



**BUSINESS PLAN**  
**CEN/TC 74**  
**Flanges and their joints**

**EXECUTIVE SUMMARY**

**Business Environment**

Europe represents a large percentage of the world market for flanges. Flanges are standard equipment in water, gas, sewage pipelines, oil and natural gas pipelines, refineries, petrochemical and chemical as well as pharmaceutical plants;

Parties involved:

- Flange users (Chemical industry, power plant industry, etc.);
- Piping designers and installers;
- Flange manufacturers and associations
- Gasket manufacturers and associations;
- Testing and surveillance laboratories.

**Benefits**

The scope of CEN/TC 74 includes standardization of flanges and their joints in pipelines and piping systems, for all applications excluding hydraulic and pneumatic load transmission.

- Since 1990, 38 European standards of CEN/TC 74 have been adopted, with some of them already been revised,
- These European standards provide harmonised state of the art solutions for the market for PN-designated products and consider commonly applied design principles in the EEA,
- European standards fix a common European level of safety for flanges and their joints in pressure equipment.

**Priorities**

Priority in the work of CEN/TC 74 has been given to:

- Standards that fulfill the essential safety requirements of the Directive on Pressure Equipment, 2014/68/EU,
- Confidence of consumers, taking into account requirements for people with special needs,
- Interoperable public transport applications,
- Electronic Commerce.

## **1 BUSINESS ENVIRONMENT OF THE CEN/TC**

### **1.1 Description of the Business Environment**

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this CEN/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The work of CEN/TC 74 concerns the trade of flanges, fasteners and flange gaskets in numerous installations. Flanges are standard equipment in various industrial domestic applications like water, gas, sewage pipelines, oil and natural gas pipelines, refineries, petrochemical and chemical as well as pharmaceutical plants. They connect most likely piping systems, valves, pressure vessels, storage tanks, tank trucks, ships for transportation, loading and unloading of various media. Interested parties in the standardisation process are flange manufacturers, gasket manufacturers, bolting manufacturers, piping and pipeline manufacturers, installers and plant manufacturing companies, as well as chemical companies and testing and surveillance laboratories.

The scope of CEN/TC 74 includes standardization of flanges and their joints for equipment in the scope of the PED 2014/68/EU, for all applications excluding hydraulic and pneumatic load transmission. This includes the standardisation of definitions, flange and gasket dimensions, technical delivery conditions, selection of materials and bolting, calculation methods and p/T ratings.

Within Europe flanges made from different steel grades, cast iron, copper alloys and aluminium alloy types are in use. These are based upon two major concurring flange systems: The PN designated system and the American based Class designated system. The Class designated system is traditionally dominating in the oil and refinery industry, while the PN designated based system is dominating in chemical and process industry.

Major differences between the two systems are the choice of materials available, dimensions and calculation rules and the range of application w/r to pressure and temperature. On account of their origin the Class designated ANSI flanges have been geared to the metrical system of units, which makes both series incompatible. Thus it is necessary for plant operating companies to keep components of both series in stock sometimes even for different installations in a single plant, which leads to high expenses.

The availability of two series of European standards (PN and Class designated) based on this means, transforming both flange systems from national standards towards equally available regional standards, respects widely used market solutions and common end user expectations.

Following legislative factors are to be observed:

- flanges and joints are subject to the Pressure Equipment Directive (PED) (2014/68/EU);
- ban on asbestos materials used for the manufacture of flange gaskets;
- Industrial Emissions Directive (IED) (2010/75/EU).

The Pressure Equipment Directive aims at establishing a legal framework covering the hazard related to pressure inherent to pressure equipment. Several Work Items of CEN/TC 74 are mandated under this Directive.

NOTE Any reference to the Construction Products Directive has not yet been taken into account.

The European gasket and sealing industry provides various solutions to meet flange joints designers/installers requirements regarding pressure, temperature, fluid resistance. In former years, rubber bound asbestos has been often in use because of its suitability for general application purposes. Development of new materials and designs had been triggered by the ban on asbestos in most EU member countries. These materials and designs are being standardised to facilitate European trade and respects the growing demands concerning health, safety and environment.

It is recognised that industry must reduce its impact on the environment in order to ensure global development for the future. Part of industrial emissions occur through unanticipated or spurious leaks in process systems, e.g. from leaking valves, pumps or flanges. These "fugitive emissions" have not only an impact on the environment, but cause also a tremendous financial burden on industry, because it represents a huge loss of potentially valuable materials, and cause of plant inefficiency. In this area the sealing industry is playing a vital role, through the development of innovative sealing technology appropriate to low or zero emission requirements. The European standards for the determination of the gasket characteristics and for the flange calculation enable the determination of the required assembly bolt forces to fulfil a demanded tightness class. This shall give the industry the possibility to reduce fugitive emissions in a pro-active manner instead of implementing control measures to find leaks on site and to minimize the leaks in this reactive way. It is therefore crucial to have testing standards as well as technical delivery conditions for gaskets and gasket materials; also a calculation procedure is required for the stress and tightness analysis.

The availability of a European testing standard and standards for delivery conditions means that official or private testing laboratories in all European countries can obtain repeatable and reproduceable results. Time consuming double research will become more and more superfluous. The money such laboratories save due to having this standard can not be calculated but is enormous. The fact that all European testing laboratories will be familiar with the same requirements enables the laboratories to exchange their experience, helps to develop and improve the testing methods and makes testing results comparable. Further it creates transparency for the end users.

## **1.2 Quantitative Indicators of the Business Environment**

Market relevance of PN designated goods (e.g. flanges, valves, safety equipment and pressure vessels):

The trade volume of recognised approved and non-approved flanges is estimated as one billion Euro worldwide, splitted to 1/3 Europe, 1/3 NAFTA and 1/3 the rest of the world.

Exports of PN designated goods, e.g. to China, would not be possible without having the respective EN standards. Exact figures are currently not collected.

## **2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC**

- to remove barriers to trade in Europe,
- to strengthen the market for PN flanges,
- to strengthen export economy and possibilities to sell goods to emerging markets like China,
- to fix a common European level of safety for flange connections in pressure equipment,
- to support European legislation, in particular the PED 2014/68/EU on Pressure Equipment.

## **3 PARTICIPATION IN THE CEN/TC**

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standardization organization in your country.

## **4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT**

### **4.1 Defined objectives of the CEN/TC**

- 1) Elaboration of a series of dimensional standards for steel flanges, cast iron flanges, copper alloy flanges and aluminium flanges for the PN designation system, and separately a series of standards for the Class designation system. The mating dimensions within both series are the same.
- 2) Elaboration of two series of gasket standards for several different gasket types, used for PN and Class designated flanges.
- 3) Elaboration of basic terminology standards.
- 4) Elaboration of standards for testing of gaskets and gasket materials and for technical delivery conditions of gaskets and for gasket parameters used in the calculation of flange joints.
- 5) Elaboration of calculation rules for the design of flanges and for the calculation of p/T ratings of flanges.
- 6) Elaboration of bolting standards suitable for flange connections.
- 7) Elaboration of a standard on qualification of personnel competency in the assembly of the bolted connections of critical service pressurized systems.

### **4.2 Identified strategies to achieve the CEN/TC's defined objectives**

CEN/TC 74 has set up different working groups reflecting the objectives given above:

- WG 2 Steel flanges (PN and Class),
- WG 3 Cast iron flanges (PN),
- WG 8 Gaskets (dimensions, testing and determination of gasket factors),
- WG 9 Bolting,
- WG 10 Calculation methods.

Liaisons with CEN/TC 54 "Unfired pressure vessels", CEN/TC 69 "Industrial valves", CEN/TC 197 "Pumps" and with CEN/TC 267 "Metallic industrial piping" ensures compatibility of CEN/TC 74 standards with related Standards in the pressure equipment field.

A liaison with ESA provides support of knowledge and personnel commitment in the field of gaskets.

### **4.3 Environmental aspects**

The activities of this committee are focused on the prevention of fugitive emissions and unexpected releases of substances from pressure systems to land, air and water. The work of the committee is therefore highly beneficial to the environment in controlling these environmental aspects.

Within the activities of the committee, there will also be a drive to ensure that materials and processes recommended within the work of the committee are sustainable and minimize negative impacts on the environment.

The TC takes account of European and national legislation, guidance and latest practices on environmental aspects related to emissions affecting air, ground water, etc.

CEN/TC 74 agreed to consider environmental aspects during the preparation and revision of product standards and recommended to use an environmental checklist according to CEN Guide 4 "Guide for addressing environmental issues in product standards" when starting the work on a project. Further publications may be taken in consideration (e.g. CEN/TS 16524 on methodology for reduction of environmental impacts in product design and development for mechanical products).

## **5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME**

- the resources of experts are decreasing,
- the resources of the standardisation bodies to support the different working groups of the CEN/TC have been reduced.

signed:

*Thu Trang Bähr* (Secretary of CEN/TC 74)

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