

Antipollution of water installations

Technical document 045-07

Hose union backflow preventers – Family H,
Types A, B, D and C and Draw-off taps

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The CSTB (Centre Scientifique et Technique du Bâtiment), a public establishment supporting innovation in construction, has four key activities: research, expertise and the assessment and dissemination of knowledge, organised to meet the challenges of ecological and energy transition in the construction sector. Its field of competence covers construction materials, buildings and their integration into districts and towns.

With over 900 employees, its subsidiaries and networks of national, European and international partners, the CSTB group works for all the stakeholders in the construction sector to push forward the quality and safety of buildings.

Modification history

Revision No.	Date	Modifications
15	01/07/2017	Update to the document introduction and reference. Basic modifications: <ul style="list-style-type: none"> - Chapter 1C: article 6.4 packing/packaging added - Paragraph 9.1: Extra details on the operating procedure added - Appendix A: Table A1 modified - Part 2 Table 2: tests during production and on finished products simplified, note on incorporating the tests during production removed and sub-paragraph on ISO 9001 sites removed - Part 3 Inspection procedures employed by the CSTB: chapters and paragraphs removed (types of products, inspection operations following admission and reduced inspection operations).
16	25/07/2022	<ul style="list-style-type: none"> - Change of lettering of paragraphs from paragraph 4.2 of chapter 1D. - Editorial update according to the structure in force following the creation of the technical management appendix of the NF045 reference system rev. 17.

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1. TECHNICAL SPECIFICATIONS

1A/ HOSE UNION ANTI-VACUUM VALVES - FAMILY H, TYPE B AND TYPE D

Standard NF EN 15096 was formally approved on 12 March 2008.

This standard is used as a technical reference.

Purpose

The purpose of this article is to add detail to certain paragraphs of Standard NF EN 15096 using the same paragraph numbers, and to complete this European reference system using criteria deemed fundamental.

1B/ AUTOMATIC DIVERTER - FAMILY H, TYPE C

Standard NF EN 14506 was formally approved on 5 November 2005.

This standard is used as a technical reference.

REMINDER

This type of protection device is specifically designed to be fitted to bath/shower type sanitary tapware. This is why this family of products has been incorporated in the application of the NF mark, entitled "Sanitary tapware" carrying the number NF077.

For the sake of transparency and homogeneity, it has been decided that:

- the technical document specific to this family of products, established in the NF Certification Reference System – Sanitary tapware (NF077), will need to be validated by the Specific Committee of the NF mark – Antipollution of water installations (NF045),
- the admission dossiers will have to be submitted to the Committee of the NF mark - Antipollution of water installations, and approval thereof obtained before being validated by the Committee of the NF mark – Sanitary Tapware.

1C/ HOSE UNION BACKFLOW PREVENTER – FAMILY H, TYPE A

Standard NF EN 14454 was formally approved on 5 September 2005.

This standard is used as a technical reference system and replaces French Standard NF P 43-016.

To preserve the performance level of the products, it has been decided to add detail to and/or supplement certain chapters of this standard.

Purpose

The purpose of this article is to add detail to certain paragraphs of Standard NF EN 14454 using the same paragraph numbers, and to complete this European reference system using criteria deemed fundamental.

1 Field of application

No modifications.

2 Nominative references

EN 12729:2002, *Devices to prevent pollution by backflow of potable water — Controllable backflow preventer with reduced pressure zone — Family B — Type A*.

NF EN 1254-20: 2021, *Copper and copper alloys – Fitting – Part 20 : Definitions, thread dimensions, test methods, reference data and additional information*.

3 Terms and definitions

No modifications.

4 Nominal size

No modifications.

“Nominal size” is understood to mean “Denomination”.

5 Designation

No modifications.

6 Marking and technical documents

6.1 General

No modifications.

6.2 Marking

No modifications.

6.3 Technical documents

No modifications.

6.4 Packing/Packaging (added)

A manufacturing reference shall be included on the packaging.

7 Symbols

No modifications.

8 General design characteristics

8.1 Design principle

No modifications.

8.2 Fittings

The threaded ends of the body of the backflow preventer shall have seal seating surfaces large enough to provide a leakproof seal under pressure and to prevent damage to the seals.

The installation of the device on a draw-off tap must not, under any circumstances, be able to disturb its operation.

The sizing of threaded connections on the pipeline must comply with the dimensional specifications of standard NF EN 1254-20.

8.3 Air inlets

The smallest dimension of the air inlets shall not be less than 2 mm.

9 Physical and chemical characteristics

9.1 Materials

Compatibility with the products used to disinfect the system shall be checked in accordance with Article 9.7.8 of Standard NF EN 12729:2003.

During admission of a product, the tests shall be performed successively on a single test specimen. Exposure to permanganate, rinsing, exposure to sodium hypochlorite, rinsing.

The sodium hypochlorite test alone is performed during the follow-up.

9.2 Nature of the materials

No modifications.

10 Characteristics and tests

10.1 General

No modifications.

10.2 Test sequence

No modifications.

10.3 Visual verification

No modifications.

10.4 Leaktightness

No modifications.

10.5 Flow rate/pressure loss test

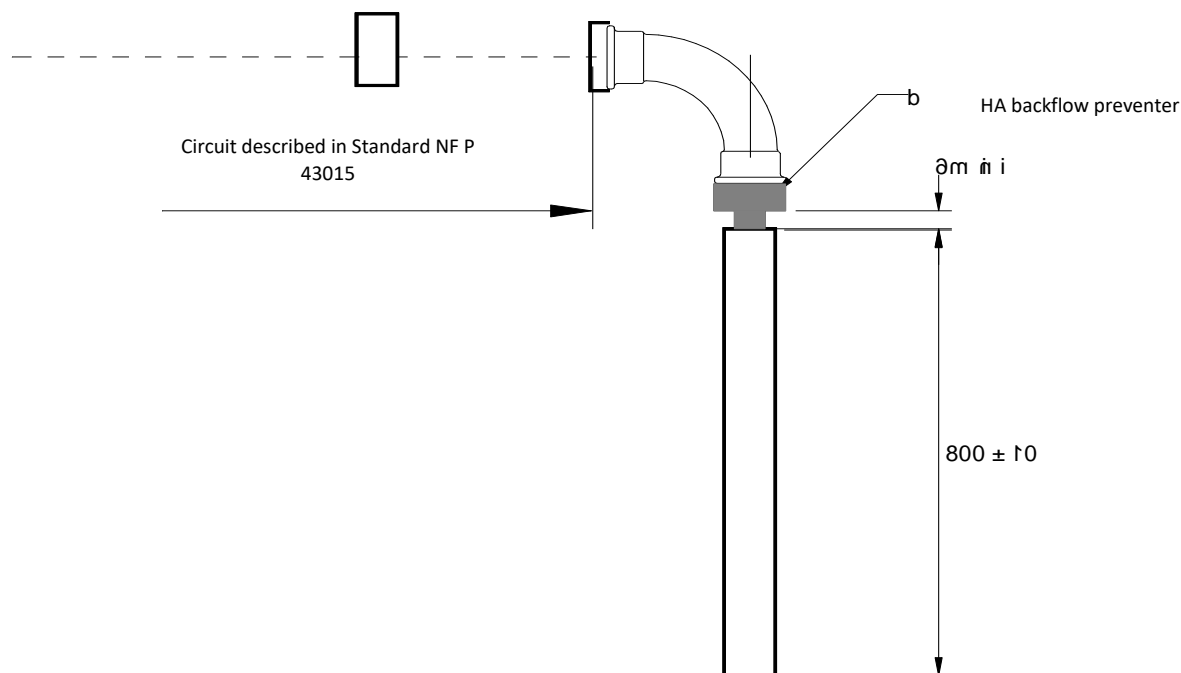
Article 10.5 of Standard EN 14454 specifies a device supply (or reverse) flow rate **at a supply pressure of 0.05 MPa (0.5 bar)** as opposed to a pressure loss of 0.5 bar.

10.5.1 Flow rate

10.5.1.1 Test equipment:

The test equipment described in Standard NF EN 14454 is supplemented by the information below:

Install the backflow preventer on a type G1 or G4 large radius elbow in accordance with Standard NF E 29-801 and connect an 800 ± 10 mm long pipe with an inner diameter matching the DN of the device downstream of the device. (See Figure and Table below).



DN of the HA	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$
Minimum inner diameter of the tube (in mm)	15	19	25	32

Plot the flow rate curve as a function of the supply pressure from 0 to 0.1 MPa.

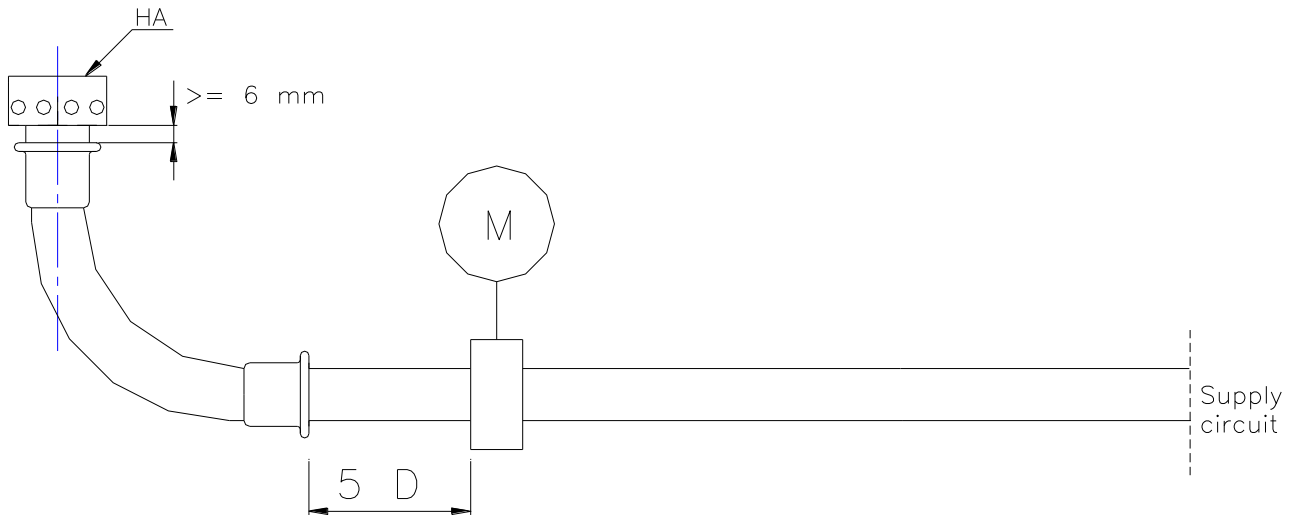
Then deduce the flow rate measured at the reference supply pressure of 0.05 MPa. At this reference pressure, the (water) shut-off system should be fully open.

10.5.2 Reverse flow

10.5.2.1 Test equipment:

The test equipment described in Standard NF EN 14454:2005 is supplemented by the following information:

Use a type G1 or G4 large radius elbow (in accordance with Standard NF E 29-801) with an equivalent DN to that of the downstream fitting of the backflow preventer.



Plot the flow rate curve as a function of the supply pressure from 0 to 0.1 MPa. Verify the specification of Standard NF EN 14454.

10.6 Back pressure tightness

No modifications.

10.7 Bending moment, mechanical strength of body and leak tightness

No modifications.

10.8 Tightness

No modifications.

10.9 Endurance

No modifications.

10.10 Vacuum

The test in Article 10.10.3 is repeated 3 times.

The water rise in tube 10 under the test conditions shall be less than the stabilised height at 100 mm and the peak height shall never exceed 150 mm, averaged over 3 tests.

10.11 Leaktightness

No modifications.

11 Acoustic characteristics

No modifications.

Only acoustic class I or II products can be considered for the NF mark.

Appendix A

Table A.1 modified as follows.

Standard article and test	Device 1	Device 2
Visual verification	x	
Leaktightness 10.4	x	x
Flow rate/pressure loss 10.5	x	
Bending moment, mechanical strength of the body and leaktightness 10.7		x
Leaktightness 10.8		x
Endurance 10.9	x	
Leaktightness under pressure 10.6 (before and after endurance testing)	x	
Vacuum 10.10.2	x	
Vacuum 10.10.3		x
Leaktightness 10.11	x	

1D/ ANTI-POLLUTION DRAW-OFF TAPS

This article was drafted at the request of the tapware manufacturers in order to provide extra details on anti-pollution draw-off tap characteristics.

1 General

1.1 Purpose

The purpose of this article is:

- to specify the characteristics of the materials and design,
- to set out the dimensional, mechanical, leaktightness, hydraulic and air control characteristics,
- to specify the test methods,
- to define the marking and presentation of the anti-pollution draw-off taps.

1.2 Field of application

This document applies to PN 10 straight or inclined head anti-pollution draw-off taps with threaded nozzle for 3/8 to 1 denomination fittings.

These taps are designed to take a flexible hose with or without a locking element at the hose union.

Pipework downstream of the tap outlet shall be removable (e.g. garden hose).

This article applies to globe valve draw-off taps. It will be extended to cover other types of tap as and when admission requests are made.

1.3 Standard references

Identification No. of the standards and texts	Designation
NF P 43-015:1985	<i>Water fittings for buildings – Draw-off taps – General technical specifications</i>
NF EN 14454:2005	<i>Devices to prevent pollution by backflow of potable water – HA Hose union backflow preventers</i>
Technical document 045-07	<i>Hose union backflow preventers - Family H</i>

1.4 Definition

Anti-pollution draw-off taps are a combination of a draw-off tap and an anti-pollution device fitted downstream of it.

1.5 Designation

Anti-pollution draw-off taps are designated by:

- their denomination - corresponding to the dimensions of the upstream threaded end connection,
- the material their bodies are made of and how they are finished,
- their shut-off type (globe valve, etc.)
- the reference to this document.

2 Materials and general design

2.1 Quality of the materials

See chapters 9.1 and 9.2 of Standard NF EN 14454:2005.

2.2 Design

Anti-pollution function

See chapters 8.1, 8.2 and 8.3 of Standard NF EN 14454 (only concerns the outlet fitting).

Non-removability: it shall not be possible for the anti-pollution function to be easily removed from the tap.

Draw-off tap function

See chapters 9.1 - 9.3 and 9.4 of Standard NF P 43-015.

3 Dimensional characteristics

3.1 General

See chapters 2.2.1 - 2.2.2 - 2.2.3 and 2.2.4 of Standard NF P 43-015.

This document is not applicable to taps with unthreaded nozzles.

3.2 Globe valve draw-off tap dimensions:

The standardised dimensions are shown on Figure 1 below and the value of the corresponding dimensions is given in Table 1.

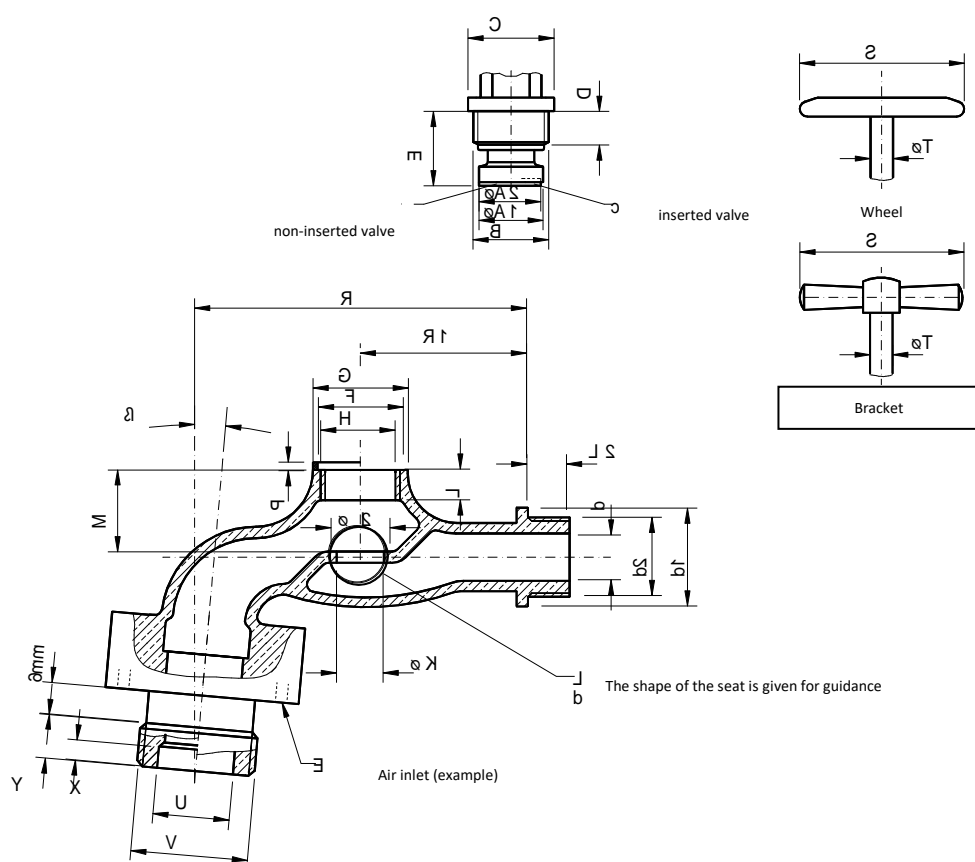


Figure 1: Anti-pollution globe valve draw-off tap

Table 1 - Anti-pollution globe valve draw-off tap dimensions

Dimensions	Tap denomination				Observations
	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	
A1 max	14.5	18	23.5	29.5	(in mm)
A2 min	12.8	16.5	22	28	(in mm)
B	G 3/8 B	G 1/2 B	G 3/4 B	G 1 B	NF E 03-005 - Tolerance B
C	21 $^{0}_{-0,2}$	25 $^{0}_{-0,2}$	31 $^{0}_{-0,2}$	38 $^{0}_{-0,3}$	(in mm)
D	7 $^{0}_{-0,4}$	8 $^{0}_{-0,4}$	8 $^{0}_{-0,4}$	11 $^{0}_{-0,4}$	(in mm)
E max	15	17	19	22	(in mm) Head in "fully open" position
F	21 $^{+0,4}_{-0,2}$	25 $^{+0,4}_{-0,2}$	31 $^{+0,4}_{-0,2}$	38 $^{+0,6}_{-0,2}$	(in mm)
G min	21	25	31	38	(in mm)
H	G 3/8	G 1/2	G 3/4	G 1	NF E 03-005
J2 min	14.7	18.5	24	30	(in mm)
K max	9	12.5	18	23.5	(in mm)
L min	7	8	8	11	(in mm)
M	19 $^{+1,5}_{0}$	22 $^{+1,5}_{0}$	25 $^{+1,5}_{0}$	30 $^{+2}_{0}$	(in mm)
P max	1.5	2	2	2.5	(in mm)
R	75 $^{+10}_{0}$	80 $^{+10}_{0}$	95 $^{+10}_{0}$	110 $^{+10}_{0}$	(in mm)
R1	40 $^{+2}_{-2}$	45 $^{+2}_{-2}$	50 $^{+2}_{-2}$	*	(in mm) * To be specified at a later date
U max	15	19	25	32	(in mm)
V	G 1/2 B	G 3/4 B	G 1 B	G 1 1/4 B	NF E 03-005
Y min	8	10	10	10	(in mm)
D2	G 3/8 B	G 1/2 B	G 3/4 B	G 1 B	NF E 03-005
l2 min	9	11	12	14	(in mm)
d	9,5 $^{+0,5}_{0}$	12,5 $^{+0,5}_{0}$	18 $^{+0,5}_{0}$	23,5 $^{+0,5}_{0}$	(in mm)
d1 min	22	26	32	40	(in mm)
T	7.5	7.5	7.5	9.5	(in mm)
S	40 to 50	45 to 55	50 to 60	60 min	(in mm)
Xmin	5	5	6	6	(in mm)
β	> 0° <10°	> 0° <10°	> 0° <10°	> 0° <10°	(in degrees)

4 Characteristics and verification

4.1 Mechanical characteristics:

Bending moment, mechanical strength of body and leak tightness of the anti-pollution device

The test is carried out on the whole tap in accordance with Article 10.7 of Standard NF EN 14454:2005. The test rig described in Article 10.7.1 of Standard NF EN 14454 is adapted to enable the test to be carried out.

For this test, the denomination to take into account is the denomination of the downstream fitting.

Mechanical endurance

This test is carried out on two samples:

- ☞ sample A, for testing the tap's moving parts.
- ☞ sample B, for testing the anti-pollution function.

Specifications

At the end of the tests,

- sample A shall comply with the specifications of Article 7.1 of Standard NF P 43-015.
- samples A and B shall comply with the specifications of Articles 10.10 and 10.4 of Standard NF EN 14454:2005.

Tests

- ☞ sample A: tested in accordance with Article 7.1 of Standard NF P 43-015.
The anti-pollution device remains in place for this test.
- ☞ sample B: tested in accordance with Article 10.9 of Standard NF EN 14454.

Operating mechanism strength under torque

Tested in accordance with Article 7.2 of Standard NF P 43-015.

4.2 Leaktightness characteristics

Leaktightness test on the tap body

This test is carried out on the whole tap in accordance with Article 3.2.4.1 of Standard NF P 43-015. The test pressure is applied for 5 minutes.

Inspection to check obturator/seat leaktightness and tapware upstream of the seat

Tested in accordance with Article 3.2.3 of Standard NF P 43-015.

Inspection to check anti-pollution function leaktightness

Test 1: in accordance with Article 10.4.2 of Standard NF EN 14454.

Test 2: in accordance with Article 10.4.3 of Standard NF EN 14454.

Test 3: in accordance with Article 10.4.6 of Standard NF EN 14454.

4.3 Hydraulic characteristics

Flow rate test

Specification

The flow rate recorded at supply pressures of 0.05 MPa (0.5 bar) and 0.2 MPa (2 bar) shall be equal to or higher than the values given in the table below.

Tap denomination	3/8	1/2	3/4	1
Supply pressure (MPa)	Flow rate (in litres per second)			
0.05	0.2	0.4	0.7	1.1
0.2	0.4	0.8	1.4	2.2

Test

Tested in accordance with Article 10.5.1 of Standard NF EN 14454:2005 (*).

Measurement of the leakage flow rate under reverse flow

Tested in accordance with Article 10.5.2 of Standard NF EN 14454:2005 (*).

4.4 Air flow characteristics

Air inlet efficiency verification

Tested in accordance with Article 10.10.3 of Standard NF EN 14454:2005.

Fitness for purpose

Tested in accordance with Article 10.10.2 of Standard NF EN 14454:2005.

4.5 Acoustic characteristics

Tested in accordance with Article 11 of Standard NF EN 14454.

The tap shut-off mechanism should be in the fully open position for this test.

4.6 Marking

See Article 10.1 of Standard NF P 43-015, Article 6.2 of Standard NF EN 14454:2005 and the NF045 Certification Rules.

4.7 Presentation

See Article 6.3 of Standard NF EN 14454:2005.

Indicate that this tap must be installed at least 0.80 m from the adjoining floor in the installation rules.

(*) **Important:** The modifications to Standard NF EN 14454 set out in Article 1B of this document must be incorporated in these articles.