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**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 47018.7-2022

**Technical conditions for ordering welding materials for
pressure equipment - Part 7: Titanium and titanium alloy
welding wires and filler wires**

(English Translation)

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Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents.

This Document is Part 7 of NB/T 47018 Technical Permission of Welding Materials for Pressure Equipment. NB/T 47018 consists of the following parts:

- Part 1: General Rules of Procurement;
- Part 2: Electrodes for Steel;
- Part 3: Steel Electrodes and Rods for Gas Shielded Arc Welding;
- Part 4: Electrodes and Fluxes for Submerged Arc Welding;
- Part 5: Stainless-Steel Strip Electrodes and Fluxes for Overlay Welding;
- Part 6: Aluminum and Aluminum Alloy Welding Wires and Filler Wires;
- Part 7: Titanium and Titanium Alloy Welding Wires and Filler Wires;

This Document replaced NB/T 47018.7-2011 Technical Permission of Welding Materials for Pressure Equipment - Section 7: Titanium and Titanium-Alloy Welding Electrodes and Rods.

Compared with NB/T 47018.7-2011, the major technical changes of this Document are as follows besides structural adjustments and editorial modifications:

- a) Add two models of titanium welding wire and filler wire, ER TA7ELI and ER TC4ELI; and specify their chemical compositions (see Tables 1 and 2 of this Edition);
- b) Delete the provisions on smelting methods (see 4.3 of this Edition; 4.3.1 of the 2011 Edition).

Please note some contents of this Document may involve patents. The issuing agency of this

Document shall not assume the responsibility to identify these patents.

This Document was proposed by and under the jurisdiction of National Technical Committee

on Boilers and Pressure Vessels of Standardization Administration of China (SAC/TC 262).

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Group Co., Ltd.; Nanjing Youtian Metal Technology Co., Ltd.; Shanghai Institute of Special Equipment Inspection and Technical; Tianjin Institute of Special Equipment Supervision and Inspection Technology; Guangxi Zhuang Autonomous Region Special Equipment Inspection and Research Institute; Harbin Welding Research Institute Co., Ltd.; Tianjin Golden Bridge Welding Materials Group Co., Ltd.; Advanced Technology & Materials Co., Ltd. of China Iron Specification of Welding Materials for Pressure Equipment -

Section 7: Titanium and Titanium-Alloy Welding Electrodes and Rods

1 Scope

This Document specifies the designation compilation, technical requirements, test methods, inspection rules and product identification of titanium and titanium alloy welding wires and filler wires.

This Document is applicable to titanium and titanium alloy welding wires and filler wires for gas tungsten arc welding, gas metal arc welding and plasma arc welding and other suitable melting welding methods of pressure equipment.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates

indicated are applicable to this Document; for the undated documents, only the latest version

(including all the amendments) is applicable to this Document.

GB/T 2653 Bend test methods on welded joints

GB/T 3620.1 Designation and Composition of Titanium and Titanium Alloys

GB/T 3623 Titanium and titanium alloy wire

GB/T 4698 (all parts) Methods for chemical analysis of titanium sponge, titanium and titanium alloys

GB/T 5168 Microstructure and macrostructure examination for titanium and titanium alloys

AWS A5.16 Titanium and titanium alloy welding wire and filler wire

NB/T 47014 Welding procedure qualification for pressure equipment

NB/T 47018.1 Technical permission of welding materials for pressure equipment - Part 1:

General rule

4.4 The transverse metallographic inspection (macrostructure) results of titanium and titanium

alloy welding wires and filler wires shall be free of cracks, folds, pores, delamination, shrinkage,

metal or non-metal inclusions and other defects that affect use.

4.5 The surface of titanium and titanium alloy welding wires and filler wires shall be clean and

smooth, free of burrs, depressions, scratches, scales, folds and other defects that affect use; and

free of contamination by lubricants and other foreign substances.

4.6 After the weld metal longitudinal bending specimen is bent to the specified angle, there

shall be no single opening defect with a length greater than 3 mm in any direction along the inner edge of the weld metal on the tensile surface. The corner opening defects of the specimen

weld metal can be ignored; but the length of the corner opening defects caused by un-fusion,

slag inclusions or other internal imperfections shall be included.

5.1 The chemical composition analysis specimens of titanium and titanium alloy welding wires

and filler wires shall be taken as finished product analysis; and the arbitration test shall be carried out in accordance with the provisions of GB/T 4698 (all parts).

5.2 The size inspection of titanium and titanium alloy welding wire and filler wire shall be

measured with a measuring tool with an accuracy of 0.01 mm.

5.3 The metallographic inspection (macrostructure) of titanium and titanium alloy welding wire

and filler wire shall be carried out in accordance with the provisions of GB/T 5168. When the

transverse metallographic inspection (macrostructure) finds that the welding wire or filler wire

has unnecessary defects, the welding wire or filler wire with typical defects can be sampled for

radiographic test.

5.4 The surface and macroscopic quality inspection of titanium and titanium alloy welding wire

and filler wire shall be visually inspected.