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- $KV_p$  is the measured impact energy, in J;
- $W$  is the width of the test piece, in mm.

The calculated impact energy  $KV_c$  shall conform to the requirements given in 11.3.2.

**11.3.4** If the requirements of 11.3.2 are not met, then an additional set of three test pieces may be taken at the discretion of the manufacturer from the same sample and tested. To consider the test unit as conforming, after testing the second set, the following conditions shall be satisfied simultaneously:

- the average value of the six tests shall be equal to or greater than the specified minimum value;
- not more than two of the six individual values may be lower than the specified minimum value;
- not more than one of the six individual values may be lower than 70 % of the specified minimum average value.

**11.3.5** The dimensions in millimetres of the test pieces, the measured impact energy values and the resulting average value shall be reported.

## 11.4 Leak tightness test

### 11.4.1 Hydrostatic test

The hydrostatic test shall be carried out at a test pressure of 70 bar<sup>2)</sup> or at a test pressure  $P$  calculated using the following equation, whichever is lower:

$$P = 20 \frac{S \times T}{D} \quad (3)$$

where :

- $P$  is the test pressure, in bar;
- $D$  is the specified outside diameter, in mm;
- $T$  is the specified wall thickness, in mm;
- $S$  is the stress, in MPa, corresponding to 70 % of the specified minimum yield strength (see Table 4) for the steel grade concerned

The test pressure shall be held for not less than 5 s for tubes with a outside diameter  $D$  less than or equal to 457 mm and for not less than 10 s for tubes with a outside diameter  $D$  greater than 457 mm.

The tube shall withstand the test without showing leakage or visible deformation.

NOTE This hydrostatic leak-tightness test is not a strength test.

### 11.4.2 Electromagnetic test

The test shall be carried out in accordance with EN 10246-1.

## 11.5 Dimensional inspection

Specified dimensions, including straightness, shall be verified.

The outside diameter shall be measured at tube ends. For tubes with outside diameter  $D \geq 406,4$  mm, the diameter may be measured using a circumference tape.

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2) 1 bar = 100 kPa.

## EN 10216-1:2002 (E)

Unless option 12 is specified the wall thickness shall be measured at both tube ends.

**Option 12:** *The wall thickness shall be measured away from the tube ends in accordance with an agreed procedure.*

### 11.6 Visual examination

Tubes shall be visually examined to ensure conformity to the requirements of 8.4.1.

### 11.7 Non-Destructive Testing

When option 6 is specified, the tubes of quality TR2 shall be subjected to a Non-Destructive testing for the detection of longitudinal imperfections in accordance with EN 10246-3, EN 10246-5 or EN 10246-7 to acceptance level 3, sub-category C, where applicable.

Regions at the tube ends not automatically tested shall either be subjected to manual/semi-automatic ultrasonic testing in accordance with EN 10246-7 or be cropped off.

### 11.8 Retest, sorting and reprocessing

For retest, sorting and reprocessing the requirements of EN 10021 shall apply.

## 12 MARKING

### 12.1 Marking to be applied

The marking shall be indelibly marked on each tube at least at one end. For tubes with outside diameter  $D \leq 51$  mm the marking on tubes may be replaced by the marking on a label attached to the bundle or box.

The marking shall include the following information:

- the manufacturer's name or trade mark;
- the number of this European Standard and the steel name (see 3.2);

In addition in case of specific inspection

- the cast number or a code number;
- the mark of the inspection representative;
- an identification number (e.g. order or item number), which permit the correlation of the product or delivery unit to related documents.

Example of marking:

X – EN 10216-1 - P265TR2 - Y - Z<sub>1</sub> - Z<sub>2</sub>

where

- X is the manufacturer's mark;
- Y is the cast number or the code number;
- Z<sub>1</sub> is the mark of the inspection representative;
- Z<sub>2</sub> is the identification number.

### 12.2 Additional marking

**Option 13:** *Additional marking, as agreed upon at the time of the enquiry and order, shall be applied.*

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### 13 PROTECTION

The tubes shall be delivered without a temporary protective coating.

**Option 14:** *A temporary protective coating or durable coating and/or lining shall be applied.*

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## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

**Table ZA-1 — Correspondence between this European Standard and the essential requirements of the EU Directive 97/23/EC**

Clauses/sub-clauses of this EN	Essential Requirements (ERs) of the Directive 97/23/EC	Qualifying remarks/Notes
8.3	Annex I, 4.1a	Appropriate material properties
7.3 and 8.4	Annex I, 4.1d	Suitable for the processing procedures
9 and 10	Annex I, 4.3	Documentation

**WARNING:** Other requirements and other EC Directives may be applicable to the product(s) falling within the scope of this standard.



## Bibliography

EN 473, *Non destructive testing - Qualification and certification of NDT personnel - General principles*

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