
**Tubes of titanium and titanium
alloys — Welded tubes for condensers
and heat exchangers — Technical
delivery conditions**

*Tubes en titane et alliage de titane — Tubes soudés pour condenseurs
et échangeurs de chaleur — Conditions techniques de livraison*

Sample Document

get full document from standards.iteh.ai



Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Information to be supplied by the purchaser	1
3.1 General information.....	1
3.2 Options.....	2
4 Manufacturing	2
5 Requirements	2
5.1 General.....	2
5.2 Chemical composition.....	2
5.3 Tensile properties.....	4
5.4 Flattening test.....	4
5.5 Reverse flattening test.....	5
5.6 Drift-expanding (flaring) test.....	5
5.7 Non-destructive tests.....	6
5.7.1 General.....	6
5.7.2 Pneumatic test.....	6
5.7.3 Eddy current test.....	6
5.7.4 Ultrasonic test.....	6
5.8 Surface conditions, imperfections and defects.....	7
5.9 Dimensions and tolerances.....	7
5.10 Finish.....	7
6 Inspection	8
6.1 Types of inspection and inspection documents.....	8
6.1.1 General.....	8
6.1.2 Inspection documents.....	8
6.2 Specific inspection.....	8
6.2.1 Inspection frequency.....	8
6.2.2 Samples and test pieces for product analysis.....	8
6.2.3 Samples and test pieces for mechanical tests.....	8
6.2.4 Test methods.....	9
7 Rounding-off procedure	9
8 Reference test and analysis	9
9 Rejection	10
10 Marking	10
10.1 General.....	10
10.2 Tube marking.....	10
11 Packaging	10
12 Certification	10
Bibliography	11

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 11, *Titanium*.

get full document from standards.iteh.ai

Tubes of titanium and titanium alloys — Welded tubes for condensers and heat exchangers — Technical delivery conditions

1 Scope

This International Standard specifies requirements for the manufacture of welded tubes made from titanium or titanium alloys, for use in condensers and heat exchangers.

2 Normative references

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

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 8492, *Metallic materials — Tube — Flattening test*

ISO 8493, *Metallic materials — Tube — Drift-expanding test*

ISO 10474, *Steel and steel products — Inspection documents*

ISO 25902-1, *Titanium pipes and tubes — Non-destructive testing — Part 1: Eddy-current examination*

ISO 25902-2, *Titanium pipes and tubes — Non-destructive testing — Part 2: Ultrasonic testing for the detection of longitudinal imperfections*

ASTM E29, *Practice for Using Significant Digits in test Data to Determine Conformance with Specifications*

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM E120, *Test methods for Chemical Analysis of Titanium and Titanium Alloys*

ASTM E1409, *Test method for determination of oxygen and nitrogen in titanium and titanium alloys by the inert gas fusion technique*

ASTM E1447, *Test method for determination of hydrogen in titanium and titanium alloys by the inert gas fusion thermal conductivity/ Infrared detection method*

ASTM E1941, *Standard Test Method for Determination of Carbon in Refractory and Reactive Metals and their Alloys by Combustion Analysis*

3 Information to be supplied by the purchaser

3.1 General information

The purchase order shall include the following information:

- a) quantity (e.g. total mass or total length of tube);
- b) grade number;
- c) outside diameter and wall thickness (minimum or average);