

Building valves — Copper alloy stopvalves for potable water supply in buildings — Tests and requirements

The European Standard EN 1213:1999 has the status of a
British Standard

ICS 23.060.20; 91.140.60

National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/504, Water supply, to subcommittee B/504/7, Control safety devices, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

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Building valves — Copper alloy stopvalves for potable water supply in buildings — Tests and requirements

Robinetterie de bâtiment - Robinets d'arrêt à soupape en alliage de cuivre pour la distribution d'eau potable dans le bâtiment - Essais et prescriptions

Gebäudearmaturen Absperrventile für Trinkwasseranlagen in Gebäuden Prüfungen und Anforderungen

This European Standard was approved by CEN on 5 September 1999.

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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of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.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.

Introduction

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

- 1) 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;
- 2) It should be noted that, while awaiting the adoption of the verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

The purpose of this standard EN 1213 is to specify:

- the requirements for the materials and the design of stopvalves;
- the mechanical, hydraulic and acoustic requirements;
- the test methods;
- the marking requirements;

for copper alloy stopvalves for use with drinking water supply in buildings.

This standard applies primarily to copper alloy stopvalves, dimensions DN 10 to DN 100, for potable water supply in buildings up to PN 10 and a distribution temperature of 65 °C. Occasional excursions up to 95 °C are permitted for a period of 1 h maximum.

Other metallic materials can be used if it can be verified that they are suitable for the application.

This standard applies also to stopvalves in combination with accessories in the same body.

This standard does not apply to regulating or servicing valves, designed specially to isolate sanitary tapware or other sanitary appliances.

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.

EN 200	<i>Sanitary tapware - General technical specifications for single taps and mixer taps (nominal size 1/2) PN10 - Minimum flow pressure of 0,05 Mpa (0,5 bar)</i>
EN 1254-1	<i>Copper and copper alloys - Plumbing Fittings - Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes.</i>
EN 1254-2	<i>Copper and copper alloys - Plumbing Fittings - Part 2: Fittings with compression ends for use with copper tube.</i>
EN 1254-3	<i>Copper and copper alloys - Plumbing Fittings - Part 3; Fittings with compression ends for use with plastics pipe.</i>
EN 1982	<i>Copper and copper alloys - Ingots and castings</i>
prEN 10255	<i>Carbon steel tubes suitable for welding or threading.</i>
EN 12420	<i>Copper and copper alloys - Forgings</i>
EN ISO 3822-1	<i>Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 1 Method of Measurement. (ISO 3822-1: 1999)</i>
EN ISO 3822-3	<i>Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 3: Mounting and operating conditions for in-line valves and appliances. (ISO 3822-3: 1997)</i>
EN ISO 6509	<i>Corrosion of metals and alloys – Determination of dezincification resistance of brass (ISO 6509 : 1981)</i>
ISO 7-1	<i>Pipe threads where pressure-tight joints are made on the threads - Part 1 Dimensions, tolerances and designation.</i>
ISO 228-1	<i>Pipe threads where pressure-tight joints are not made on the threads - Part 1 Dimensions, tolerances and designation.</i>

3 Definition

For the purposes of this standard, the following definition applies:

Stopvalve: Valve in which the manually operated obturator moves in a straight line and, in the seating area, longitudinally against the direction of flow. It ensures the complete prevention of flow in a water pipe.

The following patterns are covered:

- Straight pattern stopvalves (See figure 1)
- Angle pattern stopvalves (See figure 2)
- Oblique pattern stopvalves (See figure 3)

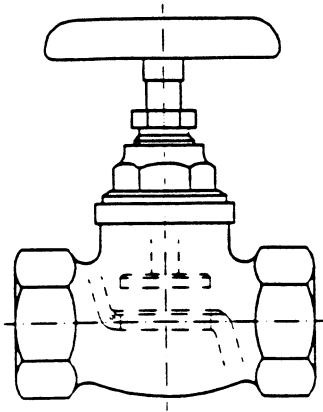


Figure 1: Straight pattern stopvalve

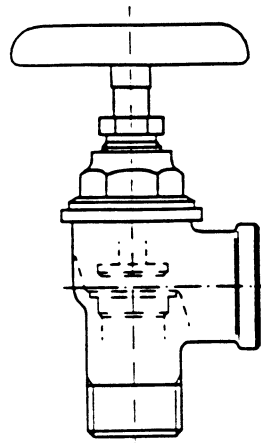


Figure 2: Angle pattern stopvalve

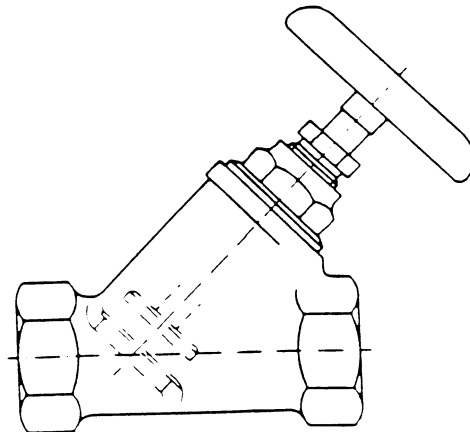


Figure 3: Oblique pattern stopvalve

4 Classification

4.1 General

Stopvalves shall be classified by the nominal size (DN), the flow rate and the end connection.

4.2 The nominal size (DN)

The nominal sizes of stopvalves, which correspond to the flow rates, are indicated in table 7.

4.3 The flow rate

Flow Rate Class VA (straight and angle pattern stopvalves), and
Flow Rate Class VB (oblique pattern stopvalves)
according to table 7 in 7.3.3.

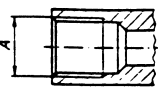
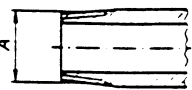
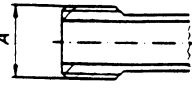
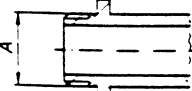
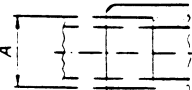
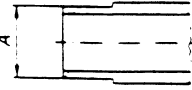
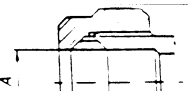
4.4 The end connections

Typical end connections are defined in table 1.

Compression ends for use with plastics pipes are described in EN1254-3.

Other end connections are permitted provided their suitability is verified.

Table 1: End connections and nominal sizes (DN)

Type	¹⁾	DN10	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
 a) Internal thread to ISO 7/1	A	Rp 3/8	Rp 1/2	Rp 3/4	Rp 1	Rp 1 1/4	Rp 1 1/2	Rp 2	Rp 2 1/2	Rp 3	Rp 4
 b) External thread to ISO 7/1	A	R 3/8	R 1/2	R 3/4	R 1	R 1 1/4	R 1 1/2	R 2	R 2 1/2	R 3	R 4
 c) External thread to ISO 228/1	A	G1/2B	G3/4B	G1B	G1 1/4B	G1 1/2B	G1 1/2B G1 3/4B	G2B	G3B	G3 1/2B	-
 d) External thread with shoulder to ISO 228/1	A	G3/8B	G1/2B	G3/4B	G1B	G1 1/4B	G1 1/2B G1 3/4B	G2B G2 3/8B	G2 1/2B	G3B	G4B
 e) Capillary socket to EN 1254-1	A	12	15/18	22	28	35	42	54	76,1	88,9	108
 f) Male capillary end to EN 1254-1	A	12	15/18	22	28	35	42	54	76,1	88,9	108
 g) Compression end for copper pipe to EN 1254-2	A	12	15/18	22	28	35	42	54	76,1	88,9	108

¹⁾ reference dimension

5 Designation

The designation of a stopvalve comprises:

- its pattern and material
- its flow rate class
- its nominal size DN
- its end connections
- its acoustic group
- reference to this standard.

EXAMPLE:

Oblique pattern stopvalve of copper alloy, flow rate class VB, DN 25, with internal threads Rp 1 on both sides, acoustic group I, EN 1213.

6 Materials

6.1 Chemical and hygienic characteristics

All materials in contact with potable water shall not cause any deterioration in water intended for human consumption with regard to food quality, appearance, odour or taste.

Within the recommended limits given in paragraph 1, materials shall not be subject to any deterioration which might compromise the operation of the stopvalve.

Pressurised parts shall withstand the limits of use. Materials with inadequate corrosion resistance shall have additional protection.

6.2 Body materials

6.2.1. Copper alloys

Examples of suitable copper alloys are given in table 2.

Table 2: Examples of copper alloys

Material Designation		
Symbol	Number	EN Standard
CuSn 10-C	CC480K	EN1982
CuSn5Pb5Zn5-C	CC491K	EN1982
CuSn3Zn8Pb5-C	CC490K	EN1982
CuZn39Pb3	CW614N	EN 12420
CuZn40Pb2	CW617N	EN 12420

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 9).

6.2.2. Other metallic materials

Other metallic materials can be used provided it can be verified that they are suitable for application.

7 Tests and requirements

7.1 General

The tests described are type tests (laboratory tests) and not quality control tests carried out during manufacture.

Tests 7.2.1. to 7.3.2. shall be carried out in the sequence of this standard on the same stopvalve.

7.2 Mechanical requirements and tests

7.2.1. Torque test

7.2.1.1 Principle

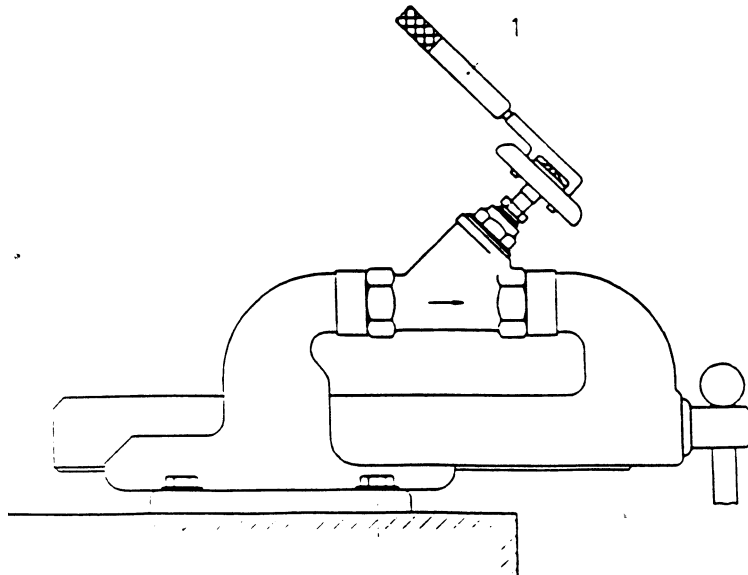
This test verifies the ability of the stopvalve to resist under an applied torque.

7.2.1.2 Test

Replace the seat washer with a metallic disc having the same dimensions.

Hold the stopvalve in a rigid fixture as shown in figure 4. Within the headwork slacken gland packings, if used, to reduce the frictional resistance.

Apply a torque, as given in table 3, to the operating member by a torque key in the closing direction for (30 + 3) s.



1 Torque key

Figure 4: Apparatus for torsional strength test

Table 3: Applied Torque

DN	10	15	20	25	32	40	50	65	80	100
Torque M_t in Nm	10 \pm 1	10 \pm 1	15 \pm 1,5	20 \pm 2	25 \pm 2,5	30 \pm 3	30 \pm 3	35 \pm 3,5	35 \pm 3,5	40 \pm 4

7.2.1.3 Requirement

The stopvalve shall withstand the applied torque for (30 + 3) s without any fracture or rupture. Any deformation shall not impair the function and leaktightness of the stopvalve.

7.2.2 Bending moment

This test is applied only to stopvalves with threaded ends of types a), b) and d) of table 1.

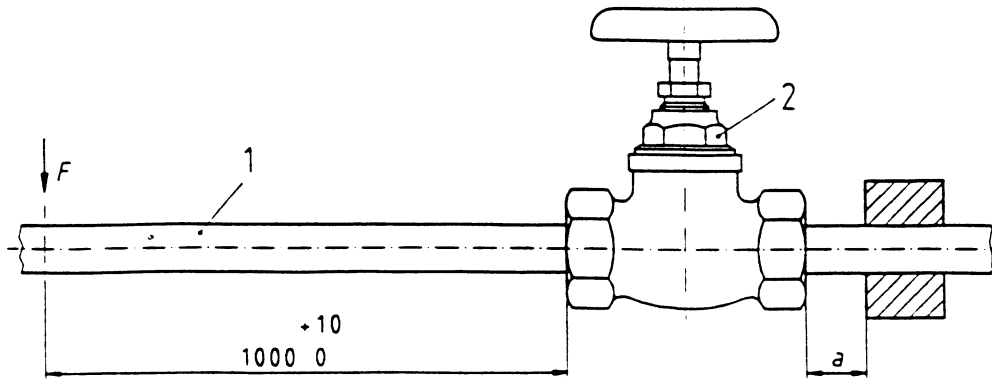
7.2.2.1 Principle

This test verifies the bending resistance of the stopvalve under an applied bending moment.

7.2.2.2 Test

Install the stopvalve in a test rig as shown in figure 5. Attach to the inlet a steel pipe complying with prEN10255 (medium series) having a length of $(1000 + 10/0)$ mm and the same diameter as the nominal size of the stopvalve.

Apply a force F , as given in table 4 to the end of the steel pipe to produce the bending moments for $(30 + 3)$ s.



- 1 Steel pipe
- 2 Stopvalve

Figure 5: Apparatus for bending moment test

Table 4: Bending moments

DN	10	15	20	25	32	40	50	65	80	100
F in N *)	50	75	95	150	190	220	310	400	500	600
a in mm *)	10	15	20	25	32	40	50	65	80	100
*) Limit deviation $+10/0$ %										

7.2.2.3 Requirement

The stopvalve shall withstand the applied bending moment for $(30 + 3)$ s without fracture or rupture. Any deformation shall not impair the function and leaktightness of the stopvalve.

7.3 Hydraulic tests and requirements

7.3.1 Leaktightness

7.3.1.1 Principle

This test verifies the leaktightness of the obturator and the stopvalve assembly under cold water pressure.

7.3.1.2 Test

Install the stopvalve in a test rig capable of maintaining the static pressures indicated in table 5. For test 1, close the stopvalve using a torque which is not greater than the values in table 3. Subject the stopvalve to the pressures indicated in table 5 for (60 +5/0) s.

7.3.1.3 Requirement

The stopvalve shall be leaktight at the static pressures and duration indicated in table 5.

Table 5: Requirements for leaktightness

Test	Tightness of	Obturator	Outlet	Static pressure	Duration
1	Obturator	Closed	Open	(1,6 ± 0,1) MPa [(1,6 ± 1) bar]	(60 +5/0) s
2	Assembled stopvalve	Open	Closed	(1,6 ± 0,1) MPa [(16 ± 1) bar] 0,02 MPa (0,2 bar) *)	(60 +5/0) s
*) Additional test if the tightness of the spindle is made by non adjustable seals (e.g. O-ring etc.)					

7.3.2 Pressure resistance

7.3.2.1 Principle

This test verifies that the stopvalve withstands an hydraulic pressure, using cold water.

7.3.2.2 Test

Install the valve in a test rig, capable of maintaining the static pressures indicated in table 6. Subject the stopvalve, with the obturator open and the outlet closed to a pressure of $(2,5 \pm 0,1)$ MPa $\{(25 \pm 1) \text{ bar}\}$ for $(10 \pm 1/0)$ min.

Leaking at stuffing box and end connections is allowed.

7.3.2.3 Requirement

The stopvalve shall show no permanent deformation, rupture or breakage at the static pressure and duration indicated in table 6.

Table 6: Requirements for hydraulic strength

Obturator	Outlet	Static pressure	Duration
Open	Closed	$(2,5 \pm 0,1)$ MPa $\{(25 \pm 1) \text{ bar}\}$	$(10 \pm 1/0)$ min

7.3.3 Flow capacity

7.3.3.1 Principle

This test verifies that the stopvalve delivers a minimum flow rate at a pressure loss of 0,01 MPa (0,1 bar).

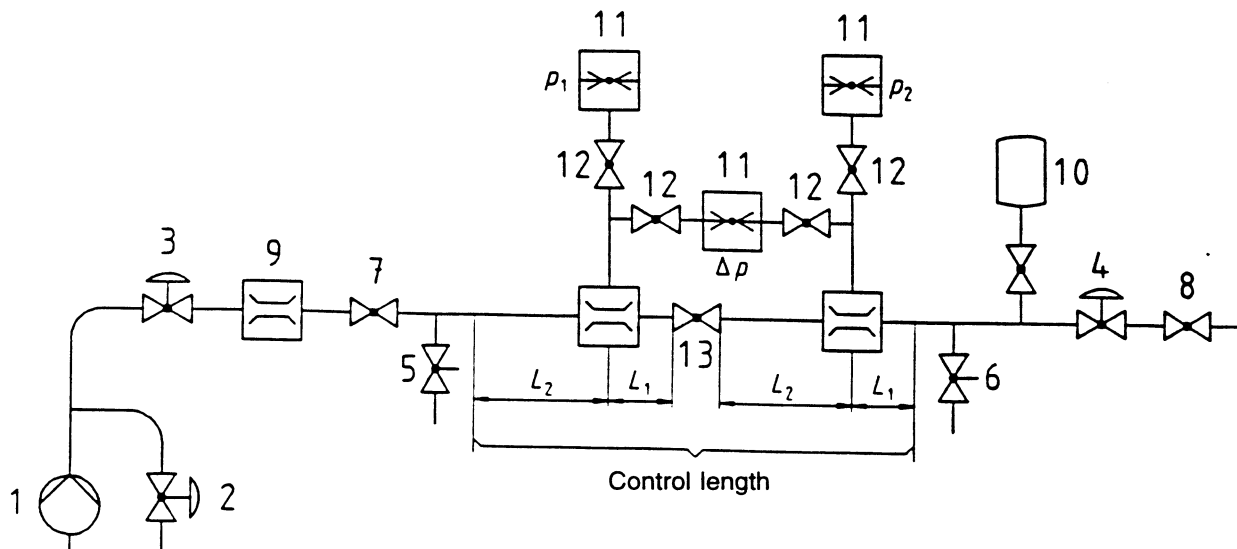
7.3.3.2 Test

Install the stopvalve in a test rig shown in fig. 6.

Determine the flow characteristics with the valve fully open.

The pressure loss is measured at varying flow rates.

The pressure losses occurring in the test installation shall be taken into account when determining the flow characteristics of the stopvalve.



- | | | | |
|-------|-----------------|----|--------------------------------------|
| 1 | Pump | 11 | Pressure/differential pressure meter |
| 2,3,4 | Regulation | 12 | Isolating valve for pressure gauge |
| 5,6 | Drain valve | 13 | Stopvalve under test |
| 7,8 | Isolation Valve | L1 | $\geq 5D$ |
| 9 | Flowmeter | L2 | $\geq 10D$ |
| 10 | Acumulator | D | Internal diameter of pipe |

Figure 6: Flow test rig

7.3.3.3 Requirements

The stopvalve shall have a flowrate, at least equal to that specified in table 7 at a pressure loss of 0,01 MPa (0,1 bar).

Table 7: Flow rate requirements in l/s

DN	10	15	20	25	32	40	50	65	80	100
Flow rate class V _A	0,10	0,20	0,40	0,70	1,20	1,60	2,70	4,50	6,70	8,50
Flow rate class V _B	0,25	0,50	1,00	1,75	3,00	4,00	6,75	11,0	16,0	22,00

7.4 Acoustic tests and requirements

This test applies only to stopvalves DN 10 to DN 32 inclusive.

7.4.1 Principle

To classify stopvalves by acoustic groups (I, II or not classified).

7.4.2 Test

The mounting and operating conditions shall be in accordance with the specifications laid down in EN ISO 3822-3.

The tests shall be carried out as described in EN ISO 3822-1 and EN ISO 3822-3.

The sound pressure level L_{ap} in dB (A) shall be determined at a flow pressure of 0,3 MPa (3 bar) and the flow rate indicated in table 8.

Table 8: Requirements for flow rates at 3 bar

DN	10	15	20	25	32
V in l/s	0,2	0,5	0,8	1,3	2,0

7.4.3 Requirements

The requirements are indicated in Table 9.

Table 9: Acoustic groups

	L_{ap} in dB (A) at 0,3 MPa (3 bar)
Acoustic group	
I	≤ 20
II	$20 \leq L_{ap} \leq 30$
Not classified	> 30

7.5 Endurance test

This test applies to all stopvalves DN10 to DN20 inclusive.

7.5.1 Principle

This test verifies the mechanical durability of the operating mechanism, by subjecting the headwork to a number of opening and closing operations.

7.5.2 Test installation

An automatic test rig shall ensure that the torque remains $(2,5 + 0,5)$ Nm during the test, which is not affected by the influence of the moment of inertia of the equipment and which does not cause any horizontally related forces onto the headwork, that might result in abnormal wear.

7.5.3 Test

Mount the stopvalve on the automatic test rig described in EN 200.

Apply a closing torque of $(2,5 \pm 0,5)$ Nm. With the stopvalve in the closed position adjust the static pressure to between 0,2 MPa and 0,4 MPa (2 bar and 4 bar). With the stopvalve in the open position adjust the flow rate to between 0,066 l/s and 0,1 l/s (4 l/min and 6 l/min) by the regulation valve (after the stopvalve under test).

The stopvalve is subjected to 10,000 cycles, according to the following sequence:

- Opening to 75 % of the full lift
- Holding for about 5 s in open position
- Closing completely with a torque of 2,5 Nm, the stopvalve does not have to be completely tight.
- Holding for about 5 s in closed position

The test is applied to stopvalves as delivered.

If the stopvalve does not operate with the indicated closing torque after this procedure, the requirements of the test have not been fulfilled.

Adjustable gland packings may be retightened during the test.

7.5.4 Requirements

If leakage or malfunctioning occurs, the test shall be stopped.

After the test, the stopvalve shall comply with the requirements of 7.3.1.

8 Design requirements

The headwork shall be removable for servicing without having to remove the stopvalve from the system.

9 Marking

Stopvalves shall be marked in a durable way with the following:

- manufacturer's name or mark
- nominal size (DN ...)
- arrow indicating normal direction of flow
- acoustic group
- in the countries where the use of products made of dezincification resistant materials is not required, the dezincification resistant products according to EN ISO 6509 as well as the products which do not contain zinc are allowed to be marked "DR".
- in the countries where the use of products made of dezincification resistant materials is required, the dezincification resistant products as well as the products which do not contain zinc shall be marked "DR".

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