

## Applying the EC Pressure Equipment Directive in the Gas Industry

Klaus Büschel, Manfred John and Udo Wasser

[Dipl.-Phys. Dipl.-Wirtschphys. Klaus Büschel, DVGW Deutsche Vereinigung des Gas- und Wasserfaches e.V., Josef-Wirmer-Str. 1-3, D-53123 Bonn [German Technical-Scientific Association of the Gas and Water Industry]; Dipl.-Ing. Manfred John, DVGW-Forschungsstelle am Engler-Bunte-Institut der Universität Karlsruhe, Richard-Willstätter-Allee 5, D-76131 Karlsruhe [Test Laboratory of DVGW] and Lawyer Udo Wasser, Bundesverband der Deutschen Gas- und Wasserwirtschaft e.V. (BGW), Josef-Wirmer-Str. 1, D-53123 Bonn [Federal Association of the German Gas and Water Industry].]

Descriptors: Pressure equipment, conformity assessment, CE mark, piping, valves, regulators, safety devices, meters, filters, pre-heaters, boilers

The EC Pressure Equipment Directive primarily concerns that broad range of equipment that falls under the Equipment Safety Act and its regulations on pressure vessels, boilers etc. However, the majority view is that also some equipment of the gas industry is affected although its pipeline systems have been excluded from the Directive. The interpretation of the Directive must take into account this background in order to reach satisfactory conclusions in the actual application of the Directive to the components of the gas industry.

### 1 Introduction

#### 1.1 The Directive's Purpose and Scope

The EC Pressure Equipment Directive 97/23/EC<sup>1</sup> follows the "New Approach"<sup>1</sup>, being a further step towards technical harmonization of products concerning their design, manufacture and conformity assessment. It applies to the placing on the market and putting into service of pressure equipment and their assemblies with a maximum allowable pressure exceeding 0,5 bar.

The Directive encompasses vessels, piping, safety accessories and pressure accessories, but excludes pipelines that both transport and distribute gas. However, this exclusion is immediately withdrawn for so-called standard pressure equipment.

Between the EC Pressure Equipment Directive and the EC Gas Appliance Directive lies a non-harmonized gap for components of low and medium pressure (e.g. meters and regulators for 100 mbar) that will probably be filled only by the already adopted standardization mandate based on the EC Construction Products Directive<sup>2</sup>. However,

---

<sup>1</sup> For more details see: van Rienen/Wasser point 76 et seq.

<sup>2</sup> See also the relevant standardization mandate M/131 (in: <http://www.europa.eu.int/comm/dg03/directs/dg3d/d3/construc/en/techspec/cen/cenmand/man131/m131t.htm>)

this mandate will show practical results only when adopted and harmonized standards are actually available<sup>3</sup>.

## 1.2 The Significance of the Directive for the Gas Industry

The Directive does not say what standard pressure equipment means but assumes that such may be found in pressure regulating and compressor stations.

Based on the assessment

- that such a Directive, with the motive for effective removal of technical barriers to trade, should apply to as many products as possible and
- that the technical requirements of the Directive—if not in full detail, then by general clauses—mostly cover the usual requirements of the gas industry for the components in question of its pipeline systems

The view that these components are mostly covered by the Directive has gained ground within Marcogaz, the technical association of the European gas industry. Meanwhile this view has been confirmed by the European Commission's Working Group "Pressure" that is preparing guidelines on the subject ("Commission Guidelines")<sup>4</sup>.

## 1.3 Timetable for the Directive's Implementation and Transitional Period

The EC Pressure Equipment Directive was adopted on 29<sup>th</sup> May 1997. This date is followed by steps of national implementation according to a standard timetable. By 29<sup>th</sup> May 1999 the national legislator would have had to pass regulations that fully comply with the substantial provisions of the Directive. As from 29<sup>th</sup> November 1999 these new regulations would have to be applied, taking into account a transitional period until 29<sup>th</sup> May 2002.

In any case, during the transitional period products that comply with the current regulations, i.e. for the gas industry the Energiewirtschaftsgesetz [Energy Industry Act]<sup>IV</sup> and the Gashochdruckleitungsverordnung [High Pressure Gas Line Ordinance]<sup>V</sup>, may be placed on the market. These are in particular those product that carry the (DIN) DVGW test mark, notwithstanding other equivalent products.

---

<sup>3</sup> In particular, a European Standard is said to be harmonized with a technical harmonization Directive (e.g. EC Directives on construction products, gas appliances, pressure equipment, machines), if they are prepared under a mandate of the Commission and listed in the Official Journal within a corresponding "Commission communication in the framework of the implementation of Directive ...". A detailed explanation on the scope of the Construction Products Directive can be found in van Rienen/Wasser point 308 et seq.

<sup>4</sup> See Commission Guideline 1/17. As a result, the view, already suggested by the European Commission during the drafting of the Directive, has gained ground that in any case all those components of the gas industry are considered as standard pressure equipment that are also used in industrial installations (see below).

It is expected that the Commission Guidelines will be available within reasonable time either on the homepage of the EU institutions (<http://www.europa.eu.int>) or via the EOTC (<http://www.eotc.be>).

#### 1.4 Direct Effect of the Directive

As long as the German legislator does not fulfill his duties of implementation, he cannot hold the requirements of the Directive out to manufacturers or users, or enforce their compliance.

At the same time, however, the principle of direct effect, in line with the jurisdiction of the European Court, applies, implying that manufacturers and their costumers may directly refer to the EC Pressure Equipment Directive as of 29<sup>th</sup> November 1999. The competent authorities may hinder neither manufacturers to place on the market products CE marked in accordance with the Directive nor their costumers putting these products into service<sup>VI 5</sup>.

#### 1.5 What is Legally Binding

Concerning the questions about the EC Pressure Equipment Directive, in particular what products are covered, it should be mentioned that only the Directive itself as well as any later pertinent judgements by the European Court are legally binding. Even national regulations transposing an EC Directive will not last, if they thwart the aims of this EC Directive in any respect.

The corresponding harmonized Standards are of indirect legal relevance because adherence to them implies presumption of conformity with the technical requirements of the Directive<sup>6</sup>. All other specifications have to be considered as non-binding recommendations—their practical value notwithstanding.

These non-binding recommendations include, among others, non-harmonized (national, European or international) standards as well as other guidelines of relevant expert bodies where even the European Commission may be represented. The “Guidance Sheets“ of the “Gas Appliance Directive Advisory Committee“ (GADAC) are an example of the latter.

Consequently, it is useful to participate in the pertinent committees in order to fix appropriate and comprehensive requirements for the relevant components in European Standards and so that these become harmonized with the Directive, if possible.

## 2 The Fundamental Structure of the Directive

### 2.1 General Remark

The contents and the main field of application of the Directive—lying outside the gas industry as mentioned above—shall be delineated only as far as seems necessary for the comprehension of questions of interpretation. In addition, reference is made to the text of the Directive itself as well as other publications on the subject<sup>VII VIII IX</sup>.

### 2.2 The Main Elements of the Directive

#### 2.2.1 Recitals

The recitals contain the motives and aims of the Directive in full detail and some additional explanations. They are not merely helpful for the understanding of the Directive but are a

---

<sup>5</sup> van Rienen/Wasser point 160

<sup>6</sup> van Rienen/Wasser point 84

binding yardstick, if there is any doubt whether the Directive has been correctly transposed into national law or adequately applied in a specific case.

### 2.2.2 The Main Part, Articles 1 to 21

The main part contains the essential procedural elements of the Directive. Based on general definitions, Article 1 specifies the scope and delineates it with several exclusion clauses, among others against the EC Directives on gas appliances and machines. Besides Article 1, Articles 3, 9 and 10 combined with Annex II (see 2.2.4 below) provide the essential elements for the classification and conformity assessment of pressure equipment.

### 2.2.3 Annex I, Essential Safety Requirements

Annex I contains the actual technical requirements for the products concerned. These requirements have to be taken into account where applicable for the specific product and its conditions of use, based on a hazard analysis<sup>7</sup>.

### 2.2.4 Annex II, Conformity Assessment Tables

Since the Directive covers a variety of products with very different levels of danger, it also differentiates the requirements for products and their conformity assessment. Consequently, if the sometimes sophisticated classification of a specific product into the nomenclature of the Directive, following particularly the above mentioned articles in the main part, has been achieved, then the minimum level of conformity assessment has to be determined with Annex II.

The Directive distinguishes categories I to IV. However, even above 0,5 bar remains an area outside these categories<sup>8</sup> (called category "0" in the following), where the Directive is formally valid but excludes, at least for this Directive, the CE marking<sup>9</sup>.

If a product falls into category I, the manufacturer may choose a higher category, for which there can be different motives: the uniform treatment of a model range, a more universal usability of a product, a higher level of quality. From the nine tables of Annex II the first one is given here in Figure 1 as an example. It refers to vessels that might also be used for natural gas.

---

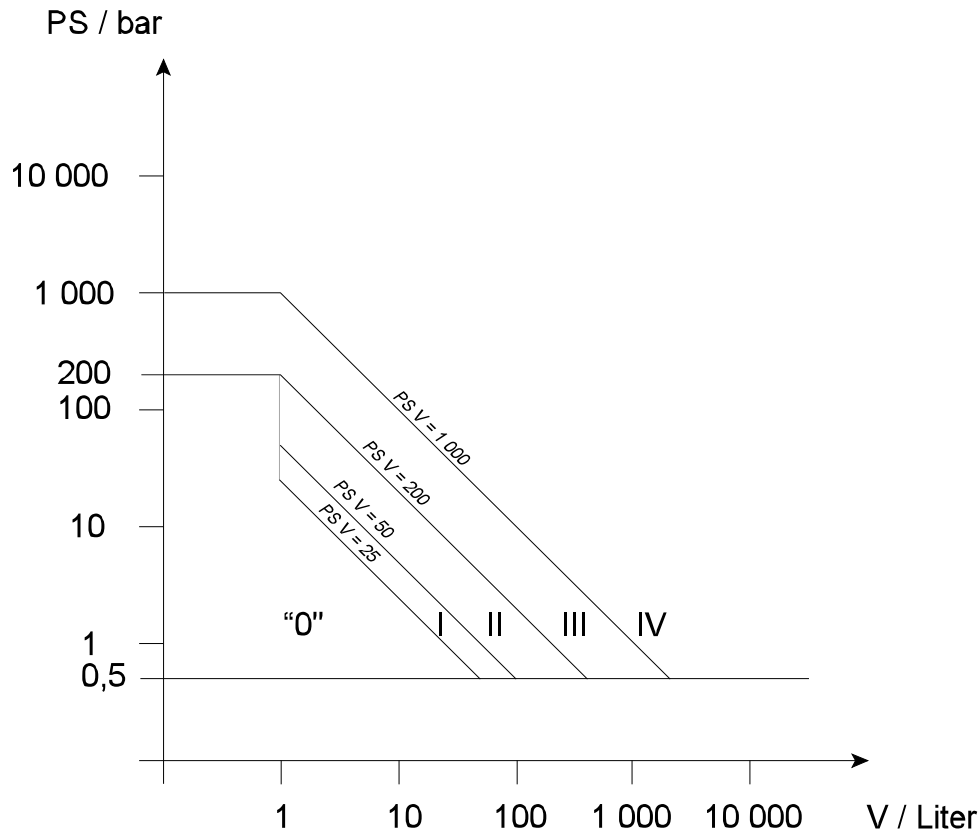
<sup>7</sup> See Annex I Preliminary Observation No. 3. Considering the detailed and continually upgraded body of standards of DVGW in Germany, the hazard analysis is an unfamiliar instrument. It has its primary impact in the new legal framework, if no harmonized standards are available.

Essential elements of the hazard analysis are the possible conditions of use that may be difficult to establish and assess for the manufacturer. A specific example is the question, if and how far stresses transmitted by pipelines can and should be taken into account in addition to the stresses induced by pressure.

<sup>8</sup> Including e.g. pipes and fittings up to DN 25.

<sup>9</sup> van Rienen/Wasser point 463

Figure 1: Table 1 of Annex II of the EC Pressure Equipment Directive



### 2.2.5 Annex III, Conformity Assessment Procedures

As can be seen in the following table, there are different modules for conformity assessment, allowing the manufacturer to pick one that best suits his production system.

Table 1: Modules for Conformity Assessment

Cat.	Modules for Conformity Assessment
"0"	„sound engineering practice“ (technically unregulated areas > 0,5 bar; no CE marking!)
I	A (internal production control)
II	A1 (internal manufacturing checks with monitoring of the final assessment) D1 (production quality assurance) E1 (product quality assurance)
III	B1 (design-examination) + D (p production quality assurance) B1 (design-examination) + F (product verification) B (type-examination) + E (product quality assurance) B (type-examination) + C1 (conformity to type) H (full quality assurance)
IV	B (type-examination) + D (p production quality assurance) B (type-examination) + F (product verification) G (unit verification) H1 (full quality assurance with design-examination and special surveillance of the final assessment)

### 2.2.6 Annex IV, Notified Bodies and Recognized Third-Party Organizations

Except for module A, the manufacturer has to involve accredited third parties in the conformity assessment. Annex IV contains the criteria that these third parties must fulfill. Their scope of activities depends on the specific extent of accreditation. Recognized third-party organizations are especially accredited for the approval of welding procedures and personnel as well as the personnel for non-destructive tests<sup>10</sup>.

### 2.2.7 Annex V, User Inspectorates

Operators of pressure equipment are free to set up their own inspectorates that take over the responsibility of a notified body exclusively within the procurement of these operators. However, only the modules A1, C1, F and G are available for conformity assessment, CE marking within the framework of this Directive is ruled out. Annex IV contains the criteria that these user inspectorates must fulfill.

### 2.2.8 Annex VI, CE Marking

The exact layout of the CE mark is specified here.

### 2.2.9 Annex VII, Declaration of Conformity

The declaration of conformity is the document in which the manufacturer comprehensively states the conformity of his products with all relevant EC Directives. Annex VII specifies the minimum extent of the declaration of conformity as far as the EC Pressure Equipment Directive is concerned. Besides, the manufacturer may use the declaration of conformity for essential instructions to the user.

For instance, the manufacturer of a pressure regulating system might include the following recommendation: "The pressure regulating system should be installed within a pressure regulating station and commissioned in accordance with DIN EN 12186 and/or DVGW Code of Practice G 491<sup>11</sup>. The pressure regulating system should be maintained in accordance with DIN EN 12186 and/or DVGW Code of Practice G 495. Instead of the above DVGW Codes of Practice, other equivalent codes of practice may also be used. Furthermore, reference is made to the operating instructions."<sup>12</sup>

---

<sup>10</sup> Test laboratories, subcontracted by notified bodies for performing tests unaffected by the above approvals, are not necessarily recognized third-party organizations according to Article 13 of the Directive.

<sup>11</sup> The DVGW Codes of Practice G 490-1 and G 491 concerning pressure regulating stations are scheduled for revision, taking into account DIN EN 12186 and, possibly, the EC Pressure Equipment Directive.

<sup>12</sup> According to Annex I No. 3.4. the manufacturer has, among others, the obligation to lay down instructions for "maintenance including checks by the user", implying that the manufacturer himself has to set up respective requirements for ensuring the safe operation. This should effectively limit the capacity of the single member state to establish additional requirements for the operation of the equipment; see also van Rienen/Wasser point 464 at the end.

### 2.3 The Main Field of Application of the Directive

For historical reasons, the Directive is heavily influenced by the regulations based on § 11 of the Equipment Safety Act, particularly on pressure vessels and boilers, as well as their respective expert bodies. They focus on the equipment of production plants for chemicals, hydrocarbons and conventional power. The several exclusion clauses of the Directive, in particular for pipelines, bear this out.

For the comprehension of the Directive it appears to be helpful to have in mind the typical design and operational features of the above industrial installations:

- limited, above ground installations of a single operator;
- production, storage and conversion of various substances;
- continuous presence of competent personnel;
- focus on the safety of employees;
- regular decommissioning and retesting;
- relatively smooth exchangeability of components;
- dominance of vessel-type equipment;
- generation and control of pressure at the same place—endogenic view;
- control of risk also via spill traps.

The pipeline systems of the gas industry display some completely different characteristics:

- far-flung, mostly below-ground installations of, sometimes various, operators;
- transport of natural gas, i.e. specialization on a single substance;
- operation mainly independent from personnel;
- focus on the safety of third parties;
- operation and maintenance without interruption of the fluid flow;
- durability and reliability prevail over exchangeability;
- dominance of pipe-type equipment;
- pressure originates upstream—exogenic view;
- step-by-step protection of downstream, often far away, installations.

The difference strikingly manifests in the limits of the scope and the classification into categories. Below 0,5 bar the Directive rates the pressure risk as insignificant, in the above mentioned area outside the categories it values the European harmonization as needless and in the area inside the categories the level of requirement rises depending on pressure and volume (see picture) or nominal size.

For industrial installations this approach, based largely on the primary pressure risk, may be fully justified. For the gas industry it seems inadequate since also the subsequent risks of a pressure loss, specifically associated with fire and explosion, must be controlled by a reliable containment of the gas under all conditions, i.e. by primary safety precautions. This particularly applies to the lower pressure range (from 0 to 4 bar). Only above 4 bar are secondary safety precautions taken for stations with no access for the public, generally for hazardous areas of Zone 2.

### 3 The Actual Application of the Directive in the Gas Industry

#### 3.1 General Remark

In the gas industry type-tested equipment is very often used. This level of conformity assessment has just recently been affirmed by the voluntary European standardization<sup>x 13</sup>. Coupled with the usual systems of quality assurance and/or surveillance by outsiders this level corresponds to category IV of the EC Pressure Equipment Directive.

Also in the EC Gas Appliance Directive this highest level of conformity assessment is required exclusively—for a range of pressures considered insignificant according to the criteria of the EC Pressure Equipment Directive.

Therefore, the interpretation of the criteria of the EC Pressure Equipment Directive for the components relevant in the gas industry must carefully take into account their conditions of use that are untypical in the above industrial installations.

#### 3.2 Pressure Equipment for the Generation of Steam or Super-Heated Water

Fired or otherwise heated pressure equipment with the risk of overheating for generation of steam or super-heated water at temperatures higher than 110 °C are hardly affected by the considered questions of interpretation concerning the gas industry. They explicitly fall into the scope of the EC Pressure Equipment Directive that insofar largely complements the EC Gas Appliance Directive.<sup>14</sup>.

---

<sup>13</sup> See for instance DIN EN 334:1999 that generally calls for type-testing and surveillance by outsiders. Currently, this standard is not harmonized with the EC Pressure Equipment Directive. It has been prepared on a voluntary basis by the European gas industry.

<sup>14</sup> See in particular Art. 1 No. 3.6. 5<sup>th</sup> indent; Art. 3 No. 1.2. & 2.1.; Annex I clause No. 5; Annex II Table 5. The exclusion clause of Art. 1 No. 3.6. 5<sup>th</sup> indent has to be regarded exclusively for the components conveying fuels or heat because Art. 3 No. 1.2. prescribes the application of Annex I to the components containing steam or super-heated water only for a domain that lies totally outside the scope of the EC Gas Appliance Directive.

The applicability of the EC Pressure Equipment Directive to the components conveying fuels or heat is noteworthy because this provides for the first stand-alone CE marking of these components. These components have to be classified in accordance with the provisions of the EC Pressure Equipment Directive, whereby the classification of standard pressure equipment within the domain of gas supply and installation systems can be used in analogy.

For pressure transmitters, pressure sensing devices, temperature limiters, automatic burner control systems, controls for combustion processes, fuel/air ratio controls, gas leakage controls, tightness controls, flame monitors and gas non-return safety devices it is assumed that these are safety accessories.

For other controls, pressure governors, temperature guards, flow controls, speed controls, test valves, and for switch valves and cylinder regulators for LPG a case-by-case consideration has to show whether (also) a safety function is given.

More explanation on the relationship between the EC Gas Appliance Directive and the EC

It is worthwhile to mention the following: The above equipment can have firings that are supplied with natural gas at low pressure (below 0,5 bar). Now if such equipment is protected from overheating via a temperature supervision device that triggers the switch-off of the gas supply when necessary, then the triggering mechanism combined with the temperature supervision device is regarded as a safety accessory.

Now if the complete firing is an integral device that does not allow an isolated consideration of the triggering mechanism and the temperature supervision device, then the Directive has to be applied to the complete firing. This example illustrates the importance of the full internal and external context of a device for the correct application of the Directive a too narrow interpretation of which could lead to unacceptable results (see also 2.2.3.).

### 3.3 Standard Pressure Equipment of Gas Supply and Installation Systems

#### 3.3.1 The Problem

In the following a classification of components in gas supply and installation systems is suggested in line with the Directive where such components are eligible as standard pressure equipment in the above meaning. The main problem consists in interpreting the criteria of the Directive in such a way that the product and its conditions of use are specifically taken into account<sup>15</sup>.

The main focus rests on the question which components of the gas industry can be classified as safety accessories or pressure accessories, where the latter as opposed to the former have an operational function. The distinction between these two types of pressure equipment is of eminent influence on the category of conformity assessment.

#### 3.3.2 Safety Devices

Safety slam-shut devices, safety cut-off devices, safety relief devices, thermally triggered shut-off devices and back flow prevention devices are classified, without exception, as safety accessories that fall into category IV, regardless of pressure (above 0,5 bar), volume or nominal size<sup>16</sup>.

---

Pressure Equipment Directive can be found in van Rienen/Wasser point 272.

<sup>15</sup> The following passages of the EC Pressure Equipment Directive are of particular interest for this paragraph: Recital No. 5; Recital No. 19; Art. 1 No. 2.1.1. "Vessel"; Art. 1 No. 2.1.2. "Piping"; Art. 1 No. 2.1.3. "Safety accessories"; Art. 1 No. 2.1.4. "Pressure accessories"; Art. 1 No. 2.1.5. "Assemblies"; Art. 1 No. 2.5. "Volume"; Art. 1 No. 2.5. "Nominal size"; Art. 1 No. 2.7. "Fluids"; Art. 1 No. 3.6.; Art. 3 No. 1.1./2./3./4.; Art. 3 Para. 2; Art. 7 Para. 1; Art. 9; Art. 10; Annex I Preliminary Observations; Annex I No. 1.1./1.3.; Annex I No. 2.8.; Annex I No. 2.10./2.11.; Annex I No. 3.2.3. (2.10.); Annex II.

<sup>16</sup> A safety slam-shut device, for example, is normally installed in a pipeline of equivalent nominal size. In accordance with Annex II No. 2. Sentence 2 it could be concluded that this safety slam-shut device has to be placed into a category of conformity assessment via Table 6, based on its nominal size.

However, this conclusion does not take into account that such a safety slam-shut device protects not only the immediate downstream pipe but also any other downstream pressure equipment from unknown volumes of gas in equally unspecified upstream pressure

### 3.3.3 Gas Pressure Regulators

For pressure regulators the distinction has to be made whether a safety function is given explicitly or implied by their use<sup>17</sup>. Regulators with permanently integrated safety devices have to be considered as safety accessories, in particular fully integrated regulators that are common in service lines.

In principle it is conceivable that manufacturers declare regulators that are built in a modular style as assemblies in order to effect a lower category for the mere pressure regulation parts. That would seem impractical, however, because the safety device and the common body will always fall into category IV.

Likewise, fail-close regulators to be used as monitors, or if the manufacturer cannot or does not want to rule out this use, have to be considered as safety accessories. Up to this point, the above comments on safety devices can be applied.

Other regulators, i.e. those that have no integrated safety devices, the use of which as monitors can be precluded and that do not trigger any such devices, cannot simply be considered as safety accessory because, primarily, they have an operational function (pressure regulation)<sup>18</sup>.

### 3.3.4 Gas Isolating Valves

If isolating valves have a safety function, they should be classified as safety accessories. Only if they have solely an operational function, the classification as pressure accessory should be considered<sup>19</sup>.

---

equipment. This upstream and downstream pressure equipment can consist of piping or vessels of any size.

This is especially important for safety devices with nominal sizes up to DN 25 because the Directive would be technically wholly irrelevant for these, if the above conclusion were correct.

Practically, the precondition that a safety device is specifically designed for equipment of a lower category and that any other use can be excluded or prevented by a clear warning of the manufacturer is never given in gas supply or installation systems. Therefore, the above conclusion has to be rejected.

<sup>17</sup> Consequently, the Commission Guideline 1/8 that generally considers pressure regulators as pressure accessories needs to be scrutinized closely in this respect.

<sup>18</sup> It is true that the failure of a meter regulator (for 100 mbar) is tolerated as an operational failure without compromising safety (dispensing with safety devices immediately upstream of meter regulators in low pressure systems). Nonetheless, any classification of regulators as pressure accessories is wholly unsatisfactory, considering the consistently high level of conformity assessment in the non-harmonized standard DIN EN 334:1999 (see above).

<sup>19</sup> The Commission Guideline 1/15 generally classifies isolating valves as pressure accessories, even if they are used as the sole means for isolation. That is unsatisfactory, if isolating valves, apart from commissioning and decommissioning purposes, primarily have a safety function.

### 3.3.5 Gas Volume Measurement Instruments

Meters usually have an operational function only so that they have to be considered pressure accessories<sup>20</sup>.

### 3.3.6 Filters, Separators, Expansion Joints, Sound Absorbers

Filters, separators, expansion joints and sound absorbers belong to the pressure accessories.

### 3.3.7 Pre-Heaters, Pipes (Tubes), Fittings

Pre-heaters, pipes (tubes), connectors, metal/plastic transition joints, pipe (tube) fittings, isolating joints and pipe caps belong to piping, if these components do not have to undergo further treatment and are ready for installation<sup>21</sup>.

## 3.4 Essential Technical Requirements from the Gas Industry's Viewpoint

### 3.4.1 General

The Directive obviously focuses on technical requirements that have been prone to pertinent barriers to trade until now, not to mention its above industrial leanings. In any case the general requirements of the Directive cover all requirements concerning the control of the pressure risk.

Apart from measuring accuracy, where applicable, all essential properties of the fitness for purpose are, from the gas industry's viewpoint, generally also related to the installation's safety. Since the installation's safety primarily rests on the control of the pressure risk these

---

Very often, such isolating valves are the sole means for preventing catastrophic releases of gas in case of failure. Manually or remotely operated, and combined with monitoring devices, they are accepted as stand-alone protective devices (see Annex I No. 2.10. b)).

Isolating valves can also be upgraded to automatic "safety cut-off devices" that would have to be regarded as safety accessories straightforwardly.

So if manually or remotely operated isolating valves practically have the same safety function as the above safety cut-off devices, or lead to the same hazard in case of failure, then the former should be regarded as safety accessories as well.

Particularly isolating valves up to DN 25, frequently used as main isolating valves in service lines(see DIN EN 331), can only be CE marked in line with the EC Pressure Equipment Directive, if they are considered safety accessories.

<sup>20</sup> For meters with movable parts take into account Art. 1 No. 3.6. 1<sup>st</sup> indent, for the relationship between the EC Pressure Equipment Directive and the EC Machine Directive see also van Rienen/Wasser point 441. The EC Pressure Equipment Directive and, for that matter, the EC Machine Directive cover exclusively the technical safety aspect. Technical requirements for measurement will only be harmonized by the expected EC Measuring Instruments Directive.

<sup>21</sup> See in particular Art. 1 No. 2.1.2. and the Commission Guidelines 1/9 and 2/4.

properties of the fitness for purpose have to be taken into account by the conformity assessment (see above 2.3)<sup>22</sup>.

Due to the fact that the Directive covers a variety of products with most different potentials for hazard and conditions of use it also grants corresponding space for interpretation, i.e. not all requirements affect each product to the same extent.

The Directive lists a series of requirements, expressed as a quality or a safety related objective, that have to be strictly complied with where a corresponding potential for hazard exists<sup>23</sup>. Besides, it contains a series of requirements that pertain to specific pressure equipment<sup>24</sup>, and another that are precisely quantified, specifying some of the above qualitative requirements<sup>25</sup>.

Concerning in particular the latter quantitative requirements it has to be taken into consideration that these are merely specific reference values that may be derogated from, based on proportionality. Presumably, the Directive does not intend to set up more stringent requirements where, up to now, safety has not been doubted on justified grounds.

Ultimately, only harmonized standards can provide an objective and reliable specification of the Directive's technical requirements for individual products, but only a rather limited number of these will be available for the foreseeable future<sup>XI 26</sup>. Meanwhile, already established and well-tried standards will be used (see above 1.5).

---

<sup>22</sup> See Annex I Preliminary Observations and clause No. 1. The mentioned Commission Guideline 1/15 needs to be closely scrutinized here as well. The properties of the fitness for purpose relevant for the gas industry include, among others, the (internal and external) tightness of equipment (e.g. isolating valves) that has to be specifically verified because the hydrostatic test according to Annex I No. 3.2.2. is not always sufficient, and product related characteristics (e.g. the accuracy of regulators and safety devices).

<sup>23</sup> Annex I, up to and including clause No. 4.

<sup>24</sup> Annex I clause No. 5. on fired or otherwise heated pressure equipment with a risk of overheating and clause No. 6. on piping.

<sup>25</sup> Annex I clause No. 7.

<sup>26</sup> OJ No. C 227 of 10.8.1999, p. 14 lists the first ten standards, mostly related to materials, harmonized with the EC Pressure Equipment Directive (it is an obvious error of the above publication that, although the correct designation 97/23/EC of the Directive with its date of adoption 29.5.1997 is given, a reference is suggested to the Directive on simple pressure vessels, without using the latter's designation 87/404/EEC).

### 3.4.2 Specific Requirements

Table 2 lists some essential requirements of the Directive as keywords.

Table 2: Specific Requirements of the Directive

Qualitative requirements	Quantitative requirements
strength materials manufacturing procedures pressure surge final assessment fire corrosion wear operating instructions	safety factors rupture energy joint coefficients 10 % pressure surge test pressures

According to what has been said in 3.4.1 it cannot be assumed that, under all conditions:

- pressure equipment shall be designed for earthquake loading<sup>27</sup>;
- grey cast iron shall not be used<sup>28</sup>;
- pressure surges in case of incidents shall not exceed 10 %<sup>29</sup>; or
- a specific Charpy-V-strength shall be demonstrated<sup>30</sup>.

### 3.5 On Conformity Assessment

It does not seem sensible to carry out the conformity assessment procedure of the Directive in all details for all concerned products, the fitness for purpose of which is sufficiently documented by existing national certificates, without taking into account existing test reports. Such an approach would contradict the economic purpose of the Directive.

Bearing this in mind, the Zentralstelle der Länder für Sicherheitstechnik (ZLS) [competent body of the German states for safety technology], being responsible for the accreditation of third bodies active within the framework of the Directive, has adopted a guideline on how far test reports submitted by the manufacturer may be taken into account when carrying

---

<sup>27</sup> The provisions specified in No. 2.2.1. of Annex I require taking into account loadings, among others by earthquakes, only insofar as is justified by reasonably foreseeable operating conditions.

<sup>28</sup> See DIN EN 334:1999 that considers grey cast iron an allowable material under certain restrictions.

<sup>29</sup> See the recently adopted DIN EN 12186 concerning the pressure sequence accepted for gas supply systems. The safety does not rest on the difference between the incidental pressure and the operating pressure but on the strictly necessary interval between the maximum incidental pressure and that pressure where components start to fail at the earliest (bursting pressure).

<sup>30</sup> In accordance with DIN EN 12007-3 and DIN EN 1594 specific Charpy-V-strengths for components of gas pipelines made from steel have to be demonstrated only for operating pressures above 16 bar.

out conformity assessment procedures<sup>31</sup>.

The EC design-examination<sup>32</sup> implies a special challenge for third party testing because its concept rests, in principle, on the presumption that the integrity and functional performance of pressure equipment in all their aspects can be assessed on a theoretical basis. In particular for complex flow patterns, typical for installations of the gas industry, it can be assumed that the theoretical verification is not sufficiently settled and/or disproportionately expensive relative to the experimental verification.

## Bibliography

I. Official Journal of the European Communities (OJ) No. L 181 of 9.7.1997, p. 1 et seq., corrigendum in OJ No. L 265 of 27.9.1997, p. 110

II. OJ No. C 136 of 4.6.1985, p. 1 et seq.

III. Commission Decision 1999/472/EC in OJ L 184 of 17.7.1999, p. 42 et seq.

IV. Bundesgesetzblatt (BGBl.) [official journal of the Federal Republic of Germany] I 1998 p. 730

V. BGBl. I 1974 p. 3591; 1992 p. 1564; 1996 p. 1916

VI. Bekanntmachung des Bundesministeriums für Arbeit und Sozialordnung (BMA) [Notification of the Federal Ministry for Labor and Social Order] of 22.7.1999 — IIIc 2-35408 —, published in Bundesarbeitsblatt [bulletin of the ministry] (1999) No. 9, p. 107

VII. van Rienen, W. und Wasser, U.: EG-Recht der Gas- und Wasserversorgungstechnik [EC Law of Gas and Water Supply Technology]. Wirtschafts- und Verlagsgesellschaft Gas und Wasser mbH; Bonn 1999.

VIII. Jannemann, T. B.: Die verschiedenen Konformitätsbewertungsverfahren europäischer Richtlinien im Gasfach [The Different Conformity Assessment Procedures of European Directives in the Gas Industry]. gwf-Gas/Erdgas [journal of the German and Austrian gas industry] 140 (1999) No. 9, p. 564-573

IX. Dupin, F.: EG-Bauproduktenrichtlinie 89/106/EWG und EG-Druckgeräterichtlinie 97/23/EG im Gasfach [EC Construction Products Directive 89/106/EEC and EC Pressure Equipment Directive 97/23/EC in the Gas Industry]. gwf-Gas/Erdgas 139 (1998) No. 8, p. 456-460

X. DIN EN 334:1999 Gas Pressure Regulators for Inlet Pressures up to 100 bar

XI. OJ. No. C 227 of 10.8.1999, p. 14.

---

<sup>31</sup> The mentioned guideline "Voraussetzungen für die Anerkennung der vom Hersteller vorgelegten Prüfberichte durch Benannte/Zugelassene Stellen" [Preconditions for the Acceptance by Notified/Approved Bodies of Test Reports Submitted by the Manufacturer] will be published in the Bundesarbeitsblatt according to ZLS.

<sup>32</sup> Annex III, Module B1 and Module H1