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SIST EN 215:2004

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SIST EN 215-1:1997
SIST EN 215-1:1997/AC1:1997
SIST HD 1215-2:1997
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Termostatni ventili za ogrevala - Zahteve in preskusne metode

Thermostatic radiator valves - Requirements and test methods

Thermostatische Heizkörperventile - Anforderungen und Prüfung

Robinets thermostatiques d'équipement du corps de chauffe - Exigences et méthodes d'essai

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23.060.01	Ventili na splošno	Valves in general
91.140.10	Sistemi centralnega ogrevanja	Central heating systems

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English version

Thermostatic radiator valves - Requirements and test methods

Robinets thermostatiques d'équipement du corps de chauffe - Exigences et méthodes d'essai

Thermostatische Heizkörperventile - Anforderungen und Prüfung

This European Standard was approved by CEN on 8 April 2004.

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.

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

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

Foreword

This document (EN 215:2004) has been prepared by CMC

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 December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document will supersede EN 215-1:1987 and HD 1215-2:1988.

This European Standard constitutes the merging of EN 215-1:1987 and HD 1215-2:1988, according to Resolution BT 80/1998. The merging has been provided such that HD 1215:1988 has been included into prEN 215 mainly as a normative annex.

The work on radiator valves started in September 1982 in CEN/TC 105 with the aim of drafting a standard for requirements and a test procedure to form the basis of a possible certification scheme for radiator valves. EN 215-1:1987 was first accepted by CEN on 1986-10-28, published in July 1987, and a Corrigendum EN 215:1987/AC 1:1987 was published in November 1987.

This European Standard incorporates the corrigendum, and it will thus supersede EN 215-1:1987 and EN 215-1:1987/ AC 1:1987.

This European Standard further includes HD 1215-2:1988, which was first accepted by CEN on 1987-08-13, published in September 1988, and a Corrigendum HD 1215-2:1988/AC1:1989 was published in March 1989.

This European Standard incorporates the corrigendum, and will supersede HD 1215-2:1988 and HD 1215-2:1988/AC1:1989.

This European Standard can be used as a reference for a CEN/CENELEC Certification Mark System on radiator valves.

Annex A is normative. Annex B is informative.

This document includes a Bibliography.

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

1 Scope

This European Standard specifies definitions, requirements and test methods for thermostatic radiator valves (referred to hereafter as thermostatic valves).

This standard applies to two port thermostatic valves with or without pre-setting facility for fitting to radiators in wet central heating installations up to a water temperature of 120 °C and a nominal pressure of PN 10.

This standard further specifies the dimensions, the materials and the connection details of four series of straight and angle pattern thermostatic radiator valves of nominal pressure ≤ PN 10.

This standard can be used as reference in a CEN/CENELEC Certification Mark System on thermostatic radiator valves.

2 Normative references

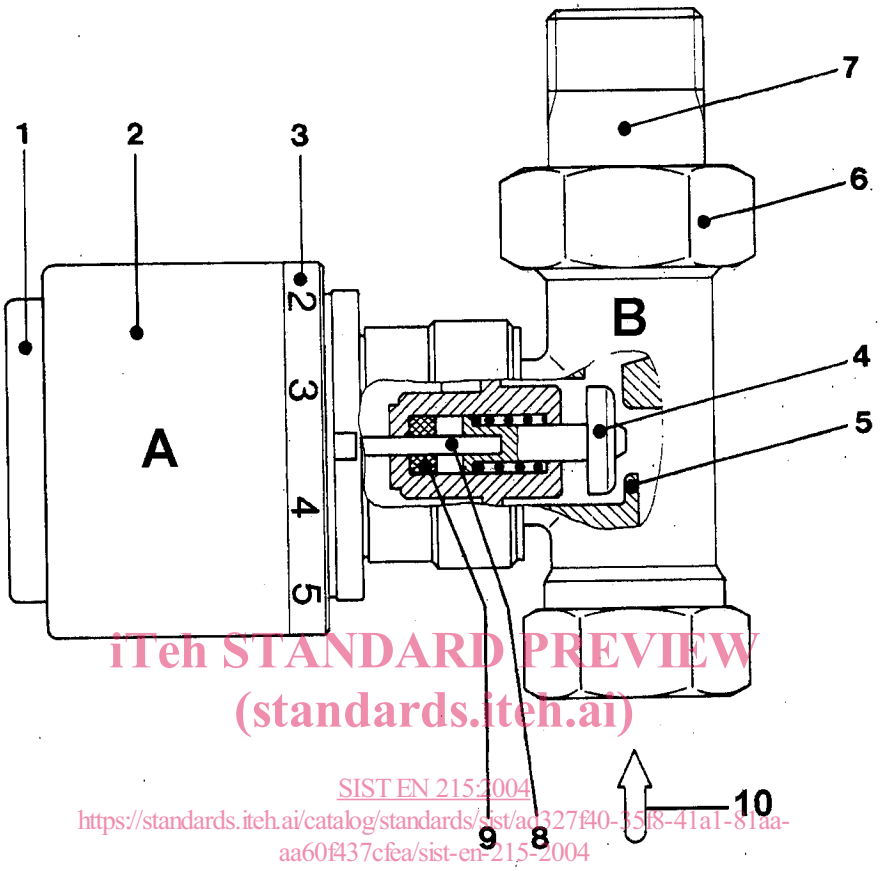
This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications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

EN 1982	*Copper and copper alloys - Ingots and castings.*
EN 12164	*Copper and copper alloys - Rod for free machining purposes.*
EN 12168	*Copper and copper alloys - Hollow rod for free machining purposes.*
EN 12420	*Copper and copper alloys – Forgings.*
EN 12449	*Copper and copper alloys - Seamless, round tubes for general purposes.*
EN ISO 228-1	*Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation (ISO 228-1:2000).*
ISO 7-1	*Pipe threads where pressure-tight joints are made on the threads - Part 1: Dimensions, tolerances and designation.*
ISO 965-1	*ISO general purpose metric screw threads -Tolerances - Part 1: Principles and basic data.*
ISO 7268	*Pipe components – Definition of nominal pressure.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1
thermostatic radiator valve - components (see Figure 1)



Key

A Thermostatic head assembly
1 Sensor
2 Temperature selector
3 Temperature selector scale
B Valve body assembly
4 Valve disc
5 Valve seat
6 Union nut
7 Tailpiece
8 Valve stem
9 Stem seal
10 Flow direction arrow

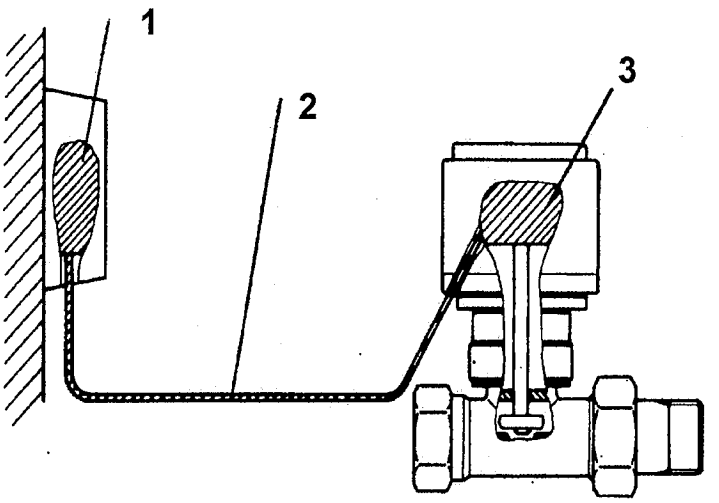
Figure 1 - Schematic drawing of the assembly of a thermostatic valve with integral sensor

3.1.1
sensor
part of the thermostatic valve that senses the temperature (controlled value) (Figure 2)

3.1.2
transmission unit
part of the thermostatic valve that converts a change of temperature or pressure of the sensor into a linear movement of the valve stem (Figure 2)

3.1.3
transmission element
part of the thermostatic valve (e.g. capillary) that transmits the volume or pressure changes from the sensor or temperature selector to the transmission unit (Figure 2)

3.1.4
thermostatic element
section containing all parts that are filled with the expansion medium (e.g. sensor, transmission element and transmission unit, shown as cross hatched parts in Figure 2)



Key

1 Sensor
2 Transmission element
3 Transmission unit

Figure 2 - Thermostatic element

3.1.5
protection cap
device that protects the valve stem and thread before the initial fitting of the thermostatic head assembly. It can be used to adjust the different flow rates as specified in 5.2.4 and 6.4.1.6.

3.2
types of thermostatic valves (see Figure 3)

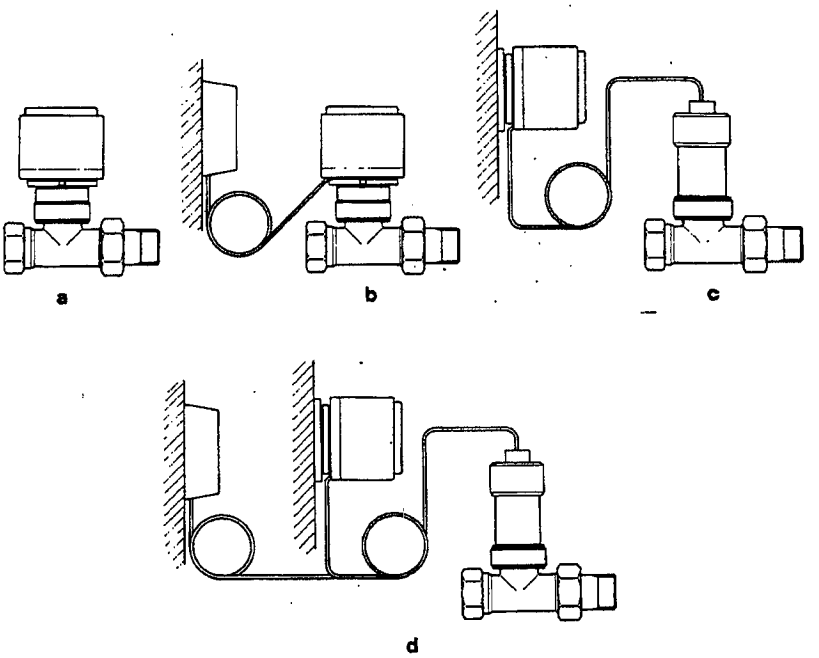


Figure 3a - Thermostatic valve with integral sensor
Figure 3b - Thermostatic valve with integral temperature selector with remote sensor
Figure 3c - Thermostatic valve with the remote sensor incorporating the selector
Figure 3d - Thermostatic valve with remote sensor and remote selector

Figure 3 - Types of thermostatic valves

3.2.1
thermostatic valve with integral sensor
valve where the sensor, transmission unit and temperature selector constitute an assembly which is incorporated with the valve body assembly (Figure 3a)

3.2.2
thermostatic valve with integral temperature selector and with remote sensor
valve where the temperature selector is incorporated within the valve. The sensor is separated from the transmission unit, and there is a transmission element between the sensor and the transmission unit (Figure 3b)

3.2.3
thermostatic valve with the remote sensor incorporating the selector
valve where the sensor and temperature selector assembly is mounted remotely from the valve body assembly and from the transmission unit. There is a transmission element between the sensor and the transmission unit (Figure 3c)

3.2.4
thermostatic valve with remote sensor and remote selector
valve where both the sensor and the temperature selector are separate from each other and from the valve body assembly with transmission unit. There is a transmission element between the sensor and the transmission unit and between the temperature selector and the transmission unit (Figure 3d).

3.2.5
thermostatic valve with pre-setting
valve where a reduced flow rate can be obtained by means of mechanical pre-adjustment incorporated in the valve body assembly

3.3
types of connections
examples of connections used to fit the valve to the radiator and to the pipe work are shown in Figure 4

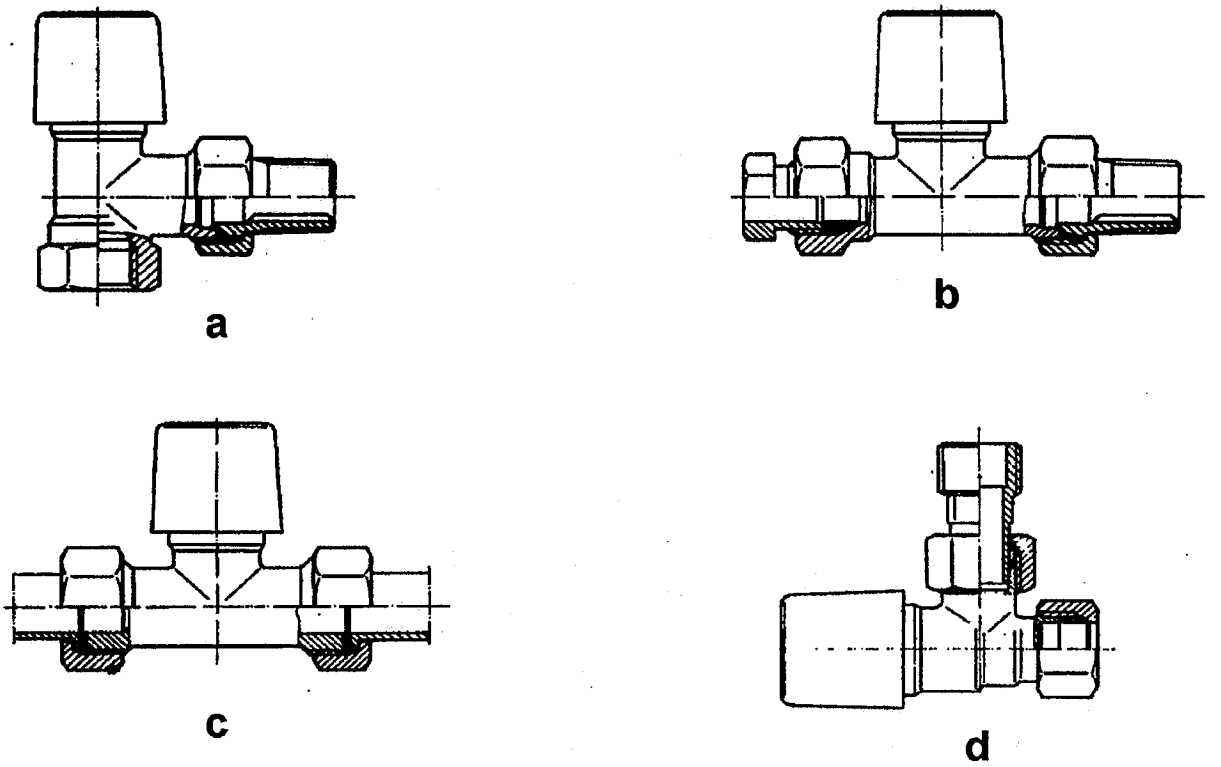


Figure 4a - Internal pipe thread and cone seated union
Figure 4b - Compression fitting and cone seated union
Figure 4c - Washered union connections
Figure 4d - Compression fittings

Figure 4 - Types of radiator valve connections

3.4
operating characteristics

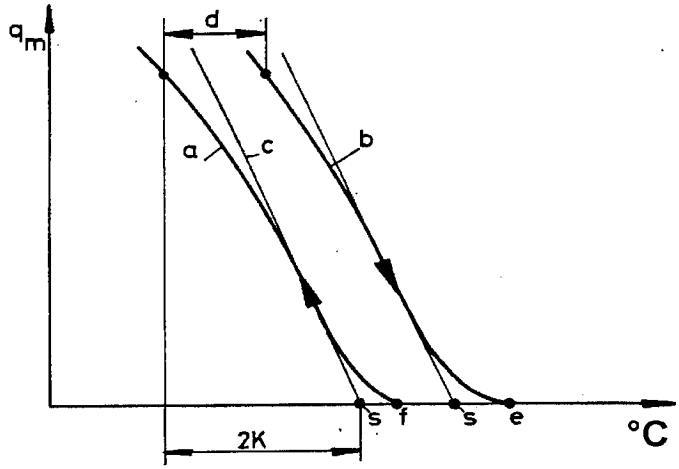
3.4.1
characteristic flow rate ($q_{m\,s}$)
water flow rate that is obtained at a temperature of point S-2K, and at a differential pressure of 10 kPa (0,1 bar), at any desired setting

3.4.2
nominal flow rate ($q_{m\,N}$)
characteristic flow rate for an intermediate setting of the temperature selector according to 6.2.1.2.

The nominal flow rate for thermostatic valves having a pre-setting facility is that obtained when the pre-setting facility is inoperative.

3.4.3
maximum flow rate ($q_{m\,max}$)
maximum water flow rate that can be obtained at a differential pressure of 10 kPa (0,1 bar)

3.4.4
hysteresis
temperature difference between the opening and closing curves obtained at the same flow rate (Figure 5)



Key

q_m Flow rate
°C Water bath temperature

a) Opening curve
b) Closing curve
c) Theoretical curve
d) Hysteresis
e) Closing temperature
f) Opening temperature
s) Temperature point S

Figure 5 - Explanatory graph of characteristic curves

3.4.5
differential pressure influence
difference between the temperature points S on the theoretical closing curves obtained at different differential pressures

3.4.6
influence of static pressure
temperature difference between two closing curves plotted at different static pressures at the same flow rate

3.4.7
water temperature effect
difference in sensor temperatures which is equivalent to the flow rate deviation caused by a change of temperature of the water flowing through the valve

3.4.8
influence of ambient temperature on thermostatic valves with transmission elements
temperature difference obtained at the same flow rate between two opening curves, one recorded with and one without temperature difference between sensor and transmission unit (valves according to 3.2.2 to 3.2.4)

3.4.9
response time
time taken for a change of flow rate after a step-change of air temperature.

This change of flow rate corresponds to a pre-determined temperature difference in accordance with 6.4.1.13.

3.5
technical definitions

3.5.1
sensor temperature
measured temperature of the sensor. In the test it is the same as the temperature of the water bath

3.5.2
differential pressure (Δp)
difference of pressure between valve inlet and valve outlet

3.5.3
closing curve and opening curve
curves showing the functions of the water flow versus sensor temperature at constant differential pressure when the valve is closing and opening respectively and at the same temperature selector setting (Figure 5)

3.5.4
closing temperature and opening temperature
sensor temperatures obtained from the closing and opening curves respectively for zero flow (Figure 5)

3.5.5
theoretical curve
straight line which passes through the points 0,5 $q_{m\,s}$ and 0,25 $q_{m\,s}$ on the characteristic curve and which is constructed according to 6.2.2 (Figure 5)

3.5.6
temperature point S
point of intersection of the theoretical curve with the abscissa $q_m = 0$ according to 6.2.2 (Figure 5).

4 Symbols and abbreviations

Table 1 - Symbols and abbreviations

Symbol	Explanation	Unit
q_m	Flow rate	kg/h
$q_{m\ N}$	Nominal flow rate	kg/h
$q_{m\ s}$	Characteristic flow rate	kg/h
$q_{m\ max}$	Maximum flow rate	kg/h
$q_{m\ s\ max}$	$q_{m\ s}$ at maximum setting of the temperature selector	kg/h
$q_{m\ s\ min}$	$q_{m\ s}$ at minimum setting of the temperature selector	kg/h
$q_{m\ x1}$, $q_{m\ x2}$	Auxiliary flow rates for measuring the response time	kg/h
t_s	Sensor temperature which corresponds to the characteristic flow rate	°C
$t_{s\ max}$	t_s at maximum setting of the temperature selector	°C
$t_{s\ min}$	t_s at minimum setting of the temperature selector	°C
S	Temperature point	°C
Δp	Differential pressure	Pa
K	Temperature difference	Kelvin

5 Requirements

5.1 Dimensions

Dimensions and connection details for different types of radiator valves are given in annex A.

5.2 Mechanical properties

5.2.1 Resistance to pressure, leak-tightness of the valve body assembly

During the test according to 6.3.1 there shall be no leak from the connections nor through the wall of the body.

5.2.2 Leak-tightness of the stem seal

The stem seal shall show no leakage of air during the test according to 6.3.3.

5.2.3 Resistance of the valve body assembly to a bending moment

The valve shall withstand the load according to 6.3.4 without permanent functional impairment, and shall fulfil the requirements of the subsequent tests.

Permanent deformation shall not be taken into account.