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**Boilers and pressure vessels —  
Registration of Codes and Standards to  
promote international recognition**

*Chaudières et récipients sous pression — Enregistrement des codes et  
normes afin de faciliter la reconnaissance internationale*

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

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## 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 3.

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years with a view to deciding whether it should be confirmed for a further three years, revised to become an International Standard, or withdrawn. In the case of a confirmed ISO/PAS or ISO/TS, it is reviewed again after six years at which time it has to be either transformed into an International Standard or withdrawn.

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

ISO/TS 16528 was prepared by Technical Committee ISO/TC 11, *Boilers and pressure vessels*.

Annexes A, B and C form a normative part of this Technical Specification. Annexes D and E are for information only.

## Introduction

This Technical Specification establishes means to register national and regional boiler and pressure vessel Codes or Standards to promote international recognition, support safety and facilitate trade. The commonly used national codes and standards have a proven history of supporting public safety and good commercial operating experience. While Codes and Standards registered to this Technical Specification are generally limited to establishing rules for individual boilers and pressure vessels, interaction with other equipment and systems should be considered, e.g. piping system layout, access for inspections, etc.

The international registration of a Code or Standard is achieved by its registration in accordance with the provisions of this Technical Specification. This procedure provides a basis for ISO/TC 11 to confirm that the candidate Code or Standard meets the criteria of this Technical Specification. The technical adequacy of specific requirements of a Code or Standard is beyond the scope of this registration process. Such technical concerns should be submitted directly to the Standardizing Body that promulgates the Code or Standard.

Requirements of a local administrative nature in candidate Codes or Standards, e.g. specific national/regional regulatory requirements for documentation, should be segregated and identified. In accordance with the principles of the Agreement on Technical Barriers to Trade, requirements of national or regional Codes or Standards registered in accordance with this Technical Specification should not be more trade-restrictive than necessary to fulfil legitimate objectives, such as national security, protection of human health and safety.

Compliance with the requirements of this Technical Specification does not relieve parties from obligations under local, national or international laws or regulations.

Standardizing Bodies promulgating Codes or Standards are solely responsible for the technical adequacy for their intended use. These Standardizing Bodies are encouraged to publish non-mandatory information documenting theories embodied in the Code or Standard, guidelines for use and similar useful information.

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# Boilers and pressure vessels — Registration of Codes and Standards to promote international recognition

## 1 Scope

This Technical Specification specifies the criteria and process for registration of boiler and pressure vessel Codes and Standards to promote international recognition, support safety and facilitate trade.

This Technical Specification is not applicable to Codes and Standards for nuclear components, railway and marine boilers, gas cylinders or piping systems, and mechanical equipment, e.g. turbines and machinery casings.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Technical Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Technical Specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 31 (all parts), *Quantities and units*, <https://standards.iteh.ai/catalog/standards/sist/41f48f80-5190-47e1-9619-296a7b1ccf4c/iso-ts-16528-2002>

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

## 3 Terms and definitions

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

### 3.1 accreditation

procedure by which an authoritative body gives formal recognition that an organization is competent to carry out specific tasks

### 3.2 associated document

document whose use is required with the Code or Standard in order to demonstrate compliance with this Technical Specification

EXAMPLES National or regional regulation, a national, regional or international standard, or other document.

### 3.3 authoritative body

governmental regulatory authority or private organization recognized by a regulatory authority

### 3.4 certification

procedure by which a third party or manufacturer gives written assurance that a product, process or service conforms to specified requirements

**3.5**

**Code**

**Standard**

document established and approved by a standardizing body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results

**3.6**

**designer**

organization or individual that carries out the design of a boiler or pressure vessel in compliance with a Code or Standard

**3.7**

**examination**

activity carried out by qualified personnel using qualified procedures to assess that given products, processes or services are in conformance with specified acceptance criteria

**3.8**

**registered Code [Standard]**

Code [Standard] on boilers and pressure vessels that meets specified criteria and has been registered under the provisions of this Technical Specification

**3.9**

**inspection**

activity to verify that the results of required testing or examinations comply with specified requirements

**3.10**

**manufacturer**

organization or individual that performs or subcontracts fulfilment of all relevant requirements in accordance with a Code or Standard, and is responsible for compliance

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**3.11**

**standardizing body**

body that promulgates a national, regional or international boiler or pressure vessel Code or Standard

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**3.12**

**qualification**

proof of suitability of an individual, process, procedure or service to fulfil specified requirements

**3.13**

**regulation**

document, providing binding legislative rules, that is adopted by a regulatory authority

**3.14**

**testing**

activity carried out to determine by specific procedures that one or more characteristics of a product, process or service meets one or more specified requirements

**3.15**

**third-party inspection body**

organization independent from the designer, manufacturer, supplier, installer, purchaser, owner or user that performs inspections on boilers and pressure vessels as provided for by Codes or Standards

**3.16**

**user**

organization or individual using or operating boilers or pressure vessels



## 4 Criteria for the structure of Codes and Standards

### 4.1 Scope

The intended technical scope, by boiler and pressure vessel type, geometric boundaries, pressure and temperature and other appropriate limits, shall be defined.

### 4.2 Normative references

Normative reference documents, for example standards for welding procedure qualification and material specifications, shall be listed. Such reference documents shall be publically available.

### 4.3 Terms, definitions and symbols

Definitions of terms and symbols shall be given. Where possible, definitions shall be consistent with common usage and shall preferably be in accordance with standard definitions provided in widely used technical standards, e.g. (inter)national standards for non-destructive examination.

### 4.4 Languages and units of measurement

Any Code or Standard and associated documents intended to be registered under this Technical Specification shall be available in the native language of the country of registration and in the English language. Translation of referenced documents such as material specifications is not required. The native language version shall be considered the official version.

The English version of the Code or Standard and associated documents shall be endorsed by the standardizing body submitting the application. (See annex E for an informative flowchart of the procedure for objection.)

NOTE It is not necessary for the English version of the Code or Standard and associated documents to be approved by an authoritative body.

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Any Code or Standard and associated documents intended to be registered under this Technical Specification shall include units that comply with ISO 1000 and ISO 31 (all parts).

### 4.5 Duties and responsibilities

The duties and responsibilities of parties such as manufacturers, designers, users and inspection bodies shall be specified. These may be in the Code or Standard, governing regulations or associated documents.

### 4.6 Classification of boilers and pressure vessels

Boilers and pressure vessels are defined by the Codes and Standards registered to this Technical Specification.

When appropriate, Codes and Standards shall classify boilers and pressure vessels according to the various levels of hazard or risk, e.g. from contained energy, use for flammable, toxic or explosive substances, considering system design criteria and overall system operation information.

### 4.7 Technical requirements

#### 4.7.1 Materials

Codes and Standards shall specify permitted standardized or otherwise specified material (including formally approved data sheets) for pressure-bearing parts. If necessary, additional requirements essential to structural integrity of the component, including limits of applicability (e.g. highest and lowest temperatures) of product forms, shall be specified.

If a Code or Standard permits use of non-standard material or the use of standardized material outside limits established by material specifications, criteria for such use shall be provided.

Material requirements shall give consideration to the classification of the boiler or pressure vessel.

Appropriate material requirements for non-pressure-bearing parts (e.g. supports and attachments) which will be welded to pressure-bearing parts shall be provided.

Welding material requirements shall be specified.

Testing and documentation of the test results shall be specified.

## **4.7.2 Design**

### **4.7.2.1 Design methods**

Design methods shall be specified. These methods shall be based on a coherent system of design, including provision for design input and recognition of modes of failure.

Design input parameters such as pressure, temperature, cycles, etc. shall be defined to ensure consistent application of design methods.

The minimum thicknesses and dimensions to ensure the integrity of the components shall be determined, either through appropriate design rules, analysis or experimental methods, or a combination of these methods.

### **4.7.2.2 Margins on material properties**

Criteria for establishing appropriate margins on utilization of material properties and types of design based on service requirements and anticipated failure modes shall be specified.

Margins imposed on material properties shall be based on criteria that account for time-dependent and time-independent properties.

### **4.7.2.3 Design factors**

In addition to margins on material properties, factors on design (such as weld joint efficiency based on extent and type of examination, shape or size of the component, etc.) shall be specified. Any limitations on application of the design factors in terms of types of material or design conditions shall be specified.

### **4.7.2.4 Loadings and other design considerations**

Internal and/or external pressure loads at coincident material temperature(s) shall be addressed.

Consideration shall also be given to the following conditions, as appropriate, either in the Code or Standard or through reference to recognized documents:

- a) mass of the component under operating conditions and hydraulic pressure test conditions;
- b) loads supported by or reacting on the component;
- c) wind loading;
- d) earthquake loading;
- e) temperature differentials, including transient conditions and by differences in coefficients of thermal expansion;
- f) fluctuations in pressure and temperature during normal operating and upset conditions;

- g) degradation mechanisms, e.g. corrosion;
- h) handling and transportation.

### 4.7.3 Manufacture

#### 4.7.3.1 Methods

Any restrictions on methods and techniques for particular applications shall be identified. Appropriate guidance regarding degradation of materials due to fabrication, e.g. heat treatment or forming, shall be provided.

#### 4.7.3.2 Identification of materials

Requirements shall be specified to ensure identity of material used for pressure-bearing parts.

#### 4.7.3.3 Preparation of parts

Limitations on preparation of parts such as cutting, forming, etc. shall be specified.

#### 4.7.3.4 Welding

##### 4.7.3.4.1 General

Permitted welding processes and any limitations shall be specified. Requirements for the use of qualified procedures, qualified welders and qualification records shall be specified. If interchangeability of welding procedure qualifications and welder qualifications is permitted, the criteria shall be specified.

##### 4.7.3.4.2 Welding procedure qualifications

The qualification of welding procedures to be used in production of boilers and pressure vessels, e.g. welding positions, materials and thickness, including range of validity, shall be specified.

##### 4.7.3.4.3 Welder qualifications

Requirements for testing the individual skill of welders appropriate to the types of welds to be made in actual production shall be specified. Also, specific qualification requirements or qualifications in accordance with the manufacturer's quality programme or recognized national qualification schemes may be specified. Requirements for requalification shall be specified.

##### 4.7.3.4.4 Welder identification

Appropriate requirements shall be specified for identification of welders to production welds.

##### 4.7.3.4.5 Heat treatment

Requirements for heat treatment of materials and weldments after welding or forming shall be specified.

##### 4.7.3.4.6 Tolerances

When tolerances and ranges are appropriate they shall be specified, e.g. for heat-treat temperature, circularity, peaking and weld sizes.