Packaged, Integrally Geared Centrifugal Air Compressors for Petroleum, Chemical, and Gas Industry Services

API STANDARD 672 FOURTH EDITION, MARCH 2004

ERRATA, OCTOBER 2007 ERRATA 2, JULY 2010



Packaged, Integrally Geared Centrifugal Air Compressors for Petroleum, Chemical, and Gas Industry Services

Downstream Segment

API STANDARD 672 FOURTH EDITION, MARCH 2004

ERRATA, OCTOBER 2007 ERRATA 2, JULY 2010



SPECIAL NOTES

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed.

API is not undertaking to meet the duties of employers, manufacturers, or suppliers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations under local, state, or federal laws.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from the employer, the manufacturer or supplier of that material, or the material safety data sheet.

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. Sometimes a one-time extension of up to two years will be added to this review cycle. This publication will no longer be in effect five years after its publication date as an operative API standard or, where an extension has been granted, upon republication. Status of the publication can be ascertained from the API Standards department telephone (202) 682-8000. A catalog of API publications, programs and services is published annually and updated biannually by API, and available through Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO 80112-5776.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this standard or comments and questions concerning the procedures under which this standard was developed should be directed in writing to the Director of the Standards department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005. Requests for permission to reproduce or translate all or any part of the material published herein should be addressed to the Director, Business Services.

API standards are published to facilitate the broad availability of proven, sound engineering and operating practices. These standards are not intended to obviate the need for applying sound engineering judgment regarding when and where these standards should be utilized. The formulation and publication of API standards is not intended in any way to inhibit anyone from using any other practices.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

All rights reserved. No part of this work may be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Contact the Publisher, API Publishing Services, 1220 L Street, N.W., Washington, D.C. 20005.

Copyright © 2004, 2007 American Petroleum Institute

FOREWORD

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any federal, state, or municipal regulation with which this publication may conflict.

Suggested revisions are invited and should be submitted to API, Standards department, 1220 L Street, NW, Washington, DC 20005.

CONTENTS

	Pa	ige	
0	INTRODUCTION	l	
1	SCOPE1	l	
2	NORMATIVE REFERENCES	l	
3	DEFINITION OF TERMS		
4	GENERAL	1 1 1	
5	REQUIREMENTS	1 1 1 1	
6	BASIC DESIGN.46.1General.46.2Pressure Casings.66.3Casing Connections.76.4External Forces and Moments.76.5Rotating Elements.76.6Seals and Sealing Systems.86.7Dynamics.86.8Bearings and Bearing Housings.96.9Lubrication.106.10Materials.116.11Nameplates and Rotation Arrows.126.12Additional Requirements for Special Duty Packages.13	4 5 7 7 3 3 3 9 9 0 1 2 3	
7	ACCESSORIES.147.1Drivers147.2Couplings and Guards157.3Baseplate/Support Structure157.4Controls and Instrumentation167.5Piping207.6Intercoolers and Aftercoolers217.7Inlet Air Filter/Silencer217.8Discharge Blowoff Silence227.9Special Tools227.10Additional Requirements for "Special Duty" packages22	4 5 5 6 0 1 1 2 2 2	
8	INSPECTION, TESTING AND PREPARATION FOR SHIPMENT 23 8.1 General 23 8.2 Inspection 23 8.3 Testing 24 8.4 Preparation for Shipment 26 8.5 Additional Inspection, Testing & Preparation for Shipment Requirements for "Special Duty" Packages 26	3 3 3 4 5	

CONTENTS

			Page
9 VEN 9.1 9.2 9.3 9.4	NDOR D Genera Propos Contra Additio	DATA al sals ct Data onal Vendor Data Requirements for "Special Duty" Packages	.27 .27 .28 .29 .30
ANNEX	ΧA	DATA SHEETS	.31
ANNEX	КВ	REFERENCED DOCUMENTS	.89
ANNEX	C C	(INFORMATION ON ROTORDYNAMIC ANALYSIS)	.91
ANNEX	(D	VENDOR DRAWINGS AND DATA REQUIREMENTS 1	01
ANNEX	ĽΕ	LUBRICATION SYSTEM SCHEMATIC 1	07
ANNEX	ΓF	REQUIREMENT FOR DETERMINING RESIDUAL UNBALANCE	111
ANNEX	G	INSPECTOR'S CHECKLIST1	17
ANNEX	КН	GUIDE TO NOMENCLATURE	19
Figures C-1 C-2 C-3 E-1 F-1 F-2 H-1	Undamp Residual Sample (bed Unbalanced Response Analysis	92 97 98 109 113 115 119
Tables 3 E-1 G-1	Equipme Lube-oil Inspecto	ent Monitoring	19 14 17

vi

Packaged, Integrally Geared Centrifugal Air Compressors for Petroleum, Chemical, and Gas Industry Services

0 Introduction

Users of this International Standard should be aware that further or differing requirements may be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the purchaser from accepting alternative equipment or engineering solutions for the individual application. This may be particularly appropriate where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this International Standard and provide details.

Annex A contains data sheets which purchasers are encouraged to use.

Annex B provides information on normative references.

Annex C specifies requirements for lateral analysis.

Annex D contains forms which may be used to indicate vendor drawing and data requirements.

Annex E contains schematic drawings of lubrication systems.

Annex F specifies requirements for determining residual unbalance.

Annex G contains an inspector's checklist.

Annex H contains an illustration of nomenclature for integrally geared centrifugal air compressors.

This International Standard requires the purchaser to specify certain details and features.

A bullet (\bullet) at the beginning of a paragraph indicates that either a decision or further information is required. Further information should be shown on the data sheets (see example in Annex A) or stated in the quotation request and purchase order.

In this International Standard, where practical, US Customary units are included in brackets for information

1 Scope

1.1 This standard covers the minimum requirements for constant-speed, packaged, general purpose integrally geared centrifugal air compressors, including their accessories. This standard is not applicable to machines that develop a pressure rise of less than 0.35 bar (5.0 psi) above atmospheric pressure, which are classed as fans or blowers.

Note: Special Purpose and Process applications, including Process Air Services, are covered by API Std 617.

• **1.2** Equipment covered by this standard is considered non-critical, usually spared and may be either of two classifications, Basic or Special Duty. The purchaser shall specify which of the two classifications applies.

Basic packages are vendors' standard packages of proven design and include minimal additional requirements.

Special duty packages are typically specified for installations that require higher availability and include additional features and requirements.

1.3 Additional or overriding requirements applicable only to packages that have been specified as "Special Duty" are noted at the end of each section (see 6.12; 7.10; 8.5; and 9.4).

1.4 Conflicting Requirements

In case of conflict between this standard and the inquiry, the inquiry shall govern. At the time of the order, the order shall govern.

2 Normative References

- **2.1** Reference publications are listed in Annex B.
- **2.2** All referenced standards, to the extent specified in the text, are normative.

2.3 The editions of the Annex B standards, codes, and specifications that are in effect at the time of publication of this standard shall, to the extent specified herein, form a part of this standard.

The applicability of changes in standards, codes, and specifications that occur after publication of this document shall be mutually agreed upon by the purchaser and the vendor.

2.4 Notes following a paragraph are informative.

• 2.5 Where dual referencing of standards occurs, the system of standards to be used shall be specified.

2.6 Statutory Requirements: The purchaser and the vendor shall mutually determine the measures that must be taken to comply with any governmental codes, regulations, ordinances, or rules that are applicable to the equipment.

3 Definition of Terms

Terms used in this standard are defined in 3.1 - 3.36.

3.1 alarm point : A preset value of a parameter at which an alarm is actuated to warn of a condition that requires corrective action.

3.2 axially split: A joint that is parallel to the shaft centerline.

3.3 bearing housing: All bearing enclosures, including the gear casing.

3.4 critical speed: A shaft rotational speed at which the rotor-bearing-support system is in a state of resonance.

3.5 delivered flow: The flow rate determined at the compressor discharge or after the discharge of the aftercooler when included in the vendor scope.

Note: When the flow is measured before the compressor inlet, it must be adjusted for the effects of aftercooler pressure drop, compressor seal losses, and interstage condensate removal.

3.6 design: A term that may be used by the equipment manufacturer to describe various parameters such as design power, design pressure, design temperature, or design speed.

Note: This terminology should be used only by the equipment manufacturer and not in the purchaser's specifications.

3.7 gear wheel (bull gear): The low-speed rotor of a gear set.

3.8 informative element: Describes part of the standard which is provided for information and is intended to assist in the understanding or use of the standard. Compliance with an informative part of the standard is not mandatory.

Note: An Annex may be informative or normative as indicated.

3.9 inlet volume flow: The flow rate expressed in volume flow units at the conditions of pressure, temperature, compressibility and air moisture content, at the compressor inlet connection.

3.10 local: The location of a device mounted on or near the equipment or console.

3.11 material certificate of compliance: A document by which the vendor certifies that the material represented has been produced and tested in accordance with the requirements of the basic material specification shown on the certificate.

3.12 maximum allowable temperature: The maximum continuous temperature for which the manufacturer has designed the equipment (or any part to which the term is referred) when handling the specified fluid at the specified maximum operating pressure.

3.13 maximum allowable working pressure: The maximum continuous pressure for which the manufacturer has designed the equipment (or any part to which the term is referred) when handling the specified fluid at the specified maximum operating temperature.

3.14 maximum discharge pressure: The maximum suction pressure plus the maximum differential the compressor is able to develop to surge at the minimum specified inlet temperature.

3.15 maximum sealing pressure: The highest pressure the seals are required to seal during any specified static or operating condition.

3.16 normally open and normally closed: Refers both to on-the-shelf state and to installed deenergized state of devices such as automatically controlled electrical switches and valves.

Note: The normal operating state of such devices is not necessarily the same as the on-the-shelf state.

3.17 normative: A requirement of the standard.

3.18 observed: An inspection or test where the purchaser is notified of the timing of the inspection or test and the inspection or test is performed as scheduled whether or not the purchaser or his representative is present.

3.19 panel: An enclosure used to mount, display, and protect gauges, switches, and other instruments.

3.20 pinion: A high-speed rotor or rotors in a gear set.

3.21 pressure casing: The composite of all stationary pressure-containing parts of the unit, including all nozzles and other attached parts.

3.22 pressure rise to surge: The difference between the discharge pressure at the rated operating point and that at the surge point when the unit is operating at rated inlet conditions and with a constant inlet guide vane position.

3.23 radially split: A joint that is perpendicular to the shaft centerline.

3.24 rated point: The maximum specified flow rate at the specified discharge pressure when operating at the specified inlet conditions and coolant temperature. This is the point at which the vendor certifies that the performance is within the tolerances stated in this standard.

3.25 rated speed (also known as 100% speed): The highest rotational speed required to meet any of the specified operating conditions.

3.26 relief valve set pressure: The pressure at which a relief valve starts to lift.

3.27 remote: The location of a device when located away from the equipment or console, typically in a control room.

3.28 shutdown set point: A preset value of a measured parameter at which automatic or manual shutdown of the system or equipment is required.

3.29 standard volume flow: The flow rate expressed in volume flow units at the following standard conditions:

ISO Standard Conditions

Flow:	Cubic meters per hour (m ³ /h)
Pressure:	1.013 bar
Temperature:	15°C
Relative Humidity:	0% (Dry)

US Standard Conditions

Flow:	Standard cubic feet per minute (scfm) Million standard cubic feet per day (mmscfd)
Pressure:	14.7 PSI
Temperature:	60°F
Relative Humidity:	0% (Dry)

3.30 standby service: A normally idle, or idling, piece of equipment that is capable of immediate automatic or manual startup and continuous operation.

3.31 total indicated reading (TIR), also known as total indicator runout: The difference between the maximum and minimum readings of a dial indicator or similar device, monitoring a face or cylindrical surface during one complete revolution of the monitored surface.

3.32 trip speed (revolutions per minute): The speed at which the independent emergency overspeed device operates to shut down a variable-speed prime mover. For the purpose of this standard, the trip speed of alternating current electric motors, except, variable frequency devices, is the speed (revolutions per minute) corresponding to the synchronous speed of the motor at maximum supply frequency.

3.33 unit responsibility: The responsibility for coordinating the delivery and technical aspects of the equipment and all auxiliary systems included in the scope of the order. The technical aspects to be considered include but are not limited to such factors as the power requirements, speed, rotation, general arrangement, couplings, dynamics, noise, lubrication, sealing system, material test reports, instrumentation, piping, conformation to specifications and testing of components.

3.34 vendor (also known as supplier): The agency that supplies the equipment.

Note: The vendor may be the manufacturer of the equipment or the manufacturer's agent and normally is responsible for service support.

3.35 verified: The purchaser's review and acceptance of vendor's certification or documentation of successful completion of the inspection or test.

3.36 witnessed: An inspection or test where the purchaser is notified of the timing of the inspection or test and a hold is placed on the inspection or test until the purchaser or his representative is in attendance.

Note: The purchaser may want to specify notification of a successful preliminary test prior to travel.

4 General

4.1 UNIT RESPONSIBILITY

The vendor who has unit responsibility shall assure that all subvendors comply with the requirements of this standard and all reference documents.

4.2 NOMENCLATURE

A guide to integrally-geared air compressor nomenclature can be found in Annex H.

5 Requirements

5.1 UNITS OF MEASUREMENT

The purchaser will specify whether data, drawings, hardware (including fasteners), and equipment supplied to this standard shall use the SI or US Customary system of measurements.

5.2 STATUTORY REQUIREMENTS

The purchaser and the vendor shall mutually determine the measures that must be taken to comply with any government codes, regulatory, ordinances, or rules that are applicable to the equipment.

5.3 ALTERNATIVE DESIGNS

The vendor may offer alternative designs for purchaser's consideration.

5.4 CONFLICTING REQUIREMENTS

In case of conflict between this standard and the inquiry, the inquiry shall govern. At the time of the order, the order shall govern.

6 Basic Design

6.1 GENERAL

6.1.1 Service Life

The equipment (including auxiliaries) covered by this standard shall be designed and constructed for a minimum service life of 20 years and at least 3 years of uninterrupted operation.

Note: It is recognized that these are design criteria.

6.1.2 The vendor shall assume unit responsibility for all equipment and auxiliary systems included in the scope of the order.

6.1.3 Sound Pressure Level

Control of the sound pressure level (SPL) of all equipment furnished shall be a joint effort of the purchaser and the vendor having unit responsibility. The equipment furnished by the vendor shall conform to the maximum allowable SPL specified. In order to determine compliance, the vendor shall provide expected maximum sound pressure level data per octave band for the equipment.

6.1.4 Packaged Equipment

Compressor package shall include:

- a. Integrally geared centrifugal air compressor
- b. Coupling and coupling guard
- c. Baseplate (or structural framework)
- d. Intercoolers and aftercooler, moisture separator and drain system
- e. Lubrication oil system
- f. Controls and instrumentation
- g. Driver
- h. Interstage air piping
- i. Inlet and discharge expansion joints
- j. Accessories as noted in this standard.

Note: Inlet piping from air inlet filter to compressor inlet control device, discharge piping between compressor package flange and discharge check valve, piping to blow-off valve, and mounting of accessory components is typically supplied by the purchaser. Piping should be designed with adequate supports to prevent undue loads on compressor flanges, including transient loads such as blow-off. The aftercooler is often shipped loose. The inlet throttle device, blow-off valve, and discharge check valve, are typically shipped loose for field installation by the purchaser

• 6.1.5 Environmental Conditions

The equipment, including all auxiliaries, shall be suitable for operation under the environmental conditions specified by the purchaser. These conditions shall include whether the installation is indoors (heated or unheated) or outdoors (with or without a roof), maximum and minimum temperatures, unusual humidity, and dusty or corrosive conditions.

6.1.6 Cooling Water Systems

Unless otherwise specified, cooling water systems shall be designed for the following conditions:

4-8 ft/s	
F/Btu	

Note: The vendor shall notify the purchaser if the criteria for minimum temperature rise and velocity over heat exchanger surfaces result in conflict. The criterion for velocity over heat exchange surfaces is intended to minimize water-side fouling; the criterion for minimum temperature rise is intended to minimize the use of cooling water.

Note 2: Gauge pressure.

Note 3: Based on site coolant conditions and user experience, the purchaser may specify a different coolant-side fouling factor. For example, for a closed loop glycol system, 0.0005 hrft² $^{\circ}$ F/Btu may be adequate; conversely, for poorer quality coolant,0.002 hrft² $^{\circ}$ F/Btu (or higher) may be required.

6.1.7 Package Arrangement

6.1.7.1 The arrangement of the package (including piping coolers, pumps, and controls) shall provide adequate clearance areas and safe access for operation and maintenance.

6.1.7.2 All equipment shall be designed to permit rapid and economical maintenance. Major parts such as casing components and bearing housings shall be designed and manufactured to ensure accurate alignment on reassembly. This may be accomplished by the use of shoulders, cylindrical dowels or keys.

6.1.7.3 Provisions shall be made for complete venting and draining of liquid-filled systems

• 6.1.8 Motors and Electrical Components

Motors, electrical components, and electrical installations shall be suitable for the area classification (class, group, and division or zone) specified by the purchaser and shall meet the requirements of the applicable sections of IEC79 or NFPA 70, Articles 500, 501, 502, and 504, as well as local codes. Local codes shall be furnished by the purchaser on request of the Vendor.

6.1.9 Performance Criteria

The equipment (compressor, driver and auxiliary equipment) shall perform on the test stand and on their permanent foundation within the specified acceptance criteria. After installation, the performance of the package shall be the joint responsibility of the purchaser and the vendor who has unit responsibility.

6.1.10 Purchaser Connections

All openings or nozzles for purchaser connections shall be DN 12 ($^{1}/_{2}$ NPS) or larger and shall be in accordance with ISO 6708. Sizes DN 32, DN 65, DN 90, DN 125, DN 175 and DN 225 ($^{1}/_{4}$, $^{2}/_{2}$, $^{3}/_{2}$, 5, 7, and 9 NPS) shall not be used.

6.1.11 Bolting

Bolting shall be furnished as specified in 6.1.11.1 - 6.1.11.4.

6.1.11.1 The details of threading shall conform to ISO 261, ISO 262, ISO 724, and ISO 966 or ASME B1.1.

6.1.11.2 Adequate clearance shall be provided at all bolting locations to permit the use of socket or box wrenches

6.1.11.3 Slotted-nut, or spanner-type bolting shall not be used unless specifically approved by the purchaser.

6.1.11.4 Manufacturer's marking shall be located on all fasteners $6 \text{ mm}(^{1}/4 \text{ in.})$ and larger (excluding washers and headless set screws). For studs, the marking shall be on the nut end of the exposed stud end.

6.1.12 Compressor Performance

6.1.12.1 The compressor total head curve shall be developed from the differential pressure measurement between the compressor inlet flange and the final-stage discharge flange.

The purchaser and vendor shall mutually agree on the pressure drop considerations for the inlet filter, aftercooler, check valves, and associated piping.

6.1.12.2 When the compressor is operating at rated operating conditions, the overall performance shall provide a minimum of 10% continuous pressure rise from rated capacity to surge.

• 6.1.13 Mounting Surfaces

When specified, mounting surfaces shall meet the following criteria:

- 1. They shall be machined to a finish of 6 µm (250 µin.) arithmetic average roughness (Ra) or better.
- 2. To prevent a soft foot, they shall be in the same horizontal plane within 25 µm (0.001 in.).

3. Each mounting surface shall be machined within a flatness of $80 \,\mu\text{m}$ per linear meters (0.001 in. per linear foot) of mounting surface.

4. Different mounting planes shall be parallel to each other within 50µm (0.002 in.).

5. The upper machined or spot faced surface shall be parallel to the mounting surface.

6. Hold-down bolt holes shall be drilled perpendicular to the mounting surface or surfaces, spot faced where necessary to accommodate fasteners and tools.

Note: Spot face is typically not necessary if surface is perpendicular to bolting within 1 degree.

6.2 PRESSURE CASINGS

6.2.1 The stress values used in the design of the casing for any material shall not exceed twenty-five percent (25%) of the ultimate stress at the maximum specified operating temperature. The vendor shall state the internationally recognized standard from which the ultimate stress value is obtained. For cast materials a factor of 0.8 for steel or 0.9 for cast and ductile iron shall be applied unless additional casting NDE is applied. The thickness of the casing shall be suitable for the maximum working and test pressure and shall include a corrosion allowance of at least 3 mm (0.125 in.).

Manufacturing data report forms, third party inspections, and stamping as specified in pressure vessel codes are not required.

6.2.2 The maximum allowable working pressure of each casing shall be at least 1.10 times the maximum discharge pressure of the stage.

6.2.3 For casing joint bolting, an allowable stress of 0.25 times the minimum ultimate tensile strength shall be used to determine the total bolting area based on hydrostatic load and gasket preload as applicable. The preload stress shall not exceed 0.75 times the bolting material minimum yield.

6.3 CASING CONNECTIONS

6.3.1 The first-stage inlet and final-stage outlet connections shall be flanged.

6.3.2 Connections welded to the casing shall meet the material requirements of the casing, including impact values, rather than the requirements of the connected piping. All welding of connections shall be completed before the casing is hydrostatically tested (see 8.3.2).

6.3.3 For connections other than main process connections, if flanged or machined and studded openings are impractical, threaded connections for pipe sizes not exceeding DN 40 ($1^{1}/2$ NPS) may be used with purchasers approval as follows:

a. On non-weldable materials, such as cast iron

b. Where essential for maintenance (disassembly and assembly).

6.3.4 Threaded openings and bosses for tapered pipe threads shall conform to ISO 7—Parts I and 2 or ANSI/ASME B16.5.

6.3.5 Threaded openings not required to be connected to piping shall be plugged with steel plugs in accordance with ANSI/ ASME B16.11. Thread tape shall not be used.

6.3.6 Flanges shall conform to ISO 7005-1 or 7005-2 (ASME B16.1, B16.5, B16.42, or B16.47 Series B) as applicable except as specified in 6.3.6.1 and 6.3.6.2. Class 200 and 400 flanges shall not be used.

6.3.6.1 Cast iron flanges shall be flat faced and conform to the dimensional requirements of ISO 7005-2 or ANSI/ASME B16.1 or 16.42. Class 125 flanges shall have a minimum thickness equal to Class 250 for sizes DN 200 (NPS 8) and smaller.

6.3.6.2 Flat-faced flanges with full raised-face thickness are acceptable on casings of all materials. Flanges in all materials that are thicker or have a larger outside diameter than required by ISO (ANSI) are acceptable. Non-standard (oversized) flanges shall be completely dimensioned on the arrangement drawing.

6.3.7 Machined and studded connections shall conform to the facing and drilling requirements of ISO 7005-1 or 7005-2 or ASME B16.1, B16.5, B16.42, or B16.47. Studs and nuts shall be furnished installed, the first 1.5 threads at both ends of each stud shall be removed.

6.3.8 To minimize nozzle loading and facilitate installation of piping, machine flanges shall be parallel to the plane shown on the general arrangement drawing to within 0.5 degrees. Studs or bolt holes shall straddle centerlines parallel to the main axes of the equipment.

6.3.9 All of the purchaser's connections shall be accessible for disassembly without requiring the machine, or any major part of the machine, to be moved.

6.4 EXTERNAL FORCES AND MOMENTS

6.4.1 The maximum allowable forces and moments that may be imposed on the package by the purchaser's piping shall be stated in the proposal.

6.4.2 The maximum allowable forces and moments shall be shown on the outline drawing.

6.5 ROTATING ELEMENTS

6.5.1 Shafts

6.5.1.1 Shafts shall be forged or hot-rolled alloy steel and machined throughout their entire length.

6.5.1.2 The rotor shaft sensing areas to be observed by radial vibration probes shall be concentric with the bearing journals. All shaft sensing areas shall be free from stencil and scribe marks or any other surface discontinuity, such as an oil hole or keyway, for a minimum of one probe tip diameter on each side of the probe. These areas shall not be metallized, sleeved, or plated. The final sur-

face finish shall be a maximum of $0.8 \ \mu m$ (32 $\mu in.$) Ra, preferably obtained by honing or burnishing. These areas shall be demagnetized as necessary to minimize electrical runout. The combined electrical and mechanical runout shall be measured and recorded.

6.5.1.3 Chrome plating of the shaft at the journal area is unacceptable.

6.5.1.4 All shaft keyways shall have fillet radii conforming to ISO 773 ANSI/ASME B17.1.

6.5.2 Impellers

6.5.2.1 The impeller material shall be stainless steel, of cast or milled construction.

6.5.2.2 The vendor's proposal shall describe in detail the type of impeller construction and the method of attachment to the shaft.

6.5.3 Gears

6.5.3.1 As a minimum, gearing shall be designed and manufactured to the tolerances specified in ISO 1328-1, Grade 5.

Note: For equivalent loading conditions gearing produced to higher quality levels will always result in longer service life and reduced bearing loads. The ISO tolerancing system has replaced the AGMA system of Quality Numbers. A practical comparison is to subtract the ISO number from 17 to arrive at the closest AGMA Quality Number.

6.5.3.2 The gear unit shall be rated in accordance with AGMA 6011 using minimum service factors of 1.4 for induction motor driven units and 1.6 for steam-turbine- and synchronous motor driven units. The rating shall be based on the driver nameplate rating.

6.5.3.3 Gear wheels and pinion hardness combinations shall be in accordance with the values recommended in AGMA 6011.

6.5.3.4 The tooth portion of pinions shall be integrally forged with their shaft.

6.5.3.5 Gear wheels shall be of forged construction and shall be assembled on the shaft with an interference fit.

6.6 SEALS AND SEALING SYSTEMS

6.6.1 Air and oil shaft seals shall be provided to achieve the following:

- a. Contain compressed air inside the compressor casings
- b. Prevent oil from entering the compressor casings and contaminating the compressed air
- c. Prevent oil from leaking out of the bearing housing into the atmosphere
- d. Prevent contamination of the oil system or compressed air by atmospheric dirt or moisture.

6.6.2 There shall be an atmospheric space between the air and oil seals.

6.6.3 The sealing system shall be furnished complete with piping, filters, instrumentation, and necessary start-up interlocks as applicable. This system, including air consumption, shall be fully described in the proposal.

6.6.4 Seal operation shall be suitable for all specified operating conditions, including suction throttling, startup, shutdown, standby, and momentary surge. The type of standby operation shall be agreed upon by the purchaser and the vendor.

6.7 DYNAMICS

6.7.1 Critical Speeds

6.7.1.1 For information on critical speeds, refer to Annex C.

6.7.1.2 Resonances of structural support systems that are within the vendor's scope of supply and that affect the rotor vibration amplitude shall not occur within the specified separation margins (see C.2.4, Annex C) unless the resonances are critically damped. The effective stiffness of the structural support shall be considered in the analysis of the dynamics of the rotor-bearing-support system.

Note: Resonances of structural support systems may adversely affect the rotor vibration amplitude.

6.7.1.3 The vendor shall determine that the drive-train (turbine, gear, motor, and the like) critical speeds (rotor lateral, system torsional, blading modes, and the like) will not excite any critical speed of the machinery being supplied and that the entire train is suitable for the rated speed and any starting-speed detent (hold-point) requirements of the train. A list of all undesirable speeds from zero to trip shall be submitted to the purchaser for his review and included in the instruction manual for his guidance (see Annex D, item 26d).

6.7.1.4 For the purposes of this standard, critical speeds and other resonant conditions of concern are those with an amplification factor (AF) equal to or greater than 6.5.

6.7.2 Lateral Analysis

The vendor's standard critical speed values that have been analytically derived and proven by testing of previously manufactured compressors of the same frame size are acceptable. A report is not required.

6.7.3 Torsional Analysis

6.7.3.1 The vendor's torsional critical speed values that have been analytically derived and proven by successful operation of previously manufactured compressor drive trains are acceptable. A report is not required.

6.7.3.2 The undamped torsional natural frequencies of the complete train shall be at least 10% above or 10% below any possible excitation frequency.

6.7.3.3 Torsional criticals at two or more times running speeds shall preferably be avoided or, in systems in which corresponding excitation frequencies occur, shall have no adverse effect. In addition to multiples of running speeds, torsional excitations that are not a function of running speeds or that are nonsynchronous in nature shall be considered in the torsional analysis when applicable and shall have no adverse effect.

6.7.3.4 When torsional resonances are calculated to fall within the margin specified in 6.7.3.2 a stress analysis shall demonstrate that the resonances have no adverse effect on the complete train. The assumptions made in this analysis regarding the magnitude of excitation and the degree of damping shall be clearly stated.

6.7.3.5 The vendor shall perform a transient torsional vibration analysis for synchronous-motor-driven units. The acceptance criteria for this analysis shall be mutually agreed upon by the purchaser and the vendor.

6.7.4 Vibration and Balancing

6.7.4.1 Manufacturer's standard balancing procedure shall be used

6.7.4.2 When spare rotating elements are supplied, they shall be dynamically balanced to the same tolerances as the main rotating elements.

6.7.4.3 During the shop test of the machine, assembled with the balanced rotors, operating at its rated speed, the peak-to-peak amplitude of unfiltered vibration in any plane, measured on the shaft adjacent and relative to each radial bearing, including runout, shall not exceed the following value or $40 \mu m$ (1.5 mils), whichever is less:

In SI units:

$$A = 25.4 \text{ x} (12\ 000\ /\ \text{N})^{1/2}$$

In customary units,

$$A = (12\ 000\ /\ N)^{1/2}$$

Where:

A = amplitude of unfiltered vibration, in µms (mil) true peak to peak.

N = rated speed, in revolutions per minute.

Note: These limits are not to be confused with the limits specified in Section C.3 of Annex C for shop verification of unbalanced response.

6.8 BEARINGS AND BEARING HOUSINGS

6.8.1 Bearings—General

- **6.8.1.1** Unless otherwise specified, hydrodynamic radial and thrust bearings shall be provided.
- **6.8.1.2** Bearings shall be designed to prevent incorrect positioning.

6.8.2 Radial Bearings

6.8.2.1 Radial bearings shall be designed for ease of assembly, precision bored and of the sleeve or pad type with babbitted replaceable liners, pads, or shells. These bearings shall be equipped with antirotation pins and shall be positively secured in the axial direction.

6.8.2.2 The bearing design shall suppress hydrodynamic instabilities and provide sufficient damping over the entire range of allowable bearing clearances to limit rotor vibration to the maximum specified amplitudes (see 6.7.4.3) while the equipment is operating loaded or unloaded at the rated operating speed.

6.8.3 Thrust Bearings

6.8.3.1 Thrust loads from impellers and gears and couplings shall be absorbed by individual thrust bearings on pinions, or transmitted to the gear wheel thrust bearing by means of thrust rider rings fixed to the pinions and gear wheel. All specified operating conditions and start up conditions shall be evaluated for resulting thrust loads.

6.8.3.2 Thrust bearings shall be selected using manufacturer's standard criteria.

Note: In sizing thrust bearings, consideration should be given to the following for each specific application:

- a. The shaft speed
- b. The temperature of the bearing babbitt
- c. The deflection of the bearing pad
- d. The minimum oil-film thickness
- e. The feed rate, viscosity, and supply temperature of the oil
- f. The design configuration of the bearing
- g. The babbitt alloy
- h. The turbulence of the oil-film.

6.8.3.3 Thrust forces from flexible-element couplings shall be calculated on the basis of the maximum allowable deflection permitted by the coupling manufacturer.

6.8.3.4 If two or more rotor thrust forces are to be carried by one thrust bearing , the resultant of the forces shall be used provided the directions of the forces make them numerically additive; otherwise, the largest of the forces shall be used.

6.8.3.5 Thrust bearings shall be babbitted, and arranged for continuous pressurized lubrication. Integral thrust collars are preferred. When replaceable collars are furnished (for assembly and maintenance purposes), they shall be positively locked to the shaft to prevent fretting.

6.8.3.6 The faces of the thrust collar or rider rings shall have a surface finish of not more than 0.4 μ m (16 μ in.) Ra, and the axial total indicator runout of either face shall not exceed 12 μ m (500 μ in.).

6.8.4 Bearing Housings

6.8.4.1 Bearing Housings shall be arranged so that bearings can be replaced without disturbing equipment driver or mounting.

Note: May require removal of gear housing cover.

6.8.4.2 Bearing housings shall be arranged to minimize foaming. The drain system shall be adequate to maintain the oil and foam level below shaft end seals. The bearings shall be designed not to exceed 30° C (50° F) oil temperature rise and an outlet temperature of 80° C (180° F).

Note: This is a design criteria. Bearing exit temperature is not measured in actual machines.

6.8.4.3 Bearing housings shall be equipped with replaceable labyrinth-type end seals and deflectors where the shaft passes through the housing; lip-type seals shall not be used. The seals and deflectors shall be made of nonsparking materials. The design of the seals and deflectors shall effectively retain oil in the housing and prevent entry of foreign material into the housing.

6.9 LUBRICATION

6.9.1 Unless otherwise specified, bearings and bearing housings shall be arranged for oil lubrication using a mineral oil in accordance with ISO 3448.

6.9.2 A pressurized oil system shall be supplied in accordance with ISO 10438 Part 3 or API Std 614 Chapter 3 except as noted in 6.9.3 – 6.9.4. (See Annex E, Figure E-1 and Table E-1 for a schematic of the minimum system and the various options applicable.)

6.9.3 Lube oil shall be supplied at the required pressure or pressures, as applicable, to the following:

- a. The bearings of the integrally geared compressor
- b. The spray nozzles for the gear teeth
- c. The bearings of the driver when specified or required.

6.9.4 The oil reservoir shall be fabricated carbon steel construction with an oil-compatible corrosion resistant internal coating.

6.10 MATERIALS

6.10.1 General

6.10.1.1 Materials of construction shall be the manufacturer's standard for the specified operating conditions, except as required or prohibited by this standard.

6.10.1.2 The materials of construction of all major components shall be clearly stated in the vendor's proposal. Materials shall be identified by reference to applicable international standards, including the material grade. When no such designation is available, the vendor's material specification giving physical properties, chemical composition, and test requirements shall be included in the proposal.

6.10.1.3 External parts that are subject to rotary or sliding motions (such as control linkage joints and adjusting mechanisms) shall be of corrosion-resistant materials suitable for the site environment and of sufficient hardness to resist wear.

6.10.1.4 Minor parts such as nuts, springs, washers, gaskets, and keys shall have corrosion resistance at least equal to that of specified parts in the same environment.

6.10.1.5 If austenitic stainless steel parts exposed to conditions that promote intergranular corrosion are to be fabricated, hard faced, overlaid, or repaired by welding, they shall be made of low-carbon or stabilized grades.

Note: Overlays or hard surfaces that contain more than 0.10% carbon can sensitize both low-carbon and stabilized grades of austenitic stainless steel unless a buffer layer that is not sensitive to intergranular corrosion is applied.

6.10.1.6 The vendor shall select materials to avoid conditions that may result in electrolytic corrosion. Where such conditions cannot be avoided, the purchaser and the vendor shall agree on the material selection and any other precautions necessary.

Note: When dissimilar materials with significantly different electrical potentials are placed in contact in the presence of an electrolytic solution, galvanic couples that can result in serious corrosion of the less noble material may be created. The NACE Corrosion Engineer's Reference Book is one resource for selection of suitable materials in these situations.

6.10.2 Low-carbon steels can be notch sensitive and susceptible to brittle fracture at ambient or lower temperatures. Therefore, only fully killed, normalized steels made to fine-grain practice are acceptable. The use of steel made to a coarse austenitic grain size practice (such as ASTM A515) is prohibited.

6.10.3 Castings

6.10.3.1 Pressure containing ferrous castings shall not be repaired except as specified in 6.10.2.1.1 - 6.10.2.1.3.

6.10.3.1.1 Weldable grades of steel castings, may be repaired by welding, using a qualified welding procedure based on the requirements of an internationally recognized pressure vessel welding standard. After major weld repairs, and before hydrotest, the complete repaired casting shall be given a postweld heat treatment to ensure stress relief and continuity of mechanical properties of both weld and parent metal and dimensional stability during subsequent machining operations.

6.10.3.1.2 Cast gray iron or nodular iron may be repaired by plugging within the limits specified in ASTM A 278, A 395, or A 536. The holes drilled for plugs shall be carefully examined, using liquid penetrant, to ensure that all defective material has been removed.

6.10.3.1.3 All repairs not covered by the applicable international material specification shall be subject to the purchaser's approval.

6.10.3.1.4 Fully enclosed cored voids, which become fully closed by methods such as plugging, welding, or assembly, are prohibited.

6.10.3.1.5 Nodular iron castings shall be produced in accordance with an internationally recognized standard such as ASTM A 395, or A 536.

6.10.4 Welding

6.10.4.1 Welding of piping and pressure-containing parts, as well as any dissimilar-metal welds and weld repairs, shall be performed and inspected by operators and procedures qualified in accordance with internationally recognized welding standards such as Section VIII, Division 1, and Section IX of the ASME Code or purchaser-approved standard, such as EN 287 or EN 288. No weld repairs are permitted after final machining.

6.10.4.2 The vendor shall be responsible for the review of all repairs and repair welds to ensure that they are properly heat treated and nondestructively examined for soundness and compliance with the applicable qualified procedures. Repair welds shall be nondestructively tested by the same method used to detect the original flaw.

• **6.10.4.3** When specified, documentation of major defects shall be submitted to the purchaser prior to any repairs being conducted at the manufacturer's shop and shall include the following

a. Extent of the repair

b. Location

c. Size

d. Welding procedure specification

e. Detailed photographs of the defect prior to any preparatory work and after preparation but prior to the actual repair. If the location of the defect cannot be clearly defined by photographic means, the location shall be indicated on a sketch or drawing of the affected component.

6.10.4.4 Repairs performed at the manufacturer's shop shall be considered major if any of the following conditions apply:

- a. Castings leak during hydrostatic testing
- b. The depth of the repair cavity prepared for welding exceeds 50% of the wall thickness or 25 mm (1 in.), whichever is smaller
- c. The surface area of all repairs to the part exceeds 10% of the surface area of the part
- d. The repair cavity is longer than 150 mm (6 in.) in any direction
- e. Repairs are to any rotating components.

6.10.4.5 Unless otherwise specified, other welding, such as welding on baseplates, non-pressure ducting, lagging, and control panels, shall be performed by welders qualified in accordance with an appropriate internationally recognized structural welding standard such as AWS D1.1.

6.10.4.6 Connections welded to pressure casings shall be installed as specified in 6.10.3.6.1 and 6.10.3.6.2.

6.10.4.6.1 Post-weld heat treatment, when required, shall be carried out after all welds, including piping welds have been completed.

6.10.4.6.2 Unless exempted by the applicable pressure vessel code, all welds shall be heat treated in accordance with internationally recognized standards such as Section VIII, Division 1, Sections UW-10 and UW-40, of the ASME Code.

6.10.5 Low Temperature

The Vendor shall define the minimum design metal temperature (MDMT) of the equipment. If the minimum site ambient temperature is below the equipment MDMT, the Vendor and the purchaser shall agree and implement measures to assure that the equipment will not be operated with pressure casing at a metal temperature below the MDMT, to avoid brittle failures.

6.11 NAMEPLATES AND ROTATION ARROWS

6.11.1 A nameplate shall be securely attached at a readily visible location on the equipment and on any major piece of auxiliary equipment.

6.11.2 Rotation arrows shall be cast in or attached to each major item of rotating equipment at a readily visible location.

6.11.3 Nameplates and rotation arrows (if attached) shall be of austenitic stainless steel or nickel-copper alloy such as UNS N04400 alloy. Attachment pins shall be of the same material. Welding is not permitted.

6.11.4 As a minimum, the following data shall be clearly stamped or engraved on the compressor nameplate:

a. Vendor's name

- b. Serial number
- c. Size, model and type
- d. Rated capacity

- e. Rated discharge pressure
- f. purchaser's item number.

Units shall be consistent with those used on the data sheets.

6.12 ADDITIONAL REQUIREMENTS FOR SPECIAL DUTY PACKAGES

6.12.1 Jackscrews, guide rods, cylindrical casing-alignment dowels, and/or other appropriate devices shall be provided to facilitate disassembly and reassembly. Guide rods shall be of sufficient length to prevent damage to the internals or casing studs by the casing during disassembly and reassembly. Lifting lugs or eyebolts shall be provided for lifting only the top half of the gear casing.

When jackscrews are used as a means of parting contacting faces, one of the faces shall be relieved (counterbored or recessed) to prevent a leaking joint or improper fit caused by marring of the face.

- 6.12.2 Gearing shall be designed and manufactured to the tolerances specified in ISO 1328-1, Grade 4.
- 6.12.3 When specified, the vendor shall provide a damped unbalanced response analysis for each machine to assure acceptable amplitudes of vibration at any speed from zero to trip.
- 6.12.4 When specified, a damped unbalanced response analysis shall be conducted and confirmed by test stand data in accordance with Annex C.
- 6.12.5 When specified, the vendor shall perform a torsional vibration analysis of the complete coupled train and shall be responsible for directing the modifications necessary to meet the requirements of 6.7.3.2 6.7.3.5.

Note: Excitations of undamped torsional natural frequencies may come from many sources, which should be considered in the analysis. These sources may include but are not limited to the following:

- a. Gear phenomena such as unbalance and pitch line runout
- b. Startup conditions such as speed detents and other torsional oscillations
- c. Torsional transients such as start-ups of synchronous electric motors and transients due to generator phase-to-phase fault or phase-to-ground fault
- d. Torsional excitation resulting from drivers
- e. One and two times line frequency
- f. Running speeds.

6.12.6 Major parts of the rotating elements, such as the shaft and impellers, shall be dynamically balanced. When a bare shaft with a single keyway is dynamically balanced, the keyway shall be filled with a fully crowned half-key, in accordance with ISO 8821. A shaft with keyways 180 degrees apart but not in the same transverse plane shall also be filled. The initial balance correction to the bare shaft shall be recorded.

6.12.7 The rotating elements shall be multiplane dynamically balanced during assembly. This shall be accomplished after the addition of each major component. Balancing correction shall be applied only to the elements added. Balancing of impellers by welding is prohibited. Minor correction of other components may be required during the final trim balancing of the completely assembled element. In the sequential balancing process, any half-keys used in the balancing of the bare shaft (see 6.12.6) shall continue to be used until they are replaced with the final key and mating element. On rotors with single keyways, the keyway shall be filled with a fully crowned half-key. The weight of all half-keys used during final balancing of the assembled element shall be recorded on the residual unbalance work sheet (see Annex F). The maximum allowable residual unbalance per plane (journal) shall be calculated as follows:

In SI units:

$$U_{\rm max} = 6350 \text{W/N} \text{ for N} < 25,000 \text{ rpm}$$
 (2a)

$$U_{\rm max} = 6350 \text{W}/25,000 \text{ for N} > 25,000 \text{ rpm}$$
 (2b)

In customary units:

 $U_{\rm max} = 4$ W/N for N < 25,000 rpm

 $U_{\text{max}} = 4W/25,000 \text{ for } N > 25,000 \text{ rpm}$

Where:

 U_{max} = residual unbalance, in gram-mm (ounce-in.).

W = journal static weight load, in kg (lbs.).

N = rated speed, in revolutions per minute (rpm).

Note: Balance tolerance above 25,000 rpm is based on an eccentricity of $0.25 \,\mu m (10 \,\mu in.)$ for each journal static weight load. Unbalance readings are measured at each journal-bearing position with no compensation to actual balance planes.

• **6.12.8** When specified, after the final balancing of each assembled rotating element has been completed, a residual unbalance check shall be performed and recorded in accordance with the residual unbalance work sheet (see Annex F).

6.12.9 Thrust bearings shall be selected such that under any operating condition the load does not exceed 50% of the bearing manufacturer's ultimate load rating. The ultimate load rating is the load that will produce the minimum acceptable oil-film thickness without inducing failure during continuous service or the load that will not exceed the creep-initiation or yield strength of the babbitt at the location of maximum temperature on the pad, whichever is less.

- 6.12.10 When specified, thrust bearings and radial bearings shall be fitted with bearing-metal temperature sensors.
- 6.12.11 When specified, installation of bearing-metal temperature sensors shall be in accordance with API Std 670.
- 6.12.12 When specified, oil cooler tubes shall have a 13 mm (0.5 in.) minimum outside diameter and be made of inhibited admiralty with an average wall thickness of 18 BWG.
- **6.12.13** When specified, an austenitic stainless steel oil reservoir shall be supplied.

7 Accessories

7.1 DRIVERS

7.1.1 General

7.1.1.1 The driver shall be of the type specified, shall be sized to meet the maximum specified operating conditions, including gear and coupling losses, and shall be in accordance with applicable specifications as stated in the inquiry and order. The driver shall be suitable for satisfactory operation under the utility and site conditions specified in the inquiry.

7.1.1.2 The driver, in combination with the controls provided, shall be sized to accept any specified process variations such as changes in the pressure, temperature, relative humidity of the air, cooling water temperature, and plant start-up conditions.

7.1.1.3 The driver shall be capable of starting under the conditions specified and the starting method shall be agreed by the purchaser and the vendor.

7.1.1.4 The driver nameplate rating (exclusive of the service factor) shall be at least 110% of the power required at the rated point.

• **7.1.1.5** When specified, the driver nameplate rating (exclusive of the service factor) shall be at least 110% of the maximum power required for all of the specified operating conditions.

7.1.1.6 For drivers that weigh more than 225 kg (500 lbs), the driver feet shall be provided with vertical jackscrews. Alternatively, a hydraulic jack may be proposed as a special tool.

7.1.2 Electric Motors

7.1.2.1 Unless otherwise specified, motor drives shall conform to internationally recognized standards such as API Std 541, 546, or IEEE 841 as applicable.

7.1.2.2 The motor's starting-torque requirements shall be met at a specified reduced voltage, and the motor shall accelerate to full speed within a period of time agreed upon by the purchaser and the vendor.

Note: Industry standards typically specify 90% voltage for starting, but for many plants the starting voltage may be 80% of the normal voltage. The time required to accelerate to full speed is generally less than 15 sec.

7.1.3 Steam Turbines

7.1.3.1 Unless otherwise specified, steam turbine drivers shall conform to ISO 10436. For purposes of this standard, API Std 611 is considered eqivalent to ISO 10436.

• 7.1.3.2 The steam turbine shall be equipped with a NEMA Class D constant speed governor as specified in NEMA SM 23. The purchaser will specify whether the governor is to be hydraulic or electronic.

7.2 COUPLINGS AND GUARDS

7.2.1 Couplings

Couplings between drivers and driven equipment shall be supplied by the manufacturer of the driven equipment and shall meet the requirements of 7.2.1.1 - 7.2.1.7.

7.2.1.1 The coupling shall be of the forged-steel, nonlubricated, flexible-element spacer type. The flexible elements shall be stainless steel or suitably coated to prevent corrosion. The purchaser and the vendor shall mutually agree upon the make, model, type, and mounting arrangement of the coupling.

7.2.1.2 The coupling spacer shall be of sufficient length to allow maintenance of the compressor, including shaft alignment, without requiring the compressor or driver to be removed.

7.2.1.3 Coupling hubs shall be keyed to the shaft. Keys and keyways and their tolerances shall conform to ISO R773, normal fit or ANSI/AGMA 9002, Commercial Class.

7.2.1.4 Flexible couplings with cylindrical bores shall be mounted with an interference fit. Cylindrical shafts shall comply with ISO R775 or ANSI/AGMA 9002 and the coupling hubs shall be bored to the following ISO 286-2 tolerances:

a. For shafts of 50 mm (2 in.) diameter and smaller — Grade N7.

b. For shafts larger than 50 mm (2 in.) diameter — Grade N8.

7.2.1.5 When the coupling hubs must be removed for maintenance, they shall be furnished with tapped puller holes of at least 10 mm (0.375 in.) diameter.

7.2.1.6 The maximum coupling operating torque load shall be limited to 80% of the manufacturer's published continuous rating. Couplings bored larger than the manufacturer's nominal rating shall be subject to the purchaser's approval.

7.2.1.7 The coupling-to-shaft juncture shall be designed and manufactured to be capable of transmitting power at least equal to the power rating of the coupling.

7.2.2 Coupling Guards

7.2.2.1 Coupling guards shall be provided and shall sufficiently enclose the coupling and the shafts to prevent any personnel from contacting parts during operation of the equipment train.

7.2.2.2 Guards shall be constructed with sufficient rigidity to withstand a 900 N (200 lb.) static point load (or force) in any direction without the guard contacting moving parts.

7.2.2.3 Guards shall preferably be fabricated from solid sheet or plate with no openings. Guards fabricated from expanded metal or perforated sheets are acceptable, provided the size of the openings does not exceed 10 mm (0.375 in.) diameter. Unless otherwise specified, guards may be constructed of either metallic or nonmetallic materials. Guards of woven wire shall not be used.

7.2.2.4 The guard shall be designed to prevent drawing oil out of adjacent bearing housings.

7.3 BASEPLATE/SUPPORT STRUCTURE

7.3.1 Unless otherwise agreed, the compressor and all other machine components shall be supported on a rigid steel frame. The frame may have full-length structural members in contact with the foundation, or it may have support feet. The term baseplate shall refer to either design.

Note: Some units are now designed with the unit's base integrally cast with the gearbox, and with the driver either flange-mounted or foot-mounted or on tubular rails. For this type equipment, the purchaser and manufacturer will need to review the applicability of 7.3.2 - 7.3.6 and 7.3.9 - 7.3.10.

7.3.2 A baseplate shall be a single fabricated steel unit, unless the purchaser and the vendor mutually agree that it may be fabricated in multiple sections. Multiple-section baseplates shall have machined and doweled mating surfaces which shall be bolted together to ensure accurate field reassembly.

7.3.3 The baseplate shall have major load-bearing members under the mounting surfaces of the major components. The structure shall be provided with lifting lugs for at least a four-point lift. Lifting the baseplate complete with all equipment mounted shall not permanently distort or otherwise damage the baseplate or the mounted equipment.

7.3.4 The bottom of the baseplate between structural members shall be open. When the baseplate is installed on a concrete foundation, accessibility shall be provided for grouting under all load-carrying structural members.

7.3.5 Mounting surfaces shall be provided for the integrally geared compressor and all drive train components. The mounting surfaces shall be at least 25 mm (1 in.) larger than the foot of the mounted equipment to allow leveling of the baseplate without removal of the equipment. The surfaces shall:

a. be machined after the baseplate is fabricated;

b. have corresponding pads in the same horizontal plane within 25 μ m (0.001 in.);

c. have each mounting surface machined within a flatness of $80 \,\mu\text{m}$ per linear meter (0.001 in. per linear ft) of mounting surface; d. have different mounting planes parallel to each other within 400 μm per m (0.005 in. per ft). This requirement shall be met by supporting and clamping the baseplate at the foundation bolt holes only.

7.3.6 The baseplate shall be drilled only for drivers that are shop fitted. The baseplates shall be supplied with leveling screws. Baseplates that are to be grouted shall have 50-mm-radius (2-in.-radius) outside corners (in the plan view). Mounting surfaces that are not to be grouted shall be coated with a rust preventive immediately after machining.

Note: Ungrouted installation is common for this equipment and some baseframe designs REQUIRE that one end of the support structure is left free to expand with thermal growth.

7.3.7 Anchor bolt holes shall be drilled perpendicular to the mounting surfaces.

7.3.8 Anchor bolts will be furnished by the purchaser.

7.3.9 Driver support mounting surfaces shall be machined to allow the installation of vendor supplied austenitic stainless steel, precut, full bearing shim packs, 3 mm - 6 mm (0.125 in. - 0.250 in.) thick with no more than 5 shims in the pack between the driver and each mounting surface. Laminated shims are not acceptable. Shims shall be slotted so they can be installed and removed without removing the fasteners.

7.3.10 When the supported driver weighs more then 225 kg (500 lbs), the driver mounting plates shall be furnished with axial and lateral jackscrews the same size as or larger than the vertical jackscrews. The lugs holding these jackscrews shall be attached to the mounting plates so that the lugs do not interfere with the installation or removal of the equipment, jackscrews, or shims. If the equipment is too heavy to use jackscrews, other means shall be provided.

Note: The integral gearbox is the fixed point, and adjustments are made on the driver.

7.3.11 The underside mounting surfaces of the baseplate shall be in one plane to permit use of a single-level foundation.

7.4 CONTROLS AND INSTRUMENTATION

7.4.1 General

7.4.1.1 Unless otherwise specified, controls and instrumentation shall be in accordance with ISO 10438 Part 1 or API Std 614, Ch. 1, Section 6, except as noted below:

7.4.1.2 Unless otherwise specified, controls and instrumentation shall be designed for outdoor installation and shall meet the requirements of IP65 as detailed in IEC 79 (NEMA 4X, as detailed in NEMA Publication 250).

7.4.1.3 Unless otherwise specified, a microprocessor based control and instrumentation system shall be provided.

• **7.4.1.4** When specified, the microprocessor shall be capable of communicating with the purchaser's distributed control system (DCS).

Note: The purchaser should advise the communication protocol to be used.

7.4.1.5 All conduit, armored cable and supports shall be designed and installed so that it can be easily removed without damage and shall be located so that it does not hamper removal of bearings, seals, or equipment internals.

7.4.1.6 Neither piping without breakout points nor rigid conduit shall be routed over the cases of horizontally split rotating machinery and they shall not be routed over or in front of removable heads on vessels and exchangers, or where the piping impairs the functionality of inspection openings or panel doors.

7.4.2 Control Systems

• 7.4.2.1 The purchaser will specify which of the following compressor capacity control modes shall be furnished by the vendor:

a. Capacity modulation (inlet throttle device or variable inlet guide vanes) used when constant discharge pressure to surge is required and when the system air demand is relatively constant

b. Automatic dual control-capacity modulation plus intermittent (load-unload) mode control for smaller air demand

c. An automatic start and automatic stop control.

7.4.2.2 When more than one mode is specified, a means to change to any mode shall be supplied. If multiple compressors are to be operated in parallel, the control system proposed shall include all the necessary controls to permit the operation of all compressors on the same control mode or individual units on separate control modes.

7.4.2.3 A compressor surge recognition and protection system shall be furnished.

Note: Typically an on/off blow-off valve is provided, and is controlled by monitoring motor amps or fluctuation in discharge pressure.

7.4.2.4 An automatic driver-overload control system shall be included to permit continuous operation at minimum ambient air and water temperatures without exceeding the nameplate rating (excluding service factor, if any).

7.4.2.5 Manual override at the control panel shall be provided to allow manual operation of the inlet throttle device and discharge blowoff valve. The system shall provide bumpless transfer from manual to automatic for smooth mode transfer. The surge protection system shall remain in effect even when the manual override is active.

7.4.2.6 To reduce driver load during startup of a motor-driven compressor, automatic unloading of the compressor by closing the inlet throttle device and opening the discharge blowoff valve shall be provided by the vendor. (An auxiliary source of control air or nitrogen may be required for initial startup.)

7.4.2.6.1 The control system shall provide a "soft" shutdown (or unloaded condition) in which the inlet valve is closed and the unloading valve is opened prior to terminating the power source to the driver except for an emergency stop. This feature allows for less severe surging when stopping the unit.

7.4.2.6.2 The control system shall also provide warning to the operator that a hot-start condition exists for the motor driver because the unit was shut down and an adequate cool-down time period has not occurred for restart of the driver.

7.4.3 Instrument and Control Panels

7.4.3.1 A panel from which startup and shutdown can be accomplished shall be provided and shall include the following:

a. Components for control systems as defined in 7.4.2.1, exclusive of the inlet throttle device or variable inlet guide vanes and discharge blowoff valve

- b. A control mode selector (see 7.4.2.2)
- c. Manual override and adjustment of control valves (see 7.4.2.5)
- d. Digital-readout pressure measurements
- e. Digital-readout temperature measurements
- f. A display for annunciation (see 7.4.5.2)
- g. Control devices for alarms and shutdowns
- h. An alarm indication and reset push button.
- i. The capability for starting and stopping the package from the control panel
- j. Vibration measurement and readout instruments (see 7.4.4.5)
- k. Self-diagnostics to check that the microprocessor and all instruments are functioning properly
- 1. Logging of the compressor's cumulative operating time
- m. Logging of the total number of compressor starts
- n. On/off switch for panel power
- o. On/auto/standby switch for auxiliary oil pump

p. Auxiliary pump running indicator

q. Lubrication oil heater status indicator.

7.4.3.2 The panel shall be fully enclosed. The panel enclosure shall have a display visible in darkness or direct sunlight, and shall be mounted on the package baseplate. If required to meet the area classification, purging shall be provided in accordance with NFPA 496. The panel shall include the following:

a. Shielding of the devices in the panel for protection from 5 watts radio-frequency (RF) interference at 1 m (3 ft) using commercial frequency bandwidths

b. Cooling for devices within the panel if the temperature inside the panel exceeds the electronic hardware temperature rating

Note: typically of concern for ambient conditions above 38°C (100°F)

- c. An interior panel heater for units when required by the ambient condition
- d. Driver, instrumentation, and control power separated in the same cabinet
- e. Sun screen/shade for control panel display for outdoor installations without a roof.

7.4.4 Instrumentation

7.4.4.1 Unless otherwise specified, signals may be generated from transmitters, transducers or switches.

7.4.4.2 Thermowells

7.4.4.2.1 Temperature sensing elements that are located in pressurized or flooded lines shall have DN 12 (NPS 1/2) minimum thermowells made of austenitic stainless steel.

• **7.4.4.2.2** When specified, thermowells shall be at least DN 19 (NPS ³/4).

7.4.4.3 Thermocouples and Resistance Temperature Detectors

Thermocouples and Resistance Temperature Detectors shall meet requirements of ISO 10438 Part 1 or API Std 614, Fourth Edition, Ch. 1, 6.4.4.

7.4.4.4 Pressure Indication

Unless otherwise specified, pressure indications shall be on the local panel display screen. When pressure gauges are specified, they shall be in accordance with API Std 614, Ch. 1, 6.4.5.2.

7.4.4.5 Vibration and Position Detectors

7.4.4.5.1 Each bearing adjacent to an impeller shall be provided with a vibration-monitoring system consisting of the following:

a. single, radially oriented, noncontacting shaft vibration sensing probe;

- b. an oscillator-demodulator; and
- c. a readout instrument.

7.4.4.5.2 The vendor shall include with his proposal a statement listing whether phase angle probe and both x and y radial probes can be mounted adjacent to each impeller shaft. Where possible, casings shall have tapped and plugged holes for mounting a second vibration probe at 90° from the original probe. Angular orientation of probe mounting holes shall be the same for both ends of each pinion. Unless otherwise specified, these devices are monitored by the compressor control system.

Note: The vibration monitoring system supplied as standard is substantially different from an API Std 670 standard system and may not interface with other user systems.

7.4.4.6 Solenoid Valves

Solenoid valves shall meet requirements of API Std 614, Ch. 1, 6.4.7.

7.4.4.7 Pressure Limiting Valves

Pressure Limiting valves shall meet requirements of API Std 614, Ch. 1, 6.4.8.

7.4.4.8 Flow indicators

Where practical, flow indicators shall be furnished in the atmospheric oil-drain return lines.

Note: Flow indicators are not feasible from individual compressor bearing drains, and sometimes not from the gear casing drain.

7.4.5 Alarms and Shutdowns

7.4.5.1 General

Switches, sensors, control devices, and annunciation function shall be furnished as specified by purchaser and mounted by the vendor and shall include those listed in Table 3 as a minimum. The alarm setting shall precede the shutdown setting. Program logic shall distinguish between a shutdown device and alarm device such that failure of a shutdown device will not allow operation of the compressor until the device problem is corrected; whereas, failure of an alarm device will cause an alarm condition but will allow continued operation of the compressor.

Condition	Alarm	Shutdown
High vibration of compressor	Х	Х
High last-stage air temperature (inlet)	Х	Х
Low lube-oil pressure	Х	Х
High oil-supply temperature	Х	Х
High oil filter differential pressure	Х	
Low sealing-system pressure ^a	Х	
Operation of the standby oil pump	Х	
Low-lube level in reservoir ^b	Х	
High inlet-air filter differential pressure	Х	
High vibration of driver ^c	Х	
Panel purged	Х	
Surge recognition	Х	
Permissive start contact ^e	Х	

Table 3—Equipment Monitoring

- Notes:
- ^a If applicable
- ^b With oil heater cutout
- c If specified
- d If required
- e Separate pilot-light indication

7.4.5.2 Annunciator

The vendor shall furnish first-out annunciation either as a separate device or as a function contained within the control system, e.g., a section of the PLC or microprocessor used for control of the compressor. If a separate annunciator is utilized, the annunciator shall contain approximately 25% spare points, and connections shall be provided for actuation of a remote signal when any function alarms or trips. The sequence of operation shall be as specified in 7.4.5.2.1 – 7.4.5.2.5.

7.4.5.2.1 The alarm condition shall be acknowledged by operating an alarm-silencing button via the keypad or a switch common to all alarm functions.

• **7.4.5.2.2** When specified, alarm indication shall consist of a flashing or rotating beacon, or equivalent, and the sounding of an audible device.

7.4.5.2.3 When the alarm is acknowledged, the flashing display or alarm shall change to steady display of alarm. The annunciator shall be capable of indicating a new alarm (with a flashing display) if another function reaches an alarm condition, even if the previous alarm condition has been acknowledged but still exists.

7.4.5.2.4 Alarm and shutdown set points shall have default values set by the vendor. These values shall be field configurable with a user-defined password or key.

7.4.5.2.5 Connections shall be provided for a common remote alarm and a common remote shutdown indication.

Note: typically this would be in the form of a relay dry (unpowered) contact.

7.4.5.3 Alarm and Shutdown Devices

7.4.5.3.1 Unless otherwise specified, the alarm and shutdown device shall utilize a single instrument located to facilitate inspection and maintenance. Where switches are specified, refer to API Std 614, Fourth Edition, Ch. 1, 6.3.4, for requirements. Mercury switches shall not be used.

7.4.5.3.2 Unless otherwise specified, contacts shall be configured to open (deenergize) to initiate alarms and shutdowns.

Note: Contacts that open (deenergize) are normally considered to be fail safe.

7.4.5.3.3 Where switches are provided, alarm and shutdown settings shall not be adjustable from outside the housing.

7.4.5.3.4 Unless otherwise specified, shutdown systems shall be provided with switches or another suitable means to permit testing without shutting down the unit.

• **7.4.5.3.5** When specified, alarm and shutdown instruments shall be arranged to permit testing of the control circuit, including when possible the actuating element, without interfering with normal operation of the equipment. The vendor shall provide a clearly visible light on the panel to indicate when shutdown circuits are in a test bypass mode.

7.4.5.3.6 The vendor shall furnish with the proposal a complete description of the alarm and shutdown facilities to be provided.

7.4.6 Electrical Systems

7.4.6.1 Electrical Systems shall meet requirements of ISO 10438, Part 1 or API Std 614, Ch. 1, Section 6.5, except as modified below.

7.4.6.2 Electrical starting and supervisory controls may be either AC or DC.

7.4.6.3 To guard against accidental contact, enclosures shall be provided for all terminal strips, relays, switches and other energized parts. Electrical power wiring shall be segregated from instrument and control signal wiring both externally and, as far as possible, inside enclosures. Inside enclosures which may be required to be opened with the equipment in operation, for example, for alarm testing or adjustment, shall be provided with secondary shields or covers for all terminal strips and other exposed parts carrying electrical potential in excess of 50 volts. Maintenance access space shall be provided around or adjacent to electrical equipment or in accordance with the appropriate code such as the National Electrical Code, Article 110.

Note: The 50 volt components inside a panel are meant to be in a secondary enclosure.

7.4.6.4 No terminal blocks shall be located in wire-ways. The terminals shall be straight-through compression type with shrouded screws (dead front) and center tapping for test purposes. Terminal block connections shall be single level (not tiered). The panel shall contain two bare soft copper grounding connections. One shall be used for a signal ground, the other an equipment ground bus. The instrument case shall not be grounded through the steel of the panel.

7.4.6.5 Control, instrumentation, and power wiring, that is not within a fully enclosed panel or other enclosure, shall be in the form of armored cable or shall be run in metal conduit as specified. Cables shall be supported on cable trays. Conduit shall be properly supported to avoid damage caused by vibration and isolated and shielded to prevent interference between different services. Conduits may terminate (in the case of the leads to temperature elements, shall terminate) with a length of flexible metal conduit, long enough to facilitate maintenance without removal of the conduit.

7.4.6.6 Internal vibration probe or thermocouple leads exposed to lube-oil turbulence shall be sufficiently anchored to prevent fatigue failures due to excessive movement.

7.5 PIPING

7.5.1 General

7.5.1.1 Piping shall meet requirements of ISO 10438, Part 1 or API Std 614, Ch. 1, Section 5 except as specifically modified below:

• **7.5.1.2** When specified, a manifolded cooling water piping system shall terminate with flanged single-supply and single-return connections at the edge of the package. It is not necessary to provide flanged connections for tubing systems.

7.5.1.3 The minimum requirement for piping material shall be as specified by ISO 10438, Part 1 or API Std 614 Ch. 1 Tables 1A, 1B, 1C, and 1D except as allowed below including 7.5.2.

7.5.1.4 Special pipe fittings in air, water or atmospheric oil service may be acceptable with purchaser approval.

Note: Such fittings facilitate maintenance and allow for misalignment of close-coupled systems.

7.5.1.5 Sealwelding of galvanized pipe as noted in ISO 10438, Part 1 or API Std 614 4th Edition, Ch. 1, Table 1-C, is not allowed.

7.5.1.6 Steel flanges mating with iron compressor flanges shall be flat faced.

7.5.1.7 Butterfly values are acceptable for water balance values DN 80 (NPS 3) and larger and for inlet air throttling values. They shall not be used for other services unless approved by the purchaser.

7.5.1.8 Gaskets and packing for flanges, valves, and other components shall not contain asbestos.

7.5.2 Oil Piping

7.5.2.1 Oil piping, tubing, and fittings downstream of filters (excluding slip-on flanges), shall be stainless steel (see ISO 10438, Part 1 or API Std 614 Table 1-D).

7.5.2.2 Oil drains shall be sized to run no more than half full and shall be arranged or sloped to ensure good drainage using manufacturer's proven practices.

7.5.2.3 Pipe joints downstream of the oil filter (filter to supply points) shall be butt-welded. Piping joints in return lines and upstream of the filter (reservoir to filter) may be socket welded. Threaded connections shall be used for instrument connections and where tubing is used.

7.5.3 Instrument Piping

Instrument piping shall meet requirements of ISO 10438, Part 1 or API Std 614, Ch. 1, 5.3, except bleeder valves are required between instruments and their isolating valves. Combinations of isolating and bleeder valves may be used.

7.6 INTERCOOLERS AND AFTERCOOLERS

Intercoolers and aftercoolers shall meet requirements of ISO 10438, Part 1 or API Std 614, Ch. 1, 5.5, except as specifically noted below:

7.6.1 The vendor shall provide an inter-cooler between each compression stage. Unless otherwise specified, an aftercooler shall be provided after the final compression stage.

7.6.2 Unless otherwise specified, the coolers shall have continuous-bleed notched gate valves to permit removal of liquid.

7.6.3 Unless otherwise specified, intercoolers and aftercooler shall be of the water-cooled shell and tube type with water on the tube side. A removable-bundle design is required. Tubes shall not have an outside diameter of less than 15 mm (5/8 in.), and the tube wall shall not have a thickness of less than 18 BWG, 1.25 mm (0.049 in.). Each cooler shall be sized to accommodate the total cooling load of the associated stage.

Note: Due to physical limitations, smaller units are commonly supplied with 10 mm ($^{3}/_{8}$ in.) tubes and thinner walls which may be acceptable with purchaser approval.

7.6.4 Double-pipe coolers and finned double-pipe designs may be furnished only when specifically approved by the purchaser.

7.6.5 Unless otherwise specified, cooler shells shall be of steel; tube sheet shall be carbon steel, painted on each side with a suitable coating for corrosion protection; and tubes shall be of manufacturer's standard copper alloy. U-bend tubes are not permitted.

Note 1: Typical tube materials are 90-10 copper-nickel, or hard drawn Cl 220 copper.

Note 2: Some plant locations may require consideration of alternative materials to combat atmospheric corrosion.

7.6.6 The vendor shall include in the proposal complete details of any proposed air-cooled cooler.

7.7 INLET AIR FILTER/SILENCER

The vendor shall furnish a dry-type multistage, high-efficiency air intake filter-silencer suitable for mounting outdoors. Unless otherwise specified, the filter-silencer shall be shipped loose for field installation by purchaser. This filter-silencer shall be provided with the following:

a. Differential pressure alarm instrumentation and indication

b. Filter portion designed such that the first-stage (prefilter) elements may be changed while the unit is operating

c. Weather hood or louvers

- d. Clean pressure drop across the filter elements which shall not exceed 5.0 millibar (2 in.) water gauge
- e. Removal of a minimum of 99.5% of particle sized 2 micron or larger over the inlet capacity range
- f. Element(s) designed to withstand pressure reversal from compressor surge

g. Carbon steel components shall be galvanized to resist internal and external corrosion. The internal fasteners and hardware downstream of the final filter element shall be stainless steel.

Note 1: Many configurations and arrangements are available. Thus, the purchaser will need to specify any required specific features.

Note 2: The filter-silencer may be elevated some distance above the compressor for certain plant locations subject to unusual conditions such as sand storms. Inlet piping between filter-silencer and the compressor is typically supplied by the purchaser. The piping should be of corrosion-resistant material to avoid ingestion of rust into the compressor.

7.8 DISCHARGE BLOWOFF SILENCER

7.8.1 The vendor shall furnish a flanged discharge blowoff silencer. The silencer is typically shipped loose for field installation by the purchaser.

7.8.2 Silencer construction shall be suitable for service in an unprotected location. The silencer preferably should be located immediately downstream of the discharge blowoff valve and oriented as specified.

7.9 SPECIAL TOOLS

7.9.1 When special tools and fixtures are required to disassemble, assemble, or maintain the unit, they shall be included in the quotation and furnished as part of the initial supply of the machine. For multiple-unit installations, the requirements for quantities of special tools and fixtures shall be mutually agreed upon by the purchaser and the vendor. These or similar special tools shall be used during shop assembly and post-test disassembly of the equipment.

7.9.2 When special tools are provided, they shall be packaged in a separate, rugged metal box or boxes and shall be marked "special tools for (tag/item number)." Each tool shall be stamped or tagged to indicate its intended use.

7.10 ADDITIONAL REQUIREMENTS FOR "SPECIAL DUTY" PACKAGES.

• **7.10.1** When specified, the product of driver nameplate rating and any applicable service factor shall be no less than the power required (including losses from shaft-driven oil pump, coupling, and gear) when the compressor is operated unthrottled (inlet throttle device wide open) at the specified low-ambient operating conditions. The purchaser will specify the inlet air temperature and the inlet cooling water temperature to be used by the vendor in calculating the maximum unthrottled power.

Note: The specified inlet temperature is not necessarily the minimum ambient temperature.

- **7.10.2** When specified, drain rim decking shall extend under the drive-train components so that any leakage from these components is contained.
- **7.10.3** When specified, the vendor shall commercially sand blast, in accordance with ISO 8501, Grade Sa2 or SSPC SP6, all grout contact surfaces of the baseplate, and coat those surfaces with a primer compatible with epoxy grouting.

7.10.4 The microprocessor shall be capable of communicating with the purchaser's distributed control system (DCS).

Note: The purchaser should advise the communication protocol to be used.

• 7.10.5 When specified, a surge avoidance system shall be provided.

Note: Typically this requires additional instrumentation for measuring flow, pressure and temperature, a modulating type anti-surge (blow-off) valve and additional control logic.

- **7.10.6** When specified, the system shall have the capability of recording data at multiple intervals just prior to an alarm or trip as an aid for troubleshooting compressor operational problems.
- **7.10.7** When specified, provisions for phase reference (phase angle probes) shall be made on all pinions in accordance with API Std 670.
- **7.10.8** When specified, a tapped and plugged hole shall be provided for mounting a probe to sense axial position of the gear wheel. Manufacturer shall advise if their thrust bearing arrangement makes it more advantageous to utilize axial position probes on the pinions instead of the bullgear.
- **7.10.9** When specified, gear casing shall have a machined surface for mounting the purchaser's accelerometer in accordance with API Std 670.

Note: This requirement is for purchaser's field diagnostics of gear condition.

- **7.10.10** When specified, vibration and axial position transducers shall be supplied, installed, and calibrated in accordance with API Std 670.
- **7.10.11** When specified, vibration and axial position monitors shall be supplied, installed, and calibrated in accordance with API Std 670.
- 7.10.12 When specified, a bearing-temperature monitor shall be supplied and calibrated in accordance with API Std 670.

7.10.13 The control system shall maintain a chronological record of the shutdowns. The panel shall have the capability of storing operational parameters related to the chronological shutdowns in a battery-backed nonvolatile memory. The Vendor and the purchaser shall mutually determine the required parameters to be stored.

- 7.10.14 When specified, each alarm device and each shutdown device shall be furnished as separate devices.
- **7.10.15** When specified, a pilot light shall be provided on the incoming side of each supply to indicate that the circuit is energized. The pilot lights shall be installed on the control panel.

7.10.16 If temperature element heads are exposed to temperatures above 60° C (140°F), a 19-mm (³/4 in.) bronze hose with four-wall-interlocking construction and joints with packed-on heatproof couplings shall be used.

7.10.17 Piping wall thickness shall conform to the minimum requirement of ISO 10438, Part 1 or API Std 614, Table 2-A. Where space does not permit the use of NPS 1/2, 3/4, or 1 pipe, seamless tubing may be furnished in accordance with ISO 10438, Part 1 or API Std 614 Table 2-B. Stainless steel fittings shall be furnished with stainless steel tubing. The make and model of fittings shall be subject to purchaser's approval.

- **7.10.18** When specified, piping on external return lines and upstream of filters shall be stainless steel (excluding slip-on flanges).
- **7.10.19** Heads of oil-actuated control valves shall be vented back to the reservoir. When specified, instrument sensing lines to safety switches shall have a continuous through flow of oil.

7.10.20 All piping components such as flanges, valves, control valve bodies or heads, and relief valves shall be made of steel.

• **7.10.21** When specified, intercooler and aftercooler channels and covers shall be of steel; tube sheet shall be of brass and tubes shall be of inhibited admiralty.

7.10.22 Intercoolers and aftercoolers shall be in accordance with TEMA Class C and shall be constructed with a removable channel cover.

8 Inspection, Testing and Preparation for Shipment

8.1 GENERAL

8.1.1 Unless otherwise specified, inspection, testing and preparation for shipment shall be in accordance with ISO 10438, Part 1 or API Std 614, Ch. 1, Section 7 except as noted below:

• 8.1.2 When specified, the purchaser's representative, the vendor's representative, or both shall indicate compliance in accordance with the inspector's checklist (see Annex G) by initialing, dating, and submitting the completed checklist to the purchaser prior to shipment.

8.2 INSPECTION

8.2.1 General

The vendor shall keep the following data available for at least 20 years:

- a. Material certificates of compliance for shafts, pinions, gear wheels, and impellers
- b. Documentation to verify that the requirements of this specification have been met, for the required level of service

c. Results of documented tests and inspections, including fully identified records of all heat treatment and nondestructive examinations.

8.2.1.1 Pressure-containing parts shall not be painted until the specified inspection and testing of the parts is complete.

Note: Purchased auxiliaries typically arrive already tested and painted. Some components may be primed at the sub-supplier.

8.2.2 Material Inspection

Material inspection including major drive train components shall meet requirements of ISO 10438, Part 1 or API Std 614, Ch. 1, 7.2.2, except as noted below:

8.2.2.1 General

8.2.2.1.1 Castings may also be inspected per MSS SP55.

8.2.2.1.2 Defects that exceed the limits imposed in ISO 10438, Part 1 or API Std 614, Ch. 1, 7.2.2, shall be removed to meet the quality standards cited, as determined by the inspection method specified.

8.2.3 Mechanial Inspection Prior to Run Test

8.2.3.1 Each component (including cast-in passages of these components) and all piping and appurtenances shall be inspected to ensure they have been cleaned and are free of foreign materials, corrosion products, and mill scale.

8.2.3.2 The gear contact pattern shall be checked in a static test with all pinions in place. Unmodified profile leads shall show a minimum contact of 60% of tooth contact along the axis, 30% radially—with no edge loading. For crowned gear teeth, 50% centered contact is acceptable.

8.3 TESTING

8.3.1 General

8.3.1.1 The equipment shall be tested in accordance with 8.3.2 - 8.3.4.

8.3.1.2 The oil parameters described in 6.9.1 shall be included in these test procedures.

8.3.2 Hydrostatic Tests

8.3.2.1 Components designed and fabricated to an internationally recognized pressure design code or standard shall be pressure tested in accordance with that code or standard. Compressor casings, interstage piping and other pressure containing components not designed to a specific code or standard shall be tested hydrostatically with liquid at a minimum of one and one-half times the maximum allowable working pressure of the component but not less than 1.5 bar (20 psi).

8.3.2.2 The chloride content of liquids used to test austenitic stainless steel materials shall not exceed 50 parts per million. To prevent deposition of chlorides on austenitic stainless steel as a result of evaporative drying, all residual liquid shall be removed from tested parts at the conclusion of the test.

8.3.2.3 Tests shall be maintained for a sufficient period of time to permit complete examination of parts under pressure. The hydrostatic test shall be considered satisfactory when neither leaks nor seepage through the pressure containing parts or complex systems may require a longer testing period to be agreed upon by the purchaser and the vendor. Seepage past internal closures required for testing of segmented cases and operation of a test pump to maintain pressure are acceptable.

8.3.2.4 Gaskets used during hydrotest of an assembled casing shall be of the same design as supplied with the casing.

8.3.2.5 Following hydrostatic testing, all equipment subassemblies shall be cleaned and dried to prevent corrosion.

8.3.3 IMPELLER OVERSPEED TEST

8.3.3.1 An overspeed test to 115% of rated speed shall be performed for a minimum duration of 1 minute. Impellers shall be examined for dimensional changes and cracking in high stress areas. No inspection/dimensional check is required of the impellers provided the following criteria are met:

a. The test is successful

b. The design impeller stress at max continuous speed does not exceed 50% of material yield strength at the highest stress point of the impeller

- c. Vibration signatures comparison before and after the impeller overspeed test are virtually identical
- d. Castings used are radiographic quality
- e. Impellers are of a design of proven success employing this approach.
- **8.3.3.2** When specified, after the overspeed test, each impeller shall be examined by magnetic particle or liquid penetrant methods. Impeller dimensions identified by the manufacturer as critical (such as bore and outside diameter) shall be measured before

and after the overspeed test. Any permanent deformation of the bore or other critical dimensions outside drawing tolerances shall be resolved to the satisfaction of the vendor and the purchaser.

8.3.4 Combined Mechanical and Performance Tests

8.3.4.1 The combined mechanical and performance test of the package, in accordance with vendor's standard test procedure, shall be conducted at rated operating speed for a continuous 2-hour period. Aerodynamic performance test shall be in accordance with either ASME PTC-10 or ISO 5389 as mutually agreed between purchaser and vendor. The purchaser and the vendor shall mutually agree upon equipment and accessories to be included in the scope of the test and the test class.

8.3.4.2 All oil pressures, viscosities, and temperatures shall be within the range of operating values recommended in the vendor's operating instructions for the specific unit being tested. Performance data shall be obtained only after bearing and lube-oil temperatures have stabilized.

8.3.4.3 During the running test, peak-to-peak vibration levels shall be recorded for each stage at operating speed.

8.3.4.4 Performance shall be calculated using the test raw data, reduced to the specified site-rated conditions, including expected inlet air filter and aftercooler losses, cooling water temperatures and flows, tube side fouling factors, and all mechanical, blowdown, and condensate losses in accordance with the vendor's standard procedure.

8.3.4.5 The requirements of 8.3.4.5.1 - 8.3.4.5.5 shall be met before the combined mechanical and performance test of the package is performed.

8.3.4.5.1 All joints and connections shall be checked for tightness, and any leaks shall be corrected.

8.3.4.5.2 Test stand oil filtration shall not exceed 10 microns nominal. Oil-system components downstream of the filters shall meet the cleanliness requirements of ISO 10438 or API Std 614 before any test is started

8.3.4.5.3 If the job lube system is not used for the package test, a functional test of the job lube system shall be performed, including verification of calibration and operation of all valves and instrumentation.

8.3.4.5.4 Total indicated runout measurements (combined electrical and mechanical) of the pinion probe areas and calibration records for flow, pressure, temperature, and vibration-measuring devices utilized during the test shall be available to the purchaser's representative for review.

8.3.4.5.5 All warning, protective, and control devices used during the test shall be checked, and adjustments shall be made as required.

8.3.4.6 The requirements of 8.3.4.6.1 - 8.3.4.6.5 shall be met during the combined mechanical and performance test.

8.3.4.6.1 With the compressor operating at its rated discharge pressure, the delivered capacity at the rated operating point reduced to rated conditions specified on the data sheets shall have zero negative tolerance when compared to rated capacity (that is, -0% tolerance on the specified rated flowrate).

8.3.4.6.2 The required power referred to the gear wheel shaft, at the rated operating point, including mechanical and convection losses, shall not exceed 104% of the value quoted for the rated operating point.

8.3.4.6.3 Overall pressure rise shall meet the criteria of 6.1.12.2.

8.3.4.6.4 Compressor vibration levels shall be recorded at every performance data point and shall meet the criteria of 6.7.4.3, and 8.5.9.

8.3.4.6.5 The performance test shall verify the expected turndown flow at the specified rated discharge pressure.

8.3.4.7 If replacement or modification of bearings or seals or dismantling of the case to replace or modify other parts is required to correct mechanical or performance deficiencies, the initial test will not be acceptable, and the final shop tests shall be run after these replacements or corrections are made.

8.3.5 Final Inspection

The purchaser's representative may perform a final inspection prior to shipment, including dimensional inspection, review of scope of supply, and documentation review.

8.3.6 Test Data

Immediately upon completion of each mechanical and performance test, copies of the data logged and the as-tested performance data shall be submitted to the purchaser.

8.4 PREPARATION FOR SHIPMENT

8.4.1 Equipment shall be suitably prepared for the type of shipment specified, including blocking of the rotor when necessary. Blocked rotors shall be identified by means of corrosion-resistant tags attached with stainless-steel wire. The preparation shall make the equipment suitable for 6 months of outdoor storage from the time of shipment, with no disassembly required before operation except for inspection of bearings and seals. If storage for a longer period is contemplated, the purchaser will consult with the vendor regarding the recommended procedures to be followed.

8.4.2 The vendor shall provide the purchaser with the instructions necessary to preserve the integrity of the storage preparation after the equipment arrives at the job site and before startup.

8.4.3 Lifting points and lifting lugs shall be clearly identified on the equipment or the equipment package. The recommended lifting arrangement shall be identified on the boxed equipment.

8.4.4 The package shall be identified with item and serial number. Material shipped separately shall be identified with securely affixed, corrosion-resistant metal tags indicating the item and serial number of the equipment for which it is intended. In addition, crated equipment shall be shipped with duplicate packing lists, one inside and one on the outside of the shipping container.

8.4.5 When spare rotating elements are purchased, they shall be prepared and crated for unheated indoor storage for a period of at least 3 years.

8.4.6 Auxiliary piping connections furnished on the purchased equipment shall be impression stamped or permanently tagged to agree with the vendor's connection table or general arrangement drawing. Service and connection designations shall be indicated.

8.4.7 One copy of the vendor's standard installation instructions shall be packed and shipped with the equipment.

8.5 ADDITIONAL INSPECTION, TESTING & PREPARATION FOR SHIPMENT REQUIREMENTS FOR "SPECIAL DUTY" PACKAGES

• **8.5.1** When specified, the vendor shall keep final assembly maintenance and running clearances for at least 20 years.

8.5.2 Impellers that are welded or machined from other than investment castings, forgings, or bar stock, shall be 100% radiographed and inspected. The radiographs, when compared with the standard reference radiographs within ASTM E446 for steel castings up to 50 mm (2 in.) in thickness or standard reference radiographs for heavy walled 50 mm – 100 mm (2 in. – 4 in.) steel castings within ASTM E186, shall show a casting quality equal to or better than Severity Level 2 for Categories A, B, and C (Types 1 – 4). Defects per categories D, E, and F are unacceptable. The methods of radiographic examination shall be in accordance with ASTM E 94.

8.5.3 Inspection of the impeller is required following overspeed testing per 8.3.3.

8.5.4 All gear wheel and pinion teeth shall be 100% magnetic particle inspected in accordance with ASTM A 275. Cracks are not acceptable. Linear indications due to metallic inclusions larger than 1.5 mm (0.06 in.) located in the tooth flanks or roots shall be reported to the purchaser for disposition. Linear indications are defined as indications whose length is at least three times the width. Acceptance or rejection shall be decided on a case-by-case basis and shall be mutually agreed upon by the purchaser and the vendor.

8.5.5 The vendor shall verify that dimensions of all rotating components and stationary gas path components fall within the drawing tolerances. Dimensional nonconformances shall be reported to the purchaser within 5 days after approval of the non-conformance by the vendor's engineering department.

- **8.5.6** When specified, the combined test shall be for a continuous 4-hour period.
- 8.5.7 When specified, a minimum of five test points shall be recorded, including surge, rated, and maximum capacity.
- 8.5.8 When specified, an unthrottled test curve shall be produced.
- **8.5.9** When specified, while the equipment is operating at rated speed, sweeps shall be made for vibration amplitudes at frequencies other than synchronous. As a minimum, these sweeps shall cover a frequency from 0.25 times to 8 times the rated speed

of the shaft being observed. If the amplitude of any discrete, nonsynchronous vibration exceeds 20% of the allowable vibration as defined in 6.7.4.3, the purchaser and the vendor shall mutually agree on requirements for any additional testing and on the equipment's suitability for shipment.

8.5.10 During the combined test, the difference between inlet- and drain-oil temperature shall not exceed 30°C (50°F).

• **8.5.11** When specified, the requirements of 8.5.11.1 – 8.5.11.3 shall be met after the combined mechanical and performance test is completed.

8.5.11.1 The bearings, seals, and gearing shall be inspected.

• **8.5.11.2** When, due to the design of the integrally geared compressor, inspection of the bearings and seals requires disassembly of any pinion rotor, the purchaser shall specify either:

a. to inspect the bearings one time and retest in accordance with 8.3.4 or

b. to forego inspection of the bearings and seals based upon analysis of test data.

8.5.11.3 The gear contact pattern shall be checked using the hard-bluing method with all pinions in place. Unmodified profile leads shall show a minimum contact of 70% of tooth contact along the axis, 30% radially, with no edge loading.

• 8.5.12 Optional Tests

The purchaser will specify whether either of the shop tests specified in 8.5.12.1 or 8.5.12.2 shall be performed (see also 6.12.4).

• 8.5.12.1 Guide Vane Test

The package shall be tested at the number of guide vane settings specified by the purchaser. Each setting shall include surge, rated, and maximum capacity.

8.5.12.2 Spare Rotor Test

Spare rotating elements with duplicate performance to the contract rotating elements shall be given a mechanical test only in accordance with the requirements of this standard. Spare rotating elements with different performance from the contract rotating elements shall be given a combined mechanical and performance test.

9 Vendor Data

9.1 GENERAL

9.1.1 The information to be furnished by the vendor is specified in 9.2 and 9.3.

9.1.2 The data shall be identified on transmittal (cover) letters, title pages, and in title blocks or other prominent position on drawings, with the following information:

- a. The purchaser's/owner's corporate name
- b. The job/project number
- c. The equipment item number and service name
- d. The inquiry or purchase order number
- e. Any other identification specified in the inquiry or purchase order

f. The vendor's identifying proposal number, shop order number, or serial number, or other reference required to completely identify return correspondence.

- **9.1.3** When specified, a coordination meeting shall be held, preferably at the vendor's plant, within 4-6 weeks after the order commitment. Unless otherwise specified, the vendor shall prepare and distribute an agenda prior to this meeting which as a minimum shall include review of the following items:
 - a. The purchase order, scope of supply, unit responsibility, subvendor items and lines of communication

b. The data sheets

- c. Applicable specifications and previously agreed exceptions
- d. Schedules for transmittal of data, production, and testing
- e. The quality assurance program and procedures
- f. Inspection, expediting, and testing
- g. Schematics and bills of material for auxiliary systems

h. The physical orientation of the equipment, piping, and auxiliary systems including access for operation and maintenance

- i. Coupling selection and rating
- j. Equipment performance, alternate operating conditions, startup, shutdown, and any operating limitations
- k. Instrumentation and controls.

9.2 PROPOSALS

9.2.1 General

The proposal shall include as a minimum, the data specified in 9.2.2 - 9.2.4 and a specific statement that the equipment and all its components and auxiliaries are in strict accordance with this standard. If the equipment or any of its components or auxiliaries are not in strict accordance, the vendor shall include a list that details and explains each deviation to enable the purchaser to evaluate any proposed alternative designs. All correspondence shall be clearly identified in accordance with 9.1.2.

9.2.2 Drawings

The drawings indicated on the Vendor Drawing and Data Requirements or VDDR form (see Annex D) shall be included in the proposal. As a minimum, the following data shall be included:

a. A general arrangement or outline drawing for each major skid or remote mounted component, showing overall dimensions, maintenance clearance dimensions, overall weights, erection weights, maximum maintenance weights (indicated for each piece) the direction of rotation, and the size and location of major purchaser connections

b. Cross-sectional drawings showing the details of the proposed equipment

c. Schematics of all auxiliary systems, including the air, lube-oil, seal air, control, and electrical systems, with bills of material identifying components by make, model, and materials of construction for each system.

9.2.3 Technical Data

9.2.3.1 The following data shall be included in the proposal:

a. The purchaser's data sheets with complete vendor's information entered thereon and literature to fully describe details of the offering

b. The predicted noise data

c. The Vendor Drawing and Data Requirements form (see Annex D), indicating the schedule according to which the vendor agrees to transmit all the data specified

- d. A schedule for shipment of the equipment, in weeks after receipt of an order
- e. A list of major wearing components, showing any interchangeability with the owner's existing units
- f. A list of priced spare parts recommended for start-up and 3 years of normal operation
- g. A list of the special tools furnished for maintenance

h. A description of any special weather protection and winterization required for start-up, operation, and periods of idleness under the site conditions specified and clearly indicating the protection to be furnished by the purchaser, as well as that included in the vendor's scope of supply

i. A complete tabulation of utility requirements (clearly indicating approximate data where applicable), such as those for steam, water electricity, air, and lube oil (including the quantity and supply pressure of the lube oil required, and the heat load to be removed by the oil), and the nameplate power rating and operating power requirements of auxiliary driver

- j. A description of any special requirements specified in the purchaser's inquiry and as outlined in 6.5.2.2, 6.10.1.2, and 7.6.6
- k. Allowable forces and moments on customer inlet and discharge air connections, as required by 6.4.1
- 1. A description of the sealing system including air consumption as required by 6.6.3
- m. A description of the alarm and shutdown functions as required by 7.4.5.3.6
- n. A statement of the number of radial vibration probes that can be mounted adjacent to each impeller as required by 7.4.4.5.2
- o. The vendor's recommended ISO grade and the minimum allowable oil temperature as requested in API Std 614, Ch. 1
- p. A description of standard tests including mechanical run and performance, control functionality, and oil system cleanliness
- q. Descriptive literature
- r. Vendor Quality Assurance Plan.

9.2.4 Curves

9.2.4.1 The vendor shall provide complete performance curves to encompass the map of operations, with any limitations indicated thereon.
9.2.4.2 Overall performance curves shall be submitted for rated, minimum, and maximum specified ambient temperatures.

9.2.4.3 Curves shall include a plot of discharge pressure, and brake horsepower against delivered standard flow. Curves shall indicate surge, rated capacity, and any other specified operating points. Curves that show throttling effects at off-design inlet conditions shall also be provided.

9.2.4.4 Preliminary speed-torque curves shall be provided.

9.3 CONTRACT DATA

9.3.1 General

9.3.1.1 Contract data shall be furnished by the vendor in accordance with the agreed VDDR form.

9.3.1.2 Each drawing shall have a title block in the lower right-hand corner with the date of certification, identification data specified in 9.1.2, the revision number and date, and the title. Similar information shall be provided on all other documents including subvendor items.

9.3.1.3 The purchaser will promptly review the vendor's data upon receipt; however, this review shall not constitute permission to deviate from any requirements in the order unless specifically agreed upon in writing. After the data have been reviewed and accepted, the vendor shall furnish certified copies in the quantities specified.

9.3.1.4 A complete list of vendor data shall be included with the first issue of the major drawings. This list shall contain titles, drawing numbers, and a schedule for transmittal of each item listed. This list shall cross-reference data with respect to the VDDR form in Annex D.

9.3.2 Drawings and Technical Data

The drawings furnished shall contain sufficient information so that together with the manuals specified in 9.3.5, the purchaser can properly install, operate, and maintain the equipment covered by the purchase order. All contract drawings and data shall be clearly legible (8-point minimum font size even if reduced from a larger size drawing), shall cover the scope of the agreed VDDR form, and shall satisfy the applicable detailed descriptions in Annex D.

• 9.3.3 Progress Reports

The vendor shall submit progress reports to the purchaser at the intervals specified.

9.3.4 Parts Lists and Recommended Squares

9.3.4.1 The vendor shall submit complete parts lists for all equipment and accessories supplied. The lists shall include part names, manufacturer's unique part numbers, materials of construction (identified by applicable international standards), and delivery times. Each part shall be completely identified and shown on appropriate cross-sectional, assembly-type cutaway or exploded-view isometric drawings. Interchangeable parts shall be identified as such. Parts that have been modified from standard dimensions or finish to satisfy specific performance requirements shall be uniquely identified by part number. Standard purchased items shall be identified by the original manufacturer's name and part numbers.

9.3.4.2 The vendor shall indicate on these complete parts lists all those parts that are recommended spares for start-up or maintenance spares and the recommended stocking quantities of each. This should include spare parts recommendations of subsuppliers that were not available for inclusion in the vendor's original proposal (see 9.2.3.1, item F).

9.3.5 Installation, Operation, Maintenance, and Technical Data Manuals

9.3.5.1 General

The vendor shall provide sufficient written instructions and all necessary drawings to enable the purchaser to install, operate, and maintain all of the equipment covered by the purchase order. This information shall be compiled in a manual or manuals with a cover sheet showing the information listed in 9.1.2, an index sheet, and a complete list of the enclosed drawings by title and drawing number.

9.3.5.2 Installation Manual

Any special information required for proper installation design that is not on the drawings shall be compiled in a manual that is separate from the operating and maintenance instructions. This manual shall be forwarded at a time that is mutually agreed upon in the order but not later than the issue of final certified drawings. the final issue of prints.

The manual shall contain information for receiving the units and for preservation of the units prior to service. It will include information such as special alignment and grouting procedures, utility specifications (including quantities), and all other installation design data, including the drawings and data specified in 9.2.2 and 9.2.3. The manual shall also include sketches that show the location of the center of gravity and rigging provisions to permit the removal of the top half of the casings, rotors, and any sub-assemblies that weigh more than 136 kg (300 lbs.).

9.3.5.3 Operating and Maintenance Manual

A manual containing all required operating and maintenance instructions shall be supplied. In addition to covering operation at specified rated conditions, this manual shall also contain separate sections that provide special instructions for operation at specified extreme environmental conditions.

9.3.5.4 Technical Data Manual

The vendor shall provide the purchaser with a technical data manual within 30 days of completion of shop testing. (see Annex D for minimum requirements of this manual.)

9.4 ADDITIONAL VENDOR DATA REQUIREMENTS FOR "SPECIAL DUTY" PACKAGES

9.4.1 When Special Duty has been specified, the following additional data shall be included in the proposal:

- a. A list of similar machines installed and operating under conditions analogous to those specified in the proposal
- b. Any start-up, shutdown, or operating restrictions required to protect the integrity of the equipment
- c. The calculated values of gear-rated power, based on AGMA 6011.

9.4.2 The coordination meeting agenda shall include discussion of the following:

- a. Thrust-bearing sizing, estimated loading and specific configurations
- b. The rotor dynamics analysis (lateral, torsional and transient torsional, as required).
- 9.4.3 When specified, the Installation, Operating and Maintenance Instructions (IOMI) manual(s) shall be prepared for the equipment covered by the purchase order and "Typical" manuals are not acceptable.

ANNEX A—DATA SHEETS

			REVISION	0		1	2	3	4
			BY						
	AL ET		REV/APPR						
AIR COMPRESSORS (API 6/24th ED) DATA SHE			JOB NO.		25		NO		
		<u> </u>	PAGE	1 0	JF	11 REQ1	N NO.		
applicable TO: O PROPOSAL O PURCHASE		O AS BUI							
				ED					
			DRIVER ITEN	4.NO					
5 O CONTINUOUS O INTERMITTENT C		BY (3.30)	BHIVEITHE	SPARED BY					
6 NOTE: INFORMATION TO BE COMPLETED: O BY PUBCHASE	 -R	()		BY MANUFACTU	REB	-		ASER OR MER	
7		GE	NERAL						
8 COMPRESSOR MFR MC	ODEL (SIZE	AND TYPE)					SERIAL NO.		
9 DRIVER MFR DR	RIVER TYPE	E _	-			RATE	D (BkW)	RPM	
10 DRIVE SYSTEM: O DIRECT COUPLED OOTHER						DUTY	(1.2) OBASIO	• C	SPECIAL
11 OPERATING CONDITIONS (6.1.	.9)						CONTROL SYST	TEM (7.4.2)	
12		LOW	MIN		CONT	ROL METHOD: (7.	4.2.1)		
	BATED	AMB *	AMB	OTHER	0			PRESS) (74212)	
	(3.24)	(7.10.1)	AND	OTTIEN	Ŭ			0	
					1				/F
					1			-SSTERIET VAL	
17 O INLET COOLING WATER TEMP. (°C)					0			 .1 b.)	
18			ı		1	0	(barG TO	(barG)	DISCH PRESS
19 INLET CONDITIONS:					0	AUTO START AND	STOP (7.4.2.1 c.)	(sard)	2.55.111200
20 O PBESSUBE (barA)					-	O START	(barG) STOP	(barG)
					0	OTHER (DESCRIE	(buid	,	(barci)
					Ĭ	0111211 (020001112			
23 O MOLECULAR WEIGHT (M)					-				
24 INI FT VOLUME. (m /b) (WFT / DBY)					-				
25			1		-				
26 DISCHARGE CONDITIONS:									
27 O PRESSURE (barA)					сомт	ROL SYSTEM RE	QUIREMENTS:		
28 TEMPERATURE (°C)					0	UNIT OPERATES	IN PARALLEL (7.4.	2.2)	
29						O W/CENTRIF	UGAL	,	
30 PERFORMANCE:						O W/ROTARY	0	W/RECIPROCATI	NG
31 MAX (BKW) REQUIRED (ALL LOSSES INCL)									
32 GkW/ 100 m /h) AIR DELIVERED					0	MICROPROCESS	OR CAPABLE OF C	COMMUNICATION	
33 INPUT SPEED (rpm)						WITH PURCHASE	R'S DCS (7.4.1.4)		
34 STIMATED SURGE, (m_/h) (@ ABOVE SPEED)						O COMM PRO	TOCOL		
35 O MAX DP ACROSS INLET FILTER, (bar)									
36 DP INCLUDED IN CALCULATION YES NO					CONT	ROL SYSTEM AL	TERNATES: (7.4.1.)	3)	
37 AFTERCOOLER OUTLET TEMP, (°C)						O OTHER THA	AN MICROPROCES	SOR BASED:	
38 PERFORMANCE CURVE NO.									
39 🔲 % RISE TO SURGE (6.1.12.2)						O SUITABLE F	OR INDOOR ONLY	Y	
40 🗖						O FURNISHED	BY PURCHASER		
41									
42		* UNTHROT	TLED PERFORMAN	CE FOR DRIVER SIZING			INTER- AND AF	TER-COOLERS (7.	6)
43 REMARKS:					AFTE	RCOOLER:			
44						O FURNISHED	BY PURCHASER	(7.6.1)	
45					1	O NOT NEEDE	ED (7.6.1)		
46					1.	O AIR-COOLE	D TYPE BY VENDO	DR	
47					0	AIR-COOLED INTE	ERCOOLERS REQI	D (7.6.3, 7.6.6)	
48					1	O FURNISHED	D BY PURCHASER		
49									
50					D	AIR-COOLED EXC	HANGER AUTOM	ATIC	
51						IEMPERATURE C	ON THOL MEANS:	(7.6.6)	
52					1	O LOUVERS	O VARIA	ABLE SPEED FANS	3
53						O VARIABLE F	PITCH FANS	O BYPA	ASS VALVE
54					P	AIR-COOLER CON		NLY (7.6.6) BY:	
55					4	O LOUVERS	О вура	SS VALVE	
56							PITCH FANS		

	PACKAGED, INTEGRALLY GEARED CENTRIFU AIR COMPRESSORS (API 6724TH ED) DATA SH	GAL IEET	JOB NO.	ITEM NO.	
			PAGE 2 OF	11 REQ'N NO.	
1				J SPECIFICATIONS	
2					(@ 1 m)
4	O OUTDOOR O UNHEATED O PART	IAL SIDES			(6 1 m)
5	O GRADE O MEZZANINE O	# 12 010 E0	ACOUSTIC HOUSING:	O YES	ΟΝΟ
6	O WINTERIZATION REQD O TROPICALIZATION REQ	D	APPLICABLE SPECIFICATIONS:		
7	,		API 672 AND O		
8	SITE DATA:				
9	O ELEVATION(m) O BAROMETER	(barA)	O NON-ASME WELDING IF NOT AW	VS D1.1: (6.10.3.5)	
10	RANGE OF AMBIENT TEMPERATURE, (°C)		O UNITS OF MEASURE (5.1)	O US CUSTOMARY	O SI O OTHER
11	DRY BULB	WET BULB			
12	2 NORMAL		PAINTING:		
13	3 MAXIMUM		O MANUFACTURER'S STD		
14	MINIMUM		O OTHER		
15	· · · · · · · · · · · · · · · · · · ·			0	
16			BASEPLATE GROUT: (7.10.3)	O EPOXY	O CEMENT O NONE
17				e . (7 10 2)	
18	O DUST O FUMES O CORROSIVE CONDITION	NS		= 5 : (7.10.3)	O
19				SPC 6 BLAST	BARE FOR FIELD BLAST
20	O CONDITIONS CAUSE STRESS CORROSION CRACKING		O INORGANIC ZINC SILICATE COA	IING	
21					
~~~		T.0005			
23		1-CODE			
24					T BOXING REQD
25				0000	
27	UTILITY CONDITIONS:		U U	TILITY CONSUMPTION (9.2.3 i	.)
27 28	UTILITY CONDITIONS:		UT	TILITY CONSUMPTION (9.2.3 i	.)
27 28 29	V UTILITY CONDITIONS:	(°C)	STEAM: OIL HEATER:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER	.) R (kg/h)
27 28 29 30	O         UTILITY CONDITIONS:           3         O         STEAM HEATING:           3         INLET MIN	(°C) (°C)	STEAM: OIL HEATER:	TILITY CONSUMPTION (9.2.3 i	.) (kg/h)
27 28 29 30 31	O         UTILITY CONDITIONS:           0         STEAM HEATING:           1         INLET MIN	(°C) (°C) (°C)	STEAM: OIL HEATER: ELECTRIC:	TILITY CONSUMPTION (9.2.3 i	.) (kg/h) .OCKED FULL LOAD
27 28 29 30 31 32	O         UTILITY CONDITIONS:           0         STEAM HEATING:           1         INLET MIN           0         NORM           0         MAX           0         OUTLET MIN           0         MAX           0         OUTLET MIN	(3°) (3°) (3°) (3°)	STEAM: OIL HEATER: ELECTRIC:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER (kW) ROTOR	.) (kg/h) .OCKED FULL LOAD . AMPS AMPS
27 28 29 30 31 32 33	O         UTILITY CONDITIONS:           0         STEAM HEATING:           1         INLET MIN           0         NORM           0         NORM           0         MAX           0         OUTLET MIN           0         MAX           0         OUTLET MIN           0         NORM           0         NORM	(C°) (C°) (C°) (C°) (C°)	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP	TILITY CONSUMPTION (9.2.3 i          (kg/h)         OTHER          (kg/h)         ROTOR          (kW)         ROTOR	.) Cocked Full Load AMPS AMPS
27 28 29 30 31 32 33 34	O         UTILITY CONDITIONS:           0         STEAM HEATING:           1         INLET MIN           0         NORM           0         NORM           0         MAX           0         OUTLET MIN           0         MAX           0         OUTLET MIN           0         MAX           0         MAX           0         MAX           0         MAX	(2°) (2°) (2°) (2°) (2°) (2°) (2°)	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR	.) COCKED FULL LOAD CAMPS AMPS
27 28 29 30 31 32 33 34 35	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           MAX         (barG)	(3°) (3°) (3°) (3°) (3°) (3°)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR	.) 2(kg/h) 2. OCKED FULL LOAD 2. AMPS AMPS
27 28 29 30 31 32 33 34 35 36	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)	(3") (3") (3") (3") (3") (3") (3")	STEAM: OIL HEATER:  MAIN LO PUMP AUX LO PUMP OIL HEATER	TILITY CONSUMPTION (9.2.3 i          (kg/h)         OTHER          (kW)         ROTOR	.)
27 28 29 30 31 32 33 34 35 36 37	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           MAX         (barG)	(°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOF(kW)	.)
27 28 29 30 31 32 33 34 35 36 37 38	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING	(°C) (°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOF	.)
27 28 29 30 31 32 33 34 35 36 37 38 39	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING           PHASE         Image: Control	(°C) (°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOF	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING           PHASE         Image: Control image: Cont	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41	O         UTILITY CONDITIONS:           INLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         Image: Control image: C	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (1 (min))	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER INTER- COOLER	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         (barG)           HEATING         CONTROL           VOLTAGE         HEATING           PHASE         Image: Control image:	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP. (*C)	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	O         UTILITY CONDITIONS:           INLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           MAX         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         HEATING           PHASE         MAX           COOLING WATER: (6.1.6)         TEMP INLET           TEMP INLET         (°C) MAX RETURN           PRESS NORM         (barG)         DESIGN	(°C) (°C) (°C) (°C) (°C) SHUTDOWN SHUTDOWN	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (bar)	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45	O         UTILITY CONDITIONS:           INLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           MAX         (barG)           OUTLET MIN         (barG)           MAX         (barG)           VOLTAGE         (barG)           HERTZ         Image: CONTROL           VOLTAGE         Image: CONTROL	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (bar)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min)  OUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min)	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(cOOLER COOLER	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         (barG)           HERTZ         HEATING           PHASE         O           COLING WATER: (6.1.6)         TEMP INLET           TEMP INLET         ('C') MAX RETURN           PRESS NORM         (barG)           MIN RETURN         (barG)           WATER SOURCE         MAX ALLOW DP	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) QUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min)	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(cooler	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           VOLTET MIN         (barG)           MAX         (barG)           VOLTAGE         HEATING           HERTZ         PHASE           PHASE         Image: Control image:	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) QUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER COOLERINTERINLET PRESS	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           VOLTAGE         HEATING           VOLTAGE         HERTZ           PHASE         Image: Phase           O         Cooling water: (6.1.6)           TEMP INLET         (barG)           MIN RETURN         (barG)           WATER SOURCE         MAX ALLOW DP           WATER SOURCE         Image: Phase	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (bar)	UT       STEAM:       OIL HEATER:       ELECTRIC:       MAIN LO PUMP       AUX LO PUMP       OIL HEATER       CONTROL SYSTEM LOAD:       COOLING WATER:       QUANTITY,       QUANTITY,       QUANTITY,       QUANTITY,       (L/min)       PRESS DROP,       (bar)	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER COOLER(barG)	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	O         UTILITY CONDITIONS:           O         STEAM HEATING:           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         DESIGN           MIN RETURN         (barG)           MIN RETURN         (barG)           WATER SOURCE         MAX ALLOW DP           MAX PRESS         (barG)	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (barG)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) QUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM:	TILITY CONSUMPTION (9.2.3 i	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           WAX         (barG)           VOLTAGE         (barG)           HEATING         CONTROL           VOLTAGE         (barG)           HERTZ         (barG)           PHASE         (barG)           COOLING WATER: (6.1.6)         TEMP INLET           TEMP INLET         (barG)           MIN RETURN         (barG)           WATER SOURCE         MAX ALLOW DP           WATER SOURCE         MAX PRESS           MAX PRESS         (barG)         MIN PRESS	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (barG)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) UTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN:  SEAL SYSTEM: CONTROL PANEL:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOF(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER COOLER(kW) INTER- COOLER COOLER [INTER- COOLER [INT	.)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           VOLTAGE         (barG)           HEATING         CONTROL           VOLTAGE         HEATING           VOLTAGE         Image: Control           VOLTAGE         Image: Control           PHASE         Image: Control           Cooling water: (6.1.6)         TEMP INLET           TEMP INLET         (°C) MAX RETURN           PRESS NORM         (barG) DESIGN           MIN RETURN         (barG) MAX ALLOW DP           WATER SOURCE         Image: Control           MAX PRESS         (barG) MIN PRESS           GAS COMPOSITION         Image: Control	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (barG)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, ('C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN:  SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR:  U TI DI LO LONDON	TILITY CONSUMPTION (9.2.3 i(kg/h) OTHER(kW) ROTOF(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER(cooler) INLET PRESS(barG)	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         HEATING           VOLTAGE         HEATING           PHASE         Image: Control           VOLTAGE         Image: Control           PRESS NORM         (barG)           DESIGN         MIN RETURN           WATER SOURCE         MAX ALLOW DP           WATER SOURCE         MIN PRESS           GAS COMPOSITION         MIN PRESS	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (barG) (barG)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOF(kW) SPACE HEAT	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           VOLTAGE         HEATING           VOLTAGE         L           HERTZ         L           PHASE         L           COOLING WATER: (6.1.6)         TEMP INLET           TEMP INLET         ('C') MAX RETURN           PRESS NORM         (barG)           MIN RETURN         (barG)           WATER SOURCE         MAX ALLOW DP           WAX PRESS         (barG)           GAS COMPOSITION         MIN PRESS	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS: CONTROL SYSTEM:	TILITY CONSUMPTION (9.2.3 i	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           VOLTAGE	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER ONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, ("C) PRESS DROP, (bar) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS: CONTROL SYSTEM: OTHER:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER(cooler(kur) INTER(barG)(barG)	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 55	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:  COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (bar) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS: CONTROL SYSTEM: OTHER: OTHER:	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOR(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER (DATG)(barG)(barG)	.) .) .)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56	O         UTILITY CONDITIONS:           INLET MIN         (barG)           INLET MIN         (barG)           NORM         (barG)           MAX         (barG)           OUTLET MIN         (barG)           NORM         (barG)           OUTLET MIN         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           NORM         (barG)           MAX         (barG)           VOLTAGE	(°C) (°C) (°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (barG) (barG)	STEAM: OIL HEATER:  ELECTRIC:  MAIN LO PUMP AUX LO PUMP OIL HEATER OOTROL SYSTEM LOAD: COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (bar) TOTAL CW, (L/min) AIR/NITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS: CONTROL SYSTEM: OTHER: TOTAL PURGE, (m_/h)	TILITY CONSUMPTION (9.2.3 i (kg/h) OTHER(kW) ROTOF(kW) SPACE HEAT(kW) SPACE HEAT(kW) SPACE HEAT(kW) INTER- COOLER(barG)(barG)	.) .) .)

PACKAGED, INTEGRALLY AIR COMPRESSORS (API 6 SI UNITS	GEARED CENTR 724th ED) DATA S (bar)	RIFUGAL A SHEET		JOB NO.	ITEM	NO		
1			CONSTRUC	TION FEATURES				
2 COMPRESSOR SPEEDS:								
3 RATED INPUT: (r	pm) TRIP		(rpm)	MATERIAL			SPLIT	
4 BULLGEAR CRITICALS: 1st	(rpm)			BULL GEAR: (6.5.3), (6.12.2)				
5 PINION CRITICALS:				RATED POWER BASED ON TOOTH SU	JRFACE DURABI	LITY:		(kW)
6 1st STG PINION 1st	(rpm)	2nd	(rpm)	RATED POWER BASED ON TOOTH BE	ENDING:			(kW)
7 2nd STG PINION 1st	(rpm)	2nd	(rpm)	O MIN AGMA SERVICE FACTOR:			ACTUAL S.F	÷.
8 3rd STG PINION 1st	(rpm)	2nd	(rpm)	GEAR RIM MATERIAL:			HARDNESS:	
9 4th STG PINION 1st	(rpm)	2nd	(rpm)	GEAR FACE WIDTH:	(mm)	GEAR CENTER MA	ATL:	
10 OTHER UNDESIRABLE SPEEDS: (6.7.1.3)				MECHANICAL EFFICIENCY:		% ISO 1328 GR	ADE:	
11 STAGE 12 SPEED	IMPELLER DIAMETER	TIP SPEED		PITCH DIA (	mm) PITCł	H LINE VELOCITY		(m/s)
13 1st STAGE (rpm)	(mm)		(m/hr)	PINIONS: (6.5.3), (6.12.2)	1st	2nd	3rd	4th
4 2nd STAGE (rpm)	(mm)		(m/hr)	SERVICE FACTOR:				
15 3rd STAGE (rpm)	(mm)		(m/hr)	MATERIAL:				· · · · · · · · · · · · · · · · · · ·
16 4th STAGE (rpm)	(mm)		(m/hr)	HARDNESS: (BHN) (R _c )				· · · · · · · · · · · · · · · · · · ·
17			_	BULL GEAR SHAFT:				
18 IMPELLERS: (6.5.2)						INTEGRAL W/GEA	R	
19 NO. OF IMPELLERS:	MATERIAL			MATL:		HARDNESS:		(BHN) (R _c )
20 TYPE (OPEN, RADIAL, BACKWARD LEANING	G, ETC.)	_		BRG SPAN	(mm)	WEIGHT (W/GEAR	)	(kg)
TYPE CONSTRUCTION: (6.5.2.2)				DIA @ GEAR	(mm)	DIA @ COUPLING		(mm)
22 METHOD OF ATTACH: (6.5.2.2)				SHAFT SLEEVES AT SEALS: MATL				
23 ROTATION, VIEWED FROM INPUT SHAFT EN	ND:	🗆 cw	CCW	SHAFT LABYS: TYPE		MATL		
24				BULL GEAR RADIAL BRG TYPE:			LENGTH	(mm)
5 COMPRESSOR CASING:				ALLOW LOAD	(bar)	ACTUAL LOA	AD	(bar)
6 MODEL	CASING SPLIT			BULL GEAR THRUST BEARING	S: (6.8.3)			
7 STG 1	STG 2	STG 3	STG 4			ТҮРЕ		
8 MATERIAL	<u> </u>			MFR		AREA		<u>(</u> mm_)
9 MAWP, (barG)	<u> </u>			THRUST COLLAR (6.8.3.6)		GRAL	REPLACEABLE	
0 HYDRO TEST, (barG)				ALLOW LOAD	(bar)	ACTUAL LO/	AD	(bar)
1 MAX OPT TEMP, (°C)				GAS LOAD	(kg)	COUPLING L	OAD	(kg)
2				BEARINGS FITTED W/TEMP SENSOR	S (6.12.10, 6.12.1	1)		
3 O MIN DESIGN METAL TEMP (6.10.5)			(°C)	O PINION RADIAL BRG	0	BULL GEAR RADIA	L BRG	
4 CASING HEAT TREATMENT REQUIRED (6.10	0.3.1.1)			O THRUST BRG				
5 ULTIMATE STRESS FOR MATL (6.2.1)			(MPa)					
6 CASTING FACTOR (6.2.1)				MAIN CONNECTIONS: (6.3)				
7 WELDED CONNECTIONSNDT PROVIDED					0175	ASME	FACINIC	DOGITION
8 O 100% RADIOGRAPH O M	IAG PARTICLE	LIQ PENET	RANT		SIZE	RATING	FACING	POSITION
۹O				COMPR INLET				
0				COMPR DISCH				
	ISINGS:			PKG OUTLET				
42 BEARING HSG MATERIAL:				ATM BLOWOFF				
43 PINION RADIAL BEARINGS: (6.8.2)				FILTER OUTLET				
14 STG 1	STG 2	STG 3	STG 4					
45 BRG TYPE				U OTHER CONNECTIONS:		I		
46 ALLOW LOAD, (bar)					NO.	SIZE	TYPE	
47 ACTUAL LOAD, (bar)				LUBE OIL INLET				
18 BRG SPAN, (mm)				LUBE OIL OUTLET				
49 PINION THRUST BEARINGS: (6.8.3)				COOLING WATER INLET				
50 STG 1	STG 2	STG 3	STG 4	PRESSURE GAUGE				
51 BRG TYPE				TEMPERATURE GAUGE				
52 ALLOW LOAD, (bar)				CONDENSATE DRAINS				
53 ACTUAL LOAD, (bar)								
54 THRUST COLLAR								

02/03 3 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
SI UNITS (bar)	PAGE 4 OF 11 REQ'N NO.
1 VIBRATION DETECTORS: (7.4.4.5), (7.10.10)	O SHOP INSPECTIONS & TESTS: (8.1.1)
2 O TYPE O MODEL	O ADVANCE NOTIFICATION REQD DAYS
3 O MFR	OBSERVED WITNESSED
4 O NO. AT EACH PINION BEARING TOTAL NO.	O SHOP INSPECTION
5 O NO. AT EACH DRIVER BEARING TOTAL NO	O HYDROSTATIC (8.3.2) O O
6 🔲 X&Y RADIAL PROBES CAN BE MOUNTED ADJACENT TO IMPELLERS FOR:	O COMBINED TEST (8.3.4), (8.5.6) O O
7 1 st STG 2nd STG 3rd STG 4th STG	O ASME PTC 10 TEST (8.3.4.1) O O
8 OSCILLATOR-DEMODULATORS:	
9 O MFR O MODEL	O AFTERCOOLER
11 O MFR O MODEL	O GUIDE VANE TEST (8.5.12.1)
12 O LOCATION ENCLOSURE	O AT NON-100% POSITIONS
13 LI READOUT SCALE RANGE O ALARM LI SET @(µm)	O SOUND-LEVEL TEST O O
14 O SHUTDOWN: LI SET @(µm) O TIME DELAYSEC	
15 O PER API 670 (7.10.10), (7.10.11)	
22 READOUT SCALE RANGE Q ALARM SET @ (um)	
	O CLEANLINESS CHECK-VESSELS (8.2.3.3)
27 O TORSIONAL VIBRATION ANALYSIS OF TRAIN REOD (6.12.5)	
28 O RESIDIUAL LINBALANCE WORKSHEET REOD (6.12.8)	
	O GEAR TOOTH MAG-PART (8.5.4) O O
	° ° °
	O PRIOR DOCUMENTATION ON MAJOR REPAIRS NOT REOD (6 10 4 3)
36 CPI G RATING (kW/100 r @ 1.0 S.E. ACTUAL S.E.	O RETAIN FINAL ASSEMBLY CLEARANCES (8.5.1)
37 SHAFT JCT RATING: @ DRIVER (kW) @ INPUT SHAFT (kW)	O SUBMITTAL OF INSPECTOR'S CHECKLIST (8.1.2)
38 MOUNTING ARRANGEMENT @ INPUT SHAFT:	SIGNED BY REP FOR: O PURCHASER O VENDOR
39 MFR MAX BORE (mm) PROPOSED BORE (mm) (7.2.1.6)	IF DESIGN REQUIRES DISASSEMBLY OF PINION FOR BRG INSPECTION,
40 DRIVER HALF-CPLG MTD BY: DRIVER MFR O COMPR VENDOR	O FORGO BEARING INSPECTION BASED ON TEST DATA; OR
41 O IDLING ADAPTER FOR DRIVER HALF-COUPLING REQD	O INSPECT BEARING AND RETEST (8.5.11.2)
42 PIPING REQUIREMENTS:	WEIGHT: (kg)
43 RECOMMENDED STRAIGHT RUN OF PIPE DIA BEFORE SUCTION:	INTEG GEAR/COMPR DRIVER
44 O VENDOR TO OBSERVE FLANGE PARTING	GEAR UPPER CASE BULL-GEAR
45 O THROUGH STUDS REQUIRED FOR PIPING FLANGES	1st STAGE PINION 2nd STAGE PINION
46	INTERCOOLER BUNDLE
47 MISCELLANEOUS:	AFTERCOOLER BUNDLE
48 O VENDOR PRESENT DURING INITIAL ALIGN CHECK	BASE CONTROL PANEL
49 O VENDOR CHECK ALIGN AT OPERATING TEMP	MAX FOR MAINTENANCE (IDENTIFY)
50 O BASE DESIGNED FOR COLUMN MOUNTING	TOTAL SHIPPING WEIGHT
51 O THERMAL RELIEF VALVES PROVIDED BY VENDOR	SPACE REQUIREMENTS, (mm)
52 O FOR WATER-COOLED EXCHANGERS	COMPLETE UNIT: L W H
53 U FOR	CONTROL PANEL: (IF SEP)         L         W         H
54 O PURCHASER WILL PREPARE COORDINATION MEETING	INLET FILTER-SILENCER: L W H
55	AFTERCOOLER: (IFFURN) L W H
00	UINER L W H

02/03 4 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFICAL AIR COMPRESSOR (a) (processed b) (processed b) (processed b) SI UNITS (bar)         Difference (processed b) (processed b) (processed b) (processed b) (pr		
AIR COMPRESSORS (API 672-441 ED) DATA SHEET         DOR 0.         ILLERO.           Made SYSTEM REGENTS-MORAL OL FLOW         LUBECA. ED.         Allel S.         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL	
SLUMI'S (00)         (DVSC 15 0 / 11         RC0140           IMBE STREE RECENTS-COMULAL OR FLOW         (SUL 3020)         (SUL 3020)         (SUL 3020)         (SUL 3020)           IMBE STREE RECENTS-COMULAL OR FLOW         (SUL 3020)         (S	AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
ADD STSTEM RECENTS-HORMAL OL FLOW     LEAD     LADU     LADU	SI UNITS (bar)	PAGE 5 OF 11 REQ'N NO.
J         UBLCULUD         LAND         BASCI         USLUEUZE         Second Control		
Image: Construction of the section of the sectin of the section of the section of the section of the se	3 LUBE OIL TO: (L/min) (barG) (SSU @ 37.7°C)	
S       DAVICE       DAVICE         P       DAVICE       DAVICE         SUPPORT       DAVICE       DAVICE         SUPPORT       DAVICE       DAVICE         SUPPORT       DAVICE       DAVICE         D       DECENTRO       MELLISDE       DAVICE         D       DECENTRO       MELLISDE       TUBE SDE         D       DECENTRO       MELLISDE       TUBE SDE         D       DECENTRO       MELLISDE       TUBE SDE         D       DECENTRO       DECENTRO       DECENTRO         D       DECENTRO       DECENTRO       DECENTRO <td></td> <td>MIN ALLOW OIL TEMP (°C) (SSU)</td>		MIN ALLOW OIL TEMP (°C) (SSU)
Corr CorA     Corr CorA     Corr CorA     Corr CorA     Corr CorA     Corr CorA     CorA	5 DRIVER	
7     OUL, SYSTEM PRESURCES     MARE     MARE     MODEL       9     SUPPLY     (bud)     PLANE P	6 🗖 EXT GEAR	SYSTEM COMPONENT SUPPLIERS:
8       SUPPLY	7 OIL SYSTEM PRESSURES:	MFR MODEL
9       950 DESIGN       (bxf)       IVTOROTEET       (bxf)         10       COLLER:       SHELL SDE       TUBE SDE         11       (bxf)       COLLER:       SHELL SDE       TUBE SDE         12       (bxf)       COLLER:       SHELL SDE       TUBE SDE         13       (bxf)       (bxf)       STADEP PAMP       STADEP PAMP         14       (bxf)       SHELL SDE       TUBE SDE       STADEP PAMP         15       (bxf)       (bxf)       (bxf)       STADEP PAMP         14       (bxf)       (bxf)       (bxf)       (bxf)         15       (bxf)       (bxf)       (bxf)       (bxf)         16       (bxf)       (bxf)       (bxf)       (bxf)         17       (bxf)       (bxf)       (bxf)       (bxf)         16       (bxf)       (bxf)       (bxf)       (bxf)         17       (bxf)       (bxf)       (bxf)       (bxf)       (bxf)         18       (bxf)       (bxf)       (bxf)       (bxf)       (bxf)         19       (bxf)       (bxf)       (bxf)       (bxf)       (bxf)         10       (bxf)       (bxf)       (bxf)       (bxf)	8 SUPPLY(barG) PUMP RV SETTING(barG)	MAIN PUMP
10       Decoles:       SHELL SDE       TURE SDE         11       OPFEATING PRESS, (bar6)       OL       OL         12       OPFEATING PRESS, (bar6)       OL       OL         14       MAX.ALLOW YEARP, (C)       OL       OL       OL         15       DIVALUOW YEARP, (C)       OL       OL       OL       OL         16       DIVALUE VIEARS, (C)       OL       OL       OL       OL       OL         16       DIVALUE VIEARS, (C)       OL       TRANSTER VIEARS, (C)       OL	9 SYS DESIGN (barG) HYDROTEST (barG)	STANDBY PUMP
11         SHILL SDE         TUBE SDE         STEMA TUBERRE(R)	10 OIL COOLER:	ELECTRIC MOTOR(S)
12       OPERATING PRESS       (bello)         13       MAX.ALLOW TENP.       (C)         14       MAX.ALLOW TENP.       (C)         15       OF LOCADER(S)       OLI FLIEBS         16       SURTION STRAKERS       OLI FLIEBS         17       SURTION STRAKERS       OLI FLIEBS         18       ADM COUCHARG       SURTION STRAKERS       OLI FLIEBS         18       SURTION STRAKERS       OLI FLIEBS       OLI FLIEBS         18       ADM COUCHARG       SURTION STRAKERS       OLI FLIEBS         18       OR COUCHARGE       NON       NON       SURTION STRAKERS       OLI FLIEBS         20       OTHORES       NON       SURTION STRAKERS       OLI FLIEBS       OLI FLIEBS         20       COUCHARGE       NON       SURTION STRAKERS       OLI FLIEBS       OLI FLIEBS         21       DESCARED       ORIGINAL       ORIGINAL       SURTION STRAKERS       OLI FLIEBS         22       ORIGINAL HOLONESS       UNIN       ORIGINAL HOLONESS       SURAKERSCO       OLI FLIEBS	11 SHELL SIDE TUBE SIDE	STEAM TURBINE(S)
15       MAX.ALLOW WORK PRESS.       (bmG)         16       MAX.ALLOW TERP.       (C)         17       SURFACE AREA       (m)       OLITY         18       MAX.ALLOW TERP.       (C)         19       SURFACE AREA       (m)       OLITY         19       ASME CODE STANDED       DESIGNED TO TAM.         19       ASME CODE STANDED       DESIGNED TO TAM.         20       TURES       (mn)       AVG         21       WAIL THICKESS       (mn)       AVG         22       WAIL THICKESS       (mn)       AVG         22       WAILTRICKESS       (mn)       AVG         22       WAILTRICKESS       (mn)       AVG         23       TURES BHELL       (MN)         24       TURES S       (mn)         25       TURES BHELL       (MN)         26       MATRIALS       MANN         27       MATRIALS       MANNELOVERS         28       DELEMENT:       MARC         29       MARCINAL COVERS       MANN         20       MARCINAL COVERS       MANN         21       MARCINAL COVERS       MANN         22       MARCINALSCOVERS       MANN<	12 OPERATING PRESS, (barG)	OIL COOLER(S)
IA       MAX.ALLOW TEMP       (C)         IS       FOLLING FATCR	13 MAX ALLOW WORK PRESS, (barG)	OIL FILTERS
IS       Include FACTOR         IS       Include FACTOR         IS       Units of the second se	14 MAX ALLOW TEMP, (°C)	ACCUMULATOR(S)
17       BURFACE AREA       (m.)       DUTY       (u.hr)         18       DIREAD VALE BALL       (u.hr)       TRANSPER VALUE(S)		
Image: Description         Image: Description         Image: Description         Image: Description         Image: Description           Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description           Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image: Description         Image		
19       ASUE CODE STAMPED       O       DESIGNED TO TEMA       PUMP RELIEV PALVES         20       TUBES:       NO.       (mm)       INTERNALS         21       WALL THEONESS       (mm)       INTERNALS         22       MATERNALS       SHELL       PUMP RELIEV PALVES         23       CHANNEL COVERS       TUBE SHETS       MAIN         24       TUBES TUBE SUPPORTS       MAIN       STANDBY         25       OH PALVERS       TUBE SHETS       MAIN         26       HANNEL COVERS       TUBE SUPPORTS       SUBMERGED         27       MICRON NATING       ORONIAL       ABSOLUTE       SUBMERGED         28       DIP (early CLEAN       MODEL       SUBMERGED       MICRON NATING         29       DELEMINT:       MARE       MODEL       SHATT DRIVEN       MICRON NATING         30       NO ELEMINTS:       MARE       MODEL       SUBMERGED       MICRON NATING         31       OC CLEANTS       MARE       MICRON NATING       COLAPSE       SUBMERGED         31       OL CLEANTS       MARE       MICRON NATING       MICRON NATING       MICRON NATING         32       DELEMINT:       MARE       MICRON NATING       ROTARAY       ROTARAY		PUMP COUPLING
20       TUBES: NO.       0.D.       (mm)       LENGTH       (mm)         21       WALL THC/NESS       (mm)       AVG       (mm)       ELECTRIC HEATER         23       CHANELSHEADS       SHELL       PUMPS:       MAIN       STANDBY         24       TUBES       TUBE SUPPORTS       VERTICAL	19 ASME CODE STAMPED O DESIGNED TO TEMA	PUMP RELIEF VALVES
21       WALL THRORESS       (mn)       A VC       MIN         22       MARTERIALS       SHELL       PUMPS:       MAIN       STANDBY         23       CHANNEL SHEADS       TUBE SHEETS       O       HORIZONTAL	20 🖸 TUBES: NO O.D(mm) LENGTH(mm)	ELECTRIC HEATER
22       MATERIALS         23       OHANNELSREADS       SHELL       PUMPS:       MAIN       STANDBY         24       TUBES       TUBE SUPPORTS       OHORCONTAL	21 WALL THICKNESS (mm) AVG MIN	
22       CHANNELSHEADS	22 O MATERIALS	
24       TUBES       TUBE SHEETS       U HORINAL         26       CHANNEL COVERS       TUBE SUPPORTS       VERTICAL         28       DIL FILTERS:       SUBMERGED	23 CHANNELS/HEADS SHELL	PUMPS: MAIN STANDBY
ab       CHARMELLOYERS       IDDE SUPPARIS       Vertical,         ab       CHARLERS:       SUBMERGED		
28       0L FILTERS       NOMINAL       ABSOLUTE         29       D PF (tway)       CLEAN       DRTY       COULAPSE       TURNINE DRIVEN         29       ELEMENT:       MAKE       MODEL       SHAFT DRIVEN		
22       DPO:       Not Ref 1103		
22       ELEWENT:       MAKE       MODEL       SHAFT DRIVEN         30       NO. ELEMENTS       HSG MATL       CONTRIFUGAL         31       CORE MATL       HSG MATL       ROTAY         32       HSG MAWP       (barG)       HSG MATL       ROTAY         33       CLHEATER       MAX ALLOW TEMP       (°C)       FLANGE CONNECTED         33       CLHEATER       ####       RATED CAPACITY       (m_/h)         34       STEAM HEATER REQD       ELECTRIC HEATER REQD       WAX TO ELEC DISCHARGE PRESS       (barG)         36       RATING       (w/in)       DISCHARGE PRESS       (barG)         36       RATIONG       (w/in)       DISCHARGE PRESS       (barG)         37       OL RESERVOR:       SPEED       SPEED       SPEED         38       RETENTION TIME       MIN       CAPACITY       (i)       SPEED       SPEED         34       SILENCERS       SOCOUPLING       OSHA GUARD       MODEL       METANDEY PUWP CONTACL RESET:         34       MINETAR FLITERVISILENCER: (7.7)       MODEL       MER       MODEL       MODEL         35       MER       MODEL       MER       MODEL       MER       MODEL         34 <td< td=""><td>28 O DP: (bar) CLEAN DIRTY COLLAPSE</td><td></td></td<>	28 O DP: (bar) CLEAN DIRTY COLLAPSE	
30       NO. ELEMENTS       MEDIA       CENTRIFUGAL         31       CORE MATL       RATAL       ROTARY         32       HSG MAWP       (barG)       MAX ALLOW TEMP       (°C)         33       CH.HEATER:       RATED CAPACITY       (m,h)         34       SITEAM HEATER REDD       ELECTRIC HEATER REOD       NO ELECT DISCHARGE PRESS       (barG)         36       WATT DENSITY       (LA/hr)       (BKW)       (MAX SU	29 C ELEMENT: MAKE MODEL	
31       CORE MATL       O       HSG MATL       PLANGE CONNECTED         32       HSG MANP       (barG)       MAX ALLOW TEMP       (°C)       FLANGE CAPACITY       (m_/h)         33       OL HEATER:       ####       RATED CAPACITY       (m_/h)	30 INO. ELEMENTS IN MEDIA	
32       HSG MAWP       (barG)       MAX ALLOW TEMP       (°C)       FLANGE CONNECTED         33       OIL HEATER:       ####       RATED CAPACITY       (m_/h)         34       STEAM HEATER REQD       ELECTRIC HEATER REQD       (kl/hr)       (gk/W)       @ MAX SSU         36       RATING       (kl/hr)       (gk/W)       @ MAX SSU	31 O CORE MATL HSG MATL	O ROTARY
33       OL. HEATER:       ####       RATED CAPACITY (m_/h)         34       STEAM HEATER REQD       ELECTRIC HEATER REQD       NO ELEC DISCHARGE PRESS (barG)         38       WAT DENSITY       (kJ/hr)       BKW) @ MAX SSU	32 HSG MAWP(barG) MAX ALLOW TEMP(°C)	FLANGE CONNECTED
34       O       STEAM HEATER REOD       NO ELEC DISCHARGE PRESS       (barG)         38       RATING       (LJ/hr)       OKWY       @ MAX SSU         38       WATT DENSITY       (Win_)       DRIVER RATING       (WV)         39       WATT DENSITY       (Win_)       DRIVER RATING       (WV)         30       RETENTION TIME       MIN       CAPACITY       (I)         30       FREE SURFACE AREA       (cm.)       INTERNAL BAFFLES       COUPLING         44       OSHA GUARD       OSHA GUARD       OSHA GUARD         44       SILENCERS       MECHANICAL SEAL	33 OIL HEATER: ####	RATED CAPACITY (m_/h)
36       RATING       (kJ/hr)       (kJ/hr)       (kJ/hr)       (kJ/hr)       (kJ/hr)         36       WATT DENSITY       (Win_)       DR/VER RATING       (kW)       (kW)         37       OL RESERVOIR:       (Min_)       CASING MATERIAL       (kW)         38       RETENTION TIME       MIN       CAPACITY       (I)       SPEED       (I)         39       FREE SURFACE AREA       (om_)       INTERNAL BAFFLES       COUPLING       (I)       COUPLING       (I)         40       GRAGUARD       (III)       MECHANICAL SEAL       (III)       (III)       (IIII)       (IIIIIII)       (IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	34 STEAM HEATER REQD ELECTRIC HEATER REQD NO E	LEC DISCHARGE PRESS (barG)
36       WATT DENSITY       (Win_)       DRIVER RATING       (W)         37       OL RESERVOIR:       CASING MATERIAL       SPEED         38       RETENTION TIME       MIN       CAPACITY       (I)         39       FREE SURFACE AREA       (OT_)       INTERNAL BAFFLES       CASING MATERIAL         40       SPEED	35 RATING	(BkW) @ MAX SSU
37       OL RESERVOIR:         38       RETENTION TIME       MIN       CAPACITY         39       FREE SURFACE AREA       (cm_)       INTERNAL BAFFLES         40       OCUPUING       OSHA GUARD         41       OSHA GUARD	36 WATT DENSITY(W/in_)	DRIVER RATING (kW)
38       RETENTION TIME       MIN       CAPACITY       (I)       SPEED         39       FREE SURFACE AREA       (cm.)       INTERNAL BAFFLES       OCUPLING       INTERNAL BAFFLES         40       OSHA GUARD       OSHA GUARD       INTERNAL SEAL       INTERNAL SEAL       INTERNAL SEAL         41       STANDBY PUMP CONTROL RESET:       O AUTOMATIC       HOA SELECTOR SWITCH         44       SILENCERS       INTERNAL SEAL       INTERNAL SEAL         44       SILENCERS       INTERNAL SEAL       INTERNAL SEAL         45       INLET AIR FILTER/SILENCER: (7.7)       INSCHARGE BLOWOFF SILENCER: (7.8)       INTERNAL         46       MFR       MODEL       INTERNAL       INTERNAL         47       DESCRIPTION       IDESCHARGE BLOWOFF SILENCER: (7.8)       INTERNAL         48       PIPING CONNECTION       IDESCRIPTION       IDESCRIPTION         49       CLEAN DP, AS QUOTED       IDESCRIPTION       IDESCRIPTION         49       CLEAN DP, AS QUOTED       IDESCHARGE CONNECTION       IDESCRIPTION         50       CORROSION PROTECTION       IDESCHARGE DAL       IDESCHARGE OF SILENCER         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       IDESCHARGE OF SILENCER       IDESCHARGE OF SILENCER	37 OIL RESERVOIR:	
39       FREE SURFACE AREA       (cm_)       INTERNAL BAFFLES       COUPLING         40       OSHA GUARD       OSHA GUARD       INTERNAL SEAL       INTERNAL SEAL         42       STANDBY PUMP CONTROL RESET:       MANUAL       AUTOMATIC       HOA SELECTOR SWITCH         44       SILENCERS       INTERNAL BAFFLES       INTERNAL BAFFLES       INTERNAL BAFFLES         45       INLET AIR FILTER/SILENCER: (7.7)       DISCHARGE BLOWOFF SILENCER: (7.8)       MODEL       INTERNAL BAFFLES         46       MFR       MODEL       INTERNAL BAFFLES       DISCHARGE BLOWOFF SILENCER: (7.8)       MODEL       INTERNAL BAFFLES         47       DESCRIPTION       IDESCRIPTION       IDESCRIPONCION       IDESCRIPONCION       ID		SPEED
40       OSHA GUARD         41       MECHANICAL SEAL         42       STANDBY PUMP CONTROL RESET:         43       O MANUAL       AUTOMATIC         44       SILENCERS         45       INLET AIR FILTER/SILENCER: (7.7)       DISCHARGE BLOWOFF SILENCER: (7.8)         46       MFR	39 Gree Surface area (cm_) Gree Internal Baffles	
41       MECHANICAL SEAL         42       STANDBY PUMP CONTROL RESET:         43       O         44       SILENCERS         45       INLET AIR FILTER/SILENCER: (7.7)         46       MFR         47       DESCRIPTION         48       PIPING CONNECTION         49       CLEAN DP, AS QUOTED         CLEAN DP, AS QUOTED       (bar)         50       CORROSION PROTECTION         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       (bar)         52       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       (@ 1 m)         53       FILTER WILL BE ELEVATED       (m)	40	
42       STANDBY PUMP CONTROL RESET:         43       O       MANUAL       O       AUTOMATIC       HOA SELECTOR SWITCH         44       SILENCERS       SILENCERS       INLET AIR FILTER/SILENCER: (7.7)       DISCHARGE BLOWOFF SILENCER: (7.8)       MODEL         46       MFR       MODEL       MODEL       DISCHARGE BLOWOFF SILENCER: (7.8)       MODEL         47       DESCRIPTION       DESCRIPTION       DESCRIPTION       Image: CONNECTION         48       PIPING CONNECTION       FLANGE CONNECTION       Image: CONNECTION       Image: CONNECTION         49       CLEAN DP, AS QUOTED       (bar)       MOUNTING       Image: PIPING       O THER         50       C ORROSION PROTECTION       SUPPORTED BY       Image: PIPING       O THER         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       SPL (dBA)       (@ 1 m)       FROM DISCHARGE OF SILENCER         52       FILTER WILL BE ELEVATED       (m)       ABOVE GRADE       FROM DISCHARGE OF SILENCER       Image: PIPING	41	
43       SILENCERS         44       SILENCERS         45       INLET AIR FILTER/SILENCER: (7.7)         46       MFR	42	STANDBY PUMP CONTROL RESET:
44       JULICENS         45       INLET AIR FILTER/SILENCER: (7.7)         46       MFR	43	MANUAL O AUTOMATIC O HOA SELECTOR SWITCH
45       International content (1.5)         46       MFR       Model         47       DESCRIPTION         48       PIPING CONNECTION         49       CLEAN DP, AS QUOTED       (bar)         50       CORROSION PROTECTION         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       (bar)         52       FILTER WILL BE LEVATED         53       FILTER WILL BE ELEVATED		
47     DESCRIPTION     DESCRIPTION       48     PIPING CONNECTION     FLANGE CONNECTION       49     CLEAN DP, AS QUOTED     (bar)       50     C CORROSION PROTECTION     MOULL       51     O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE     (bar)       52     O FILTER WILL BE LEVATED     (m)       53     O FILTER WILL BE ELEVATED     (m)		
48       PIPING CONNECTION         49       CLEAN DP, AS QUOTED         50       CORROSION PROTECTION         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE         52       (m)         53       FILTER WILL BE ELEVATED		
49       CLEAN DP, AS QUOTED       (bar)       MOUNTING       HORIZONTAL       VERTICAL         50       CORROSION PROTECTION       SUPPORTED BY       PIPING       OTHER         51       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE       FROM COMPRESSOR       SPL (dBA)       (@ 1 m)       FROM DISCHARGE OF SILENCER         52       FILTER WILL BE ELEVATED       (m)       ABOVE GRADE       SPL (dBA)       (@ 1 m)       FROM DISCHARGE OF SILENCER		
50     CORROSION PROTECTION     SUPPORTED BY     O PIPING     O THER       51     O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A DISTANCE     SNPORTED BY     Image: SNPORTED BY     Image: SNPORTED BY       52     O FILTER WILL BE ELEVATED     (m)     FROM COMPRESSOR     Image: SNPORTED BY     FROM DISCHARGE OF SILENCER       53     O FILTER WILL BE ELEVATED     (m)     ABOVE GRADE     Image: SNPORTED BY     Image: SNPORTED BY     Image: SNPORTED BY	49 CLEAN DP, AS QUOTED (bar)	MOUNTING O HORIZONTAL O VERTICAL
51       O       FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A         52       DISTANCE	50 O CORROSION PROTECTION	
52         Distribute         (m)         PRUM COMPRESSUR           53         O         FILTER WILL BE ELEVATED         (m)         ABOVE GRADE	51 O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A	SPL (dBA) (@ 1 m) FROM DISCHARGE OF SILENCER
53 V HILLER WILL BE ELEVATED(m) ABOVE GRADE		
	53 V FILIER WILL BE ELEVATED(m) ABOVE GRADE	

					•						
PACKAGED, INTEGRALLY GEARED CENTRIFUGAL  ARC COMPRESSORS (AP 1672-HT ED) DATA SHEET  UNC   O  O  O  O  O  O  O  O  O  O  O  O											
PACKAGED, INTEGRALLY GEAVED CENTRIFICAL     PRO     PACKAGED, INTEGRALLY GEAVED CENTRIFICAL     PRO     P											
AIR COMPRESSORS (AP 107-0-11 ED) DATA SHEET			PACKAGED INTEGRALLY GEARED CENTRIEUGAL								
SUNTS (bar)         year         e         or         t         network           class         commod a downer with rest         commod a downer with rest         res         rest         res         res			AIR COMPRESSORS (API 6724TH ED) DATA SHEET		JOB NO.				ITEM NO.		
			SI UNITS (bar)		PAGE	6	OF	1	REQ'N NO.		
VOLCOMMON AMELLY (7.4.3)     VOLCOMMON AMELLY (7.4.3.4)     VOLCOMMON AMELLY (7.4.4)     VOLCOMMON AMELLY (7.4.4.4)     VOLCOMMON AMELLY (7.4.4.4.4)     VOLCOMMON AMELLY (7.4.4.4.4.4)     VOLCOMMON AMELLY (7.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4	1		c	ONTROLS AND I	NSTRUMENT	ATION (7	7.4)				
Image: Instrument Suprame       DV       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0	2	OCA	AL CONTROL PANEL: (7.4.3)								
Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)       Image: Becomester (7.4.3.3)         Image: Becomester (7.4.4.3.3)       Image: Becomester (7.4.4.3.3)       Image: Becomester (7.4.4.3.3)         Image: Becomester (7.4.4.3.3)       Image: Becomester (7.4.4.3.3.4.3.4.3.4.3.4.3.4.3.4.3.4.3.4.	3	0	ELECTRICAL AREA CLASSIFICATION:				REQUIREN	1ENT: (7.4	.3.2)		<u> </u>
	4						ONE	0	INSTRUMENT AIR	2	O NITROGEN
With ITPE ALTROUCHE AND LINK:       Image: Construction of the ALTROUGH AND LINK:         With ITPE ALTROUCHE WITH ALTROUGH AND HAZARDOUGH AND HAXARDOUGH AND HAZARDOUGH AND HAXARDOUGH AND HAZARDOUGH AND HAXARDO	5						PE XRED	DUCES TH TO I	E CLASSIFICATION	FROM DIV 1	
TAREL FAILURE TAILOUTED     TO THE CAREGO TO THE CONTROL OF THE CAREGO TO THE CAR	7									FROM DIV 1	
	8	$\underline{\sim}$	AREAS) REQUIRED					TO	DIV 2		
INCOMPARATIONS       O STRIP HEATER       O INTERNAL COOLING       TOMONIAZAREDUS         INTERNAL COOLING       O OTHER       O TROPCALIZATION REQUIRED         INTERNAL COOLING       O OTHER       O TROPCALIZATION REQUIRED         INTERNAL CAUCES       NER       SZE A TYPE         INTERNAL CAUCES       NER       SZE A TYPE         INTERNAL EXCLUSION       SZE A TYPE       INTERNAL COULES         INTERNAL EXCLUSION       NER       SZE A TYPE         INTERNAL RELET VALUES       NER       SZE A TYPE         INTERNAL RELET VALUES       NER       SZE A TYPE         INTERNAL RELET VALUES       NER       SZE A TYPE         SSE A TYPE       SZE A TYPE       SZE A TYPE         SSE A TYPE       SZE A TYPE       SZE A TYPE         INTERNAL RELET VALUES       NER       SZE A TYPE         SSE A TYPE       SZE A TYPE       SZE A TYPE         SSE A TYPE       SZE A TYPE       SZE A TYPE         SSE A TYPE       SZE A TYPE       SZE A TY	9 F	ANE	EL FEATURES: (7.4.3.2)				PE ZREC	DUCES TH	E CLASSIFICATION	FROM DIV 2	
IV       WEATHERHOOD       PURCE CONNECTIONS       O       OTHER       O       TROPCALIZATION REQUIRED         IV       MISTERIARY SUPPLIERS:       MFR       SUZE A TYPE	10	О	VIBRATION ISOLATORS O STRIP HEATER O INTERN	AL COOLING				TOT	NONHAZARDOUS		
TOPPCALIZATION REQUIRED      TROPPCALIZATION REQUIRED      TROPPCALIZATION REQUIRED      TROPPCALIZATION REQUIRED      TROPPCALIZENT ON RECOVERES      MFR      SIZE & TYPE      SIZE & TYPE	11	0	WEATHERHOOD DURGE CONNECTIONS O	THER							
Image: state of the state	12					O TF	ROPICALIZ	ATION RE	QUIRED		
Image: Section of the sectin of the section of the	13										
Name       SUBJ Control Notion         Name       SUB_A TYPE         SUB_A TYPE       SUB_A TYPE         Name       SUB_A TYPE         SUB_A TYPE       SUB_A TYPE         SUB_A TYPE       SUB_A TYPE         SUB_A TYPE       SUB_A TYPE </td <td>14</td> <td></td>	14										
Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes:       Image: Solute buddes:     Image: Solute buddes:     Image: Solute buddes: <t< td=""><td>15</td><td>$\Box$</td><td>INSTRUMENT SUPPLIERS:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	15	$\Box$	INSTRUMENT SUPPLIERS:								
LUVE LANUES     MORESULATE     LUVE LANUES     MORESULATE     LUVE LANUES     MORESULATE     LUVE LANUES     MORESULATE     MORE      MORE     MORE     MORE      MORE	10								SIZE & ITPE		
UPF PRESURE GUIDES:       MPR         IDF PRESURE SUTCHES:       MPR         IDF PRESURE SUTCHES:       MPR         IDF PRESURE SUTCHES:       MPR         IDF PRESURE SUTCHES:       MPR         IDF PRESURE TANSMITTERS       MPR         IDF PRESURE TANSMITTERS:       MPR         IDF TEMPERATURE CONTROL VALVES:       MPR	18								SIZE & TYPE		
PRESSURE SWITCHES:       MFR         PRESSURE TANDE SWITCHES:       MFR         LEVEL SWITCHES:       MFR         SUE & TYPE         LEVEL SWITCHES:       MFR         SUE & TYPE         TEMPERATURE TANSMITTERS:       MFR         SUE & TYPE         CONTROL VALVES:       MFR         SUE & TYPE         SUE & TYPE         CONTROL VALVES:       MFR         SUE & TYPE	19		DIFF PRESSURE GAUGES: MFR						SIZE & TYPE		
1       TEMPERATURE SWITCHES:       MFR         2       LEVEL SWITCHES:       MFR         3       PRESSURE TRANSMITTERS:       MFR         4       TEMPERATURE TRANSMITTERS:       MFR         5       LEVEL SWITCHES:       MFR         5       LEVEL TRANSMITTERS:       MFR         6       CONTROL VALVES:       MFR         7       PRESSURE RELIEF VALVES:       MFR         8       CONTROL VALVES:       MFR         9       TEMPERATURE CONTROL VALVES:       MFR         9       Start FLOW INDICATORS:       MFR         9       Start TRUE       Start TYPE         9       Start TRUE       MFR         9       Start TRUE       Start TYPE         9       MFR       Start	20		PRESSURE SWITCHES: MFR						SIZE & TYPE		
12       Level, SWITCHES:       MFR       Size & TYPE         29       PRESSURE TRANSMITTERS:       MFR       Size & TYPE         26       TEMPERATURE TRANSMITTERS:       MFR       Size & TYPE         26       CONTROL VALVES:       MFR       Size & TYPE         27       PRESSURE RELIEF VALVES:       MFR       Size & TYPE         28       TEMPERATURE CONTROL VALVES:       MFR       Size & TYPE         29       TEMPERATURE CONTROL VALVES:       MFR       Size & TYPE         20       TEMPERATURE CONTROL VALVES:       MFR       Size & TYPE         21       TEMPERATURE CONTROL VALVES:       MFR       Size & TYPE         23       SIGHT FLOW INDICATORS:       MFR       Size & TYPE         24       ANUNCATOR:       MFR       Size & TYPE         25       SOLENDID VALVES:       MFR       Size & TYPE         26	21		TEMPERATURE SWITCHES: MFR						SIZE & TYPE		
25       PRESSURE TRANSMITTERS:       MFR         26       TEMPERATURE TRANSMITTERS:       MFR         27       TEMPERATURE TRANSMITTERS:       MFR         28       LEVEL TRANSMITTERS:       MFR         29       LEVEL TRANSMITTERS:       MFR         20       CONTROL VALVES:       MFR         21       LEVEL TRANSMITTERS:       MFR         22       CONTROL VALVES:       MFR         23       TEMPERATURE CONTROL VALVES:       MFR         24       THERMAL RELEF VALVES:       MFR         25       SOLENDO VALVES:       MFR         26       TOW INDICATORS:       MFR         27       PURGE FLOW INDICATORS:       MFR         28       SOLEA TYPE         29       SOLEA TYPE         20       MFR       SIZE A TYPE         21       UBE FITTINGS       MFR         23       MFR       SIZE A TYPE         24       MFR       SIZE A TYPE         25       MFR       SIZE A TYPE         26       MFR       SIZE A TYPE         27       MFR       SIZE A TYPE         28       MFR       SIZE A TYPE         29       MFR	22		LEVEL SWITCHES: MFR						SIZE & TYPE		
24     TEMPERATURE TRANSMITTERS:     M/R     SUZE & TYPE       25     LEVEL TRANSMITTERS:     M/R     SUZE & TYPE       26     CONTROL VALVES:     M/R     SUZE & TYPE       27     PRESSURE RELIEF VALVES:     M/R     SUZE & TYPE       28     THEMPERATURE CONTROL VALVES:     M/R     SUZE & TYPE       29     TSGHT FLOW INDICATORS:     M/R     SUZE & TYPE       20     SIGHT FLOW INDICATORS:     M/R     SUZE & TYPE       29     SUENDO VALVES:     M/R     SUZE & TYPE       20     SIGHT FLOW INDICATORS:     M/R       21     PURGE FLOW INDICATORS:     M/R       22     SUENDO VALVES:     M/R       23     SOLENOU VALVES:     M/R       24     TUBE FITTINGS     M/R       25     SUE & TYPE       26     TUBE FITTINGS     M/R       27     M/R     SUZE & TYPE       28     M/R     SUZE & TYPE       29     M/R     SUZE & TYPE       20     O PEN     CLOSE     T	23		PRESSURE TRANSMITTERS: MFR						SIZE & TYPE		
25       LEVEL TRANSMITTERS:       MFR         26       CONTROL VALVES:       MFR         27       THESSURE RELIEF VALVES:       MFR         28       THERMAL RELIEF VALVES:       MFR         29       THERMAL RELIEF VALVES:       MFR         20       THERMAL RELIEF VALVES:       MFR         29       THERMAL RELIEF VALVES:       MFR         30       SIGHT FLOW INDICATORS:       MFR         31       PURGE FLOW INDICATORS:       MFR         32       SOLENOID VALVES:       MFR         33       SOLENOID VALVES:       MFR         34       TUBE FITINGS       MFR         35       SOLENOID VALVES:       MFR         36       MFR       SIZE & TYPE         37       TUBE FITINGS       MFR         38       MFR       SIZE & TYPE         39       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE <td< td=""><td>24</td><td></td><td>TEMPERATURE TRANSMITTERS: MFR</td><td></td><td></td><td></td><td></td><td></td><td>SIZE &amp; TYPE</td><td></td><td></td></td<>	24		TEMPERATURE TRANSMITTERS: MFR						SIZE & TYPE		
CONTROL VALVES: MER      MER     SIZE & TYPE     SIZE & T	25		LEVEL TRANSMITTERS: MFR						SIZE & TYPE		
27       PRESSURE RELIEV VALVES:       MPR         28       THERMERATURE CONTROL VALVES:       MPR         29       TEMPERATURE CONTROL VALVES:       MPR         30       SIGHT FLOW INDICATORS:       MPR         31       PURGE FLOW INDICATORS:       MPR         32       SOLENDI VALVES:       MPR         34       MURCH FLOW INDICATORS:       MPR         35       SUZE & TYPE	26		CONTROL VALVES: MFR						SIZE & TYPE		
Intelligent values       Init N         Side Trype       Side Trype         Side Trype       Size & Trype         Side Trype       Size & Trype         PURGE FLOW INDICATORS:       MFR         Size & Trype       Size & Trype         ANNUNCIATOR:       MFR         Size & Trype       Size & Trype         ANNUNCIATOR:       MFR         Size & Trype       Size & Trype         ANNUNCIATOR:       MFR         MFR       Size & Trype         Size & Trype       MFR	27								SIZE & ITPE		
Self FLOW INDICATORS:       MFR         SUBJECT FLOW INDICATORS:       MFR         SUBJECT FLOW INDICATORS:       MFR         SOLED ID VALVES:       MFR         SUBJECT FLOW INDICATORS:       OPEN         CLOSE       TO SOUND ALARM AND BE NORMALLY	20								SIZE & TYPE		
31       PURGE FLOW INDICATORS:       MFR         32       SUENDID VALVES:       MFR         33       ANNUKCIATOR:       MFR         34       ANNUKCIATOR:       MFR         35       MFR       SIZE & TYPE         36       MFR       SIZE & TYPE         37       MFR       SIZE & TYPE         38       MFR       SIZE & TYPE         39       SWITCH CLOSURES: (7.4.5.3.2)       MFR         4       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       DE-ENERGIZED         4       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       O DE-ENERGIZED         4       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       O DE-ENERGIZED         5       SHUTDOWN SYSTEMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION       O ENERGIZED       O DE-ENERGIZED         4       O NON-SHUTDOWN SYSTEMALEY TO ENERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O NON-SHUTDOWN SYSTEMARENT OT DE FROVIDE DUTH	30		SIGHT FLOW INDICATORS: MFR						SIZE & TYPE		
32       SOLENOID VALVES:       MFR         33       ANNUNCIATOR:       MFR         34       TUBE FITTINGS       MFR         35       MFR       SIZE & TYPE         36       MFR       SIZE & TYPE         37       MFR       SIZE & TYPE         38       MFR       SIZE & TYPE         39       SWTCH CLOSURES: (7.4.5.3.2)         40       ALARM CONTACTS SHALL:       O OPEN         41       SHUTOW CONTACTS SHALL:       O OPEN         5       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY         40       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY         41       SHUTDOWN CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       O ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       O ENERGIZED       O DE-ENERGIZED         43       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION         44       O THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED       O THROUGH FLOWING INSTRUMENTATION:         45       O THROUGH FLOWING INSTRUMENT SENSING LINE REPLATE TO VIB	31		PURGE FLOW INDICATORS: MFR						SIZE & TYPE		
33       ANNUNCIATOR:       MFR       SIZE & TYPE         34       TUBE FITTINGS       MFR       SIZE & TYPE         35       MFR       SIZE & TYPE         36       MFR       SIZE & TYPE         37       MFR       SIZE & TYPE         38       MFR       SIZE & TYPE         39       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE         39       MFR       SIZE & TYPE         39       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE         31       MFR       SIZE & TYPE         30       MFR       SIZE & TYPE         31       MARDUDON CONTACTS SHALL:       O PPEN O CLOSE TO SOUND ALARM AND BE NORMALLY       O ENERGIZED O DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O OPEN O CLOSE TO SOUND ALARM AND BE NORMALLY       O ENERGIZED O DE-ENERGIZED         42       (NOTE: NORMAL CONTROLOR SON IS IN OPERATION)       O ENERGIZED O TRIP AND BE NORMALLY       O ENERGIZED O DE-ENERGIZED         44       NON-SHUTDOWN DEVICES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES<	32		SOLENOID VALVES: MFR						SIZE & TYPE		
34       TUBE FITTINGS       MFR       SIZE & TYPE         35       MFR       SIZE & TYPE       SIZE & TYPE         36       MFR       SIZE & TYPE       SIZE & TYPE         37       MFR       SIZE & TYPE       SIZE & TYPE         39       SWTCH CLOSURES: (7.4.5.3.2)       MFR       SIZE & TYPE       SIZE & TYPE         39       SWTCH CLOSURES: (7.4.5.3.2)       O PEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       O ENERGIZED       O DE-ENERGIZED         40       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO TRIP AND BE NORMALLY       O ENERGIZED       O DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O OPEN       CLOSE       TO TRIP AND BE NORMALLY       O ENERGIZED       D DE-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O NO-SHUTDOWN MEDICES ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT REPLACEMENT DURING OPERATION         43       SILE VALUES MAR NOT TO BE PROVIDED WITH A MEANS TO PERMIT REPLACEMENT DURING OPERATION       O INFORMATION VALUES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         44       MISCELLANEOUS INSTRUMENTATION:       INFOR 490 EVICES       RV BODY MATERIAL:       O INFORMATION:         50	33		ANNUNCIATOR: MFR						SIZE & TYPE		
35       MFR       SIZE & TYPE         36       MFR       SIZE & TYPE         37       MFR       SIZE & TYPE         38       MFR       SIZE & TYPE         39       SWTCH CLOSURES: (7.4.5.3.2)       MFR         40       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       De-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O OPEN       CLOSE       TO TRIP AND BE NORMALLY       ENERGIZED       De-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       CLOSE       TO TRIP AND BE NORMALLY       ENERGIZED       De-ENERGIZED         43       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       NON-SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)         44       NON-SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTING DOWN THE UNIT (7.4.5.3.4)       NON-SHUTDOWN DEVICES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         45       MISCELLANEOUS INSTRUMENT SENSING LINE REQUIRED TO VIBRATION       SUBATION       NON-STUDENTS THAT CAN BE ISOLATED         46       LIQUID-FILLED GAUGES ARE REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       RV BODY MATERIAL:       RV BODY MATERIAL:         50	34		TUBE FITTINGS MFR						SIZE & TYPE		
38       MFR       SIZE & TYPE         37       MFR       SIZE & TYPE         38       MFR       SIZE & TYPE         39       SWITCH CLOSURES: (7.4.5.3.2)       NFR         40       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       O ENERGIZED       O E-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O OPEN       CLOSE       TO TRIP AND BE NORMALLY       O ENERGIZED       O E-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O SHUTDOWN SYSTEMS ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION         44       NON-SHUTDOWN SYSTEMS ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION       O ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         46       ISOLATION VALVES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION       O RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL       Image: Required por Annuncipation of the provider of the prov	35		MFR						SIZE & TYPE		
37	36		MFR						SIZE & TYPE		
33       MFR       SWITCH CLOSURES: (7.4.5.3.2)         34       SWITCH CLOSURES: (7.4.5.3.2)       OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       DE-ENERGIZED         40       ALARM CONTACTS SHALL:       OPEN       CLOSE       TO SUND ALARM AND BE NORMALLY       ENERGIZED       DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       OPEN       CLOSE       TO TRIP AND BE NORMALLY       ENERGIZED       DE-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       ON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION         44       NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION       ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         45       INROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED       INROLED TO VIBATION       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL         46       CHIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       RV BODY MATERIAL:       SUBJECT TO VIBATION         50       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN STEEL       RV BODY MATERIAL:       CONNECTION ONLY         51       O THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       X       Y       Z       <	37		MFR						SIZE & TYPE		
39       Symmetry CLOSURES. (1,4.3.32)         40       ALARM CONTACTS SHALL:       O OPEN       CLOSE       TO SOUND ALARM AND BE NORMALLY       ENERGIZED       O DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O OPEN       CLOSE       TO TRIP AND BE NORMALLY       ENERGIZED       O DE-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       Image: Condition is when compressor is in operation       Image: Condition is when compressor is in operation       Image: Condition is when compressor is in operation         43       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       Image: Condition is when compressor is in operation         44       NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION       Image: Condition is strumentation       Image: Condition is strumentation         45       Isolation valves are required for shutdown sensing devices       Image: Condition is strumentation       Image: Condition is strumentation         46       LiQUID-Filled GAUGES are required for AREAS SUBJECT TO VIBRATION       Image: Condition is strumentation       Image: Condition is when compression is that can be isolated       Image: Condition is when compression is that can be isolated         50       Relief Valves Required For ANNUNCIATOR (7.4.3.2)       Image: Condition is when compression is the connection only       Image: Condition is when com	38								SIZE & ITPE		
Hurdnamic Contracts Stall:       O       OFEN       O       CLOSE       TO SUMU ALARM AND BE NORMALLY       O       DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O       OPEN       O       CLOSE       TO TRIP AND BE NORMALLY       O       ENERGIZED       DE-ENERGIZED         41       SHUTDOWN CONTACTS SHALL:       O       OPEN       O       CLOSE       TO TRIP AND BE NORMALLY       O       ENERGIZED       DE-ENERGIZED         42       (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O       DE-ENERGIZED         43       SHUTDOWN DEVICES ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)       O       DE-ENERGIZED         44       NON-SHUTDOWN DEVICES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES       ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES       ISOLATION VALVES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         45       O       THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED       INFOLUTION IS WHAT AND BE ENDITION       INFOLUTION IS WHAT AND SENSING LINE REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       INFOLUTION IS WHAT AND HAVE BODIES IN MATERIALS OTHER THAN STEEL       INFOLUTION IS WHAT AND HAVE SAUGHTED       INFOLUTION IS WHAT AND HAVE SAUGHTED       INFOLUTION IS WHAT AND HAVE SAUGHTED       INFOLUTION IS WHAT AND H	39										
1       OFFENDITION TO THE NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)       Image: Condition of the provided with a means to operation)         2       SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)         4       NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION         45       ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         46       THROUGH FLOWING INSTRUMENTATION:         47       MISCELLANEOUS INSTRUMENT SENSING LINE REQUIRED         48       THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED         49       LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL         51       THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED         52       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY         53       PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)         54       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED         54       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED         56	40 F			TO TRIP AND						RGIZED	
<ul> <li>SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)</li> <li>NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION</li> <li>ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES</li> <li>ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES</li> <li>THROUGH FLOWING INSTRUMENTATION:</li> <li>THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED</li> <li>LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION</li> <li>RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL</li> <li>THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED</li> <li>FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY</li> <li>PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)</li> <li>NFPA 496 PURGE TYPE:</li> <li>X</li> <li>Y</li> <li>Z</li> <li>CONNECTION ONLY</li> <li>COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED</li> <li>G</li> </ul>	42	1101	(NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)		DE NORMA				U LINEI	(OIZED	O DE ENERGIZED
44       O       NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION         45       O       ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         46       Miscellaneous instrumentation:         47       Miscellaneous instrument sensing line required         49       Liquid-Filleb GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       Relief VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL         51       THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED         52       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BUILS EYE TYPE WITH STEEL BODY         53       O         54       O         55       O         56       O	43	О	SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT T	ESTING WITHOU	T SHUTTING	DOWN T	HE UNIT (7	7.4.5.3.4)			
45       O       ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES         46       MISCELLANEOUS INSTRUMENTATION:         47       MISCELLANEOUS INSTRUMENTATION:         48       O       THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED         49       LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL         51       O         52       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY         53       O         54       O         55       O         56       O	44	С	NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT	REPLACEMENT [	DURING OPE	RATION					
46         47         47         MISCELLANEOUS INSTRUMENTATION:         48         49         49         49         49         49         41         41         42         43         44         44         45         46         46         47         48         49         49         41         41         42         43         44         45         46         46         47         48         49         41         41         42         42         43         44         45         46         46         47         48         49         40         41         42         42         43         44         44         45 <tr< td=""><td>45</td><td>С</td><td>ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>	45	С	ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES								
47       MISCELLANEOUS INSTRUMENTATION:         48       ○       THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED         49       ○       LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       ○       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL       ○       RV BODY MATERIAL:         51       ○       THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED          52       ○       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY          52       ○       PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)       NFPA 496 PURGE TYPE:       ○       X       ○       Y       ○       Z       ○       CONNECTION ONLY         54       ○       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED	46										
48       O       THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED         49       O       LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL       Image: Components That Can be IsoLated         51       THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       Image: Components That Can be IsoLated         52       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY       Image: Components That Can be IsoLated         53       PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)       NFPA 496 PURGE TYPE:       O       X       Y       Z       CONNECTION ONLY         54       O       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED       Image: Component Structure Struc	47	IISC	ELLANEOUS INSTRUMENTATION:								
49       C       LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION         50       C       RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL       Image: Components That Can be isolated         51       O       THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED       Image: Components That Can be isolated         52       O       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY       Image: Components That Can be isolated         53       O       PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)       Image: NFPA 496 PURGE TYPE:       O       X       O       Y       Image: Z       Connection ONLY         54       O       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED       Image: Z	48	$\mathbf{S}$	THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED								
50       C RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STELL       RV BODY MATERIAL:         51       O THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED         52       O FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY         53       O PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)         54       O COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED         55       O         56       O	49	2	LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION				г	<u></u>			
52       FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY         53       PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)         54       COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED         55	50	$\tilde{\mathbf{n}}$	RELIEF VALVES MAY HAVE BUDIES IN MATERIALS OTHER THAN STEEL	TED			L		SODY MATERIAL:		;
53     O     PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)     NFPA 496 PURGE TYPE:     O     X     O     Z     CONNECTION ONLY       54     O     COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED     S6     O     S6     O	52	õ	FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BUILD FOR COMPONENTS THAT CAN BE ISOLAT	EL BODY							
COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED     So	53	õ	PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)	== 000 . FPA 496 PURGE 1	YPE:		0	xΩ	Y O Z	O CONNEC	CTION ONLY
55 O	54	õ	COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED				-				
56 O	55	0									
	56	О									

02/03 6 OF 10 API672.XLS

	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL																		
	AIR COMPRESSORS (API 6724th ED) DATA SHEET		JOB N	NO.							ITEM	NO.							
1	SI UNITS (bar)	ENTATIO	PAGE	OPE C	FSUP	7 PPLY	OF		11		REQ'	NO.							
1			00		1 001	EL	EMEN	т						IN	DICAT	OR			
3		PRO\	/ BY		TYPE		L	OCATIO	N	INSTA	LL BY	PRO	V BY	L	OCATIO	N			
-																			
				OUT		(1)			(0						(0				F F
			ER	EAD		TER	В К С	NEL	PING		ER		ШШ	В КG	PING	NEL		z g	
		К	HAS	T RI	ж	LIMS	R F	LPA	ЧЬ	Ю	HAS	Ю	HAS	Я	НЫ	LPA	5	NOC	0 7
		ĒND	URC	REC	WITC	3AN:	ĒND	DCAI	URC	ĒND	JRC	- ND	URC	Ū.	URC	DCAI	AR	E H	
4		>	ā	ā	Ś	Ē	5	Ľ	ā	5	ā	>	ā	>	ā	Ľ	A	IS I	r.
5 6																			
7																			
8	LUBE OIL DISCHARGE																		
10		<u> </u>																	
11	AIR FILTER/SILENCER DP																		
12		ı			1		1								1				1
13	TEMPERATURE:																		
14	COMPRESSOR SUCTION STAGE																		
15	COMPRESSOR DISCHARGE STAGE									İ				ī			İ	Ť	İ
16	OIL COOLER INLET & OUTLET																		
17	COMPRESSOR PINION JOURNAL BRG																		
18	BULL GEAR JOURNAL BRG																		
19	BULL GEAR THRUST BRG																		
20	DRIVER JOURNAL BRG																		
21	DRIVER THRUST BRG																		
22	RESERVOIR																		
23																			
24	LEVEL:																		
25	LUBE OIL RESERVOIR																		
26	SEPARATOR																		
27																	1	-	
28																			
29																			
30	AXIAL POSITION BULL GEAR SHAFT																		
32	AXIAL POSITION STAGE PINION																		
22	RADIAL VIBRATION ON DRIVER																		
34	AXIAL POSITION ON DRIVER SHAFT																		
35	ACCELEROMETER ON GEAR BOX	1																	
36		•	•																
37	FLOW:																		
38	OIL RETURN																		
39	SEAL GAS																		
40																			
41	MISCELLANEOUS:																		
42	STANDBY L.O. PUMP RUNNING																		
43	PANEL PURGE FAILURE																		
44																			
45																	_		
46																			
47																			
48 40		ı	I	I		I										I			
49 50	NOTES: 1) TRANSMITTERS SUPPLIED BY VENDOR SHALL INCLUDE SENSING FLEMEN	лт																	
51	2) SUPPLY "REPEAT SIGNAL" FOR CONTROL ROOM ALSO																		
52	,																		
	02/03 7 OF 10 API672.XLS																		

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
SI UNITS (bar)	PAGE 8 OF 11 REQ'N NO.
1 (INTER-) (AFTE	(R-) COOLER(S) (7.6)
2 SERVICE OF UNIT:	
3 SIZE: TYPE: HORIZ	VERT CONNECTED IN PARALLEL SERIES
4 SURF/UNIT: (GROSS/EFF)(m_) SHELLS/UNIT:	SURF/SHELL: (GROSS/EFF) (m_)
5 PERFORMAI	NCE OF ONE UNIT
6	SHELL SIDE TUBE SIDE
7 O FLUID NAME	
8 🔲 FLUID QUANTITY, TOTAL (kg/h)	
9 VAPORIN/OUT	
10 LIQUIDIN/OUT	
11 TEMPERATUREIN/OUT (°C)	
12 SPECIFIC GRAVITY	
13 VISCOSITY, LIQUID (mPa-s)	
14 SPECIFIC HEAT, (kJ/kg °C)	
15 THERMAL CONDUCTIVITY, (kJ/m h °C)	
16 🔲 LATENT HEAT, (kJ/kg °C)	
17 LIIINLET PRESSURE, (barG)	
18 VELOCITY, (m/s)	
19 PRESSURE DROPALLOW/CALC, (bar)	
20 O FOULING RESISTANCEMINIMUM (hr m_ °C/kJ)	
21 HEAT EXCHANGED	(kJ/hr) MTD CORRECTED(°C)
22 TRANSFER RATE, (kJ/hr m_°C) SERVICE	CLEAN
23 CONSTRUCTION OF ONE SHELL	SKETCH: BUNDLE NOZZLE ORIENTATIONS
24 SHELL SIDE	TUBE SIDE
25 DESIGN/TEST PRESSURE, (barG)	
26 DESIGN TEMPERATURE, (°C)	
27 NO. PASSES PER SHELL	
28 CORROSION ALLOWANCE, (mm)	
29 NOZZLES: INLET	
30 SIZE & OUTLET	
31 RATING VENT-DRAIN	
32 TUBE NO. O.D. (mm) THK (MIN) (AVG) (mm)	LENGTH (m) PITCH (mm) < 30 <a>60 <a>90 &lt;&gt; 45</a></a>
33 TUBE TYPE	MATERIAL
34 SHELL MATL I.D(mm) O.D(mm)	SHELL COVER MATL (INTEG)(REMOV)
35 CHANNEL OR BONNET MATL	CHANNEL COVER MATL
36 TUBESHEETSTATIONARY MATL	TUBESHEETFLOATING MATL
37 FLOATING HEAD COVER MATL	
38 BAFFLESCROSS MATL TYPE	% CUT (DIA) (AREA) SPACING: C/C INLET (mm)
39 BAFFLES-LONG MATL	SEAL TYPE
40 SUPPORTSTUBE U-BEND	TYPE
	TUBE SIDE
46 REMARKS:	
47	
48	
49	
51	
52	
53	
54	
55	

02/03 8 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET SI UNITS (bar)	JOB NO ITEM NO
1 NEMA FRAME INDUCTION MOTORS	TO IEEE 841
2 MFR MODEL	SERIAL NO. NEMA FRAME
3 DRIVEN EQUIPMENT TYPE DRIVEN EQUIPMENT ITEM NO.	MOTOR ITEM NO.
	ITIONS
5       6       SITE DATA:         7       ELECTRICAL SUPPLY:       VOLT         8       ELECTRICAL AREA CLASSIFICATION:       O         9       O       CLASS         10       ATMOSPHERIC MIXTURE:	DRIVE SYSTEM: O DIRECT CONNECTED O EXTERNAL GEAR O OTHER STARTING: (7.1.2.2)
11       IGNITION TEMPERATURE:      (°C)       TEMP CODE:         12       ALTITUDE:       O       LESS THAN       (1000 m)       O         13       AMBIENT TEMPERATURE MINIMUM:	(m)     O     FULL VOLTAGE     O     REDUCED VOLTAGE     %       (m)     O     LOADED     O     UNLOADED     %       ("C)     O     VOLTAGE DIP     %
17	AD CURRENT, AMP EFFICIENCY POWER FACTOR ILL
23 CONSTRUCTION F	EATURES
28       NAMEPLATE       (KW) (rpm)	MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)  CW CW CCW BI-DIRECTIONAL  INSULATION CLASS: B B C F O TROPICALIZED  TEMPERATURE RISE: (DEFAULT IS 80°C ABOVE 40°C BY RES @ 1.0)  C TEMPERATURE RISE: (DEFAULT IS 80°C ABOVE 40°C BY RES @ 1.0)  C TEMPERATURE RISE: (DEFAULT IS 80°C ABOVE 40°C BY RES @ 1.0)  C TOPICALIZED  TEMPERATURE RISE: (DEFAULT IS 80°C ABOVE 40°C BY RES @ 1.0)  C TOPICALIZED  TOPICALIZED  MOTOR TO BE "HERMALLY PROTECTED"  MOTOR TO BE "HERMALLY PROTECTED"  MOTOR TO BE "OVER TEMP PROTECTED"  MOTOR TO BE "OVER TEMP PROTECTED"  TYPE #1-"WINDING-RUNNING AND LOCKED-ROTOR PROTECTED"  TYPE #2-"WINDING-RUNNING PROTECTED"  TYPE #3-"WINDING-PROTECTED, NON-SPECIFIC"  SPACE HEATER REQD RATED AT:  VOLTS PHASE HERTZ VOLTS KAS SHEATH TEMPERATURE:  SEPARATE JUNCTION BOX FOR SPACE HEATER LEADS  MOTOR THRUST LOAD:  MISCELLANEOUS PAINTING:  MISCELLANEOUS PAINTING:  MISCELLANEOUS PAINTING:  MISCELLANEOUS PAINTING:
51 IEEE TESTING:       O OBSVD       O WIT       O SUBMIT CERT'D RESULTS         52       O SPECIAL TESTING:	PAINTING: O IEEE 841 STD O OTHER
02/03 9 OF 10 API672.XLS	

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL	).	
AIR GUINFRESSORS (API 0/2411 EU) DATA SHEET JOB NO ITEM NO	10.	
1 ALLOWABLE PIPING FORCES AND MOMENTS (6.4)		
2		1
3 COMPRESSOR INLET COMPRESSOR DISCHARGE PACK	AGE OUTLET	
4 PORCE, (kg) MOMENT, (N-m) PORCE, (kg) MOMENT, (N-m) PORCE, (kg)	(N-m)	
5 AAAL		
7 TRANS		
8		
9 ADDITIONAL DATA:		
10		
11		
14		
15		
16		
17		
18		
19		
21		
22		
23		
24		
25		
27		
28		
29		
30		
31		
33		
34		
35		
36		
3/		
39		
40		
41		
42		
43		
45		
46		
47		
48		
49		
51		
52		
53		
54		

02/03 10 OF 10 API672.XLS

Λ	2
4	<b>.</b> ר.
	~

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET SI UNITS (bar)	
CENTRIFUGAL AIR COMP	RESSOR PERFORMANCE CURVES
When this requisition is issued for purchase, the supp the selected compressor will be inserted here as a su	olier's proposed curves for bstitute for this sheet.
The compressor performance and characteristics as g will be a part of the supplier's contractual obligation v	jiven on this performance curve vithin the tolerances agreed upon.
02/03 ADI672 YI S	

			1				1	1	I.		
			REVISION	0		1	2	3	4		
			DATE								
			BY								
PACKAGED, INTEGRALLY GEARED CENTRIFU	GAL		REV/APPR								
AIR COMPRESSORS (API 6724th ED) DATA SI	HEET		JOB NO.			ITEM	NO.				
Hybrid			PAGE	1 (	OF	11 REQ'	N NO.				
		O AS BU	ПТ								
	•	•									
	O	BB)( (0.00)		WINO.							
6 NOTE: INFORMATION TO BE COMPLETED: O BY PURCHA	ASER	-		BY MANUFACTU	RER		BY PURCH	ASER OR MFR			
7		G	ENERAL								
8 COMPRESSOR MFR	ZE AND TYPE	) _				SERIAL NO.					
9 DRIVER MFR	DRIVER TY	PE _				RATE	D 0	RPM			
10 DRIVE SYSTEM: O DIRECT COUPLED O OTHER						DUTY	(1.2) O BASI	c C	SPECIAL		
11 OPERATING CONDITIONS (	6.1.9)						CONTROL SYS	TEM (7.4.2)			
10		LOW	MIN		CONT		4.2.1)				
12		LOW	MIIN			KOL METHOD. (/	.4.2.1)				
13 (ALL DATA ON PER UNIT BASIS)	RATED	AMB *	AMB	OTHER	0	CAPACITY MODULA	TION (CONST DISCH	PRESS) (7.4.2.1 a.)			
14	(3.24)	(7.10.1)	↓ ↓		-		OTTLE DEVICE	0	DAMPER		
15 O DELIVERED FLOW,					1	GLOBE VAL	VE O	BUTTERFLY VAL	VE		
16 O WEIGHT FLOW, 0 (WET) (DRY)						O VARIABLE	NLET GUIDE VAN	ES			
17 O INLET COOLING WATER TEMP, 0					0	AUTOMATIC DUA	L CONTROL (7.4.2	.1 b.)			
18			•		1	0	0 TO	0	DISCH PRESS		
					0		STOP (7 4 2 1 c)				
			1 1		Ť		0 3101 (7.4.2.1 0.)	OTOP.	0		
20 O PRESSURE 0			+			O START	0	STOP	0		
21 O TEMPERATURE 0					0	OTHER (DESCRIE	3E):				
22 O RELATIVE HUMIDITY %											
23 O MOLECULAR WEIGHT (M)											
24 INLET VOLUME, 0 (WET / DRY)											
25											
26 DISCHARGE CONDITIONS:											
27 O PRESSURE 0					CONT	ROL SYSTEM RE	QUIREMENTS:				
					0			2.2)			
					Ŭ			.2.2)			
29											
30 PERFORMANCE:			1 1			O W/ROTARY O W/RECIPROCATING					
31 MAX 0 REQUIRED (ALL LOSSES INCL)					_						
32 0 AIR DELIVERED					0	MICROPROCESS	OR CAPABLE OF	COMMUNICATION			
33 INPUT SPEED 0						WITH PURCHASE	R'S DUS (7.4.1.4)				
34 ESTIMATED SURGE, 0 (@ ABOVE SPEED)						O COMM PRO	TOCOL				
35 O MAX DP ACROSS INLET FILTER, 0											
36 DP INCLUDED IN CALCULATION YES NO					CONT	ROL SYSTEM AL	TERNATES: (7.4.1.	.3)			
								SSOB BASED			
					1						
					1			v			
39 - 70 FIBE TO SURGE (0.1.12.2)			+ -		1	O SUITABLE I		T			
40			┥		-		UBY PURCHASER	l			
41 🖵											
42		* UNTHRO	TTLED PERFORMAN	ICE FOR DRIVER SIZING	à		INTER- AND AF	TER-COOLERS (7.	6)		
43 REMARKS:					AFTE	RCOOLER:					
44						O FURNISHE	D BY PURCHASER	8 (7.6.1)			
45					1	O NOT NEEDI	ED (7.6.1)				
46			1			OB					
47											
40											
40					-		D DT PURCHASEH	1			
49											
50			$\Box$	AIR-COOLED EXC	HANGER AUTOM	ATIC					
51			4		UNINUL MEANS:	. (7.0.0)					
52					1	O LOUVERS	O VARI	ABLE SPEED FAN	3		
53					1	O VARIABLE I	PITCH FANS	О вуря	ASS VALVE		
54					0	AIR-COOLER CO	NTROL MANUAL C	NLY (7.6.6) BY:			
55						O LOUVERS	O BYP	ASS VALVE			
56					1		PITCH FANS				
					-						

02/03 1 OF 10 API672.XLS

PACKAGED. INTEGRALLY GEARED CENTRIFUGAL	
AIR COMPRESSORS (API 6724TH ED) DATA SHEET	JOB NO. ITEM NO.
Hybrid	PAGE 2 OF 11 REQ'N NO.
1 O LOCATION, SITE DATA (6.1.5)	O SPECIFICATIONS
2 LOCATION:	NOISE SPECIFICATIONS: (6.1.3)
3 O INDOOR O HEATED O UNDER ROOF	O MAX ALLOWABLE SPL0
4 O OUTDOOR O UNHEATED O PARTIAL SIDES	O APPLICABLE SPEC
5 O GRADE O MEZZANINE O	ACOUSTIC HOUSING: O YES O NO
6 O WINTERIZATION REQD O TROPICALIZATION REQD	APPLICABLE SPECIFICATIONS:
7	API 672 AND O
8 SITE DATA:	
9 O ELEVATION0 O BAROMETER0	O NON-ASME WELDING IF NOT AWS D1.1: (6.10.3.5)
10 O RANGE OF AMBIENT TEMPERATURE, 0	O UNITS OF MEASURE (5.1) O US CUSTOMARY O SI O OTHER
11 DRY BULB WET BULB	
12 NORMAL	PAINTING:
13 MAXIMUM	O MANUFACTURER'S STD
14 MINIMUM	O OTHER
15	
16	BASEPLATE GROUT: (7.10.3) O EPOXY O CEMENT O NONE
17 UNUSUAL CONDITIONS:	
18 O DUST O FUMES O CORROSIVE CONDITIONS	PREPARATION FOR GROUT SURFACES: (7.10.3)
19 O CORROSIVES PRESENT:	O MFR STD O SSPC 6 BLAST O BARE FOR FIELD BLAST
20 O CONDITIONS CAUSE STRESS CORROSION CRACKING	O INORGANIC ZINC SILICATE COATING
21 O OTHER	
22	
23 AREA ELECTRICAL CLASSIFICATION: (6.1.8) T-CODE	SHIPMENT: (8.4.1)
24 O CLASS GROUP DIVISION	O DOMESTIC O EXPORT O EXPORT BOXING REQD
25 O LOCAL ELECTRICAL CODES:	O OUTDOOR STORAGE OVER 6 MONTHS
26	
27 O UTILITY CONDITIONS:	UTILITY CONSUMPTION (9.2.3 i.)
27 O UTILITY CONDITIONS: 28 O STEAM HEATING:	UTILITY CONSUMPTION (9.2.3 i.) STEAM:
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:           29         INLET MIN         0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0
STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OTHER         0
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OTHER         0           ELECTRIC:         LOCKED
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OTHER         0           ELECTRIC:         LOCKED           0         ROTOR           0         ROTOR
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0	
O         UTILITY CONDITIONS:           27         O         STEAM HEATING:           28         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OTHER         0           ELECTRIC:         LOCKED           0         ROTOR           0         ROTOR           AMPS         AMPS
O         UTILITY CONDITIONS:           27         O         STEAM HEATING:           28         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35          0         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OTHER         0           ELECTRIC:         LOCKED           0         ROTOR           0         ROTOR           AMPS         AMPS
O         UTILITY CONDITIONS:           28         O         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           0         OTHER           0         ROTOR
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:           37         HEATING         CONTROL         SHUTDOWN	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         ROTOR           AMPS         FULL LOAD           0         ROTOR           AMPS
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0           36         O         ELECTRICITY:         37         HEATING         CONTROL         SHUTDOWN	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         OTHER           0         COCKED           0         ROTOR           AMPS         AMPS           0         MAIN LO PUMP           AUX LO PUMP
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0           36         O         ELECTRICITY:          5           37         VOLTAGE         SHUTDOWN         SHUTDOWN           38         HERTZ	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OIL HEATER:         0           OTHER         0           ELECTRIC:         LOCKED           NAIN LO PUMP         0           AUX LO PUMP         0           OIL HEATER         0           SPACE HEATER         0           CONTROL SYSTEM LOAD:         0           COOLING WATER:         0
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         O         ELECTRICITY:         1           37         HEATING         CONTROL         SHUTDOWN           38         VOLTAGE         1         1           40         PHASE         1         1	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OIL HEATER         0           OIL HEATER         0           SPACE HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         VOLTAGE         HEATING         SHUTDOWN           40         PHASE	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OIL HEATER         0           SPACE HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           OIL HEATER         0           CONTROL SYSTEM LOAD:         0           COOLING WATER:         0           LO         INTER-           COOLER         AFTER-           OTHER         OTHER
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         O         ELECTRICITY:         1           37         HEATING         CONTROL         SHUTDOWN           40         PHASE         1         1           41         Q         COOLING WATER: (6.1.6)         5	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0         OTHER         0           ELECTRIC:         LOCKED         FULL LOAD           0         ROTOR         AMPS         FULL LOAD           AUX LO PUMP
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN           30         NORM           31         MAX           0         0           32         OUTLET MIN           0         0           33         NORM           0         0           34         MAX           0         0           35         O           36         O           27         HEATING           28         O           39         HEATING           40         PHASE           41         O           42         O           43         TEMP INLET           0         MAX RETURN	Image: Construction of the construction of
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0           36         O         ELECTRICITY:         1         0           37         HEATING         CONTROL         SHUTDOWN           VOLTAGE         1         1         1         1           40         PHASE         1         1         1           41         O         COOLING WATER: (6.1.6)         1         1           42         O         COOLING WATER: (6.1.6)         1         1           44         PRESS NORM         0         DESIGN         0         0	Image: Construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0         0           36         O         ELECTRICITY:	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:         0           OIL HEATER:         0         OTHER         0           ELECTRIC:         LOCKED         FULL LOAD           MAIN LO PUMP
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0           36         O         ELECTRICITY:         0         0         0           37         HEATING         CONTROL         SHUTDOWN         0           38         VOLTAGE	Image: Construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of the construction of
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         INLET MIN         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:           36         O         ELECTRICITY:           37         HEATING         CONTROL         SHUTDOWN           38         VOLTAGE	Image: Constraint of the constrant of the constraint of the constraint of the constraint of the c
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         INLET MIN         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:           36         O         ELECTRICITY:           37         HEATING         CONTROL         SHUTDOWN           38         VOLTAGE	Image: Constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         INLET MIN         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         O         ELECTRICITY:         0           37         HEATING         CONTROL         SHUTDOWN           40         PHASE	Image: Constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         OUTLET MIN         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         C ELECTRICITY:	Image: Constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constrated of the constraint of the constraint of the constraint of the
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         INLET MIN         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         O         0         0           35         O         ELECTRICITY:         0           36         O         ELECTRICITY:         0           37         HEATING         CONTROL         SHUTDOWN           40         PHASE	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:           OIL HEATER:         0           OIL HEATER         0           OIL HEATER         0           SPACE HEATER         0           OIL HEATER         0           SPACE HEATER         0           OIL HEATER         0           SPACE HEATER         0           OUL HEATER         0           SPACE HEATER         0           COOLING WATER:         0           COOLING WATER:         0           QUANTITY,         0           QUANTITY,         0           OUTLET TEMP,         0           PRESS DROP,         0           TOTAL CW,         0           AIR/NITROGEN:         INLET PRESS           QUANTITY         0           SEAL SYSTEM:
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         O         ELECTRICITY:         0           36         O         ELECTRICITY:         0           37         HEATING         CONTROL         SHUTDOWN           40         PHASE	Image: Construction of the construction of
27         O         UTILITY CONDITIONS:           28         O         STEAM HEATING:         0         0           30         NORM         0         0         0           31         MAX         0         0         0           32         OUTLET MIN         0         0         0           33         NORM         0         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0         0           36         O         ELECTRICITY:	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:         0         OTHER         0           OIL HEATER:         0         OTHER         0           ELECTRIC:         LOCKED         FULL LOAD           0         ROTOR         AMPS         FULL LOAD           AUX LO PUMP
27         O         UTILITY CONDITIONS:           28         STEAM HEATING:         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         OUTLET MIN         0         0           36         ELECTRICITY:         0         0           36         ELECTRICITY:	UTILITY CONSUMPTION (9.2.3 i.)           STEAM:         0         OTHER         0           OIL HEATER:         0         OTHER         0           ELECTRIC:         LOCKED         FULL LOAD           NAIN LO PUMP         0         ROTOR         AMPS           AUX LO PUMP
INLET MIN         0         0           30         NORM         0         0           31         MAX         0         0           32         OUTLET MIN         0         0           33         NORM         0         0           34         MAX         0         0           35         OUTLET MIN         0         0           34         MAX         0         0         0           35         O         ELECTRICITY:         0         0         0           36         O         ELECTRICITY:	Image: Constraint of the constrated of the constraint of the constraint of the constraint of the
O         UTILITY CONDITIONS:           28         STEAM HEATING:           29         INLET MIN           30         NORM           31         MAX           0         0           32         OUTLET MIN           0         0           31         MAX           0         0           32         OUTLET MIN           0         0           33         NORM           0         0           34         MAX           0         0           33         NORM           0         0           34         MAX           0         0           35         O           36         ELECTRICITY:           37         HEATING           9         HERTZ           9         HERTZ           9         HERTZ           9         HEATING           9         PRESS NORM           141         O           142         O           143         TEMP INLET           144         PRESS NORM           145         MIN RETURN	Image: Constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constraint of the constrated of the constraint of the constraint of the constraint of the

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL	
AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
Hybria Construct	PAGE 3 OF 11 REQ'NINO.
3 RATED INPUT: 0 TRIP 0	MATERIAL SPLIT
4 BULLGEAR CRITICALS: 1st 0	BULL GEAR: (6.5.3), (6.12.2)
5 PINION CRITICALS:	RATED POWER BASED ON TOOTH SURFACE DURABILITY: 0
6 1st STG PINION 1st0 2nd0	RATED POWER BASED ON TOOTH BENDING: 0
7 2nd STG PINION 1st0 2nd0	O MIN AGMA SERVICE FACTOR:
8 3rd STG PINION 1st0 2nd0	GEAR RIM MATERIAL: HARDNESS:
9 4th STG PINION 1st 0 2nd 0	GEAR FACE WIDTH: 0 GEAR CENTER MATL:
10 OTHER UNDESIRABLE SPEEDS: (6.7.1.3)	MECHANICAL EFFICIENCY:% ISO 1328 GRADE:
11 STAGE IMPELLER INP SPEED DIAMETER SPEED	
13 1st STAGE 0 0 0	PINIONS: (6.5.3), (6.12.2) 1st 2nd 3rd 4th
14 2nd STAGE 0 0 0 0	SERVICE FACTOR:
15 3rd STAGE 0 00	MATERIAL:
16 4th STAGE000	HARDNESS: (BHN) (R _c )
17	BULL GEAR SHAFT:
18 IMPELLERS: (6.5.2)	
19 NO. OF IMPELLERS: MATERIAL	BRG SPAN
20 TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)	DIA @ GEAR 0 DIA @ COURLING 0
21 METHOD OF ATTACH: (6.5.2.2)	SHAFT SLEEVES AT SEALS: MATL
23 ROTATION, VIEWED FROM INPUT SHAFT END:	SHAFT LABYS: TYPE MATL
24	BULL GEAR RADIAL BRG TYPE: LENGTH 0
25 COMPRESSOR CASING:	ALLOW LOAD 0 ACTUAL LOAD 0
26 MODEL CASING SPLIT	BULL GEAR THRUST BEARINGS: (6.8.3)
27 STG 1 STG 2 STG 3 STG 4	LOCATION TYPE
28 MATERIAL	MFR AREA 0
29 MAWP, 0	
31 MAX OPT TEMP 0	
32	BEARINGS FITTED W/TEMP SENSORS (6.12.10, 6.12.11)
33 O MIN DESIGN METAL TEMP (6.10.5) 0	O PINION RADIAL BRG O BULL GEAR RADIAL BRG
34 CASING HEAT TREATMENT REQUIRED (6.10.3.1.1)	O THRUST BRG
35 ULTIMATE STRESS FOR MATL (6.2.1) 0	
36 CASTING FACTOR (6.2.1)	
	ASME SIZE RATING FACING POSITION
39 0	
41 COMPRESSOR BEARINGS & BEARING HOUSINGS:	PKG OUTLET
42 BEARING HSG MATERIAL:	ATM BLOWOFF
43 PINION RADIAL BEARINGS: (6.8.2)	FILTER OUTLET
44 STG 1 STG 2 STG 3 STG 4	
45 BRG TYPE	
46 ALLOW LOAD, 0	NU. SIZE TYPE
47 ACTUAL LOAD, 0	
50 STG 1 STG 2 STG 3 STG 4	PRESSURE GALIGE
51 BRG TYPE	TEMPERATURE GAUGE
52 ALLOW LOAD, 0	CONDENSATE DRAINS
53 ACTUAL LOAD, 0	
54 THRUST COLLAR	

02/03 3 OF 10 API672.XLS

AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO. ITEM NO.	
Hybrid	PAGE 4 OF 11 REQ'N NO.	
1 VIBRATION DETECTORS: (7.4.4.5), (7.10.10)	O SHOP INSPECTIONS & TESTS: (8.1.1)	
2 TYPE MODEL	O ADVANCE NOTIFICATION REQD	DAYS
3 O MFR		OBSERVED WITNESSED
4 O NO. AT EACH PINION BEARING TOTAL NO.		<b>•</b> •
5 O NO. AT EACH DRIVER BEARING TOTAL NO.		0 0
6 X&Y RADIAL PROBES CAN BE MOUNTED ADJACENT TO IMPELLERS FOR:	COMBINED TEST (8.3.4), (8.5.6)	
		0 0
10 O MONITOR SUPPLIED BY	0	
11 O MFR O MODEL	O GUIDE VANE TEST (8.5.12.1)	0 0
12 O LOCATION ENCLOSURE	O AT NON-100% POSITIONS	
13 🔲 READOUT SCALE RANGEO ALARM 🔲 SET @0	O SOUND-LEVEL TEST	0 0
14 O SHUTDOWN: SET @0 O TIME DELAYSEC	O SPARE ROTOR TEST (8.5.12.2)	0 0
15 O PER API 670 (7.10.10), (7.10.11)	O SPARE ROTOR MECH ONLY	0 0
16 BEARING-TEMPERATURE MONITOR: (7.10.12)	O IMPELLER OVERSPEED TEST (8.3.3)	
17 O REQD O SUPPLIED BY: O PER API 670	O POST OVERSPEED TEST NDE OF IMPELLERS (8.3.3.2)	0 0
		0 0
	BRG SEAL GEAR CHECK (8.5.14.3.5)	0 0
22 READOUT SCALE RANGE Q ALARM SET @ 0		õõ
	O CLEANLINESS CHECKVESSELS (8.2.3.3)	õ õ
24 DYNAMICS: (6.7) (6.12)	CLEANLINESS CHECK-PIPING (8.2.3.3)	0 0
25 O CRITICAL LATERAL SPEEDS ARE PROVEN BY PRIOR LINITS (6.7.2)	O HARDNESS CHECK OF PINIONS (8,2,3,4)	õõ
26 O DAMPED UNBALANCED RESPONSE ANALYSIS REQD (6.12.3)	O OF BULL-GEAR	õ õ
27 O TORSIONAL VIBRATION ANALYSIS OF TRAIN REQD (6.12.5)	O OF WELD REPAIRS	0 0
28 O RESIDUAL UNBALANCE WORKSHEET REQD (6.12.8)	O NDE OF MAJOR REPAIRS (8.2)	0 0
29 🖸 REMARKS	O GEAR TOOTH MAG-PART (8.5.4)	0 0
30 COUPLINGS: (7.2.1)	O FINAL INSPECTION PRIOR TO PAINT	0 0
31 TYPE: O DISK PAK O DIAPHRAGM O OTHER	O INSPECTION OF PREP FOR SHIPMENT (8.4)	0 0
32 DISK MATL: O STAINLESS STEEL O COATED W/	0	0 0
33 🖸 MAKE 🔟 MODEL	0	0 0
	-	
35 SPACER LENGTH0 LIMITED END-FLOAT REQD	O PRIOR DOCUMENTATION ON MAJOR REPAIRS NOT REQD (6.10.4.3)	
36 CPLG RATING 0 @ 1.0 S.F. ACTUAL S.F.	O RETAIN FINAL ASSEMBLY CLEARANCES (8.5.1)	
37 SHAFT JCT RATING: @ DRIVER0 @ INPUT SHAFT0	SUBMITTAL OF INSPECTOR'S CHECKLIST (8.1.2)	0
		U VENDOR
40 DRIVER HALF-CPLG MTD BY: O PROFOLD BORE (7.2.1.0)		
41 O IDLING ADAPTER FOR DRIVER HALF-COUPLING REQD	O INSPECT BEARING AND RETEST (8.5.11.2)	
42 PIPING REQUIREMENTS:		
43 RECOMMENDED STRAIGHT RUN OF PIPE DIA BEFORE SUCTION:	INTEG GEAR/COMPR DRIVER	
44 O VENDOR TO OBSERVE FLANGE PARTING	GEAR UPPER CASE BULL-GEAR	
45 O THROUGH STUDS REQUIRED FOR PIPING FLANGES	1st STAGE PINION 2nd STAGE PIN	ON
46	INTERCOOLER BUNDLE	
47 MISCELLANEOUS:	AFTERCOOLER BUNDLE	
48 O VENDOR PRESENT DURING INITIAL ALIGN CHECK	BASECONTROL PAN	EL
49 O VENDOR CHECK ALIGN AT OPERATING TEMP	MAX FOR MAINTENANCE (IDENTIFY)	
50 U BASE DESIGNED FOR COLUMN MOUNTING		
	SPACE REQUIREMENTS, 0	
52 FUR WATER-COULED EACHAINGERS	CONTROL PANEL: (JE SEP)	n
		н
4GENDA (9.1.3)	AFTERCOOLER: (IF FURN) L W	н
56	OTHER: L W	н

02/03 4 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL	
AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
Hybrid	PAGE 5 OF 11 REQ'N NO.
1 LUBE O	L SYSTEM (6.9)
2 BASIC SYSTEM REQ'MNTSNORMAL OIL FLOW	LUBRICANT: O SYNTHETIC O HYDROCARBON
4 🖵 COMPR/GEAR	MIN ALLOW OIL TEMP00
	MFR MODEL
	STEAM TURBINE(S)
13 MAX ALLOW WORK PRESS, 0	OIL FILTERS
14 MAX ALLOW TEMP, 0	ACCUMULATOR(S)
15 O FOULING FACTOR	SUCTION STRAINERS
16	CHECK VALVES
17 U SURFACE AREA0 DUTY0	TRANSFER VALVE(S)
	PUMP COUPLING
23 CHANNELS/HEADS SHELL	PUMPS: MAIN STANDBY
24 TUBES TUBE SHEETS	
25 CHANNEL COVERS TUBE SUPPORTS	O VERTICAL
26 OIL FILTERS:	
27 MICRON RATING O NOMINAL O ABSOLUTE	
28 O DP: 0 CLEAN DIRTY COLLAPSE	
32 HSG MAWP 0 MAX ALLOW TEMP 0	FLANGE CONNECTED
33 OIL HEATER: ####	
34 O STEAM HEATER REQD CELECTRIC HEATER REQD NO	ELEC DISCHARGE PRESS 0
35 RATING 0	0 @ MAX SSU
36 WATT DENSITY0	DRIVER RATING 0
37 OIL RESERVOIR:	
38 🖸 RETENTION TIME MIN 🗖 CAPACITY0	SPEED
39 FREE SURFACE AREA0 INTERNAL BAFFLES	
40	O SHA GUARD
41	O MECHANICAL SEAL
42	STANDBY PUMP CONTROL RESET:
43	O MANUAL O AUTOMATIC O HOA SELECTOR SWITCH
49 CLEAN DP, AS QUOTED 0	MOUNTING O HORIZONTAL O VERTICAL
50 O CORROSION PROTECTION	SUPPORTED BY O PIPING O OTHER
51 O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A	SPL (dBA) 0 FROM DISCHARGE OF SILENCER
53 O FILTER WILL BE ELEVATED0 ABOVE GRADE	

02/03 5 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724TH ED) DATA SHEET	JOB NO ITEM NO						
1 CONTROLS AND	INSTRUMENTATION (7.4)						
2 LOCAL CONTROL PANEL: (7.4.3)							
	PURGE REQUIREMENT: (7.4.3.2)						
4 CL GR DIV ()							
5 PANEL ENCLOSURE REQUIREMENT: (7.4.3.2)	TYPE XREDUCES THE CLASSIFICATION FROM DIV 1						
6 🔘 NEMA TYPE 4X ENCLOSURE MATERIAL:	TO NONHAZARDOUS						
7 NEMA TYPE 7 (INDOOR EXPLOSION-PROOF FOR HAZARDOUS GAS AREAS) REQUIRED	TYPE Y-REDUCES THE CLASSIFICATION FROM DIV 1 TO DIV 2						
9 PANEL FEATURES: (7.4.3.2)	TYPE ZREDUCES THE CLASSIFICATION FROM DIV 2						
10 O VIBRATION ISOLATORS O STRIP HEATER O INTERNAL COOLING	TO NONHAZARDOUS						
11 O WEATHERHOOD OURGE CONNECTIONS O OTHER							
12	O TROPICALIZATION REQUIRED						
13							
14							
15 O INSTRUMENT SUPPLIERS:							
16 PRESSURE GAUGES: MFR	SIZE & TYPE						
17 TEMPERATURE GAUGES: MFR	SIZE & TYPE						
18 LEVEL GAUGES: MFR	SIZE & TYPE						
19 DIFF PRESSURE GAUGES: MFR	SIZE & TYPE						
20 PRESSURE SWITCHES: MFR	SIZE & TYPE						
21 TEMPERATURE SWITCHES: MFR	SIZE & TYPE						
22 LEVEL SWITCHES: MFR							
23 PRESSURE IRANSMITTERS: MFR							
24 IEMPERATURE TRANSMITTERS. MPR							
26 CONTROL VALVES: MER	SIZE & TYPE						
	SIZE & TYPE						
28 THERMAL RELIEF VALVES: MFR	SIZE & TYPE						
29 TEMPERATURE CONTROL VALVES: MFR	SIZE & TYPE						
30 SIGHT FLOW INDICATORS: MFR	SIZE & TYPE						
31 PURGE FLOW INDICATORS: MFR	SIZE & TYPE						
32 SOLENOID VALVES: MFR	SIZE & TYPE						
33 ANNUNCIATOR: MFR	SIZE & TYPE						
34 TUBE FITTINGS MFR	SIZE & TYPE						
35 MFR	SIZE & TYPE						
36 MFR	SIZE & TYPE						
37 MFR	SIZE & TYPE						
38 MFR	SIZE & TYPE						
39 SWITCH CLOSURES: (7.4.5.3.2)							
40 ALARM CONTACTS SHALL: O OPEN O CLOSE TO SOUND	ALARM AND BE NORMALLY O ENERGIZED O DE-ENERGIZED						
41 SHUTDOWN CONTACTS SHALL: O OPEN O CLOSE TO TRIP AN	D BE NORMALLY O ENERGIZED O DE-ENERGIZED						
42 (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)							
43 O SHOTDOWN STSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT							
44 O NORSHOTDOWN DEVICES ARE NOT REQUIRED FOR SHITDOWN SENSING DEVICES	BOKING OF EXAMON						
47 MISCELLANEOUS INSTRUMENTATION:							
48 O THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED							
49 O LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION							
50 O RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL	RV BODY MATERIAL:						
51 O THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED							
52 O FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH STEEL BODY							
53 O PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2) NFPA 496 PURGE	TYPE: O X O Y O Z O CONNECTION ONLY						
54 O COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED							
55 0							
56 O							
02/03 6 OF 10 API672.XLS							

PACKAGED, INTEGRALLY GEARED CENTRIFUG AIR COMPRESSORS (API 6724th ED) DATA SHE	AL ET	JOB	NO.							ITEM	NO.							
Hybrid	Hybrid PAGE 7 OF 11 REQN NO.																	
1	INSTRUMENTAT	ON SC	OPE C	JF SUI			т					r	INI		OP			1
2	PRC	V BY		TYPE	EL		I OCATIO	N	INSTA	II BY	PRC	OV BY			N			
3		1			1	-												
			5		Ē													(S)
		Ř	ADC		TER	ð	ΕĽ	5NG		Ř		Ř	Ω Ω	ING	山		z	GNA
	Я	ASE	TRE	т	MIT	JR P	PAN	H P IE	R	HASE	R	ASE	DR P	H P IF	PAP	-	MO	L SI
	NDC	JRC-	REC	VITC	SANS	NDC	CAL	JRC-	DD	JRCF	DDD	JRC-	NDC	JRCF	CAL	ARN	1 L L	Ъ
	VE	Ч	ō	ŝ	Ĕ	Ň	2	Ъ	ž	đ	VE	Ъ	VE	Ч	9	AL	ά	2
g LUBE OIL DISCHARGE																		
10 LUBE OIL SUPPLY																		
11 AIR FILTER/SILENCER DP																		
12																		
13 TEMPERATURE:																		
14 COMPRESSOR SUCTIONSTAGE																		
15 COMPRESSOR DISCHARGESTAGE																		
16 OIL COOLER INLET & OUTLET																		
17 COMPRESSOR PINION JOURNAL BRG																		
18 BULL GEAR JOURNAL BRG																		
20 DRIVER JOURNAL BRG																		
21 DRIVER THRUST BRG																		
22 RESERVOIR																		
23																		
24 LEVEL:																		
25 LUBE OIL RESERVOIR																		
26 SEPARATOR																		
		1	1		ľ	<u> </u>						l – I			r			
29 RADIAL VIBRATION EACH STAGE																		
30 RADIAL VIBRATION BULL GEAR SHAFT																		
31 AXIAL POSITION BULL GEAR SHAFT																		
32 AXIAL POSITIONSTAGE PINION																		
33 RADIAL VIBRATION ON DRIVER																		
34 AXIAL POSITION ON DRIVER SHAFT																		
35 ACCELEROMETER ON GEAR BOX																		
36 27 FLOW:																		
38 OIL RETURN																		
39 SEAL GAS																		
40																		
41 MISCELLANEOUS:																		
42 STANDBY L.O. PUMP RUNNING																		
		-																
44 ANNUNCIATOR PURGE FAILURE		-																
46 OIL HEATER ON		1			-							-						
47 COMMON REMOTE ALARM INDICATION								-			-							
48 COMMON REMOTE SHUTDOWN INDICATION																		
49	•																	
50 NOTES: 1) TRANSMITTERS SUPPLIED BY VENDOR SHALL INCLUDE SE	ENSING ELEMENT																	
51 2) SUPPLY "REPEAT SIGNAL" FOR CONTROL ROOM ALSO																		
52																		

02/03 7 OF 10 API672.XLS

	PA AIR	CKAGED, IN	TEGRALLY GI ORS (API 672	EARED CENT 4th ED) DAT	RIFUGAL A SHEET		JOB NO.			ITEM NO	· _			
			Hybrid			(INTER-) (AET	PAGE	8 OF	- 11	REQ'N N	0.			
1		IT.					EK-) COOLER(3)	(7.0)	ITEM NO					
2	SERVICE OF UN		TYDE				VERT		CONNECT					
3												-		E3 0
-	Controlant. (Ch	000/211)	-			DEDEODM/		шт	OOKI /OHEI		/			°
5						FERFORM	I I			1				
6	~							SHEL	L SIDE			TUBE S	SIDE	
7		ME												
8	FLUID QU	ANTITY, TOTAL	0										1	
9	VAP	ORIN/OUT												
10			0											
12			0											
12			0											
14		HEAT.	0											
15		CONDUCTIVITY.	- 0											
16		EAT, 0												
17		ESSURE,	0											
18	O VELOCITY	, O												
19	O PRESSUR	E DROPALLOW/0	CALC,	0										
20		RESISTANCEMIN	IIMUM	0										
21		HANGED					0		MTD CORR	ECTED				0
22		R RATE,	0	SERVICE					CLEAN					
23				STRUCTION OF O	NE SHELL					SKETCH: BUNI	DLE NOZZLE (	ORIENTATIO	NS	
24					SHELL SIDE			TUBE SIDE						
25	DESIGN/TEST P	RESSURE,	0											
26	DESIGN TEMPE	RATURE,	0							-				
27	NO. PASSES PE	R SHELL								_				
28	CORRUSION AL	LOWANCE,		-						_				
30	SIZE &		OUTLE											
31	RATING		VENT-DRAIN	1										
32	TUBE NO.		 O.D.	0 THK (MIN)	(AVG)	0	LENGTH	0	PITCH	0	<b>1</b> 30	<b>∧</b> 60	<b>9</b> 0	♦ 45
33	TUBE TYPE			,			MATERIAL				<b>N</b>			•
34	SHELL MATL		I.D.	0	O.D.	0	SHELL COVER	MATL					(INTE	G)(REMOV)
35	CHANNEL OR B	ONNET MATL					CHANNEL COV	/ER MATL						
36	TUBESHEETST	TATIONARY MATL					TUBESHEETF	LOATING M	IATL					
37	FLOATING HEAD	OCOVER MATL					IMPINGEMENT	PROTECTIO	NC					
38	BAFFLESCROS	SS MATL			ТҮРЕ		% CUT (DIA) (A	REA)		SPACING	6: C/C			0
39	SUPPOPTS TU						SEAL TYPE			TVDE				
41	BYPASS SEAL A	RRANGEMENT					TUBETUBESH	HEET JOINT						
42	GASKETSSHEL	L SIDE					TUBE SIDE							
43	F	LOATING HEAD												
44	ASME SECTION	VIII CODE REQUIR	REMENTS:		DESIGN & TEST	r 🗆	STAMP	NOT APP	PLICABLE	TE	MA CLASS			
45	WEIGHT/SHELL			0	FILLED WITH W	ATER			0	BUNDLE				0
46	REMARKS:													
47														
48 40														
50														
51														
52														
53														
54														
55														

02/03 8 OF 10 API672.XLS

	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO.		05	11		
4	NEMA FRAME INDUCTION MOTORS	PAGE	9 1	UF	11	REQININO.	
1							
21		SERIAL INC	J				
31		TIONS					
4	U OPERATING COND	THONS					
5 6 7 8 9 10 11 12	SITE DATA: ELECTRICAL SUPPLY: VOLT PHASE ELECTRICAL AREA CLASSIFICATION: O NON-HAZARDOUS O CLASS GROUP DIVISION ATMOSPHERIC MIXTURE: IGNITION TEMPERATURE: 0 TEMP CODE: ALTITUDE: O LESS THAN 0 O	DRIV STA	RTING: (7.1.2 O FULL O LOAI	2.2) L VOLTAGE	 O	O EXTERNAL	GEAR
13 A	AMBIENT TEMPERATURE MINIMUM: 0 MAXIMUM:	0	O VOL	TAGE DIP			%
14 l	UNUSUAL CONDITIONS:						
15							
16	PERFORMAN	CE					
17	· -		1 -				
18 1	NO LOAD CURRENT, AMPS LO.	AD	(	CURRENT, AMF		EFFICIENCY	POWER FACTOR
19 F	FULL LOAD TORQUE, 0 FU	LL	-				
20 \$	STARTS PER HOUR: HOT COLD /5	70 %					
21 /	ACCELERATION TIME: SEC SO	ROTOR	-				
22		ATUDER					
23		AIURES					
25 26 27 28 29 8 33 34 35 8 33 34 35 8 33 34 35 8 30 40 41 1 42 43 6 44 45 46 8 49 8 40 49 8 40 49 8 40 8 40 8 40 8 4	Imameplate       0       S.F.         NEMA TORQUE DESIGN:       0       A       0       B       C       0       D         Image: Nema Locked Rotor kva code Letter:         EFFICIENCY:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         EFFICIENCY:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         EFFICIENCY:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         EFFICIENCY:       Image: Nema Locked Rotor kva code Letter:         Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:		OTATION: (F/ CW DN CLASS: NON-HYGF IPERATURE I TOR TO BE "C TOR TO BE "C TYPE #1" TYPE #1" TYPE #2" TYPE #2" TYPE #3" CE HEATER VOLTS MAX SHEA SEPARATE HRUST LOAD ECTION OF T MOTOR TH	ACING END OP	DOSITE S	SHAFT EXTENSION) BI-DIRECTIONAL	@S.F. p* 
50	TESTING			0		MISCELLANEOUS	
51 I	EEE TESTING: O OBSVD O WIT O SUBMIT CERT'D RESULTS	PAINTING:	:	O IEEE 84	1 STD	O OTHER	
52	SPECIAL TESTING:	$\cup$ –					
53							
54							
55							
56							

AIR COMPRESSORS (API 6724th ED) DATA SHEET Hybrid					10 OF	11	ITEM NO. REQ'N NO.		
		•	ALLOWABLE P	IPING FORCES AND N	IOMENTS (6.4)				
r	00115				25	1	DACKAO		
	FORCE	MOMENT	FORCE	MOMENT	3E	FORCE	PACKAG	MOMENT	
AXIAL	101102, 0	0	101102,	0	0	, onor,	U	inoineiri,	0
VERT									
TRANS									
NAL DATA	A:								

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL	
AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
Hybrid	PAGE 11 OF 11 REQ'N NO.
CENTRIFUGAL AIR COMPRE	SSOR PERFORMANCE CURVES
When this requisition is issued for purchase, the supplic	r's proposod curvos for
the selected compressor will be inserted here as a subst	itute for this sheet
The compressor performance and characteristics as give	en on this performance curve
will be a part of the supplier's contractual obligation with	nin the tolerances agreed upon.
·····	
02/03 API672.XLS	

	F	REVISION	0	1 2 3 4				4				
	C.	DATE										
	E	BY										
ACKAGED, INTEGRALLY GEARED CENTRIFUGAL	F	REV/APPR			ITEM							
SI UNITS (kPa)		PAGE	1 (	)F	11 BEO'N	NO						
		TAGE	1 0		n negr	110.						
		UNIT										
3 SITE	1	NO. REQUIRE	ED					<u> </u>				
4 SERVICE	[	DRIVER ITEN	1 NO.									
5 O CONTINUOUS O INTERMITTENT O STANDBY	Y (3.30)	_ *	SPARED BY:									
6 NOTE: INFORMATION TO BE COMPLETED: O BY PURCHASER			BY MANUFACTUR	RER		O BY PURCH	ASER OR MFR					
7	GEN	NERAL										
8 COMPRESSOR MFR MODEL (SIZE A	AND TYPE)	-			DATE	SERIAL NO.						
								SPECIAL				
					0011		FM (7.4.2)	OF EGIAE				
	-						<b>Em</b> (7. <del>4</del> .2)					
12	LOW	MIN		CONT	ROL METHOD: (7.	4.2.1)						
13 (ALL DATA ON PER UNIT BASIS) RATED	AMB *	AMB	OTHER	0		TION (CONST DISCH F	PRESS) (7.4.2.1 a.)					
14 (3.24)	(7.10.1)							DAMPER				
15 DELIVERED FLOW, NM_/H (101.3 kPaA & 0°C DRY)												
16 WEIGHT FLOW, (Kg/h) (WET) (DRY)							-5					
							(kBaC)					
				0		STOP (7 4 2 1 c)	(KPaG)	DIGOLI LUGOLI LUGOLI LUGOLI LUGOLI				
				-	O START	(kPaG	STOP	(kPaG)				
				0	OTHER (DESCRIB	(.u. uc	.,	(10 00)				
22 O RELATIVE HUMIDITY %				-								
23 O MOLECULAR WEIGHT (M)												
24 INLET VOLUME, (m_/h) (WET / DRY)												
25												
26 DISCHARGE CONDITIONS:												
27 O PRESSURE (kPaA)				CONT	ROL SYSTEM REC	QUIREMENTS:						
28 TEMPERATURE (°C)				0	UNIT OPERATES	IN PARALLEL (7.4.	2.2)					
29					O W/CENTRIF	UGAL						
30 PERFORMANCE:	r				O W/ROTARY	0	W/RECIPROCATI	NG				
31 MAX (BkW) REQUIRED (ALL LOSSES INCL)												
32 U (BkW/ 100 m_/h) AIR DELIVERED				0	MICROPROCESSO WITH PURCHASE	OR CAPABLE OF C R'S DCS (7.4.1.4)	COMMUNICATION					
33 III INPUT SPEED (rpm)					0							
					О СОММРНО	TOCOL						
				CONT	ROL SYSTEM ALT	FRNATES: (7 4 1	3)					
38 PERFORMANCE CURVE NO.					. Unen me							
39 🔲 % RISE TO SURGE (6.1.12.2)					O SUITABLE F	OR INDOOR ONLY	(					
40					O FURNISHED	BY PURCHASER						
41												
42	* UNTHROTTL	LED PERFORMANC	CE FOR DRIVER SIZING			INTER- AND AF	TER-COOLERS (7.	6)				
43 REMARKS:				AFTE	RCOOLER:							
44					O FURNISHEE	BY PURCHASER	(7.6.1)					
45					O NOT NEEDE	ED (7.6.1)						
46				-	O AIR-COOLE	D TYPE BY VENDO	DR					
47			0	AIR-COOLED INTE	ERCOOLERS REQI	D (7.6.3, 7.6.6)						
48					BY PURCHASER							
49												
50				9	AIR-COOLED EXC TEMPERATURE C	HANGER AUTOM	ATIC (7.6.6)					
51					O 1000000	<u> </u>	,					
52												
54				$\Box$				ISS VALVE				
							SS VALVE					
56							IGO VALVE					
JU						II OFI FAINS						

		PACKAGED, INTE AIR COMPRESSO	EGRALLY GE RS (API 672	ARED CENT 4TH ED) DAT	RIFUGAL TA SHEET	JOB NO.		r	TEM NO.		
		0.100	SI UNITS (k	Pa)		PAGE	2 OF	11 F	REQ'N NO.		
1		O LOCA	TION, SITE DATA	(6.1.5)		-		O SPECIF	ICATIONS		
2	LOC	ATION:	~	~		NOISE SPECIFICA	ATIONS: (6.1.3)				
3	0	INDOOR	O HEATED	0	UNDER ROOF	O MAX	ALLOWABLE SPL	_		(@	1 m)
4	0	OUTDOOR	O UNHEATED	0	PARTIAL SIDES	O APPL	ICABLE SPEC		~	~	
5	0	GRADE	O MEZZANINE	0		ACOUSTIC	HOUSING:		O YES	O NO	
6	0	WINTERIZATION REQD	0	TROPICALIZATIO	ON REQD	APPLICABL	E SPECIFICATION	S:			
7						API 672 ANI					
8	SITE	DATA:	0								
9	0	ELEVATION	(m) O BARC	DMETER	(kPaA)	O NON-ASME	WELDING IF NOT	AWS D1.1: (6.	10.3.5)		
10	0	RANGE OF AMBIENT TEMPER	ATURE,	(°C)		O UNITS OF N	IEASURE (5.1)	Ouscus	STOMARY	O _{si} C	OTHER
11			DRY BU	LB	WET BULB						
12		NORMAL				PAINTING:					
13		MAXIMUM				O MANUFACT	URER'S STD				
14		MINIMUM				O OTHER					
15											
16						BASEPLATE	E GROUT: (7.10.3)		O EPOXY	O CEMENT	O NONE
17	UNU	SUAL CONDITIONS:									
18	0	DUST O FUME	s O	CORROSIVE CO	NDITIONS	PREPARATION F	OR GROUT SURFA	CES: (7.10.3)			
19	0	CORROSIVES PRESENT:				O MFR STD	0	SSPC 6 BLAS	т	O BARE FO	R FIELD BLAST
20	0	CONDITIONS CAUSE STRESS	CORROSION CRA	ACKING		O INORGANIC	ZINC SILICATE CO	DATING			
21	0	OTHER				O OTHER					
22						_					
23	ARE	A ELECTRICAL CLASSIFICATIO	N: (6.1.8)		T-CODE	SHIPMENT: (8.4.1	1)				
24	0	CLASS GROL	IP	DIVISION		O DOMESTIC	́ 0	EXPORT	O EXP	ORT BOXING REC	D
25	0	LOCAL ELECTRICAL CODES:				O OUTDOOR	STORAGE OVER 6	MONTHS			
26						-					
27				010		-					
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			UTILITY CONDITION	UNS:				UTILITY CON	SUMPTION (9.2	.3 i.)	
28	0		UTILITY CONDITION	UNS:		STEAM		UTILITY CON	SUMPTION (9.2	.3 i.)	
28 29	0	STEAM HEATING:		(kPaG)	ീറ്റ	STEAM:		UTILITY CON	SUMPTION (9.2	.3 i.)	(ka/h)
28 29 30	0	STEAM HEATING: INLET MIN		(kPaG)	ට°) ට°)	STEAM: OIL HEATER:			SUMPTION (9.2 kg/h) OTH	.3 i.) ER	(kg/h)
28 29 30 31	0	STEAM HEATING: INLET MIN NORM MAX		(kPaG) (kPaG) (kPaG)	2°) 2°) 2°)	STEAM: OIL HEATER: ELECTRIC:			SUMPTION (9.2 kg/h) OTH	3 i.) ER	(kg/h)
28 29 30 31	0	STEAM HEATING: INLET MIN NORM MAX		(kPaG) (kPaG) (kPaG) (kPaG)	27) 27) 27) 29)	STEAM: Oil Heater: Electric:			SUMPTION (9.2 kg/h) OTH	ER LOCKED OR AMPS	(kg/h) FULL LOAD AMPS
28 29 30 31 32 33	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN		(kPaG) (kPaG) (kPaG) (kPaG)	2") 2") 2") 2") 2")	STEAM: OIL HEATER: ELECTRIC:		UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT	I i.) ER LOCKED OR AMPS	(kg/h) FULL LOAD AMPS
28 29 30 31 32 33 34	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM		(kPaG) (kPaG) (kPaG) (kPaG) (kPaG)	27) 27) 27) 27) 27) 27)	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP		UTILITY CON ((	SUMPTION (9.2           kg/h)         OTH           kW)         ROT	.3 i.) ER LOCKED OR AMPS	(kg/h) FULL LOAD AMPS
28 29 30 31 32 33 34 35	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX		(kPaG) (kPaG) (kPaG) (kPaG) (kPaG) (kPaG)	2") 2") 2") 2") 2") 2") 2") 2") 2"]	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP		UTILITY CON ((	SUMPTION (9.2           kg/h)         OTH           kW)         ROT	I i.) ER LOCKED OR AMPS	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX FLECTRICITY:		(kPaG)	2") 2") 2") 2") 2") 2") 2") 2")	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP		UTILITY CON (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	SUMPTION (9.2           kg/h)         OTH           kW)         ROT           SPACE HE	BR	(kg/h) FULL LOAD AMPS
28 29 30 31 32 33 34 35 36 27	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY:		(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG)	27) 27) 27) 27) 27) 27) 27) 27) 27) 27)	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTEOL SYSTE		UTILITY CON ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	SUMPTION (9.2           kg/h)         OTH           kW)         ROT           SPACE HE	BER LOCKED OR AMPS	(kg/h) FULL LOAD AMPS (WW) (kW)
28 29 30 31 32 33 34 35 36 37	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT		(KPaG)	(°C	OIL HEATER: AUX LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE		UTILITY CON ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	SUMPTION (9.2           kg/h)         OTH           kW)         ROT           SPACE HE	3 i.) ER OR AMPS  ATER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 30	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE		(kPaG)	('C ('C ('C ('C ('C ('C SHUTDOWN	OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE - COOLING WATER		UTILITY CON (( (( (( (( ((((((((((((((((((((((((	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE	3 i.) ER OR AMPS  ATER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE		(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL	('C ('C ('C ('C ('C ('C ('C ('C	OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER	  M LOAD: R:	(( (( (( ((kW))	SUMPTION (9.2           kg/h)         OTH           kW)         ROT           SPACE HE           INTED.	3 i.) ER LOCKED OR AMPS  ATER 	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE		(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL	("C ("C ("C ("C ("C ("C ("C ("C ("C	OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER -		UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE INTER- COOLER	AFTER COOLER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER
28 29 30 31 32 33 34 35 36 37 38 39 40 41	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (5.1.5)		(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL	(°C (°C (°C (°C (°C (°C (°C	OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER OILANTITY		UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE	AFTER-	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6)		(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL	(°C (°C (°C (°C (°C (°C (°C (°C	STEAM:       OIL HEATER:       ELECTRIC:       MAIN LO PUMP       AUX LO PUMP       OIL HEATER       CONTROL SYSTE       COLING WATER       OUANTITY,       OUANTITY,	 M LOAD: R: (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE	AFTER- COOLER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET DATABASE		(KPaG)	(°C	OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE - COOLING WATER QUANTITY, OUTLET TEMP, OUTLET TEMP,	(L/min) (°C)	UTILITY CON (( (( (( ((WV)) (KWV) (COOLER	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE INTER- COOLER	3 i.)  ER LOCKED OR AMPS ATER AFTER. COOLER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM	TING (°C)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL MAX RETURN DESIGN	('C ('C ('C ('C ('C ('C SHUTDOWN	COLLET TEMP, OUL TESS DROP,	(L/min) (°C) (kPa)	UTILITY CON (( (( ((kW)) (kW)) (COOLER ()) () () () () () () () () () () () ()	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE	3 i.)  ER LOCKED OR AMPS ATER AFTER. COOLER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN MIN RETURN	TING ("C) (KPaG)	(KPaG)	('C ('C ('C ('C ('C ('C SHUTDOWN ('C ('C (P (RP	OIL HEATER:     OIL HEATER:     ELECTRIC:     MAIN LO PUMP     AUX LO PUMP     OIL HEATER     CONTROL SYSTE     OUANTITY,     OUTLET TEMP,     PRESS DROP,     OI TOTAL CW,	(L/min) (L/min) (L/min)	UTILITY CON (( (( ((kW)) (kW)) (COOLER () () () () () () () () () () () () ()	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE	3 i.)  ER LOCKED OR AMPS ATER AFTER. COOLER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE	ПNG (°C) (кРаG) (кРаG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL CONTROL MAX RETURN DESIGN MAX ALLOW DP	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	CONTROL SYSTEM STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER OUANTITY, OUTLET TEMP, PRESS DROP, TOTAL CW, UNITER TEMP,	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE	3 i.)  ER LOCKED OR AMPS ATER AFTER COOLER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	0	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE	TING (°C) (°C) (kPaG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL  MAX RETURN DESIGN MAX ALLOW DP	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	COLLING WATER COLLING VIEW COLLING COLLING VIEW COLLING COLLING VIEW COLLING COLLING VIEW COLLING COLLING WATER COLLING WATER COLLING WATER COLLING VIEW COLLING COLLING br>COLLING VIEW COLLING COLLI	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE INTER- COOLER	3 i.)  ER LOCKED OR AMPS ATER ATER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48	00000	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN:	TING (°C) (kPaG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL  MAX RETURN DESIGN MAX ALLOW DP	("C ("C ("C ("C ("C ("C ("C ("C ("C ("C	COLING WATER COLING WATER CONTROL SYSTE COOLING WATER CONTROL SYSTE COOLING WATER QUANTITY, OUTLET TEMP, INFORMATION PRESS DROP, TOTAL CW, AIR/NITROGEN:	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	AFTER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER  QUANTITY 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	0000	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS	(kPaG)	(KPaG)	("C ("C ("C ("C ("C ("C ("C ("C ("C ("C	GIL HEATER: STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER QUANTITY, OUTLET TEMP, ITOTAL CW, AIR/NITROGEN: GI HEATER COLING WATER AIR/NITROGEN:	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	AFTER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 8 9 50	0000	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION	TING (°C) (kPaG) (kPaG)	(KPaG)	(°C	STEAM: OIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE OULET TEMP, OUTLET TEMP, OUTLET TEMP, OTTAL CW, AIR/NITROGEN: G) SEAL SYSTEM: CONTROL PANEL	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER ATER AFTER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER  QUANTITY (m_/h)
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	0 0 Rem	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	TING (°C) (kPaG) (kPaG)	(KPaG)	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GIL HEATER: COLL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER QUANTITY, OUTLET TEMP, QUANTITY, OUTLET TEMP, IGI RESS DROP, TOTAL CW, AIR/NITROGEN: IGI SEAL SYSTEM: CONTROL PANEL LO RESERVOIR:	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER AFTER- COOLER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	0 0 REM	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	TING (°C) (KPaG) (kPaG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL CONTROL MAX RETURN DESIGN MAX ALLOW DP MIN PRESS	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GIL HEATER: COLL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER OUANTITY, OUTLET TEMP, PRESS DROP, TOTAL CW, AIR/NITROGEN: GSEAL SYSTEM: CONTROL PANEL LO RESERVOIR: INSTR HOUSINGS	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER ATER AFTER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53	0 0 REM	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN MAX OUTLET MIN MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	TING (°C) (kPaG) (kPaG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL MAX RETURN DESIGN MAX ALLOW DP MIN PRESS	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE OUANTITY, OUTLET TEMP, (G) PRESS DROP, TOTAL CW, AIR/NITROGEN: (G) SEAL SYSTEM: CONTROL PANEL LO RESERVOIR: INSTR HOUSINGS CONTROL SYSTE	(L/min) (°C) (kPa) (L/min) :: ::	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER ATER ATER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER  QUANTITY (m_/h)
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	0 0 REM	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	TING ("C) (kPaG) (kPaG)	(KPaG)	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GIL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER OUANTITY, OUTLET TEMP, OUANTITY, OUTLET TEMP, INTROGEN: GI SEAL SYSTEM: CONTROL PANEL INSTR HOUSINGS CONTROL PANEL INSTR HOUSINGS CONTROL SYSTE OTHER:	(L/min) (°C) (kPa) (L/min) :: ::	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER ATER ATER	(kg/h) FULL LOAD AMPS (kW) (kW) (kW) OTHER  QUANTITY (m_/h)
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53	0 0 REM	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	ПNG (°C) (kPaG) (kPaG)	(KPaG) (KPaG) (KPaG) (KPaG) (KPaG) (KPaG) CONTROL CONTROL MAX RETURN MAX ALLOW DP MIN PRESS	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GUANTITY, OUL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE OULIET TEMP, OUTLET TEMP, OUTLET TEMP, OUTLET TEMP, OUTLET TEMP, OUTLET TEMP, OUTLET TEMP, INTROGEN: INTROGEN: LO RESERVOIR: INSTR HOUSINGS CONTROL SYSTE OTHER: OTHER:	(L/min) (°C) (kPa) (L/min)	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER ATER	(kg/h) FULL LOAD AMPS 
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56	0 0 REM	STEAM HEATING: INLET MIN NORM MAX OUTLET MIN NORM MAX ELECTRICITY: VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION ARKS:	(kPaG)	(KPaG)	('C ('C ('C ('C ('C ('C ('C ('C ('C ('C	GUANTITY, OUL HEATER: ELECTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTE COOLING WATER OULTET TEMP, OUTLET TEMP, OUTLET TEMP, OUTLET TEMP, TOTAL CW, AIR/NITROGEN: INSTR HOUSINGS CONTROL PANEL INSTR HOUSINGS CONTROL SYSTE TOTAL PURGE,	(L/min) (°C) (kPa) (L/min) :: :: :: :: :: :: :: :: :: :: :: :: ::	UTILITY CON	SUMPTION (9.2 kg/h) OTH kW) ROT SPACE HE SPACE HE INTER- COOLER INLET PRESS (kPaG)	3 i.)  ER LOCKED OR AMPS ATER AFTER COOLER	(kg/h) FULL LOAD AMPS 

02/03 2 OF 10 API672.XLS

	PACKAGED, IN	FEGRALL	Y GEARED CEN	TRIFUGAL						
	AIR COMPRESS	ORS (API	6724th ED) DA	TA SHEET		JOB NO.	ITEM	NO		
		SI UNI	ГS (kPa)			PAGE 3 OF	11 REQ'I	N NO.		
1	_				CONSTRUC					
2	COMPRESSOR SPEEDS:					INTEGRAL GEAR HOUSING:				
3	RATED INPUT:		(rpm) TRIP		(rpm)	MATERIAL			SPLIT	
4	BULLGEAR CRITICALS:	1st	(rpm)			BULL GEAR: (6.5.3), (6.12.2)				
5	PINION CRITICALS:					RATED POWER BASED ON TOOTH SU	JRFACE DURABI	LITY:		(kW)
6	1st STG PINION	1st	(rpm)	2nd	(rpm)	RATED POWER BASED ON TOOTH BE	ENDING:		_	(kW)
7	2nd STG PINION	1st	(rpm)	2nd	(rpm)	O MIN AGMA SERVICE FACTOR:			ACTUAL S.F	·
8	3rd STG PINION	1st	(rpm)	2nd	(rpm)	GEAR RIM MATERIAL:			HARDNESS:	
9	4th STG PINION	1st	(rpm)	2nd	(rpm)	GEAR FACE WIDTH:	(mm)	GEAR CENTER M	ATL:	
10	OTHER UNDESIRABLE SPEEDS: (6	6.7.1.3)				MECHANICAL EFFICIENCY:		% ISO 1328 GI	RADE:	
11	STAGE		IMPELLER	TIP		PITCH DIA (1	mm) PITCł	LINE VELOCITY		(m/s)
12	SPEED		DIAMETER	SPEED						
13	1st STAGE	(rpm)	(m	m)	(m/hr)	PINIONS: (6.5.3), (6.12.2)	1st	2nd	3rd	4th
14	2nd STAGE	(rpm)	(m	m)	(m/hr)	SERVICE FACTOR:				
15	3rd STAGE	(rpm)	(m	m)	(m/hr)	MATERIAL:		· · · · · · · · · · · · · · · · · · ·		
16	4th STAGE	(rpm)	(m	m)	(m/hr)	HARDNESS: (BHN) (R _c )		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
17		()	(	,	()					
18								INTEGRAL W/GEA	R	
10			MATERIAL			MATL:			ut	(BHN) (R.)
20						BRG SPAN	(mm)	WEIGHT (W/GEAR	2)	() (i.e)
20			NG, ETC.)			DIA @ GEAR	(mm)			(Kg)
21		2.2)				SHAFT SLEEVES AT SEALS: MATL	(((((((((((((((((((((((((((((((((((((((	DIA @ COUPLING	·	(1111)
22	METHOD OF ATTACH: (6.5.2									
23	ROTATION, VIEWED FROM I	NPUT SHAFT	END:					MATL	·	
24						BULL GEAR RADIAL BRG TYPE:			LENGTH	(mm)
25	COMPRESSOR CASING:						(kPa)	ACTUAL LO	AD	(kPa)
26	MODEL		CASING SPLIT			BULL GEAR THRUST BEARING	S: (6.8.3)			
27		SIG 1	SIG 2	SIG 3	SIG 4			1YPE		
28	MATERIAL					MFR		AREA		(mm_)
29	MAWP, (kPaG)					THRUST COLLAR (6.8.3.6)		GRAL 🖵	REPLACEABLE	
30	HYDRO TEST, (kPaG)					ALLOW LOAD	(kPa)	ACTUAL LO	AD	(kPa)
31	MAX OPT TEMP, (°C)					GAS LOAD	(kg)	COUPLING	LOAD	(kg)
32	~					BEARINGS FITTED W/TEMP SENSORS	S (6.12.10, 6.12.1	1)		
33	MIN DESIGN METAL TEMP (6	6.10.5)			(°C)	O PINION RADIAL BRG	0	BULL GEAR RADI	AL BRG	
34	CASING HEAT TREATMENT	REQUIRED (6	.10.3.1.1)			O THRUST BRG				
35	ULTIMATE STRESS FOR MA	TL (6.2.1)			(MPa)					
36	CASTING FACTOR (6.2.1)					MAIN CONNECTIONS: (6.3)				
37	WELDED CONNECTIONSNDT PR							ASME		
38	100% RADIOGRAPH	0	MAG PARTICLE	O LIQ PE	NETRANT		SIZE	RATING	FACING	POSITION
39	o					COMPR INLET				
40						COMPR DISCH				
41	COMPRESSOR BEARINGS &	BEARING H	OUSINGS:			PKG OUTLET				
42	BEARING HSG MATERIAL:					ATM BLOWOFF				
43	PINION RADIAL BEARINGS:	(6.8.2)				FILTER OUTLET				
44		STG 1	STG 2	STG 3	STG 4					
45	BRG TYPE									
46	ALLOW LOAD. (kPs	a)					NO.	SIZE	TYPE	
47	ACTUAL LOAD (kPa	-/ a)				LUBE OIL INLET				
41	BRG SPAN (mm)	·/								
40		(6.9.2)								
49	PINION THRUST BEARINGS:	(0.8.3)	070 0	070 0	oto :					
50		SIG1	SIG 2	SIG 3	SIG 4	PRESSURE GAUGE		├		
51	BKG TYPE							<u>├──</u>		
52	ALLOW LOAD, (kPa	1)				CONDENSATE DRAINS		<u>├──</u>		
53	ACTUAL LOAD, (kPa	a)					L			
54	THRUST COLLAR	-								

02/03 3 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
SI UNITS (KPa)	PAGE 4 OF 11 REQ'N NO.
	SHOP INSPECTIONS & TESTS: (8.1.1)
	O ADVANCE NOTIFICATION REQD DAYS
	OBSERVED WITNESSED
5 O NO. AT EACH DRIVER BEARING TOTAL NO.	O HYDROSTATIC (8.3.2) O O
6 Karata Carata  O COMBINED TEST (8.3.4), (8.5.6)	
7 L 1st STG L 2nd STG L 3rd STG L 4th STG	O ASME PTC 10 TEST (8.3.4.1) O O
8 OSCILLATOR-DEMODULATORS:	
	O AFTERCOOLER
11 O MFR O MODEL	O GUIDE VANE TEST (8.5.12.1)
	O ATNON-100% POSITIONS
13 C READOUT SCALE RANGEO ALARM LI SET @(µm)	O SOUND-LEVEL TEST O O
14 O SHUTDOWN: LI SET @(µm) O TIME DELAYSEC	O SPARE ROTOR TEST (8.5.12.2) O O
15 O PER API 670 (7.10.10), (7.10.11)	O SPARE ROTOR MECH ONLY O O
16 BEARING-TEMPERATURE MONITOR: (7.10.12)	O IMPELLER OVERSPEED TEST (8.3.3)
17 O REQD O SUPPLIED BY: O PER API 670	O POST OVERSPEED TEST NDE OF IMPELLERS (8.3.3.2) O O
18 O MFR O MODEL	O RESIDUAL UNBALANCE CHECK (6.12.8)
19 AXIAL POSITION MOVEMENT DETECTOR: (7.10.10, 7.10.11)	O OIL SYSTEM CLEANLINESS O O
20 O TYPE O MODEL	O CONTROL SYSTEM CHECK (8.3.4.5.5) O O
	O BRG, SEAL, GEAR CHECK (8.5.11.1, 6.5.11.2) O O
22 C READOUT SCALE RANGE O ALARM L SET @(µm)	O GEAR CONTACT CHECK (8.2.3.2) O O
23 O SHUTDOWN: LI SET @(µm) O TIME DELAY(sec)	O CLEANLINESS CHECKVESSELS (8.2.3.3) O O
24 DYNAMICS: (6.7), (6.12)	O CLEANLINESS CHECKPIPING (8.2.3.3) O O
25 O CRITICAL LATERAL SPEEDS ARE PROVEN BY PRIOR UNITS (6.7.2)	O HARDNESS CHECK OF PINIONS (8.2.3.4) O O
26 O DAMPED UNBALANCED RESPONSE ANALYSIS REQD (6.12.3)	O OF BULL-GEAR O O
27 O TORSIONAL VIBRATION ANALYSIS OF TRAIN REQD (6.12.5)	O OF WELD REPAIRS O O
28 O RESIDUAL UNBALANCE WORKSHEET REQD (6.12.8)	O NDE OF MAJOR REPAIRS (8.2) O O
29 O REMARKS	O GEAR TOOTH MAG-PART (8.5.4) O O
30 COUPLINGS: (7.2.1)	O FINAL INSPECTION PRIOR TO PAINT O O
31 TYPE: 🖸 DISK PAK 🖸 DIAPHRAGM O OTHER	O INSPECTION OF PREP FOR SHIPMENT (8.4) O O
32 DISK MATL: O STAINLESS STEEL O COATED W/	o
33 🖸 MAKE 🖸 MODEL	o
34 O NON-LUBE O LUB'D LUBRICATION	
35 🔲 SPACER LENGTH(mm) 🔘 LIMITED END-FLOAT REQD	O PRIOR DOCUMENTATION ON MAJOR REPAIRS NOT REQD (6.10.4.3)
36 CPLG RATING (kW/100 r @ 1.0 S.F. ACTUAL S.F.	O RETAIN FINAL ASSEMBLY CLEARANCES (8.5.1)
37 🛄 SHAFT JCT RATING: @ DRIVER(KW) @ INPUT SHAFT(KW)	O SUBMITTAL OF INSPECTOR'S CHECKLIST (8.1.2)
38 MOUNTING ARRANGEMENT @ INPUT SHAFT: DRIVER	SIGNED BY REP FOR: O PURCHASER O VENDOR
39 MFR MAX BORE (mm) PROPOSED BORE (mm) (7.2.1.6)	IF DESIGN REQUIRES DISASSEMBLY OF PINION FOR BRG INSPECTION,
40 DRIVER MALE-CPLG MID BY: O DRIVER MFR O COMPR VENDOR	O FORGO BEARING INSPECTION BASED ON TEST DATA; OR
41 O IDLING ADAPTER FOR DRIVER HALF-COUPLING REQD	O INSPECT BEARING AND RETEST (8.5.11.2)
42 PIPING REQUIREMENTS:	WEIGHT: (kg)
43 RECOMMENDED STRAIGHT RUN OF PIPE DIA BEFORE SUCTION:	INTEG GEAR/COMPRDRIVER
44 O VENDOR TO OBSERVE FLANGE PARTING	GEAR UPPER CASEBULL-GEAR
45 O THROUGH STUDS REQUIRED FOR PIPING FLANGES	1st STAGE PINION 2nd STAGE PINION
46	INTERCOOLERBUNDLE
47 MISCELLANEOUS:	AFTERCOOLERBUNDLE
48 O VENDOR PRESENT DURING INITIAL ALIGN CHECK	BASECONTROL PANEL
49 O VENDOR CHECK ALIGN AT OPERATING TEMP	MAX FOR MAINTENANCE (IDENTIFY)
50 O BASE DESIGNED FOR COLUMN MOUNTING	
51 U THERMAL RELIEF VALVES PROVIDED BY VENDOR	SPACE REQUIREMENTS, (mm)
52 O FOR WATER-COOLED EXCHANGERS	COMPLETE UNIT: L W H
53 U FOR	CONTROL PANEL: (IF SEP) L W H
54 V PURCHASER WILL PREPARE COORDINATION MEETING AGENDA (9.1.3)	INLET FILTER-SILENCER: L W H
	AFTERGOULER: (IF FURN) L W H
30	

02/03 4 OF 10 API672.XLS

AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO. ITEM NO.
SI UNITS (kPa)	PAGE 5 OF 11 REQ'N NO.
1 LUBE OI	L SYSTEM (6.9)
2 BASIC SYSTEM REQ'MNTSNORMAL OIL FLOW	LUBRICANT: O SYNTHETIC O HYDROCARBON
3 LUBE OIL TO: (L/min) (kPaG) (SSU @ 37.7°C)	
	MFR MODEL
8 SUPPLY (kPaG) PUMP RV SETTING (kPaG)	MAIN PUMP
9 SYS DESIGN (kPaG) HYDROTEST (kPaG)	STANDBY PUMP
10 OIL COOLER:	ELECTRIC MOTOR(S)
11 SHELL SIDE TUBE SIDE	STEAM TURBINE(S)
12 OPERATING PRESS, (kPaG)	OIL COOLER(S)
13 MAX ALLOW WORK PRESS, (kPaG)	
	CHECK VALVES
17 SURFACE AREA (m_) DUTY (kJ/hr)	TRANSFER VALVE(S)
18 REMOVABLE BUNDLE TO BE FURNISHED	PUMP COUPLING
19 SAME CODE STAMPED O DESIGNED TO TEMA	PUMP RELIEF VALVES
20 UTUBES: NO O.D(mm) LENGTH(mm)	
22 WALL IFICKINESS (IIIII) AVG WIN	
23 CHANNELS/HEADS SHELL	PUMPS: MAIN STANDBY
24 TUBES TUBE SHEETS	
25 CHANNEL COVERS TUBE SUPPORTS	
26 OIL FILTERS:	SUBMERGED
27 MICRON RATING O NOMINAL O ABSOLUTE	
28 O F. (KPa) CLEANDIRTYCOLLAPSE	
31 O CORE MATL HSG MATL	
32 HSG MAWP(kPaG) MAX ALLOW TEMP(°C)	FLANGE CONNECTED
33 OIL HEATER: ####	RATED CAPACITY         (m_/h)
34 O STEAM HEATER REQD O ELECTRIC HEATER REQD NO E	LEC DISCHARGE PRESS (kPaG)
35 🔲 RATING(kJ/hr)	(BkW) @ MAX SSU
36 WATT DENSITY(W/in_)	
39 D FREE SURFACE AREA(CM_) D INTERNAL BAFFLES	
41	
42	
43	O MANUAL O AUTOMATIC O HOA SELECTOR SWITCH
44 Sil	ENCERS
45 INLET AIR FILTER/SILENCER: (7.7)	DISCHARGE BLOWOFF SILENCER: (7.8)
46 H MFR MODEL	MODEL
51 O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A	SPL (dBA) (@ 1 m) FROM DISCHARGE OF SILENCER
52 DISTANCE (m) FROM COMPRESSOR	
53 O FILTER WILL BE ELEVATED (m) ABOVE GRADE	
02/03 5 QE 10 API672 XLS	

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL         JOB NO.         ITEM NO.           AIR COMPRESSORS (API 6724TH ED) DATA SHEET         JOB NO.         ITEM NO.           SI UNITS (kPa)         PAGE         6         OF         11         REQN NO.	
PACKAGED, INTEGRALLY GEARED CENTRIFUGAL         JOB NO.         ITEM NO.           AIR COMPRESSORS (API 6724TH ED) DATA SHEET         JOB NO.         ITEM NO.           SI UNITS (kPa)         PAGE         6         OF         11         REQ'N NO.	
PACKAGED, INTEGRALLY GEARED CENTRIFUGAL         JOB NO.         ITEM NO.           AIR COMPRESSORS (API 6724TH ED) DATA SHEET         JOB NO.         ITEM NO.           SI UNITS (kPa)         PAGE         6         OF         11         REQ'N NO.	
AIR COMPRESSORS (API 6724TH ED) DATA SHEET JOB NO. ITEM NO. SI UNITS (kPa) PAGE 6 OF 11 REQ'N NO.	
SI UNITS (kPa)	
1 CONTROLS AND INSTRUMENTATION (7.4)	
2 LOCAL CONTROL PANEL: (7.4.3)	
3 O ELECTRICAL AREA CLASSIFICATION: PURGE REQUIREMENT: (7.4.3.2)	
4 CL GR DIV () O NONE O INSTRUMENT AIR	O NITROGEN
5 PANEL ENCLOSURE REQUIREMENT: (7.4.3.2)	M DIV 1
6 NEMA TYPE 4X ENCLOSURE MATERIAL: TO NONHAZARDOUS	
7 NEMA TYPE 7 (INDOOR EXPLOSION-PROOF FOR HAZARDOUS GAS	M DIV 1
a ARCAD REQUIRED TO DIV 2	
9 PANEL FEATURES: (7.4.3.2)	M DIV 2
10 VIBRATION ISOLATORS O STRIP HEATER O INTERNAL COOLING TO NONPAZARDOUS	
11 U WEATHERHOOD U PURGE CONNECTIONS U OTHER	
12 O TROPICALIZATION REQUIRED	
16 PRESSURE GAUGES: MFR SUZF & TYPE	
17 TEMPERATURE GAUGES: MFR SIZE & TYPE	
18 LEVEL GAUGES: MFR SIZE & TYPE	
19 DIFF PRESSURE GAUGES: MFR SIZE & TYPE	
20 PRESSURE SWITCHES: MFR	
21 TEMPERATURE SWITCHES: MFR	
22 LEVEL SWITCHES: MFR	
23 PRESSURE TRANSMITTERS: MFR	
24 TEMPERATURE TRANSMITTERS: MFR	
25 LEVEL TRANSMITTERS: MFR	
26 CONTROL VALVES: MFR SIZE & TYPE	
27 PRESSURE RELIEF VALVES: MFR SIZE & TYPE	
20 TECHWALRELEY VALVES: MPR	
29 EURE ENVIRON VALVES. MER SIZE & TYPE	
Sill Pulke FLOW INDICATORS:         MFR         Sile & ITPE           31         PURSE FLOW INDICATORS:         MFR         QUE & TVDE	
Sile         Sile         Min         Sile         Sile         Min         Sile         Si	
33 ANNUNCIATOR: MFR SIZE & TYPE	
34 TUBE FITTINGS MFR SIZE & TYPE	
35 MFR SIZE & TYPE	
36 SIZE & TYPE	
37 MFR SIZE & TYPE	
38 SIZE & TYPE SIZE & TYPE	
39 SWITCH CLOSURES: (7.4.5.3.2)	
40 ALARM CONTACTS SHALL: O OPEN O CLOSE TO SOUND ALARM AND BE NORMALLY O ENERGIZE	D DE-ENERGIZED
41 SHUTDOWN CONTACTS SHALL: O OPEN O CLOSE TO TRIP AND BE NORMALLY O ENERGIZE	D DE-ENERGIZED
42 (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)	
43 SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOUT SHUTTING DOWN THE UNIT (7.4.5.3.4)	
44 ON NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT DURING OPERATION	
45 O ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES	
4/ ImscelLaneous instrumentation:	
40 O InfoQuer FLOWING INSTRUMENT SENSING LINE REQUIRED	
2 O FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EVE TYPE WITH STEEL BODY	
53 O PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2) NFPA 496 PURGE TYPE: O X O Y O Z O	CONNECTION ONLY
54 O COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED	
55 O	
56 O	

02/03 6 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL																			
	AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB N	۷O.			~-				ITEM	NO.								
1	SI UNITS (KPA)	PAGE	OPE C	F SUF	7 PPLY	OF		11		REQ'N	I NO.								
1		1	ELEMENT INDICATOR																
3		PRO\	/ BY		TYPE		L	OCATIO	N	INSTA	LL BY	PRO	OV BY LOCATION						
			OUT		(1)			(0						(0			:	AL (2	
		Ш	EADO		TER	КG	NEL	5NIC		К		н	ВXG	5NIC	NEL		z	2	
		SR	HAS	TR	т	SMIT	ORF	PA-	НРІ	R	HAS	К	HAS	OR F	НРІ	- PA	5	MOC -	
		Ō Nij	JRC	REC	VITC	RAN	ND ND	DCAI	JRC	Ū.	JRC	ND	JRC	Ū.	JRC	DCAI	ARI	IL I	
4		3	đ	ā	Ś	Ξ	32	Ľ	P	32	đ	3	đ	2	Ē	Ľ	AI	5	r
5																			
-																			
8																			
9																		-+	
10																		-+	
11		1	I	I	I														
13	TEMPERATURE:	[																	
14	COMPRESSOR SUCTION STAGE																	-	
15	COMPRESSOR DISCHARGE STAGE		İ	İ														—i	-i
16	OIL COOLER INLET & OUTLET																		
10	COMPRESSOR PINION JOURNAL BRG																		
18	BULL GEAR JOURNAL BRG																		
19	BULL GEAR THRUST BRG																		
20	DRIVER JOURNAL BRG																	-	
21	DRIVER THRUST BRG																		
22	RESERVOIR																		
23																			
24	LEVEL:																		
25	LUBE OIL RESERVOIR																		
26	SEPARATOR																		
27				1	-													<u> </u>	
28																			
29																			
30																			
31																			
22	RADIAL VIBRATION ON DRIVER																		
33	AXIAL POSITION ON DRIVER SHAFT																		
35	ACCELEROMETER ON GEAR BOX	-									_								
36																		ł.	
37	FLOW:																	1	
38	OIL RETURN																		
39	SEAL GAS																		
40																			
41	MISCELLANEOUS:																		
42	STANDBY L.O. PUMP RUNNING																	$ \rightarrow $	
43	PANEL PURGE FAILURE																	$\rightarrow$	
44	ANNUNCIATOR PURGE FAILURE																	-+	
45	SURGE RECOGNITION																	-+	
46																		-+	
47																		$\rightarrow$	
48		1	I	I	I													<u> </u>	
49 50		лт																	
51	2) SUPPLY "REPEAT SIGNAL" FOR CONTROL ROOM ALSO	••																	
52	_, in in in the interval in t																		
	02/03 7 OF 10 API672.XLS																		

	PAC AIR (	COMPRESS	EGRALLY GE DRS (API 672-	ARED CENT	RIFUGAL A SHEET	- r	JOB NO.				ITEM	NO.			
			SI UNITS (k	Pa)			PAGE	8	OF	11	REQ'N	I NO.			
1						(INTER-) (AF	rer-) Cooler	<b>(S)</b> (7.6)							
2 SER	RVICE OF UNIT	r:							_	ITEM NO.		_			
3 SIZE	E:		TYPE:			HORIZ	VERT			CONNECT	ED IN	D PARALLEL	-	SERI	ES
4 SUR	RF/UNIT: (GRO	ISS/EFF)			(m_)	SHELLS/UNIT:			_	SURF/SHE	LL: (GROSS/E	.FF)			(m_)
5						PERFORM	ANCE OF ONE	UNIT							
6								S	HELL S	SIDE			TUBE S	SIDE	
7 0	FLUID NAME	E													
8 🖵	FLUID QUAN	NTITY, TOTAL	(kg/h)							1				1	
9	VAPO	RIN/OUT													
			(%C)												
			(0)												
13			(mPa-s)												
14	SPECIFIC H	IEAT.	(kJ/ka °C)											1	
15	THERMAL C	CONDUCTIVITY,	(kJ/m	h °C)											
16 🗖	LATENT HE	AT, (kJ/k	g °C)												
17 🗖	INLET PRES	SSURE,	(kPaG)												
18 🔘	VELOCITY,	(m/s)													
19 <b>O</b>	PRESSURE	DROPALLOW/C	ALC,	(kPa)											
20 <b>O</b>	FOULING R	ESISTANCEMINI	IMUM	(hr m_ °C/kJ	)										
21	HEAT EXCH	IANGED						(kJ/hr)		MTD CORF	RECTED				(°C)
22	TRANSFER	RATE,	(kJ/hr m_ °C)	SERVICE					_	CLEAN					
23				STRUCTION OF ON	IE SHELL						SKETCH: BU	JNDLE NOZZLE (	ORIENTATIO	NS	
24					SHELL SID	E	TUBE SIDE								
25 DES	SIGN/TEST PRI	ESSURE,	(kPaG)								_				
26 DES	SIGN TEMPER	ATURE,	(°C)								_				
27 NO.	PASSES PER	SHELL									-				
28 COF		JWANCE,	(mm)								-				
30 SIZE	= &										-				
31 RAT			VENT-DRAIN												
22 TUP	DE NO			(mm) THK (MINI) (		(mm)			(m)	DITCH		(mm) 🖌 20	<b>^</b> 60		<b>∧</b> 45
33 TUB	RE TYPE		0.0.	((1111)) 1111X ((11114)) (2	NVG)	(11111)	MATERIAL		_(11)	FIIGH		(1111) \ 30	<u> </u>		✔ 43
34 SHE	ELL MATL		I.D.	(mm)	0.D.	(mm)	SHELL COV	ER MATL						(INTE	EG)(REMOV)
35 CHA	ANNEL OR BO	NNET MATL					CHANNEL C	OVER MA	TL						
36 TUB	BESHEETSTA	TIONARY MATL					TUBESHEE	FLOATIN	NG MAT	rl –					
37 FLO	ATING HEAD	COVER MATL					IMPINGEME	NT PROTE	CTION	I					
38 BAF	FLESCROSS	6 MATL			TYPE		% CUT (DIA	(AREA)			SPAC	ING: C/C		INLET	(mm)
39 BAF	FLESLONG N	MATL					SEAL TYPE								
40 SUP	PORTSTUBE				U-BE	END					TYPE				
41 BTP	ASS SEAL AR							SHEET JU	JINT						
42 GAG	FL						TUBE SIDE	·							
44 ASN	IE SECTION V	III CODE REQUIR	EMENTS:		DESIGN &	TEST	STAMP		T APPLI	ICABLE		TEMA CLASS			
45 WEI	GHT/SHELL			(kg)	FILLED WI	TH WATER				(kg)	BUND	LE			(kg)
46 REN	ARKS:												-	-	
47															
48															
49								-							
50															
51															
52															
53															
54															
55															

02/03 8 OF 10 API672.XLS

DUNI D (MP)         MEAN FRAME INDUCTION NOTIONS TO MEET IN	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NOITEM NO
	SI UNITS (KFa)	PAGE 9 0F 11 REQ'N NO. TO IEEE 841
DEVICE EQUIPMENT TYPE     OPPENTING CONTINUE     OPPENTING     OPPENTING CONTINUE     OPPENTING     OPPENTI	2 MFR MODEL	SERIAL NO. NEMA FRAME
	3 DRIVEN EQUIPMENT TYPE DRIVEN EQUIPMENT ITEM NO	MOTOR ITEM NO.
Betternound and constructions down and the system     Tectorics     Tecto		DITIONS
Independent Muture	5 6 SITE DATA: 7 ELECTRICAL SUPPLY: VOLT PHASE HERTZ 8 ELECTRICAL AREA CLASSIFICATION: O NON-HAZARDOUS 9 O CLASS GROUP DIVISION	DRIVE SYSTEM: O DIRECT CONNECTED O EXTERNAL GEAR
Image: Section of the sectin of the section of the section of the secti	10         ATMOSPHERIC MIXTURE:           11         IGNITION TEMPERATURE:           12         ALTITUDE:           13         AMBIENT TEMPERATURE MINIMUM:           14         UNUSUAL CONDITIONS:	STARTING: (7.1.2.2)         O         FULL VOLTAGE         O         REDUCED VOLTAGE         %           (m)         O         LOADED         O         UNLOADED         %           ("C)         O         VOLTAGE DIP        %
Image: Section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the sectis the sectis the sectis the sectis the section of the	16 PERFORMA	NCE
11       DUAD CURRENT, AMP       EFFICIENCY       POWER FACTOR         11       PALLOAD TORUE, [N+m]       HOT       COULD       COURD       CURRENT, AMP       EFFICIENCY       POWER FACTOR         11       PALLOAD TORUE, [N+m]       HOT       COULD       COURT       FULL       Image: Court of the court of the	17	
Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second State Performance         Image: Second	18 NO LOAD CURRENT, AMPS LC	AD CURRENT, AMP EFFICIENCY POWER FACTOR
Normalize periods       Hot       COLD       75%	19 FULL LOAD TORQUE, (N-m) FU	ILL IIII
21       OCCELERATION TIME:	20 STARTS PER HOUR: HOT COLD	5%
22       CONSTRUCTION FEATURES         23       CONSTRUCTION FEATURES         24       MAMEPLATE         25       MAMEPLATE         26       MAMEPLATE         27       MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)         28       MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)         29       MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)         20       MAX SOUND PRESSURE LEVEL (GBA)         20       MAX SOUND PRESSURE LEVEL (GBA)         21       EXECTED SFL (GBA)         22       MOTOR TO BE "DEFAURE RISE: (DEFAULT IS BO'C ABOVE 40'C BY RES & 1.0)         23       EXECTED SFL (GBA)         24       MAX SOUND PRESSURE LEVEL (GBA)         25       ENCLOSURE:         26       TEMPERATURE RISE: (DEFAULT IS BO'C ABOVE 40'C BY RES & 1.0)         27       MOTOR TO BE "OVER TEMP PROTECTED"         26       MOTOR TO BE "OVER TEMP PROTECTED"         27       MOTOR TO BE "OVER TEMP PROTECTED"         28       EXPECTED SFL (GBA)       VERTICAL         29       PARSE HERMING ROTOTOR THAND AND AND LOCKED ROTOR PROTECTED"         29       MOTOR TO BE "OVER TEMP PROTECTED"         29       MOTOR TO BE "OVER TEMP RESCIDED NON-SPECIFIC"         29       MOTOR THRUS	21 ACCELERATION TIME: SEC 50	9%
CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      MAX SOLAD PRESSION:     CONSTRUCTION FEATURES      CONSTRUCTION FEATURE      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION      CONSTRUCTION FEATURES      CONSTRUCTION FEATURES      CONSTRUCTION      CONSTRUCTI	22 LOCKEL	RUTUR
ANAMEPLATE       (W)       (pm)       S.F.		EATURES
36       #### #### #### ####       IPC       IPC #1-WINDING-RUNNING AND LOCKED-ROTOR PROTECTED*         37       MOUNTING:       IPC HORIZONTAL       IPC WERTICAL       IPC #2-WINDING-RUNNING AND LOCKED*         38       FOOT MOUNTED       IPLANGE MOUNTED       IPC #2-WINDING-RUNNING AND LOCKED*       IPC #2-WINDING-RUNNING AND LOCKED*         39       SHAFT UP       IPLANGE MOUNTED       SHAFT DOWN       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*         40       MAIN TERMINAL BOX MOUNTING LOCATION:       IPC #2-WINDIRG-RUNNING AND LOCKED.*OTOR PROTECTED*       WATTS         41       MAIN TERMINAL BOX MOUNTING LOCATION:       IPC #2-WINDIRG-RUNNING AND LOCKED.*OTOR PROTECTED*       WATTS         42       FAN:       REVERSIBLE       UNI-DIRECTIONAL       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*         43       FAN:       REVERSIBLE       UNI-DIRECTIONAL       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*         44       NON-SPARKING       SEALED FOR IF*       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*         45       BRG LUBRICATION:       GREASE       RING OIL       OIL INIST       IPC #2-WINDING-RUNNING AND LOCKED.*OTOR PROTECTED*         46       BRARING TYPE:       BRG LUBRICATION:       GREASE       RING OIL INIST       IPC #2-WINDING-RUNNING AND LOCKE	25     INAMEPLATE     (kW)     (rpm)     S.F.       26     NEMA TORQUE DESIGN:     O     A     O     B     O     C     O       27     NEMA LOCKED ROTOR KVA CODE LETTER:	MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)          INSULATION CLASS:       B       F       O THER:         NON-HYGROSCOPIC       TROPICALIZED         TEMPERATURE RISE: (DEFAULT IS 80°C ABOVE 40°C BY RES @ 1.0)        °C       ABOVE       °C BY       @       S.F.         MOTOR TO BE "THERMALLY PROTECTED"         MOTOR TO BE "OVER TEMP PROTECTED"
41 MAIN TERMINAL BOX MOUNTING LOCATION:   42   43   44   45   46   46   46   47   48   49   49   40   40   41   42   42   43   44   45   46   46   46   47   48   49   49   40   40   40   41   42   43   44   45   46   47   48   49   49   49   49   40   40   41   42   43   44   45   46   47   48   49   49   49   49   40   40   40   41   42   43   44   45   46   47   48   49   49   40   40   41   42   43   44   45   45   46   46   47   48   49   49   49   49   40    40 <td>30     mmm     mmm     Tere       37     MOUNTING:     Image: Constant in tere     Image: Constant in tere       38     Image: Constant in tere     Image: Constant in tere       38     Image: Constant in tere     Image: Constant in tere       39     Image: Constant in tere     Image: Constant in tere       40     Image: Constant in tere     Image: Constant in tere</td> <td>TYPE #1-* WINDINGRUNNING AND LOCKED-RUN PROTECTED      TYPE #2-*WINDINGRUNNING PROTECTED*      TYPE #3-*WINDINGPROTECTED, NON-SPECIFIC*      SPACE HEATER REQD RATED AT: WATTS</td>	30     mmm     mmm     Tere       37     MOUNTING:     Image: Constant in tere     Image: Constant in tere       38     Image: Constant in tere     Image: Constant in tere       38     Image: Constant in tere     Image: Constant in tere       39     Image: Constant in tere     Image: Constant in tere       40     Image: Constant in tere     Image: Constant in tere	TYPE #1-* WINDINGRUNNING AND LOCKED-RUN PROTECTED      TYPE #2-*WINDINGRUNNING PROTECTED*      TYPE #3-*WINDINGPROTECTED, NON-SPECIFIC*      SPACE HEATER REQD RATED AT: WATTS
44       O NON-SPARKING         45       GREASE       ROLLER       SLEEVE         46       BEARL       ROLLER       SLEEVE         47       BRG LUBRICATION:       GREASE       RING OIL       O IL MIST         48       GREASE FITTING:       PLUGGED       O ALEMITE       O THER         49       BRG SHIELDING:       SINGLE       D DOUBLE       SEALED FOR LIFE         50       TESTING       TESTING       MISCELLANEOUS         51       IEEE TESTING:       O OBSVD       WIT       SUBMIT CERT D RESULTS         54       SPECIAL TESTING:       O SUBMIT CERT D RESULTS       PAINTING:       MISCELLANEOUS         54       SPECIAL TESTING:       SUBMIT CERT D RESULTS       IEEE 841 STD       O THER         56       SPECIAL TESTING:       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS         54       SPECIAL TESTING:       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS         54       SPECIAL TESTING:       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS         54       SPECIAL TESTING:       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS       SUBMIT CERT D RESULTS         56       SUBMIT C	41     MAIN TERMINAL BOX MOUNTING LOCATION:     Image: Constraint of the second	Volts       Phase       Hertz         Max sheath temperature:       °C         Separate junction box for space heater leads
50     TESTING     MISCELLANEOUS       51     IEEE TESTING:     O BSVD     WIT     O SUBMIT CERT'D RESULTS       52     SPECIAL TESTING:     O IEEE 841 STD     O OTHER       53	45 46 47 48 49 49 49 49 49 49 49 40 40 40 40 40 40 40 40 40 40	MOTOR THRUST LOAD: O (kg) O NONE DIRECTION OF THRUST: O TOWARD COUPLING MOTOR THRUST RATING: (kg)
	50         TESTING           51         IEEE TESTING:         O OBSVD         O WIT         O SUBMIT CERT'D RESULTS           52         O SPECIAL TESTING:	MISCELLANEOUS           PAINTING:         O           O

	P Al	ACKAGEL R COMPR	), INTEGRA ESSORS (A	ALLY GEARED	CENTRIFU ) DATA SH	IGAL IEET	JOB NO.			ITEM NO.				
1			SIL	INITS (KPa)		ALLOWAE	BLE PIPING F	PAGE ORCES AND I	10 OF MOMENTS (6.4)	11	REQ'N NO.			
2														
3		FORCE	COMF	RESSOR INLET		FORCE	COMPRES	SOR DISCHAR	GE	EORCE	PACKAG	SE OUTLET		
4 5	AX	AL	, (Kg)	MOMENT,	(N-m)	TOROE,	(Kg)	WOMENT,	(N-m)	TONOE,	(K <u>g</u> )	WOWENT,	(N-m)	
6	VE	RT												
7	TRA	NS												
8														
9 10	ADDITIONAL L	ATA:												
11														
12														
13 14														
15														
16														
17														
19														
20														
21														
22														
24														
25														
26 27														
28														
29														
30														
31														
33														
34														
35														
37														
38														
39														
40 41														
42														
43														
44														
46														
47														
48														
49 50														
51														
52														
53														
54														

02/03 10 OF 10 API672.XLS
PACKAGED, INTEGRALLY GEARED CENTRIFUGAL												
AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO											
SI UNITS (KPa)	PAGE 11 OF 11 REQ'N NO.											
CENTRIFUGAL AIR COMPRESSOR PERFORMANCE CURVES												
When this requisition is issued for purchase, the supr	nlier's proposed curves for											
the selected compressor will be inserted here as a sul	bstitute for this sheet.											
The compressor performance and characteristics as c	given on this performance curve											
will be a part of the supplier's contractual obligation	vithin the tolerances agreed upon.											

			REVISION	0		1	2		3	4		
			DATE						-	-		
			BY									
PACKAGED, INTEGRALLY GEARED CENTRIFU	GAL		REV/APPR									
AIR COMPRESSORS (API 6724th ED) DATA SH	IEET		JOB NO.	JOB NO ITEM NO								
METRIC (kg/cm2)			PAGE 1 OF 11 REQ'N NO.									
1 APPLICABLE TO: O PROPOSAL O PURCHASE		O AS BU	ILT									
2 FOR			UNIT									
3 SITE	ISITE											
4 SERVICE	_		DRIVER ITE	M NO.								
5 O CONTINUOUS O INTERMITTENT	O STAN	DBY (3.30)	_	SPARED BY:								
6 NOTE: INFORMATION TO BE COMPLETED: O BY PURCHA	SER			BY MANUFACTU	RER		О ВУ РС	JRCHASER C	OR MFR			
7		G	ENERAL									
8 COMPRESSOR MFR	MODEL (SIZ	E AND TYPE	) _				SERIAL NO.					
	DRIVER TY	PE -				R	ATED (BkW)	<b>B 1 0 0</b>	RPM			
10 DRIVE SYSTEM: O DIRECT COUPLED OTHER						D	UTY (1.2) O	BASIC	0	SPECIAL		
11 OPERATING CONDITIONS (	6.1.9)						CONTROL	. SYSTEM (7.	.4.2)			
12		LOW	MIN		CONT	ROL METHOD	: (7.4.2.1)					
13 (ALL DATA ON PER UNIT BASIS)	RATED	AMB *	AMB	OTHER	0	CAPACITY MOD	ULATION (CONST D	SCH PRESS)	(7.4.2.1 a.)			
14	(3.24)	(7.10.1)				O INLET T	HROTTLE DEVIC	Œ	0	DAMPER		
15 O DELIVERED FLOW, NM_/H (1.033 kg/cm_A & 0°C DRY)					1	O GLOBE	VALVE	O BUTTE	ERFLY VAL\	/E		
16 WEIGHT FLOW, (kg/h) (WET) (DRY)					1.	O VARIAB	LE INLET GUIDE	VANES				
17 O INLET COOLING WATER TEMP, (°C)					0	AUTOMATIC	DUAL CONTROL	(7.4.2.1 b.)				
18					-	o	(kg/cn TO		(kg/cm_G)	DISCH PRESS		
19 INLET CONDITIONS:		1	-		0	AUTO START	AND STOP (7.4.2	2.1 c.)				
20 O PRESSURE (kg/cm_A)						O START		(kg/cm_G)	STOP	(kg/cm_G)		
21 O TEMPERATURE (°C)					0	OTHER (DESC	CRIBE):					
22 O RELATIVE HUMIDITY %												
23 O MOLECULAR WEIGHT (M)												
24 INLET VOLUME, (m_/h) (WET / DRY)												
25												
26 DISCHARGE CONDITIONS:												
27 O PRESSURE (kg/cm_A)					CONT	ROL SYSTEM	REQUIREMENTS	S:				
28 TEMPERATURE (°C)					UNIT OPERATES IN PARALLEL (7.4.2.2)							
29					O W/CENTRIFUGAL							
30 PERFORMANCE:						O W/ROT/	ARY	O W/REG	CIPROCATIN	١G		
31 MAX (BkW) REQUIRED (ALL LOSSES INCL)					_							
32 (BkW/ 100 m_/h) AIR DELIVERED					0	MICROPROCI	ESSOR CAPABLE	E OF COMMU	JNICATION			
33 INPUT SPEED (rpm)					-	-	AGEN 3 D03 (7.4					
34 ESTIMATED SURGE, (m_/h) (@ ABOVE SPEED)					-	О сомм	PROTOCOL					
35 O MAX DP ACROSS INLET FILTER, (kg/cm_)					-							
		1	1 1		CONT	ROL SYSTEM	ALTERNATES: (	7.4.1.3)				
37 AFTERCOOLER OUTLET TEMP, (°C)			┥		-	U OTHER	THAN MICROPR	OCESSOR B	BASED:			
38 PERFORMANCE CURVE NO.			┥		-	~ <del></del>						
39 39 % RISE TO SURGE (6.1.12.2)			┥		-	O SUITAB	LE FOR INDOOR					
			+		-	U FURNIS	HED BY PURCH	ASER				
41 🖵										c)		
42		* UNTHRO	TTLED PERFORMA	NCE FOR DRIVER SIZING	3		INTER-AN	AFTER-U	55LLK3 (7.	<i>''</i>		
43 HEMAHKS:					AFTE	RCOOLER:						
44					-		HED BY PURCH	ASER (7.6.1)				
45												
46					AIR-CO	ULED I YPE BY V						
4/								HEQD (7.6.3	3, 7.6.6)			
48				1		HED BY PURCH	ASER					
49							TOMATIC					
50			AIR-COOLED EXCHANGER AUTOMATIC TEMPERATURE CONTROL MEANS: (7.6.6)									
51												
52					-			VAHIABLE S	FANS	; ;		
53			VARIABLE PITCH FANS O BYPASS VALVE									
54						AIH-COOLER		JAL ONLY (7.	.6.6) BY:			
50					1			BYPASS VA	LVE			
00					-		LE PITCH FANS					

		PACKAGED, INTE	EGRALLY GEARED CEN	TRIFUGAL			
		AIR COMPRESSOR	RS (API 6724TH ED) DA	ATA SHEET	JOB NO.	ITEM NO	,
	1		TION SITE DATA (6.1.5)		PAGE 2 OF 11	REQ'N NO. SPECIFICATIONS	
1	1.00						
2	0						(@ 1 m)
4	õ	OUTDOOR	O UNHEATED C				(6 + m)
5	Ō	GRADE	O MEZZANINE C	)	ACOUSTIC HOUSING:	O YES O	NO
6	0	WINTERIZATION REQD	O TROPICALIZAT	ION REQD	APPLICABLE SPECIFICATIONS:		
7					API 672 AND O		
8	SITE	E DATA:					
9	0	ELEVATION	(m) O BAROMETER	(kg/cm_A)	O NON-ASME WELDING IF NOT AWS D	D1.1: (6.10.3.5)	
10	0	RANGE OF AMBIENT TEMPER.	ATURE, (°C	:)	O UNITS OF MEASURE (5.1)	US CUSTOMARY O	SI O OTHER
11			DRY BULB	WET BULB			
12		NORMAL			PAINTING:		
13		MAXIMUM			O MANUFACTURER'S STD		
14		MINIMUM			O OTHER		
15							
16					BASEPLATE GROUT: (7.10.3)	O EPOXY O	CEMENT O NONE
17					DREDADATION FOR CROUT SURFACES	(7.10.2)	
18			S O CORROSIVE C	ONDITIONS		0.00	
19		CORROSIVES PRESENT:					BARE FOR FIELD BLAST
20		CONDITIONS CAUSE STRESS	CORROSION CRACKING			lG	
21							
22							
23		EA ELECTRICAL CLASSIFICATIO	N: (6.1.8)	T-CODE	SHIPMENT: (8.4.1)	···· 0 ······	
24		CLASS GROU	DIVISION		O DOMESTIC O EXPO		OXING REQD
25		LOCAL ELECTRICAL CODES:			OUTDOOR STORAGE OVER 6 MONT	IHS	
20							
27	0		UTETT CONDITIONS.			111 CONSOMPTION (9.2.31.)	
28		STEAM HEATING:	(ka/am_C)	(%0)			(102/b)
29			(kg/cm_G)	(°C)		(kg/l) OTHER	(kg/ii)
31		MAX	(kg/cm_G)	(0)	ELECTRIC.	100	
32		MADA		(*(*)	ELECTRIC:	108	KED ΕΠΠΙΟΔΟ
33		OUTLET MIN	(kg/cm_G)	(°C)		(kW) ROTOR	AMPS AMPS
			(kg/cm_G) (kg/cm_G) (kg/cm_G)	(°C) (°C) (°C)	MAIN LO PUMP	(kW)	AMPS AMPS
34		OUTLET MIN NORM MAX	(kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_G)	(3°) (3°) (3°) (3°)	MAIN LO PUMP AUX LO PUMP	(kW) ROTOR	AMPS AMPS
34 35		OUTLET MIN NORM MAX	(kg/cm_G)	(3°) (3°) (3°) (3°)	MAIN LO PUMP AUX LO PUMP	(kW) ROTOR	AMPS AMPS
34 35 36	0	OUTLET MIN NORM MAX ELECTRICITY:	(kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_G)	(°C) (°C) (°C) (°C)	AUX LO PUMP OIL HEATER	(kW) ROTOR	AMPS AMPS
34 35 36 37	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	ALIX LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:	(kW) ROTOR	KED         FULL LOAD           AMPS         AMPS
34 35 36 37 38	0		(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	ALEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD:	(kW) ROTOR	AMPS FULL LOAD AMPS AMPS
34 35 36 37 38 39	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	ALEUTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:		AMPS FULL LOAD AMPS AMPS
34 35 36 37 38 39 40	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	ALEUTRIC: MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:		AMPS FULL LOAD AMPS AMPS
34 35 36 37 38 39 40 41	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE	(kg/cm_G)           (kg/cm_G)           (kg/cm_G)           (kg/cm_G)           (kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	AUX LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:	(kW) ROTOR	AMPS FULL LOAD AMPS AMPS
34 35 36 37 38 39 40 41 42	0	OUTLET MINNORMNAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6)	(kg/cm_G)           (kg/cm_G)           (kg/cm_G)           (kg/cm_G)           (kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN	ALEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: L COO QUANTITY, (L/min)	(kW) ROTOR	AMPS FULL LOAD AMPS AMPS 
34 35 36 37 38 39 40 41 42 43	0	OUTLET MINNORMNAX MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET	(kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_G) (kg/cm_C) (kg/cm_C)	(°C) (°C) (°C) (°C) SHUTDOWN	ALEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: L COOLING WATER: L COOLING WATER: L COOLING WATER: L COOLING WATER: L COOLING WATER: L COOLING WATER: COOLING WATER: L	(KW) ROTOR	AMPS FULL EOAD AMPS AMPS
34 35 36 37 38 39 40 41 42 43 44	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) SHUTDOWN	ALLEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER	(KW) ROTOR	KED         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALEUTRE.  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:  COOLING WATER:  COOLING WATER:  L COO QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min)	(KW) ROTOR	AMPS FULL LOAD AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:  U COC QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min)		AMPS FULL LOAD AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47	0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (kg/cm, P	ALEUTRIC.  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:  U COC QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min) AIR/NITROGEN:	(kW) ROTOR	AMPS FULL LOAD AMPS AMPS 
34 35 36 37 38 39 40 41 42 43 44 45 46 46 47 48	0 0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/INITROGEN:	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C) (kg/cm, (kg/cm, )	ALEUTRIC.  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: CUUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min) AIR/NITROGEN: COULING CO	(KW) ROTOR	AMPS         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 45 46 47 48 49	0 0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (°C) (°C) (°C) (°C) (kg/cm, (kg/cm	ALIEUTRIC.  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATE	(KW) ROTOR	AMPS         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	0 0	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION	(kg/cm_G)	(°C) (°C) (°C) (°C) SHUTDOWN (°C) (°C) (°C) (kg/cm, (k	ALIEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: COOLING WATER: COOLING WATER: COOLING WATER: COOLING WATER: COOLING WATER: CONTROL PANEL: CONTROL PANEL:	(KW) ROTOR	AMPS FULL LOAD AMPS AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 50	0 0 REM	OUTLET MIN NORM HAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE MAX PRESS GAS COMPOSITION MARKS:	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALIEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: COOLING WATER: COOLING WATER: L. COOLING WATER: COOLING WATER: LI COOLING WATER: COOLING WATER: LI COOLING WATER: COOLING W	(kW) ROTOR	KED         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	O O REM	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE MAX PRESS GAS COMPOSITION MARKS:	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALIEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER:  QUANTITY, (L/min) OUTLET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min) AIRNITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS:	(KW) ROTOR	KED         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 51 52 53	0 0 Rem	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE WATER SOURCE AIR/NITROGEN: MAX PRESS GAS COMPOSITION	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALIEUTRIC. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: CONTROL SYSTEM: CONTROL	(KW) ROTOR	CED         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	0 0 REM	OUTLET MINNORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE MAX PRESS GAS COMPOSITION MARKS:	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (kg/cm, (kg/cm, (kg/cm,	ALLEUTRU. MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: COULING WATER:	(KW) ROTOR	CED         FULL LOAD           AMPS         AMPS
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55	0 0 REM	OUTLET MIN NORM MAX ELECTRICITY: HEAT VOLTAGE HERTZ PHASE PHASE COOLING WATER: (6.1.6) TEMP INLET PRESS NORM MIN RETURN WATER SOURCE MIN RETURN WATER SOURCE GAS COMPOSITION MARKS:	(kg/cm_G)	(°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	ALEUTRIC.  MAIN LO PUMP AUX LO PUMP OIL HEATER CONTROL SYSTEM LOAD: COOLING WATER: COOLING WATER: COOLING WATER: COULET TEMP, (°C) PRESS DROP, (kg/cm_) TOTAL CW, (L/min) AIRNITROGEN: SEAL SYSTEM: CONTROL PANEL: LO RESERVOIR: INSTR HOUSINGS: CONTROL SYSTEM: OTHER: COTHER:	(KW) ROTOR	CED         FULL LOAD           AMPS         AMPS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 672-44) ED) DATA SHEET METRIC (Lg(cm2)         LOB NO.         ITEM NO.           MATER COMPRESSOR SAFEDS:         MATRIX (Lg(cm2)         COMMITTEER AT ALRES         SPLICE           Commension Particle (Lg(cm2)         COMMITTEER AT ALRES         SPLICE         SPLICE           Commension Particle (Lg(cm2)         COMMITTEER AT ALRES         SPLICE         SPLICE           Commension Particle (Lg(cm2)         Commension Particle (Lg(cm2)         SPLICE         SPLICE         SPLICE           SPLICE CONCERTIONERS         Image (Lg) (Lg) (Lg) (Lg) (Lg) (Lg) (Lg) (Lg)											
AIR COMPRESSORS (AP) 672-411 ED) DATA SHEET         P39.0         TFM-0           METRIC (Lg/cm2)         CONSTRUCTOR FAILES         Image: 1         Heads No.           Image: 1         Heads No.         Heads No.         Heads No. <td< th=""><th></th><th></th><th>EGRALLY</th><th></th><th>TRIFLICAL</th><th></th><th></th><th></th><th></th><th></th><th></th></td<>			EGRALLY		TRIFLICAL						
METRIC (kg/cm2)         page		AIR COMPRESSO	DRS (API 6	6724th ED) DA	TA SHEET		JOB NO.	ITEM	NO.		
I         CONSTRUCTION FLATURES           I         CONSTRUCTION FLATURES           I         INTERNAL         SPAIL           INTERNAL         INTERNAL           INTERNAL         SPAIL           INTERNAL <td></td> <td></td> <td>METRIC</td> <td>(kg/cm2)</td> <td>-</td> <td></td> <td>PAGE 3 OF</td> <td>11 REQ</td> <td>N NO.</td> <td></td> <td></td>			METRIC	(kg/cm2)	-		PAGE 3 OF	11 REQ	N NO.		
Image: Section Sector         Tree Contracts:         (pm)         Mittion Mithing         SPLIT         SPLIT         (pm)           Image: Section Sector         111         (pm)         (pm)         Mithing         SPLIT         (pm)           Image: Sector         111         (pm)         (	1	_				CONSTRUC	TION FEATURES				
A NATED RULE         (mm)         MATERIAL         SPL1           I ALLEGAR CRITICUS:         11         (mm)         Matterial         SPL1           I ANDERAL CRITICUS:         11         (mm)         Matterial         (mm)           (mm)           I ANDERAL CRITICUS:         11         Matterial         (mm)         (mm)         (mm)         (mm) <tr< td=""><td>2</td><td>COMPRESSOR SPEEDS:</td><td></td><td></td><td></td><td></td><td>INTEGRAL GEAR HOUSING:</td><td></td><td></td><td></td><td></td></tr<>	2	COMPRESSOR SPEEDS:					INTEGRAL GEAR HOUSING:				
• BLILGEAK CRITICULS         ts         (pm)           • MUNCRETICULS         (pm)         ////////////////////////////////////	3	RATED INPUT:		(rpm) TRIP		(rpm)				SPLIT	
Interventional         Interventional         (mm)         Interventional         (mm)	4	BULLGEAR CRITICALS:	1st	(rpm)			BULL GEAR: (6.5.3), (6.12.2)		UT7/-		(1)40
2         2         1         2         1         ACTUAL 5.F.         0           2         2         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td< td=""><td>с 6</td><td>1et STG PINION</td><td>1et</td><td>(rom)</td><td>2nd</td><td>(rom)</td><td>RATED POWER BASED ON TOOTH</td><td></td><td></td><td></td><td>(KVV)</td></td<>	с 6	1et STG PINION	1et	(rom)	2nd	(rom)	RATED POWER BASED ON TOOTH				(KVV)
#         add STG PNION         ts         (rm)         CALM NATERAL:         HARDNESS           #         #STG PNION         ts         (rm)         CALM PLATERAL:         HARDNESS         (rm)           #         STG PNION         ts         (rm)         CALM PLATERAL:         (rm)         (rm)           *         STG PNION         ts         (rm)         (rm)         (rm)         (rm)           *         STG PNION         ts         (rm)	7	2nd STG PINION	1st	(rpm)	2nd	(rpm)	O MIN AGMA SERVICE FACTOR	R:		ACTUAL S.F	
#         (m) STD FINION         1st         (m)         (m) <t< td=""><td>8</td><td>3rd STG PINION</td><td>1st</td><td>(rpm)</td><td>2nd</td><td>(rpm)</td><td>GEAR RIM MATERIAL:</td><td></td><td></td><td>HARDNESS:</td><td></td></t<>	8	3rd STG PINION	1st	(rpm)	2nd	(rpm)	GEAR RIM MATERIAL:			HARDNESS:	
Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Construct Strade         Image: Constru	9	4th STG PINION	1st	(rpm)	2nd	(rpm)	GEAR FACE WIDTH:	(mm)	GEAR CENTER M	ATL:	
11       STAGE       IMPELLER       TP       PTCH DIA       (mm)       PTCH DIA       (mm)       PTCH DIA       (mm)       (mm)       (mm)         13       ISTAGE       (pm)       (mm)       (mm	10	OTHER UNDESIRABLE SPEEDS: (6	.7.1.3)				MECHANICAL EFFICIENCY:		% ISO 1328 G	RADE:	
1 str STAGE       (pm)       (mm)       (mm) <td>11 12</td> <td>STAGE SPEED</td> <td></td> <td>IMPELLER DIAMETER</td> <td>TIP SPEED</td> <td>)</td> <td>PITCH DIA</td> <td>(mm) PITC</td> <td>H LINE VELOCITY</td> <td></td> <td>(m/s)</td>	11 12	STAGE SPEED		IMPELLER DIAMETER	TIP SPEED	)	PITCH DIA	(mm) PITC	H LINE VELOCITY		(m/s)
Ind STAGE       (pm)	13	1st STAGE	(man)	(m	m)	(m/hr)	PINIONS: (6.5.3), (6.12.2)	1st	2nd	3rd	4th
15       Strade       (ppn)       (mn)       (mh)         16       ah STACE       (ppn)       (mn)       (mh)         16       ah STACE       (ppn)       (mn)       (mh)         16       ah STACE       (ppn)       (mn)       (mh)         17       Implementation       (ppn)       (mn)       (mh)         18       MOP Charlaster       Integration       (mn)       (mn)         19       NO OR MELLERS:       (AATERIAL)       MATERIAL       MATERIAL         20       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       DIA @ GAR MATT       (mn)       WEIGHT (W/GEAR)       (kg)         21       TYPE CONSTRUCTOR (6.2.2)       DIA @ GAR RADUL BROTYPE       MATE       (mn)       MATERIAL         22       COMPRESSOR CASING:       CASING SPLT       DIAL GEAR THRUST BEARNOSS, ESC.       (mn)         23       MATERIAL       STG 1       STG 2       STG 3       STG 4       UCONTON       (MIC MARCALERA       (mn)         24       THERIAL       STG 1       STG 2       STG 3       STG 4       UCONTON       (MIC MARCALERA       (mn)         26       MMP, (pg/m_G)       CASING SPLT       CASING SPLT       OUCONTON       ACTUAL LOAD       <	14	2nd STAGE	(rpm)	(m	m)	(m/hr)	SERVICE FACTOR:				
Ide div STAGE       (ppn)       (mm)       (mh)       HARDNESS: (BH/IR (B)         Impellers:       (6.52)       BULI GEAR SIAFT:       BULI GEAR SIAFT:         Impellers:       (MATE:       HARDNESS:       (MATE:         TYPE (OPR, RADIA, BACKWARD LEANING, ETC.)       BRS SPAN       (mm)       UKGHT WICEGAR;       (gig)         Impellers:       (MATE:       HARDNESS:       (MATE:       HARDNESS:       (BH/IR)         Impellers:       (MATE:       HARDNESS:       (BH/IR)       (mm)       (Gig)       (mm)         Impellers:       (MATE:       HARDNESS:       (BH/IR)       (mm)       (Gig)       (mm)       (Gig)       (mm)         Impellers:       (MATE:       (MATE:       HARDNESS:       (BH/IR)       (mm)       (Gig)       (mm)         Impellers:       (MATE:       (MATE:       HARDNESS:       (BH/IR)       (mm)       (Mate)       (mm)         Impellers:       (MATE:	15	3rd STAGE	(rpm)	(m	m)	(m/hr)	MATERIAL:				
17       BUL CERA SHAFT:         18       NO. OF IMPELLERS:       MATERIAL         18       NO. OF IMPELLERS:       MATERIAL         19       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       BRG SPAN         19       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       BRG SPAN         20       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       BRG SPAN         21       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       DIA & GEAR         22       METHOD OF ATTACH: (6.5.2.2)       STG 4         23       ROTATION, VIEWED FROM INPUT SHAFT END:       CW         24       COMPRESSOR CASING:       MATL         25       COMPRESSOR CASING:       ACTUAL LOAD       (dg/em.)         26       COMPRESSOR CASING:       CASING SPLIT       BULL CEAR THRUST BEARINGS: (6.3.3)       LOCATION       TYPE         27       STG 1       STG 2       STG 3       STG 4       LOCATION       (dg/em.)       ACTUAL LOAD       (dg/em.)         28       MATERIAL	16	4th STAGE	(rpm)	(m	m)	(m/hr)	HARDNESS: (BHN) (R _c )				
10       MPELLERS: (6.2)       Immediate Structures       Immediate Structures </td <td>17</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>BULL GEAR SHAFT:</td> <td></td> <td></td> <td></td> <td></td>	17						BULL GEAR SHAFT:				
19       NO. OF INPELLERS:       MATE:       MARDNESS:       (BHV) (R         20       TYPE (OPEN, RADUL, BACKWARD LEANING, ETC.)       BRG SPAN       (mm)       WEIGHT (W(GEAR)       (kg)         21       TYPE (OPEN, RADUL, BACKWARD LEANING, ETC.)       BRG SPAN       (mm)       WEIGHT (W(GEAR)       (kg)         22       METHOD OF ATTACH: (6.5.2.2)       BRG SPAN       (mm)       DIA @ GEAR       (mm)       DIA @ COUPLING       (kg)         23       ROTATION, VIEWED FROM INPUT SHAFT END.       CW       CW       GW SHAFT LARYS: TYPE       —       —       —         24       COMPRESSOR CASING:       CASING SPLIT       BULL GEAR RADUL REG TYPE:       LENGTH (mm,       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _       _	18	IMPELLERS: (6.5.2)					REPLACEABLE		INTEGRAL W/GEA	AR	
20       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       BRG SPAN       (mm)       WEIGHT (WCBAR)       (kg)         21       TYPE (OPEN, RADIAL, BACKWARD LEANING, ETC.)       DIA @ CEAR       (mm)       DIA @ COUPLING       (mm)         22       METHOD OF ATTACH: (6.5.2.2)       SHAFT SLEEVES AT SEALS: MATL       (mm)       DIA @ COUPLING       (mm)         23       ROTATION, VIEWED FROM INPUT SHAFT END:       CW       CCW SHAFT LABRS TYPE:       LENGTH       (mm)         24       OMPRESSOR CASING:       CASING SPLIT       LOCATION       MATL       (mm)       ACTUAL LOAD       (kg) om,         26       OMPRESSOR CASING:       CASING SPLIT       LOCATION       ACTUAL LOAD       (kg) om,       ACTUAL LOAD       (kg) om,         26       MATERUL       CASING SPLIT       LOCATION       AREA       (mm)       AREA       (mm)         27       STG 1       STG 2       STG 3       STG 4       MFR       AREA       (mm)       CASING SPLIT         28       MATERUL       COMPRIST (kg) (kg) (kg) (kg) (kg) (kg) (kg) (kg)	19	NO. OF IMPELLERS:		MATERIAL			MATL:		HARDNESS:		(BHN) (R _c )
21       TYPE CONSTRUCTION: (6.5.22)       IMA & SUBJER       (mm)       DIA & COUPLING       (mm)         23       MOTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       SHAFT SLEEVES AT SEALS: MATL         24       MOTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       SHAFT SLEEVES AT SEALS: MATL         24       MOTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       SHAFT SLEEVES AT SEALS: MATL         24       MOTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       SHAFT SLEEVES AT SEALS: MATL         24       MOTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       SHAFT SLEEVES AT SEALS: MATL         24       MAREA       LENGTH       LENGTH       LENGTH       (mm)         25       MOTA SUBJERS       ACTUAL LOAD       (kg/cm, Cu/g/cm, ACTUAL LOAD       (kg/cm, Cu/g/cm,	20	TYPE (OPEN, RADIAL, BACK)	VARD LEANIN	IG, ETC.)			BRG SPAN	(mm)	WEIGHT (W/GEAF	۲)	(kg)
22       METHOD OF ATTACH: (6.52.2)       SHAFT LABY: TYPE       MATL         23       ROTATION, VIEWED FROM INPUT SHAFT END:       CW       CW       CW       CW       MATL         24       COMPRESSOR CASING:       CASING SPLIT       LENGTH       LENGTH       (mm         25       MODEL       CASING SPLIT       Bull GEAR THRUST BEARINGS: (6.3.3)       TYPE       MATL         26       MAWP.       (kg/cm_2)       ACTUAL LOAD       (kg/cm_2)       ACTUAL LOAD       (kg/cm_2)         27       STG 1       STG 2       STG 3       STG 4       LOCATION       TYPE       MARWP.       AREA       (mm         28       MATERIAL	21	TYPE CONSTRUCTION: (6.5.2	2.2)				DIA @ GEAR	(mm)	DIA @ COUPLING		(mm)
23       ROTATION, VIEWED FROMINFUT SHAFTEND:       LENCTH       MAIL         24       BULL GEAR RADIAL BRG TYPE:       LENCTH       LENCTH         25       COMPRESSOR CASING:       LENCTH       LENCTH       (mm         26       MODEL       STG 1       STG 2       STG 3       STG 4         27       STG 1       STG 2       STG 3       STG 4       LOCATION       RAREA       (mm,         29       MAWP,       (kg/cm_G)	22	METHOD OF ATTACH: (6.5.2.2	2)			<u></u>	SHAFT SLEEVES AT SEALS. MATL				
24	23	ROTATION, VIEWED FROM IN	IPUT SHAFTE	END:		cw 🗆 ccw	SHAFT LABYS: TYPE		MAIL		(mm)
26       ODMINION DIMONSTRUCT	24						ALLOW LOAD	(kg/cm)			(mm)
27       STG 1       STG 2       STG 3       STG 4       LOCATION	26			CASING SPLIT			BULL GEAR THRUST BEARI	(kg/cm_)	AOTOAL LO		(kg/cm_)
28       MATERIAL       MFR	27		STG 1	STG 2	STG 3	STG 4	LOCATION	,	TYPE		
29       MAWP, (kg/cm_G)       INTEGRAL       REPLACEABLE         30       HYDRO TEST, (kg/cm_G)       GAS LOAD       (kg/cm_G)       COUPLING LOAD       (kg/cm_G)         31       MAX OPT TEMP, ('C)       GAS LOAD       (kg/cm_G)       COUPLING LOAD       (kg/cm_G)         32       MIN DESIGN METAL TEMP (6.10.5)       ('C)       GAS LOAD       (kg/cm_G)       COUPLING LOAD       (kg/cm_G)         33       O       MIN DESIGN METAL TEMP (6.10.5)       ('C)       ('C)       PINION RADIAL BRG       DULTIMATE STRESS FOR MATL (6.2.1)       O       BULL GEAR RADIAL BRG       ('kg)         34       ULTIMATE STRESS FOR MATL (6.2.1)       (MPa)       (MPa)       O       SIZE       RATING       FACING       POSITION         35       O       100% RADIOGRAPH       MAG PARTICLE       O LIQ PENETRANT       COMPR DISCH       SIZE       RATING       FACING       POSITION         39       O       100% RADIOGRAPH       MAG PARTICLE       FILD PENETRANT       COMPR DISCH       FACING       FACING       POSITION         44       STG 1       STG 2       STG 3       STG 4       FILTER OUTLET       I       I       I       I       I       I       I       I       I       I       I	28	MATERIAL					MFR		AREA		(mm_)
30       HYDRO TEST, (kg/cm_G)       ALLOW LOAD       (kg/cm_) ACTUAL LOAD       (kg/cm_)         31       MAX OPT TEMP, (*C)       GAS LOAD       (kg) COUPLING LOAD       (kg/cm_)         32       MIN DESIGN METAL TEMP (6.10.5)       (*C)       GAS LOAD       (kg/cm_) ACTUAL LOAD       (kg/cm_)         32       MIN DESIGN METAL TEMP (6.10.5)       (*C)       GAS LOAD       (kg/cm_) BEARINGS FITTED WITEMP SENSORS (6.12.10, 6.12.11)       BEARINGS FITTED WITEMP SENSORS (6.12.10, 6.12.11)       GAS LOAD       GAS LOAD       BEARINGS FITTED WITEMP SENSORS (6.12.10, 6.12.11)       GAS LOAD       GAS	29	MAWP, (kg/cm_G)					THRUST COLLAR (6.8.3.6)		GRAL	REPLACEABLE	
31       MAX OPT TEMP, ('C)	30	HYDRO TEST, (kg/cm_G)					ALLOW LOAD	(kg/cm_)	ACTUAL LC	AD	(kg/cm_)
32       MIN DESIGN METAL TEMP (6.10.5)	31	MAX OPT TEMP, (°C)					GAS LOAD	(kg)	COUPLING	LOAD	(kg)
33       O       MIN DESIGN METAL TEMP (6.10.5)	32	<u> </u>					BEARINGS FITTED W/TEMP SENSO	ORS (6.12.10, 6.12.1	1)		
34     CASING HEAT TREATMENT REQUIRED (6.10.3.1.1)     (MPa)       35     ULTIMATE STRESS FOR MATL (6.2.1)     (MPa)       36     CASTING FACTOR (6.2.1)     (MPa)       37     WELDED CONNECTIONSNDT PROVIDED     MAG PARTICLE     ILIQ PENETRANT       38     0     100% RADIOGRAPH     MAG PARTICLE     ILIQ PENETRANT       41     COMPRESSOR BEARINGS & BEARING HOUSINGS:     PKG OUTLET     ASME       41     COMPRESSOR BEARINGS & BEARING HOUSINGS:     PKG OUTLET     ATM BLOWOFF       42     BEARING HSG MATERIAL:     PKG OUTLET     ATM BLOWOFF       44     STG 1     STG 2     STG 3     STG 4       45     BRG TYPE     ACTUAL LOAD, (kg/cm_)	33	MIN DESIGN METAL TEMP (6	.10.5)			(°C)	O PINION RADIAL BRG	0	BULL GEAR RADI	AL BRG	
33       ULTIMATE STRESS FOR MAIL (62.1)       (MPa)         36       CASTING FACTOR (62.1)       (MPa)         37       WELDED CONNECTIONSNDT PROVIDED       MAG PARTICLE       Ulq PENETRANT         38       0       100% RADIOGRAPH       MAG PARTICLE       Ulq PENETRANT         40       0       0       COMPR INLET       0         41       COMPRESSOR BEARINGS & BEARING HOUSINGS:       PKG OUTLET       0       0         42       BEARING HSG MATERIAL:       PKG OUTLET       0       0         43       PINION RADIAL BEARINGS: (6.8.2)       PKG OUTLET       0       0         44       STG 1       STG 2       STG 3       STG 4       0       0         45       BRG TYPE       0       0       0       0       0       0       0         46       ALLOW LOAD, (kg/cm_)       ULBE OIL INLET       UBE OIL INLET       0       0       0       0       0         48       BRG SPAN, (mm)       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0	34		REQUIRED (6.1	10.3.1.1)			O THRUST BRG				
36       CISINING FACTOR (6.2.1)         37       WELDED CONNECTIONSNDT PROVIDED         38	35		L (6.2.1)			(MPa)					
31       Intelligibility of the formation of the formatio of the formation of the formation of the for	30						MAIN CONNECTIONS: (6.3)		ASME		
3     Compressor bearings & bearing housings:     Compressor bearings & bearing housings:     Compressor bearings & bearing housings:       41     Compressor bearings & bearing housings:     PKG OUTLET     Image: Compressor bearing housings:       42     BEARING HSG MATERIAL:     ATM BLOWOFF       43     PINION RADIAL BEARINGS: (6.8.2)       44     STG 1     STG 2       45     BRG TYPE       46     ALLOW LOAD, (kg/cm_]       47     ACTUAL LOAD, (kg/cm_]       48     BG SPAN, (mm)       49     PINION THRIST BEARINGS: (6.8.2)	38	100% RADIOGRAPH	0	MAG PARTICLE		ENETRANT		SIZE	RATING	FACING	POSITION
40     COMPR DISCH     Image: Compression Bearings & Bearing Housings:       41     Compression Bearings & Bearing Housings:     PKG OUTLET       42     BEARING HSG MATERIAL:     ATM BLOWOFF       43     PINION RADIAL BEARINGS: (6.8.2)     FILTER OUTLET       44     STG 1     STG 2       45     BRG TYPE     Image: Compression Bearing Housings:       46     ALLOW LOAD, (kg/cm_)       47     ACTUAL LOAD, (kg/cm_)       48     BRG SPAN, (mm)       49     PINION THRIJST BEARINGS: (6.8.3)	39	0					COMPR INLET				
41       COMPRESSOR BEARINGS & BEARING HOUSINGS:       PKG OUTLET       ATM BLOWOFF         42       BEARING HSG MATERIAL:       ATM BLOWOFF       Image: Comparison of the comparison of the	40						COMPR DISCH				
42       BEARING HSG MATERIAL:       ATM BLOWOFF       Image: Constraint of the second seco	41	COMPRESSOR BEARINGS &	BEARING HO	USINGS:			PKG OUTLET				
43       PINION RADIAL BEARINGS: (6.8.2)         44       STG 1       STG 2       STG 3       STG 4         45       BRG TYPE	42	BEARING HSG MATERIAL:	-				ATM BLOWOFF				
44     STG 1     STG 2     STG 3     STG 4       45     BRG TYPE	43	PINION RADIAL BEARINGS: (	6.8.2)				FILTER OUTLET				
45     BRG TYPE     Image: Constraint of the cons	44		STG 1	STG 2	STG 3	STG 4	L				
46     ALLOW LOAD, (kg/cm_)     NU.     SIZE     IYPE       47     ACTUAL LOAD, (kg/cm_)     LUBE OIL INLET     Implement       48     BRG SPAN, (mm)     LUBE OIL OUTLET     Implement       49     PINION THRIJST BEARINGS: (6.8.3)     COOL ING WATER INLET     Implement	45	BRG TYPE					OTHER CONNECTIONS:	NO	0175	TVOC	
4/         ACTUAL LOAD, (kg/cm_)         LUBE OIL INLET           48         BRG SPAN, (mm)         LUBE OIL OUTLET           49         PINION THRUST BEARINGS: (6.8.3)         COOLING WATER INLET	46	ALLOW LOAD, (kg/cm_)				·		NU.	SIZE	TYPE	
48 BKG SPAIN, (mm) 49 PINION THRUST BEARINGS: (6.8.3)	47	ACTUAL LOAD, (kg/cm_)	)								
971 E DIVISTU E	48		(6.9.2)	·							
	49 50	FINION THRUST DEARINGS:	STG 1	STG 2	STG 3	STG 4	PRESSURE GAUGE				
51 BRG TYPE	51	BRG TYPE	0.01	5102	0100	5104	TEMPERATURE GAUGE				
52 ALLOW LOAD, (kg/cm_) CONDENSATE DRAINS	52	ALLOW LOAD, (kg/cm.)	)			· · · · · · · · · · · · · · · · · · ·	CONDENSATE DRAINS				
53 ACTUAL LOAD, (kg/cm_)	53	ACTUAL LOAD, (kg/cm_)									
54 THRUST COLLAR	54	THRUST COLLAR									

02/03 3 OF 10 API672.XLS

AIR COMPRESSORS (API 6724th ED) DATA SHEFT		
METRIC (kg/cm2)		
1 VIBRATION DETECTORS: (7.4.4.5). (7.10.10)	O SHOP INSPECTIONS & TESTS: (8.1.1)	
2 TYPE MODEL	O ADVANCE NOTIFICATION REQD DAYS	
3 O MFR	OBSERVED WITNE	ESSED
4 O NO. AT EACH PINION BEARING TOTAL NO.	O SHOP INSPECTION	
5 O NO. AT EACH DRIVER BEARING TOTAL NO	O HYDROSTATIC (8.3.2)	0
6 🔲 X&Y RADIAL PROBES CAN BE MOUNTED ADJACENT TO IMPELLERS FOR:	O COMBINED TEST (8.3.4), (8.5.6)	0
7 L 1st STG L 2nd STG L 3rd STG L 4th STG		0
	Q	
11 O MFR O MODEL	O GUIDE VANE TEST (8.5.12.1)	0
12 O LOCATION ENCLOSURE	O AT NON-100% POSITIONS	
13 C READOUT SCALE RANGE O ALARM SET @ (µm)	O SOUND-LEVEL TEST O	0
14 O SHUTDOWN:	O SPARE ROTOR TEST (8.5.12.2) O	0
15 O PER API 670 (7.10.10), (7.10.11)	O SPARE ROTOR MECH ONLY O	0
16 BEARING-TEMPERATURE MONITOR: (7.10.12)	O IMPELLER OVERSPEED TEST (8.3.3)	0
17 O REQD O SUPPLIED BY: O PER API 670	O POST OVERSPEED TEST NDE OF IMPELLERS (8.3.3.2)	0
		õ
	CONTROL SYSTEM CHECK (8 3 4 5 5)	õ
	O BRG. SEAL. GEAR CHECK (8.5.11.1, 6.5.11.2)	õ
22 READOUT SCALE RANGE O ALARM SET @ (µm)	O GEAR CONTACT CHECK (8.2.3.2)	õ
23 O SHUTDOWN: SET ( (µm) O TIME DELAY (sec)	O CLEANLINESS CHECKVESSELS (8.2.3.3)	0
24 DYNAMICS: (6.7), (6.12)	O CLEANLINESS CHECKPIPING (8.2.3.3)	0
25 O CRITICAL LATERAL SPEEDS ARE PROVEN BY PRIOR UNITS (6.7.2)	O HARDNESS CHECK OF PINIONS (8.2.3.4) O	0
26 O DAMPED UNBALANCED RESPONSE ANALYSIS REQD (6.12.3)	O OF BULL-GEAR O	0
27 O TORSIONAL VIBRATION ANALYSIS OF TRAIN REQD (6.12.5)	O OF WELD REPAIRS O	0
28 O RESIDUAL UNBALANCE WORKSHEET REQD (6.12.8)	O NDE OF MAJOR REPAIRS (8.2) O	0
29 O REMARKS	O GEAR TOOTH MAG-PART (8.5.4) O	0
30 COUPLINGS: (7.2.1)	O FINAL INSPECTION PRIOR TO PAINT O	0
31 TYPE: O DISK PAK O DIAPHRAGM O OTHER	O INSPECTION OF PREP FOR SHIPMENT (8.4)	0
32 DISK MATE: O STAINLESS STEEL O COATED W/		0
	00	0
36 CPLG RATING (kW/100 r @ 1.0 S.F. ACTUAL S.F.	O RETAIN FINAL ASSEMBLY CLEARANCES (8.5.1)	
37 SHAFT JCT RATING: @ DRIVER (kW) @ INPUT SHAFT (kW)	O SUBMITTAL OF INSPECTOR'S CHECKLIST (8.1.2)	
38 O MOUNTING ARRANGEMENT @ INPUT SHAFT: DRIVER	SIGNED BY REP FOR: O PURCHASER O VENDOR	
39 MFR MAX BORE (mm) PROPOSED BORE (mm) (7.2.1.6)	IF DESIGN REQUIRES DISASSEMBLY OF PINION FOR BRG INSPECTION,	
40 DRIVER HALF-CPLG MTD BY: O DRIVER MFR O COMPR VENDOR	O FORGO BEARING INSPECTION BASED ON TEST DATA; OR	
41 O IDLING ADAPTER FOR DRIVER HALF-COUPLING REQD	O INSPECT BEARING AND RETEST (8.5.11.2)	
42 PIPING REQUIREMENTS:	WEIGHT: (kg)	
43 43 RECOMMENDED STRAIGHT RUN OF PIPE DIA BEFORE SUCTION:	INTEG GEAR/COMPRDRIVER	
44 O VENDOR TO OBSERVE FLANGE PARTING	GEAR UPPER CASEBULL-GEAR	
45 O THROUGH STUDS REQUIRED FOR PIPING FLANGES	1st STAGE PINION 2nd STAGE PINION	
48 O VENDOR PRESENT DURING INITIAL ALIGN CHECK	BASE CONTROL PANEL	
49 O VENDOR CHECK ALIGN AT OPERATING TEMP	MAX FOR MAINTENANCE (IDENTIFY)	
50 O BASE DESIGNED FOR COLUMN MOUNTING	TOTAL SHIPPING WEIGHT	
51 O THERMAL RELIEF VALVES PROVIDED BY VENDOR	SPACE REQUIREMENTS, (mm)	
52 O FOR WATER-COOLED EXCHANGERS	COMPLETE UNIT: L W H	
53 O FOR	CONTROL PANEL: (IF SEP)         L         W         H	
54 O PURCHASER WILL PREPARE COORDINATION MEETING AGENDA (9.1.3)	INLET FILTER-SILENCER: L W H	
55	AFTERCOOLER: (IF FURN) L W H	
90	UTHER: L W H	

02/03 4 OF 10 API672.XLS

_

	Ι								
	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL								
	AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO							
	METRIC (kg/cm2)	PAG	E 5 OF 11 R	EQ'N NO.					
		SYS							
2 B	BASIC SYSTEM REQ'MNTS-NORMAL OIL FLOW			YNIHEIIO		OCARBON			
، ا		Ħ			(%C)	(8811)			
5			MIN ALLOW OIL TEMP		(*C)	(550)			
6		O	SYSTEM COMPONENT SUPPLIERS						
7			STOTEM COM CHERT COT LIERC.		MFR	MODEL			
8	SUPPLY (ka/cm G) PUMP RV SETTING (ka/cm G)		MAIN PUMP						
9	SYS DESIGN (kg/cm_G) HYDROTEST (kg/cm_G)		STANDBY PUMP	-					
10 0	DIL COOLER:		ELECTRIC MOTOR(S)						
11	SHELL SIDE TUBE SIDE		STEAM TURBINE(S)						
12	OPERATING PRESS, (kg/cm_G)		OIL COOLER(S)						
13	MAX ALLOW WORK PRESS, (kg/cm_G)		OIL FILTERS						
14	MAX ALLOW TEMP, (°C)		ACCUMULATOR(S)						
15			SUCTION STRAINERS						
16			CHECK VALVES						
17	SURFACE AREA     (m_)     DUTY     (kJ/hr)		TRANSFER VALVE(S)						
18									
20									
20									
22				-					
23	CHANNELS/HEADS SHELL	PUM	PS:		MAIN	STANDBY			
24	TUBES TUBE SHEETS	Ο	HORIZONTAL						
25	CHANNEL COVERS TUBE SUPPORTS	0	VERTICAL						
26 <b>O</b>	DIL FILTERS:	0	SUBMERGED						
27	MICRON RATING O NOMINAL O ABSOLUTE	0	MOTOR DRIVEN	-					
28	DP: (kg/cm_) CLEAN DIRTY COLLAPSE	0	TURBINE DRIVEN						
29		0	SHAFT DRIVEN						
30		P	CENTRIFUGAL						
31			ROTARY						
32	L HSG MAWP(kg/cm_G) L MAX ALLOW TEMP(°C)	9	FLANGE CONNECTED						
33 0	DIL HEATER:	닖	RATED CAPACITY (m_/h)						
34	STEAM HEATER REQD LECTRIC HEATER REQD NO EL	E	DISCHARGE PRESS (kg/cm_G)						
35	RATING (kJ/hr)	Н	(BkW) @ MAX SSU		·				
36	WATI DENSITY(W/in_)		DRIVER RATING (KW)						
37 0		띰	CASING MATERIAL						
38		님	SPEED						
39	FREE SURFACE AREA     (cm_)     INTERNAL BAFFLES	띪	COUPLING		·				
40	-	R							
41			MECHANICAL SEAL						
42	:	STAP			~				
43	911 E		O MANUAL O AUTOMATIC		O HOA SELECTOR S	WITCH			
44	NI ET AIR FII TER/SII ENCER: (7.7)	DISC							
45			MER		MODEL				
47			DESCRIPTION						
48			FLANGE CONNECTION						
49	CLEAN DP, AS QUOTED (kg/cm )	_			VERTICAL				
50			SUPPORTED BY		O OTHER				
51	O FILTER WILL BE REMOTE MOUNTED BY PURCHASER AT A		SPL (dBA) (@ 1 m) FROM DISCH	ARGE OF	SILENCER				
52									
53	O FILTER WILL BE ELEVATED(m) ABOVE GRADE								
0	2/03 5 OF 10 API672.XLS								

PACKAGED INTEGRALLY GEARED CENTRIFLIGAL	
AIR COMPRESSORS (API 6724TH ED) DATA SHEET	JOB NO. ITEM NO.
METRIC (kg/cm2)	PAGE 6 OF 11 REQ'N NO.
1 CONTROLS AND	INSTRUMENTATION (7.4)
2 LOCAL CONTROL PANEL: (7.4.3)	
3 O ELECTRICAL AREA CLASSIFICATION:	
5 PANEL ENCLOSURE REQUIREMENT: (7.4.3.2)	
6 O NEMA TYPE 4X ENCLOSURE MATERIAL:	TO NONHAZARDOUS
7 NEMA TYPE 7 (INDOOR EXPLOSION-PROOF FOR HAZARDOUS GAS AREAS) REQUIRED	TYPE Y-REDUCES THE CLASSIFICATION FROM DIV 1 TO DIV 2
9 PANEL FEATURES: (7.4.3.2)	TYPE ZREDUCES THE CLASSIFICATION FROM DIV 2
10 O VIBRATION ISOLATORS O STRIP HEATER O INTERNAL COOLING	TO NONHAZARDOUS
11 O WEATHERHOOD O PURGE CONNECTIONS O OTHER	—
12	O TROPICALIZATION REQUIRED
13	
15 O INSTRUMENT SUPPLIERS:	
16 PRESSURE GAUGES: MFR	SIZE & TYPE
17 TEMPERATURE GAUGES: MFR	SIZE & TYPE
18 LEVEL GAUGES: MFR	SIZE & TYPE
19 DIFF PRESSURE GAUGES: MFR	SIZE & TYPE
20 PRESSURE SWITCHES: MFR	
21 TEMPERATORE SWITCHES: MFR	SIZE & TYPE
23 PRESSURE TRANSMITTERS: MFR	SIZE & TYPE
24 TEMPERATURE TRANSMITTERS: MFR	SIZE & TYPE
25 LEVEL TRANSMITTERS: MFR	SIZE & TYPE
26 CONTROL VALVES: MFR	SIZE & TYPE
27 PRESSURE RELIEF VALVES: MFR	SIZE & TYPE
28 THERMAL RELIEF VALVES: MFR	
30 SIGHT ELOW INDICATORS: MER	SIZE & TYPE
31 PURGE FLOW INDICATORS: MFR	SIZE & TYPE
32 SOLENOID VALVES: MFR	SIZE & TYPE
33 ANNUNCIATOR: MFR	SIZE & TYPE
34 TUBE FITTINGS MFR	SIZE & TYPE
35 MFR	SIZE & TYPE
36 MFR	
38 MFR	SIZE & TYPE
39 SWITCH CLOSURES: (7.4.5.3.2)	
40 ALARM CONTACTS SHALL: O OPEN O CLOSE TO SOUND.	ALARM AND BE NORMALLY O ENERGIZED O DE-ENERGIZED
41 SHUTDOWN CONTACTS SHALL: O OPEN O CLOSE TO TRIP AN	D BE NORMALLY O ENERGIZED O DE-ENERGIZED
42 (NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)	
43 O SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PERMIT TESTING WITHOU	JT SHUTTING DOWN THE UNIT (7.4.5.3.4)
44 O NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PERMIT REPLACEMENT	DURING OPERATION
45 O ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES	
47 MISCELLANEOUS INSTRUMENTATION:	
48 O THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED	
49 O LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRATION	
50 O RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL	RV BODY MATERIAL:
51 O THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE ISOLATED	
	TTPE: U X U Y U Z U CONNECTION ONLY
55 O	
56 O	

02/03 6 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET		JOB NO ITEM NO																
METRIC (kg/cm2)		PAGE	OPF C	F SUF	7 201 Y	OF		11		REQ'N	NO.							
	- NIAIN	00		1 001	EL	EMEN	т						IN	DICAT	OR			
3	PROV	/ BY		TYPE		L	OCATIO	4	INSTAL	L BY	PRO	V BY	L	OCATIO	N			
																		~
			DUT		£													L (2
		ĸ	EADO		TER	Å	Ē	ON C		ĸ		R	KG	SING	ΤĒΓ		z	dN/
	R	HASE	TRE	т	MIT	DR P	PA	I PIE	ж	HASE	R	HASE	DR P	I P II	PAI	~	MOC	LT SI
	DDUD	IRCF	REC	VITO	ANS	DQN	CAL	IRC I	Ŋ	IRCF	NDC	IRCF	NDC	IRCF	CAL	ARN	1 L T	ЪЦ
4	Ξ/	٦		SV	RT I	۳ ۲	2	۲	۳ ۲	٢	Ϋ́Ε	Ы	Ň	٦	2	AL	φ	R
5 PRESSURE:																		
6 COMPRESSOR SUCTIONSTAGE																		
7 COMPRESSOR DISCHARGE STAGE																		
8 LUBE OIL DISCHARGE																		
9 LUBE OIL FILTER DP																		
				I										]				
									T									
					1										1			
S COMPRESSOR DISCHARGE STAGE																		
BILL GEAR THRUST BRG												_				_		
DRIVER THRUST BRG																		
2 RESERVOIR																		
3																		
LEVEL:																		
5 LUBE OIL RESERVOIR																		
6 SEPARATOR																		
7																		
8 VIBRATION:																		
9 RADIAL VIBRATION EACH STAGE																		
0 RADIAL VIBRATION BULL GEAR SHAFT																		
1 AXIAL POSITION BULL GEAR SHAFT																		
2 AXIAL POSITIONSTAGE PINION																		
3 RADIAL VIBRATION ON DRIVER																		
4 AXIAL POSITION ON DRIVER SHAFT																		
5 ACCELEROMETER ON GEAR BOX																		
6 7 FLOW																		
OIL RETURN																		
g SEAL GAS																		
5] 0																		
1 MISCELLANEOUS:																		
2 STANDBY L.O. PUMP RUNNING																		
3 PANEL PURGE FAILURE																		
4 ANNUNCIATOR PURGE FAILURE																		
5 SURGE RECOGNITION																		
6 OIL HEATER ON																		
7 COMMON REMOTE ALARM INDICATION																		
8 COMMON REMOTE SHUTDOWN INDICATION																		
9																		
0 NOTES: 1) TRANSMITTERS SUPPLIED BY VENDOR SHALL INCLUDE SENSING ELEMEN	т																	
1 2) SUPPLY "REPEAT SIGNAL" FOR CONTROL ROOM ALSO																		
2																		

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NOITEM NO
	PAGE 8 OF 11 REQ'N NO.
4 SUBE/UNIT: (GROSS/EEE) (m) SHELLS/UNIT:	
(,	
5	
	SHELL SIDE TOBE SIDE
13 VISCOSITY, LIQUID (mPa-s)	
14 SPECIFIC HEAT, (kJ/kg °C)	
15 THERMAL CONDUCTIVITY, (kJ/m h °C)	
16 LATENT HEAT, (kJ/kg °C)	
17 INLET PRESSURE, (kg/cm_G)	
18 VELOCITY, (m/s)	
19 PRESSURE DROPALLOW/CALC, (kg/cm_)	
20 O FOULING RESISTANCEMINIMUM (hr m_ °C/kJ)	
21 HEAT EXCHANGED	(kJ/hr) MTD CORRECTED (°C)
22 TRANSFER RATE, (kJ/hr m_ °C) SERVICE	CLEAN
23 CONSTRUCTION OF ONE SHELL	SKETCH: BUNDLE NOZZLE ORIENTATIONS
24 SHELL SIDE	TUBE SIDE
25 DESIGN/TEST PRESSURE, (kg/cm_G)	
26 DESIGN TEMPERATURE, (°C)	
27 NO. PASSES PER SHELL	
28 CORROSION ALLOWANCE, (mm)	
29 NOZZLES: INLET	
31 RATING VENT-DRAIN	
32 TUBE NO O.D(mm) THK (MIN) (AVG)(mm	) LENGTH(m) PITCH(mm) < 30 $\bigtriangleup 60$ 🗌 90 🗸 45
34 SHELL WATE 1.D(IIIII) 0.D(IIIII)	CHANNEL COVER MATL
36 TUBESHEET-STATIONARY MATL	
37 FLOATING HEAD COVER MATL	
38 BAFFLESCROSS MATL TYPE	% CUT (DIA) (AREA) SPACING: C/C INLET (mm)
39 BAFFLESLONG MATL	SEAL TYPE
40 SUPPORTSTUBE U-BEND	ТҮРЕ
41 BYPASS SEAL ARRANGEMENT	TUBETUBESHEET JOINT
42 GASKETSSHELL SIDE	TUBE SIDE
43FLOATING HEAD	
44 ASME SECTION VIII CODE REQUIREMENTS:	
46 REMARKS:	
4/	
49	
50	
51	
52	
53	
54	
55	

02/03 8 OF 10 API672.XLS

	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO.		ITEM NO.						
	METRIC (kg/cm2)	PAGE	9 OF 11	REQ'N NO.						
1	NEMA FRAME INDUCTION MOTORS	O IEEE 84	1							
2 N	/IFR MODEL	SERIAL NO	0	NEMA FRAME						
3 D	DRIVEN EQUIPMENT TYPE DRIVEN EQUIPMENT TIEM NO.			MOTOR ITEM NO.						
4	O OPERATING COND	ITIONS								
5 6 <b>S</b> 7 E 8 E 9 10	BITE DATA:     VOLT     PHASE     HERTZ       ELECTRICAL SUPPLY:     VOLT     O     NON-HAZARDOUS       O     CLASS     GROUP     DIVISION       ATMOSPHERIC MIXTURE:     (60)     TENDOODE	DRIVE SYSTEM:     O DIRECT CONNECTED     O EXTERNAL GEAR     STARTING: (7.1.2.2)								
11					%					
12 A		(m)		UNLOADED						
13 A		(°C)		%						
14 U										
15	PERFORMAN	CE								
17	—									
18 N	IO LOAD CURRENT, AMPS LO.	٨D	CURRENT, AMP	EFFICIENCY	POWER FACTOR					
19 F	FULL LOAD TORQUE, (N-m) FU	LL								
20 S	STARTS PER HOUR: HOT COLD 75	%								
21 A	ACCELERATION TIME: SEC 50	%								
22	LOCKED	ROTOR								
23		EATURES								
25 26 27 28 29 2 30 31 N 32 33 34 35 2 36 37 M 38 39 40 41 M 42 43 F 44 45 46 B 44 45 46 B 48 G 49 B 48 G 50	NAMEPLATE       (KW)       (rpm)       S.F.         NEMA TORQUE DESIGN:       O       A       O       B       C       O       D         Image: Nema Locked Rotor kva code Letter:         Strict Code       Standard       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Strict Code       Standard       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Strict Code       Standard       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Strict Code       Standard       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Strict Code       Max Sound Pressure Level (dBA)       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:       Image: Nema Locked Rotor kva code Letter:         Strict Code       TefC       TefC       Tenv       Explosion Proof       Filler:       Image: Nema Locked Rotor kva code Letter:         Strict Code       TefC       TefC       TefC       TefC       TefC       Filler:       Filler:       Filler:       Filler: <t< td=""><td></td><td>OTATION: (FACING END OPPOSITE SH CW CCW O NON CLASS: O B NON-HYGROSCOPIC APERATURE RISE: (DEFAULT IS 80°C A °C ABOVE TOR TO BE "THERMALLY PROTECTED TOR TO BE "OVER TEMP PROTECTED TOR TO BE "OVER TEMP PROTECTED, TYPE #1WINDINGRUNNING AND TYPE #2WINDINGRUNNING AND TYPE #2WINDINGRUNNING AND TYPE #2WINDINGRUNNING PRO TYPE #3WINDINGROTECTED, N ACCE HEATER REQD VOLTS PHASE MAX SHEATH TEMPERATURE: SEPARATE JUNCTION BOX FOR SP. HRUST LOAD: O ECTION OF THRUST: MOTOR THRUST RATING:</td><td>AFT EXTENSION) BI-DIRECTIONAL</td><td>S.F. ATTS °C D NONE (kg)</td></t<>		OTATION: (FACING END OPPOSITE SH CW CCW O NON CLASS: O B NON-HYGROSCOPIC APERATURE RISE: (DEFAULT IS 80°C A °C ABOVE TOR TO BE "THERMALLY PROTECTED TOR TO BE "OVER TEMP PROTECTED TOR TO BE "OVER TEMP PROTECTED, TYPE #1WINDINGRUNNING AND TYPE #2WINDINGRUNNING AND TYPE #2WINDINGRUNNING AND TYPE #2WINDINGRUNNING PRO TYPE #3WINDINGROTECTED, N ACCE HEATER REQD VOLTS PHASE MAX SHEATH TEMPERATURE: SEPARATE JUNCTION BOX FOR SP. HRUST LOAD: O ECTION OF THRUST: MOTOR THRUST RATING:	AFT EXTENSION) BI-DIRECTIONAL	S.F. ATTS °C D NONE (kg)					
50		DAINTING	0							
51 IE	ELE LESTING: OBSVD O WIT O SUBMIT CERT'D RESULTS		: U IEEE 841 STD							
52		<u> </u>								
54										
55										
56										

	P	CKAGED,	INTEGRAL	LY GEARED C	ENTRIFU	IGAL								
	AI	COMPRE	SSORS (AF	PI 6724th ED)	DATA SH	IEET		JOB NO.			ITEM NO.			
1			METRI	C (kg/cm2)		ALLOWAE	BLE PIPING F	PAGE ORCES AND M	10 OF OMENTS (6.4)	11	REQ'N NO	l.		
2							-		(- /					
3			COMPR	ESSOR INLET			COMPRES	SOR DISCHAR	ЭЕ		PACKAG	GE OUTLET		
4		FORCE,	(kg)	MOMENT,	(N-m)	FORCE,	(kg)	MOMENT,	(N-m)	FORCE,	(kg)	MOMENT,	(N-m)	
5	AXI			-										
7	TRA	IS												
8														
9	ADDITIONAL D	TA:												
10														
11														
13														
14														
15														
16														
17														
19														
20														
21														
22														
24														
25														
26														
27														
29														
30														
31														
32														
34														
35														
36														
37														
39														
40														
41														
42														
43														
45														
46														
47														
48 40														
50														
51														
52														
53														
54														

02/03 10 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET METRIC (kg/cm2)	JOB NOITEM NO PAGE 11 OF 11 REGIN NO
CENTRIFUGAL AIR COMPRES	SSOR PERFORMANCE CURVES
When this requisition is issued for purchase, the supplie the selected compressor will be inserted here as a subst	r's proposed curves for itute for this sheet.
The compressor performance and characteristics as give will be a part of the supplier's contractual obligation with	en on this performance curve nin the tolerances agreed upon.
02/03 API672.XLS	

			REVISION DATE	0		1	2	3	4						
PACKAGED, INTEGRALLY GEARED CENTRIF	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL						REV/APPR								
AIR COMPRESSORS (API 6724th ED) DATA		JOB NO ITEM NO													
		0.000	PAGE	1	OF	11 REQ'N	N NO.								
2 FOR	5E	O AS BU													
3 SITE			NO. REQUIE	RED											
4 SERVICE			DRIVER ITE	M NO.											
5 O CONTINUOUS O INTERMITTENT	O STAN	IDBY (3.30)	_	SPARED BY:											
6 NOTE: INFORMATION TO BE COMPLETED: O BY PURC	HASER			BY MANUFACTU	IRER		O BY PURCH	ASER OR MFR							
9 DRIVER MFR	DRIVER TY	PE	.)			RATE	D (BHP)	RPM							
10 DRIVE SYSTEM: O DIRECT COUPLED O OTHER						DUTY	(1.2) OBASI		SPECIAL						
11 OPERATING CONDITION	<b>S</b> (6.1.9)						CONTROL SYS	TEM (7.4.2)							
12		LOW	MIN		CON	TROL METHOD: (7.	4.2.1)								
13 (ALL DATA ON PER UNIT BASIS)	RATED	AMB *	AMB	OTHER	0	CAPACITY MODULAT	ION (CONST DISCH I	PRESS) (7.4.2.1 a.)							
14	(3.24)	(7.10.1)				O INLET THRO	DTTLE DEVICE	Ó	DAMPER						
15 O DELIVERED FLOW, SCFM (14.7 psia & 60°F DRY)					_	O GLOBE VAL	VE O	BUTTERFLY VAL	/E						
16 O WEIGHT FLOW, (lb/hr) (WET) (DRY)						O VARIABLE I	NLET GUIDE VAN	S							
17 O INLET COOLING WATER TEMP, (°F)					-0		L CONTROL (7.4.2	1 b.)							
18						0	(psig) TO	(psig)	DISCH PRESS						
		1			-10		) STOP (7.4.2.1 c.)	0705							
20 PRESSURE (psia) 21 O TEMPEDATURE (°E)							(psig)	STOP	(psig)						
22 O BELATIVE HUMIDITY %					$\neg$	OTHER (DESCRID	<u> </u>		,						
23 O MOLECULAR WEIGHT (M)															
24 INLET VOLUME, (cfm) (WET / DRY)															
25															
26 DISCHARGE CONDITIONS:					_										
27 PRESSURE (psia)					CON	TROL SYSTEM REC	QUIREMENTS:								
28 TEMPERATURE (°F)					-0		IN PARALLEL (7.4.	2.2)							
29															
					-	• WRUTARY	0	W/RECIPROCATI	NG						
32 BHP/100 CEM) AIR DELIVERED					0	MICROPROCESS	OR CAPABLE OF C								
33 INPUT SPEED (rpm)						WITH PURCHASE	R'S DCS (7.4.1.4)								
34 ESTIMATED SURGE, (icfm) (@ ABOVE SPEED)						O COMM PRO	TOCOL								
35 O MAX DP ACROSS INLET FILTER, (psi)															
36 DP INCLUDED IN CALCULATION YES NO		1			CON	TROL SYSTEM ALT	ERNATES: (7.4.1.	3)							
37 AFTERCOOLER OUTLET TEMP, (°F)					_	O OTHER THA	N MICROPROCES	SOR BASED:							
					-										
39 39 % RISE TO SURGE (6.1.12.2)					-			ſ							
						- FURNISHEL	DI FUNCHASEN								
42		* UNTHRO	TTLED PERFORMA	NCE FOR DRIVER SIZIN	G		INTER- AND AF	TER-COOLERS (7.	6)						
43 REMARKS:					AFTE	RCOOLER:									
44							BY PURCHASER	(7.6.1)							
45					_	O NOT NEEDE	ED (7.6.1)								
46						O AIR-COOLE	D TYPE BY VENDO	DR							
47					-	AIR-COOLED INTE	ERCOOLERS REQ	D (7.6.3, 7.6.6)							
48					-		D BY PURCHASER								
50					Ы	AIB-COOLED EXC	HANGER AUTOM	ATIC							
51						TEMPERATURE C	ONTROL MEANS:	(7.6.6)							
52						O LOUVERS	O VARI	ABLE SPEED FAN	6						
53	-	-		-		O VARIABLE F	PITCH FANS	O BYPA	ASS VALVE						
54					Ō	AIR-COOLER CON	ITROL MANUAL O	NLY (7.6.6) BY:							
55					_	O LOUVERS	O BYPA	SS VALVE							
56					_		PITCH FANS								

02/03 1 OF 10 API672.XLS

	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724TH ED) DATA SHEET	JOB NOITEM NO
		PAGE 2 OF 11 REQ'N NO.
1	U LOCATION, SITE DATA (6.1.5)	U SPECIFICATIONS
2	LOCATION:	NOISE SPECIFICATIONS: (6.1.3)
3	O INDOOR O HEATED O UNDER ROOF	O MAX ALLOWABLE SPL (@ 3 Ft)
4	O OUTDOOR O UNHEATED O PARTIAL SIDES	O APPLICABLE SPEC
5	O grade O mezzanine O	ACOUSTIC HOUSING: O YES O NO
6	O WINTERIZATION REOD O TROPICALIZATION REOD	APPLICABLE SPECIFICATIONS:
8		<u></u>
9	C ELEVATION(ft) C BAROMETER(psia)	NON-ASME WELDING IF NOT AWS D1.1: (6.10.3.5)
10	O RANGE OF AMBIENT TEMPERATURE, (°F)	O UNITS OF MEASURE (5.1) O US CUSTOMARY O SI O OTHER
11	DRY BULB WET BULB	
12	NORMAL	PAINTING:
13	ΜΑΧΙΜΙΙΜ	O MANUEACTURER'S STD
14		
15		
16		BASEPLATE GROUT: (7.10.3) O EPOXY O CEMENT O NONE
17	UNUSUAL CONDITIONS:	
18	O DUST O FUMES O CORROSIVE CONDITIONS	PREPARATION FOR GROUT SURFACES: (7.10.3)
19	O CORROSIVES PRESENT:	O MER STD O SSPC 6 BLAST O BARE FOR FIELD BLAST
20		
20		
21		
22		
23	AREA ELECTRICAL CLASSIFICATION: (6.1.8) T-CODE	SHIPMENT: (8.4.1)
24	O CLASS GROUP DIVISION	O DOMESTIC O EXPORT O EXPORT BOXING REQD
25		O OUTDOOR STORAGE OVER 6 MONTHS
26		
20		
07	C) UTITITY CONDITIONS'	
27		
27	O STEAM HEATING:	STEAM:
27 28 29	O         STEAM HEATING:           INLET MIN (psig)(°F)	STEAM:        (lb/hr)         OTHER        (lb/hr)
27 28 29 30	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)	STEAM:         (lb/hr)         OTHER         (lb/hr)           OIL HEATER:        (lb/hr)         OTHER        (lb/hr)
27 28 29 30 31	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)	STEAM:
27 28 29 30 31 32	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         ("F)	CILIT CONSOMPTION (9.2.3.1) STEAM: OIL HEATER: (Ib/hr) OTHER (Ib/hr) ELECTRIC: LOCKED FULL LOAD (HP) ROTOR AMPS AMPS
27 28 29 30 31 32	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           OUTLET MIN         (psig)	STEAM:     (ib/hr)     OTHER     (ib/hr)       OIL HEATER:     (ib/hr)     OTHER     (ib/hr)       ELECTRIC:     LOCKED     FULL LOAD       (HP)     ROTOR     AMPS
27 28 29 30 31 32 33	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)	STEAM:     (lb/hr)     OTHER     (lb/hr)       OIL HEATER:     (lb/hr)     OTHER     (lb/hr)       ELECTRIC:     LOCKED     FULL LOAD       (HP)     ROTOR     AMPS       MAIN LO PUMP     HONDER     HONDER
27 28 29 30 31 32 33 34	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           NORM         (psig)           MAX         (psig)	STEAM:     (ib/hr)     OTHER     (ib/hr)       OIL HEATER:     (ib/hr)     OTHER     (ib/hr)       ELECTRIC:     LOCKED     FULL LOAD       (HP)     ROTOR     AMPS       MAIN LO PUMP
27 28 29 30 31 32 33 34 35	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)	STEAM:       OIL HEATER:       (ib/hr)       OTHER       (ib/hr)       ELECTRIC:       (HP)       ROTOR       AMPS       AMPS       AUX LO PUMP
27 28 29 30 31 32 33 34 35 36	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           (°F)         MAX           O ELECTRICITY:	STEAM:
27 28 29 30 31 32 33 34 35 36 37	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           (psig)         ("F)           MAX         (psig)           HEATING         CONTROL	STEAM:       OIL HEATER:       (ib/hr)       OTHER       (ib/hr)         ELECTRIC:       LOCKED       FULL LOAD         (HP)       ROTOR       AMPS       AMPS         MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           NORM         (psig)           NORM         (psig)           NORM         (psig)           NORM         (psig)           VOLTAGE         HEATING	STEAM:       OIL HEATER:       (ib/hr)       OTHER       (ib/hr)         ELECTRIC:       LOCKED       FULL LOAD         MAIN LO PUMP       (HP)       ROTOR       AMPS         AUX LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           VOLTAGE         HEATING           HERTZ         I	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           MAX         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           VOLTAGE         HEATING           HERTZ         HEATING	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           OUTLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           VOLTAGE         HEATING           HERTZ         HEATING           PHASE         Image: Control shutbown	STEAM:       OIL HEATER:       (Ib/hr)       BLECTRIC:       (HP)       ROTOR       AMPS       MAIN LO PUMP       AUX LO PUMP       OIL HEATER       (KW)       OIL HEATER       (KW)       COOLING WATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41	O         STEAM HEATING:           INLET MIN         (psig)           NORM         (psig)           OUTLET MIN         (psig)           NORM         (psig)           MAX         (psig)           OUTLET MIN         (psig)           MAX         (psig)           VORM         (psig)           VOLTAGE         HEATING           HERTZ         HEATING           PHASE         O	STEAM:         OIL HEATER:         (b/hr)         OTHER         (b/hr)           ELECTRIC:         (b/hr)         OTHER         (b/hr)         ELECTRIC:         LOCKED         FULL LOAD           MAIN LO PUMP         (HP)         ROTOR         AMPS         FULL LOAD           AUX LO PUMP
27 28 29 30 31 32 33 44 35 36 37 38 39 40 41 42	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         Interview         Interview         Interview           O         Cooling water: (61.6)         Interview         Interview	COOLING WATER: QUANTITY, (gpm)
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43	O         STEAM HEATING:           INLET MIN         (psig)         ("F")           MAX         (psig)         ("F")           MAX         (psig)         ("F")           OUTLET MIN         (psig)         ("F")           OUTLET MIN         (psig)         ("F")           NORM         (psig)         ("F")           OUTLET MIN         (psig)         ("F")           NORM         (psig)         ("F")           MAX         (psig)         ("F")           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         ("F")         ("F")           O         COOLING WATER: (6.1.6)         TEMP INLET         ("F")	OIL IF CONSOMPTION (9.2.31.)         STEAM:         OIL HEATER:       (ib/hr)         ELECTRIC:       LOCKED         (HP)       ROTOR         MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         ("F)         MAX           PHASE         Image: Shutter:         ("F)         SHUTDOWN           VOLTAGE         Image: Shutter:         (f)         SHUTDOWN           VOLTAGE         Image: Shutter:         Image: Shutter:         (f)           PHASE         Image: Shutter:         (f)         MAX RETURN         (f)           PRESS NORM         Image	OIL IF CONSOMPTION (9.2.31.)         STEAM:         OIL HEATER:       (ib/hr)         ELECTRIC:       LOCKED (HP)       FULL LOAD AMPS         MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45	O         STEAM HEATING:           INLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           MAX         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           MAX         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           NORM         (psig)         (°F)           MAX         (psig)         (°F)           MAX         (psig)         (°F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (°F)         MAX           PHASE         Image: Im	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN	OIL IF CONSOMPTION (9.2.31.)         STEAM:         OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE         Image: Shutter (s.1.6)         TEMP INLET         ("F)           TEMP INLET         (psig)         DESIGN         (psig)           MIN RETURN         (psig)         MAX ALLOW DP         (psi)           WATER SOURCE         Image: Source         Image: Source         Image: Source	OIL IF CONSOMPTION (9.2.31.)           STEAM:         OIL IF CONSOMPTION (9.2.31.)           STEAM:         OIL IF CONSOMPTION (9.2.31.)           STEAM:         OIL IF CONSOMPTION (9.2.31.)           STEAM:         OIL HEATER:         (ib/hr)           ELECTRIC:         LOCKED (HP)         FULL LOAD AMPS           MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 8	O         STEAM HEATING:           INLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           MAX         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           NORM         (psig)         (°F)           NORM         (psig)         (°F)           NORM         (psig)         (°F)           MAX         (psig)         (°F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (°F)         MAX PLODOWN           VOLTAGE         HEATING         (°F)         (°F)           PHASE         Image: State transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state transmitted to the state trate trate transmitted to the state transmitted to the sta	STEAM:         OIL HEATER:         (ib/hr)         OTHER         (ib/hr)           ELECTRIC:         (ib/hr)         OTHER         (ib/hr)         FULL LOAD           MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         ("F)         MAX           PHASE	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE	STEAM:       OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE             HERTZ             PHASE             O         COOLING WATER: (6.1.6)            TEMP INLET         ("F)         MAX RETURN         ("F)           PRESS NORM         (psig)         MAX ALLOW DP         (psig)           MIN RETURN         (psig)         MAX ALLOW DP         (psig)           WATER SOURCE              MAX PRESS         (psig)         MIN PRESS         (psig)           GAS COMPOSITION	OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE	STEAM:         OIL IT CONSOMPTION (9.2.31.)           STEAM:         OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 23	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE	Dilling Consolur Flow (9.2.51.)           STEAM:         OIL HEATER:         (lb/hr)         OTHER         (lb/hr)           ELECTRIC:         LOCKED (HP)         FULL LOAD AMPS         FULL LOAD AMPS           MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 5 46 47 48 49 50 51 52 53	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           O         ELECTRICITY:         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE         D         D         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE         D         D         SHUTDOWN           VOLTAGE         MIN RETURN         (psig)         (psig)           MIN RETURN         (psig)         MAX ALLOW DP         (psig)	Image: Consider Fight (9.231)           STEAM:         OIL HEATER:         (ib/hr)         OTHER         (ib/hr)           ELECTRIC:         LOCKED (HP)         FULL LOAD AMPS         FULL LOAD AMPS           MAIN LO PUMP AUX LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 51 52 53 54	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           MAX         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         MAX PRESS         (psig)         MAX ALLOW DP         (psig)           MAX PRESS         (psig)         <	Image: Consider Flow (9.2.31.)           STEAM:         OIL HEATER:         (ib/hr)         OTHER         (ib/hr)           ELECTRIC:         LOCKED (HP)         FULL LOAD AMPS         FULL LOAD AMPS           MAIN LO PUMP
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 54 64 45 46 47 48 49 50 51 52 55	O         STEAM HEATING:           INLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           OUTLET MIN         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           NORM         (psig)         ("F)           MAX         (psig)         ("F)           MAX         (psig)         ("F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         ("F)           PHASE	STEAM:         OIL IF CONSOMPTION (9.2.51.)           STEAM:         OIL HEATER:
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 40 41 42 43 44 45 60 51 52 53 54 55 56	O         STEAM HEATING:           INLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           MAX         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           OUTLET MIN         (psig)         (°F)           NORM         (psig)         (°F)           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         CONTROL         SHUTDOWN           VOLTAGE         HEATING         (psig)         (°F)           PHASE         Image: Ima	Dilling Consolur Flow (9.2.31.)           STEAM:           Oil HEATER:

PACKAGED, INTEGRALL AIR COMPRESSORS (API	Y GEARED CEN 6724th ED) DA	TRIFUGAL TA SHEET		JOB NO.	ITEM	NO		
0.5. 008			CONSTRU	PAGE 3 OF	11 REQ	N NO.		
			CONSTRUC					
2 COMPRESSOR SPEEDS:				INTEGRAL GEAR HOUSING:				
3 RATED INPUT:	(rpm) TRIP		(rpm)	MATERIAL			SPLIT	
4 BULLGEAR CRITICALS: 1st	(rpm)			BULL GEAR: (6.5.3), (6.12.2)				
5 PINION CRITICALS:				RATED POWER BASED ON TOOTH S	SURFACE DURAB	ILITY:		(HP)
6 1st STG PINION 1st	(rpm)	2nd	(rpm)	RATED POWER BASED ON TOOTH E	BENDING:		—	(HP)
2nd STG PINION 1st	(rpm)	2nd	(rpm)	O MIN AGMA SERVICE FACTOR:			ACTUAL S.F	=
3rd STG PINION 1st	(rpm)	2nd	(rpm)	GEAR RIM MATERIAL:			HARDNESS:	
4th STG PINION 1st	(rpm)	2nd	(rpm)	GEAR FACE WIDTH:	(in)	GEAR CENTER M	ATL:	
OTHER UNDESIRABLE SPEEDS: (6.7.1.3)				MECHANICAL EFFICIENCY:		% ISO 1328 G	RADE:	
STAGE SPEED	IMPELLER DIAMETER	TIP SPEED		PITCH DIA	(in) PITC	H LINE VELOCITY		(fps)
1st STAGE (rpm)	(	in)	(ft/min)	PINIONS: (6.5.3), (6.12.2)	1st	2nd	3rd	4th
2nd STAGE (rpm)	(	in)	(ft/min)	SERVICE FACTOR:				
3rd STAGE (rom)	(	in)	(ft/min)	MATERIAL				
Ath STAGE (rpm)	(	in)	(ft/min)	HARDNESS: (BHN) (R.)				
	(		(1011111)					
	MATERIAL			MATL:				(BHN) (R)
				BRG SPAN	<i>(</i> )	HARDNESS:		(Dinit) (itc)
TYPE (OPEN, RADIAL, BACKWARD LEANI	NG, ETC.)				(in)	WEIGHT (W/GEAF	<)	(ID)
TYPE CONSTRUCTION: (6.5.2.2)					(in)	DIA @ COUPLING	·	(in)
METHOD OF ATTACH: (6.5.2.2)		<b>—</b> .		SHALL SELEVES AT SEALS. WATE				
ROTATION, VIEWED FROM INPUT SHAFT	END:			SHAFT LABYS: TYPE		MATL		
<u> </u>				BULL GEAR RADIAL BRG TYPE:			LENGTH	(in)
COMPRESSOR CASING:				ALLOW LOAD	(psi)	ACTUAL LC	DAD	(psi)
MODEL	CASING SPLIT			BULL GEAR THRUST BEARIN	GS: (6.8.3)			
STG 1	STG 2	STG 3	STG 4			TYPE		
MATERIAL				MFR		AREA		(in_)
MAWP, (psig)				THRUST COLLAR (6.8.3.6)		GRAL	REPLACEABLE	
HYDRO TEST, (psig)				ALLOW LOAD	(psi)	ACTUAL LC	DAD	(psi
MAX OPT TEMP, (°F)				GAS LOAD	(lb)	COUPLING	LOAD	(lb)
				BEARINGS FITTED W/TEMP SENSOR	RS (6.12.10, 6.12.1	1)		
O MIN DESIGN METAL TEMP (6.10.5)			(°F)	O PINION RADIAL BRG	0	BULL GEAR RADI	AL BRG	
CASING HEAT TREATMENT REQUIRED (6	5.10.3.1.1)			O THRUST BRG				
ULTIMATE STRESS FOR MATL (6.2.1)			(psi)					
CASTING FACTOR (6.2.1)				MAIN CONNECTIONS: (6.3)				
WELDED CONNECTIONSNDT PROVIDED						ASME		
O 100% RADIOGRAPH O	MAG PARTICLE		NETRANT		SIZE	RATING	FACING	POSITION
0				COMPR INLET				
				COMPR DISCH				
COMPRESSOR BEARINGS & BEARING H	OUSINGS:			PKG OUTLET				
BEARING HSG MATERIAL				ATM BLOWOFF		1		
STG 1	STG 2	STC 2	STG 4					1
BRG TYPE	0102	0100	5164					
				- OTHER CONNECTIONS:	NO.	SIZE	TYPE	
BRG SPAN, (IN)						<del>   </del>		
PINION THRUST BEARINGS: (6.8.3)	0-0-	o <del></del> -				<u>}                                    </u>		
STG 1	STG 2	SIG 3	STG 4	PRESSURE GAUGE		<u>├──</u>		
BRG TYPE				TEMPERATURE GAUGE		+ - + -		
ALLOW LOAD, (psi)				CONDENSATE DRAINS		├── ┼──		
ACTUAL LOAD, (psi)					. I			
THRUST COLLAR								

02/03 3 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
U.S. CUSTOMARY	PAGE 4 OF 11 REQ'N NO.
1 VIBRATION DETECTORS: (7.4.4.5), (7.10.10)	O SHOP INSPECTIONS & TESTS: (8.1.1)
2 O TYPE O MODEL	O ADVANCE NOTIFICATION REQD DAYS
3 O MFR	OBSERVED WITNESSED
4 O NO. AT EACH PINION BEARING TOTAL NO.	O SHOP INSPECTION
5 O NO. AT EACH DRIVER BEARING TOTAL NO.	O HYDROSTATIC (8.3.2) O O
6 X&Y RADIAL PROBES CAN BE MOUNTED ADJACENT TO IMPELLERS FOR:	O COMBINED TEST (8.3.4), (8.5.6) O O
7 1st STG 2nd STG 3rd STG 4th STG	O ASME PTC 10 TEST (8.3.4.1) O O
8 OSCILLATOR-DEMODULATORS:	
	0
16 BEARING-TEMPERATURE MONITOR: (7.10.12)	O IMPELLER OVERSPEED TEST (8.3.3) O O
17 O REQD O SUPPLIED BY:	O POST OVERSPEED TEST NDE OF IMPELLERS (8.3.3.2) O O
18 O MFR O MODEL	O RESIDUAL UNBALANCE CHECK (6.12.8) O O
19 AXIAL POSITION MOVEMENT DETECTOR: (7.10.10, 7.10.11)	O OIL SYSTEM CLEANLINESS O O
20 O TYPE O MODEL	O CONTROL SYSTEM CHECK (8.3.4.5.5) O O
21 O MFR	O BRG, SEAL, GEAR CHECK (8.5.11.1, 6.5.11.2) O O
22 📙 READOUT SCALE RANGEO ALARM 📙 SET @(mil)	O GEAR CONTACT CHECK (8.2.3.2) O O
23 O SHUTDOWN: SET @(mil) O TIME DELAY(sec)	O CLEANLINESS CHECKVESSELS (8.2.3.3) O O
24 DYNAMICS: (6.7), (6.12)	O CLEANLINESS CHECKPIPING (8.2.3.3) O O
25 O CRITICAL LATERAL SPEEDS ARE PROVEN BY PRIOR UNITS (6.7.2)	O HARDNESS CHECK OF PINIONS (8.2.3.4) O O
26 O DAMPED UNBALANCED RESPONSE ANALYSIS REQD (6.12.3)	O OF BULL-GEAR O O
27 O TORSIONAL VIBRATION ANALYSIS OF TRAIN REOD (6.12.5)	
28 O RESIDUAL LINBALANCE WORKSHEFT REOD (6.12.8)	
30 COUPLINGS: (7.2.1)	O FINAL INSPECTION PRIOR TO PAINT O O
31 TYPE: O DISK PAK O DIAPHRAGM O OTHER	O INSPECTION OF PREP FOR SHIPMENT (8.4) O O
32 DISK MATL: O STAINLESS STEEL O COATED W/	
33 O MAKE O MODEL	000
34 O NON-LUBE O LUB'D O LUBRICATION	_
35 SPACER LENGTH (in) O LIMITED END-FLOAT REQD	O PRIOR DOCUMENTATION ON MAJOR REPAIRS NOT REQD (6.10.4.3)
36 CPLG RATING (HP/100 r @ 1.0 S.F. ACTUAL S.F.	O RETAIN FINAL ASSEMBLY CLEARANCES (8.5.1)
37 SHAFT JCT RATING: @ DRIVER (HP) @ INPUT SHAFT (HP)	O SUBMITTAL OF INSPECTOR'S CHECKLIST (8.1.2)
38 MOUNTING ARRANGEMENT @ INPUT SHAFT: DRIVER	SIGNED BY REP FOR: O PURCHASER O VENDOR
39 MFR MAX BORE(in) PROPOSED BORE(in) (7.2.1.6)	IF DESIGN REQUIRES DISASSEMBLY OF PINION FOR BRG INSPECTION,
40 DRIVER HALF-CPLG MTD BY: DRIVER MFR O COMPR VENDOR	O FORGO BEARING INSPECTION BASED ON TEST DATA; OR
41 O IDLING ADAPTER FOR DRIVER HALF-COUPLING REQD	O INSPECT BEARING AND RETEST (8.5.11.2)
42 PIPING REQUIREMENTS:	WEIGHT: (lb)
43 RECOMMENDED STRAIGHT RUN OF PIPE DIA BEFORE SUCTION:	INTEG GEAR/COMPR DRIVER
44 O VENDOR TO OBSERVE FLANGE PARTING	GEAR UPPER CASE BULL-GEAR
45 O THROUGH STUDS REQUIRED FOR PIPING FLANGES	1st STAGE PINION 2nd STAGE PINION
46	INTERCOOLER BUNDLE
47 MISCELLANEOUS:	AFTERCOOLER BUNDLE
48 O VENDOR PRESENT DURING INITIAL ALIGN CHECK	BASE CONTROL PANEL
49 O VENDOR CHECK ALIGN AT OPERATING TEMP	MAX FOR MAINTENANCE (IDENTIFY)
50 O BASE DESIGNED FOR COLUMN MOUNTING	TOTAL SHIPPING WEIGHT
51 O THERMAL RELIEF VALVES PROVIDED BY VENDOR	SPACE REQUIREMENTS.
52 O FOR WATER-COOLED EXCHANGERS	COMPLETE UNIT: L W H
53 O FOR	CONTROL PANEL: (IE SEP)
AGENDA (9.1.3)	AFTERCOOLER: (IE FURN)
56	
30 	

02/03 4 OF 10 API672.XLS

		PACKAGED, INTE	EGRALLY GE	ARED CENTRIFU	JGAL						
		AIR COMPRESSO	RS (API 672-	-4th ED) DATA SH	HEET	JOB	NO		ITEM NO.		
			U.S. CUSTON	IARY		PAG	E 5 OF	11	REQ'N NO.		
1	1 61				LUBE O	1.110	DICANT:	O	SVNTHETIC		
3	431			(psig)	(SSU @ 100°F)	0	DESCRIPTION				TT DROCARDON
4 E		COMPR/GEAR	(Sharri)	(borg)	(000 (0 100 1)		MIN ALLOW OIL TEMP			(°F)	(SSU)
5		DRIVER									
6		EXT GEAR				0	SYSTEM COMPONENT SU	PPLIERS:			
7 L		OIL SYSTEM PRESSURES:								MFR	MODEL
8		SUPPLY	(psig) PUMF	P RV SETTING	(psig)		MAIN PUMP				
9		SYS DESIGN	(psig)	HYDROTEST	(psig)	4	STANDBY PUMP				
10 0		COOLER:					ELECTRIC MOTOR(S)				
12			(ocid)	SHELL SIDE	TUBE SIDE		OIL COOLER(S)				
13		MAX ALLOW WORK PRESS.	(psig) (psig)	1			OIL FILTERS				
14		MAX ALLOW TEMP,	(°F)				ACCUMULATOR(S)				
15	С	FOULING FACTOR					SUCTION STRAINERS				
16	_						CHECK VALVES				
17 L		SURFACE AREA	(ft_)	DUTY	(BTU/hr)		TRANSFER VALVE(S)				
18	읙	REMOVABLE BUNDLE TO BE I									
20	วี	TUBES: NO.	O.D.	(in) LENG	GTH (in)		ELECTRIC HEATER				
21		WALL THICKNESS	(in)	AVG							
22	С	MATERIALS									
23		CHANNELS/HEADS		SHELL		PUM	IPS:			MAIN	STANDBY
24				TUBE SHEETS	3		HORIZONTAL				
25				TUBE SUPPORTS	<u> </u>		VERTICAL				
26 0	יייי הרי	MICRON RATING				R					
28	峛	DP: (psi) CLEAN	DIRT	Y COL		ŏ	TURBINE DRIVEN				
29	วี	ELEMENT: MAKE		MODEL		Ō	SHAFT DRIVEN				
30		NO. ELEMENTS	0	MEDIA		0	CENTRIFUGAL				
31	익	CORE MATL		HSG MATL		0	ROTARY				
32 L		HSG MAWP	(psig)	MAX ALLOW TEN	ИР(°F)	믿	FLANGE CONNECTED				
33 0	ш. П	IEATER:			####	말	RATED CAPACITY	(gpm)			
34	읙	STEAM HEATER REQD		ELECTRIC HEAT	ER REQD NO I		DISCHARGE PRESS	(psig)			
36					(BTO/III) (W/in_)		DRIVER RATING	(HP)			
27 0					(*****)	5		()			
38	5	RETENTION TIME	MIN		(cal)	H	SPEED				
39		FREE SURFACE AREA		(ft_) INTERNAL	BAFFLES	ō	COUPLING				
40				,		0	OSHA GUARD				
41						0	MECHANICAL SEAL				
42						STA	NDBY PUMP CONTROL RES	ET:			
43							O MANUAL C	О АПТОМАТ	ГIC	O HOA SELE	CTOR SWITCH
44					SI	ENCE	ERS				
45 IN	ALE.	T AIR FILTER/SILENCER: (7.7)					CHARGE BLOWOFF SILENC	ER: (7.8)			
46 L	4			MODEL		님				MODEL	
4/ L 48 [						Ы					
49		CLEAN DP, AS QUOTED			(psi)	1		HORIZON	TAL	O VER	TICAL
50	С	CORROSION PROTECTION			u ,		SUPPORTED BY		ING	O OTHER	
51 🤇	С	FILTER WILL BE REMOTE MOU	UNTED BY PURCH	ASER AT A			SPL (dBA) (@ 3 Ft)	FROM DIS	SCHARGE OF	BILENCER	
52			(ft) 1100w								
33	2/02			(it) ABO	VL GRADE	<u> </u>					

		PACKAGED, INTEGRALLY GEARED CENTRIFUG/						
		AIR COMPRESSORS (API 6/2-41H ED) DATA SHE	EI	JOB NO.	_	_	ITEM NO	
.1		U.S. CUSTOMARY		PAGE	6 0	F	11 REQ'N NO.	
1			CONTROLS AND IT	NSTRUMENT	ATION (7.4)			
2		AL CONTROL PANEL: (7.4.3)				UDEMENT. /7	4.0.0)	
3	0	ELECTRICAL AREA CLASSIFICATION:					4.3.2)	Ô
4						C	INSTRUMENT AIR	
5					U TYPE X-	REDUCES T	HE CLASSIFICATION FROM DIV 1	
6	읮							
7	$\cup$	NEMA TYPE 7 (INDOOR EXPLOSION-PROOF FOR HAZARDOUS GAS AREAS) REQUIRED				REDUCES I TC	HE CLASSIFICATION FROM DIV 1 DIV 2	
8								
9						REDUCES I TC	HE CLASSIFICATION FROM DIV 2 NONHAZARDOUS	
10	8	VIBRATION ISOLATORS O STRIP HEATER O IN						
11	0	WEATHERHOOD OF PURGE CONNECTIONS			<u> </u>			
12						ALIZATION R	EQUIRED	
13								
14								
15	$\cup$	INSTRUMENT SUPPLIERS:						
10		PRESSURE GAUGES: MFR						
17		TEMPERATURE GAUGES: MFR						
18		LEVEL GAUGES: MFR						
19		DIFF PRESSURE GAUGES: MFR						
20								
21								
22								
23								
24		LEVEL TRANSMITTERS: MER					SIZE & TYPE	
26								
20		PRESSURE RELIEE VALVES: MER					SIZE & TYPE	
28		THERMAL RELIEF VALVES: MER					SIZE & TYPE	
29							SIZE & TYPE	
30		SIGHT FLOW INDICATORS: MFR					SIZE & TYPE	
31		PURGE FLOW INDICATORS: MFR					SIZE & TYPE	
32		SOLENOID VALVES: MFR					SIZE & TYPE	
33		ANNUNCIATOR: MFR					SIZE & TYPE	
34		TUBE FITTINGS MFR					SIZE & TYPE	
35		MFR					SIZE & TYPE	
36		MFR					SIZE & TYPE	
37		MFR					SIZE & TYPE	
38		MFR					SIZE & TYPE	
39	SWIT	TCH CLOSURES: (7.4.5.3.2)						
40	ALAR	RM CONTACTS SHALL: O OPEN O CL	LOSE TO SOUND A	LARM AND B	E NORMALLY		O ENERGIZED	O DE-ENERGIZED
41	снит	TDOWN CONTACTS SHALL: O OPEN O CL	LOSE TO TRIP AND	BE NORMAI	LY		O ENERGIZED	O DE-ENERGIZED
42		(NOTE: NORMAL CONDITION IS WHEN COMPRESSOR IS IN OPERATION)						
43	0	SHUTDOWN SYSTEMS ARE NOT TO BE PROVIDED WITH A MEANS TO PER	RMIT TESTING WITHOU	T SHUTTING	DOWN THE UN	NIT (7.4.5.3.4)		
44	0	NON-SHUTDOWN DEVICES ARE NOT REQUIRED TO HAVE VALVING TO PE	RMIT REPLACEMENT D	URING OPE	RATION			
45	0	ISOLATION VALVES ARE REQUIRED FOR SHUTDOWN SENSING DEVICES						
46								
47	MISC	ELLANEOUS INSTRUMENTATION:						
48	0	THROUGH FLOWING INSTRUMENT SENSING LINE REQUIRED						
49	0	LIQUID-FILLED GAUGES ARE REQUIRED FOR AREAS SUBJECT TO VIBRAT	ION					
50	0	RELIEF VALVES MAY HAVE BODIES IN MATERIALS OTHER THAN STEEL					BODY MATERIAL:	
51	0	THERMAL RELIEF VALVES REQUIRED FOR COMPONENTS THAT CAN BE IS	SOLATED					
52	0	FLOW INDICATOR TYPE/MATERIAL IF OTHER THAN BULLS EYE TYPE WITH	H STEEL BODY					
53	0	PURGE REQUIRED FOR ANNUNCIATOR (7.4.3.2)	NFPA 496 PURGE T	YPE:	C	о х с	Y O Z O CONN	ECTION ONLY
54	0	COMBINATION BLOCK AND BLEED VALVES MAY BE SUBSTITUTED						
55	0							
56	0							

02/03 6 OF 10 API672.XLS

82

	PACKAGED, INTEGRALLY GEARED CENTRIFUGAL																		
AIR COMPRESSORS (API 6724th ED) DATA SHEET			JOB NO ITEM NO																
1	U.S. COSTOMART INSTRUM	ENTATIO	PAGE 7 OF 11 REQ'N NO.																
2			ELEMENT							INDICATOR									
3		PRO\	/ BY		TYPE		L	LOCATIO	N	INSTALL BY PR			V BY	L	OCATIO	N			
																			<u></u>
				OUT		(1)			(1)						(1)			:	AL (5)
			ER.	EAD		19L	PKG	NEL	PINC		ER B		ШШ	PKG	PINC	NEL		ş	N OIGN
		0 B	HAS	CTR	н	SMI	0R	T PA	НЫ	В	HAS	R R	HAS	OR	Б	ΓЪν	Σ	DO	N N
4		END	URC	IREC	MIT	RAN	END	OCA	URC	END	URC	END	URC	END	URC	OCA	LAR	FH I	ц Г П
4	PRESSURE	>	٩.		S	-	>		٩.	>	۵.	>	۵.	>	۵.	-	<	S	<u>r</u>
6	COMPRESSOR SUCTION STAGE																		
7	COMPRESSOR DISCHARGE STAGE																		
9	LUBE OIL FILTER DP																		
10	LUBE OIL SUPPLY																		
11	AIR FILTER/SILENCER DP																		
12																			
13	TEMPERATURE:																		
14	COMPRESSOR SUCTIONSTAGE																		
15	COMPRESSOR DISCHARGESTAGE																		
16	OIL COOLER INLET & OUTLET																		
17	COMPRESSOR PINION JOURNAL BRG																		
18	BULL GEAR JOURNAL BRG																		
19	BULL GEAR THRUST BRG																		
20	DRIVER JOURNAL BRG																		
21	DRIVER THRUST BRG																		
22	RESERVOIR																		
23											1	1				-			
24																			
25	SEPARATOR																		
26																			
27																			
20	RADIAL VIBRATION EACH STAGE																		
30	RADIAL VIBRATION BULL GEAR SHAFT																		
31	AXIAL POSITION BULL GEAR SHAFT																		
32	AXIAL POSITIONSTAGE PINION																		
33	RADIAL VIBRATION ON DRIVER																		
34	AXIAL POSITION ON DRIVER SHAFT																		
35	ACCELEROMETER ON GEAR BOX																		
36																			
37	FLOW:																		
38																			
39	SEAL GAS																		
40	MISCELLANEOUS	1	r –			r –		m		1						r	<u> </u>	T	
41	STANDBY L.O. PUMP RUNNING																		
42	PANEL PURGE FAILURE	<u> </u>																	
44	ANNUNCIATOR PURGE FAILURE	1												_					
45	SURGE RECOGNITION												_	_					
46	OIL HEATER ON																		
47	COMMON REMOTE ALARM INDICATION																		
48	COMMON REMOTE SHUTDOWN INDICATION																		
49				_	_				_	_		_	_	_	_	_			
50	NOTES: 1) TRANSMITTERS SUPPLIED BY VENDOR SHALL INCLUDE SENSING ELEMEN	T																	
51	2) SUPPLY "REPEAT SIGNAL" FOR CONTROL ROOM ALSO																		
52																			

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO ITEM NO
U.S. CUSTOMARY	PAGE 8 OF 11 REQ'N NO.
	AFTER-) COOLER(3) (7.0)
5	
6	SHELL SIDE I UBE SIDE
8 FLUID QUANTITY, TOTAL (Ib/hr)	
9 VAPORIN/OUT	
15 THERMAL CONDUCTIVITY. (Btu/ft h °F)	
$16 \square LATENT HEAT. (BTU/b °F)$	
17 INLET PRESSURE, (psig)	
18 VELOCITY, (fps)	
19 PRESSURE DROPALLOW/CALC, (psi)	
20 FOULING RESISTANCEMINIMUM (hr ft_°F/BTU)	
21 HEAT EXCHANGED	(BTU/hr) MTD CORRECTED (°F)
22 TRANSFER RATE, (BTU/hr ft_°F) SERVICE	CLEAN
23 CONSTRUCTION OF ONE SHELL	SKETCH: BUNDLE NOZZLE ORIENTATIONS
24 SHELL SIDE	TUBE SIDE
25 DESIGN/TEST PRESSURE, (psig)	
26 DESIGN TEMPERATURE, (°F)	
27 NO. PASSES PER SHELL	
28 CORROSION ALLOWANCE, (in)	
29 NOZZLES: INLET	
30 SIZE & OUTLET	
31 RATING VENT-DRAIN	
32 TUBE NO O.D (in) THK (MIN) (AVG) (i	n) LENGTH(ft) PITCH(in) < 30 <a href="https://doi.org/10.1016/j.com">doi:1016/j.com</a> 90  45
34 SHELL MATL I.D. (In) O.D. (I)	1) SHELL COVER MAIL (INTEG)(REMOV)
38 BAFFLESCROSS MATL TYPE	% CUT (DIA) (AREA) SPACING: C/C INLET (in)
39 BAFFLESLONG MATL	SEAL TYPE
40 SUPPORTSTUBE U-BEND	ТҮРЕ
41 BYPASS SEAL ARRANGEMENT	TUBETUBESHEET JOINT
42 GASKETSSHELL SIDE	TUBE SIDE
43FLOATING HEAD	
44 ASME SECTION VIII CODE REQUIREMENTS:	
43 WEIGHT/SHELL(ID) FILLED WITH WATER	(lb) BUNDLE(lb)
46 REMARKS:	
47	
48	
50	
51	
52	
53	
54	
55	

02/03 8 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NOITEM NO
U.S. CUSTOMART NEMA FRAME INDUCTION MOTORS	PAGE 9 OF 11 REQ'N NO. TO IEEE 841
2 MFR MODEL	SERIAL NO. NEMA FRAME
3 DRIVEN EQUIPMENT TYPE DRIVEN EQUIPMENT ITEM NO.	MOTOR ITEM NO.
	DITIONS
5 6 SITE DATA: 7 ELECTRICAL SUPPLY: VOLT PHASE HERTZ 8 ELECTRICAL AREA CLASSIFICATION: O NON-HAZARDOUS 9 O CLASS GROUP DIVISION	DRIVE SYSTEM: O DIRECT CONNECTED O EXTERNAL GEAR O OTHER
10         ATMOSPHERIC MIXTURE:           11         IGNITION TEMPERATURE:           12         ALTITUDE:           13         AMBIENT TEMPERATURE MINIMUM:           14         UNUSUAL CONDITIONS:	STARTING: (7.1.2.2)         O         FULL VOLTAGE         O         REDUCED VOLTAGE         %           (ft)         O         LOADED         O         UNLOADED         %           ('F)         O         VOLTAGE DIP        %
17	
18         NO LOAD CURRENT,         AMPS         LO           19         FULL LOAD TORQUE,         (ft-lb)         FUL           20         STARTS PER HOUR:         HOT         COLD         75           21         ACCEL FEATION TIME-         SEC         50	AD CURRENT, AMP EFFICIENCY POWER FACTOR ILL % % % % % % % % % % % % % % % % % %
22 LOCKED	ROTOR
23 CONSTRUCTION F	EATURES
25       NAMEPLATE       (HP)       (rpm)       S.F.         26       NEMA TORQUE DESIGN:       O       A       B       C       O         27       NEMA TORQUE DESIGN:       O       A       B       C       O       D         27       NEMA LOCKED ROTOR KVA CODE LETTER:	MOTOR ROTATION: (FACING END OPPOSITE SHAFT EXTENSION)          INSULATION CLASS:       O       B - DIRECTIONAL         INSULATION CLASS:       O       B O       F       O OTHER:         INSULATION CLASS:       O       F       O OTHER:       Insertion of the Comparison of the Compari
46       BEARING TYPE:       BALL       ROLLER       SLEEVE         47       BRG LUBRICATION:       GREASE       RING OIL       O OIL MIST         48       GREASE FITTING:       PLUGGED       ALEMITE       O OTHER         49       BRG SHIELDING:       SINGLE       DOUBLE       SEALED FOR LIFE         50       TESTING       TESTING         51       IEEE TESTING:       OBSVD       WIT       SUBMIT CERT'D RESULTS         52       SPECIAL TESTING:	DIRECTION OF THRUST:     O     TOWARD COUPLING       O     AWAY FROM COUPLING       Image:     Image: (b)         PAINTING:     O         Image:     O         Image:     Image:         Image:         Image:         Ima

	PA AIR	CKAGED, I COMPRES	NTEGRALL	Y GEARED C I 6724th ED)	ENTRIFU DATA SH	GAL IEET		JOB NO.	10 05	11	ITEM NO.			
1			0.3.00	JIOWARI		ALLOWAB	LE PIPING F	ORCES AND N	IOMENTS (6.4)	11	REQININO.			
2														
3		FORCE	COMPRE	SSOR INLET		FORCE	COMPRES	SOR DISCHAR	GE	FORCE	PACKAG	EOUTLET		
4	AXIA	FORCE,	(lb)	WOWENT,	(ft-lb)	FORCE,	(lb)	WOWENT,	(ft-lb)	FURCE,	(lb)	WOWENT,	(ft-lb)	
6	VER													
7	TRAN	6												
8														
9	ADDITIONAL DA	TA:												<u> </u>
10 11														
12														<u> </u>
13														
14														
15														
17														
18														
19														
20														
21														<u> </u>
23														<u> </u>
24														
25														
26														
27														
29														
30														
31														
32														
34														
35														
36														
37														
38														
40														
41														
42														
43														
44 45														
46														
47														
48														
49														
50														
52														
53														
54														

02/03 10 OF 10 API672.XLS

PACKAGED, INTEGRALLY GEARED CENTRIFUGAL					
AIR COMPRESSORS (API 6724th ED) DATA SHEET	JOB NO.				ITEM NO.
U.S. CUSTOMARY	PAGE	11	OF	11	REQ'N NO.
CENTRIFUGAL AIR COMPR	ESSOR PE	RFOR	MANCE	- CURV	/ES
When this requisition is issued for nurshapped the suppl	lior's propo	604 0		or	
the selected compresser will be inserted here as a sub	etituto for 4	bie ch			
the selected compressor will be inserted here as a sub	silule for t	1115 51	ieet.		
		-			
The compressor performance and characteristics as gi	iven on this	s perfo	ormance	e curve	9
will be a part of the supplier's contractual obligation wi	ithin the to	eranc	es agre	ed upo	on.

02/03 API672.XLS

### ANNEX B—REFERENCED DOCUMENTS

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API

Std 541	Form-Wound Squirrel Cage Induction Motors—250 Horsepower and Larger
Std 546	Brushless Synchronous Machines—500 kVA and Larger, Second Edition
Std 611	General-Purpose Steam Turbines for Petroleum, Chemical, and Gas Industry Services, Fourth Edition
Std 614	Lubrication, Shaft-Sealing, and Control-Oil Systems and Auxiliaries for Petroleum, Chemical and Gas Industry Services, Fourth Edition Chapter 1—General Requirements Chapter 2—Concered Rumpose Oil Systems
Std 617	Axial and Centrifugal Compressors and Expander-Compressors for Petroleum, Chemical and Gas Industry Services, Seventh Edition
Std 670	Machinery Protection Systems, Fourth Edition
AGMA ¹	
6011	Specification for High Speed Helical Gear Units
9002	Bores and Keyways for Flexible Couplings (Inch Series)
ASME ²	
B1.1	Unified Inch Screw Threads (UN and UNR Thread Form)
B16.1125	Cast Iron Pipe Flanges and Flanged Fittings Classes 25 and 250
B16.5	Pipe Flanges and Flanged Fittings NPS ^{1/2} Through NPS 24 Addenda A
B16.11	Forged Fittings, Socket-Welding and Threaded
B16.42	Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300
B16.47	Large Diameter Steel Flanges NPS 26 Through NPS 60 Addenda A Boiler and Pressure Vessel Code Section VIII, Division 1 Section W
PTC-10	Section 1X Performance Test Code on Compressors and Exhausters
A STM3	
$\Delta 275/\Delta 275M$	Standard Test Method for Magnetic Particle Examination of Steel Forgings
A278/A278M	Standard Test Method for Magnetic Furthere Examination of Steel Forgings Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 Degrees F (350 Degrees C)
A 395/A395M A536	Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures Standard Specification for Ductile Iron Castings
A515/A515M	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
E94	Standard Guide for Radiographic Examination
E186	Standard Reference Radiographs for Heavy-Walled (2 to $4^{1/2}$ -in. (51 to 114-mm) Steel Castings
E446	Standard Reference Radiographs for Steel Castings up to 2 in. (51 mm) in Thickness
AWS ⁴	
D1.1/D1.1M	Structural Welding Code - Steel Errata
IEC ⁵	

79

¹American Gear Manufacturers Association, 1500 King Street, Suite 201, Alexandria, Virginia 22134.

²ASME International, 3 Park Avenue, New York, New York 10016-5990.

³American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959. ⁴American Welding Society, 550 N.W. LeJeune road, Miami, Florida 33135.

⁵International Electrochemical Commission, 1 rue de Varembe, Geneva, Switzerland.

90	API Standard 672
IFFF6	
841	Standard for Petroleum and Chemical Industry—Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel
	Cage Induction Motors—Up to and Including 370 kW (500 hp)
ISO ⁷	
261	ISO General Purpose Metric Screw Threads—General Plan Second Edition
262	ISO General Purpose Metric Screw Threads—Selected Sizes for Screws, Bolts and Nuts Second Edition
286-2	ISO System of Limits and Fits—Part 2: Tables of Standard Tolerance Grades and Limit Deviations for Holes and Shafts First Edition
724	ISO General-Purpose Metric Screw Threads—Basic Dimensions Second Edition
773	(Withdrawn) Rectangular or Square Parallel Keys and Their Corresponding Keyways (Dimensions in Millimetres)
775	(Withdrawn) Cylindrical and 1/10 Conical Shaft Ends First Edition
1328-1	Cylindrical Gears—ISO System of Accuracy—Part 1: Definitions and Allowable Values of Deviations Relevant to Corresponding Flanks of Gear Teeth
3448	Industrial Liquid Lubricants—ISO Viscosity Classification Second Edition
6708	Pipework Components—Definition and Selection of DN (Nominal Size) Second Edition
7005-1	Metallic Flanges—Part 1: Steel Flanges First Edition;
7005-2	Metallic Flanges—Part 2: Cast Iron Flanges First Edition
8501	Preparation of Steel Substrates Before Application of Paints and Related Products - Visual Assessment of Sur- face Cleanliness
8821	Mechanical Vibration—Balancing—Shaft and Fitment Key Convention First Edition
10436	(Pending) Petroleum and Natural Gas Industries—General-Purpose Steam Turbines Second Edition
10438-1	Petroleum and Natural Gas Industries—Lubrication, Shaft-Sealing and Control-Oil Systems and Auxiliaries— Part 1: General Requirements
10438-3	Petroleum and Natural Gas Industries—Lubrication, Shaft-Sealing and Control-Oil Systems and Auxiliaries— Part 3: General Purpose Oil Systems
5389	Turbocompressors—Performance Test Code
MSS ⁸	
SP55	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components Visual Method for Evaluation of Surface Irregularities
NEC ⁹	
Article 110	
NEMA ¹⁰	
SM23	Steam Turbines for Mechanical Drive Service
250	Enclosures for Electrical Equipment (1000 Volts Maximum)
NEDA 11	
496	Standard for Purged and Pressurized Enclosures for Electrical Equipment
450 GGDG ¹²	Sumura jor 1 argea and 1 ressur 2ea Enclosures for Electrical Equipment
55PC12	Commencial Plant Cleaning NACE No. 2 2000 (Steel Structure Driving Manual Ch. 2. S. C. D.
540	tion Specs.)
TEMA ¹³	

⁶Institute of Electrical and Electronics Engineers, 445 Hoes Land, Piscataway, New Jersey 08855-1331.

⁷International Organization for Standardization, ISO publications available from the American National Standards Institute, 1, rue de Varembé, Case postale S6 CH-1211, Geneva 20, Switzerland.

 ⁸Manufacturers Standardization Society of the Value Fittings Industry, Inc., 127 Park Street, N.E., Vienna, Virginia 22180.
 ⁹National Electrical Code: National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269.
 ¹⁰National Electrical Manufacturers Association, 1300 North 17th Street, Arlington, Virginia 22209.

¹¹National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269.

¹²Steel Structures Painting Council, 40 24th Street, Suite 600, Pittsburgh, Pennsylvania 15222.

¹³Tubular Exchange Manufacturers Association, 25 North Broadway, Tarrytown, New York 10591.

# ANNEX C-(INFORMATION ON ROTORDYNAMIC ANALYSIS)

## C.1 General

Note: Refer to API Publication 684, *Tutorial on the API Standard Paragraphs Covering Rotor Dynamics and Balancing: An Introduction to Lateral Critical and Train Torsional Analysis and Rotor Balancing,* for more information on rotor dynamics.

**C.1.1** In the design of rotor-bearing systems, consideration should be given to all potential sources of periodic forcing phenomena (excitation) that should include, but are not limited to, the following sources:

- a. Unbalance in the rotor system
- b. Oil-film instabilities (whirl)
- c. Internal rubs
- d. Blade, vane, nozzle, and diffuser passing frequencies
- e. Gear-tooth meshing and side bands
- f. Coupling misalignment
- g. Loose rotor-system components
- h. Hysteretic and friction whirl
- i. Boundary-layer flow separation
- j. Acoustic and aerodynamic cross-coupling forces
- k. Asynchronous whirl
- 1. Electrical line frequency.

Note 1: The frequency of a potential source of excitation may be less than, equal to, or greater than the rotational speed of the rotors.

Note 2: When the frequency of a periodic forcing phenomenon (excitation) applied to a rotor-bearing-support system coincides with a natural frequency of that system, the system will be in a state of resonance. A rotor-bearing-support- system in resonance may have the magnitude of its normal vibration amplified. The magnitude of amplification and, in the case of critical speeds, the rate of change of the phase-angle with respect to speed, are related to the amount of damping in the system.

**C.1.2** For the purposes of this standard, critical speeds and other resonant conditions of concern are those with an amplification factor (AF) equal to or greater than 6.5

**C.1.3** Resonances of structural support systems that are within the vendor's scope of supply and that affect the rotor vibration amplitude should not occur within the specified operating speed range or the specified separation margins (see C.2.10). The effective stiffness of the structural support should be considered in the analysis of the dynamics of the rotor-bearing-support system (see C.2.4c)

Note: Resonances of structural support systems may adversely affect the rotor vibration amplitude.

**C.1.4** The vendor who is specified to have unit responsibility for the complete drive train communicates the existence of any undesirable running speeds in the range from zero to trip speed. This can be illustrated by the use of Campbell (forced frequency) diagrams for individual machines and/or for the complete train. When such has been specified for Special Duty service, these diagrams should be submitted for purchaser review and included in the instruction manual. (see Annex D, Item 41).

Note: Examples of undesirable speeds are those caused by the rotor lateral criticals of concern, system torsionals, and blading modes.

**C.2** Lateral Analysis

**C.2.1** Unless previously derived and confirmed by actual tests of a given design, critical speeds and their associated amplification factors should be determined by means of a damped unbalanced rotor response analysis.

**C.2.2** Unless known from previous tests of a given design, the location of all critical speeds below the trip speed should be confirmed on the test stand during the mechanical running test (see C.3.1). The accuracy of the analytical model should be demonstrated (see C.3).

**C.2.3** Before carrying out the damped unbalanced response analysis, the vendor should conduct an undamped analysis to identify the undamped critical speeds and determine their mode shapes located in the range from zero to 125% of trip speed. For any new designs, the results of the undamped analysis should be furnished. The presentation of the results should include:



Figure C-1—Undamped Unbalanced Response Analysis

Note: For machinery with widely varying bearing loads and/or load direction such as overhung style machines, the vendor may propose to substitute mode shape plots for the undamped critical speed map and list the undamped critical speed for each of the identified modes.

a. Mode shape plots (relative amplitude vs. axial position on the rotor).

b. Critical speed-support stiffness map (frequency vs. support stiffness). Superimposed on this map should be the calculated system support stiffness'; horizontal (kxx), and vertical (kyy), (See Figure C-1.)

**C.2.4** The damped unbalanced response analysis should include but should not be limited to the following:

Discussion: The following is a list of items the analyst is to consider. It does not address the details and product of the analysis that is covered in C.2.7 and C.2.8.

a. Rotor masses, including the mass moment of coupling halves, stiffness, and damping effects (for example, accumulated fit tolerances, fluid stiffening and damping).

b. Bearing lubricant-film stiffness and damping values including changes due to speed, load, preload, range of oil temperatures, maximum to minimum clearances resulting from accumulated assembly tolerances, and the effect of asymmetrical loading which may be caused by partial arc admission, gear forces, side streams, eccentric clearances, etc.

c. For tilt-pad bearings, the pad pivot stiffness.

d. Support stiffness, mass, and damping characteristics, including effects of frequency dependent variation. The term "support" includes the foundation or support structure, the base, the machine frame and the bearing housing as appropriate. For machines whose bearing support system stiffness values are less than or equal to 3.5 times the bearing oil film stiffness values, support stiffness values derived from modal testing or calculated frequency dependent support stiffness and damping values (impedances) should be used. The vendor should state the support stiffness values used in the analysis and the basis for these values (for example, modal tests of similar rotor support systems, or calculated support stiffness values).

Note: The support stiffness should in most cases be no more than 8,75 x 10⁶ N/mm (5 x 10⁶ lbs/in).

Discussion: Guidelines are used to define whether or not bearing support stiffness should be considered. While modal testing of the actual bearing support system would be preferred, an analytical analysis (such as FEA) is permitted.

e. Rotational speed, including the various starting-speed detents, operating speed and load ranges (including agreed-upon test conditions if different from those specified), trip speed, and coast-down conditions.

f. The influence, over the operating range, of the hydrodynamic stiffness and damping generated by the rotor gas and oil seals.

g. The location and orientation of the radial vibration probes which should be the same in the analysis as in the machine.

h. The potential cross-excitation of other operating rotors in an integrally geared machine.

**C.2.5** In addition to the damped unbalanced response analysis requirements of C.2.4, for machines equipped with rolling element bearings, the vendor should state the bearing stiffness and damping values used for the analysis and either the basis for these values or the assumptions made in calculating the values.

**C.2.6** The effect of other equipment in the train is rarely necessary to be included in the damped unbalanced response analysis. A train lateral analysis should only be performed if the drive train is rigidly coupled to the compressor.

Note: In particular this analysis should be considered for machinery trains with rigid couplings.

**C.2.7** A separate damped unbalanced response analysis should be conducted for each critical speed within the speed range of 0 to 125% of trip speed. Unbalance or side load should analytically be placed at the locations that have been determined by the undamped analysis to affect the particular mode most adversely. For the translatory (symmetric) modes, the unbalance should be based on the sum of the journal static loads and should be applied at the location of maximum displacement. For conical (asymmetric) modes, an unbalance should be added at the location of maximum displacement nearest to each journal bearing. These unbalances should be 180° out of phase and of magnitude based on the static load on the adjacent bearing. Figure C-1 shows the typical mode shapes and indicates the location and definition of U for each of the shapes. The magnitude of the unbalances should be four times the value of U as calculated by Equation 2.

In SI units

$$U = 6350 \text{ W/N}$$
 (2)

In Customary units

$$U = 4 W/N$$

where

- U = Input unbalance for the rotor dynamic response analysis in g-mm (ounce-in.),
- N = Operating speed nearest to the critical speed of concern, in revolutions per minute,
- W = Journal static load in kg (lbs), or for bending modes where the maximum deflection occurs at the shaft ends, the overhung mass (that is the mass of the rotor outboard of the bearing) in kg (lbs). See Figure C-1.

C.2.8 As a minimum, the unbalanced response analysis should produce the following:

a. Identification of the frequency of each critical speed in the range from zero to 125% of the trip speed.

b. Frequency, phase and response amplitude data (Bode plots) at the vibration probe locations through the range of each critical speed resulting from the unbalance specified in C.2.7.

c. The plot of deflected rotor shape for each critical speed resulting from the unbalances specified in C.2.7, showing the majoraxis amplitude at each coupling plane of flexure, the centerlines of each bearing, the locations of each radial probe, and at each seal throughout the machine as appropriate. The minimum design diametrical running clearance of the seals should also be indicated.

d. Additional Bode plots that compare absolute shaft motion with shaft motion relative to the bearing housing for machines where the support stiffness is less than 3.5 times the oil-film stiffness.

**C.2.9** Additional analyses should be made for use with the verification test described in C.3. The vendor should determine the location of the unbalance. Any test stand parameters that influence the results of the analysis should be included.

API STANDARD 672

**C.2.10** The damped unbalanced response analysis should indicate that the machine would meet the following separation margins:

a. If the amplification factor (AF) at a particular critical speed is less than 2.5, the response is considered critically damped and no separation margin is required.

b. If the amplification factor at a particular critical speed is 2.5 or greater and that critical speed is below the minimum speed, the separation margin (SM) (as a percentage of the minimum speed) should not be less than the value from Equation 3 or the value 16 which ever is less.

$$SM = 17 \left( 1 - \frac{1}{AF - 1.5} \right)$$
(3)

c. If the amplification factor at a particular critical speed is equal to 2.5 or greater and that critical speed is above the maximum continuous speed, the separation margin (as a percentage of the maximum continuous speed) should not be less than the value from Equation 4 or the value of 26 which ever is less.

**C.2.11** The calculated unbalanced peak to peak amplitudes (see C.2.8 Item b) should be multiplied using the correction factor calculated from Equation 5.

$$SM = 10 + 17 \left( 1 - \frac{1}{AF - 1.5} \right)$$
(4)

where

$$CF = \frac{A_1}{A_{4x}}$$
(5)

where

CF = Correction Factor

 $A_1$  = Almplitude limit, calculated using Equation 6 in microns (mils peak to peak.)

 $A_{4X}$  = Peak to peak amplitude at the probe location per requirements of C.2.8 Item c in microns (mils peak to peak). In SI units:

$$A_1 = 25 \sqrt{\frac{12000}{N}}$$
(6)

In Customary units

$$A_{I} = \sqrt{\frac{12000}{N}}$$

where

N = operating speed nearest to the critical speed of concern, in revolutions per minute.

**C.2.12** The calculated major-axis, peak-to-peak, unbalanced rotor response amplitudes, corrected in accordance with C.2.11 at any speed from zero to trip speed should not exceed 75% of the minimum design diametrical running clearances throughout the machine (with the exception of floating-ring seal locations). For machines with abraidable seals, the response amplitude to the running clearance should be mutually agreed.

Note: Running clearances may be different than the assembled clearances with the machine shutdown.

**C.2.13** If the analysis indicates that the separation margins still cannot be met or that a non-critically damped response peak falls within the operating speed range and the purchaser and vendor have agreed that all practical design efforts have been

exhausted, then acceptable amplitudes should be mutually agreed upon by the purchaser and the vendor, subject to the requirements of C.3.3

### C.3 Unbalanced Rotor Response Verification Test

**C.3.1** For previously untested designs, an unbalanced rotor response test should be performed as part of the mechanical running test (see 8.3.4), and the results should be used to verify the analytical model. The actual response of the rotor on the test stand to the same arrangement of unbalance as was used in the analysis specified in C.2.9 should be the criterion for determining the validity of the damped unbalanced response analysis. To accomplish this, the requirements of C.3.1.1 through C.3.1.6 should be followed:

**C.3.1.1** During the mechanical running test (see 8.3.4), the amplitudes and phase angle of the shaft vibration from zero to trip speed should be recorded. The gain of any analog recording instruments used should be preset before the test so that the highest response peak is within 60 - 100% of the recorder's full scale on the test-unit coast-down (deceleration).

Note: This set of readings is normally taken during a coastdown, with convenient increments of speed such as 50 rpm. Since at this point the rotor is balanced, any vibration amplitude and phase detected should be the result of residual unbalance and mechanical and electrical runout.

**C.3.1.2** The location of critical speeds below the trip speed should be established.

**C.3.1.3** The unbalance that was used in the analysis performed in C.2.9, should be added to the rotor in the location used in the analysis. The unbalance should not exceed 8 times the value from Equation 2.

**C.3.1.4** The machine should then be brought up to the operating speed nearest the critical and the indicated vibration amplitudes and phase should be recorded using the same procedure used for C.3.1.1.

**C.3.1.5** The corresponding indicated vibration data taken in accordance with C.3.1.1 should be vectorially subtracted from the results of this test. It is necessary that probe orientation be the same for the analysis and the machine for the vectorial subtraction to be valid.

**C.3.1.6** The results of the mechanical run including the unbalance response verification test should be compared with those from the analytical model specified at C.2.9.

**C.3.2** The vendor should correct the model if it fails to meet either of the following criteria:

a. The actual critical speeds determined on test should not deviate from the corresponding critical speeds predicted by analysis by more than 5%. Where the analysis predicts more than one critical speed in a particular mode (due for example to the bearing characteristics being significantly different horizontally and vertically or between the two ends of the machine), the test value should not be lower than 5% below the lowest predicted value nor higher than 5% above the highest predicted value.

Note: It is possible, particularly on electric motors, that the vertical and horizontal stiffness are significantly different and the analysis will predict two differing critical speeds. Should the operating speed fall between these critical speeds, these two critical speeds should be treated separately, as if they resulted from separate modes.

b. The actual major axis amplitude of peak responses from test, including those critically damped, should not exceed the predicted values. The predicted peak response amplitude range should be determined from the computer model based on the radial probe locations of each rotor.

Discussion: The amplification factor has been removed as a verification test criterion since when the conditions of frequency (Item a) and amplitude (Item b) are satisfied the computer model is calibrated. Additionally, with split criticals and broad response curves, related to highly damped rotors, the actual amplification factor using test data may be difficult to calculate. This diminishes the value of calculating the amplification factor from test data as a valid comparison tool. The 45° probe mounting has a tendency to distort the data in the case of a split critical by showing a broad critical rather than two distinct criticals. This distortion can be corrected by electronically rotating the probes to true vertical and horizontal to permit the visualization of the true response.

Contrary to test data, the amplification factor may be accurately calculated from the computer model, which then sets the required separation margins

**C.3.3** If the support stiffness is less than 2 times the bearing oil film stiffness, the absolute vibration of the bearing housing should be measured and vectorially added to the relative shaft vibration, in both the balanced (C.3.1.1) and in the unbalanced (C.3.1.4) condition before proceeding with the step specified in C.3.1.5. In such a case, the measured response should be compared with the predicted absolute shaft movement

**C.3.4** The verification test of the rotor unbalance should be performed only on the first rotor tested, if multiple identical rotors are produced.

**C.3.5** The vibration amplitudes and phase from each pair of x-y vibration probes should be vectorially summed at each vibration response peak after correcting the model, if required, to determine the maximum amplitude of vibration. The major-axis amplitudes of each response peak should not exceed the limits specified in C.2.12.

# C.4 Additional Testing

**C.4.1** Additional testing is required (see C.4.2) if, from the shop verification test data (see C.3) or from the damped, corrected unbalanced response analysis (see C.3.3), it appears that either of the following conditions exists:

Discussion: When the analysis or test data does not meet the requirements of the standard, additional more stringent testing is required. The purpose of this additional testing is to determine on the test stand that the machine will operate successfully.

a. Any critical response will fail to meet the separation margin requirements (see C.2.10) or will fall within the operating speed range.b. The clearance requirements of C.2.12 have not been met.

**C.4.2** Unbalance weights should be placed as described in C.2.7; this may require disassembly of the machine. Unbalance magnitudes should be achieved by adjusting the indicated unbalance that exists in the rotor from the initial run to raise the displacement of the rotor at the probe locations to the vibration limit defined by Equation 6 (see C.2.11) at the maximum continuous speed; however, the unbalance used should be no less than twice or greater than 8 times the unbalance limit specified in C.2.7 Equation 2. The measurements from this test, taken in accordance with C.3.1.1 and C.3.1.2, should meet the following criteria.

a. At no speed outside the operating speed range, including the separation margins, should the shaft deflections exceed 90% of the minimum design running clearances.

b. At no speed within the operating speed range, including the separation margins, should the shaft deflections exceed 55% of the minimum design running clearances or 150% of the allowable vibration limit at the probes (see C.2.11).

**C.4.3** The internal deflection limits specified in C.4.2 Items a and b should be based on the calculated displacement ratios between the probe locations and the areas of concern identified in C.2.12 based on a corrected model if required. Actual internal displacements for these tests should be calculated by multiplying these ratios by the peak readings from the probes. Acceptance will be based on these calculated displacements or inspection of the seals if the machine is opened. Damage to any portion of the machine as a result of this testing should constitute failure of the test. Minor internal seal rubs that do not cause clearance changes outside the vendor's new-part tolerance do not constitute damage.

## C.5 Level I Stability Analysis

**C.5.1** A stability analysis should be performed on the initial design of all centrifugal compressors rotors except those rotors whose maximum continuous speed is below the first critical speed in accordance with C.2.3 as calculated on rigid supports. For this analysis, the machine inlet and discharge conditions should be at the rated condition unless the vendor and purchaser mutually agree upon another operating point.

Note: Level I analysis was developed to fulfill two purposes: First, it provides an initial screening to identify rotors that do not require a more detailed study. The approach as developed is conservative and not intended as an indication of an unstable rotor. Second, the Level I analysis specifies a standardized procedure applied to all vendors similar to that found in C.2. (Refer to API 684 1.6 for a detailed explanation.)

**C.5.2** The model used in the Level I analysis should include the items listed in C.2.4 together with the effects of squeeze film dampers and oil seals when used.

**C.5.3** All components should be analyzed using the mean value of oil inlet temperature and the extremes of the operating limits for clearance.

C.5.4 When tilt pad journal bearings are used, the analysis should be performed with synchronous tilt pad coefficients.

**C.5.5** For rotors that have quantifiable external radial loading (e.g. integrally geared compressors), the stability analysis should also include the external loads associated with the operating conditions defined in C.5.1. For some rotors, the unloaded (or minimum load) condition may represent the worst stability case and should be considered.

**C.5.6** The anticipated cross coupling, Q_A, present in the rotor is defined by the following procedures:

For centrifugal compressors:

The parameters in Equation 7 should be determined based on the specified operating condition in C.5.1.

$$Q_{A} = \frac{HP * B_{c} * C}{D_{c} * H_{c} * N} * \frac{\rho_{d}}{\rho_{s}}$$
(7)

Equation 7 is calculated for each impeller of the rotor. QA is equal to the sum of QA for all impellers.

**C.5.7** An analysis should be performed with a varying amount of cross coupling introduced at the center of gravity of the stage or impeller for single overhung rotors. For double overhung rotors, the cross coupling should be placed at each stage or impeller concurrently and should reflect the ratio of the anticipated cross coupling,  $Q_A$ , calculated for each impeller or stage.

**C.5.8** The applied cross coupling should extend from zero to the minimum of:

a. A level equal to ten times the anticipated cross coupling, QA.

b. The amount of the applied cross coupling required to produce a zero log decrement,  $Q_0$ . This value can be reached by extrapolation or linear interpolation between two adjacent points on the curve.

**C.5.9** A plot of the calculated log decrement,  $\delta$ , for the first forward mode should be prepared for the minimum and maximum component clearances. Each curve should contain a minimum of five (5) calculated stability points. The ordinate (y-axis) should be the log decrement. The abscissa (x-axis) should be the applied cross coupling with the range defined in C.5.8. For double overhung rotors, the applied cross coupling will be the sum of the cross coupling applied to each impeller or stage.

A typical plot is presented in Figure C-2.  $Q_0$  and  $\delta_A$  are identified as the minimum values from either component clearance curves.

#### C.5.10 Level I screening criteria

For centrifugal compressors:

If any of the following criteria apply, a Level II stability analysis should be performed:

a.  $Q_0/Q_A < 2.0$ .

ii. 
$$\delta_A < 0.1$$

iii.  $2.0 < Q_0/Q_A < 10$  and CSR is contained in Region B of Figure C-3.

Otherwise, the stability is acceptable and no further analyses are required.



Figure C-2



Figure C-3

### C.6 Level II Stability Analysis

**C.6.1** A Level II analysis, which reflects the actual operating behavior of the rotor, should be performed as required by C.5.10.

**C.6.2** The Level II analysis should include the dynamic effects from all sources that contribute to the overall stability of the rotating assembly as appropriate. These dynamic effects should replace the anticipated cross coupling,  $Q_A$ . These sources may include, but are not limited to, the following:

- a. Labyrinth seals
- b. Balance piston
- c. Impeller/blade flow
- d. Shrink fits
- e. Shaft material hysteresis.

It is recognized that methods may not be available at present to accurately model the destabilizing effects from all sources listed above. The vendor should state how the sources are handled in the analysis.

**C.6.3** The Level II analysis should be calculated for the operating conditions defined in C.5.1 extrapolated to maximum continuous speed. The modeling requirements of C.5.2, C.5.4 and C.5.5 should also apply. The component dynamic characteristics should be calculated at the extremes of the allowable operating limits of clearance and oil inlet temperature to produce the minimum log decrement.

**C.6.4** The frequency and log decrement of the first forward damped mode should be calculated for the following conditions (except for double overhung machines where the first two forward modes must be considered):

- a. Rotor and support system only. (Basic log decrement,  $\delta_b$ )
- b. For the addition of each group of destabilizing effects utilized in the analysis.
- c. Complete model including all destabilizing forces. (Final log decrement,  $\delta_f$ )

#### C.6.5 Acceptance criteria

The Level II stability analysis should indicate that the machine, as calculated in C.6.1 thru C.6.3, should have a final log decrement,  $\delta_f$ , greater than 0.1.

**C.6.6** If after all practical design efforts have been exhausted to achieve the requirements of C.6.5, acceptable levels of the log decrement,  $\delta_f$ , should be mutually agreed upon by the purchaser and vendor.

This stability analysis section represents the first uniform methodology specified for centrifugal compressors, steam turbines and axial and/or radial flow rotors. The analysis method and the acceptance criteria specified are unique in that no vendor has used these exact methods to evaluate the susceptibility of their equipment to subsynchronous instability. When these requirements are included within a specification, all vendors are expected to analyze their rotors accordingly. However, it should be recognized that other analysis methods and continuously updated acceptance criteria have been used successfully since the mid-1970's to evaluate rotordynamic stability. The historical data accumulated by machinery vendors for successfully operated machines may conflict with the acceptance criteria of this specification. If such a conflict exists and a vendor can demonstrate that his stability analysis methods and acceptance criteria predict a stable rotor, then the vendor's criteria should be the guiding principle in the determination of acceptability.

#### **Symbols**

- $B_c = 3$
- $B_t = 1.5$
- C = 9.55(63)
- $D_c$  = Impeller diameter, mm (in.)
- $D_t$  = Blade pitch diameter, mm (in.)
- $H_c$  = Minimum of diffuser or impeller discharge width per impeller, mm (in.)
- $H_t$  = Effective blade height, mm (in.)
- HP = Rated power per stage or impeller, Nm/sec (HP)
- CSR = Critical speed ratio is defined as:

 $CSR = \frac{maximum \ continuous \ speed}{first \ undamped \ critical \ speed \ on \ rigid \ supports \ (FCSR)}$ 

- N = Operating speed, rpm
- $Q_A$  = Anticipated cross coupling for the rotor, KN/mm (Klbf/in) defined as:

$$Q_{A} = \sum_{t=1}^{s} q_{Ai}$$
⁽⁹⁾

- $Q_0$  = Minimum cross coupling needed to achieve a log decrement equal to zero for either minimum or maximum component clearance.
- $Q_A = Cross$  coupling defined in Eq. 7) or 8) for each stage or impeller, KN/mm (Klbf/in)
- S = Number of stages or impellers
- $\delta_A$  = Minimum log decrement at the anticipated cross coupling for either minimum or maximum component clearance.
- $\delta_b$  = Basic log decrement of the rotor and support system only.
- $\delta_f$  = Log decrement of the complete rotor support system from the Level II analysis.
- $\rho_d$  = Discharge gas density per stage or impeller
- $\rho_s$  = Suction gas density per stage or impeller
- $\rho_{ave}$  = Average gas density across the rotor, kg/m³ (lbm/ft³)

#### Definitions

**Stability analysis** is the determination of the natural frequencies and the corresponding logarithmic decrements of the damped rotor/support system using a complex eigenvalue analysis.

API STANDARD 672

**Synchronous tilt pad coefficients** are derived from the complex frequency dependent coefficients with the frequency equal to the rotational speed of the shaft.

Stage refers to an individual turbine or axial compressor blade row.

**Hysteresis** or internal friction damping causes a phase difference between the stress and strain in any material under cyclic loading. This phase difference produces the characteristic hysteric loop on a stress-strain diagram and thus, a destabilizing damping force.

Minimum clearance for a tilt pad bearing occurs at the maximum preload condition. These can be calculated using the following formulas:

$$Preload_{max} = 1 - \frac{Bearing Radius_{min} - Shaft Radius_{max}}{Pad Bore_{max} - Shaft Radius_{max}}$$

Bearing Clearance_{min} = Bearing Radius_{min} - Shaft Radius_{max}

For maximum clearance at minimum preload:

Bearing Clearance_{max} = Bearing Radius_{max} – Shaft Radius_{min}

$$Preload_{min} = 1 - \frac{Bearing Radius_{max} - Shaft Radius_{min}}{Pad Bore_{min} - Shaft Radius_{min}}$$

### C.7 Torsional Analysis

**C.7.1** For synchronous motor-driven units and units including gears, units comprising three or more coupled machines, or when specified, the vendor having unit responsibility should ensure that a torsional vibration analysis of the complete coupled train is carried out and should be responsible for directing any modifications necessary to meet the requirements of C.6.2 through C.6.6.

**C.7.2** Excitation of torsional natural frequencies may come from many sources that may or may not be a function of running speed and should be considered in the analysis. These sources should include but are not limited to the following:

a. Gear characteristics such as unbalance, pitch line runout, and cumulative pitch error

b. Cyclic process impulses

- c. Torsional transients such as start-up of synchronous electric motors and generator phase-to-phase or phase-to-ground faults
- d. Torsional excitation resulting from electric motors, reciprocating engines, and rotary type positive displacement machines
- e. Control loop resonances from hydraulic, electronic governors, and variable frequency drives
- f. One and two times line frequency
- g. Running speed or speeds
- h. Harmonic frequencies from variable frequency drives.

**C.7.3** The torsional natural frequencies of the complete train should be at least 10% above or 10% below any possible excitation frequency within the specified operating speed range (from minimum to maximum continuous speed).

**C.7.4** Torsional natural frequencies at two or more times running speeds should preferably be avoided or, in systems in which corresponding excitation frequencies occur, should be shown to have no adverse effect.

**C.7.5** When torsional resonances are calculated to fall within the margin specified in C.6.3 (and the purchaser and the vendor have agreed that all efforts to remove the critical from within the limiting frequency range have been exhausted), a stress analysis should be performed to demonstrate that the resonances have no adverse effect on the complete train. The assumptions made in this analysis regarding the magnitude of excitation and the degree of damping should be clearly stated. The purchaser and the vendor should mutually agree upon the acceptance criteria for this analysis.

**C.7.6** In addition to the torsional analyses required in C.6.2 through C.6.5, the vendor should perform a transient torsional vibration analysis for synchronous motor driven units, variable frequency motors, and turbine generators sets. The purchaser and the vendor should mutually agree upon the acceptance criteria for this analysis.
## ANNEX D—VENDOR DRAWING AND DATA REQUIREMENTS

This annex consists of a distribution record (schedule), followed by a representative description of the items that are presented numerically in the schedule.

#### DESCRIPTION

The following numbered items correspond to the "Description" portion of the preceding "Packaged, General Purpose Integrally Geared Centrifugal Air Compressors Vendor Drawing and Data Requirements."

- 1. Certified dimensional outline drawings and list of connections, including the following:
  - a. Size, type, rating, location, and identification of all customer connections
  - b. The weight of the package and approximate overall erection and maintenance handling weights of equipment and subassemblies that weigh more than 130 kilograms (300 pounds)
  - c. Principal dimensions including overall package, maintenance clearances, dismantling clearances, and those required for the piping design
  - d. Shaft centerline height
  - e. Direction of rotation for the bull-gear shaft
  - f. Location of the center of gravity and lifting points
  - g. Allowable piping loads
  - h. Vendor recommendation for piping, including requirements for straight length of air inlet piping or for straightening vanes where applicable.
- 2. Cross-sectional drawings and bill of materials, including a listing of all parts
- 3. Control, alarm, and trip settings (pressures and recommended temperatures).
- 4. Shaft-coupling assembly drawings and bills of materials, including the following:
  - a. The make, size, and type of the couplings
  - b. Mounting procedure
  - c. Shaft-end gap and tolerance
  - d. Coupling guards.
- 5. Sealing air system schematics and bills of materials, including the following:
  - a. Gas flows and control-valve (regulator) settings
  - b. Pipe and valve sizes
  - c. .Instrumentation, safety devices, and control schemes
  - d. List of purchaser connections (if any).
- 6. Foundation loading diagram including dimensions of baseplates complete with the following:
  - a. Diameter, number, and locations of bolt holes; thickness of the metal through which the bolts must pass; and recommended clearance
  - b. Weights and centers of gravity for major components.
- 7. Cooling or heating schematic and bill of materials including cooling or heating media, fluid flows, pressure, pipe and valve sizes, instrumentation, and orifice sizes.
- 8. Lube oil schematic and bill of materials including the following:
  - a. Oil flows, temperatures, and pressures at each use point.
  - b. Control, alarm, and trip settings (pressure and recommended temperatures).
  - c. Pipe, valve, and orifice sizes.
  - d. Instrumentation, safety devices, control schemes, and wiring diagrams.
- 9. Lube oil system assembly and arrangement drawing(s) including size, rating, and location of all customer connections.
- 10. Electrical, instrumentation and control schematics, wiring diagrams, and bill of materials for all systems. The schematics shall show all control settings, alarm, and shutdown limits (set points). Drawings shall include, but not be limited to the following:
  - a. Electrical one-line diagram
  - b. Elementary (schematic) wiring diagram.

- c. Interconnecting wiring/tubing diagrams.
- d. Conduit/wiring installation plans and details
- 11. Electrical and instrumentation arrangement drawings, including junction box location drawing and lists of connections.
- 12. ISA data sheets for all instruments.
- 13. Tabulation of utility requirements (may be on as built purchaser data sheets).
- 14. Motor performance & electrical data and curves
- 15. Motor terminal box details and wiring instructions
- Curves showing discharge pressure and brake horsepower plotted against delivered inlet flow at rated conditions. Performance curves shall indicate surge and rated capacity.
- 17. Curves showing performance characteristics at other specified inlet conditions.
- 18. Curve showing the effects of inlet guide vanes at off- design inlet conditions.
- 19. Mechanical running test logs, including but not limited to the following:
  - a. Oil pressures and temperatures.
  - b. Vibration, including (where applicable) an x-y plot of amplitude versus revolutions per minute during start-up and coast-down.
- 20. Certified hydrostatic test logs.
- 21. Material certificates of compliance or mill test reports of items as agreed upon in the precommitment or pre inspection meetings.
- 22. Dimensional drawings for all major auxiliary equipment or components.
- 23. Data sheets applicable to proposals, purchase, and As-built.
- 24. Noise data sheets.
- 25. Installation manual describing requirements and recommendations for installation of the package.
- 26. Operating and maintenance manuals covering the compressor package including all auxiliary equipment, controls and instrumentation (see 9.3.5.3)
- 27. Spare parts list with stocking level recommendations in accordance with 9.3.4.
- 28. Preservation, packaging and shipping procedures.
- 29. Material Safety data sheets

#### SPECIAL DUTY

- 40. Sizing calculations for control valve, relief valve, and orifice plates.
- 41. Damped unbalanced response analysis.
- 42. Technical data manual, including the following (see 9.3.6.4):
  - a. As-built purchaser data sheets, per Item 32.
  - b. Certified performance curves, per Items 17-19.
  - c. Drawings, in accordance with 9.3.2.
  - d. Spare parts list in accordance with 9.3.5.
  - e. Utility data, per Item 16.
  - f. Applicable reports, per Items 20, 21, 22.
- 43. Lateral critical speed analysis report, including but not limited to the following:
  - a. Complete description of the method used.
  - b. Graphic display of critical speeds versus operating speed.
  - c. Graphic display of bearing and support stiffness and its effect on critical speeds.
  - d. Graphic display of rotor response to unbalance (including damping).
  - e. Journal static loads.
  - f. Stiffness and damping coefficients.
  - g. Tilting-pad bearing geometry and configuration, including the following:

103

- 1. Pad angle (arc) and number of pads.
- 2. Pivot offset.
- 3. Pad clearance (with journal radius, pad bore radius, and bearing-set bore radius).
- 4. Preload.
- 44. Torsional critical speed analysis report, including but not limited to the following:
  - a. Complete description of the method used.
  - b. Graphic display of the mass elastic system.
  - c. Tabulation identifying the mass moment and torsional stiffness of each component identified in the mass elastic system.
  - d. Graphic display of exciting forces versus speed and frequency.
  - e. Graphic display of torsional critical speeds and deflections (mode-shape diagram).
  - f. Effects of alternative coupling on analysis.
- 45. Curves and data for an operational five point performance test.
- 46. Curves and data for an optional unthrottled performance test.
- 47. Data from optional vibration sweeps.
- 48. Project specific IOMI Manual(s) typical not acceptable.
- 49. Transient torsional analysis of all units using synchronous motors.

#### PACKAGED, GENERAL PURPOSE, INTEGRALLY GEARED, CENTRIFUGAL AIR COMPRESSORS VENDOR DRAWING AND DATA REQUIREMENTS API 672 4TH EDITION

JOB NO	_ ITEM NO		
PURCHASE ORDER NO.		DATE	
REQUISITION NO		DATE	
		DATE	
PAGE OF	BY		
REVISION			
UNIT			
NO. REQUIRED			

FOR	
SITE	
SERVICE	

		Proposal ^a	Bidde	r shall furnish	copies of data for	r all items indicated by a	n X.				
		review ^b	Vend	or shall furnish	copies and	transparencies of dr	awings ar	nd data in	dicated		
		final ^c	Vend	or shall furnish or shall furnish	copies and operating and m	transparencies of dr aintenance manuals.	awings ar	nd data in	idicated.		
		Di	STRIBUTION RECORD	Final Rec Final Due Review R Review R Review D	eived from vendor from vendor ^c teturned to vendor teceived from vendor rue from vendor ^c						
¥	<b>↓</b> ,	↓		DESCRIP	TION		]	¥	¥	V	¥
	ΤΤ	1. Certified d	limensional outline dr	awing							
		2. Cross sec	tional drawings and b	ill of materials.							
		3. Control. a	larm and trip settings								
		4. Shaft cour	oling assembly drawi	ng and bill of mater	ials.						
		5. Sealing ai	r system schematics	and bill of material	S.						
		6 Foundatio	n loading diagram								
		7 Cooling or	heating schematic a	nd hill of material							
		8 Lube oil si	chematic and hills of	materials							
	+	9 Lube oil s	vstem arrangement d	rawing							
	+	10 Electrical	and instrument scher	natics wiring diagr	ams and hill of mate	rial					
	+	10. Electrical	and instrument arran	natios, writig diagr	d list of connections						
	+	12 ISA data s	sheets for instrument								
		13. Tabulation	of utility requirement	te							
	+	14. Motor per	formance & electrica	l data and curves							
	+	14. Motor torn	ninal box dotails and								
		15. Wotor term		t rated conditions							
		10. Curves sh	lowing performance a	t other specified or	anditions						
	+	18 Curves sh	lowing performance a	nal inlet quide van							
	+	10. Cuives sin	all rupping tosts	fial lillet guide van	63						
		20 Certified b	an running tests								
-	+ +	20. Ceruneum									
	+	22 Dimension	nal drawings for all m	aior auviliary equip	ment or components						
	+	22. Dimension			d ee built						
		23. Data silee		urchase an							
	+	24. Noise uata									
	+	25. Installation		nuclo							
	+	20. Operation	and maintenance ma	anuals							
	+	27. Spare par	is recommendations	and price list							
	+ +	20. Preservati	on, packaging, and s	hipping procedures	5		<u> </u>				
	+ +		alety data sheets				<u> </u>				
	+ +						<u> </u>				
	+ +										
	+ +										
	+ $+$										

^aProposal drawings and data do not have to be certified or as-built. Typical data shall be clearly identified as such

^bPurchaser will indicate in this column the time frame for submission of materials using the nomenclature given at the end of this form.

^cBidder shall complete these two columns to reflect his actual distribution schedule and include this form with his proposal.

105

			TYPICAL VENDOR DRAWIN DATA REQUIREM	G AND ENTS	JOB NO _ PAGE DATE	2	_ OF	2	_	ITEM NO BY REVISIO	D DN		
			Proposal ^a	Bidder shall furnish	copies of data	for all i	tems indica	ated by an	Х.				
			Review ^b	Vendor shall furnish _	copies and	t	ransparenc	ies of drav	vings ar	nd data in	dicated		
			Final ^c	Vendor shall furnish Vendor shall furnish	copies and operating and	t mainte	ransparenc enance mar	ies of drav nuals.	vings ar	id data in	dicated.		
			DISTRIBUTION RECORD	Final R Final D Review Review Review	eceived from vendor ue from vendor ^c Returned to vendor Received from vend Due from vendor ^c	 or							
¥	V	¥		DESCR	IPTION				¥	V	V	V	•
			SPECIAL DUTY										
			30. Control valve, relief valv	e, and orifice plate sizin	g calculation								
			31. Damped unbalanced re	sponse analysis									
			32. Lateral critical speed an	alysis									
			33. Torsional critical speed	analysis.									
			34. Residual unbalance wo	rk sheet.									
			35. Curves and data for an	optional five point test									
			36. Curve for an optional ur	throttled test									
			37. Data from optional vibra	ition sweeps									
			38. Curves for optional guid	le vane test									
			39. Data from spare rotor te	ests.									
			40. Project specific IOMI Ma	anual(s)									

^aProposal drawings and data do not have to be certified or as-built. Typical data shall be clearly identified as such

^DPurchaser will indicate in this column the time frame for submission of materials using the nomenclature given at the end of this form.

^cBidder shall complete these two columns to reflect his actual distribution schedule and include this form with his proposal.

#### Notes:

- 1. Send all drawings and data to
- All drawings and data must show project, appropriation, purchase order, and item numbers in addition to the plant location and unit. In addition to the copies specified above, one set of the drawings/instructions necessary for field installation must be forwarded with the shipment.

#### Nomenclature:

S	numl	ber d	Ъf	weel	٢S	prior	to	shipm	ent.
						•			

- F -- number of weeks after firm order.
  - D -- number of weeks after receipt of approved drawings.

Vendor		
Date	Vendor Reference	
Signature		

(Signature acknowledges receipt of all instructions)

## ANNEX E—LUBRICATION SYSTEM SCHEMATIC

This annex contains a schematic for lubrication systems. The notes and key to symbols in Figure E-1 are shown in Table E-1. This plan represents the default system. Other variations and systems are available and may be specified by the purchaser and mutually agreed upon by the purchaser and the vendor.

Tahle	F-1_	-l ube-oil	Svste	m Rea	uirements
Tuble	<u> </u>		i Oyotoi		uncritorito

API 614-4th, Ch.3,	Options /	API 672 Requirements /
App. A Figures	Adds	Resolution of API 614 Fig. 3A options
3A-1 Minimum requirements for general purpose oil systems	Note	Superseded by 672-4th Annex E, Fig. 1
3A-2 Reservoir	Option 1	A level switch is not required
	Option 2	A temperature indicator with thermowell is required
	Option 3	(When specified an electric immersion heater is required
	Option 4	Additional connections are required for: 1. System pressure control valve return 2. Independent suction connection with strainer for Aux. Pump
	Option 5	One tapped grounding lug is required
	Option 6	Gauge glass shall be armored
	Add 1	A vent connection with air eductor or motorized oil demister shall be pro- vided
	Add 2	A minimum 50 mm (2 nps) flanged drain connection with valve and blind shall be provided at the low end
3A-3 Pumps	Option 1	One 100% auxiliary oil pump is required
	Option 2	Block valves are not required
	Option 3	A separate pre/post lube oil pump is not required
	Option 4	(When specified, a pressure switch shall be provided for direct initiation of aux. motor start. Otherwise, the start signal shall come from the microprocessor.
	Option 5	(Pressure transducers are standard unless transmitters or switches are speci- fied.
	Add 1	(When specified, a separate sensor shall be provided for shutdown signal
	Add 2	A means for priming the shaft -driven pump with the discharge of the aux. pump shall be provided
3A-4 Filters and coolers	Option 1	One oil cooler is required
	Option 2	Duplex filters are required
	Option 3	(When specified, a three-way constant temperature control valve with bypass line shall be provided
	Option 4	A two or three way variable temperature control valve is not required
	Option 5	A temperature switch is NOT required
	Option 6	A single transfer valve with cooler and filter in parallel with separate TCV is not required
	Option 7	A differential pressure indication is required from the microprocessor
3A-5 Pressure control	Option 1	A pressure relieving valve is required if a pump can be blocked in (may be integral w/pump)
	Option 2	A pressure regulator (relief-valve type) is standard. A direct acting back- pressure control valve is optional
	Option 3	Block valves around the PCV / regulator are not required
	Option 4	A globe bypass valve is not required



Key

- 1 Rotating Equipment
- 2 Reservoir
- 3 Shaft Driven Main Oil Pump
- 4 Motor Driven Standby Oil Pump (3A-3 Option 1)
- 5 Oil Cooler (3A-4 Option 1)
- 6 Duplex Oil Filter (3A-4 Option 2)
- 7 Temperature Control Valve (3A-4 Option 3)
- 8 Pressure Regulator (3A-5 Option 1,2,3,& 4)
- 9 Heater (3A-2 Option 3)
- 10 Temperature Indicator (3A-2 Option 2)
- 11 Pump Discharge Pressure Signal

- 12 Differential Pressure Signal (3A-4 Option 7)
- 13 Aux Pump Start Signal (3A-3 Opt. 4)
- 14 Low Pressure Alarm Signal
- 15 Low Pressure Shutdown Signal (3A-3 Add. 1 Option)
- 16 Reservoir Internal Baffle
- 17 Breather (3A-2 Add. 1)
- 18 Drain Valve (3A-2 Add. 2)
- 19 Maximum Operating Level
- 20 Minimum Operating Level
- 21 Pump Suction Loss Level
- 22 Level Gauge
- 23 Provision for priming (3A-3 Add. 2)

Figure E-1

# ANNEX F-REQUIREMENT FOR DETERMINING RESIDUAL UNBALANCE

## F.1 Scope

This appendix describes the procedure to be used to determine residual unbalance in machine rotors. Although some balancing machines may be set up to read out the exact amount of unbalance, the calibration can be in error. The only sure method of determining residual unbalance is to test the rotor with a known amount of unbalance.

# F.2 Definition

Residual unbalance is the amount of unbalance remaining in a rotor after balancing. Unless otherwise specified, it shall be expressed in gram-millimeters or ounces-inches.

## F.3 Maximum Allowable Residual Unbalance

F.3.1 The maximum allowable residual unbalance per plane shall be calculated using Equation 6.12.7 of this standard.

**F.3.2** If the actual static weight load on each journal is not known, assume that the total rotor weight is equally supported by the bearings. For example, a two-bearing rotor weighting 6000 pounds would be assumed to impose a static weight load of 3000 pounds on each journal.

## F.4 Residual Unbalance Check

## F.4.1 GENERAL

**F.4.1.1** When the balancing machine readings indicate that the rotor has been balanced to within the specified tolerance, a residual unbalance check shall be performed before the rotor is removed from the balancing machine.

**F.4.1.2** To check residual unbalance, a known trial weight is attached to the rotor sequentially in six (or twelve, if specified by the purchaser) equally spaced radial positions, each at the same radius. The check is run in each correction plane, and the readings in each plane are plotted on a graph, using the procedure specified in F.4.2.

## F.4.2 PROCEDURE

**F.4.2.1** Select a trial weight and a radius that will be equivalent to between one and two times the maximum allowable residual unbalance (that is, if  $U_{\text{max}}$  is 2 ounces-inches, the trial weight should cause 2 to 4 ounces-in. of unbalance).

**F.4.2.2** Starting at the last known heavy spot in each correction plane, mark off the specified number of radial positions (six or twelve) in equal (60- or 30-degree) increments around the rotor. Add the trial weight to the last known heavy spot in one plane. If the rotor has been balanced very precisely and the final heavy spot cannot be determined, add the trial weight to any one of the marked radial positions.

**F.4.2.3** To verify that an appropriate trial weight has been selected, operate the balancing machine and the note units of unbalance indicated on the meter. If the meter pegs, a smaller trial weight should be used. If little or no meter reading results, a larger trial weight should be used. Little or no meter reading generally indicates that the rotor was not balanced correctly, the balancing machine was not sensitive enough, or that a balancing machine fault exists (i.e., a faulty pickup). Whatever the error, it must be corrected before proceeding with the residual unbalance check.

**F.4.2.4** Locate the weight at each of the equally spaced positions in turn, and record the amount of unbalance indicated on the meter for each position. Repeat the initial position as a check. All verification shall be performed using only one sensitivity range on the balance machine.

**F.4.2.5** Plot the readings on the residual unbalance work sheet and calculate the amount of residual unbalance (see Figure F-1). The maximum meter reading occurs when the trial weight is added at the rotor's heavy spot; the minimum reading occurs when the trial weight is opposite the heavy spot. Thus, the plotted readings should form an approximate circle (see Figure F-2). An average of the maximum and minimum meter readings represents the effect of the trial weight. The distance of the circle's center from the origin of the polar plot represents the residual unbalance in that plane.

**F.4.2.6** Repeat steps described in F.4.2.1 through F.4.2.5 for each balance plane. If the specified maximum allowable residual unbalance has been exceeded in any balance plane, the rotor shall be balanced more precisely and checked again. If a correction is made in any balance plane, the residual unbalance check shall be repeated in all planes.

**F.4.2.7** For stack component balanced rotors, a residual unbalance check shall be performed after the addition and balancing of the first rotor component, and at the completion of balancing the entire rotor, as a minimum.

Note: This ensures that time is not wasted and rotor components are not subjected to unnecessary material removal in attempting to balance a multiple component rotor with a faulty balancing machine.

Equipment (rotor) no.:	
Purchase order no.:	
Correction plane (inlet, drive-end, etc. use sketch):	
Balancing speed:	 rpm
N Maximum allowable rotor speed:	 rpm
<i>W</i> Weight of journal (closest to this correction plane):	 lbs.
$U_{max} = Maximum allowable residual unbalance = 4 3 W/N (6350 W/N) 4 3 lbs./ rpm$	 ozin. (gm-mm)
Trial unbalance (2 3 $U_{\rm max}$ )	 ozin. (gm-mm)
<i>R</i> Radius (at which weight will be placed):	 inches
Trial unbalance weight = trial unbalance / R ozin ./ inches =	 oz. (gm )

Conversion information: 1 ounce = 28.375 grams

TEST DATA							
Position	Amplitude	Angular Position					
1							
2							
3							
4							
5							
6							
Repeat 1							

ROTOR SKETCH

TEST Data Graphical Analysis

- Step 1: Plot data on the polar chart (Figure F-1 continued). Scale the chart so the largest and smallest amplitude will fit conveniently.
- Step 2: With the compass, draw the best fit circle through the six points and mark the center of this circle.

Step 3:	Measure the diameter of the circle in units of	
	scale chosen in Step 1 and record.	 units
Step 4:	Record the trial unbalance from above.	 ozin. (gm-mm)
Step 5:	Double the trial unbalance in Step 4 (may use twice the actual residual unbalance).	ozin. (gm-mm)
Step 6:	Divide the answer in Step 5 by the answer in Step 3.	 Scale Factor

You now have a correlation between the units in the polar chart and the gm-in. of actual balance.

Figure F-1—Residual Unbalance Worksheet



The circle you have drawn must contain the origin of the polar chart. If it doesn't, the residual unbalance of the rotor exceeds the applied test unbalance. Proceed with the balancing machine sensitivity check before rebalancing is attempted.

If the circle does contain the origin of the polar chart, the distance between origin of the chart and the center of your circle is the actual residual unbalance present on the rotor correction plane. Measure the distance in units of scale you choose in Step 1 and multiply this number by the scale factor determined in Step 6. Distance in units of scale between origin and center of the circle times scale factor equals actual residual balance.

Record actual residual unbalance		(ozin.)(gm-mm)
Record allowable residual unbalance (from	(ozin.)(gm-mm)	
Correction plane	for Rotor No	(has/has not) passed.
Ву	Date	

Figure F-1—Residual Unbalance Worksheet (continued)

Equipment (rotor) no.:	C-101	
Purchase order no.:		
Correction plane (inlet, drive-end, etc. use sketch):	A	
Balancing speed:	800	rpm
N Maximum allowable rotor speed:	10,000	rpm
${m W}$ Weight of journal (closest to this correction plane):	908	lbs.
$U_{max}$ = Maximum allowable residual unbalance = 4 3 <i>W</i> / <i>N</i> (6350 <i>W</i> / <i>N</i> ) 4 3 <u>908</u> lbs./ <u>10,000</u> rpm	0.36	ozin. (gm-mm)
Trial unbalance (2 3 $U_{\rm max}$ )	0.72	ozin. (gm-mm)
R Radius (at which weight will be placed):	6.875	inches
Trial unbalance weight = trial unbalance/ $R$ 0.72 ozin./6.875 inches =	0.10	oz. (gm )

#### Conversion information: 1 ounce = 28.375 grams

TEST DATA				
Position	Amplitude	Angular Positio n		
1	16.2	0°		
2	12.0	<i>60</i> °		
3	12.5	<i>120</i> °		
4	17.8	180°		
5	24.0	<i>240</i> °		
6	23.0	<i>300</i> °		
Repeat 1	16.2	<i>0</i> °		

ROTOR SKETCH



#### TEST DATA GRAPHIC ALALYSIS

- Step 1: Plot data on the polar chart (Figure F-2-continued). Scale the chart so the largest and smallest amplitude will fit conveniently.
- Step 2: With the compass, draw the best fit circle through the six points and mark the center of this circle.

Step 3:	Measure the diameter of the circle in units of		
	scale chosen in Step 1 and record.	35	units
Step 4:	Record the trial unbalance from above.	0.72	ozin. (gm-mm)
Step 5:	Double the trial unbalance in Step 4 (may use		
	twice the actual residual unbalance).	1.44	ozin. (gm-mm)
Step 6:	Divide the answer in Step 5 by the answer in Step 3.	0.041	Scale Factor

You now have a correlation between the units in the polar chart and the gm-in. of actual balance.

Figure F-2—Sample Calculations for Residual Unbalance



The circle you have drawn must contain the origin of the polar chart. If it doesn't, the residual unbalance of the rotor exceeds the applied test unbalance. Proceed with the balancing machine sensitivity check before rebalancing is attempted.

If the circle does contain the origin of the polar chart, the distance between origin of the chart and the center of your circle is the actual residual unbalance present on the rotor correction plane. Measure the distance in units of scale you choose in Step 1 and multiply this number by the scale factor determined in Step 6. Distance in units of scale between origin and center of the circle times scale factor equals actual residual balance.

Record actual residual unbalance	6.5 (0.041) =	0.27	_ (ozin.)(gm-mm)
Record allowable residual unbalance	(from Figure F-2)	0.36	(ozin.)(gm-mm)
Correction plane A	for Rotor No.	C-101	(has/has not) passed.
Ву	Date	11-	-16-92

Figure F-2—Sample Calculations for Residual Unbalance (continued)

## ANNEX G-INSPECTOR'S CHECKLIST

The levels indicated in Table G-1 may be characterized as follows:

- Level 1 is typically used for packages and basic services;
- Level 2 comprises optional performance and material requirements and is more stringent than level 1;
- Level 3 items should be considered for packages in special duty services.

The required inspection shall be indicated in the first column as:

- C Certification only;
- O Observed inspection;
- W Witnessed inspection.

Notes:

- ^a Check against certified dimensional outline drawing
- ^b When specified in contract.

#### Table G-1—Inspector's Checklist

Inspection		API 672	Date	Inspected	
C. O. or W	Item	number	inspected	by	Status
-, -,	Level 1 - Basic		F	- 5	
	Package scope	contract, 6.1.4			
	Auxiliary systems per design	contract, auxiliary system schematics			
	Overall dimensions and connection locations ^a				
	Anchor bolt layout and size ^a				
	Motors and electrical components area classification	6.1.8			
	Casing connections: nozzle size, rating and finish ^a	outline drawing, 6.1.10, 6.3			
-	Bolting	6.1.11			
	Rotor balancing	6.7.4.1			
	Vibration within acceptance criteria	6.7.4.3			
	Lubrication system reservoir internal coating and cleanliness	6.9.4			
	Equipment nameplate data	6.11.4			
	Rotation arrows	6.11			
	Jackscrews on driver feet	7.1.1.6			
	Couplings proper type	7.2.1			
	Coupling guards with sufficient protection and suffi- ciently rigid	7.2.2			
	Baseplate with major components supported	7.3			
	Lifting lugs included and identified	7.3.3, 8.4.3			
	Mounting surfaces within tolerances	6.1.13, 7.3.5			
	Conduit routing, properly supported, properly shielded	7.4.1.5, 7.4.1.6, 7.4.6.5			
	Instrument control panel scope	7.4.3.1, 5.4.3.2			
	Annunciator panel scope and function	7.4.5.2			
	Segregated instrument and control wiring from elec- trical power wiring	7.4.6.3			
	Piping fabrication and installation	7.5			

Inspection		API 672			
required		paragraph	Date	Inspected	
C, O, or W	Item	number	inspected	by	Status
	Inlet air filter/silencer scope and construction materials	7.7			
	Pre-test static gear contact pattern	8.2.3.2			
	Hydrostatic tests	8.3.2			
	Impeller over-speed test	8.3.3			
	Combined mechanical performance test	8.3.4			
	Preparation for shipment	8.4.1			
	Storage preservation instructions	8.4.2			
	Rust prevention				
	Painting				
	Shipping documents and tags				
	Level 2 - Intermediate (Add to Level 1)				
	Copies of sub-vendor purchase order				
	Material certification				
	Non-destructive examination (components)				
	Hydrotest witnessed				
	Rotating elements balancing witnessed				
	Building records (runouts, clearances)				
	Performance and Mechanical tests Witnessed				
	Inspection of cleanliness of internals	8.2.3.1			
	Level 3 - Special (Add to Level 1 and 2)				
	Special devices used for maintenance	6.12.1			
	Confirm damped unbalanced response analysis	6.12.4			
	Dynamic, component balancing	6.12.6, 6.12.7			
	Residual unbalance check	6.12.8			
	Stainless steel oil reservoir	6.12.13			
	Drain rim decking under drive train components ^b	7.10.2			
	Proper preparation of grouted surfaces ^b	7.10.3			
	Provisions for phase reference ^b	7.10.7			
	Gear axial position probe provision ^b	7.10.8			
	Gear casing accelerometer mounting provisions ^b	7.10.9			
	Vibration and axial position probe transducers ^b	7.10.10			
	Vibration and axial position probe monitors ^b	7.10.11			
	Bearing temperature monitors ^b	7.10.12			
	Alarm and shutdown devices separate? ^b	7.10.14			
	Pilot lights on electrical circuits ^b	7.10.15			
	Stainless steel oil piping throughout ^b	7.10.18			
	Oil-actuated control valves vented back to reservoir ^b	7.10.19			
	All piping components of steel	7.10.20			
	Special cooler materials	7.10.21			
	Coolers TEMA C with removable channel covers ^b	7.10.22			
	Documentation for clearances	8.5.1			
	Impellers radiographed and inspected	8.5.2, 8.5.3			
	Non-synchronous vibration within tolerance ^b	8.5.9			
	Post test inspection ^b	8.5.11			
	Spare rotor mechanical test	8.5.12.2			

## Table G-1—Inspector's Checklist (Continued)





Key

- 1. First Stage Inlet
- 2. Impeller
- 3. Diffuser
- 4. Oil seal
- 5. Pinion journal/thrust bearing
- 6. Pinion
- 7. Gear casing
- 8. Second Stage Inlet

- 9. Gear Wheel (Bull Gear)
- 10. Gear Wheel Journal/Thrust Bearing
- 11. Input (drive) shaft
- 12. Third stage inlet
- 13. Third stage discharge
- 14. Shaft driven main oil pump
- 15. Vibration instrument
- 16. Air Seal

Figure H-1



**Invoice To** ( Check here if same as "Ship To")

### Effective January 1, 2004.

API Members receive a 50% discount where applicable.

The member discount does not apply to purchases made for the purpose of resale or for incorporation into commercial products, training courses, workshops, or other commercial enterprises.

Available through Global Engineering Documents: Phone Orders: 1-800-854-7179 (Toll-free in the U.S. and Canada) 303-397-7956 (Local and International) Fax Orders: 303-397-2740 Online Orders: www.global.ihs.com

#### API Member (Check if Yes)

Ship To (UPS will not deliver to a P.O. Box)

Name:		Name:							
Title: Company: Department:		Title: Company: Department:							
						Address:		Address:	
						City:	State/Province:	Citv:	State/Province:
Zip/Postal Code:	Country:	Zip/Postal Code:	Country:						
Telephone:		Telephone:							
Fax:		Fax:							
E-Mail:		E-Mail:							

Quantity	Product Number	t Number Title			so*	Unit Price	Total	
	C61009	Standard 610; 0 Petroch	Standard 610; Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas				\$ 182.00	
	C68202	Standard 682; Pumps—Shaft Sealing Systems for Centrifugal and Rotary Pumps				\$ 162.00		
	C61404	Standard 614; Lubrication and Auxiliaries for Petrol	Standard 614; Lubrication, Shaft-sealing, and Control-oil Systems nd Auxiliaries for Petroleum, Chemical and Gas Industry Services			\$ 147.00		
	ТВА	Standard 54 Induction Moto	Standard 541; Form-wound Squirrel-cage Induction Motors 500 Horsepower and Larger				\$ TBA	
	C54602	Standard 546; Brushless Synchronous Machines—500 kVA and Larger				\$ 135.00		
Payment	Enclosed 🔲	P.O. No. (Enclose Copy)					Subtotal	
Charge N					Applic	able Sa	les Tax (see below)	
		·			Rust	n Shippi	i <b>ng Fee</b> (see below)	
	MasterCard	American Express	Diners Club	Discover	Shipping	; and Ha	andling (see below)	
Credit Card N	lo.:					To	<b>tal</b> (in U.S. Dollars)	
Print Name (	As It Appears on Card	):			\star То і	be placed	on Standing Order for future	editions of this publication
Expiration Da	ite:						ріасе а спеск тагк іп ц	ie so column and sign here.

Signature:

Date:

Pricing and availability subject to change without notice.

Mail Orders - Payment by check or money order in U.S. dollars is required except for established accounts. State and local taxes, \$10 processing fee*, and 5% shipping must be added. Send mail orders to: API Publications, Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO 80112-5776, USA. Purchase Orders – Purchase orders are accepted from established accounts. Invoice will include actual freight cost, a \$10 processing fee*, plus state and local taxes

Telephone Orders – If ordering by telephone, a \$10 processing fee* and actual freight costs will be added to the order. Sales Tax – All U.S. purchases must include applicable state and local sales tax. Customers claiming tax-exempt status must provide Global with a copy of their exemption certificate. Shipping (U.S. Orders) – Orders shipped within the U.S. are sent via traceable means. Most orders are shipped the same day. Subscription updates are sent by First-Class Mail. Other options, including next-day service, air service, and fax transmission are available at additional cost. Call 1-800-854-7179 for more information.

Shipping (International Orders) – Standard international shipping is by air express courier service. Subscription updates are sent by World Mail. Normal delivery is 3-4 days from shipping date.
Rush Shipping Fee - Next Day Delivery orders charge is \$20 in addition to the carrier charges. Next Day Delivery orders must be placed by 2:00 p.m. MST to ensure overnight delivery.
Returns - All returns must be pre-approved by calling Global's Customer Service Department at 1-800-624-3974 for information and assistance. There may be a 15% restocking fee. Special order
items, electronic documents, and age-dated materials are non-returnable.

*Minimum Order - There is a \$50 minimum for all orders containing hardcopy documents. The \$50 minimum applies to the order subtotal including the \$10 processing fee, excluding any applicable taxes and freight charges. If the total cost of the documents on the order plus the \$10 processing fee is less than \$50, the processing fee will be increased to bring the order amount up to the \$50 minimum. This processing fee will be applied before any applicable deposit account, quantity or member discounts have been applied. There is no minimum for orders containing only electronically delivered documents.

# There's more where this came from.

The American Petroleum Institute provides additional resources and programs to the oil and natural gas industry which are based on API[®] Standards. For more information, contact:

•	API Monogram [®] Licensing Program	Phone: Fax:	202-962-4791 202-682-8070
•	American Petroleum Institute Quality Registrar (APIQR®)	Phone: Fax:	202-962-4791 202-682-8070
•	API Spec Q1 [®] Registration	Phone: Fax:	202-962-4791 202-682-8070
•	API Perforator Design Registration	Phone: Fax:	202-962-4791 202-682-8070
•	API Training Provider Certification Program	Phone: Fax:	202-682-8490 202-682-8070
•	Individual Certification Programs	Phone: Fax:	202-682-8064 202-682-8348
•	Engine Oil Licensing and Certification System (EOLCS)	Phone: Fax:	202-682-8516 202-962-4739
•	API PetroTEAM™ (Training, Education and Meetings)	Phone: Fax:	202-682-8195 202-682-8222

Check out the API Publications, Programs, and Services Catalog online at www.api.org.



Additional copies are available through Global Engineering Documents at (800) 854-7179 or (303) 397-7956

Information about API Publications, Programs and Services is available on the World Wide Web at: http://www.api.org

American Petroleum Institute

1220 L Street, Northwest Washington, D.C. 20005-4070 202-682-8000 **Date of Issue:** October 2007 **Affected Publication:** API Standard 672, *Packaged, Integrally Geared Centrifugal Air Compressors for Petroleum, Chemical and Gas Industry Services*, Fourth Edition

## ERRATA

At the end of Annex D—Vendor Drawing and Data Requirements, insert the attached data requirement sheets.

#### PACKAGED, GENERAL PURPOSE, INTEGRALLY GEARED, CENTRIFUGAL AIR COMPRESSORS VENDOR DRAWING AND DATA REQUIREMENTS API 672 4TH EDITION

JOB NO	ITEM NO		
PURCHASE ORDER NO.		DATE _	
REQUISITION NO		DATE _	
		DATE _	
PAGE OF	. BY		
REVISION			
UNIT			
NO. REQUIRED			

PAGE	<u>    1  </u> 0F <u>   2  </u>	BY	
REVISION			
UNIT			
NO. REQU	JIRED		

	Proposal ^a	Bidder shall furnish	copies of data for	all items indicated by an	1 X.			
	review ^b	Vendor shall furnish	copies and	transparencies of dra	wings and data	indicated		
	final ^c	Vendor shall furnish Vendor shall furnish	copies and operating and m	transparencies of dra aintenance manuals.	wings and data	indicated.		
	DISTRI	Final Reco BUTION Final Due ORD Review Re Review Re Review Du	eived from vendor from vendor ^c eturned to vendor _ eceived from vendor ue from vendor ^c					
¥ 1		DESCRIPT	ΓΙΟΝ				•	•
	1. Certified dimens	sional outline drawing						
	2. Cross sectional	drawings and bill of materials.						
	3. Control, alarm a	and trip settings						
	<ol><li>Shaft coupling a</li></ol>	assembly drawing and bill of materi	als.					
	5. Sealing air syste	em schematics and bill of materials	i.					
	<ol><li>Foundation load</li></ol>	ding diagram						
	<ol><li>Cooling or heat</li></ol>	ing schematic and bill of material				_		
	8. Lube oil schema	atic and bills of materials.						
	9. Lube oil system	arrangement drawing.	ma and hill of moto	riol				
	10. Electrical and in	strument schematics, wiring diagra	ams, and bill of mate	rial				
	12 ISA data sheets	for instruments						
	13. Tabulation of ut	ility requirements						
	14. Motor performa	nce & electrical data and curves						
	15. Motor terminal l	pox details and wiring instructions						
	16. Curves showing	performance at rated conditions						
	17. Curves showing	performance at other specified co	nditions					
	18. Curves showing	g effects of optional inlet guide vane	es					
	19. Data from all ru	nning tests						
$\vdash$	20. Certified hydros	tatic test data					ļ	
	21. Material certific	ations						┥──┤
	22. Dimensional dra	awings for all major auxiliary equipr	nent or components					
	23. Data sneets ap	plicable to proposals, purchase and	as-duilt					
	24. NOISE Udid Siles	215 Mal						
	26. Operation and r	naintenance manuals						
	27. Spare parts rec	ommendations and price list						
	28. Preservation, pa	ackaging, and shipping procedures				1	1	
	29. Material safety	data sheets						
						1		$\square$
1						1		1

^aProposal drawings and data do not have to be certified or as-built. Typical data shall be clearly identified as such

^bPurchaser will indicate in this column the time frame for submission of materials using the nomenclature given at the end of this form.

^cBidder shall complete these two columns to reflect his actual distribution schedule and include this form with his proposal.

## TYPICAL VENDOR DRAWING AND **DATA REQUIREMENTS**

JOB NO			ITEM NO	
PAGE	2	OF	2	BY
DATE				REVISION

			Proposal ^a	Bidder shall furnish	_ copies of data for	all items indicated by ar	ı X.				
	_		Review ^D	Vendor shall furnish	copies and	transparencies of dra	wings ar	nd data in	dicated		
			Final ^c	Vendor shall furnish Vendor shall furnish	copies and operating and m	transparencies of dra aintenance manuals.	wings ar	nd data in	dicated.		
			DISTRIBUTION RECORD	Final Recei Final Due fr Review Ret Review Ret Review Due	ved from vendor rom vendor ^c turned to vendor _ ceived from vendor e from vendor ^c						
¥	V	V		DESCRIPTI	ON		V	V	V	V	V
			SPECIAL DUTY								
			30. Control valve, relief valve	e, and orifice plate sizing ca	alculation						
			31. Damped unbalanced res	ponse analysis							
			32. Lateral critical speed ana	llysis							
			33. Torsional critical speed a	nalysis.							
			34. Residual unbalance work	sheet.							
			35. Curves and data for an o	ptional five point test							
			36. Curve for an optional unt	hrottled test							
			37. Data from optional vibrat	ion sweeps							
		<u> </u>	38. Curves for optional guide	e vane test							
			39. Data from spare rotor tes	sts.							
		<u> </u>	40. Project specific IOMI Ma	nual(s)							
		1									
		1									
		1									
	1	Ť									

^aProposal drawings and data do not have to be certified or as-built. Typical data shall be clearly identified as such

^bPurchaser will indicate in this column the time frame for submission of materials using the nomenclature given at the end of this form.

^cBidder shall complete these two columns to reflect his actual distribution schedule and include this form with his proposal.

#### Notes:

- 1. Send all drawings and data to
- 2. All drawings and data must show project, appropriation, purchase order, and item numbers in addition to the plant location and unit. In addition to the copies specified above, one set of the drawings/instructions necessary for field installation must be forwarded with the shipment.

Nomenclature:

S	number	of w	eeks	nrior	to	shinment
0	nunner	01 W	CCNO	prior	ιU	SINDINGIN.

- F -- number of weeks after firm order.
- D -- number of weeks after receipt of approved drawings.

Vendor
Date

_____ Vendor Reference

Signature

(Signature acknowledges receipt of all instructions)

**Date of Issue:** July 2010 **Affected Publication:** API Standard 672, *Packaged, Integrally Geared Centrifugal Air Compressors for Petroleum, Chemical, and Gas Industry Services*, Forth Edition, March 2004

# ERRATA 2

This errata corrects editorial errors in the fourth edition of API Standard 672.

Page 8, Section 6.5.3.1, revise the ISO reference to read:

ISO 1328-1

Page 13, Section 6.12.2, revise the ISO reference to read:

ISO 1328-1

Page 90, Annex B—Referenced Documents, revise the ISO reference to 11328-2 to:

1328-1 Cylindrical Gears—ISO System of Accuracy—Part 1: Definitions and Allowable Values of Deviations Relevant to Corresponding Flanks of Gear Teeth