



BSI Standards Publication

## Corrugated metal hose assemblies for pressure applications

---

Part 3: Design method

## National foreword

This Published Document is the UK implementation of CEN/TR 14585-3:2017.

The UK participation in its preparation was entrusted to Technical Committee GSE/42, Gas fittings and connections including metal hose and hose assemblies.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017  
Published by BSI Standards Limited 2017

ISBN 978 0 580 98506 5

ICS 23.040.70

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2017.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

TECHNICAL REPORT

**CEN/TR 14585-3**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

October 2017

ICS 23.040.70

English Version

## 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

This Technical Report was approved by CEN on 25 September 2017. It has been drawn up by the Technical Committee CEN/TC 342.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions .....	6
4 Symbols and abbreviations .....	7
5 Materials.....	10
5.1 General requirements .....	10
5.2 Suitable materials .....	10
5.3 Other materials.....	13
5.4 Corrosion.....	13
5.5 Low temperature application.....	13
5.6 Material documentation .....	15
6 Design methods .....	15
6.1 General.....	15
6.2 Basic design criteria.....	16
6.2.1 Design conditions.....	16
6.2.2 Temperatures.....	16
6.2.3 Additional loadings .....	16
6.2.4 Structural conditions .....	17
6.2.5 Dimensions.....	17
6.3 Design on the basis of nominal pressures PN .....	19
6.4 Allowable stresses .....	19
7 Calculation design method .....	20
7.1 General.....	20
7.2 Corrugated metal hose .....	21
7.2.1 Scope .....	21
7.2.2 General factors .....	22
7.2.3 Limiting conditions.....	24
7.2.4 Pressure capacity of the corrugated metal hose braided or unbraided .....	26
7.3 Braid .....	28
7.3.1 Scope .....	28
7.3.2 General factors .....	28
7.3.3 Limiting design conditions .....	30
7.3.4 Pressure capacity of the braid.....	31
7.4 Metal hose assembly .....	31
7.4.1 General.....	31
7.4.2 Burst pressure of the corrugated hose.....	32
7.4.3 Burst pressure of the braid .....	33
7.4.4 Burst pressure of the metal hose assembly.....	33
7.5 Flanges and other end fittings.....	34
Annex A (informative) Calculation coefficients $C_p$ , $C_b$ , $C_d$ .....	35
A.1 Graphs of coefficients .....	35

<b>A.2</b>	<b>Polynomial approximation of the coefficients</b> .....	<b>38</b>
<b>A.2.1</b>	<b>Coefficients <math>C_p</math></b> .....	<b>38</b>
<b>A.2.2</b>	<b>Coefficients <math>C_f</math></b> .....	<b>39</b>
<b>A.2.3</b>	<b>Coefficients <math>C_d</math></b> .....	<b>39</b>
<b>A.2.4</b>	<b>Intermediate values</b> .....	<b>40</b>
<b>Annex B</b>	<b>(informative) Main information to be supplied to the hose manufacturer</b> .....	<b>41</b>
<b>B.1</b>	<b>Main design conditions</b> .....	<b>41</b>
<b>B.2</b>	<b>Additional information/requirements dependent on application</b> .....	<b>41</b>
	<b>Bibliography</b> .....	<b>42</b>

## **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.

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.

## **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.

## 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