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## Buildings valves – Combined temperature and pressure relief valves – Tests and requirements

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Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

## Vattenförsörjning – Byggnadsventiler – Kombinerad temperatur- och tryckstyrd säkerhetsventil – Provning och krav

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**EN 1490**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2000

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English version

## Building valves - Combined temperature and pressure relief valves - Tests and requirements

Robinetterie de bâtiment - Soupapes combinées  
température et pression - Essais et prescriptions

Gebäudearmaturen - Kombinierte Druck-Temperaturventile  
- Prüfungen und Anforderungen

This European Standard was approved by CEN on 3 January 2000.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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## CONTENTS

	Page
Foreword	3
Introduction	3
1 Scope	4
2 Normative references	4
3 Definitions	4
4 Materials and surface finishes	6
5 Design and dimensional requirements	7
6 Hydraulic and temperature tests and requirements	11
7 Mechanical tests and requirements	16
8 Acoustic tests and requirements	18
9 Classification	18
10 Designation	19
11 Marking	19
12 Installation instructions	20
Annex A (informative) : Safety equipment for water heaters	25

## **FOREWORD**

This European Standard has been prepared by Technical Committee CEN/TC 164 "Water supply", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A of this European Standard is informative.

## **INTRODUCTION**

In respect of potential adverse effect on the quality of water intended for human consumption, caused by the product covered by this standard:

- a) This standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA.
- b) It should be noted that, whilst awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and or the characteristics of this product remain in force.

## 1 SCOPE

This European Standard specifies, dimensions, materials and performance requirements (including methods of test) for combined temperature and pressure relief valves, of nominal sizes from DN 15 to DN 40, having working pressures<sup>1)</sup> from 0,1 MPa (1 bar) to 1,0 MPa (10 bar).

Combined temperature and pressure relief valves are intended for fitting to storage water heaters, having a maximum distribution temperature of 95 °C, for all energy sources.

Combined temperature and pressure relief valves control and limit the temperature and pressure of the water contained in a hot water heater to the valves rating pressure and a temperature not exceeding 100 °C and will prevent water to steam formation when other temperature controls fail.

They are not intended to act as an expansion valve under normal conditions and does not control cold water flow.

Alone it does not constitute the control functions for a water heater.

NOTE : The use of the device specified in this Standard does not override the need to use controls (e.g. thermostats and cut-outs) which act directly on the power sources of water heaters.

## 2 NORMATIVE REFERENCES

This European Standard 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 of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest addition of the publication referred to applies.

EN 1254-2	Copper and copper alloys - Plumbing fittings - Part 2: Fittings with compression ends for use with copper tubes.
EN 1982	Copper and copper alloys - ingots and castings
EN 12420	Copper and copper alloys - forgings
EN ISO 6509	Corrosion of metals and alloys - Determination of dezincification resistance of brass (ISO 6509 : 1981)
ISO 7-1:1994	Pipe threads where pressure-tight joints are made on the threads - Part 1: Dimensions, tolerances and designation.
ISO 228-1:1994	Pipe threads where pressure-tight joints are not made on the thread - Part 1: Dimensions, tolerances and designation.
ISO 7005-3:1988	Metallic flanges - Part 3: Copper alloy and composite flanges.

## 3 DEFINITIONS

For the purposes of this Standard, the following definitions apply:

**3.1 temperature relief valve** is a temperature activated valve which opens automatically at a specified set temperature to discharge fluid. It is fitted to water heaters to prevent the temperature of the contained water from exceeding 100 °C.

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<sup>1)</sup> All pressures are gauge unless otherwise stated

**3.2 pressure relief valve** is a pressure activated valve which opens automatically at a specified set pressure to discharge fluid. It is fitted to prevent the pressure in a water heater from exceeding the maximum working pressure.

**3.3 combined temperature and pressure relief valve** is a valve which is capable of performing the function of both a temperature relief valve and a pressure relief valve.

**3.4 thermal element** provides the thermal control; comprising a thermal probe and associated control rods.

### 3.5 Pressures

**3.5.1 nominal set pressure ( $P_{nr}$ )** is the pressure of the combined temperature and pressure relief valve which is set on production.

**3.5.2 water tightness pressure ( $P_e$ )** is the pressure up to which the combined temperature and pressure relief valve is closed (see figure 1).

**3.5.3 initial opening pressure ( $P_{de}$ )** is the pressure at which the combined temperature and pressure relief valve opens for the first time, as indicated by the first droplet of water, after a period of storage (see figure 1).

**3.5.4 opening pressure ( $P_o$ )** is the pressure at which a flow rate of 2,4 litre/hour of water is attained (see figure 1) through the combined temperature and pressure relief valve (see figure 1).

**3.5.5 rating pressure ( $P_{dn}$ )** is the pressure at which the water discharge capacity of the combined temperature and pressure relief valve corresponds to the rated flow (see figure 1).

**3.5.6 closing pressure ( $P_f$ )** is the pressure at which the combined temperature and pressure relief valve closes after having reached the rating pressure (see figure 1).

### 3.6 Temperatures

**3.6.1 maximum working temperature** is the maximum temperature at which the combined temperature and pressure relief valve is designed to be used.

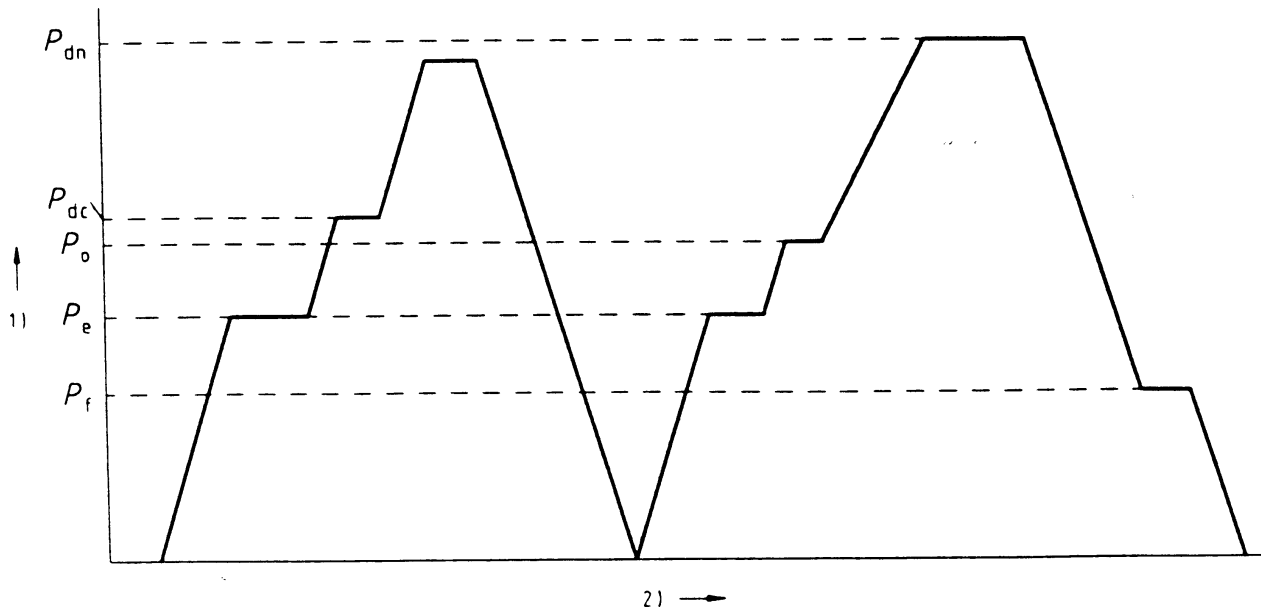
**3.6.2 nominal set temperature** is the temperature range, 90 °C to 95 °C, in which the combined temperature and pressure relief valve is set to operate.

**3.6.3 initial opening temperature** is the temperature at which the combined temperature and pressure relief valve opens, as indicated by the first droplet of water, after a period of storage.

**3.6.4 closing temperature** is the temperature at which the combined temperature and pressure relief valve closes after discharging under temperature conditions.

**3.6.5 rated steam discharge capacity** is the minimum rate of steam discharge, kg/hour, that can be discharged through the valve under the conditions specified in the test in section 6.5.

**3.6.6 water discharge capacity** is the rate of water discharge, litre/hour, that can be discharged through the combined temperature and pressure relief valve under the conditions specified in the test in section 6.4.



**key**

- 1) Pressure
- 2) Time

**Figure 1 - Pressures - see Section 3 Definitions**

**3.6.7 nominal power rating** is the power rating, in table 9, to be assigned to a combined temperature and pressure relief valve, as appropriate, which meets the test criteria of tests in sections 6.4 and 6.5.

**4 MATERIALS AND SURFACE FINISHES**

**4.1 General**

The selection of materials is the responsibility of the manufacturer, provided they satisfy the following requirements:

- a) materials and coatings shall not contaminate the drinking water, when in normal or accidental contact,
- b) in a technical document, the manufacturer shall state the nature of the materials and coatings used,
- c) material with inadequate corrosion resistance shall have additional protection, and
- d) the materials used shall not deteriorate at a temperature of 95 °C for 1 hour and be suitable under the temperatures specified in the tests in this Standard.

**4.2 Nature of materials**

Examples of bronze and brass which may be used, without coating, for manufacturing purposes are given in table 1.



**Table 1 - Examples of copper alloys**

Material Designation		EN Standard
Symbol	Reference Number	
Cu Sn 5 Pb 5 Zn 5 - C	CC491K	EN 1982
Cu Sn 3 Zn 8 Pb 5 - C	CC490K	EN 1982
Cu Zn 39 Pb 3	CW614N	EN 12420
Cu Zn 40 Pb 2	CW617N	EN 12420
Cu Zn 36 Pb 2 As	CZ132	-

Copper-zinc alloys containing more than 10 % zinc are subject to dezincification when submitted to water capable of dezincification. In the countries where the use of products made of dezincification resistant materials is required, the products have to guarantee a dezincification depth less than 200 µm in any direction, they have to be tested in accordance with the standard EN ISO 6509 and have to be marked in compliance with the indications under section „MARKING“ (point 11).

## 5 DESIGN AND DIMENSIONAL REQUIREMENTS

### 5.1 General guidance

- a) The combined temperature and pressure relief valve shall be of the type where the spring is isolated from the water.
- b) All components shall be designed so as to avoid any risk of seizing, scaling or sticking.
- c) Sliding or rotating parts shall not be in contact with water, except for the thermal element.
- d) The components controlling the setting of pressure and temperature valve shall not be accessible to the end user without damage to the valve.
- e) The thermal element shall be so designed that contact by water on the thermally responsive material is prevented.
- f) Wing or similar guides shall not be used on the inlet side of the combined temperature and pressure relief valve (see figure 2(d)).
- g) For combined temperature and pressure relief valves with threaded ends two spanner flats shall be provided on the body.
- h) The normal operation of the combined temperature and pressure relief valve shall not be influenced by external forces.
- i) If there is only one direction for operation of rotary controls of a combined temperature and pressure relief valve it shall be anti-clockwise.
- j) Where separate seats are fitted to the combined temperature and pressure relief valve disc or body they shall be secured to prevent them from working loose in normal service.

### 5.2 Pressures

For set pressures below 0,3 MPa (3 bar) the same differential pressures shall be used as for 0,3 MPa (3 bar).

EXAMPLE: a combined temperature and pressure relief valve with a set pressure of 0,2 MPa (2 bar) shall have a rating pressure of  $P_{dn}$  equal to 0,23 MPa (2,3 bar), see figure 1.

#### 5.2.1 Nominal set pressure ( $P_{nr}$ )

The nominal set pressure shall not be greater than 1,0 MPa (10 bar).

### **5.2.2 Water tightness pressure ( $P_e$ )**

The water tightness pressure is related to the nominal set pressure ( $P_{nr}$ ) by:

$$P_{e \text{ minimum}} = 0,95 P_{nr}.$$

### **5.2.3 Opening pressure ( $P_o$ )**

The opening pressure  $P_o$  is related to the nominal set pressure ( $P_{nr}$ ) by:

$$P_o = 1,1 P_{nr}.$$

### **5.2.4 Rating pressure ( $P_{dn}$ )**

The rating pressure is related to the nominal set pressure ( $P_{nr}$ ) by:

$$P_{dn} = 1,2 P_{nr}.$$

### **5.2.5 Closing pressure ( $P_f$ )**

The closing pressure is related to the nominal set pressure ( $P_{nr}$ ) by:

$$P_{f \text{ minimum}} = 0,75 P_{nr}.$$

## **5.3 Dimensional Characteristics**

The nominal outlet diameter of the combined temperature and pressure relief valve shall be at least equal to the inlet dimension.

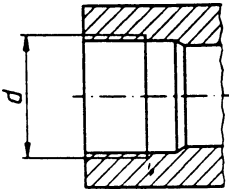
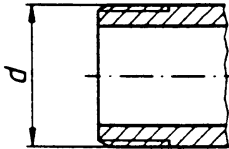
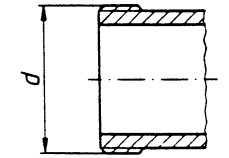
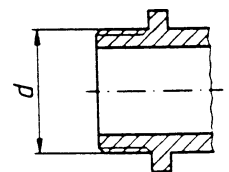
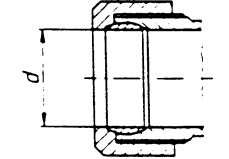
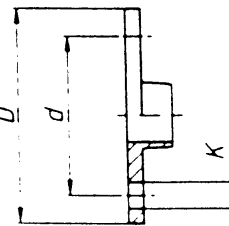
### **5.3.1 End connections**

Examples of end connections shall be as given in table 2.

### **5.3.2 Other connections (e.g. unions)**

Connections, other than those specified in section 5.3.1, shall be tested in accordance with section 7.2.3.2.

**Table 2 - Examples of end connections and nominal sizes (DN)**

Type	1)	DN 15	DN 20	DN 25	DN 32	DN 40
 a) internal thread to ISO 7-1:1994	d	Rp 1/2	Rp 3/4	Rp 1	Rp 1 1/4	Rp 1 1/2
 b) External taper thread to ISO 7-1:1994	d	R 1/2	R 3/4	R 1	R 1 1/4	R 1 1/2
 c) Flat faced external thread to ISO 228-1:1994	d	G 3/4 B	G 1 B	G 1 1/4 B	G 1 1/2 B	G 1 3/4 B
 d) External thread with shoulder to ISO 228-1:1994	d	G 1/2 B	G 3/4 B	G 1 B	G 1 1/4 B	G 1 1/2 B
 e) compression fitting for copper pipe to EN 1254-2	d	15/18	22	28	35	42
 f) flange to ISO 7005-3:1988 1) reference dimensions	D d K	95 75 14	105 75 14	115 85 14	140 100 18	150 110 18