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S.R. CEN/TR 14585-3:2017

# Corrugated metal hose assemblies for pressure applications - Part 3: Design method

**S.R. CEN/TR 14585-3:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

S.R. CEN/TR 14585-3:2017 is the adopted Irish version of the European Document CEN/TR 14585-3:2017, Corrugated metal hose assemblies for pressure applications - Part 3: Design method

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CEN/TR 14585-3

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## Corrugated metal hose assemblies for pressure applications - Part 3: Design method

Tuyauteries métalliques flexibles onduleuses pour applications sous pression - Partie 3: Méthode de conception

Gewellte Metallschlauchleitungen für Druckerwendungen - Teil 3: Auslegungsverfahren

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## **CEN/TR 14585-3:2017 (E)**

### **European foreword**

This document (CEN/TR 14585-3:2017) has been prepared by Technical Committee CEN/TC 342 "Metal hose, hose assemblies, bellows and expansion joints", the secretariat of which is held by SNV.

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## **Introduction**

Technical Committee CEN/TC 342 “Metal hose, hose assemblies, bellows and expansion joints” is carrying out a revision of EN 14585-1:2006 and CEN/TR 14585-2:2006 to include calculation methods for the combined structure of hose and braid for:

- pressure resistance;
- fatigue life;
- allowable displacements.

The selection of materials for corrosive environments and the calculation of fluid pressure drops are also being included.

It is appreciated that these studies are ambitious and will involve much new analyses so that this revision will take some time.

Whilst continuing to work on this revision, CEN/TC 342 decided that the key aspects of the calculation method should be circulated as an informative Technical Report CEN/TR 14585-3, which is limited to the pressure resistance of the combined structure of hose and braid. This approach will enable manufacturers and Notified Bodies to use and gain experience of the calculation method and any feedback can be taken into account in the revision of EN 14585, harmonized to the Pressure Equipment Directive 2014/68/EU.

## CEN/TR 14585-3:2017 (E)

### 1 Scope

This Technical Report provides guidance on the design of corrugated metal hose assemblies for pressure applications, i.e. maximum allowable pressure PS greater than 0,5 bar. Allowable stresses are consistent with the requirements of the Pressure Equipment Directive 2014/68/EU.

### 2 Normative references

Not applicable.

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7369 and the following apply.

#### 3.1

##### **metal hose assembly**

assembly of a corrugated metal hose with its end fittings

Note 1 to entry: In the context of Pressure Equipment Directive [1], a metal hose assembly is a component of piping and not a PED assembly.

#### 3.2

##### **maximum allowable pressure PS**

maximum pressure for which the metal hose assembly is designed

#### 3.3

##### **maximum/minimum allowable temperature TS**

maximum and minimum temperature for which the metal hose assembly is designed

#### 3.4

##### **nominal pressure PN**

dimensionless alphanumeric designation which is a convenient rounded number commonly used for reference purposes of piping components and stock parts; for this Technical Report PN represents the maximum allowable pressure at 20 °C as specified by the metal hose assembly manufacturer

#### 3.5

##### **test pressure PT**

pressure at which the pressure metal hose assembly is pressure tested (normally at ambient temperature)

#### 3.6

##### **main pressure bearing parts**

parts, such as corrugated metal hose, braid, pipe ends, the failure of which may result in a sudden discharge of pressure energy

#### 3.7

##### **pressure bearing parts**

parts, such as swivel nuts, flanges, threaded fittings, that are not main pressure bearing parts defined in 3.6 and the failure of which may not lead to a sudden discharge of pressure energy

#### 3.8

##### **attachments to pressure parts**

parts, such as ferrules, that are directly welded to parts defined in 3.6 or 3.7

### 3.9

#### **other parts**

parts, such as external protection, anti-kink device, braid protecting spiral, which are not parts according to 3.6 to 3.8

### 3.10

#### **equipment manufacturer**

natural or legal person responsible for the values of the parameters PS and TS

Note 1 to entry: This may be the manufacturer or planner of the piping for which the metal hose assembly is designed.

### 3.11

#### **hose manufacturer**

natural or legal person responsible for the design and the manufacturing of the corrugated metal hose and/or the metal hose assembly

### 3.12

#### **hydraulic forming (longitudinal welded)**

corrugating a tube by pressurizing the inside against external tooling which allows this corrugated tube to be axially shortened during the process

### 3.13

#### **roll forming (longitudinal welded)**

corrugating a tube by rolling from the outside to the inside and allowing or forcing this corrugated tube to be axially shortened during the process

### 3.14

#### **helical crest welded (resistance welded)**

profiling a strip, rolling it over helically and finally welding the overlaps

### 3.15

#### **strand**

group of parallel wires used for plain braid or wires woven together to form a braided strand

### 3.16

#### **braided braid**

braid that is manufactured from previously braided strands

## 4 Symbols and abbreviations

For the purposes of this document, the symbols listed in Table 1 apply.

**Table 1 — Symbols**

<b>Symbol</b>	<b>Description</b>	<b>Unit</b>
$A$	elongation at rupture according to EN ISO 6892-1	%
$A_c$	cross sectional metal area of one corrugation; see Formula (3a) and 3b)	mm <sup>2</sup>
$A_e$	hose effective area; see Formula (5)	mm <sup>2</sup>
$a_w$	Braid wire cross section; see Formula (29)	mm <sup>2</sup>
$b_c$	width of corrugation crest; see Figures 2 a) and 2 b)	mm

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