

English Version

**Flanges and their joints - Design rules for gasketed circular  
flange connections - Part 4: Qualification of personnel  
competency in the assembly of bolted joints fitted to equipment  
subject to the Pressure Equipment Directive**

Brides et leurs assemblages - Règles de calcul des  
assemblages à brides circulaires avec joint - Partie 4 :  
Qualification des compétences du personnel en charge du  
montage des assemblages boulonnés sur des équipements  
relevant de la Directive Équipements sous pression

Flansche und ihre Verbindungen - Regeln für die  
Auslegung von Flanschverbindungen mit runden Flanschen  
und Dichtung - Teil 4: Qualifizierung der Kompetenz von  
Personal zur Montage von Schraubverbindungen im  
Geltungsbereich der Druckgeräte-Richtlinie

This Technical Specification (CEN/TS) was approved by CEN on 26 May 2007 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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## Foreword

This document (CEN/TS 1591-4:2007) has been prepared by Technical Committee CEN/TC 74 "Flanges and their joints", the secretariat of which is held by DIN.

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

The integrity of a bolted joint is key in any pressure containment system and should be subjected to personnel competence. The aim of this document is to offer a procedure for training and competency assessment of personnel who disassemble, assemble and tighten bolted joints under the Pressure Equipment Directive 97/23/EC.

EN / ENV / CEN/TS 1591 *Flanges and their joints — Design rules for gasketed circular flange connections* consists of the following parts:

*Part 1: Calculation method (EN)*

*Part 2: Gasket parameters (ENV)*

*Part 3: Calculation method for metal to metal contact type flanged joint (CEN/TS)*

*Part 4: Qualification of personnel competency in the assembly of bolted joints fitted to equipment subject to the Pressure Equipment Directive (CEN/TS)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 1 Scope

### 1.1 General

This European Technical Specification establishes a process for training and competency assessment of personnel who disassemble, assemble and tighten bolted joints such as fitted to equipment subject to the Pressure Equipment Directive 97/23/EC (PED), in the content of this Technical Specification named "PED".

### 1.2 Requirement for competency

Training and competence, experience and knowledge are often confused with each other. Training is no guarantor of competence, nor is experience a guarantor of knowledge and understanding. Training, experience, and assessment of knowledge are all required to achieve competence.

Design codes for mechanical joints (see for example EN 1591-1 or CEN/TS 1591-3) increasingly require controlled bolt tightening in order to meet the specified bolt load tolerances.

The intent of this Technical Specification is to ensure personnel are competent to assemble and tighten bolted joints using the design bolt load and documented work instructions, thereby establishing a joint capable of maintaining a leak-free status throughout its service life.

Competency in the analysis of joint failure is not required beyond use of knowledge gained during training. A correctly assembled and tightened joint that fails in service requires specialist knowledge and is out with the scope of this Technical Specification.

### 1.3 Validity

This Technical Specification is applicable for bolted joints included on mechanical equipment subject to the PED, or any joint where failure would endanger personnel, plant or the environment. Such joints may or may not be fitted with a gasket.

The validity includes all bolting arrangements, both circular and non-circular, and fluids (gas or liquid) with the exception of:

- joints having less than 4 bolts, or bolt diameters less than M16;
- potable or fire water, sewage systems.

This Specification excludes:

- craft personnel who are trained, examined and verified as competent in their craft training or normal course of work to assemble bolted joints, such as in the manufacture of equipment;
- professional persons, who by their professional training and experience and contemporary practices are regularly concerned with bolted joints and their assembly.

### 1.4 Quality management system

Manufacturers or operators need to develop and include a procedural framework within their quality management system to meet the requirements of this specification. Such a framework needs to address:

- identification of personnel requiring training;
- identification of a competent trainer or training provider, e.g. "Qualified Person for Pressure";

- evaluation of the effectiveness of the training.

For examples, refer to EN ISO 9001:2000, 6.2.2.

## 2 Normative references

Not applicable.

## 3 Terms and definitions

### 3.1

#### **manufacturer**

organisation that manufactures equipment subject to the PED directive

### 3.2

#### **operator**

organisation that is responsible for the operation and maintenance of equipment subject to the PED directive. This includes suppliers or contractors employed to assemble the operator's equipment joints

### 3.3

#### **training provider**

organisation with the capability to deliver the required training

### 3.4

#### **trainer**

individual assigned by the training provider to deliver the training

## 4 Objective

The objective of this Technical Specification is to set down a route for achieving competency in the skills required to safely and successfully disassemble, assemble and tighten bolted joints.

The essential elements to achieve competency are:

- classroom training followed by monitored workshop practice;
- written test to verify candidate has understood the classroom training;
- period of monitored work site experience under the supervision of a competent person;
- assessment by a qualified assessor to verify the training has been understood and applied.

These elements may be combined through perennial training including technical schooling, on-plant training, and final examination.

## 5 Training location

Training may either take place at a suitable training centre or at the facility where the candidates normally work.

The location should include a suitable classroom and practical workshop where the possibility exists to train with bolted joints that are representative of the candidate's normal place of work.