
**Titanium and titanium alloys —
Titanium sponge**

Titane et alliages de titane — Éponge de titane

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Foreword

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

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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.