INTERNATIONAL STANDARD

ISO 10428

First edition
1993-12-15

Petroleum and natural gas industries — Sucker rods (pony rods, polished rods, couplings and sub-couplings) — Specification

Industries du pétrole et du gaz naturel — Tiges de pompage — Spécifications

Reference number
ISO 10428:1993(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10428 was prepared by the American Petroleum Institute (API) (as Spec 11B, 24th edition) and was adopted, under a special "fast-track procedure", by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, in parallel with its approval by the ISO member bodies.

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Introduction

International Standard ISO 10428:1993 reproduces the content of API Spec 11B, 24th edition, 1990, and its Supplement 1 (April 1, 1991). ISO, in endorsing these API documents, recognizes that in certain respects they do not comply with all current ISO rules on the presentation and content of an International Standard. Therefore, the relevant technical body, within ISO/TC 67, will review ISO 10428:1993 and reissue it, when practicable, in a form complying with these rules.

This standard is not intended to obviate the need for sound engineering judgement as to when and where this standard should be utilized and users of this standard should be aware that additional or differing requirements may be needed to meet the needs for the particular service intended.

Standards referenced herein may be replaced by other international or national standards that can be shown to meet or exceed the requirements of the referenced standards.

Appendix A to the API document shall not be regarded as being part of the requirements of this standard.

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Petroleum and natural gas industries — Sucker rods (pony rods, polished rods, couplings and sub-couplings) — Specification

1 Scope

This International Standard specifies the requirements for the dimensional characteristics, chemical and mechanical properties and gauging practice of sucker rods (pony rods, polished rods, couplings and sub-couplings) used in the petroleum and natural gas industries.

2 Requirements

Requirements are specified in:

"API Specification 11B (Spec 11B), Twenty-forth Edition, October 1, 1990 — *Specification for Sucker Rods (Pony Rods, Polished Rods, Couplings and Subcouplings)*",

which is adopted as ISO 10428.

For the purposes of international standardization, however, modifications shall apply to specific clauses and paragraphs of publication API Spec 11B. These modifications are outlined below.

Throughout publication API Spec 11B, the conversion of English units shall be made in accordance with ISO 31.

LENGTH	1 inch (in) 1 foot (ft)	= 25,4 mm (exactly) = 304,8 mm or 0,304 8 m (exactly)
TORQUE	1 foot-pound force (ft·lbf)	= 1,355 818 N·m
TEMPERATURE	The following formula was used to convert degrees Fahrenheit (°F) to degrees Celsius (°C)	

$$°C = 5/9 (°F - 32)$$

Page 12

Suggestion for ordering sucker rods

The option to place an order in accordance with ISO 10428 shall be added.

Page 13

Information given in the POLICY is relevant to the API publication only.

Page 14

Scope

Information given in subclauses 1.3 through 1.6 is relevant to the API publication only.

Page 18

Subclause 4.3.2.2

The reference to MIL-STD-105D shall be replaced by a reference to ISO 2859-1.

Page 19

Subclause 4.3.7

The reference to MIL-STD-105D shall be replaced by a reference to ISO 2859-1.

Table 4.4 and Table 4.5

The reference to MIL-STD-105D shall be replaced by a reference to ISO 2859-1.

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Subclause 6.2

Reference to class X tolerance according to National Bureau of Standards[1] Handbook H28 should be supplemented by reference to the equivalent ISO tolerance class, if available.

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Section 8, Gauge certification

The gauge certification system specified in this section is not considered as an integral part of this International Standard. This system shall be subject of a further study by ISO/TC 67 with a view to establishing an ISO or ISO/API certification scheme. The registration of certification agencies and reference master gauges should then be carried out in accordance with Annex N of Part 1 of the ISO/IEC Directives.

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Section 10 — "Marking, packaging and thread protection"

Subclauses 1c., 2c.

The option to mark the product with "ISO 10428" shall be added. Moreover, the "identification code marks" described in the examples to subclauses 1e., 2e., 3 and 10.2 respectively, may be used on a provisional basis. In the future edition of this International Standard marking should comply with the provisions of annex E of the ISO/IEC Directives, part 2.

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Subclause 12.9

The reference to MIL-STD-105D shall be replaced by a reference to ISO 2859-1.

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Subclause 12.10, Footnote*

This information is relevant to the API document only.

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1) Replace "National Bureau of Standards" by "National Institute of Standards and Technology".

Subclause 12.10c.

The option to mark the product with "ISO 10428" shall be added.

Table 12.3

The reference to MIL-STD-105D shall be replaced by a reference to ISO 2859-1.

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Appendix A, Use of API monogram

Appendix A, as well as any other clauses that refer to the use of the API monogram, shall not be considered as an integral part of this International Standard.

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Specification for Sucker Rods (Pony Rods, Polished Rods, Couplings and Subcouplings)

API SPECIFICATION 11B (SPEC 11B)
TWENTY-FOURTH EDITION, OCTOBER 1, 1990

American Petroleum Institute
1220 L Street, Northwest
Washington, DC 20005

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Supplement 1
(April 1, 1991)

Specification for Sucker Rods (Pony Rods, Polished Rods, Couplings and Subcouplings)

API SPECIFICATION 11B (SPEC 11B)
TWENTY-FOURTH EDITION, OCTOBER 1, 1990

American Petroleum Institute
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OFFICIAL PUBLICATION

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Foreword

This supplement covers changes in API Spec 11B (Twenty-Fourth Edition, October 1, 1990): *Specification for Sucker Rods (Pony Rods, Polished Rods, Couplings and Subscouplings)*, adopted at the 1990 Standardization Conference as reported in Circ PS-1920 and approved by letter ballot.

Page 13, Table 5.3: *Revise the following D_c and C_f dimensions.*

Size of Rod	D_c
1 (25.4)	1.865 (47.37)
1⅛ (28.6)	2.110 (53.54)

Size of Rod	C_f
½ (12.7)	.026 (.66)
⅝ (15.9)	.026 (.66)
¾ (19.1)	.08 (2.03)
⅞ (22.2)	.08 (2.03)
1 (25.4)	.142 (3.61)
1⅛ (28.6)	.171 (4.34)

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TABLE OF CONTENTS

SUGGESTIONS FOR ORDERING SUCKER RODS

In placing orders for sucker rods and couplings to be manufactured in accordance with API Spec 11B, purchasers should specify the following on their purchase orders:

1. Specification ..... API Spec 11B
2. Quantity .....
3. Grade ..... Par. 2.1, Table 2.1
4. Size ..... Par. 3.1, Table 3.1
5. Length ..... Par. 3.1, Table 3.1
6. Type of Ends ..... Par. 3.2, 3.3
7. Couplings:
   - Size ..... Par. 4.1
   - Class ..... Par. 4.3
   - Style ..... Par. 4.4
   - Subcouplings ..... Par. 4.2

Foreword

a. This specification is under the jurisdiction of the Committee on Standardization of Production Equipment of the American Petroleum Institute.

b. **Attention Users of this Publication:** Portions of this publication have been changed from the previous edition. The location of changes has been marked with a bar in the margin. In some cases the changes are significant, while in other cases the changes reflect minor editorial adjustments. The bar notations in the margins are provided as an aid to users to identify those parts of this publication that have been changed from the previous edition, but API makes no warranty as to the accuracy of such bar notations.

c. *This Standard shall become effective on the date printed on the cover but may be used voluntarily from the date of distribution.*

Note

This edition supersedes the 23rd edition dated October, 1, 1989. It includes changes adopted at the 1989 Standardization Conference and subsequently approved by letter ballot.

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SECTION 1
SCOPE

1.1 Definition. "One-piece" sucker rod is understood to mean a rod whose body and pin or box ends are an integral unit. The ends may be formed by forging the ends of a one-piece body stock or by welding or fusing end pieces on the body. "Three-piece" sucker rod is understood to mean a rod whose body and pin or box ends are joined by threaded connections. Except where specified "one-piece" or "three-piece," this specification shall apply to both types of sucker rods.

1.2 Coverage. This specification covers (1) three grades of sucker rods; (2) dimensional requirements for sucker rods, couplings, subcouplings and polished rod connections; (3) stipulations on thread gages, gaging practice, and gage certification; (4) polished rods and polished rod liners; (5) stuffing boxes and pumping tees; (6) requirements on packaging; and (7) conditions under which the API monogram may be used.

1.3 American Petroleum Institute (API) Specifications are published as aids to the procurement of standardized equipment and materials, as well as instructions to manufacturers of equipment or materials covered by an API Specification. These Specifications are not intended to obviate the need for sound engineering, nor to inhibit in any way anyone from purchasing or producing products to other specifications.

1.4 The formulation and publication of API Specifications and the API monogram program is not intended in any way to inhibit the purchase of products from companies not licensed to use the API monogram.

1.5 API Specifications may be used by anyone desiring to do so, and diligent effort has been made by the Institute to assure the accuracy and reliability of the data contained therein. However, the Institute makes no representation, warranty, or guarantee in connection with the publication of any API Specification and hereby expressly disclaims any liability or responsibility for loss or damage resulting from their use, for any violation of any federal, state, or municipal regulation with which an API Specification may conflict, or for the infringement of any patent resulting from the use of an API Specification.

1.6 Any manufacturer producing equipment or materials represented as conforming with an API Specification is responsible for complying with all the provisions of that Specification. The American Petroleum Institute does not represent, warrant or guarantee that such products do in fact conform to the applicable API standard or specification.

SECTION 2
MATERIAL*

2.1 Chemical and Mechanical Properties. Grade K, C, and D sucker rods and pony rods furnished to this specification shall conform to the chemical and mechanical properties shown in Table 2.1. The chemical composition and mechanical properties of other grades of sucker rods and pony rods shall be as agreed upon between the user and the manufacturer.

NOTE: *Although minimum impact requirements are not specified, sucker rod impact properties shall be determined from round Type 2 (cantilever-beam) Izod test specimens detailed in the latest revision of ASTM E23,* Notched Bar Impact Testing of Metallic Materials.

*The requirements of Section 2 do not apply to couplings, subcouplings, polished rods, polished rod liners, stuffing boxes or pumping tees.

TABLE 2.1
CHEMICAL AND MECHANICAL PROPERTIES

1	2	3	4
		Tensile Strength, psi	
Grade	Chemical Composition	Min. (PSI)	Max. (PSI)
		(MPA)	(MPA)
K	AISI 46XX	85,000 (586)	115,000 (793)
C	AISI 1536 (1)	90,000 (620)	115,000 (793)
D	Carbon or Alloy (2)	115,000 (793)	140,000 (965)

(1)Generally manufactured from, but not restricted to, AISI 1536.

(2)Any composition which can be effectively heat treated to the minimum ultimate tensile strength.

SECTION 3
GENERAL DIMENSIONS

3.1 Sizes and Lengths. Sucker rods and pony rods shall be furnished in the sizes and lengths shown in Table 3.1, as specified on the purchase order.

3.2 Dimensional Tolerances for Rod Bodies. Final rod body should be manufactured to the following tolerances, Table 3.1, column 12. The diameter must be met at any point along the rod body.

3.3 Pin-and-Pin Rods. Unless box-and-pin rods are ordered, sucker rods shall be furnished with pins on both ends. Rod ends shall conform to the dimensions given in Table 3.1. Rod pins shall conform to the requirements of Sect. 5.

3.4 Box-and-Pin Rods. Box-and-pin rods (and box-and-pin pony rods) are available in ⅝ and ¾ in. sizes only, and shall be furnished with one box end and one pin end. Rod ends shall conform to the dimensions given in Table 3.1. Rod pins and boxes shall conform to the requirements of Sect. 5.

3.5 Couplings. Unless otherwise ordered, all pin-and-pin sucker and pony rods shall be furnished with a coupling assembled on one end. All couplings and subcouplings shall conform to the requirements of Sect. 4 and Sect. 5.

3.6 Polished Rod Pins. Polished rods shall be furnished with pins on both ends as specified in Sect. 12. Polished rod pins shall conform to Fig. 5.2, and Tables 5.1 and 5.3.

3.7 Thread Protection. All exposed threads shall be provided with thread protectors conforming to the requirements of Sect. 10.

NOTE: *This requirement does not apply to unassembled couplings or subcouplings.*

TABLE 3.1
GENERAL DIMENSIONS AND TOLERANCES FOR SUCKER RODS AND PONY RODS

1	2	3	4	5	6	7	8	9	10	11	12
Size of Rod	Nominal Diameter of Pin	Outside Diameter of Pin Shoulder and Box D_f	Width of Wrench Square ±1/32 (±.8mm) W_s	Length of Wrench Square[1] W_l	Total Length of Rod Box, min. L_b	Length of Sucker Rod[3] ±2.0 in. (±50.8 mm)	Length of Pony Rods[1, 2, 3] ±2.0 in. (±50.8mm)	Diameter of Bead[6] D_u	A^R ±⅛ (±3.17)	C^R +1/16 −1/16 +1.59 −.40	Tolerances Diameter
in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	ft. (m)	ft.	in. (mm)	in. (mm)	in. (mm)	in. (mm)
½ (12.7)	¾ (19.1)	1.000 +0.005 −0.010 (25.4 +.13 −.25)	⅝ (15.9)	¾ (19.1)	—	25.30 (7.62,9.14)	2,3,4,6,8,10,12	⅞ +.005 −1/16 (22.2 +.13 −3.17)	1½ (38.1)	⅛ (3.17)	+.007 −.014 (+0.178 −0.356)
⅝ (15.9)	15/16 (23.8)	1.250 +0.005 −0.010 (31.8 +.13 −.35)	⅞ (22.2)	1¼ (31.8)	2⅛ (54.0)	25.30 (7.62,9.14)	2,3,4,6,8,10,12	17/32 +.005 −1/16 (31.0 +.13 −3.17)	1¼ (47.6)	⅛ (3.17)	+.007 −.014 (+0.178 −0.356)
¾ (19.1)	1 1/16 (27.0)	1.500 +0.005 −0.010 (38.1 +.13 −.25)	1 (25.4)	1¼ (31.8)	2⅜ (60.3)	25.30 (7.62,9.14)	2,3,4,6,8,10,12	1 13/32 +.005 −1/16 (35.7 +.13 −3.17)	2¼ (57.1)	⅛ (3.17)	+.008 −.016 (+0.203 −0.406)
⅞ (22.2)	1 3/16 (30.2)	1.625 +0.005 −0.010 (41.3 +.13 −.25)	1 (25.4)	1¼ (31.8)	2⅜ (60.3)	25.30 (7.62,9.14)	2,3,4,6,8,10,12	1½ +.005 −1/16 (38.1 +.13 −3.17)	2⅝ (66.7)	3/16 (4.76)	+.008 −.016 (+0.203 −0.406)
1 (25.4)	1⅜ (34.9)	2.000 +0.005 −0.010 (50.8 +.13 −.25)	1 5/16 (33.3)	1½ (38.1)	3 (76.2)	25.30 (7.62,9.14)	2,3,4,6,8,10,12	1 29/32 +.005 −3/16 (48.4 +.13 −6.35)	3 (76.2)	3/16 (4.76)	+.009 −.018 (+0.229 −0.457)
1⅛ (28.6)	1 9/16 (39.7)	2.250 ±0.015 (57.2 ±.38)	1½ (38.1)	1⅝ (41.3)	3¼ (82.6)	25.30 (7.62,9.14)	2,3,4,6,8,10,12	2 3/16 +.005 −3/16 (55.6 +.13 −6.35)	3⅜ (85.7)	3/16 (4.76)	+.010 −.020 (+0.254 −0.508)

[1]Minimum length exclusive of fillet.
[2]The length of box-and-pin rods shall be measured from contact face of pin shoulder to contact face of box.
[3]The length of sucker and pony rods shall be measured from contact face of pin shoulder to contact face on the field end of the coupling.
[4]S.I. equivalents of pony rod lengths are: 0.41, 0.61, 0.91, 1.22, 1.83, 2.44, 3.05 and 3.66 m.
[5]Dimension D_f of ⅝ in. (15.9 mm) box-and-pin rods shall be 1.375 ±0.015 in. (34.92 ±0.38 mm).

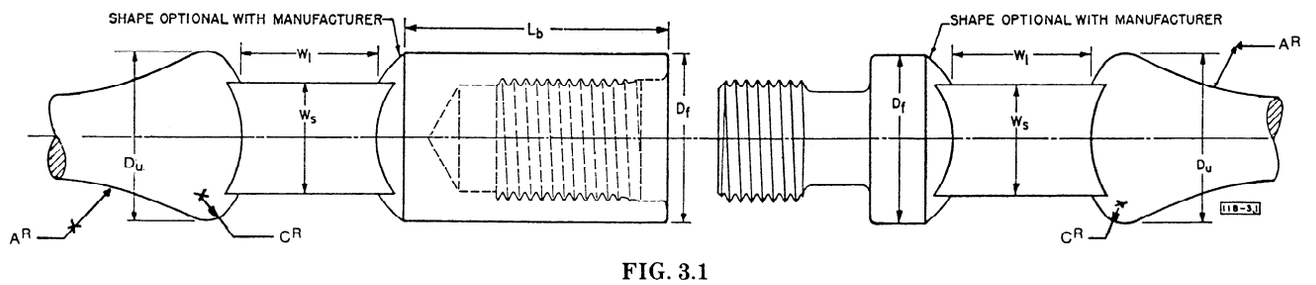


FIG. 3.1
GENERAL DIMENSIONS FOR SUCKER-ROD BOX AND PIN ENDS
See Table 3.1
See Sect. 5 for details of shouldered connection.

SECTION 3B
THREE-PIECE SUCKER RODS

3B.1 Three-piece sucker rods shall conform to all dimensional specifications for the given size rod except that portion immediately adjacent to the tapered end may have a diameter not to exceed ¼ inch (6.35 mm) greater than the rod body nominal diameter. The transition from the end piece diameter to the rod body diameter shall be rounded or angled. (Sharp corners which might hang up in the rod elevators shall not be allowed.)

3B.2 The threaded end pieces of three-piece rods shall be made up on the body in a manner which will allow them to withstand the torque values in Table 1 at any temperature between -50°F and 500°F without unscrewing or coming apart in any manner. There should not be a dead fluid area at the body-end connection nor should a dead fluid area develop under storage or normal use. The connection must not deteriorate when cycled over a temperature range of -50°F to 500°F or over any stress range from the API modified Goodman diagram for the class rod.

TABLE 1

Size (in.)	Torque (ft. lb.)
½	90
⅝	180
¾	300
⅞	450
1	675
1⅛	900

SECTION 4
COUPLINGS AND SUBCOUPLINGS

4.1 Couplings. Couplings furnished to this specification shall have the same size connection on each end. They shall conform to the dimensions stipulated in Table 4.1 or Table 4.2, whichever is applicable. Threading may be continuous or discontinuous at the manufacturer's option and shall conform to the requirements of Section 5.

4.2 Subcouplings. Subcouplings furnished to this specification shall be of two types as illustrated in Fig. 4.1 and shall conform to the dimensions stipulated in Table 4.1 or Table 4.2, whichever is applicable. Threading shall conform to the requirements of Section 5. The outside diameter of the box-and-box subcouplings (Type I) shall conform to the W dimension given in Table 4.1 or Table 4.2 for the larger specified connection. The outside diameter of the box-and-pin subcouplings (Type II) shall conform to the W dimension given in Table 4.1 or Table 4.2. The length N_L shall be optional with the manufacturer.

TABLE 4.1
FULLSIZE COUPLINGS AND SUBCOUPLINGS
(All dimensions in inches followed by equivalent in mm. See Fig. 4.3.)

1	2	3	4	5	6
Nominal Coupling Size*	Outside Diameter +0.005 -0.010 W	Length Min. N_L	Length of Wrench Flat W_L**	Dist. Between Wrench Flats 0-1/32 (0-.8mm) W_f	Used With Min. O.D. Tubing Size
⅝ (15.9)	1½ (38.1)	4 (101.6)	1¼ (31.8)	1⅜ (34.9)	2 1/16 (52.4)
¾ (19.1)	1⅝ (41.3)	4 (101.6)	1¼ (31.8)	1½ (38.1)	2⅜ (60.4)
⅞ (22.2)	1 13/16 (46.0)	4 (101.6)	1¼ (31.8)	1⅝ (41.3)	2⅞ (73.0)
1 (25.4)	2 3/16 (55.6)	4 (101.6)	1½ (38.1)	1⅞ (47.6)	3½ (88.9)
1⅛ (28.6)	2⅜ (60.3)	4½ (114.3)	1⅝ (41.3)	2⅛ (53.9)	3½ (88.9)

*Also size of rod with which coupling is to be used.
**Minimum length exclusive of fillets.

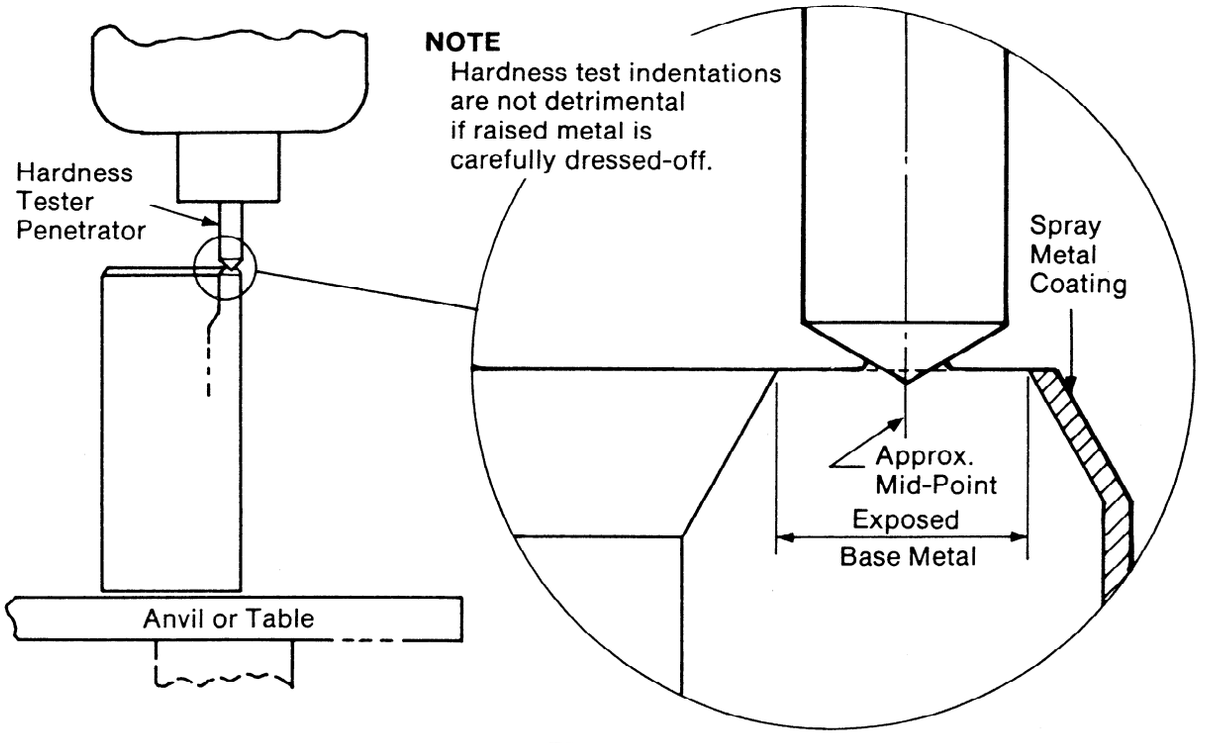


FIG. 4.1
ROCKWELL A HARDNESS
DETERMINATION OF BASE METAL

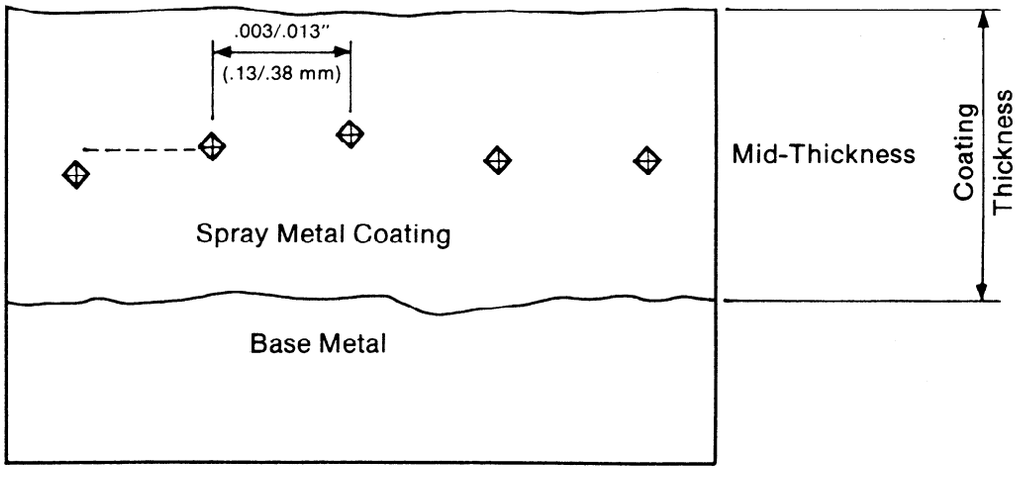


FIG. 4.2
VICKERS MICROHARDNESS
DETERMINATION OF SPRAY METAL COATING

TABLE 4.2
SLIMHOLE COUPLINGS AND SUBCOUPLINGS
(All dimensions in inches followed by equivalent in mm. See Fig. 4.3.)

1	2	3	4
Nominal Coupling Size*	Outside Diameter +.005,-.010 in. (+.13,-.25 mm) W	Length Min. N_L	Used With Min. Tubing Size O.D.
½ (12.7)	1 (25.4)	2¾ (69.9)	1.660 (42.2)
⅝ (15.9)	1¼ (31.8)	4 (101.6)	1.990 (50.6)
¾ (19.1)	1½ (38.1)	4 (101.6)	2 1/16 (52.4)
⅞ (22.2)	1⅝ (41.3)	4 (101.6)	2⅜ (60.4)
1 (25.4)	2 (50.8)	4 (101.6)	2⅞ (73.0)

*Also size of rod with which coupling is to be used.

4.3 Coupling Class. This specification covers two classes of steel sucker rod couplings which shall be designated as shown in Table 4.3.

TABLE 4.3

	BASE METAL HARDNESS		COATING HARDNESS	
Class	Measured in HRA	Equiv. to HRC	Measured in HV_{200}	Equiv. to HRC
T	58/62	(16)/23	—	—
SM	58/62	(16)/23	595 min.	55 min.

The values shown in parentheses are beyond the normal range of the test scale and are given only for comparison with other values.

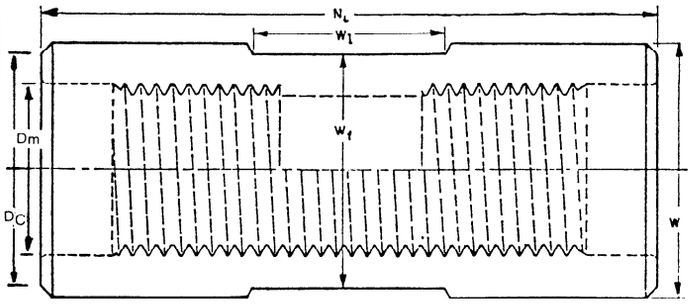
Hardness Testing

4.3.1 Couplings shall be hardness tested as shown in Fig. 4.1 using the Rockwell A procedure per ASTM E18. End face hardness values shall comply with Table 4.3. Raised metal surfaces as a result of the hardness test indentation shall be carefully removed.

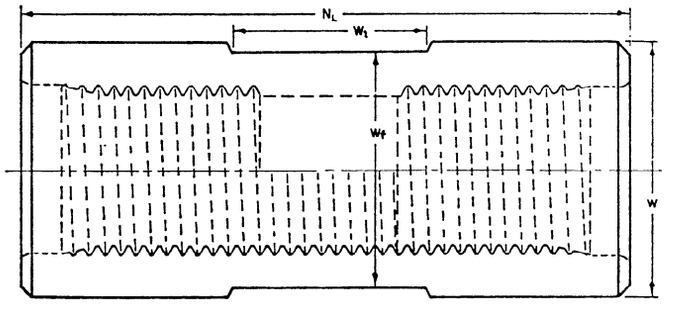
4.3.2 Couplings shall be randomly selected and tested using one of the following procedures:

4.3.2.1 In the event that continuous inspection is the method of inspection, one out of every 50 manufactured couplings is tested as it comes out of the production line. If a coupling is found which fails to meet hardness requirements, all couplings starting with the rejected coupling shall be 100% inspected, back to the last coupling where hardness was satisfactory.

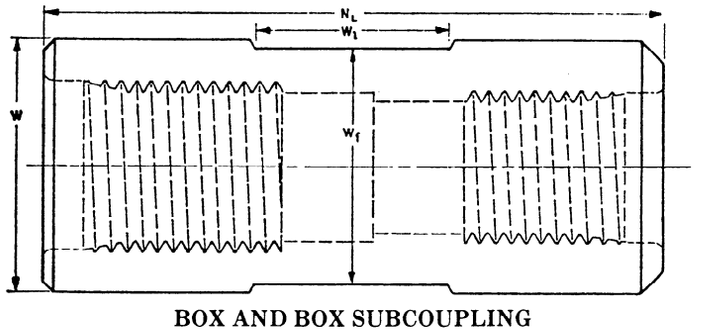
4.3.2.2 In the event that batch type inspection is practiced (samples are picked at random from the finished batch), it is required that a procedure similar to MIL-STD-105D be used. Table 4.4 (excerpted from MIL-STD-105D) is required to be used to determine acceptance levels.



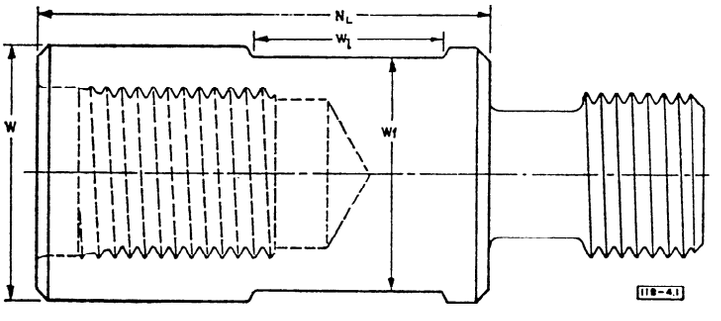
SUCKER-ROD COUPLING
(DO NOT USE ON POLISHED RODS)



POLISHED-ROD COUPLING



BOX AND BOX SUBCOUPLING
(TYPE I)



BOX AND PIN SUBCOUPLING
(TYPE II)

FIG. 4.3
SUCKER ROD COUPLINGS, POLISHED ROD COUPLINGS AND SUBCOUPLINGS
See Table 4.1 and 4.2

TABLE 4.4
SAMPLING PROCEDURES
excerpt from MIL-STD-105D
Single Sampling Plan for Normal Inspection
General Inspection Level I
Acceptable Quality Level = 4.0%

Lot Size	Sample Size	No. of Parts Out of Spec. Accept Lot	Reject Lot*
2 to 8	2	0	1
9 to 15	2	0	1
16 to 25	3	0	1
26 to 50	5	0	1
51 to 90	5	0	1
91 to 150	8	1	2
151 to 280	13	1	2
281 to 500	20	2	3
501 to 1200	32	3	4
1201 to 3200	50	5	6
3201 to 10,000	80	7	8
10,001 to 35,000	125	10	11

*100% inspection (sort) of rejected parts is acceptable practice.

4.3.3 Coupling coating shall be hardness tested as shown in Fig. 4.2 using the Vickers Microhardness procedure with a 200 Kg load, per ASTM E384. One production coupling, selected at random, shall be tested **per batch of coating raw material or one per 5000 couplings, whichever is more frequent. Results shall comply with Table 4.3.**

Dimensional Testing

4.3.4 Couplings shall be randomly selected at a rate of at least one in every 10 couplings manufactured.

4.3.5 Couplings shall be inspected using B2 and B6 go and not-go gages. The gap between the go gage and the coupling shall be measured so a 0.002 inch (0.051 mm) thick feeler gage can not enter the gap.

In the event that a coupling fails to meet the above test, the following procedure should be followed:

4.3.6 In the event that continuous inspection is the method of inspection (1 out of every 10 manufactured couplings is inspected as they come out of the production line) and a coupling is found which fails to meet the required inspections, all couplings starting with the rejected coupling shall be 100% inspected to the last coupling where a satisfactory test was made. Rejected couplings can be re-worked to within API Spec 11B specifications.

4.3.7 In the event that batch type inspection is practiced (samples are picked at random from the finished batch), it is required that a procedure similar to MIL-STD-105D be used. Table 4.5 (excerpted from MIL-STD-105D) is required to be used to determine acceptance levels. Rejected couplings can be reworked to within API Spec 11B specifications.

TABLE 4.5
SAMPLING PROCEDURES
EXCERPT FROM MIL-STD-105D
Single Sampling Plan for Normal Inspection
General Inspection Level II
Acceptable Quality Level = 2.5%

LOT SIZE	SAMPLE SIZE	NUMBER OF PARTS OUT OF TOLERANCE[1] ACCEPT LOT	REJECT LOT[2]
2 to 8	2	0	1
9 to 15	3	0	1
16 to 25	5	0	1
26 to 50	8	0	1
51 to 90	13	1	2
91 to 150	20	1	2
151 to 280	32	2	3
281 to 500	50	3	4
501 to 1200	80	5	6
1,201 to 3,200	125	7	8
3,201 to 10,000	200	10	11
10,001 to 35,000	315	14	15

[1]Out of tolerance parts must be reworked before returning them to accepted lot.
[2]100% inspection (sort) and rework of rejected parts is acceptable practice.

4.4 Coupling Chemical Requirements.

4.4.1 Base Metal Chemistry. The maximum sulphur content of the base metal for couplings and subcouplings is limited to .05%. The remainder of the chemical analysis of the steels to be used is purposely omitted from this specification in order to provide the manufacturer with freedom to develop steels most suitable for the multiplicity of requirements encountered.

TABLE 4.6
CHEMICAL COMPOSITION

	MIN	MAX
Carbon	0.50	1.00
Silicon	3.50	5.50
Phosphorus	—	0.02
Sulfur	—	0.02
Chromium	12.00	18.00
Boron	2.50	4.50
Iron	3.00	5.50
Cobalt	—	0.10
Titanium	—	0.05
Aluminum	—	0.05
Zirconium	—	0.05
Nickel	Remainder	

4.4.2 Coating Requirements for Class SM Couplings. Chemistry levels shall be within limits given in Table 4.6.

4.4.3 Coating thickness. A minimum coating thickness of .010" (.25mm) is required on the OD surface. The finished dimensions of the coated coupling shall be within the limits specified in Tables 4.1 and 4.2.

4.4.4 Application of Coating. In order to provide acceptable coating to base metal bond, the base metal shall be blasted to a NACE White Metal Finish. The coating shall be applied so that any necessary heating will not detrimentally affect mechanical properties of cold-formed threads, if used.

4.4.5 Coating Coverage. The spray metal coating over the coupling O.D. and chamfer or radius shall terminate at the outside contact face dimension, D_f-$^1/_{16}$" (D_f = 1.6mm). The face shall be ground or machined back to obtain this dimension and maintain flatness and parallelism (see Sect. 6).

4.5 Coupling Styles. This specification covers two styles of couplings and subcouplings which shall be designated as FULLSIZE and SLIMHOLE. FULLSIZE couplings and subcouplings shall conform to the dimensions listed in Table 4.1 and shall be furnished in the T Class. FULLSIZE couplings may be furnished without wrench flats when agreed upon between the purchaser and the manufacturer. SLIMHOLE couplings and subcouplings shall conform to the dimensions listed in Table 4.2 and shall be furnished as specified on the purchase order without wrench flats. The 1-inch (25.4 mm) SLIMHOLE couplings or subcouplings (2-inch (50.8 mm) OD), however, may be furnished with wrench flats conforming to the wrench flat dimensions for 1-inch (25.4 mm) couplings listed in the Table 4.1, when so specified on the purchase order.

4.6 Antigalling Treatment. All couplings and subcouplings furnished to this specification shall be given a nonmetallic type phosphate coating, or other equally antigalling treatment.

4.7 Coupling Land. In order to provide sufficient bearing surface the coupling land shall not be less than the minimum face width C_f as listed in Table 5.3.

4.8 Surface Finish.

4.8.1 The surface finish of the coupling outside diameter for a T coupling shall be 125 micro-inch R_A maximum. The outside surface shall be free of scratches, gouges, and handling nicks in excess of 0.010 inches depth.

4.8.2 The surface finish of the coupling outside diameter for an SM coupling shall be measured along the longitudinal direction and shall be 63 micro-inch R_A or smoother. The outside surface shall be free of scratches, gouges and handling nicks in excess of 0.005 inches in depth.

4.8.3 Spray Metal Couplings.

4.8.3.1 The spray metal coating on every coupling shall not exhibit pinholes or pullback detectable by unaided visual inspection.

a. The requirement of 63 microinch R_a or less smoother surface finish does not apply to the end chamfer or radius transition from the O.D. to the face.

b. The wear surface shall be free of cracks as indicated by dye penetrant inspection per ASTM E165, (1983 Revision) Method B.

4.8.3.2 The preceeding tests shall be done on one random selected coupling from a batch of coating raw material or on one out of 5,000 couplings, whichever is the more frequent.

SECTION 5
SUCKER ROD, PONY ROD, PIN, AND BOX* CONNECTIONS

5.1 Pin Connections.

1. Sucker and pony rod pins and Type II subcoupling pins (undercut sucker rod pin) shall conform to the applicable dimensions of Tables 5.1 and 5.3 and Fig. 5.1.

2. Polished rod pins (9 deg cone pin) shall conform to the applicable dimensions of Tables 5.1 and 5.3 and Fig. 5.2.

NOTE: *The undercut sucker rod pin, adopted at the 1961 midyear meeting, cannot be used on polished rods, which have no shoulder in most sizes. Therefore, requirements for the earlier 9 deg cone pin and corresponding gages are retained in this specification for polished rod connections.*

5.2 Box Connections.

1. Sucker and pony rod couplings (deep counterbore) shall conform to the applicable dimensions of Tables 5.2 and 5.3 and Fig. 5.1.

2. Polished rod couplings and Type I and II subcouplings (¼ in. (6.3 mm) deep counterbore and 9 deg taper) shall conform to the applicable dimensions of Tables 5.2 and 5.3 and Fig. 5.2.

5.3 Thread Alignment. Maximum parallel misalignment of axes of coupling or subcoupling threads shall not exceed 0.020 in. (0.508 mm). Maximum angular misalignment shall not exceed $^{15}/_{32}$ in. (11.9 mm) in 12½ ft. (3.81 m). The extent of angular misalignment shall take into account parallel misalignment.

NOTE: *Alignment tests on sucker-rod couplings and subcouplings shall be made by screwing the coupling onto a threaded test mandrel which has been accurately centered in a lathe, then screwing into the other end of the coupling a lathe-turned piece which will provide a measured length of about 1 ft. (0.3 m).*

Care should be taken to make certain that the coupling does not shoulder on either mandrel. A taper of $^1/_{16}$ in. per ft. (5.2 mm/m) on the mandrel thread is recommended.

The extent of parallel misalignment shall be determined by the use of a micrometer indicator on the turned piece close to the coupling face, and the angular misalignment by the use of a micrometer indicator on the turned piece at the outer end as the assembly is rotated.

Any other method giving the same degree of accuracy may be used.

5.4 Pin-and-Box Contact Shoulders. Contact shoulders on pin-and-box connections shall conform to the dimensions specified in Table 5.3.

5.5 Threads. The threaded portion of sucker rod shouldered connections and polished rod pins (9 deg cone) shall be 10 threads per inch and conform to the unified thread form with class 2A-2B tolerances and allowances, as defined in National Bureau of Standards Handbook H28, *Screw Thread Standards for Federal Services*, except that the roots of pin threads are truncated to a rounded form as shown in Fig. 5.3. As indicated herein, sucker rod threads are straight threads (see Fig. 5.1); polished rod threads are straight threads, with the imperfect pin threads on the vanish cone (see Fig. 5.2).

NOTE: *The following relationships are the basis for thread-form dimensions.*

1. *Height of sharp thread (H) = 0.086603 in. = 0.86603 p.*
2. *Basic height of pin thread (maximum metal condition) = 0.06134 in. = 17H/24.*
3. *Basic depth of pin crest truncation = 0.01083 in. = H/8.*
4. *Basic depth of pin root truncation = 0.01083 = H/8.*
5. *Radius of basic pin root = 0.01083 in. = H/8.*
6. *Allowance at pin root for worn tool = 0.00361 = H/24.*
7. *Basic height of box thread = 0.05413 = 5H/8.*
8. *Basic depth of box crest truncation = 0.02165 in. = H/4.*
9. *Basic depth of box root truncation = 0.01083 in. = H/8.*

**The term "box" as used in this specification refers to the female threaded connection of couplings and subcouplings.*

TABLE 5.1
PIN CONNECTIONS
All dimensions in inches followed by equivalent in mm.
See Fig. 5.1, 5.2, and 5.3.

1	2	3	4	5	6	7
Size of Rod	Nominal Diam. of Thread	Diam. of Stress Relief ±0.005 (±0.13) D_1	Length of Stress Relief +0.031 (+0.79) -0.000 (-0.00) L_R	Length of Pin +0.062 (+1.58) -0.000 (-0.00) L_s	Max. Pin Major Diam.[1]	Min. Pin Major Diam.[1]
½ (12.7)	¾ (19.1)	0.602 (15.29)	0.437 (11.10)	1.125 (28.58)	0.7482 (19.004)	0.7353 (18.677)
⅝ (15.9)	15/16 (23.8)	0.790 (20.07)	0.516 (13.11)	1.250 (31.75)	0.9362 (23.779)	0.9233 (23.452)
¾ (19.1)	1 1/16 (26.9)	0.915 (23.24)	0.594 (15.09)	1.437 (36.50)	1.0611 (26.952)	1.0482 (26.624)
⅞ (22.2)	1 3/16 (30.2)	1.040 (26.42)	0.672 (17.07)	1.625 (41.28)	1.1861 (30.127)	1.1732 (29.799)
1 (25.4)	1⅜ (34.9)	1.227 (31.17)	0.797 (20.24)	1.875 (47.63)	1.3735 (34.887)	1.3606 (34.559)
1⅛ (28.6)	1 9/16 (39.7)	1.414 (35.92)	0.875 (22.23)	2.125 (53.98)	1.5609 (39.647)	1.5480 (39.319)

*These dimensions for thread elements are given for information in connection with the gaging practice and gage requirements. It is not intended that these dimensions be subject to verification by direct measurement of the product thread.
[2]It is not required that dmension L_{2s} be measured separately.

TABLE 5.1
PIN CONNECTIONS
All dimensions in inches followed by equivalent in mm.
See Fig. 5.1, 5.2, and 5.3.

8	9	10	11	12	13	14
Max. Pin Pitch Diam.[1]	Min. Pin Pitch Diam.[1]	Max. Pin Minor Diam.[1]	Length of Perfect Polished Rod Threads[2] +0.111 (+2.82) -0.000 (-0.00) L_{2s}	Length Polished Rod Pipe +0.061 (+1.55) -0.000 (-0.00) L_{3s}	[2]Diam. of Polished Rod Pin Shank +0.0000 (+0.000) -0.0129 (-0.328) B_S	Diam. of Polished Rod Pin-and-Box Cone Base Theoretical) B_4
0.6832 (17.353)	0.6773 (17.203)	0.6255 (15.888)	----------	----------	----------	----------
0.8712 (22.129)	0.8654 (21.981)	0.8135 (20.663)	0.575 (14.61)	1.125 (28.58)	0.9362 (23.780)	0.9430 (23.952)
0.9962 (25.303)	0.9900 (25.146)	0.9384 (23.895)	0.825 (20.96)	1.375 (34.93)	1.0611 (26.952)	1.0680 (27.127)
1.1211 (28.476)	1.1150 (28.321)	1.0634 (27.010)	0.825 (20.96)	1.375 (34.93)	1.1861 (30.127)	1.1930 (30.302)
1.3085 (33.236)	1.3020 (33.071)	1.2508 (31.770)	1.200 (30.48)	1.750 (44.45)	1.3735 (34.887)	1.3805 (35.065)
1.4960 (37.998)	1.4892 (37.826)	1.4382 (36.530)	1.450 (36.83)	2.000 (50.80)	1.5609 (39.647)	1.5680 (39.827)

*These dimensions for thread elements are given for information in connection with the gaging practice and gage requirements. It is not intended that these dimensions be subject to verification by direct measurement of the product thread.
[2]It is not required that dmension L_{2s} be measured separately.

TABLE 5.2
BOX CONNECTIONS
All dimensions in inches followed by equivalent in mm. See Fig. 5.1 and 5.3.

1	2	3	4	5	6	7	8	9	10
Size of Rod	Nominal Diam. of Thread	Total Depth of Box min. L_{nb}	Total Length of Threads in Box Including Counterbore, min. L_{3n}	*Min. Box Major Diam. (Basic)	*Max. Box Pitch Diam.	*Min. Box Pitch Diam. (Basic)	*Max. Box Minor Diam.	*Min. Box Minor Diam.	Diam. of Box Counterbore +0.010 (+0.25) -0.000 (-0.00) Q
½ (12.7)	¾ (19.1)	1⅝ (41.3)	1.29 (26.7)	0.7500 (19.050)	0.6927 (17.595)	0.6850 (17.399)	0.663 (16.84)	0.642 (16.31)	0.767 (19.48)
⅝ (15.9)	15/16 (23.8)	1¾ (44.5)	1.41 (35.8)	0.9380 (23.825)	0.8806 (22.367)	0.8730 (22.174)	0.851 (21.62)	0.830 (21.08)	0.955 (24.26)
¾ (19.1)	1 1/16 (26.9)	1 15/16 (49.2)	1.60 (40.6)	1.0630 (27.000)	1.0060 (25.552)	0.9980 (25.349)	0.976 (24.79)	0.955 (24.26)	1.080 (27.43)
⅞ (22.2)	1 3/16 (30.2)	2⅛ (53.9)	1.79 (45.5)	1.1880 (30.175)	1.1310 (28.727)	1.1230 (28.524)	1.101 (27.97)	1.080 (27.43)	1.205 (30.61)
1 (25.4)	1⅜ (34.9)	2½ (63.5)	2.07 (52.6)	1.3754 (34.935)	1.3190 (33.503)	1.3105 (33.287)	1.288 (32.72)	1.267 (32.18)	1.393 (35.38)
1⅛ (28.6)	1 9/16 (59.7)	2¾ (69.8)	2.31 (58.7)	1.5630 (39.700)	1.5068 (38.273)	1.4980 (38.049)	1.476 (37.49)	1.455 (36.96)	1.580 (40.13)

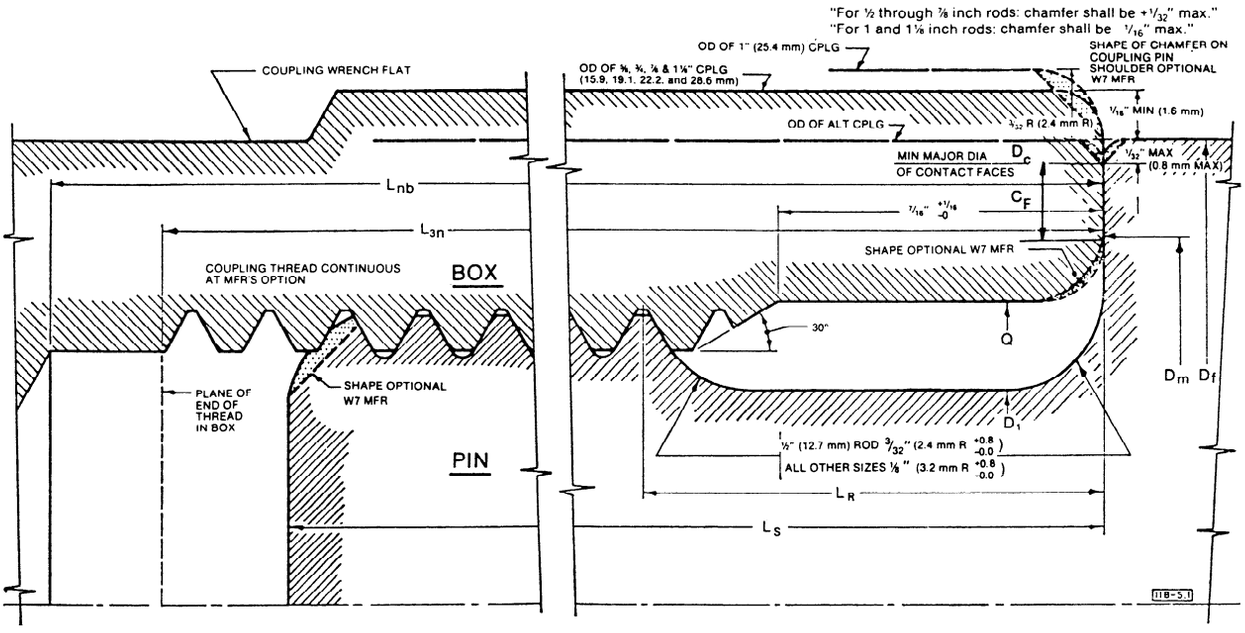
*These dimensions for thread elements are given for information in connection with the gaging practice and gage requirements. It is not intended that these dimensions be subject to verification by direct measurement of the product thread.

NOTE: *The hollow crest of cold-formed threads should not be considered detrimental.*

TABLE 5.3
PIN-AND-BOX CONTACTS
All dimensions in inches followed by equivalent in mm. See Fig. 5.1 and 5.2.

1	2	3	4
Size of Rod	Min. Major Diameter of Contact Faces, D_c (D_f - 1/16" -.010)	Minor Diameter of Contact Faces, D_m +0.015 (0.380) -0.000 (0.000)	Minimum Face Width C_f $\left(\frac{D_c-D_m}{2}\right)$
½ (12.7)	.927 (23.55)	.861 (21.87)	.025 (.635)
⅝ (15.9)	1.177 (29.90)	1.110 (28.65)	.026 (.66)
¾ (19.1)	1.427 (36.25)	1.253 (31.83)	.079 (2.007)
⅞ (22.2)	1.552 (39.42)	1.378 (35.00)	.079 (2.007)
1 (25.4)	1.927 (48.94)	1.566 (39.78)	.149 (3.785)
1⅛ (28.6)	2.172 (55.16)	1.753 (44.53)	.178 (4.521)

Limits for pin shank diameter are the same as those for the major pin diameter; see Table 5.1.



NOTE: *Undercut area with dimension L_R shall be free from surface imperfections which would impair successful rod operation.*

FIG. 5.1
SUCKER ROD CONNECTION
See Table 3.1, 5.1, 5.2, and 5.3.

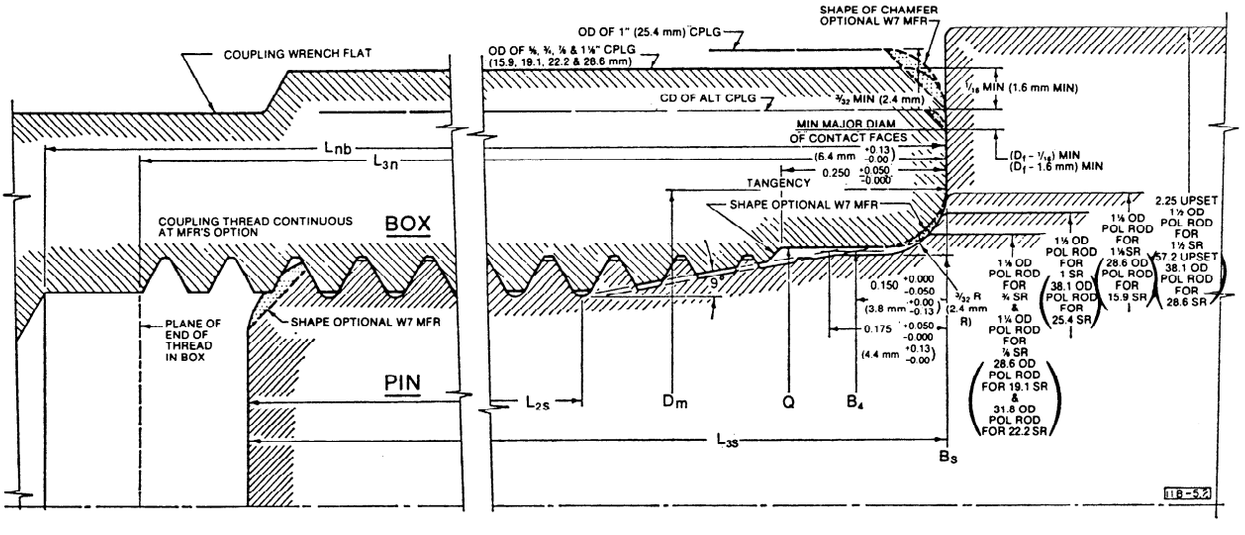
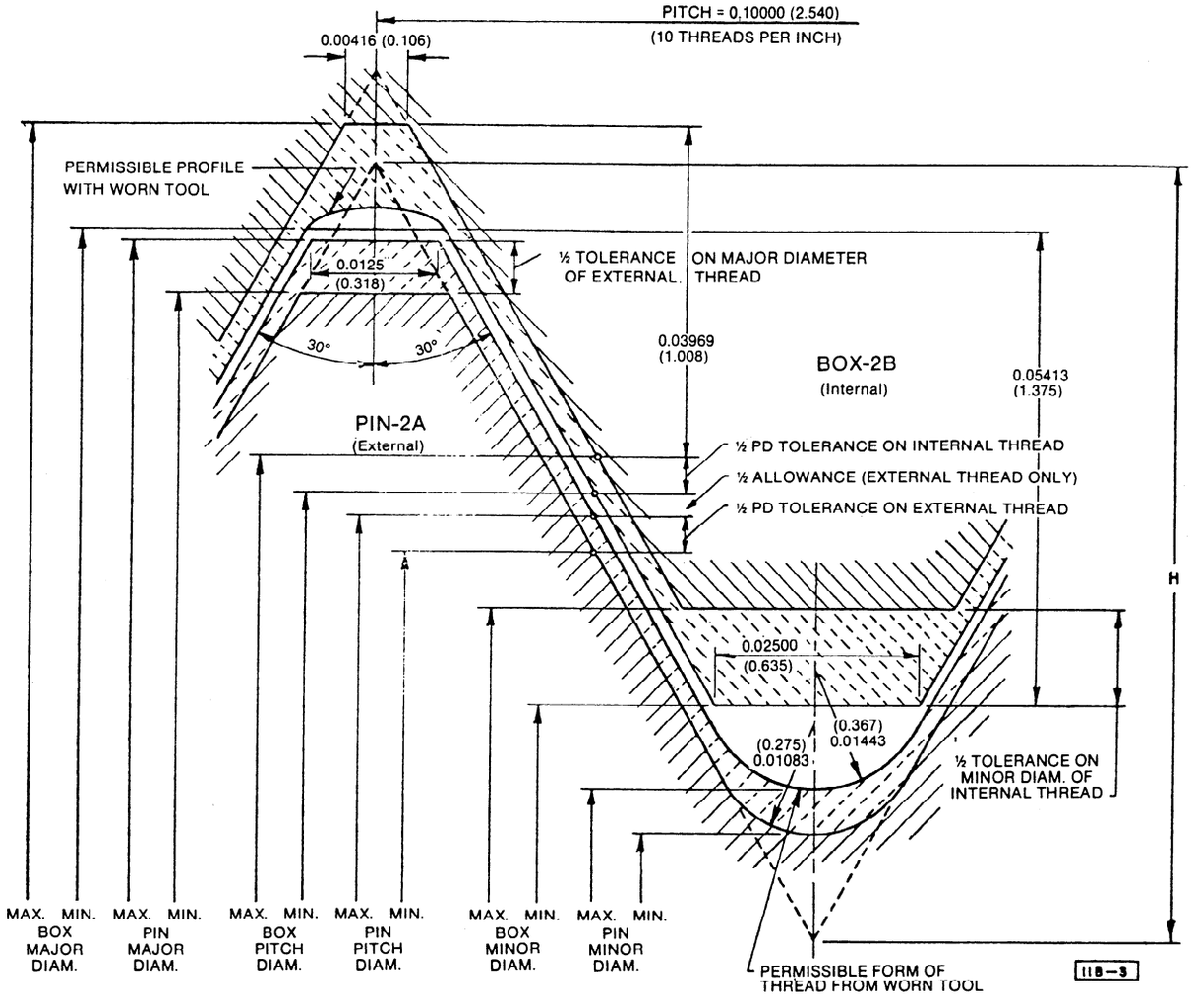


FIG. 5.2
POLISHED ROD CONNECTION
See Table 5.1 and 5.3.

NOTE: *1 in. OD polished rods are furnished with the undercut ½ in. sucker rod pin as shown in Fig. 5.1.*



Major Diam. Tol. = 0.06 $\sqrt[3]{0.1^2}$ = 0.012927 (0.3283)

Pin Pitch Diam. Tol. = 0.0015 $\sqrt[3]{D}$ + 0.0015 $\sqrt{L_e}$ + 0.015 $\sqrt[3]{p^2}$

Box Pitch Diam. Tol. = 1.300 Pin Pitch Diam. Tol.

Box Minor Diam. Tol. = $0.25p - 0.4p^2$ = 0.02100 (0.533)

Allowance = 0.300 Pin Pitch Diam. Tol.

2 × Box Thread Height = 1¼ H = 0.10825 (2.750)

2 × Pin Thread Addendum = ¾ H = 0.06495 (1.650)

Refer to pages 20, 21, and 22 *Screw-Thread Standards for Federal Services*, 1957, Handbook H28 Part 1 for balance of formulae.

FIG. 5.3
THREAD FORM
See Par. 5.5 and Table 5.1 and 5.2.
All dimensions in inches (followed by equivalent in mm)

SECTION 6
GAGING PRACTICE

6.1 Thread Gages

6.1.1 Reference Master Gages. All sucker-rod connections shall comply with the gaging practice requirements specified herein. Accordingly, any manufacturer who desires to produce API sucker rods, couplings, subcouplings, or polished rod threads to this specification shall own or have access to API reference master gages, consisting of reference master plug and mating reference master ring gages, conforming to the requirements of Sect. 7 and certified as required in Sect. 8.

6.1.2 Working Gages. The manufacturer shall own or have access to necessary working thread gages for use in gaging the product, and shall maintain all working gages in such condition as to ensure that product threads gaged as required herein are acceptable under this specification. Working gages in use shall be checked against master reference gages. As an alternate procedure, the working plug gages shall be checked with a supermicrometer — over thread wires. The supermicrometer shall be capable of measuring to within .00001". The ring gages shall be checked with a set plug which has been checked with a supermicrometer over thread wires. Thread wires and gage blocks shall be approved once per year by an agency listed in Section 8 of this specification. A set of working gages for both box and pin elements shall include the following as a minimum.

Pin Connections

1. Go pin-thread ring gages, P-8
   P-8 is used on sucker rods only.

2. Not-go pin-thread ring gage, P-6
   P-6 is used on sucker rods and polished rods.

3. Pin-cone ring gage, P-4
   P-4 is used on polished rods only.

4. Go pin-thread ring gage, P-2
   P-2 is used on polished rods only and does not check 9 deg cone.

Box Connections

1. Go box-thread plug gage, B-2
   B-2 does not check 9 deg cone on polished rod couplings and subcouplings.

2. Box-cone plug gage, B-4
   Box-cone plug gage B-4 is used on polished rod couplings and subcouplings.

   Do not use on sucker rod couplings.

3. Not-go box-thread plug gage, B-6
   Not-go box-thread plug gage B-6 is used on sucker rod couplings, polished rod couplings and subcouplings.

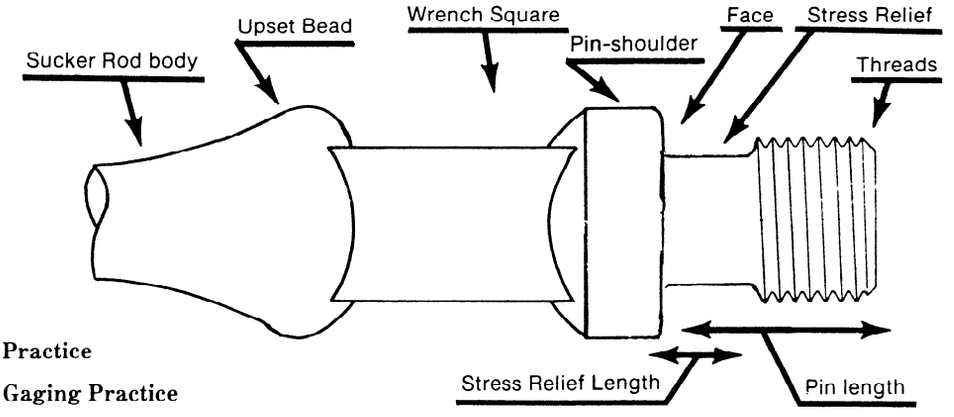
Working thread gages shall conform to stipulation given herein for master gages, except that class X gages may be specified by the purchaser. See National Bureau of Standards Handbook H28 for class X tolerances.

NOTE: *If class X gages are used for working gages, it is possible that such gages will not assemble with the mating reference master gage, particularly if the master gage is at the extreme of the tolerances permitted. In any case, the manufacturer shall take all necessary precautions to ensure that the finished product will pass inspection with reference master gages.*

6.2 Measuring Instruments. The manufacturer shall own or have access to the necessary measuring instruments and maintain those instruments in such condition to ensure the product dimensions measured as required herein are acceptable under this specification. Measuring instruments shall include the following as a minimum.

1. Tape measure — capable of accurately measuring to inches.
2. Micrometer — capable of accurately measuring to within .001".
3. Vernier caliper — capable of accurately measuring to within .001".
4. 6" straight edge
5. 12" straight edge
6. Dial indicator — capable of accurately measuring to within .001".
7. Pit gage — capable of accurately measuring to within .001".
8. Feeler gage

Other measuring instruments such as gap gages are acceptable if capable of accurately measuring to within .001".

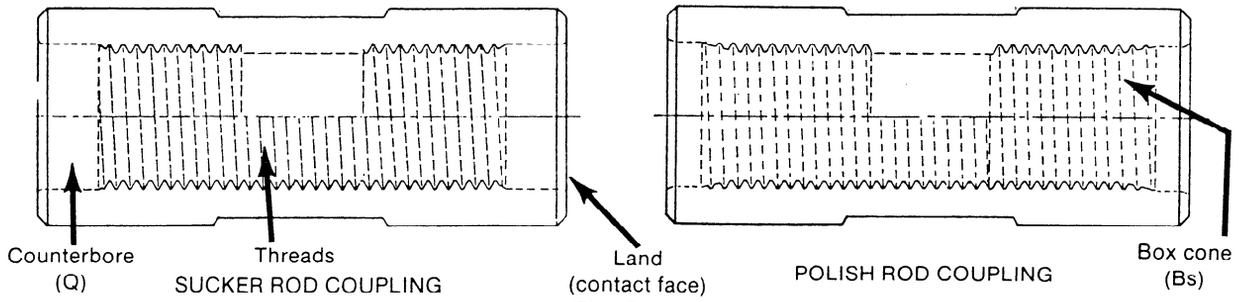


6.3 Product Gaging Practice

6.3.1 Sucker Rod Gaging Practice

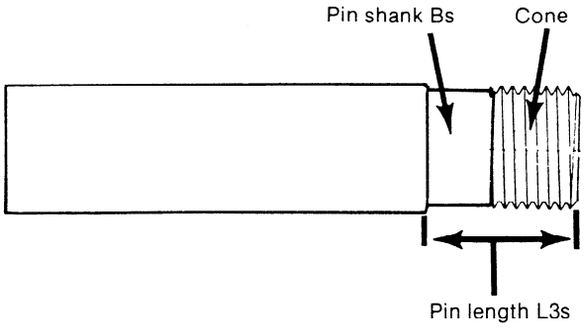
Check for	Gage or measuring instrument	Procedure
Threads minimum (under size)	API P-6 Not-go pin-thread ring gage	The product pin shall not enter the P-6 ring gage more than the third turn of assembly.
Threads maximum (over size)	API P-8 Go pin-thread thread ring gage	The product pin shall enter the P-8 ring gage to pin-shoulder face contact.
Pin-shoulder face parallelism	API P-8 Go pin-thread ring gage & .002″ flat feeler gage	The product pin shall enter the P-8 ring gage to pin-shoulder face contact. The feeler gage shall not enter, at any point, between the face of the gage and the product pin-shoulder face.
Stress relief D_1 maximum and minimum dia.	Micrometer, Vernier caliper, or gap gage	Maximum dia.: Measure to dimension D.1, Table 5.1 plus the allowable (+) tolerance or set gap gage to the same dimension. The gap gage shall pass over the stress relief. Minimum dia.: Measure to dimension D.1, Table 5.1 minus the allowable (-) tolerance or set gap gage to the same dimension. The gap gage shall not pass over the stress relief.
Pin-Shoulder D_f & Upset bead D_u maximum and minimum dia.	Micrometer, Vernier caliper, or gap gage	Maximum dia.: Measure to the dimension listed in Table 3.1 plus the allowable (+) tolerance or set gap gage to the same dimension. The gap gage shall pass over the particular area being gaged. Minimum dia.: Measure to the dimension listed in Table 3.1 minus the allowable (-) tolerance or set gap gage to the same dimension. The gap gage shall not pass over the particular area being gaged.
Stress relief L_r & Pin Length L_s maximum and minimum length	Vernier caliper or gap gages	Maximum length: Measure to dimension length listed in Table 5.1 plus the allowable (+) tolerance or set gap gage to same dimension. The product length shall not be longer. Minimum length: Measure to dimension length listed in Table 5.1 or set gap gage to the same dimension. The product length shall not be shorter.
Sucker rod body maximum and minimum dia.	Micrometer, Vernier caliper, or gap gage *Note. Anvils on measuring instruments shall be ⅛″ wide minimum	Maximum diameter: Measure to dimension listed in Table 3.1 plus the allowable (+) tolerance or set gap gage to the same dimension. The gap gage shall pass over the rod body, the entire length Minimum diameter: Measure to dimension listed in Table 3.1 minus the allowable (-) tolerance or set gap gage to the same dimension. The gap gage shall not pass over the rod body, the entire length.
Sucker Rod Length maximum and minimum length	Tape Measure	Maximum length. Measure to the dimension listed in Table 3.1 plus the allowable (+) tolerance. The product shall not be longer. Minimum length. Measure to the dimension listed in Table 3.1 minus the allowable (-) tolerance. The product shall not be shorter.

Check for	Gage or measuring instrument	Procedure
Wrench square width W_s maximum and minimum width	Vernier caliper or gap gage. *Note: anvils on measuring instruments shall be ⅛" wide minimum and their length must be equal to or exceed the wrench square width	Maximum dim.: Measure to the dimension listed in Table 3.1 plus the allowable (+) tolerance or set gap gage to the same dimension. The gap gage shall pass over the entire width. Minimum dim.: Measure to the dimension listed in Table 3.1 minus the allowable (-) tolerance or set gap gage to the same dimension. The gap gage shall not pass over the entire width.
Wrench square length W_l	Vernier caliper or gap gage	Measure to the dimension listed in Table 3.1 or set gap gage to the same dimension. The product length shall not be shorter.



6.3.2 Sucker Rod Coupling Gaging Practice

Check for	Gage or measuring instrument	Procedure
Threads maximum (over size)	API B-6 Not-go coupling-thread Plug gage	The B-6 plug gage shall not enter the product box threads more than the third turn of assembly.
Threads minimum (under size)	API B-2 Go coupling-thread Plug gage	The B-2 plug gage shall enter the product box threads to the contact face.
Coupling Face parallelism	API B-2 Go coupling-thread Plug gage & a .002" flat feeler gage	The B-2 plug gage shall enter the product box threads to the contact face. The feeler gage shall not enter, at any point, between the face of the gage and the product contact face.
Box Cones (Polish rod couplings and sub couplings only)	API B-4 coupling plug cone gage & a Vernier caliper or gap gages	The B-4 plug cone gage shall enter the product box threads to cone contact. When so engaged, the standoff of the gage from the box face shall be not less than .100" and not more than .150"
Box Counterbore - Q & Minor Dia. contact face - D_m maximum and minimum dia.	Micrometer, Vernier caliper, or gap gages	Maximum dia.: Measure to the applicable dimension Q or D_m. Table 5.3 plus the allowable (+) tolerance or set gap gage to same dimension. The gap gage shall not pass into the counterbore or if measuring the minor dia of the coupling land, it shall not pass inside the coupling face. Minimum dia.: Measure to the applicable dimension Q or D_m, Table 5.3 minus the allowable (-) tolerance or set gap gage to same dimension. The gap gage shall pass into the counterbore or if measuring the minor dia of the coupling land, it shall pass inside the coupling face.
Coupling outside dimension — W maximum and minimum dia.	Micrometer, Vernier caliper, or gap gages	Maximum diameter (coupling O.D.): Measure to dimension as listed in Tables 4.1 & 4.2, plus the allowable (+) tolerance or set gap gage to same dimension. The gap gage shall pass over the coupling diameter. Minimum diameter (coupling O.D.): Measure to dimension as listed in Tables 4.1 & 4.2, minus the allowable (-) tolerance or set gap gage to same dimension. The gap gage shall not pass over the coupling diameter.
Coupling land width (contact face) — C_f	Vernier caliper or gap gage	Minimum width (coupling land): Measure to dimension as listed in Table 5.3. The contact face shall be wider.
Coupling Length N_L	Micrometer, Vernier caliper, or gap gage	Minimum length: Measure to dimension listed in Tables 4.1 or 4.2 or set gap gage to same dimension. The product length shall not be shorter.
Distance between Wrench flats W_f maximum and minimum distance.	Micrometer, Vernier caliper, or gap gage	Maximum distance measure to distance listed in Table 4.1 or set gap gage to same dimension. The gap gage shall not pass over the wrench flat. Minimum distance measure to distance listed in Table 4.1 minus the allowable (-) tolerance or set gap gage to same dimension. The gap gage shall not pass over the wrench flats.
Coupling length of wrench flats. W_L	Vernier caliper or gap gage	Minimum length measure to dimension listed in Table 4.1 or set gap gage to same dimension. The wrench flats length shall not be shorter.



6.3.3 Polish Rod Gaging Practice

Check for	Gage or measuring instrument	Procedure
Threads minimum (under size)	API P-6 Not-go pin-thread ring gage	The product pin shall not enter the P-6 ring gage more than the third turn of assembly.
Threads maximum (over size)	API P-2 Go pin-thread ring gage	The product pin shall enter the P-2 ring gage to pin-shoulder face contact.
Pin-Shoulder Face parallelism	API P-2 Go pin-thread ring gage .002" flat feeler gage	The product pin shall enter the P-2 ring gage to pin-shoulder face contact. The feeler gage shall not enter, at any point, between the face of the gage and the product pin-shoulder face. Note: Parallelism cannot be determined on certain sizes due to insufficient shoulder.
Pin cones	API P-4 Ring cone gage, Vernier caliper or gap gage	The product pin shall enter the P-4 ring cone gage to cone contact. When so engaged, the standoff of the gage from the pin-shoulder face shall be not less than .100" and not more than .150".
Pin Shank Bs maximum and minimum dia.	Micrometer, Vernier caliper, or gap gage	Maximum dia.: Measure to dimension Bs, Table 5.1, or set gap gage to same dimension. The gap gage shall pass over the pin shank. Minimum dia.: Measure to dimension Bs, Table 5.1 minus the allowable (-) tolerance or set gap gage to same dimension. The gap gage shall not pass over the pin shank.
Pin length L3s maximum and minimum length	Vernier caliper or gap gages	Maximum length: Measure to dimension listed in Table 5.1 plus the allowable (+) tolerance or set gap gage to same dimension. The pin length shall not be longer. Minimum length: Measure to dimension listed in Table 5.1 or set gap gage to same dimension. The pin length shall not be shorter.
Outside diameter maximum and minimum	Micrometer, Vernier caliper, or gap gage.	Maximum dia.: Measure to dimension listed in Table 12.1 or set gap gage to same dimension. The gap gage shall pass over the polish rod diameter. Minimum dia.: Measure to dimension listed in Table 12.1 minus the allowable (-) tolerance or set gap gage to same dimension. The gap gage shall not pass over the polish rod diameter.

SECTION 7
GAGE SPECIFICATION

7.1 Reference Master Gages. Each set of reference master gages shall consist of the following component gages for each size of connection:

Sucker Rod Pin Connections

1. Go Pin-Thread Truncated Setting Plug Gage, P7

This gage represents the maximum permissible pitch diameter of the pin thread. It is used (1) in setting the mating ring gage P8 and the corresponding working ring gage, (2) in checking the shoulder squareness of the working gage, and (3) for detecting wear, see Par. 7.6.

2. Go Pin-Thread Ring Gage, P8

This gage mates with the P7 go pin-thread plug gage. In cases of dispute, this gage may be used in gaging the product pin threads, but such use should be held to a minimum.

3. Not-Go Pin-Thread Truncated Setting Plug Gage, P5*

This gage represents the minimum permissible pitch diameter of the pin thread. It is used (1) in setting the mating ring gage P6 and the corresponding working ring gage and (2) for detecting wear, see Par. 7.6.

4. Not-Go Pin-Thread Ring Gage, P6*

This gage mates with the P5 not-go pin-thread plug gage. In cases of dispute, this gage may be used in gaging the product pin threads, but such use should be held to a minimum.

Box Connections

1. Go Box-Thread Ring Gage (Checking Ring), B1

This gage represents the minimum permissible pitch diameter of the box thread. It is used in checking the B2 go box-thread plug gage and the corresponding working gage, also in checking the shoulder squareness of the working gage.

2. Go Box-Thread Plug Gage, B2

Go Box-Thread Plug Gage B2 is used on polished rod couplings and subcouplings but does not check the 9 deg cone.

This gage mates with the B1 go box-thread ring gage. In cases of dispute, this gage may be used in gaging the product box threads, but such use should be held to a minimum.

3. Box-Cone Ring Gage (Fitting Ring), B3

Go Box-Cone Plug and Ring Gage B3 and B4 are used on polished rod couplings and subcouplings. Do not use on sucker rod coupling.

This gage represents the basic box cone. It is used as the master in establishing the standoff of the mating B4 plug gage and the corresponding working plug gage.

4. Box-Cone Plug Gage, B4

Go Box-Cone Plug and Ring Gage B3 and B4 are used on polished rod couplings and subcouplings. Do not use on sucker rod coupling.

This gage mates with the B3 box-cone ring gage. In cases of dispute, it may be used in gaging the product box cone, but such use should be held to a minimum.

5. Not-Go Box-Thread Ring Gage (Checking Ring), B5

Not-Go Box-Thread Ring and Plug Gage B5 and B6 are used on sucker rod coupling, polished rod coupling, and subcoupling.

This gage represents the maximum permissible pitch diameter of the box thread. It is used in checking the mating plug gage B6 and the corresponding working plug gage.

6. Not-Go Box-Thread Plug Gage, B6

Not-Go Box-Thread Ring and Plug Gage B5 and B6 are used on sucker rod coupling, polished rod coupling, and subcoupling.

This gage mates with the B5 not-go box-thread ring gage. In cases of dispute, it may be used in gaging product box threads, but such use should be held to a minimum.

Polished Rod Pin Connections

1. Go Pin-Thread Truncated Setting Plug Gage, P1

This gage represents the maximum permissible pitch diameter of the pin thread. It is used (1) in setting the mating ring gage P2 and the corresponding working ring gage, (2) in checking the shoulder squareness of the working gage, and (3) for detecting wear, see Par. 7.6.

2. Go Pin-Thread Ring Gage, P2

P2 does not check 9 deg cone.

This gage mates with the P1 go pin-thread plug gage. In cases of dispute, this gage may be used in gaging the product pin threads, but such use should be held to a minimum.

3. Pin-Cone Plug Gage (Fitting Plug), P3

This gage represents the basic pin cone. It is used as the master in establishing the standoff of the mating P4

*Not-go pin thread plug and ring gage, P5 and P6 are used on both sucker rods and polished rods.

pin-cone ring gage and the corresponding working ring gage.

4. Pin-Cone Ring Gage, P4

This gage mates with the P3 pin-cone plug gage. In cases of dispute, it may be used in gaging the product pin cone, but such use should be held to a minimum.

5. Not-Go Pin-Thread Truncated Setting Plug Gage, P5*

This gage represents the minimum permissible pitch diameter of the pin thread. It is used in setting the mating ring gage P6 and the corresponding working ring gage.

6. Not-Go Pin-Thread Ring Gage, P6*

This gage mates with the P5 not-go pin-thread plug gage. In cases of dispute, this gage may be used in gaging the product pin threads, but such use should be held to a minimum.

NOTE: *The basic sizes of thread elements of reference master gages are identical with those of the product. Gage tolerances encroach on the product tolerance; therefore, it is theoretically possible for one gage to accept and another to reject a given product thread. For this reason, a product thread passing any certified reference master gage shall be considered as within the product dimensions, provided such gage is within the limits specified for used gages. In case of dispute the owner of gages in question shall furnish proof regarding compliance.*

7.2 Hardening. Reference master gages shall be hardened within the limits of Rockwell C 60-C 63 or equivalent hardness on a superficial scale. They shall be ground and lapped gages, and shall conform to the dimensions and tolerances given in Table 7.1 through 7.8 and shall have been certified as required in Sect. 8.

7.3 Taper. Pitch diameter taper of setting plug gages (P1, P5, and P7) and thread plug gages (B2 and B6) shall not exceed 0.00015 in. (0.0038 mm) over the length L_{ts}. The permissible taper shall be back taper (largest diameter at entering end) and shall be confined within the pitch diameter limits.

7.4 Precision Centers. Go plug gages (P1, P7 and B2) and cone plug gages (P3 and B4) shall have precision centers to permit measurement of runout of shoulder face and eccentricity of cone.

7.5 Construction. Cone ring gages used on polished rods only shall be of the solid type (non-adjustable). Go and not-go ring gages may be either solid or adjustable.

7.6 Shake Test. Go and not-go ring gages shall be set to a snug fit at full engagement with their mating plugs. When backed off to 2 turns engagement there shall be no perceptible shake. This test for shake shall be made on the truncated portion of full and truncated setting plugs. An adjustable ring gage may be set initially on either the full form or the truncated portion of the setting plug. When screwed onto the other portion of the setting plug there shall be only a slight change in fit if any. If there is perceptible shake or play in the looser fit, the ring gage should be reconditioned.

7.7 Root Form. The minor diameter of thread plug gages and setting plug gages shall be cleared beyond a P/8 width of flat, either by an extension of the sides of the thread toward a sharp V or by an undercut to any dimension no wider than the width resulting from P/8 maximum width either side of centerline of the thread space.

The major diameter of go thread ring gages shall be cleared by a clearance cut of substantially P/8 width and approximately central.

The root form of the go and not-go thread ring gages shall be of sufficient depth to clear the maximum major diameter of the full form setting plug after the gage has been properly set.

The major diameter of not-go thread ring gages shall be cleared by a clearance cut of substantially P/4 width and approximately central.

7.8 Blunt Start. The partial threads at both ends of all gages and the junction of the full and truncated portions of setting plugs shall be removed to a blunt start except at the entering end of P4 and B3 ring gages and the counterbored end of P2, P8, and B1 ring gages where a blunt start would be undesirable or impractical. Fig. 7.3, 7.4, 7.6, and 7.7 illustrate deviations from the blunt start.

7.9 Helix Angle. The helix angle correction shall be disregarded in all pitch diameter determinations.

7.10 Gage Marking (by Manufacturer). Certified reference master gages shall be permanently marked by the gage manufacturer with the markings given below. Plug gages should preferably be marked on the body, although marking on the handle is acceptable on gages in small sizes or when the handle is integral with the body. Any markings which are considered necessary by the gage maker may be added. Unless otherwise stated, both plug and ring shall be marked as follows:

1. The gage registration number.
2. The gage symbol as given in Par. 7.1.
3. The nominal size of the rod.
4. The word **2A-PIN** or **2B-BOX**, as applicable.
5. The word **GO** or **NOT-GO** or **CONE** as applicable.
6. The gage manufacturer's name or identifying mark.
7. **API Monogram.** The API monogram may be used only on certified reference master gages and *shall not be used on working gages or gages which do not meet all stipulations given herein.* The API monogram shall be applied only as specified. On

*Not-go pin thread plug and ring gage, P5 and P6 are used on both sucker rods and polished rods.

TABLE 7.2
P5: NOT-GO PIN-THREAD TRUNCATED SETTING PLUG GAGE
P6: NOT-GO PIN-THREAD RING GAGE
(For Gaging Sucker Rod and Polished Rod Pin Connections)
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 9.2.

1	2	3	4	5	6	7
	P5: NOT GO PIN-THREAD TRUNCATED SETTING PLUG GAGE				P6: NOT GO PIN-THREAD RING GAGE	
Rod Size	Truncated Major Diam. +0.0000 (+0.000) -0.0006 (-0.015) B_{st}	Full Form Major Diam. +0.0006 (+0.015) -0.0000 (-0.000) B_s	Pitch Diam. +0.0002 (+0.005) -0.0000 (-0.000) E_s	Length Thd. ±0.015 (±0.38) L_{ts}	Length Ring ±0.015 (±0.38) L_n	Minor Diam. Ring +0.0006 (+0.015) -0.0000 (-0.000) K_n
½ (12.7)	0.7205 (18.303)	0.7482 (19.004)	0.6773 (17.203)	1.250 (31.75)	0.562 (14.27)	0.6557 (16.655)
⅝ (15.9)	0.9087 (23.081)	0.9362 (23.779)	0.8654 (21.981)	1.500 (38.10)	0.688 (17.48)	0.8437 (21.430)
¾ (19.1)	1.0333 (26.246)	1.0611 (26.952)	0.9900 (25.146)	1.500 (38.10)	0.688 (17.48)	0.9683 (24.595)
⅞ (22.2)	1.1583 (29.421)	1.1861 (30.127)	1.1150 (28.321)	1.625 (41.28)	0.750 (19.05)	1.0933 (27.770)
1 (25.4)	1.3453 (34.171)	1.3735 (34.889)	1.3020 (33.071)	1.625 (41.28)	0.750 (19.05)	1.2803 (32.520)
1⅛ (28.6)	1.5325 (38.926)	1.5609 (39.647)	1.4892*(37.826)	1.875 (47.63)	0.812 (20.62)	1.4675 (37.275)

All sizes, 10 threads per inch. Class 2A-2B

*Tolerance on E_s for 1⅛ in. (28.6 mm) plug gage is $^{+0.00025\ (+0.0064)}_{-0.00000\ (-0.0000)}$

NOTE: *P5 and P6 gages made to 2A-2B tolerances under Std 11B, 13th Edition may be used. P5 and P6 gages made under the 12th and prior editions of Std 11B (not conforming to 2A-2B tolerances) may not be used.*

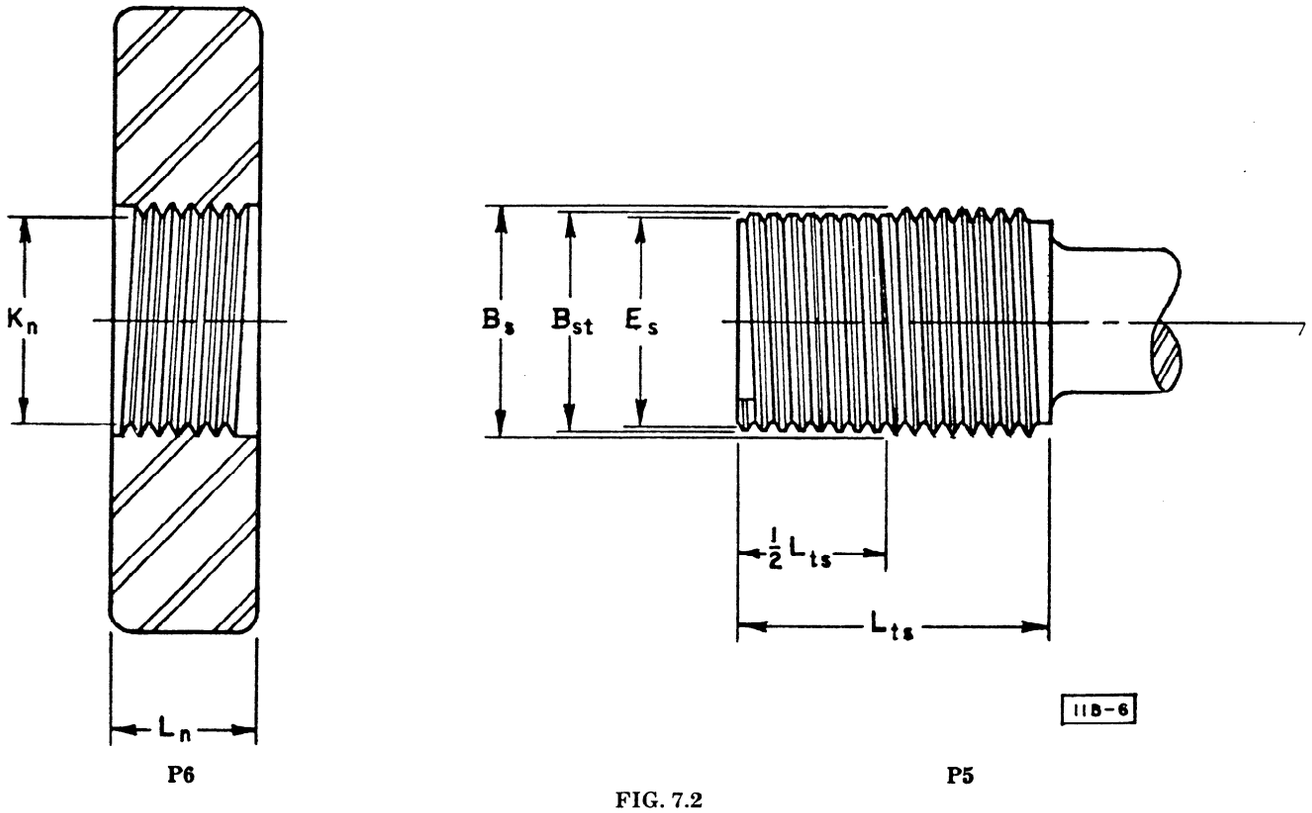


FIG. 7.2
NOT-GO PIN-THREAD GAGES
(For Gaging Sucker Rod and Polished Rod Pin Connections)
See Table 7.2

TABLE 7.3
B1: GO BOX-THREAD RING GAGE (Checking Ring)
B2: GO BOX-THREAD PLUG GAGE
(For Gaging Sucker Rod, Polished Rod, and Subcoupling Box Connections)
NOTE: B2 does not check 9 deg cone
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 7.3.

1	2	3	4	5	6	7	8
	B2: GO BOX-THREAD PLUG GAGE					B1: GO BOX-THREAD RING GAGE	
Rod Size	Major Diam. +0.0006 (+0.015) -0.0000 (-0.000) B_s	Pitch Diam. +0.0002 (+0.005) -0.0000 (-0.000) E_s	Length Thd. ±0.015 (±0.38) L_{ts}	Diam. of Plug or Ring Collar +0.000 (+0.000) -0.010 (-0.025) D_f	Length of Plug or Ring ±0.015 (±0.38) L	Minor Diam. +0.001 (+0.03) -0.000 (-0.00) K_n	Diam. C'bore +0.005 (+0.13) -0.000 (-0.00) D_m
½ (12.7)	0.7500 (19.050)	0.6850 (17.399)	0.888 (22.56)	1.005 (25.53)	1.188 (30.18)	0.652 (16.56)	0.861 (21.87)
⅝ (15.9)	0.9380 (23.825)	0.8730 (22.174)	1.011 (25.68)	1.255 (31.86)	1.311 (33.30)	0.840 (21.34)	1.128 (28.65)
¾ (19.1)	1.0630 (27.000)	0.9980 (25.349)	1.200 (30.48)	1.505 (38.23)	1.500 (38.10)	0.965 (24.51)	1.253 (31.83)
⅞ (22.2)	1.1880 (30.175)	1.1230 (28.524)	1.386 (35.20)	1.630 (41.40)	1.686 (42.82)	1.090 (27.69)	1.378 (35.00)
1 (25.4)	1.3754 (34.935)	1.3105 (33.287)	1.636 (41.55)	2.005 (50.93)	1.936 (49.17)	1.278 (32.46)	1.566 (39.78)
1⅛ (28.6)	1.5630 (39.700)	1.4980*(38.049)	1.886 (47.90)	2.265 (57.53)	2.186 (55.52)	1.465 (37.21)	1.753 (44.53)

All sizes, 10 threads per inch. Class 2A-2B

*Tolerance on E_s for 1⅛ in. (28.6 mm) plug gage is $^{+0.00025\ (+0.0064)}_{-0.00000\ (-0.0000)}$

NOTE: *B1 and B2 gages are for box connections used with undercut pins. B1 and B2 gages made under the 13th and prior editions of Std 11B may not be used, except on polished rod connections.*

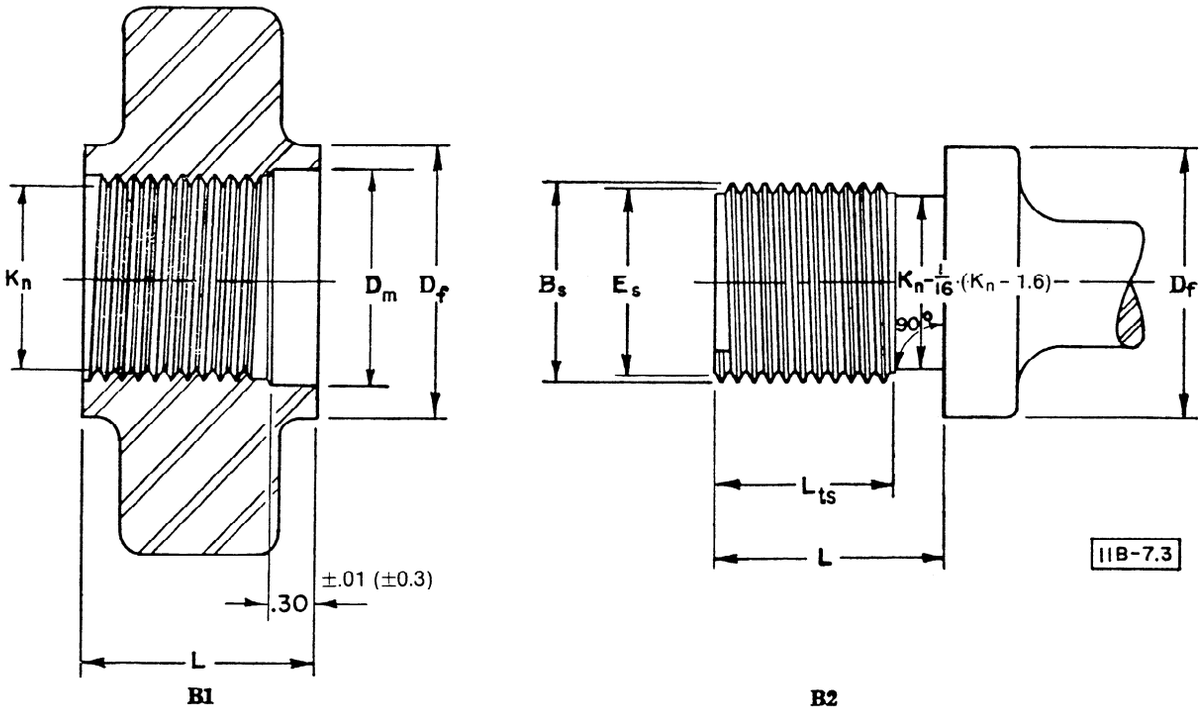


FIG. 7.3
GO BOX-THREAD GAGES
(For Gaging Box Connections)
See Table 7.3.
All dimensions in inches (followed by equivalent in mm)

TABLE 7.4
B3: BOX-CONE RING GAGE (Fitting Ring)
B4: BOX-CONE PLUG GAGE
(For Gaging Polished Rod and Subcoupling Box Connections)
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 7.4.

1	2	3	4	5	6	7	8
	B4: BOX CONE PLUG GAGE						
Rod Size	Major Diam. +0.0006 (+0.015) -0.0000 (-0.000) B_s	Pitch Diam. +0.0005 (+0.013) -0.0000 (-0.000) E_s	Length Thd. ±0.015 (±0.32) L_{ts}	Diam. Plug Cone +0.0000 (+0.000) -0.0002 (-0.005) B_4	Length of Plug or Ring ±0.015 (±0.38) L	Diam. of Plug or Ring Collar +0.000 (+0.00) -0.010 (-0.25) D_f	Minor Diam. Ring +0.000 (+0.00) -0.001 (-0.03) K_n
5/8 (15.9)	0.9233 (23.452)	0.8654 (21.981)	0.63 (16.00)	0.9430 (23.952)	1.03 (26.2)	1.255 (31.88)	0.822 (20.88)
3/4 (19.1)	1.0482 (26.624)	0.9900 (25.146)	0.88 (22.35)	1.0680 (27.127)	1.28 (32.5)	1.505 (38.23)	0.947 (24.05)
7/8 (22.2)	1.1732 (29.799)	1.1150 (28.321)	0.88 (22.35)	1.1930 (30.302)	1.28 (32.5)	1.630 (41.40)	1.072 (27.23)
1 (25.4)	1.3606 (34.559)	1.3020 (33.071)	1.26 (32.00)	1.3805 (35.065)	1.66 (42.2)	2.005 (50.93)	1.259 (31.98)
1 1/8 (28.6)	1.5480 (39.319)	1.4892 (37.826)	1.51 (38.35)	1.5680 (39.827)	1.91 (48.5)	2.265 (57.53)	1.446 (36.73)

All sizes, 10 threads per inch. Class 2A-2B.

Diam. of ring cone (B_5) must be such as to provide a standoff of 0.325 ±0.0015 in. (8.26 ±0.038 mm).

NOTE: *B3 and B4 gages made under any edition of Std 11B may be used.*

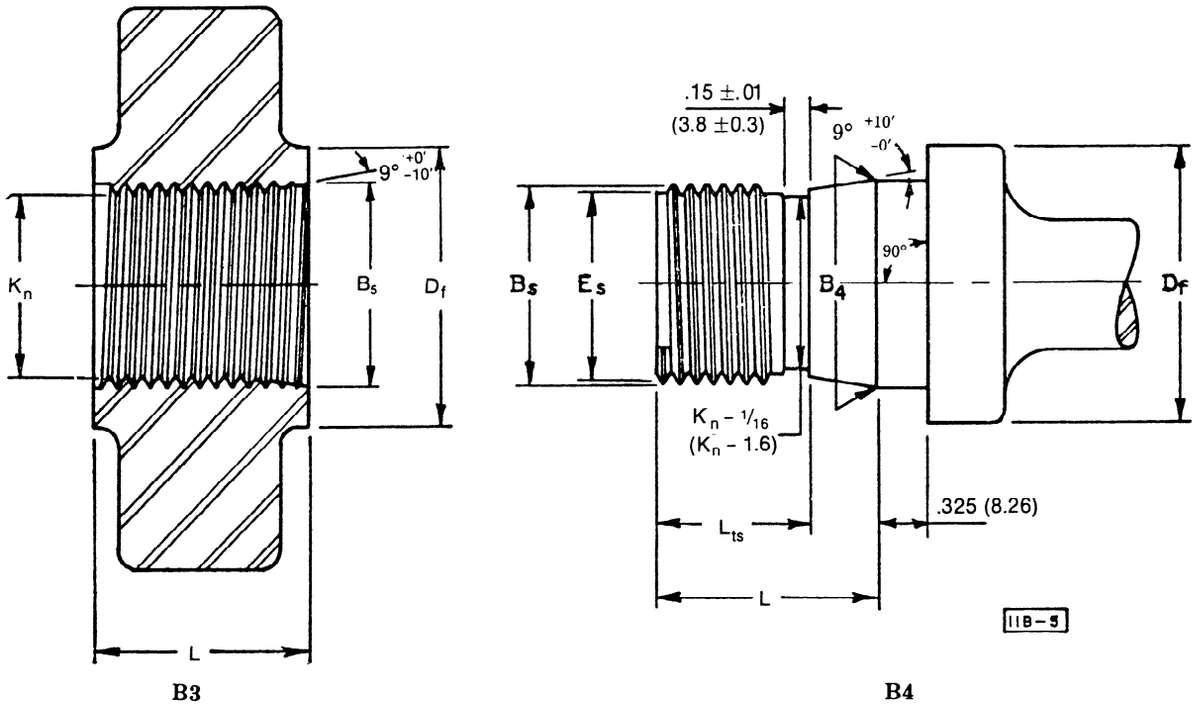


FIG. 7.4
BOX-CONE GAGES
(For Gaging Box Connections)
See Table 7.4.
All dimensions in inches (followed by equivalent in mm)

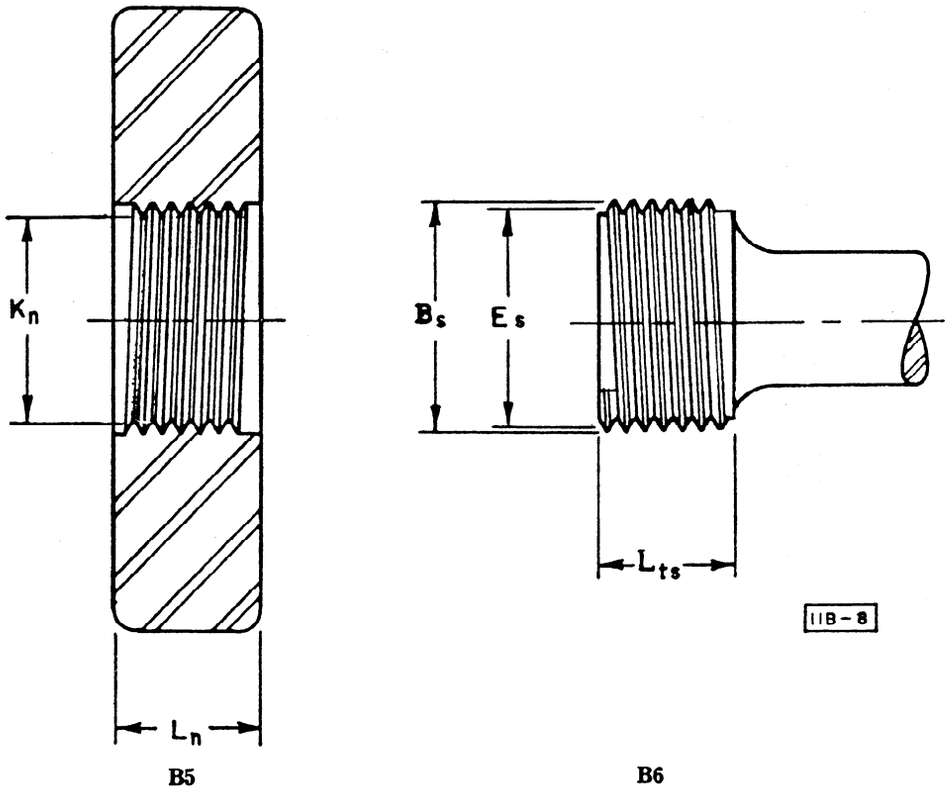
TABLE 7.5
B5: NOT-GO BOX-THREAD RING GAGE (Checking Ring)
B6: NOT-GO BOX-THREAD PLUG GAGE
(For Gaging Sucker Rod, Polished Rod and Subcoupling Box Connections)
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 7.5.

1	2	3	4	5	6
	B6: NOT-GO BOX-THREAD PLUG GAGE			B5: NOT-GO BOX-THREAD RING GAGE	
Rod Size	Major Diam. +0.0000 (+0.000) -0.0006 (-0.015) B_s	Pitch Diam. +0.0000 (+0.000) -0.0002 (-0.005) E_s	Length Thread ±0.015 (±0.38) L_{ts}	Length Ring ±0.015 (±0.38) L_n	Minor Diam. +0.001 (+0.03) -0.000 (-0.00) K_n
½ (12.7)	0.7360 (18.694)	0.6927 (17.595)	0.500 (12.70)	0.562 (14.27)	0.652 (16.56)
⅝ (15.9)	0.9239 (23.467)	0.8806 (22.367)	0.625 (15.88)	0.688 (17.48)	0.840 (21.34)
¾ (19.1)	1.0493 (26.652)	1.0060 (25.552)	0.625 (15.88)	0.688 (17.48)	0.965 (24.51)
⅞ (22.2)	1.1743 (29.827)	1.1310 (28.727)	0.750 (19.05)	0.750 (19.05)	1.090 (27.69)
1 (25.4)	1.3623 (34.602)	1.3190 (33.503)	0.750 (19.05)	0.750 (19.05)	1.278 (32.46)
1⅛ (28.6)	1.5501 (39.373)	1.5068*(38.272)	0.875 (22.23)	0.812 (20.62)	1.465 (37.21)

All sizes, 10 threads per inch. Class 2A-2B.

*Tolerance on E_s for 1⅛ in. (28.6 mm) plug gage is $^{+0.00000\ (+0.0000)}_{-0.00025\ (-0.0064)}$

NOTE: *B5 and B6 gages made to 2A-2B tolerances under Std 11B, 13th Edition may be used. B5 and B6 gages made under the 12th and prior editions of Std 11B (not conforming to 2A-2B tolerances) may not be used.*



B5 B6

FIG. 7.5
NOT-GO BOX-THREAD GAGES
(For Gaging Box Connections)
See Table 7.5.

TABLE 7.6
P1: GO PIN-THREAD TRUNCATED SETTING PLUG GAGE
P2: GO PIN-THREAD RING GAGE
(For Gaging Polished Rod Pin Connections)
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 7.6.

1	2	3	4	5	6	7	8	9	10
	P1: GO PIN-THREAD TRUNCATED SETTING PLUG GAGE						P2: GO PIN-THREAD RING GAGE		
Rod Size	Truncated Major Diam. +0.0000 (+0.000) -0.0006 (-0.015) B_t	Full Form Major Diam. +0.0006 (+0.015) -0.0000 (-0.000) B_s	Pitch Diam. +0.0000 (+0.000) -0.0002 (-0.005) E_s	Length Thd. ±0.015 (±0.38) L_{ts}	Length of Plug ±0.015 (±0.38) L_p	Diam. of Plug or Ring Collar +0.000 (+0.00) -0.010 (-0.25) D_f	Minor Diam. +0.0000 (+0.000) -0.0006 (-0.015) K_n	Diam. of C'bore +0.005 (+0.13) -0.000 (-0.00) Q	Length Ring +0.000 (+0.00) -0.020 (-0.51) L_R
⅝ (15.9)	0.9216 (23.409)	0.9362 (23.779)	0.8712 (22.128)	1.25 (31.8)	1.80 (45.7)	1.255 (31.88)	0.8279 (21.029)	0.955 (24.26)	1.125 (28.58)
¾ (19.1)	1.0465 (26.581)	1.0611 (26.952)	0.9962 (25.303)	1.75 (44.5)	2.30 (58.4)	1.505 (38.23)	0.9529 (24.204)	1.080 (27.43)	1.375 (34.93)
⅞ (22.2)	1.1715 (29.756)	1.1861 (30.127)	1.1211 (28.476)	1.75 (44.5)	2.30 (58.4)	1.630 (41.40)	1.0778 (27.376)	1.205 (30.61)	1.375 (34.93)
1 (25.4)	1.3589 (34.516)	1.3735 (34.887)	1.3085 (33.236)	2.50 (63.5)	3.05 (77.5)	2.005 (50.93)	1.2652 (32.136)	1.393 (35.38)	1.750 (44.45)
1⅛ (28.6)	1.5463 (39.276)	1.5609 (39.647)	1.4960 (37.998)*	3.00 (76.2)	3.55 (90.2)	2.265 (57.53)	1.4527 (36.899)	1.580 (40.13)	2.000 (50.80)

All sizes, 10 threads per inch. Class 2A-2B

*Tolerance on E_s for 1⅛ in. (28.6 mm) plug gage is $^{+0.00000\ (+0.0000)}_{-0.00025\ (-0.0064)}$

NOTE: *P1 and P2 gages made to 2A-2B tolerances under Std 11B, 13th Edition may be used. P1 and P2 gages made under the 12th and prior editions of Std 11B (not conforming to 2A-2B tolerances) may not be used.*

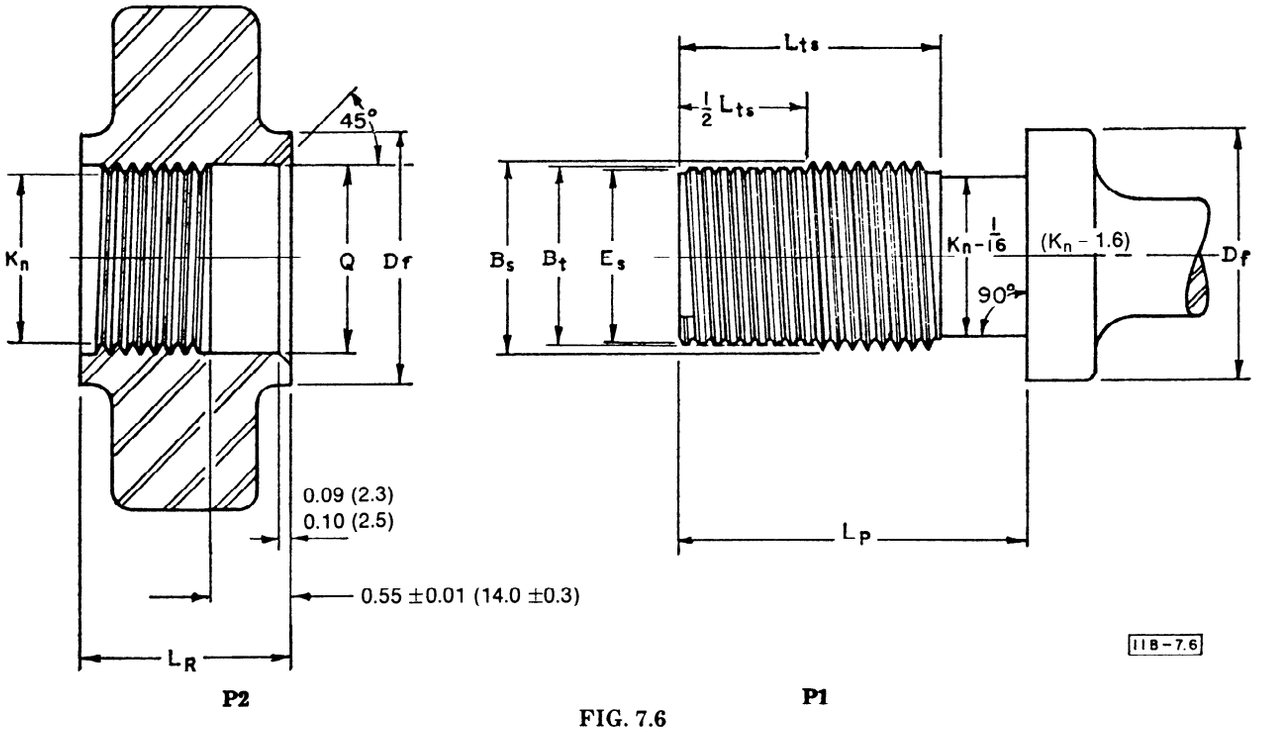


FIG. 7.6
GO PIN-THREAD GAGES
(For Gaging Polished Rod Pin Connections)
See Table 7.6.
All dimensions in inches (followed by equivalent in mm)

TABLE 7.7
P3: PIN-CONE PLUG GAGE (Fitting Plug)
P4: PIN-CONE RING GAGE
(For Gaging Polished Rod Pin Connections)
All dimensions in inches (followed by equivalent in mm) at 68 F (20 C). See Fig. 7.7.

1	2	3	4	5	6	7	8
	P3: PIN-CONE PLUG GAGE					P4: PIN-CONE RING GAGE	
Rod Size	Major Diam. +0.0006 (+0.015) -0.0000 (-0.000) B_s	Pitch Diam. +0.0000 (+0.000) -0.0005 (-0.013) E_s	Length Thd. ±0.015 (±0.38) L_{ts}	Diam. Plug Cone +0.0000 (+0.000) -0.0002 (-0.005) $B4$	Length Plug and Ring ±0.015 (±0.38) L	Diam. of Plug or Ring Collar +0.000 (+0.00) -0.010 (-0.25) Df	Minor Diam. Ring +0.000 (+0.00) -0.001 (-0.03) K_n
⅝ (15.9)	0.9456 (24.018)	0.8806 (22.367)	0.63 (16.0)	0.9430 (23.952)	1.03 (26.2)	1.255 (31.88)	0.851 (21.62)
¾ (19.1)	1.0710 (27.203)	1.0060 (25.552)	0.88 (22.4)	1.0680 (27.127)	1.28 (32.5)	1.505 (38.23)	0.976 (24.79)
⅞ (22.2)	1.1960 (30.378)	1.1310 (28.727)	0.88 (22.4)	1.1930 (30.302)	1.28 (32.5)	1.630 (41.40)	1.101 (27.97)
1 (25.4)	1.3840 (35.154)	1.3190 (33.503)	1.26 (32.0)	1.3805 (35.065)	1.66 (42.2)	2.005 (50.93)	1.288 (32.72)
1⅛ (28.6)	1.5718 (39.924)	1.5068 (38.273)	1.51 (38.4)	1.5680 (39.827)	1.91 (48.5)	2.265 (57.53)	1.476 (37.49)

All sizes, 10 threads per inch. Class 2A-2B.

Diam. of ring cone B_5 must be such as to provide a standoff of 0.325 ±0.0015 in. (8.26 ±0.038 mm).

NOTE: *P3 and P4 gages made under any edition of Std 11B may be used.*

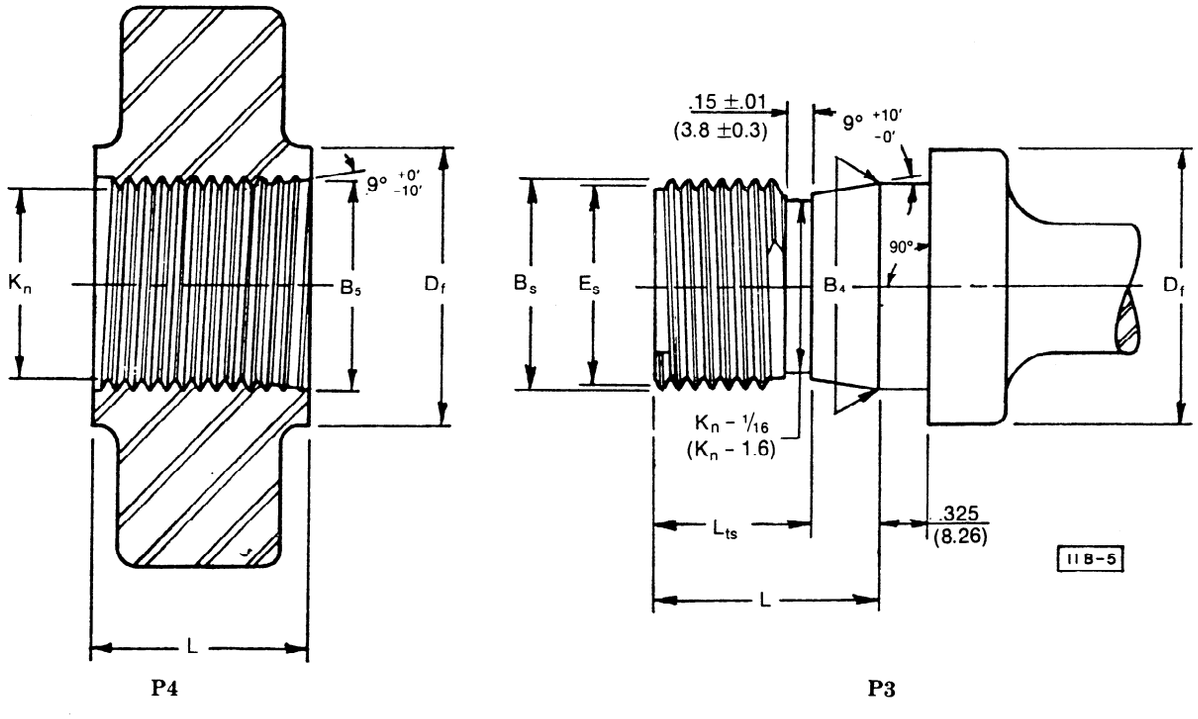


FIG. 7.7
PIN-CONE GAGES
(For Gaging Polished Rod Pin Connections)
See Table 7.7.
All dimensions in inches (followed by equivalent in mm)

gages submitted to the National Bureau of Standards for certification, the monogram shall be applied by the manufacturer. On all other gages the monogram shall be applied by the certifying agency.

Example:

A master go pin-thread plug gage, for ¾ in. sucker rod should be marked as follows:

Gage registration number	P7—¾ 2A-PIN—GO	Mfrs Name or identifying mark	Ⓐ

7.11 Retest. All reference master gages shall be submitted for retest to one of the certifying agencies listed in Sect. 8, at least once each 2 years subsequent to the initial certification, except that gages shall be tested within a period of one year if the certifying agency indicates on the test certificate that the gages are approaching the specified limits of permissible wear.

7.12 Reinspection Line. Gages submitted to a certifying agency for retest shall be certified as satisfactory for continued use if they conform to the following requirements:

1. The pitch diameter of go and not-go plug gages (P7, P5, B2, B6, and P1) shall be within the tolerance limits as specified in Table 7.1, 7.2, 7.3, 7.5, and 7.6.
2. The minor diameter of go and not-go ring gages (P8, P6, B1, B5, and P2) shall be within the tolerance limits as specified in Table 7.1, 7.2, 7.3, 7.5, and 7.6.
3. The axial variation of shoulder face of go thread plug and ring gages (P1, P2, P7, P8, B1, and B2) shall be within the limits shown in Table 7.9.
4. Cone plug and ring gages (P3, P4, B3, and B4) shall be checked for mating step value, which shall not vary by more than 0.0015 in. (0.038 mm) from the original value.

   NOTE: *This is equivalent to a decrease in cone base diameter of 0.00047 in. (0.0119 mm) on plug, or to an increase of 0.00047 in. (0.0119 mm) on ring, or to a combined change of 0.00047 in. (0.0119 mm).*
5. The fit of go and not-go thread gages on their mating gages shall conform to the requirements specified in Par. 7.6.

7.13 Maintenance. Maintenance of gages is the responsibility of the gage owner, and gages reported by the certifying agency as in non-conformance with requirements should be promptly reconditioned or replaced, and resubmitted for test.

TABLE 7.8
TOLERANCES FOR REFERENCE MASTER GAGES
All dimensions in inches at 68 F (followed by mm at 20 C), except otherwise indicated

1 Element	2 Tolerance
Plug gages	
Half angle of thread	±6 min
Lead[1]	±0.00025 (±0.0064)
Runout of shoulder face[2] (P1, P7, and B2)	0.0002 (0.005)
Eccentricity of cone with respect to thread (P3 and B4)	0.0002 (0.0004 total indicator reading)
Ring gages	
Half angle of thread	±6 min
Lead[1]	±0.00025 (±0.0064)
Runout of face[2] (P2, P8, and B1)	0.0002 (0.005)
Eccentricity of cone with respect to thread	0.0003 (0.0006 total indicator reading)
Standoff from plug[3] (P4 and B3)	0.325 ±0.0015 (8.26 ±0.038)

[1]The tolerance shown is the maximum deviation in lead between any two threads, whether adjacent or separated by any amount not exceeding the full length less one full turn at each end. In the case of setting plugs, the tolerance applies to a length of thread equal that of the thread in the mating ring gage. On truncated setting plugs, the sign of any lead deviation present shall be the same on the full-form portion and the truncated portion and such deviation shall be uniform within 0.0001 in. (0.003 mm) over any portion equivalent to the length of the ring gage.

[2]Runout shall be measured at distance $D_f/2$ minus ⅛ in. (3.2 mm) from the axis of the gage.

[3]Ring shall be assembled with mating plug to cone contact by hand without spinning.

TABLE 7.9
AXIAL VARIATION OF SHOULDER FACE
All dimensions in inches at 68 F (followed by mm at 20 C)

1 Gage	2 Axial Variation of Shoulder Face[1]
P1	0.0003 (0.008)
P2	0.0004 (0.010)
P7	0.0003 (0.008)
P8	0.0004 (0.010)
B1	0.0004 (0.010)
B2	0.0003 (0.008)

[1]If the axial centers of plug gage P7, B2, and P1 have been damaged so that a reliable determination of the variation in shoulder faces cannot be obtained, the combined variation of mating gages shall be determined by the use of a gage block, or a combination of gage blocks, as feeler gages. The combined variation shall not exceed 0.0007 in. (0.018 mm).

SECTION 8
GAGE CERTIFICATION

8.1 Certification Agencies. All new and reconditioned reference master plug and mating ring gages, prior to use, shall have been certified to be in conformance with the stipulations given in Sect. 7, by one of the following agencies:[1]

Instituto Nacional De Technologia Industrial,
Buenos Aires, Argentina

National Institute of Metrology,
Beijing, People's Republic of China

National Institute of Standards and Technology,
Gaithersburg, Maryland

National Physical Laboratory,
Teddington, Middlesex, England

Oil Country Tubular Goods Inspection Laboratory
China National Oil & Gas
Exploration and Development Corporation
BAOJI, SHAANXI
People's Republic of China

Physikalisch-Technische Bundesanstalt,
Braunschweig, Germany

8.2 Certification. The gage certifying agency shall inspect new and reconditioned reference master gages for conformance to the requirements of Sect. 7. For each gage which complies with all requirements, the certifying agency shall issue a certificate to the gage owner, with copy to the API Dallas office, stating that the gage complies with API Spec 11B. For each gage which does not comply with all requirements, the certifying agency shall issue a report to the gage manufacturer, with copy to the API Dallas office, stating the reason for rejection and showing the measured value for those dimensions which are outside the permissible limits. Reference master gages must be certified in complete sets, i.e., a reference master plug and a reference master ring gage. A single reference master plug or a single reference master ring gage may not be certified unless accompanied by a previously certified mating reference master gage.

8.3 Marking (by Certifying Agency). The certifying agency shall verify the markings required under Par. 7.10, and shall mark all acceptable reference master gages (both plug and ring unless otherwise stated below) with the following markings.[2] In recertifying reconditioned gages, the markings as applied by the certifying agency making the previous test shall be replaced as necessary, so that only one set of markings appears on the recertified gage.

1. **Date of Certification.** The date of certification shall be marked on all gages. In recertifying reconditioned gages, the previous certification date shall be replaced with the date of recertification. Dates of retest, as required by Par. 7.11, shall not be marked on reference master gages.

2. **Name or Mark of Certifying Agency.** The identification mark of the certifying agency shall be placed on all gages.

3. **Mating Standoff.** The initial mating standoff of cone gages shall be marked on the ring gage only for pin gages, and on the plug gage only for box gages.

4. **API Monogram.** All certified gages shall be marked with the monogram by the certifying agency, if not applied by the gage maker. If any gage marked with the monogram is determined by the certifying agency to be in nonconformance to requirements, that agency shall remove the monogram, unless the gage is to be reconditioned and returned to the agency for rechecking.

8.4 Retest. On gages submitted to the certifying agency for periodic retest (see Par. 7.11 for test period), the agency shall give the owner a report, with copy to the API Dallas office, stating whether or not the gage is suitable for further use, and if not, giving the measurements of the elements which are outside the permissible limits. If the gage is approaching the permissible limit of wear and, in the opinion of the certifying agency, should be retested within a one-year period, the report shall so state, giving the measurement for the element or elements on which the statement is based.

[1] A schedule of fees for tests may be obtained upon application to the testing agency.

[2] The certifying agency may mark the gages with any additional markings considered necessary for proper identification.

SECTION 9
WORKMANSHIP AND FINISH

9.0 Scope. This section specifies the requirements for sucker rod and pony rod straightness, surface finish and discontinuities.

9.1 Straightness Specifications.

a. Cold straightening of kinks is not acceptable.

b. A kink is a short, tight bend measured with a 6 inch (152.4 mm) ruler or straight edge with a gap in the middle greater than ⅛ inch (3.175 mm).

9.1.1 Body Straightness.

a. The body is the rod length between the upset tapers.

b. Bends can be measured by means of a straight edge held on the concave side of the bend. The amount of bend is the gap measured between the straight edge and the rod surface.

c. Bends can be measured by the total indicator runout (TIR) measured at the rod surface a known distance away from a support. TIR values are twice the amount of the bend over the gage length.

d. Because of the various types of bends, the measurement should be made at a distance of one foot from the support.

e. For a gage length of 12 inches (304.8 mm), the maximum allowable bend for all rod sizes ½ to 1⅛ inches (12.7 to 28.6 mm) is .065 (.130 TIR) inches (1.65(3.30TIR)mm).

9.1.2 End Straightness.

a. End straightness will be measured by supporting the rod body at a distance of 1.5 feet (18 inches (457.2 mm)) from the rod pin shoulder. The rest of the rod shall be supported at a maximum of 6 ft. centers (1.83 m) in the same plane. The amount of bend is measured via a dial indicator riding on the machined surface of the pin shoulder O.D. The maximum allowable TIR values for all rod sizes ½ to 1⅛ inch (12.7 to 28.6 mm) is .200 inch (5.08 mm).

b. End straightness for 24 inch (0.61 m) pony rods will be measured by supporting the rod body at a distance of 1.0 feet (12 inches (0.30 m)) from the rod pin shoulder. The amount of bend is measured via a dial indicator riding on the machine surface of the pin shoulder O.D. The maximum allowable TIR values for all rod sizes ½ to 1⅛ inch (12.7 to 28.6 mm) is .130 inch (3.30 mm).

9.2 Surface Discontinuity Definitions.

a. General Terms

Discontinuity — Any interruption in the normal physical structure or configuration of a sucker rod such as cracks, laps, seams, pits and laminations. A discontinuity may or may not affect the usefulness of a sucker rod or exceed critical flaw size. Also called a flaw or imperfection. See Figure 9.1 for examples of discontinuities.

Transverse — Direction in steel bars at a right angle to the working process.

Longitudinal — The principal direction of material flow in a worked metal.

b. Dent — A local change in surface contour caused by mechanical impact, but not accompanied by loss of metal.

c. Nick — A local change in surface contour caused by mechanical impact accompanied by loss of metal.

d. End Shear Crack — A mill shear discontinuity which shows as a crack across the pin end face. (Not shown in Fig. 9.1).

e. Rolling Overfill — Raised ridges formed during bar rolling.

f. Forging Overfill — Excessive metal stocking of the forging die resulting in a forging lap. This shows as a crack on the rod bead (C^R in Fig. 3.1) or transition (A^R in Fig. 3.1).

g. Underfill — A portion of the upset forging that has a depression, typically insufficient metal that was formed during forging.

h. Scab (sliver) — A loose or torn segment of material longitudinally rolled into the surface of the bar.

i. Rolled-in-scale — A surface discontinuity caused by scale (metal oxide) formed during a previous heating which has not been removed prior to bar rolling or upset forging.

j. Rolling lap — A longitudinal surface discontinuity that can have the appearance of a seam, caused during rolling, fins, or sharp corners being folded over and then rolled into the bar surface without metallurgical bonding.

k. Forging lap — A discontinuity produced when two surfaces of metal fold against each other without metallurgical bonding. This can occur when flash produced by one forging operation is pressed into the metal surface during a subsequent operation.

l. Seam — A longitudinal discontinuity which may be closed or open, but without metallur-

gical bonding. It can have the appearance of a straight line, scratch, or small longitudinal separation on the bar.

9.2.1 Surface Finish.

a. When the depth of a discontinuity can not be measured, it shall be removed with a smooth transition.

9.2.2 Surface Finish, Rod Body.

a. Discontinuities such as rolled-in-scale, slivers, mechanical damage, etc., when removed must be removed with a smooth transition. The rod is unacceptable if the removal of the discontinuity results in a rod tolerance below the minimum specified in Par. 9.1.

b. Longitudinal discontinuities are zero stress concentration points. Longitudinal discontinuities are acceptable as long as the depth or height does not exceed .020 inch (0.508 mm) from the actual adjacent surface. Longitudinal discontinuities within .020 inch (0.508 mm) need not be removed.

c. Transverse linear discontinuities which are unaided visually detected, greater than .004 inch (0.102 mm) deep are unacceptable and shall be removed with a smooth transition. Upon removal of the discontinuity, the rod tolerance shall still meet this specification.

9.2.3 Surface Finish, Upset Area.

a. Longitudinal discontinuities which occur in the area above the point where the upset diameter equals the width of the wrench square are acceptable. Longitudinal discontinuities which occur in any area of the upset from the rod body up to that point where the upset diameter equals the width of the wrench square are acceptable as long as the height or depth does not exceed 1/32 inch (0.794 mm). Longitudinal discontinuities which exceed 1/32 inch (0.794 mm) in this area shall be reworked with a smooth transition provided that all tolerances are maintained.

b. Transverse linear discontinuities which are continuous around the upset, deeper than 1/16 inch (1.588 mm), are unacceptable and shall be removed with a smooth transition. Upon removal of the discontinuity, the rod tolerance shall meet this specification. Transverse linear discontinuities greater than 1/8 inch (3.175 mm) are unacceptable.

9.3 Pin End Surface and Threads.

a. The pin undercut end and adjacent radii and shoulder face, including threads, should be free of burrs or excessively rough edges. The pin undercut ends and adjacent radii shall have a surface finish not to exceed 250 micro-inch R_a.

b. The presence of end shear cracks past the root of the first thread is reason for rejection.

c. Raised metal surfaces on the pin shoulder face which result from nicks or dents, shall be carefully removed before feeler gage inspection per Section 6, Gaging Practice, Paragraph 6.3.

d. Laps originating on either thread flank, below the pitch diameter are reason for rejection.

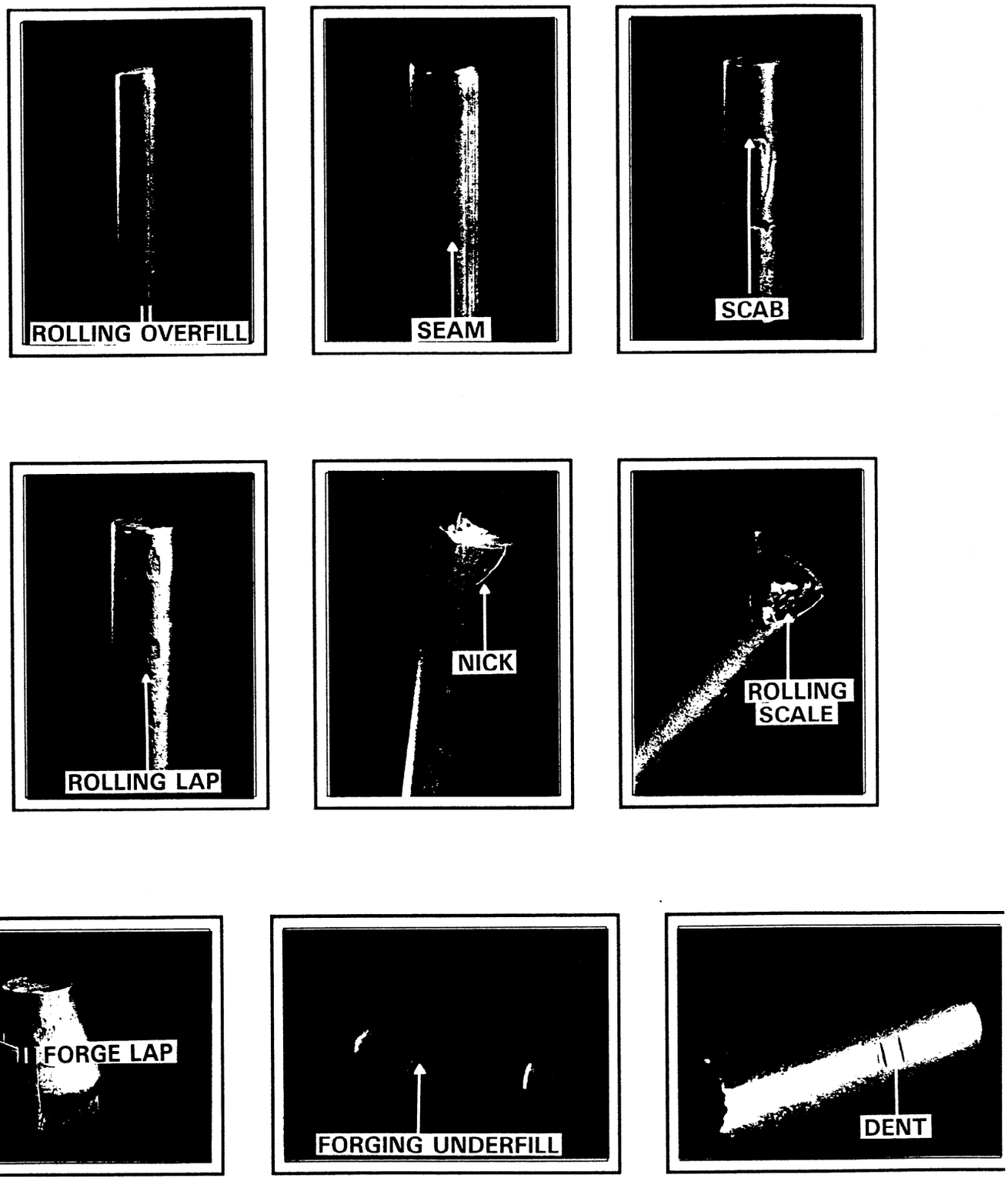


FIGURE 9.1
REPRESENTATIVE EXAMPLES OF DISCONTINUITIES

SECTION 10
MARKING**, PACKAGING AND THREAD PROTECTORS

10.1 Product Marking. Sucker rods, pony rods, couplings, and subcouplings, manufactured in conformance with this specification, shall be marked by the manufacturer as specified hereinafter. Such markings shall be die stamped or forged, or both, at the option of the manufacturer.

1. **Sucker Rods and Pony Rods.** For sucker rods and pony rods the following markings shall be applied to the wrench square on one end or both ends at the option of the manufacturer, but if applied to both ends, the marking on each end shall be complete.

   a. **Manufacturer's name or mark.**

   b. **Size** (nominal size of rod).

   c. **Spec 11B**

   d. **Grade.** Grade markings shall be applied adjacent to Spec 11B.

   e. **Identification Code Mark.** The code mark shall identify the product with respect to a record of the time of manufacture, grade of steel, heat number, and metallurgical treatment. This record shall be available to the purchaser on request. Care should be exercised in the orientation of characters and in die stamping so as not to create undue stress risers.

Example:

A 5/8-in. (15.9 mm) grade C sucker rod or pony rod shall be marked as follows:

Mfrs. Name or Mark	Size	Spec	Grade	Identification Code Metallurgy	Month	Year
—	5/8	11B	C	—	2	73

2. **Couplings.** The following markings shall be placed on the coupling wrench flat or on the outside surface of the coupling. These markings shall be provided by a method which is not injurious to the performance of the coupling.

   a. **Manufacturer's name or mark.**

   b. **Size** (nominal size of rod).

   c. **Spec 11B.**

   d. **Class.** Class markings shall be applied adjacent to Spec 11B.

   e. **Identification Code.** The code shall identify the product with respect to a record of the time of manufacture, grade of steel, heat number, and metallurgical treatment. This record shall be available to the purchaser upon request. The identification with respect to date of manufacture shall be as follows:

      (1) The month of manufacture shall be designated by the numerals 1 through 12, chronologically, with January represented as number 1.

      (2) The year of manufacturer shall be designated by the last two numerals of the year.

Example:

A through hardened sucker rod coupling manufactured in April, 1972 shall be marked as follows:

Mfrs. Name or Mark	Size	Spec	Class	Identification Code Metallurgy	Month	Year
—	3/4	11B	T	—	4	72

A spray metal sucker rod coupling manufactured in April 1972 shall be marked as follows:

Mfrs. Name or Mark	Size	Spec	Class	Identification Code Metallurgy	Month	Year
—	3/4	11B	SM	—	4	72

3. **Polished Rod Couplings and Subcouplings.** In addition to the marking requirements for sucker rod couplings contained herein, polished rod couplings and subcouplings shall be marked with the letters "PR" in front of the manufacturer's name or mark.

Example:

A 7/8-inch (22.2 mm) polished rod coupling and a 3/4 × 7/8-inch (19.1 × 22.2 mm) subcoupling manufactured in April, 1972 shall be marked as follows:

Polished Rod Coupling	Mfrs. Name or Mark	Size	Spec	Class	Identification Code Metallurgy	Month	Year
PR	—	7/8	11B	T	—	4	72
3/4 × 7/8 Inch Sub-Coupling PR	—	3/4 × 7/8	Spec 11B	T	—	4	72

**Users of this specification should note that there is no longer a requirement for marking a product with the API monogram. The American Petroleum Institute continues to license use of the monogram on products covered by this specification but it is administered by the staff of the Institute separately from the specification. The policy describing licensing and use of the monogram is contained in Appendix A, herein. No other use of the monogram is permitted.

SECTION 11
INSPECTION AND REJECTION

11.1 Inspection Notice. Where the inspector representing the purchaser desires inspection at the manufacturer's works, reasonable notice shall be given of the time at which the run is to be made.

11.2 Inspection. While work on the contract of the purchaser is being performed, the purchaser's inspector shall have free entry at all times to all parts of the manufacturer's works which will concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being manufactured in accordance with this specification. All inspections should be made in the place of manufacture prior to shipment, unless otherwise specified on the purchase order, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

11.3 Rejection. Material which shows injurious defects on mill inspection or subsequent to acceptance at the manufacturer's works, or which proves defective when properly applied in service, may be rejected and the manufacturer so notified. If tests that require the destruction of material are made other than at the place of manufacture, the purchaser shall pay for that material which meets the specification, but shall not pay for any material which fails to meet the specification.

11.4 Compliance. The manufacturer is responsible for complying with all of the provisions of this specification. The purchaser may make any investigation necessary to statisfy himself of compliance by the manufacturer and may reject any material that does not comply with this specification.

SECTION 12
POLISHED RODS AND POLISHED-ROD LINERS

Polished Rods.

12.1 Polished rods shall be furnished in the sizes shown in Table 12.1, as specified on the purchase order.

12.2 Polished rods shall be furnished with pin threads on each end. The threaded ends shall conform to the thread and gaging practice requirements for polished rods, as stipulated in Section 6.

12.3 Polished-rod couplings shall conform to the requirement in API Spec 11B. The lack of matching tapers on sucker rod couplings and polished-rod pins will prevent proper pin makeup. The use of standard rod couplings on polished rods can result in split couplings.

TABLE 12.1
(See Fig. 5.2 for polished-rod thread details.)

1		2	3	4
Polished-Rod Size (OD), in.	+0.000" -0.010" (.25 mm) (mm)	[1]Length ft. (m)	Thread Size (Nominal Pin Dia., in.) (mm)	Size Sucker Rod with which used (mm)
1	(25.4)	8, 11, 16 (2.4, 3.3, 4.8)	¾ (19.1)	½ (12.7)
[2]1⅛	(28.6)	8, 11, 16, 22 (2.4, 3.3, 4.8, 6.7)	15/16, 1 1/16 (23.8, 27.0)	⅝, ¾ (15.9, 19.1)
[2]1¼	(31.8)	11, 16, 22 (3.3, 4.8, 6.7)	1 3/16 (30.1)	⅞ (22.2)
1½	(38.1)	16, 22 (4.8, 6.7)	1⅜ (34.9)	1 (25.4)
[3]1½ (upset)	(38.1)	16, 22 (4.8, 6.7)	1 9/16 (39.7)	1⅛ (28.6)

[1]Polished rods in lengths greater than 22 ft (6.7 m) may be furnished by agreement between the purchaser and manufacturer.
[2]1⅛ (28.6 mm) and 1¼ in. (31.8 mm) polished rods may be furnished with an upset on one end if so specified on the purchase order.
[3]The upset on 1½ in. (38.1 mm) polished rods to be made on one end only with a shoulder diameter equal to dimension D_f (57.2 mm ±.38 mm) in accordance with Fig. 5.2 and the length of this shoulder parallel to the body of the rod shall be ½ in. (12.7 mm) minimum.

Polished-Rod Liners.

12.4 Polished-rod liners shall be furnished in the sizes shown in Table 12.2, as specified on the purchase order.

12.5 Threaded polished-rod liners shall be furnished with pin threads as specified in Table 12.2.

TABLE 12.2
POLISHED-ROD LINERS

1	2	3
Liner, Size, (OD), in. (mm)	*Threaded End Connection (UN-Class 2A) (mm)	Size Polished Rod with which used (OD), in. (mm)
1⅜ (34.9)	1⅜—16 (34.9)	1⅛ (28.6)
1½ (38.1)	1½—16 (38.1)	1¼ (31.8)
1¾ (44.4)	1¾—16 (44.4)	1½ (38.1)

*See Handbook H28, Screw-Thread Standards for Federal Service; obtainable from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Surface Finish.

12.6 Polished rods and polished-rod liners shall have a surface finish of 10-20 micro-inch R_a.

12.7 Surface finish shall be checked with a surface finish gauge such as a profilometer or a comparator.

12.8 In the event that continuous checking of the finish is the selected method, then 1 out of every 20 manufactured polished rods or polished-rod liners shall be checked as they come off the production line. If the selected polished rod or polished-rod liner fails to meet the required finish, all polished rods or polished-rod liners starting with this rejected one shall be 100% checked and rejected until an acceptable one is found which passes the finish requirement. Rejected polished rods or polished-rod liners can be re-worked to be within the API 11B specifications.

12.9 In the event that batch type checking is practiced, it is required that a procedure similar to MIL-STD-105D be used. Table 12.3 (excerpted from MIL-STD-105D) is required to be used to determine acceptable quality and checking levels. Rejected polished rods or polished rod liners can be reworked to be within the API 11B specifications.

Marking.*

12.10 Polished rods and polished rod liners manufactured in accordance with this specification shall be die stamped on one or both ends or on the O.D. within 3 inches of end face by the manufacturer as follows, except that for liners the required markings may be painted, stenciled, or applied by decal at the manufacturer's option.

a. Manufacturer's name or mark.

b. Size (outside diameter).

c. Spec 11B.

*Users of this specification should note that there is no longer a requirement for marking a product with the API monogram. The American Petroleum Institute continues to license use of the monogram on products covered by this specification but it is administered by the staff of the Institute separately from the specification. The policy describing licensing and use of the monogram is contained in Appendix A, herein. No other use of the monogram is permitted.

TABLE 12.3
SAMPLING PROCEDURES
Excerpt From MIL-STD-105D

Single Sampling Plan for Normal Inspection

General Inspection Level II
Acceptable Quality Level = 4.0%

		Number of Parts Out of Tolerance[1]	
Lot Size	Sample Size	Accept Lot	Reject Lot[2]
2 to 8	2	0	1
9 to 15	3	0	1
16 to 25	5	0	1
26 to 50	8	1	2
51 to 90	13	1	2
91 to 150	20	2	3
151 to 280	32	3	4
281 to 500	50	5	6
501 to 1200	80	7	8
1201 to 3200	125	10	11
3201 to 10,000	200	14	15
10,001 and over	315	21	22

[1]Out of tolerance parts must be reworked before returning them to the accepted lot.
[2]100% checking and reworking of rejected parts is acceptable practice.

SECTION 13
STUFFING BOXES AND PUMPING TEES

Stuffing Boxes.

13.1 Stuffing boxes for pumping wells furnished to this specification shall comply with the requirements of Par. 13.2 through 13.5.

13.2 Size. Nominal size of stuffing boxes shall be in accordance with the size and type of bottom connection and for complete boxes the diameter of the polished rod or polished-rod liner with which it is intended to be used. The bottom connection shall be either upset or non-upset external tubing threads conforming to API Std 5B.

13.3 Alignment. The maximum radial displacement of axes of the packing chamber and the bottom thread, measured in a plane perpendicular to these axes, shall not exceed 0.03125 in. (.79 mm). The maximum angular misalignment shall not exceed ¾ in. (19.1 mm) per 20 ft (6 m) of projected axis. Concentricity and alignment tests may be made by screwing the bottom thread of the box onto a threaded test mandrel which has been accurately centered in a lathe, then snugly fitting into the packing chamber a lathe-turned piece which will provide a measured length of about one foot, the extent of radial displacement being determined by the use of a micrometer indicator on the turned piece close to the top of the box, and the extent of angular misalignment being determined by the use of a micrometer indicator on the turned piece at its outer end as the assembly is rotated. Any other method giving the same degree of accuracy may be used.

13.4 Hydrostatic Test. A representative number of each production lot of stuffing-box bodies shall be hydrostatically tested (without packing) to twice the working pressure rating.

13.5 Marking*. Each stuffing box body shall be prominently and permanently marked by the manufacturer with the following information.

a. Manufacturer's name or mark.

b. Spec 11B.

c. Size and type of bottom thread.

d. Maximum working pressure rating.

Example:

A stuffing-box body having a 2⅜ in. (60.3 mm) upset tubing thread as a bottom connection and having been hydrostatically tested to 5000 psi (34.4 kPa) should be marked as follows:

Mfrs. Name or Mark	Spec 11B	2⅜	UPSET	2500	WOG

Pumping Tees.

13.6 Pumping tees furnished to this specification shall comply with the requirements of Par. 13.7 through 13.10.

13.7 Size. Nominal size of pumping tees shall be in accordance with the size and type of top, bottom and flow-line connections. Top and bottom connections shall be either upset or non-upset internal tubing threads conforming to API Std 5B. Flow-line connections shall be line pipe threads conforming to API Std 5B. Bleeder outlet shall be 1 in. (25.4 mm) line pipe thread conforming to API Std 5B.

13.8 Alignment. The maximum radial displacement of axes of pumping tee threads, measured in the plane of the tee face, shall not exceed 0.03125 in. (.79 mm). The maximum angular misalignment shall not exceed ¾ in. (19.1 mm) per 20 ft (6 m) of projected axis. Concentricity and alignment tests may be made by screwing the bottom end of the tee onto a threaded test mandrel which has been accurately centered in a lathe, then screwing into the other end of the tee a lathe-turned piece which will provide a measured length of about one foot, the extent of radial displacement being determined by the use of a micrometer indicator on the turned piece close to the face of the tee, and the extent of angular misalignment being determined by the use of a micrometer indicator on the turned piece at its outer end as the assembly is rotated. Any other method giving the same degree of accuracy may be used.

13.9 Hydrostatic Test. A representative number of each production lot of pumping tees shall be hydrostatically tested to twice the working pressure rating.

13.10 Marking*. Pumping tees manufactured in accordance with this specification shall be prominently and permanently marked by the manufacturer with the following information:

a. Manufacturer's name and mark.

b. Spec 11B.

c. Size and type of top, bottom, and flow-line threads.

d. Maximum working pressure rating.

Example:

A pumping tee with a 2⅜ in. (60.3 mm) upset tubing thread on top, a 2⅞ in. (.73 mm) non-upset tubing thread on bottom, a 2 in. (50.8 mm) line pipe flow line connection, and having been hydrostatically tested to 10000 psi (68.8 kPa) should be marked as follows:

Mfrs. Name or Mark	Spec 11B	2⅜	UPSET × 2⅞ × 2 5000 WOG

*Users of this specification should note that there is no longer a requirement for marking a product with the API monogram. The American Petroleum Institute continues to license use of the monogram on products covered by this specification but it is administered by the staff of the Institute separately from the specification. The policy describing licensing and use of the monogram is contained in Appendix A, herein. No other use of the monogram is permitted.

SECTION 14
POLISHED ROD CLAMPS

14.1 Material Selection and Design. The material chosen for the manufacture of polished rod clamps and the gripping face design shall be such that there is no indentation of the polished rod surface which may affect the service life of the polished rod when the polished rod clamp is installed and used in accordance with the manufacturers instructions.

14.2 Polished Rod Clamp Marking.

14.2.1 Each polished rod clamp shall carry a permanent inscription identification. This identification will be a permanent part of the forging or casting. If other type of manufacturing process is used, this identification shall be steel stamped. The information shall include:

a) maximum rated load
b) nominal polished rod diameter and
c) manufacturer identification

14.2.2 Each polished rod clamp shall have securely attached (such as by wiring) a tag showing the manufacturers installation instructions. This tag may be paper or metal.

14.2.3 The manufacturer shall make available an installation and maintenance manual on each size polished rod clamp.

14.3 Maximum Rated Load. The maximum rated load shall be no more than 75% of the minimum load to initial slippage when a new polished rod clamp is tested in accordance with this specification.

14.4 Testing Procedure.

14.4.1 Only new polished rod clamps shall be used in this test.

14.4.2 A polished rod whose nominal diameter conforms to API 11B Par. 12.1 shall be used.

14.4.3 The polished rod clamp shall be installed in accordance with the manufacturers instruction on one end of a sample of polished rod of suitable length.

14.4.4 The polished rod sample with the polished rod clamp attached shall be suspended by the polished rod clamp from the upper crosshead of a tensile testing machine through a hole in a thick steel plate. The dimension of the hole shall be the nominal diameter of the polished rod plus ⅛ inch *(3.17 mm)*. The tolerances on the hole diameter shall be -0+1/64 inch *(-0+0.40 mm)*.

14.4.5 The polished rod shall be gripped in the lower crosshead and a load applied and increased until the first slippage occurs between the polished rod and the polished rod clamp. This load shall be recorded.

14.4.6 The rate of separation of the crossheads under load shall not exceed ½ inch *(12.7 mm)* per min. or be less than ⅛ inch *(3.17 mm)* per min.

14.5 Test Results. The minimum slippage load (Par. 14.4.5) multiplied by 0.75 shall be equal to or greater than the published maximum rated load of the polished rod clamp.

14.6 Surface Condition After Test. Examination of the surface of the polished rod after the test and removal of the clamp shall not reveal any indentation in excess of 0.010 inch *(0.25 mm)* and in no case shall any indentation be of a nature which may affect the service life of the polished rod. Failure to comply with these requirements shall constitute a test failure.

14.7 Retest. Should the initial test result fail to conform to the requirement of Par. 14.5 or Par. 14.9.2 then two more polished rod clamps shall be selected at random and tested. Any additional failure shall be cause for rejection of the lot.

14.8 Manufacturers Rating. The manufacturer shall perform sufficient tests by the method detailed in Par. 14.4 during the design phase to ensure that the polished rod clamp for each size will comply with the published rated loads.

14.9 Production Tests.

14.9.1 The manufacturer shall perform a production test on a clamp randomly selected at a rate of at least one manufactured clamp per size per lot of 100 or portion thereof.

14.9.2 The test procedure as detailed in Par. 14.4 will be followed with the exception that Par. 14.4.5 be modified such that it is not necessary to load to slippage. The applied load shall be the maximum rated load. If the clamp slips before reaching this load it is rejected. Continued loading to slippage is not required.

14.9.3 The test detailed in Par. 14.9.2 is considered non-destructive and any clamp passing this test is considered usable.

REFERENCE MASTER GAGE LIST
(As of February 1, 1990)

Size, inches	½	⅝	¾	⅞	1	1⅛
	Gage Registration Numbers					
Allen Gauge & Tool Co. — Pittsburgh, PA	....	7572	....	....	7571	....
Armco Steel Corp., Machinery & Equip. Div., Houston, TX	....	2001	2002	2003	8518	....
	....	2089	2090	2091	2092	....
Avan S.A.I.C., Buenos Aires, Argentina	....	8567	8568	8569	8570	....
	....	8578	8579	8580	8581	....
	....	8724	....	....	....	....
Axelson, Inc., Subsidiary of U.S. Industries, Inc., Longview, TX	....	....	....	....	....	8789
	....	2009	2010	2011	2099	2566
	....	....	....	8725	8788	8726
B&D Oilfield Supply, Inc., Bartlesville, OK	....	....	7452	7453	7454	....
B&E Machine Shop, Trout, LA	....	8547	8548	8549	8550	....
B&G Machine Inc. — Jackson, MI	....	7496	7497	....	....	....
Bell Machine Shop — Athens, TX	....	....	7480	....	....	....
Bennet Industries, Peotone, IL	....	8671	....	8673	8769	....
	....	8664	....	8665	....	....
Benton Harbor Screw Co. — St. Joseph, MI	....	7565	7566	....	....	....
Bethlehem Steel Co., Lebanon, PA	....	2063	2064	2065	2098	....
Bolland & Cia. S.A., Buenos Aires, Argentina	....	....	8560	....	....	....
Braun Engineering Co., Detroit, MI	....	....	7573	7574	....	....
Burgess-Norton Mfg. Co., Geneva, IL	....	....	8530	....	....	....
Cannco Tool and Machine, Taylor, MI	....	8671	8672	8673	8674	8675
	....	7472	7473	7474	7475	7476
Card Drill Steel Corp., Erin, TN	....	....	8645	....	....	....
China National Machinery Import and Export Corp., Beijing, China	....	8705	8706	8707	8708	....
China North Industries Corp., Peking, China	....	....	8636	8635	7499	....
Chisholm Machine, Duncan, OK	....	7599	....	....	....	....
Clipper International Corp., Detroit, MI	....	....	8733	....	....	....
	....	....	8657	7593	7568	....
Columbus Auto Parts, Columbus, OH	....	8694	8695	....	....	....
Cometarsa S.A.I.C., Capital Federal, Argentina	....	8513	8514	8527	8543	8561
	....	8759	8760	8761	8762	....
Companhia METALOMECANICA DO BRAZIL, Feira de Santa, Brasil	....	7451	....	7458	7459	7460
	....	8756	8684	8757	8754	8755
	....	....	....	....	8674	....
Consolidated Metal Products, Cincinnati, OH	7595	8693	8692	....	....	....
	7597	7598	....	....	....	....
Cornerstone Enterprises Inc., Barberton, OH	....	8599	8603	....	....	....
D&E Tool Co., Inc., Huntington, WV	....	8594	8685	8686	7495	....
	....	8584	....	....	....	....
Delta International, Greenwood, MS	....	8605	8608	8609	8610	....
Del-Tex Inc., Claremore, OK	....	7481	7482	7483	7484	7485
	....	....	8662	8665	....	....
	....	8563	8565	8564	8566	8623
	....	7583	7584	7585	7586	....

REFERENCE MASTER GAGE LIST

(As of February 1, 1990)

	½	⅝	¾	⅞	1	1⅛
Dover Resources, Tulsa, OK	....	2058	....	7569	2095	8509
	....	8730	....	7569	7570	....
	....	2052	2059	2060	7570	....
	....	....	8766	8767	8768	....
	....	8758	8747	8748	8749	....
	....	....	....	....	8751	....
Dover Corp. (Canada) Ltd., Edmonton, Alberta, Canada	....	....	8787	....	....	....
	....	2058	2059	2060	2095	....
	....	8519	8520	8521	8522	....
	....	8786	8731	....	....	....
Engex S.A. Equipamentos Especializados, Sao Paulo, Brazil	....	8637	8638	8639	7454	7551
	....	8647	8648	8649	8646	....
Equipetrol S.A., Salvador, Brazil	...	8775	8776	8777	....	....
Establecimiento Metalurgico Guerra Sacifia, Buenos Aires, Argentina	....	8696	8697	8698	8699	8700
Fabricated Steel Corp., Columbus, OH	....	8670	....	....	....	....
Fiat Concord S.A.I.C., Buenos Aires, Argentina	....	....	8536	....	8535	....
Fibercast, Sand Springs, OK	....	8717	8716	8718	8719	....
Fiberflex Industrial, Big Spring, TX	....	8711	8720	8721	8722	....
Fitting Valve & Control Corp., Mesquite, TX	....	7468	7469	7470	7471	....
FRB Machine, Emlenton, PA	....	....	8661	....	....	....
Freeman Pump and Supply Co., Garden City, KS	....	....	8559	....	....	....
Grand Valley Manufacturing Co., Titusville, PA	....	8604	8663	....	....	....
Grove International Steel Co., Grove City, PA	....	8600	8601	8602	....	....
Harbison-Fischer, Crowley, TX	....	8728	8727	8729	....	....
	....	....	8715	....	....	....
	....	....	2560	....	....	....
	....	2579	2580	2581	7561	....
Harbison-Fischer Canada Ltd., Calgary, Alberta, Canada	....	8773	8771	8772	....	....
Harbor Forge, Inc., St. Joseph, MI	....	....	8657	....	....	....
Highland Pump Co., Midland, TX	....	7600	8573	8702	7559	....
	....	....	7579	....	....	....
Hughes Tool Co., Houston, TX	....	....	8630	....	....	....
Hunt Tool Corp., Dallas, TX	....	8765	....	....	....	....
Hunt Tool GmbH, Celle, West Germany	....	8640	8641	8642	8643	8644
ICO, Inc., Odessa, TX	8529	2026	7555	2028	2093	....
Imerman Industries, Inc., Detroit, MI	....	8655	8656	....	....	....
Impamex, S.A., Mexico D.F., Mexico	....	....	8544	....	....	....
Indufor, S.A.I.C., Buenos Aires, Argentina	....	8745	8714	8746	8792	....
Innovation Co., Odessa, TX	....	2026	2027	2028	2093	....

REFERENCE MASTER GAGE LIST
(As of February 1, 1990)

	½	⅝	¾	⅞	1	1⅛
Intreprinderea Mecanica Cimpina, Cimpina, Romania	8736	8737	8738	8739	8740	8741
Joslyn Mfg. & Supply Co., Cicero, IL	....	....	....	8562	....	....
Kanagwon Industrial Co., Ltd., San Francisco, CA	....	8616	8617	....	....	....
K.D.K. Upset Forging Co., Blue Island, IL	....	7486	....	....	....	....
King Pump & Supply Co., Drumwright, OK	....	....	8542	....	....	....
Kyodo Shaft Co., Ltd., Osaka, Japan	....	8629	8628	8627	8626	....
LCOR Industries Inc., McPherson, KS	....	....	....	....	7487	....
Lanzhou, People's Republic of China	....	8666	8667	8668	8669	....
	....	8680	8681	8682	8683	....
Laxmi Udyog, Jodhpur, India	....	7575	7576	7577	7578	....
Leavell Corp., McPherson, KS	....	8618	8541	....	....	....
	....	8676	8677	8678	....	....
Liberty Mfg. Co., Fort Worth, TX	8529	....	....	....	....	....
Lovell Extrusion Co., Troy, MI	....	7567	....	....	....	....
LTV Energy Products Co., Garland, TX	....	8734	7552	7553	8735	....
	....	2018	2019	2020	2101	8508*
Mega Industries, Inc., Dallas, TX	....	7580	7581	7582	....	....
Mid-America Forming, Maryville, MO	....	7557	7556	7558	....	....
Mihahn Inc., Woodland Hills, CA	....	....	7466	7467	....	....
Millingford Engineering Co., Ltd., Lancashire, England	....	8537	8538	8539	8540	....
Milrod Ltd., West Allis , WI	....	....	7477	7478	....	....
Mitsubishi Steel Mfg. Co., Ltd., Tokyo, Japan	....	8585	8586	8587	8588	8589
Morrison Molded Fiberglass Co., Bristol, VA	....	....	8797	8679	7498	....
NSS Industries, Plymouth, MI	....	7455	7456	....	....	....
Oakmar Industries, Spring Park, MN	....	8582	8583	....	....	....
Oilwell, Division U.S. Steel Corp., Imperial Works, Garland, TX	....	2561	2562	2563	2096	8551
Oilwell, Div. U.S. Steel Corp., Imperial Works, Oil City, PA	....	8780	8781	....	8782	8783
Oilwell Production Products, Santa Teresa, NM	....	8790	8774	....	8791	....
	....	....	8778	8779	8744	....
	....	8619	8620	8621	8622	8704
J. A. Patton Corp., Little Rock, AR	....	8650	8651	8652	7562	7494
Positive Action Tool Co., Mills, WY	....	....	8556	....	....	....
Pozo International, Tucson, AZ	....	....	7489	7490	7488	....
Production Services, Detroit, MI	....	7500	....	....	....	....
	....	8703	....	....	....	....
Quinn's Oilfield Supply Ltd., Red Deer, Alta., Canada	....	....	8545	....	....	....
R&D Machine Co., Edmonton, Alberta, Canada	....	....	8590	8591	....	....
	....	....	8592	8593	....	....

*Inactive and cannot be placed in service until retested by an authorized testing agency as stipulated in Sect. 8.

REFERENCE MASTER GAGE LIST
(As of February 1, 1990)

	½	⅝	¾	⅞	1	1⅛
Raines Tool, Houston, TX	....	7479	....	....	....	....
Red Arrow Tools, Inc., Odessa, TX	....	8552	8553	8554	8555	....
	....	8595	8596	8597	8598	....
Reinhold Industries, Inc., Edmonton, Alberta, Canada	....	7592	8709	8710	8770	....
	....	7594	....	....	....	....
Roper Pump Company, Commerce, GA	....	....	7554	....	....	....
Sabin St. Germain, Inc., Westwood, NJ	....	....	....	....	8646	....
Sargent Industries, Odessa, TX	....	....	8732	....	....	....
Southern Forge Inc., Longview, TX	....	....	9542	8743	....	....
	....	....	8657	7558	7499	....
	....	....	8662	....	....	....
Standard Machinists Supply Co., Pittsburgh, PA	....	....	8752	8753	....	....
Stelco, Inc., Edmonton, Alberta, Canada	....	8506	8505	8507	8510	....
	....	....	....	8784	8546	....
	....	....	....	....	8785	....
Sumitomo Metal Industries, Ltd., Osaka, Japan	....	8687	8688	8689	8690	8691
Swain & Sons, Inc., Bakersfield, CA	....	....	8713	....	....	....
Tex-Star Machine Works, Gainesville, TX	....	8660	....	....	....	....
Trico Industries, Monarch Div., Gardena, CA	....	7455	7456	7457	....	....
	....	2055	2056	2057	7458	....
	....	8531	8532	8533	8534	....
Tru-End Manufacturing Co., Cleveland, OH	....	8632	8633	8634	....	....
Tsukamoto Seiki Co., Ltd., Tokyo, Japan	....	8611	8612	8613	8614	8615
UPCO Inc., Claremore, OK	....	8650	8651	8632	7562	7563
	....	8600	8601	8602	7586	8120
	....	7583	8633	7585	8566	....
	....	8563	7584	8665	7485	....
	....	....	8565	8564	....	....
	....	....	7482	....	....	....
	....	....	8662	....	....	....
Vereinigte Edelsta, Wien, Austria	....	....	....	....	....	7563
Vereinigte Edelsta AG-Bohler Schdeller, Wien, Austria	....	....	....	....	7493	....
Vereinigte Edelstahlwerke A.G., Vienna, Austria	....	2586	2582	2583	2587	8512
Vulcan Rod & Steel, Burleson, TX	....	8658	7560	7491	....	....
	....	8763	8659	7564	....	....
	....	....	8764	....	....	....
Wells Oilfield Specialty, Bakersfield, CA	....	8653	8654	8631	....	....
Wooding Consolidated Industries	....	8606	8607	....	....	....
	....	....	7457	....	....	....
	....	7461	7462	7463	7464	7465
Woods Energy Products, Owasso, OK	....	8793	8794	8795	8796	....
Y.P.F., Buenos Aires, Argentina	....	8575	8574	8576	8577	....

APPENDIX A
USE OF API MONOGRAM

The API monogram is a registered trademark of the American Petroleum Institute.

Manufacturers desiring to warrant that articles manufactured or sold by them conform with this specification shall obtain the license to use the Official API Monogram.

The original resolutions adopted by the Board of Directors of the American Petroleum Institute on Oct. 20, 1924, embodied the purpose and conditions under which such official monogram may be used.

The following restatement of the resolution was adopted by the Board of Directors on Nov. 14, 1977.

WHEREAS, The Board of Directors of the American Petroleum Institute has caused a review of the Institute's program for licensing the use of the API monogram and

WHEREAS, It now appears desirable to restate and clarify such licensing policy and to confirm and make explicitly clear that it is the licensees, not API, who make the representation and warranty that the equipment or material on which they have affixed the API monogram meets the applicable standards and specifications prescribed by the Institute;

NOW, THEREFORE, BE IT RESOLVED, That the purpose of the voluntary Standardization Program and the Monogram Program of the American Petroleum Institute is to establish a procedure by which purchasers of petroleum equipment and material may identify such equipment and materials as are represented and warranted by the manufacturers thereof to conform to applicable standards and specifications of the American Petroleum Institute; and be it further

RESOLVED, That the previous action under which the following monogram was adopted as the official monogram of the American Petroleum Institute is reaffirmed;

BE IT FURTHER RESOLVED, That the American Petroleum Institute's monogram and standardization programs have been beneficial to the general public as well as the petroleum industry and should be continued and the Secretary is hereby authorized to license the use of the monogram to anyone desiring to do so under such terms and conditions as may be authorized by the Board of Directors of the American Petroleum Institute, provided that the licensee shall agree that the use of the monogram by such licensee shall constitute the licensee's representation and warranty that equipment and materials bearing such monogram complies with the applicable standards and specifications of the American Petroleum Institute; and that licensee shall affix the monogram in the following manner;

BE IT FURTHER RESOLVED, That the words "Official Publication" shall be incorporated with said monogram on all such standards and specifications that may hereafter be adopted and published by the American Petroleum Institute, as follows:

OFFICIAL PUBLICATION

REG. U.S. PATENT OFFICE

A.1 API Monogram. The API monogram — — is a registered trademark/servicemark of the American Petroleum Institute. Authorization to use the monogram is granted by the Institute to qualified licensees for use as a warranty that they have obtained a valid license to use the monogram and that each individual item which bears the monogram conformed, in every detail, with the API Specification applicable at the time of manufacture. However, the American Petroleum Institute does not represent, warrant or guarantee that products bearing the API monogram do in fact conform to the applicable API standard or specification. Such authorization does not include use of the monogram on letterheads or in advertising without the express statement of fact describing the scope of licensee's authorization and further does not include use of the monogram, the name AMERICAN PETROLEUM INSTITUTE or the description "API" in any advertising or otherwise to indicate API approval or endorsement of products.

The formulation and publication of API Specifications and the API monogram program is not intended in any way to inhibit the purchase of products from companies not licensed to use the API monogram.

A.2 Application for Authority to Use Monogram. Manufacturers desiring to warrant that products manufactured by them comply with the requirements of a given API specification may apply for a license to use the monogram with forms provided in an appendix to each specification. Exhibit B is a typical "Statement of Manufacturer's Qualifications" and Exhibit C is a "License Agreement."

The "Agreement" form must be submitted in duplicate for each specification under which monogram rights are desired. One "Statement of Manufacturer's Qualifications" is required for each facility.

A manufacturer desiring to apply the monogram at more than one facility (a facility is any manufacturing location) must submit a separate application for each facility.

Applicants shall have an approved functioning quality program in conformance with API Spec Q1 prior to being issued a license to use the API monogram.

A.3 Authorization to Use the Monogram. A decision to award or withhold monogram rights will be made by the staff of the Institute. A survey of the applicant's facilities will be made by an approved Insti-

tute surveyor prior to a decision to approve or withhold the license. The basis of the survey shall be appropriate product Specification and all applicable portions of API Spec Q1.

For a manufacturer having more than one facility (plant), each facility will be judged separately and if determined to be eligible for authorization to use the monogram will be granted a separate license for each Specification, or part thereof, under which authorization is granted. The application of the monogram may not be subcontracted.

A.4 Fee for Use of Monogram.

Initial Authorization Fee. The applicant will be invoiced an initial authorization fee for the first Specification included in the application, and a separate fee for each additional Specification included in the application. The applicant will also be invoiced for the surveyor's fee.

Annual Renewal Fee. In addition to the initial authorization fee, licensees will be assessed an annual renewal fee for each specification under which he is authorized to use the monogram. Applicants issued monogram certificates dated November 1 through December 31 shall not be required to pay a renewal fee for the following year.

The fees assessed are to defray the cost of the Monogram Program.

A.5 Periodic Surveys. Existing licensees must be periodically surveyed by an approved Institute surveyor to determine whether or not they continue to qualify for authorization to use the monogram. The frequency of the periodic surveys will be at the discretion of the staff of the Institute. The surveyor's fee and expenses for making a periodic survey will be paid by the Institute.

A.6 Cancellation of Monogram Rights. The right to use the monogram is subject to cancellation for the following causes:

a. Applying the monogram on any product that does not meet the Specification.

b. Failure to maintain reference master gages in accordance with the Specifications.

c. Failure to meet the requirements of any resurvey.

d. Failure to pay the annual renewal fee for use of the monogram.

e. For any other reason satisfactory to the Executive Committee on Standardization of Oilfield Equipment and Materials.

A.7 Reinstatement of Monogram Rights. Manufacturers whose authorization to use the monogram has been cancelled may request reinstatement at any time. If a request for reinstatement is made within sixty (60) days after cancellation, and if the reason for cancellation has been corrected, no new application is necessary. A resurvey of the manufacturer's facilities will be made by an approved Institute surveyor prior to a decision to reinstate monogram rights. The manufacturer will be invoiced for this resurvey regardless of the Institute's decision on reinstatement. If the resurvey indicates that the manufacturer is qualified, the license will be reissued.

Request for reinstatement made more than sixty (60) days after cancellation shall be treated as a new application unless circumstances dictate an extension of this time period as agreed upon by the API staff.

A.8 Appeals. An interested party may appeal any API standards action. Appeals shall be directed to the Director, API Production Department and handled by the General Committee of the Production Department with a further right of appeal to the API Management Committee. Competing suppliers or manufacturers of the product or service to which the standard applies or might apply may not be involved in appeals. The General Committee and the Management Committee may convene appeals boards to hear and act on appeals.

A.9 Marking. The following marking requirements apply to licensed manufacturers using the API monogram on products covered by this specification.

A.10 Rods and Couplings. Sucker rods, pony rods, couplings, and subcouplings, manufactured in conformance with this specification, shall be marked by the manufacturer as specified hereinafter. Such markings shall be die stamped or forged, or both, at the option of the manufacturer.

1. **Sucker Rods and Pony Rods.** For sucker rods and pony rods the following markings shall be applied to the wrench square on one end or both ends at the option of the manufacturer, but if applied to both ends, the marking on each end shall be complete.

   a. **Manufacturer's name or mark.**

   b. **Size** (nominal size of rod).

   c. **API Monogram.** The monogram shall be applied only by authorized manufacturers (see Appendix B for regulations governing the use of the API monogram). The minimum size of the monogram shall be ⅛ in. (3.2 mm).

   d. **Grade.** Grade markings shall be applied adjacent to the API monogram. See Par. 2.1 for applicable grade marks.

   e. **Identification Code Mark.** The code mark shall identify the product with respect to a record of the time of manufacture, grade of steel, heat number, and metallurgical treatment. This record shall be available to the purchaser on request. Care should be exercised in the orientation of characters and in die stamping so as not to create undue stress risers.

Example:

A ⅝-in. (15.9 mm) grade C sucker rod or pony rod shall be marked as follows:

Mfrs. Name or Mark	Size	API Monogram	Grade	Identification Code Metallurgy	Month	Year
—	⅝	API	C	—	2	73

2. **Couplings.** The following markings shall be placed on the coupling wrench flat or on the outside surface of the coupling.

   a. **Manufacturer's name or mark.**

   b. **Size** (nominal size of rod).

   c. **API Monogram.** The monogram shall be applied only by authorized manufacturers (see Appendix B for regulations governing the use of the API monogram). The minimum size of the monogram shall be ⅛ in. (3.2 mm).

   d. **Class.** Class markings shall be applied adjacent to the API monogram. See Par. 4.3 for class mark.

   e. **Identification Code.** The code shall identify the product with respect to a record of the time of manufacture, grade of steel, heat number, and metallurgical treatment. This record shall be available to the purchaser upon request. The identification with respect to date of manufacture shall be as follows:

      (1) The month of manufacture shall be designated by the numerals 1 through 12, chronologically, with January represented as number 1.

      (2) The year of manufacture shall be designated by the last two numerals of the year.

   Example:

   A through hardened sucker rod coupling manufactured in April, 1972 by an authorized manufacturer shall be marked as follows:

Mfrs. Name or Mark	Size	API Monogram	Class	Identification Code Metallurgy	Month	Year
—	⅝	⌀	T	—	4	72

   A spray metal sucker rod coupling manufactured in April 1972 by an authorized manufacturer shall be marked as follows:

Mfrs. Name or Mark	Size	API Monogram	Class	Identification Code Metallurgy	Month	Year
—	⅝	⌀	SM	—	4	72

3. **Polished Rod Couplings and Subcouplings.** In addition to the marking requirements for sucker rod couplings contained herein, polished rod couplings and subcouplings shall be marked with the letters "PR" in front of the manufacturer's name or mark.

   Example:

   A ⅞-inch (22.2 mm) polished rod coupling and a ¾ × ⅞-inch (19.1 × 22.2 mm) subcoupling manufactured in April, 1972 by an authorized manufacturer shall be marked as follows:

Polished Rod Coupling	Mfrs. Name or Mark	Size	API Monogram	Class	Identification Code Metallurgy	Month	Year
PR	—	⅞	⌀	T	—	4	72
¾ × ⅞ Inch Sub-Coupling PR	—	¾ × ⅞	⌀	T	—	4	72

A.11 Polished Rod Liners. Polished rods and polished-rod liners manufactured in accordance with this specification shall be die stamped on one end or both ends by the manufacturer as follows, except that for liners the required markings may be paint stenciled or applied by decal at the manufacturer's option.

a. **Manufacturer's name or mark.**

b. **Size** (outside diameter).

c. **API Monogram.** The monogram shall be applied only by authorized manufacturers (see Appendix B for regulations governing the use of the API monogram). The minimum size of the monogram shall be ¼ in. (6.3 mm).

A.12 Stuffing Box. Each stuffing box body shall be prominently and permanently marked by the manufacturer with the following information.

a. Manufacturer's name or mark.

b. API monogram. (See Appendix B on use of the monogram.)

c. Size and type of bottom thread.

d. Maximum working pressure rating.

Example:

A stuffing-box body having a 2⅜ in. (60.3 mm) upset tubing thread as a bottom connection and having been hydrostatically tested to 5000 psi (34.4 kPa) should be marked as follows:

Mfrs. Name or Mark	⌀	2⅜	UPSET	2500	WOG

Pumping Tee

A.13 Marking. Pumping tees manufactured in accordance with this specification shall be prominently and permanently marked by the manufacturer with the following information:

a. Manufacturer's name and mark.

b. API monogram. (See Appendix B on use of the monogram.)

c. Size and type of top, bottom, and flow-line threads.

d. Maximum working pressure rating.

Example:

A pumping tee with a 2⅜ in. (60.3 mm) upset tubing thread on top, a 2⅞ in. (73 mm) non-upset tubing thread on bottom, a 2 in. (50.8 mm) line pipe flow line connection, and having been hydrostatically tested to 10000 psi (68.8 kPa) should be marked as follows:

Mfrs. Name or Mark	⌀	2⅜	UPSET × 2⅞ × 2 5000 WOG

AMERICAN PETROLEUM INSTITUTE

PRODUCTION DEPARTMENT
2535 ONE MAIN PLACE
DALLAS TX 75202

STATEMENT OF MANUFACTURER'S QUALIFICATIONS TO USE API MONOGRAM

The information indicated below, when requested by the Institute, must accompany all applications to use the API monogram. All such information is subject to investigation and application must be rejected if the information supplied so warrants.

Material:_____
(List here the equipment on which applicant desires to apply the monogram.)

API specification designation:_____

1. Name of applicant:_____
2. Location of principal office:_____
3. Where will equipment be manufactured?_____
4. Class of ownership:_____
(Corporation, partnership, or individual)
5. Capital invested:_____
6. Year organized:_____
7. Is the applicant thoroughly familiar with all stipulations given in the API specification covering this material?_____
8. Is the applicant actually manufacturing this material now?_____
   a. State the length of time applicant has made the material and supplied it to the oil industry:_____
   (Years and Months)
   b. State the approximate percentage of production of this material to applicant's total production:_____
9. Give the names and addresses of five representative users in the oil industry to whom applicant has sold this material (give name of company, complete street address, and name of company representative to whom inquiries should be addressed):

10. If applicant has not supplied this material to the oil industry and cannot furnish the five references under item 9, give the names and addresses of five representative users in other industries to whom applicant has sold similar equipment (give name of company, complete street address, and name of company representative to whom inquiries should be addressed):

11. If the applicant is not now manufacturing this material, when does he expect to begin production?

12. If the applicant has not previously made this material, state fully (on an attached sheet) the experience of any members of applicant's present organization in the manufacture of this material, giving names of organizations where such experience was obtained.

Questions 13, 14, and 15 need be answered only if the specification requires testing or possession of reference master gages.

13. Does the applicant now possess the necessary equipment and personnel for conducting all tests required in the API specification covering this material?

14. Does the applicant now possess such API reference master thread gages as required by the specification covering this material?

If applicant possesses such gages, give full information (on separate sheet) on types, sizes, certifying agency, and certification dates.

15. If the applicant does not now possess such gages, have they been ordered?

If so, give full information (on separate sheet) on types, sizes, and from whom ordered.

16. Give names of five responsible business men as references regarding applicant's general character, integrity, and reputation. (Give complete mailing address and name of organization with which each is affiliated.)

17. Name and address of applicant's representative to whom API correspondence should be directed:

(Signature and title of authorized officer)

Date

(Name of organization, company or individual)

(The above statement to be signed in the name of the applicant by an authorized officer)

2.5M—4-90—Johnston
2M—9-90—Johnston

LICENSE AGREEMENT

Use of the Official Monogram of the American Petroleum Institute

This Agreement between the AMERICAN PETROLEUM INSTITUTE (hereinafter "API"), a corporation of the District of Columbia, having an office at 1220 L — Street, N.W., Washington, D.C., and _____, (hereinafter "Licensee"), a corporation of _____, having its principal place of business at _____ provides that:

WHEREAS, API is the owner of federal trademark and servicemark registrations including registration nos. 677,359; 679,642 and 840,642, as well as the owner of common law rights to such trademarks and servicemarks and various other trademarks and servicemarks;

WHEREAS, API through licensing, publications and other programs seeks to establish and promote standards and specifications for goods and services in the petroleum industry;

WHEREAS, Licensee desires a non-exclusive license from API for the purpose of promoting the standards and specifications of API by use of API trademarks or servicemarks on or in connection with the marketing of goods made in accordance with API standards and specifications.

NOW THEREFORE, in consideration of the mutual covenants hereinafter stated, the parties agree as follows:

1. API grants to Licensee a non-exclusive license to use the trademark/servicemark API (the "monogram") on _____
(List here the products on which the monogram is to be applied)
made at its facility located at _____ ("facility") in accordance with the official publication of API entitled API Spec 11B, API Specification for Sucker Rods ("the products"), including any amendments, modifications or substitutions that may hereafter be adopted.

2. API grants to Licensee a non-exclusive license to use the monogram in connection with the marketing of the products; provided, however, that Licensee shall not use the monogram on letterheads or in any advertising without an express statement of fact describing the scope of Licensee's authorization, and further provided that Licensee shall not use the monogram or the name the AMERICAN PETROLEUM INSTITUTE or the description "API" in any advertising or otherwise to indicate API approval or endorsement of the products.

3. Licensee agrees that it will do all acts required of it by API to ensure that pertinent API standards and specifications are being met at all times in the manufacture of the products, including submitting when requested by API a statement of manufacturer's qualifications and samples of the products and permitting API, or a representative thereof, upon reasonable notice to inspect pertinent manufacturing facilities. API shall be the sole judge of whether Licensee meets the appropriate qualifications to become and remain a licensee and whether the products meet the appropriate qualifications.

4. Licensee agrees that use of the monogram on the products shall constitute a representation and warranty by Licensee to API and to the purchasers of the products that the products conform to the applicable standards and specifications of API; and Licensee agrees to hold harmless and indemnify API for any and all liability, loss, damage, cost and expense which API may suffer, incur, or be put to by reason of any claim, suit or proceeding, for personal injury, property damage or economic loss based on failure or alleged failure of the Licensee's products to conform to such standards and specifications; and Licensee further agrees to defend API, at Licensee's expense, against any and all such suits, claims or proceedings.

5. This license solely for the products made by licensee at its facility designated above and shall not be assignable or transferable by Licensee in any manner nor shall Licensee have the right to grant sublicenses.

6. This Agreement may be terminated at any time and for any reason satisfactory to the API.

7. This license shall run for a term of three years unless sooner terminated.

8. Licensee agrees to pay an annual license fee when billed by API.

Date: _____

Effective Date: _____

Expiration Date: _____

_____
(Licensee Company Name)

By _____

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