INTERNATIONAL STANDARD

ISO 13092

First edition
2012-05-15

Titanium and titanium alloys — Titanium sponge

Titane et alliages de titane — Éponge de titane

Reference number
ISO 13092:2012(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13092 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 11, *Titanium*.

Copyrighted material licensed to Dublin Institute of Technology by SAI Global (www.saiglobal.com), downloaded on 12 Jul 12 by Ann McSweeney.
No further reproduction or distribution is permitted. Uncontrolled when printed.

Titanium and titanium alloys — Titanium sponge

1 Scope

This International Standard specifies properties of titanium sponge used for malleable materials and castings.

2 Normative references

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

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
titanium sponge
products of metallic titanium in porous and sponge-like form, which is applied as titanium-metal melting stock.

3.2
magnesium reduction method
manufacturing process of titanium sponge that uses metallic magnesium

NOTE Titanium tetrachloride is reduced by metallic magnesium, followed by distillation and crashing.

3.3
sodium reduction method
manufacturing process of titanium sponge that uses metallic sodium

NOTE Titanium tetrachloride is reduced by metallic sodium, followed by leaching and drying.

4 Classification, symbols and manufacturing method

The classification, symbols and manufacturing method of titanium sponge shall be as given in Table 1.

Table 1 — Classification, symbols and manufacturing method

Classification	Symbol	Manufacturing method
Class 0 M	TS-100 M	Magnesium reduction method
Class 1 M	TS-105 M	Magnesium reduction method
Class 1 S	TS-105 S	Sodium reduction method
Class 2 M	TS-120 M	Magnesium reduction method
Class 2 S	TS-120 S	Sodium reduction method
Class 3 M	TS-140 M	Magnesium reduction method
Class 3 S	TS-140 S	Sodium reduction method
Class 4 M	TS-160 M	Magnesium reduction method
Class 4 S	TS-160 S	Sodium reduction method
Class 5 M	TS-200 M	Magnesium reduction method

5 Quality

The quality of the titanium sponge shall be as follows:

a) The titanium sponge shall be uniform in quality and free from the admixture of other materials that affect the quality.

b) The chemical composition and Brinell hardness of titanium sponge shall comply with Table 2. The Brinell hardness test method shall be in accordance with ISO 6506-1.

Table 2 — Chemical composition and hardness

Symbol	Chemical composition %											Hardness HBW 10/1500
	Fe	Cl	Mn	Mg	Na	Si	N	C	H	O	Ti	
TS-100 M	0,06 max.	0,06 max.	0,01 max.	0,06 max.	—	0,02 max.	0,02 max.	0,02 max.	0,005 max.	0,06 max.	99,7 min.	100 max.
TS-105 M	0,10 max.	0,10 max.	0,01 max.	0,06 max.	—	0,03 max.	0,02 max.	0,03 max.	0,005 max.	0,08 max.	99,6 min.	105 max.
TS-105 S	0,03 max.	0,15 max.	0,01 max.	—	0,10 max.	0,03 max.	0,01 max.	0,03 max.	0,010 max.	0,08 max.	99,6 min.	105 max.
TS-120 M	0,15 max.	0,12 max.	0,02 max.	0,07 max.	—	0,03 max.	0,02 max.	0,03 max.	0,005 max.	0,12 max.	99,4 min.	Over 105 to 120 incl.
TS-120 S	0,05 max.	0,20 max.	0,02 max.	—	0,15 max.	0,03 max.	0,01 max.	0,03 max.	0,010 max.	0,12 max.	99,4 min.	Over 105 to 120 incl.
TS-140 M	0,20 max.	0,15 max.	0,05 max.	0,08 max.	—	0,03 max.	0,03 max.	0,03 max.	0,005 max.	0,15 max.	99,3 min.	Over 120 to 140 incl.
TS-140 S	0,07 max.	0,20 max.	0,05 max.	—	0,15 max.	0,03 max.	0,03 max.	0,03 max.	0,015 max.	0,15 max.	99,3 min.	Over 120 to 140 incl.
TS-160 M	0,20 max.	0,15 max.	0,05 max.	0,08 max.	—	0,03 max.	0,03 max.	0,03 max.	0,005 max.	0,25 max.	99,2 min.	Over 140 to 160 incl.
TS-160 S	0,07 max.	0,20 max.	0,05 max.	—	0,15 max.	0,03 max.	0,03 max.	0,03 max.	0,015 max.	0,25 max.	99,2 min.	Over 140 to 160 incl.
TS-200 M	0,40 max.	0,30 max.	0,08 max.	0,15 max.	—	0,06 max.	0,10 max.	0,05 max.	0,030 max.	0,30 max.	98,5 min.	200 max.

Copyrighted material licensed to Dublin Institute of Technology by SAI Global (www.saiglobal.com), downloaded on 12 Jul 12 by Ann McSweeney.
No further reproduction or distribution is permitted. Uncontrolled when printed.

ICS 77.120.50

Price based on 2 pages