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**Pressure gauges - Part 2: Selection and installation recommendations for pressure gauges**

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Druckmeßgeräte - Teil 2: Auswahl- und Einbauempfehlungen für Druckmeßgeräte

Manometres - Partie 2: Recommandations sur le choix et l'installation des manometres

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If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 141 "Pressure gauges - Thermometers - Means of measuring and/or recording temperature during the distribution of refrigerated, frozen and quick-frozen products", the secretariat of which is held by AFNOR.

This document is currently submitted to the Formal Vote.

EN 837 consists of the following parts, under the general title "Pressure gauges" :

- Part 1 : Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing
- Part 2 : Selection and installation recommendations for pressure gauges
- Part 3 : Diaphragm and capsule pressure gauges - Dimensions, metrology, requirements and testing.

## 0 Introduction

Pressure gauges are instruments used for pressure measurement which implies :

- the selection of a gauge suited to the conditions of use ;
- the respect of a certain number of rules and precautions concerning :
  - . storage ;
  - . installation ;
  - . safety in view of the service conditions ;
  - . maintenance.

## 1 Scope

This part of prEN 837 only applies to those pressure gauges whose pressure responsive element measuring system is a metal part which deforms under the effect of the pressure measured, as defined in EN 837-1 and EN 837-3.

This standard has been prepared to assist in the selection, installation and use of pressure gauges to ensure that they give satisfactory service for the intended application with the maximum level of safety.

## 2 Normative references

This part of prEN 837 incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any these publications apply to this part of this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 472	1994	Pressure gauges - Vocabulary
EN 837-1	1996	Pressure gauges - Part 1 : Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing
EN 837-3	1996	Pressure gauges - Part 3 : Diaphragm and capsule pressure gauges - Dimensions, metrology, requirements and testing

## 3 Definitions

For the purpose of this European Standard the definitions given in EN 472 apply.

## 4 Selection

Following criteria should be considered :

### 4.1 Selection of pressure sensitive element

The type of pressure responsive element may be selected according to the following table 1 :

Table 1

Reference of the standard	Type of pressure gauge	Pressure range	Process fluid			
			Gas or steam	Liquid		
				Low viscosity	High viscosity	Polluted
EN 837-1	Bourdon tube	0,6 bar to 1 600 bar	x	x	1)	1)
EN 837-3	Diaphragm	2,5 mbar to 25 bar	x	x	x	x
EN 837-3	Capsule	1 mbar to 600 mbar	x	x <sup>2)</sup>		

1) Separators should be used.

2) The capsule and the pipe shall be fully filled with the liquid.

## **4.2 Safety**

### **4.2.1 Pressure range**

The range should be such that the maximum working pressure does not exceed 75 % of the maximum scale value for steady pressure or 65 % of the maximum scale value for cyclic pressures.

### **4.2.2 Safety design**

The safety design shall be selected in consideration of safety requirements of the specific applications.

Criteria for the selection of pressure gauges with Bourdon tube are given in table 2.

For diaphragm and capsule gauges normally there are no specific requirements but the manufacturer should be consulted where special condition may apply for instance possibility of high pressure overload.

NOTE : Capsule, diaphragm gauges are not recommended for oxygen and acetylene use. However where absolutely necessary, consultation between user and manufacturer is required.

## **4.3 Materials**

Pressure gauges are manufactured with pressure responsive elements that can be made from various materials. It is therefore necessary to choose from these materials the one best suited to the type of process fluid and its pressure. The purchaser shall indicate to the manufacturer all information concerning the materials which are compatible with the fluid in relation to the specific conditions of measurement.

If none of the standard materials are suitable, it shall be necessary to interpose a separator between the process fluid and the pressure gauge.

The filling of a chemical seal pressure gauge assembly shall always be done by the manufacturer and these two instruments shall never be uncoupled.

## **4.4 Accuracy**

The accuracy class required shall be selected from EN 837-1 or EN 837-3.

## **4.5 Pressure connection**

The pressure connection shall be selected from EN 837-1 or EN 837-3.

Other connections specific to certain industries and applications shall be specified.

#### **4.6 Nominal size**

The size of gauge required shall be selected from EN 837-1 or EN 837-3.

#### **4.7 Mounting**

Type of mounting required shall be selected from EN 837-1 or EN 837-3.

#### **4.8 Other criteria**

If the application involves pressure pulsations, vibrations, extremes of temperature, shock loading, solids in suspension, viscous or chemically aggressive pressure fluid, hostile environment, or requires correction for a static head, the manufacturer shall be consulted.

### **5 Transport**

Certain modes of transport may be incompatible with certain types of pressure gauges (for instance : high precision gauges or gauges with sensitivity to variations of atmospheric pressure). In these cases, the customer shall leave the manufacturer with free choice of the means of transport, even the free choice of the carrier.

### **6 Storage prior to installation**

Gauges should be stored in dry, clean conditions within the temperature range of - 40 °C to + 70 °C and protected against any impact damage.

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**Table 2: Criteria for selection of pressure gauges with Bourdon tube (safety aspect)**

Pressure fluid	Liquid						Gas or steam (see note 1)					
Case filling	Dry			Liquid			Dry			Liquid		
Nominal size	< 100		≥ 100		< 100		≥ 100		< 100		≥ 100	
Pressure range (in bars)	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25
Minimum safety design code	0	0	0	0	S1	S1	S1	S1	0	S2	S1	S3

Safety design codes :

0 Gauge without blow-out device  
S1 Blow-out device gauge  
S2 Safety pattern gauge without baffle wall  
S3 Safety pattern gauge with baffle wall (providing a higher level of safety)

NOTE 1 : All oxygen and acetylene gauges shall be safety pattern gauges.

NOTE 2 : Glycerine filled gauges shall not be used with oxygen or other strong oxydising process fluid. For such applications, highly fluoridated and chlorinated liquids can be used.

NOTE 3 : This table indicates the normal safety design code. Users must have cognisance of their special requirements and may use safety pattern gauges at pressures lower than 25 bar.

## **7 Installation**

### **7.1 General**

The user shall ensure that the correct gauge has been selected and has the correct range and construction.

If necessary an isolating valve shall be inserted to facilitate removal for maintenance.

Pressure connections shall be leak tight :

- gauges with parallel threads : The pressure seal is made on the sealing face using a sealing washer which is compatible with the fluid (see figure 1a) ;
- gauges with tapered threads : The pressure seal is normally made by the mating of the thread, but it is common practice to apply jointing material to the male thread before assembly. The jointing material shall be compatible with the fluid (see figure 1b) ;
- diaphragm gauges with flange connection should be fitted in accordance with recommendation from the relevant standards ;
- direct mounting gauges should have the tightening torque applied to the connection by means of a spanner applied to the flats on the shank of the gauge. When tightening the pressure connection of a surface or flush mounted gauge, the tightening torque applied to the connection should be opposed by a spanner fitted to the flat on the shank of the gauge to prevent damaging the gauge or its mounting points.

Do not tighten by grasping the case of the gauge as this may cause damage.

When first applying pressure, the leak tightness of the connection shall be checked.

All gauges shall be mounted vertically unless marked on the dial (see EN 837-1 or EN 837-3).

When the gauge incorporates a blow out device or blow-out back, a minimum distance of 20 mm from any obstacle shall be ensured.

### **7.2 Special conditions**

#### **7.2.1 Mechanical shocks**

Pressure gauges shall not be subject to mechanical shocks. If installations are subject to mechanical shocks, gauges shall be mounted remotely and connected by flexible pipe.