WATER

TECHNICAL DOCUMENT

SANITARY TAPWARE

Technical document 077-04

ECAU and/or EChAU ratings for thermostatic mixer taps

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01/10/2020

CENTRE SCIENTIFIQUE ET TECHNIQUE DU BATIMENT
84 avenue Jean Jaurès – Champs-sur-Marne – 77447 Marne-la-Vallée Cedex 2
Tel: +33 (0)1 64 68 82 82 – www.cstb.fr
MARNE-LA-VALLÉE / PARIS / GRENOBLE / NANTES / SOPHIA-ANTIPOLIS

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MODIFICATION HISTORY

Revision no.	Application date	Modifications
00	01/06/2017	Update to the document layout and reference. Content modifications: – Some technical changes
01	02/04/2019	Update of technical document – according to the new frame: “Trame_doc_technique_VF_PC_DT_R3. ” – According to the revision of Standard NF EN 1111, version dated August 2017: Cancels and replaces technical document 077-04_Rev 18
02	**01/10/2020**	Reference to the regulation for use of marks (DT077-00) - Addition of the method for determining the scores in chapter 2.7 "E.C.A.U. and / or E.Ch.A.U. rating"

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1 Normative support for ECAU and/or EChAU ratings

1.1 Purpose

The purpose of this chapter is to list the articles of standard NF EN 1111 - version 2017 that will be taken into account for the ECAU and/or EChAU ratings in accordance with the regulation for use DT077-00.

1.2 List of the tests involved

The table below lists the articles of the Standard NF EN 1111.

Articles	**Title of articles**
7	Marking/Identification
7.1	Marking
7.2	Identification
8	Materials
8.1	Chemical and hygienic requirements
8.2 A	State of visible surfaces and coating quality *(neutral salt spray test)*
8.2 B	State of visible surfaces and coating quality *("air" thermal shock resistance test)*
9	Dimensional characteristics
9.2	Inlet dimensions
9.3	Outlet dimensions
9.4	Assembly dimensions
10	Protection against backflow
11	Test sequences
12	Leaktightness
12.2	Obturator leaktightness upstream of it
12.3	Cross-feed between water inlets
12.4	Leaktightness downstream of the obturator
12.5	Leaktightness of the manually operated diverter
12.6	Leaktightness of automatic diverters
13	Performance (Hydraulic characteristics)
13.2	Flow rate determination
13.3	Sensitivity
13.4	Reliability
13.5	Temperature stability
13.5.1	Temperature setting operation
13.5.2	Flow rate reduction
13.5.3	Failure and restoration of cold water supply
13.5.4	Supply pressure variation
13.5.5	Supply temperature variation
13.5.6	Retractable temperature stop
14	Resistance to pressure
14.3	Test on the mechanical performance of the thermostatic mixer upstream of the obturator - Obturator in the closed position
14.4	Mechanical behaviour downstream of the obturator - Obturator in the open position
15	Torsional strength of the operating devices
16	Mechanical endurance characteristics

Articles	Title of articles
16.2	Sequential control device endurance test
16.3	Endurance test of opening and closing systems operated by rotation of the control device
16.4	Obturator-diverter endurance test
16.5	Endurance test of other opening and closing systems
16.6	Endurance of diverters for thermostatic mixers
16.6.2.3.1	Mechanical endurance of manual diverters
16.6.2.3.2	Mechanical endurance of automatic diverters
16.7	Mechanical endurance of swivel spouts
16.8	Thermostatic component
17	Acoustic characteristics

2 ECAU and/or EChAU ratings

2.1 Foreword

ECAU and/or EChAU ratings were created to meet the expectations of market players who require performances that are superior or complementary to those indicated in the NF EN 1111 standard.

For thermostatic mixers, the following are required:

- Ergonomics with special dimensions for using the tap;
- A suitable design to facilitate the cleaning of the tap;
- Resistance to alternating pressure stress against water hammer problems;
- Verification of installation system for fixed-spout single-hole taps;
- Hydraulic performance levels according to user needs;
- The safety test to limit the risk of burns;
- Constant mixed temperature according to pressure variations and variations in the hot water supply temperature, the flow rate and the initial draw-off for user comfort;
- Accuracy of the displayed temperature to compensate for differences in supply pressures;
- Water saving to avoid wasting water in certain cases of use;
- Energy saving to avoid consuming hot water in certain cases of use;
- Creation of the 3 acoustic classes to clarify this performance;
- Increased endurance performance by multiplying by 2.5 the requirements of the European standard to optimise maintenance frequencies;

It should be noted, however, that the use of these ECAU and/or EChAU ratings is voluntary and supplementary to the evaluation of a product that is already certified under the NF EN 1111 Standard.

2.2 Purpose

The purpose of this chapter is to establish the dimensional, leaktightness, hydraulic, mechanical, mechanical endurance and acoustic performance levels to be met by thermostatic mixers to qualify for ECAU and/or EChAU ratings.

2.3 Field of application

This chapter applies to thermostatic mixers subject to Standard NF EN 1111.

2.4 References to standards and additional specifications

NF EN 1111	Sanitary tapware. Thermostatic mixing valves (PN 10) – General technical specifications.
NF EN 246	Sanitary tapware - General specifications for flow rate regulators.
NF EN ISO 3822-1	Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 1: Method of measurement
NF EN ISO 3822-2	Acoustics - Laboratory tests on noise emission from tapware and hydraulic equipment used in water supply installations - Part 2: Guidelines for the installation and operation of draw-off taps and tapware.
T 54 094	Plastics - Piping components made of unplasticised polyvinyl chloride and unplasticised chlorinated polyvinyl chloride - Fittings for pressure pipelines - Determination of resistance to alternate pressure stress.
DT077-00	Regulations for use of marks

2.5 ECAU and/or EChAU rating principle

The rating can only be assigned to taps

- pursuant to standard NF EN 1111. The test procedures are defined in Article 1 of this document.
- having passed the performance tests for the ECAU and/or EChAU ratings. The test procedures are provided in Article 2.6 below.

2.5.1 Meaning of E

The flow characteristic taken into account is the use flow ‘q’ of the tap as it is equipped (standard accessories: regulators, fittings, etc.).

There are 7 classes for this characteristic. See Article 2.7.1.1.

2.5.2 Meaning of C and Ch

The comfort characteristics taken into account are the dimensions, hydraulic performance and resistance to alternating pressure stress.

There are 6 classes for this characteristic. See Article 2.7.2.1.

	C	Ch
Field of application	– Household (house, apartment, student residence)	– Household **with waiver** (house, apartment, student residence) – Public (Hospitality, ERP (institution receiving the public), office, EHPA (nursing home), non-medical retirement home, spa treatment centre)
Class 1 (Note 1)	– Dimensional; – Safety test with hot water temperature at 50°C – Safety stop effectiveness – Accuracy of displayed temperature – Endurance test (number of cycles X 2.5, except for the thermostatic component) – Resistance to alternating pressure stress – Verification of installation system for fixed-spout single-hole taps	
Class 2 (Note 2)	– Must be C1 – Must be E0 for washbasin, bidet and sink – Must be E1 for shower outlet – Flow rate in water saving position; – Inclusion of a flow control system (button or additional force to be applied or other) to obtain maximum flow from the tap.	– Must be C1 (note 1) – Must be **E00** for washbasin, bidet – Must be **E0** for shower outlet – Controlled flow rate for water saving with a flow controller
Class 3	– Must be C1 and C2 – Must be E0 for washbasin, bidet and sink – Must be E1 for shower outlet – Temperature limitation of the water at 50 °C in the maximum temperature position; – Inclusion of a non-adjustable stop on the tap temperature control; – Specific product marking indicating the limitation of hot water temperature to 50 °C; – It only applies to shower, shower set, bath shower, washbasin, bidet and sink mixers	– Must be **C1 (note 1)** and Ch2 – Must be **E00** for washbasin, bidet – Must be **E0** for shower outlet – Temperature limitation of the water at 50 °C in the maximum temperature position; – Inclusion of a non-adjustable stop and disengaging system on the tap temperature control for disinfecting the system; – Specific marking on the tap temperature control indicating limitation of hot water temperature to 50 °C; – It applies only to shower, shower set, bath shower, washbasin and bidet mixers
Note 1:	In cases in which the requirements of C and Ch are identical, only the letter C is used (e.g. for class 1, only C1 is used and there is no Ch1 rating)	
Note 2:	To be examined for the ECAU/EChAU rating, all tapware equipped with a "pressure point or button" system will be classified as "C2". This means that holders may not request only a C1 rating for a product equipped with a "hard point or button" system. They must file a complementary "EC_2AU" rating application.	
Note 3:	The characteristics for complying with the decree of 30 November 2005 amending the decree of 23 June 1978 on the limitation of the risk of burns are taken into account for class 3.	

2.5.3 Meaning of A

The acoustic characteristic taken into account is the sound pressure level, L_{ap}.

There are 3 classes for this characteristic. See Article 2.7.3.1.

2.5.4 Meaning of U

The wear characteristic taken into account is the mechanical endurance and, more precisely, the number of operating cycles to which the following are subjected:

- Obturators;
- Temperature control
- Swivel spouts;
- Bath shower diverters.

There is 1 class for this characteristic. See Article 2.7.4.1.

An application for an ECAU and/or EChAU rating involves a class 3 application for endurance tests (U3).

2.6 Performance level for ECAU and/or EChAU ratings

2.6.1 Marking and identification

In addition to the standard NF EN 1111, for the C3 or Ch3 characteristic, the marking of the maximum temperature position of “50 °C MAX.” must be indicated.

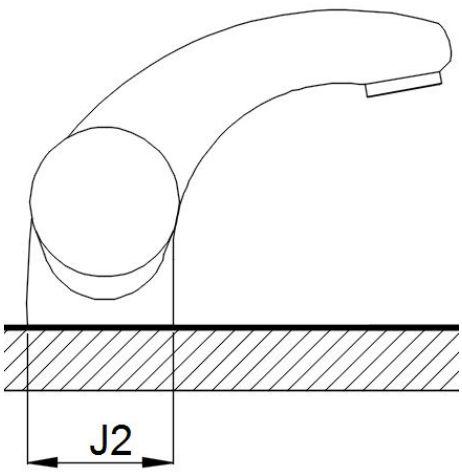
2.6.2 Materials

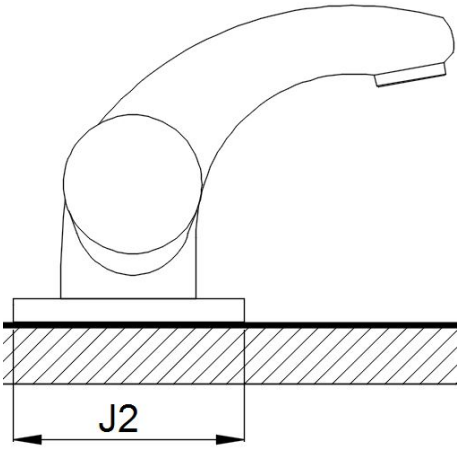
No requirements in addition to those under the NF EN 1111 standard.

2.6.3 Dimensional characteristics

In addition to the NF EN 1111 Standard, the following additional dimensions must be verified: J2, D4 and P2.

- The diameter of the tapware body base (J2, established at a minimum of 45 mm) must not be obtained by introducing an insert between the base of the body and the support.

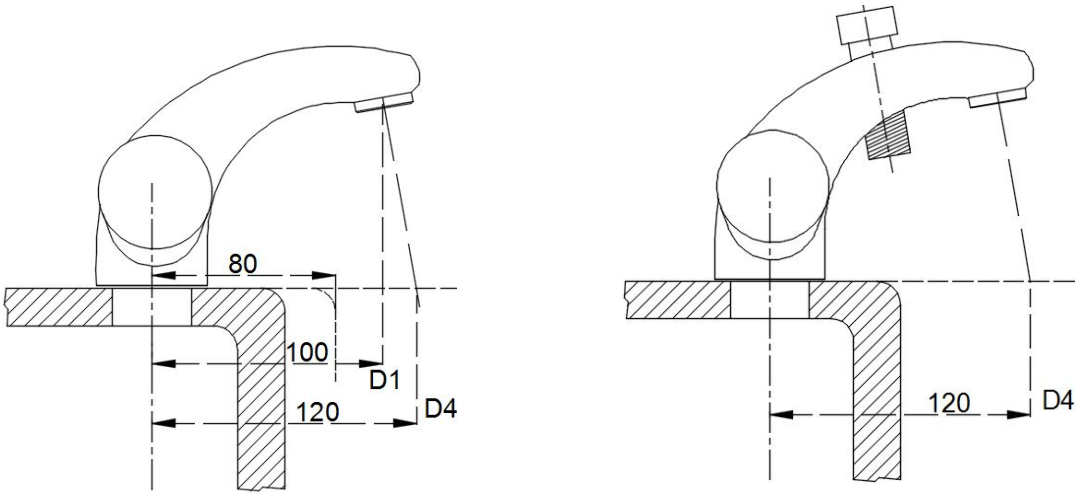




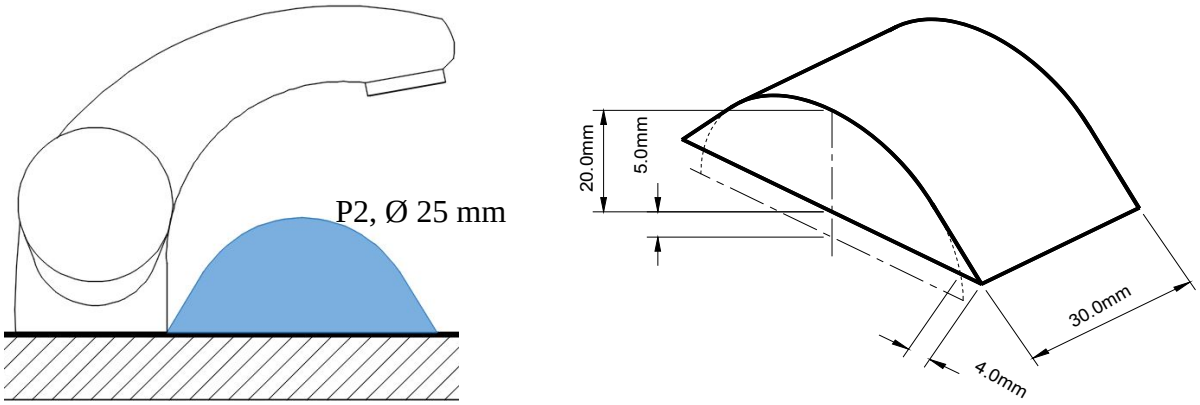
- for washbasin taps, the jet axis must intersect the washbasin surface (at the tap base) at least 120 mm from the tap base axis (D4).

NOTE As the current trend is to make taps increasingly smaller, if the minimum dimensions of projections and height are combined, the suitability for use requirement is not met.

The figure below shows in dotted lines the maximum range for standard washbasins (80 mm) and for standard taps the minimum projection (100 mm, D1) with the minimum height (25 mm). It is clearly impossible to wash one's hands under the tap.



- the spout must be separated in such a way that a rod consisting of a cylindrical segment with a 25 mm radius that is 20 mm in height and 30 mm in length of the generator can be slid onto the plane of the base. The rod must at least touch the base in the common base plane.



2.6.4 Test sequence

Table 7 - The test sequence under standard NF EN 1111 is supplemented to take into account the tests to be carried out on the samples for ECAU and/or EChAU ratings.

Sample Sequence	**Order**	**Tests**	
Sample 0 Installation	**1.**	§2.6.13 Verification of the installation system for sanitary tapware Important: Test only conducted for admission	
Sample 1 Obturator endurance		**Sample 1A – rotary obturator**	**Sample 1B – diverter obturator**
	1.	§7.1 Marking	§7.1 Marking
	2.	§7.2 Identification	§7.2 Identification
	3.	§10 Protection against backflow	§10 Protection against backflow
	4.	§12.2 Leaktightness	§12.2 Leaktightness
	5.	§12.3 Leaktightness	§12.3 Leaktightness
	6.	§12.4 Leaktightness	§12.4 Leaktightness
	7.		§12.5 Leaktightness
	8.	§16.3 Endurance	§16.4 Endurance
	9.	§12.2 Leaktightness	§12.2 Leaktightness
	10.	§12.3 Leaktightness	§12.3 Leaktightness
	11.	§12.4 Leaktightness	§12.4 Leaktightness
	12.	§2.6.10 Endurance	§2.6.10 Endurance
	13.	§12.2 Leaktightness	§12.2 Leaktightness
	14.	§12.3 Leaktightness	§12.3 Leaktightness
	15.	§12.4 Leaktightness	§12.4 Leaktightness
	16.		§12.5 Leaktightness
Sample 2 Diverter endurance		**Sample 2A**	**Sample 2B**
	1.	§7.1 Marking	§7.1 Marking
	2.	§7.2 Identification	§7.2 Identification
	3.	§10 Protection against backflow	§10 Protection against backflow
	4.	§12.5 Leaktightness	§12.6 Leaktightness
	5.	§16.6.2.3.1 Endurance	§16.6.2.3.2 Endurance
	6.	§12.5 Leaktightness	§12.6 Leaktightness
	7.	§2.6.10 Endurance	§2.6.10 Endurance
	8.	§12.5 Leaktightness	§12.6 Leaktightness
Sample 3 Spout endurance	**1.**	§7.1 Marking	
	2.	§7.2 Identification	
	3.	§10 Protection against backflow	
	4.	§12.4 Leaktightness	
	5.	§16.7 Endurance	
	6.	§12.4 Leaktightness	
	7.	§2.6.10 Endurance	
	8.	§12.4 Leaktightness	

Sample Sequence	Order	Tests				
Sample 4 Charact. Hydraulic		Sample 4 for C1 or CH1	Sample 4 for C2	Sample 4 for C3	Sample 4 for Ch2	Sample 4 for Ch3
	1.	§7.1 Marking	§7.1 Marking	§7.1 Marking	§7.1 Marking	§7.1 Marking
	2.	§7.2 Identification	§7.2 Identification	§7.2 Identification	§7.2 Identification	§7.2 Identification
	3.			§2.6.1 Identification		§2.6.1 Identification
	4.	§10 Protection against backflow	§10 Protection against backflow	§10 Protection against backflow	§10 Protection against backflow	§10 Protection against backflow
	5.	§9 Dimensions	§9 Dimensions	§9 Dimensions	§9 Dimensions	§9 Dimensions
	6.	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions
	7.	§13.2 Flow rate outlet 1 and 2 if applicable	13.2 Flow rate outlet 1 and 2 if applicable	13.2 Flow rate outlet 1 and 2 if applicable	13.2 Flow rate outlet 1 and 2 if applicable	13.2 Flow rate outlet 1 and 2 if applicable
	8.	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity
	9.	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability
	10.	§13.5.1 Setting operation	§13.5.1 Setting operation	§13.5.1 Setting operation	§13.5.1 Setting operation	§13.5.1 Setting operation
	11.	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction
	12.	§13.5.3 CW failure outlet 1 and 2 if applicable	§13.5.3 CW failure outlet 1 and 2 if applicable	§13.5.3 CW failure outlet 1 and 2 if applicable	§13.5.3 CW failure outlet 1 and 2 if applicable	§13.5.3 CW failure outlet 1 and 2 if applicable
	13.	§13.5.4 Pressure variation outlet 1 and 2 if applicable	§13.5.4 Pressure variation outlet 1 and 2 if applicable	§13.5.4 Pressure variation outlet 1 and 2 if applicable	§13.5.4 Pressure variation outlet 1 and 2 if applicable	§13.5.4 Pressure variation outlet 1 and 2 if applicable
	14.	§13.5.5 HW temperature variation outlet 1 and 2 if applicable	§13.5.5 HW temperature variation outlet 1 and 2 if applicable	§13.5.5 HW temperature variation outlet 1 and 2 if applicable	§13.5.5 HW temperature variation outlet 1 and 2 if applicable	§13.5.5 HW temperature variation outlet 1 and 2 if applicable
	15.	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop
	16.	§2.6.7.1.1 Flow rate in "fully open" position (Class E)	§2.6.7.1.1 Flow rate in "fully open" position (Class E)	§2.6.7.1.1 Flow rate in "fully open" position (Class E)	§2.6.7.5.1 Flow rate in "fully open" position (Class E)	§2.6.7.5.1 Flow rate in "fully open" position (Class E)
	17.	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.5.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.5.2 CW Failure HW Temp. 50°C (shower outlet)
	18.	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.5.3 Accuracy of displayed temperature	§2.6.7.5.3 Accuracy of displayed temperature
	19.	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.5.4 Safety stop effectiveness	§2.6.7.5.4 Safety stop effectiveness
	20.		§2.6.7.2.1 C2 Flow rate	§2.6.7.2.1 C2 Flow rate	§2.6.7.5.5 Ch2 Flow rate	§2.6.7.5.5 Ch2 Flow rate
	21.			§2.6.7.3.1 C3 CW Failure		§2.6.7.6.1 Ch3 CW Failure
	22.			§2.6.7.3.2 C3 Temperature accuracy		§2.6.7.6.2 Ch3 Temperature accuracy
	23.			§2.6.7.3.3 C3 Stop effectiveness		§2.6.7.6.3 Ch3 Stop effectiveness
	24.			§2.6.7.3.4 C3 Pressure variation		§2.6.7.6.4 Ch3 Pressure variation
	25.			§2.6.7.3.5 C3 HW Temperature variation		§2.6.7.6.5 Ch3 HW Temperature variation
	26.			§2.6.7.3.6		§2.6.7.6.6

				C3 Initial draw-off		Ch3 Initial draw-off
	27.	§16.3 Endurance	§16.3 Endurance	§16.3 Endurance	§16.3 Endurance	§16.3 Endurance
	28.	§12.2 Leaktightness	§12.2 Leaktightness	§12.2 Leaktightness	§12.2 Leaktightness	§12.2 Leaktightness
	29.	§12.3 Leaktightness	§12.3 Leaktightness	§12.3 Leaktightness	§12.3 Leaktightness	§12.3 Leaktightness
	30.	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity	§13.3 Sensitivity
	31.	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability	§13.4 Reliability
	32.	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction	§13.5.2 Flow rate reduction
	33.	§13.5.3 CW Failure outlet 1 and 2 if applicable	§13.5.3 CW Failure outlet 1 and 2 if applicable	§13.5.3 CW Failure outlet 1 and 2 if applicable	§13.5.3 CW Failure outlet 1 and 2 if applicable	§13.5.3 CW Failure outlet 1 and 2 if applicable
	34.	§13.5.4 Pressure variation	§13.5.4 Pressure variation	§13.5.4 Pressure variation	§13.5.4 Pressure variation	§13.5.4 Pressure variation
	35.	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop	§13.5.6 Retractable stop
	36.	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.1.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.5.2 CW Failure HW Temp. 50°C (shower outlet)	§2.6.7.5.2 CW Failure HW Temp. 50°C (shower outlet)
	37.	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.1.3 Accuracy of displayed temperature	§2.6.7.5.3 Accuracy of displayed temperature	§2.6.7.5.3 Accuracy of displayed temperature
	38.	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.1.4 Safety stop effectiveness	§2.6.7.5.4 Safety stop effectiveness	§2.6.7.5.4 Safety stop effectiveness
	39.			§2.6.7.3.1 C3 CW Failure		§2.6.7.6.1 Ch3 CW Failure
	40.			§2.6.7.3.3 C3 Stop effectiveness		§2.6.7.6.3 Ch3 Stop effectiveness
	41.			§2.6.7.3.4 C3 Pressure variation		§2.6.7.6.4 Ch3 Pressure variation
	42.			§2.6.7.3.6 C3 Initial draw-off		§2.6.7.6.6 Ch3 Initial draw-off
	43.	§14.3 Upstream mechanical behaviour	§14.3 Upstream mechanical behaviour	§14.3 Upstream mechanical behaviour	§14.3 Upstream mechanical behaviour	§14.3 Upstream mechanical behaviour
	44.	§14.4 Downstream mechanical behaviour	§14.4 Downstream mechanical behaviour	§14.4 Downstream mechanical behaviour	§14.4 Downstream mechanical behaviour	§14.4 Downstream mechanical behaviour

Sample Sequence	Order	Tests	
Sample 5 Torsion		Sample 5A – Obturator torque	Sample 5A – Temperature control torque
	1.	§7.1 Marking	§7.1 Marking
	2.	§7.2 Identification	§7.2 Identification
	3.	§10 Protection against backflow	§10 Protection against backflow
	4.	§15 Torque	§15 Torque
	5.	§12.2 Leaktightness	§12.2 Leaktightness
Sample 6-7-8 Acoustic	**1.**	§7.1 Marking	
	2.	§7.2 Identification	
	3.	§10 Protection against backflow	
	4.	§17 Acoustic	
	5.	§2.6.11 Class A for acoustics	
Sample 9 Alternating pressures	**1.**	§7.1 Marking	
	2.	§7.2 Identification	
	3.	§10 Protection against backflow	
	4.	§2.6.12 Resistance to alternating pressure	
	5.	§12.2 Leaktightness	
Sample 10 Materials	**1.**	§8.2A Materials (salt spray)	
Sample 11 Materials	**1.**	§8.2B Materials (air thermal shock)	

2.6.5 Protection against backflow

No requirements in addition to those under the NF EN 1111 Standard.

2.6.6 Leaktightness characteristics

No requirements in addition to those under the NF EN 1111 Standard.

2.6.7 Hydraulic characteristics

2.6.7.1 Hydraulic characteristics for class C1

In addition to the NF EN 1111 Standard, the following hydraulic characteristics must be verified:

2.6.7.1.1 Flow rate in “fully open” position (Class E)

Verification of the flow rate value obtained with class E, see Article 2.7.1.1.

2.6.7.1.2 Failure and restoration of CW supply

2.6.7.1.2.1 Principle

It consists of verifying that for the position of the control handle at the safety stop, hot water flow is negligible in the event of sudden drop in cold water pressure and is consistent with the value specified in paragraph 2.6.7.1.2.3. Flow rate is set to values (12 + 0/-1) L/min

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.1.2.2 Operating procedure

- Supply the mixer under a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) with pre-set temperatures (for θ° Cold (13 ± 0.5) °C and for θ° Hot (50 ± 0.5) °C).
- Bring the mixed water control device to the safety stop position at a flow rate of (12 +0/-1) L/min.
- Cut off the cold water pressure abruptly (in up to 1 s).
- Recover the amount of tap water to the previous level three seconds after the cut-off over a period of 10 seconds.
- Reopen the cold water supply to the thermostatic mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) in less than 2 s and after 10 s record the temperature of the mixed water, for about 5 s.

2.6.7.1.2.3 Required characteristics

Three seconds after cutting off the cold water, the amount of water collected in 10 s must not exceed 0.1 l.

The temperature difference of the mixed water temperature after reopening the cold water and stabilisation must not exceed ± 2 K compared to the initial temperature.

2.6.7.1.3 Accuracy of displayed temperature

2.6.7.1.3.1 Principle

It consists of verifying that for the mixed water control position at the safety stop, the mixed water temperature complies with the specifications established for supply pressures of 0.3 MPa (3 bar).

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.1.3.2 Operating procedure

- Supply the mixer under a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) with pre-set temperatures (for θ° Cold (13 ± 0.5) °C and for θ° Hot (63 ± 0.5) °C so that Δt = 50 ± 1 K).
- Set the temperature control device to the safety stop position and the flow control device to obtain (12 + 0/-1) L/min.
- Set the temperature control device to the minimum temperature position.
- Operate the temperature control device to bring it, within up to 3 s, from the minimum temperature position to the safety stop.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.
- Repeat this operation 5 times and record 5 average mixed water temperatures.
- Repeat the same test for the following supply pressures:

- o CWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar)) and HWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar))
- o CWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar)) and HWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar))

2.6.7.1.3.3 Required characteristics

- The temperature difference of the mixed water obtained for each type of supply pressure (5 measurements) must be less than 1 K.
- Ensure that the difference between the average θ_M) temperatures of the mixed water does not exceed 2.5 K regardless of the supply pressures and without additional calibration according to the types of supply pressure.

2.6.7.1.3.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curves as a function of time. Check that the average temperatures are below that indicated in the paragraph 2.6.7.1.3.3 specification

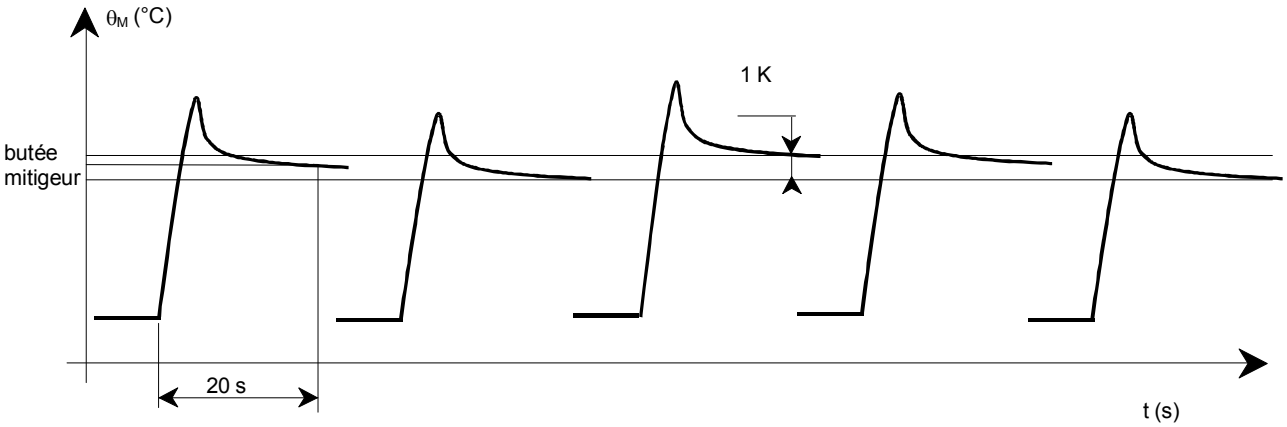


Figure 1 – Accuracy of displayed temperature curve

2.6.7.1.4 Safety stop effectiveness

2.6.7.1.4.1 Principle

It consists of verifying the effectiveness of the safety stop. The flow rate is set to (12 + 0/-1) L/min.

This test is performed only on washbasin, bidet, sink and shower outlets.

2.6.7.1.4.2 Operating procedure

See Article 13.5.6.2 of Standard NF EN 1111.

2.6.7.1.4.3 Required characteristics

The mixed water temperature before endurance must be between 37 °C and 40 °C for the 5 measurements with a difference ≤ 1K.

2.6.7.2 Hydraulic characteristics for class C2

All thermostatic mixers “with a water saver” equipped with an eco button or an obturator with a pressure point shall be classified as C2.

To be examined for the ECAU rating, the “water saving” characteristic must meet the following requirements:

Taps used in a sanitary installation are subjected to a reduced flow rate when they are used for the washbasins, bidets, sinks and showers. This position may be achieved by a button or a “pressure point”. It is important for users to be able to obtain the full flow position in all cases, if they wish.

In addition to the NF EN 1111 Standard, the following hydraulic characteristics must be verified:

2.6.7.2.1 Flow rate in “WATER SAVING” position

To ensure the flow rate in the “water saving” position, it seemed advisable to use a test described in Article 13.2 of the NF EN 1111 Standard and to measure the flow rate in the “water saving” position.

2.6.7.2.1.1 Principle

It consists in determining the flow rate of the thermostatic mixer QM within a temperature range of (34 to 44) °C.

When the thermostatic mixer has several outlets, each of the outlets must comply with the flow rate requirements.

The measurement is performed on a tap by shifting from the closed position to the “water saving” position. If the tap includes standard accessories (regulators, showers, etc.), the measurement is performed by replacing them with a hydraulic resistance equivalent to the calibrated flow, as defined in Article 17.3.3 of Standard NF EN 1111.

2.6.7.2.1.2 Operating procedure

See Article 13.2.2 of Standard NF EN 1111.

2.6.7.2.1.3 Required characteristics

The flow rate value measured under 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar must be for C2

- For washbasins, bidets and sinks: 4 L/min ≤ QM ≤ 6 L/min
- For the shower “outlet”: 5 L/min ≤ QM ≤ 9 L/min

2.6.7.3 Hydraulic characteristics for class C3

To be examined for the **ECAU** rating, the “Limitation of hot water temperature to 50 °C” characteristic must meet the following requirements:

- Taps used in a sanitary installation are subject to temperature limitation in the maximum temperature position when they are used for washbasins, bidets, sinks, showers and bath showers.
- To ensure the 50 °C temperature limitation, it seemed advisable to repeat some tests described in Article 13 of Standard NF EN 1111 and to measure the hot water temperature value in the maximum temperature position.
- The 50 °C setting cannot be changed by the user.
- Specific marking on the part where the temperature is set is required to indicate that the thermostatic mixer is rated “C3”. This marking is defined by the indication “50° Max or 50° Maxi”.

In addition to the NF EN 1111 Standard, the following hydraulic characteristics must be verified:

2.6.7.3.1 C3 Failure and restoration of CW supply

2.6.7.3.1.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, hot water flow is negligible in the event of a sudden drop in cold water pressure and is consistent with the value specified in Article 2.6.7.3.1.3.

Flow rate is set to values (12 + 0/-1) L/min

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.3.1.2 Operating procedure

- Supply the mixer under a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) with pre-set temperatures (for θ° Cold (13 $\pm$ 0.5) °C and for θ° Hot (63 $\pm$ 0.5) °C so that Δt = 50 $\pm$ 1 K).
- Bring the mixed water control device to the maximum temperature position at a flow rate of (12 +0/-1) L/min.
- Cut off the cold water pressure abruptly (in up to 1 s).
- Increase the amount of tap water to the previous level three seconds after the cut-off over a period of 10 seconds.
- Reopen the cold water supply to the thermostatic mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) in less than 2 s and after 10 s record the temperature of the mixed water, for about 5 s.

2.6.7.3.1.3 Required characteristics

a) Three seconds after cutting off the cold water, the amount of water collected in 10 s shall not exceed 0.3 l.

b) The deviation of the mixed water temperature after the reopening of the cold water and stabilisation must not exceed $\pm$ 2 K compared to the initial temperature.

2.6.7.3.2 C3 Accuracy of displayed temperature

2.6.7.3.2.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, the mixed water temperature complies with the specifications established for supply pressures of 0.3 MPa (3 bar).

The flow rate is set to (12 + 0/-1) L/min.

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.3.2.2 Operating procedure

- Supply the mixer under a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) with pre-set temperatures (for θ° Cold (13 ± 0.5) °C and for θ° Hot (63 ± 0.5) °C so that Δt = 50 ± 1 K).
- Set the mixing device to the maximum temperature position, with the flow control device set to obtain (12 + 0/-1) L/min.
- Set the temperature control device to the minimum temperature position.
- Operate the temperature control device to bring it, within up to 3 s, from the minimum temperature position to the maximum temperature position.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.

Repeat this operation 5 times and record 5 average mixed water temperatures.

Repeat the same test for the following supply pressures:

- CWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar)) and HWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar))
- CWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar)) and HWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar))

2.6.7.3.2.3 Required characteristics

a) The average temperature of the mixed water obtained for each operation of the temperature control device and for each type of supply pressure must not exceed 50 °C

b) The temperature difference of the mixed water obtained after the 5 operations of the temperature control device for each type of supply pressure must be less than 2 K.

2.6.7.3.2.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curves as a function of time. Check that the average temperatures are below that indicated in the paragraph 2.6.7.3.2.3 specification.

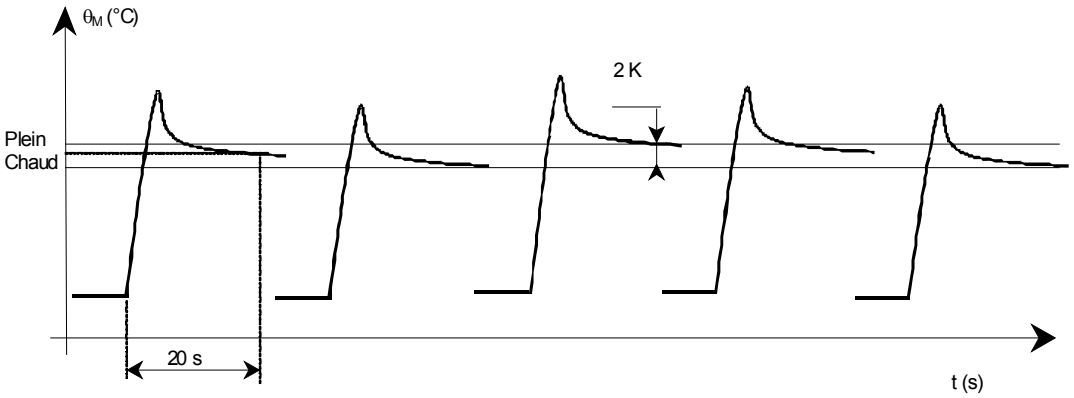


Figure 2 – C3 Accuracy of displayed temperature curve

2.6.7.3.3 C3 end stop effectiveness

2.6.7.3.3.1 Principle

It consists of verifying the effectiveness of the “maximum temperature” stop of the temperature control device.

The flow rate is set to (12 + 0/-1) L/min.

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.3.3.2 Operating procedure

- Shift from the minimum temperature position to the maximum temperature position.
- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the flow control device to obtain (12 + 0/-1) L/min.
- Record the minimum temperature position and the maximum temperature stop position.
- Operate the temperature control device to bring it, within up to 5 s, from the minimum temperature position to the maximum temperature position.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.
- Repeat this operation 5 times and record 5 average mixed water temperatures.

2.6.7.3.3.3 Required characteristics

a) The mixed water temperature before or after the endurance test must be between 43 °C and 50 °C max.

2.6.7.3.4 C3 Constant temperatures θ_M in the maximum temperature position with respect to pressure variations.

2.6.7.3.4.1 Principle

It consists of verifying that in the maximum temperature position of the temperature control device, variations in the mixed water temperature remain limited when supply pressures drop suddenly by 0.1 MPa (1 bar).

The flow rate is set to (12 + 0/-1) L/min.

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.3.4.2 Operating procedure

- Supply the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the mixing device to the maximum temperature position and the flow control device to obtain a flow rate of 12 (-1/0) L/min.
- Record the mixed water temperature for about 15 s.
- Reduce the hot water pressure to 0.2 (+ 0.02/0) MPa or 2 (+ 0.2/0) bar over 1 s and record the mixed water temperature for about 15 s.
- Restore the supply of hot water to the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar and after 5 s record the mixed water temperature for about 15 s.

- Reduce the cold water pressure to 0.2 (+ 0.02/0) MPa or 2 (+ 0.2/0) bar over 1 s maximum and record the mixed water temperature for about 15 s.
- Restore the supply of cold water to the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) and after 5 s record the mixed water temperature for about 15 s.

2.6.7.3.4.3 Required characteristics

On recording the temperature of the mixed water as a function of time, ensure that:

- a) The peak temperature of the mixed water does not exceed 3 K for more than 1 s;
- b) 5 s after the start of the alteration observed in the mixed water, **the average temperature of the mixed water is not greater than 50 °C**;
- c) 5 s after the start of the alteration, the temperature does not vary within a range greater than ± **1.5 K**;
- d) The difference in the mixed water temperature after restoring the supply of hot or cold water and the **average temperature of the mixed water is not greater than 50 °C.**

2.6.7.3.4.4 Analysing the results

Based on the results obtained during the tests, plot the average temperature θ_M curve as a function of time. Verify that the temperature variation of the mixed water does not exceed the values specified in paragraph 2.6.7.3.4.3.

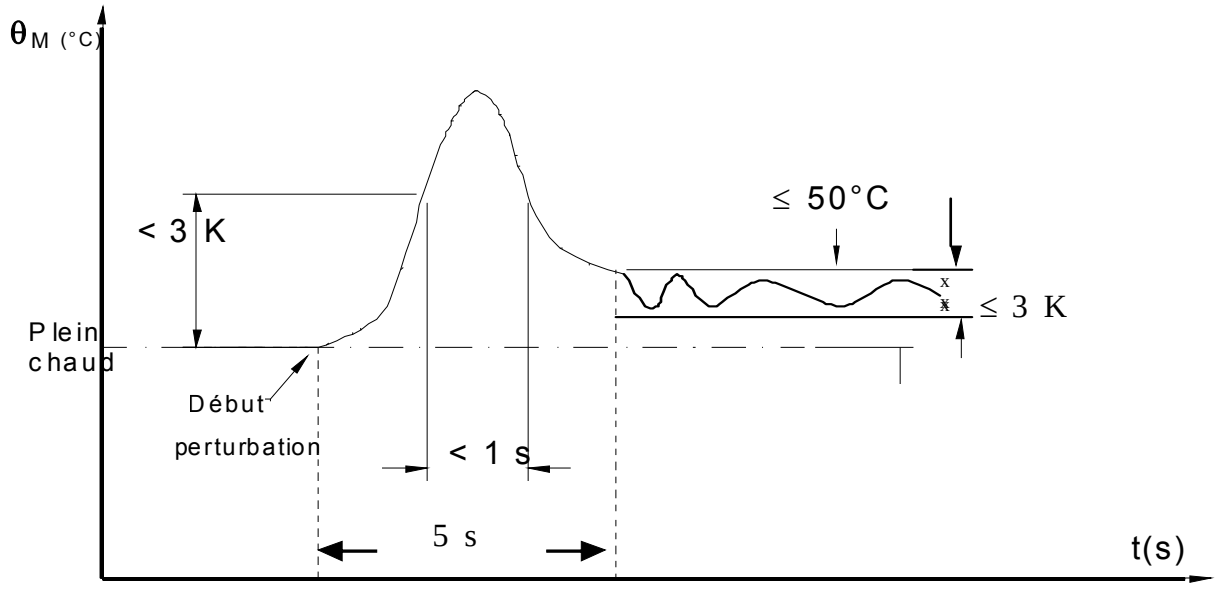


Figure 3 – C3 Curve of constant temperature θ_M with respect to pressure variations

2.6.7.3.5 Constant temperatures θ_M in the maximum temperature position with respect to temperature variations.

2.6.7.3.5.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, variations in the mixed water temperature remain limited when hot water temperature drops by 10 K within a time frame of up to 10 s.

The flow rate is set to (12 + 0/-1) L/min.

This test is performed only on washbasin, bidet, sink and shower outlets

2.6.7.3.5.2 Operating procedure

- Supply the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the mixing device to the maximum temperature position and the flow control device to obtain a flow rate of 12 (-1/0) L/min.
- Record the average mixed water temperature for about 15 s.
- Reduce the hot water temperature by 10 K in 5 s and record the mixed water temperature for about 20 s.
- Restore the initial temperature of the hot water in less than 5 seconds and record the mixed water temperature after 8 seconds over approximately 12 seconds.

2.6.7.3.5.3 Required characteristics

- a) The peak temperature of the mixed water does not exceed 3 K for more than 1 s;
- b) 10 s after the start of the alteration observed in the mixed water, the average temperature of the mixed water is not greater than 50 °C;
- c) 10 s after the start of the alteration, the temperature does not vary within a range greater than $\pm$ 1.5 K;
- d) The difference in the mixed water temperature restoring the hot water temperature and the average temperature of the mixed water is not greater than 50 °C

2.6.7.3.5.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curve as a function of time. Verify that the temperature variation of the mixed water does not exceed the values specified in Article 2.6.7.3.5.3 of this document.

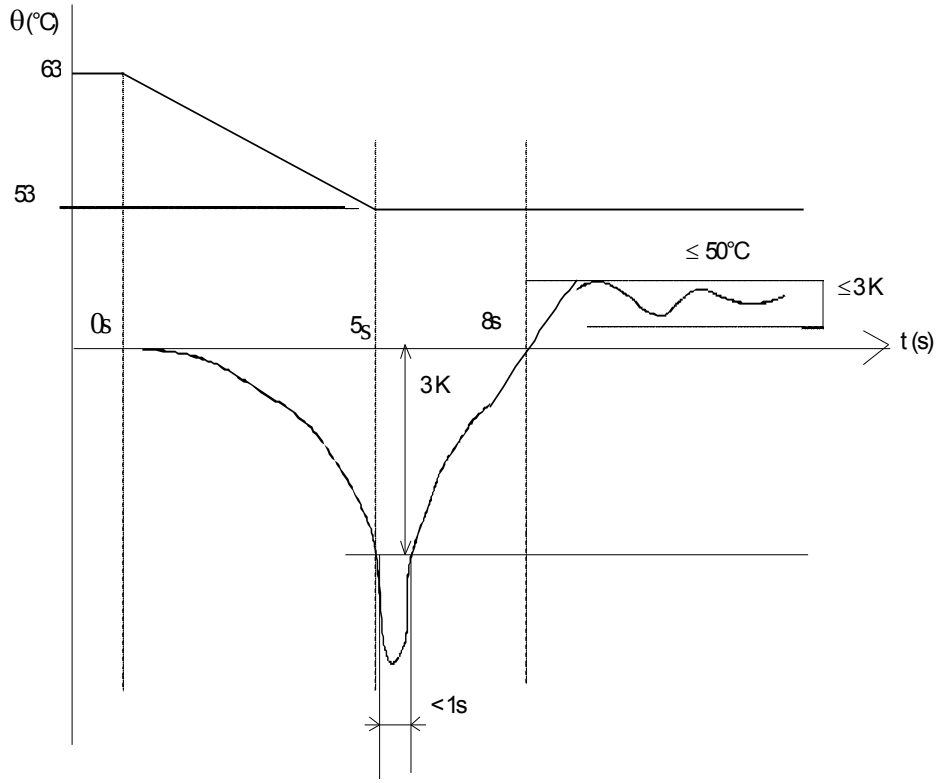


Figure 4 – C3 Curve of constant temperature θ_M with respect to temperature variations

2.6.7.3.6 C3 Initial draw-off

2.6.7.3.6.1 Principle

The principle is to make sure that after a rest period (cooled thermostatic mixer), the first draw-off does not lead to an excessive peak temperature (risk of burning) and that the mixer succeeds in stabilising itself.

2.6.7.3.6.2 Operating procedure

- Supply the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at pre-set temperatures:
  - For θ° Cold (13 ± 0.5) °C and
  - For θ° Hot (63 ± 0.5) °C
  - So that Δt = 50 ± 1 K.
- Set the mixing device to the maximum temperature position and the flow control device to obtain a flow rate of 12 (-1/0) L/min.
- Record the position of the flow control device at 12 (-1/0) l / min.
- Supply the tap at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at a temperature for θ° Cold (13 ± 0.5) °C on the hot water supply side over (15 ± 2) s to cool the tap.
- Close the flow control device once the valve is cool.
- Supply the tap again at a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at a temperature for θ° hot (63 ± 0.5) °C on the hot water supply side without operating the flow control device.
- Move the flow control device from 0 to 12 L/min in no more than 1 to 2 s.
- Record the average mixed water temperature after the start of the variation for approximately 30 s.

2.6.7.3.6.3 Required characteristics

a) The outlet water temperature must not exceed:

- 55 °C over more than 3 s and
- 60 °C over more than 0.5 s.

b) The mixed water temperature must be stabilised at ± 1.5 K, 10 s after the draw-off and must not be greater than 50 °C.

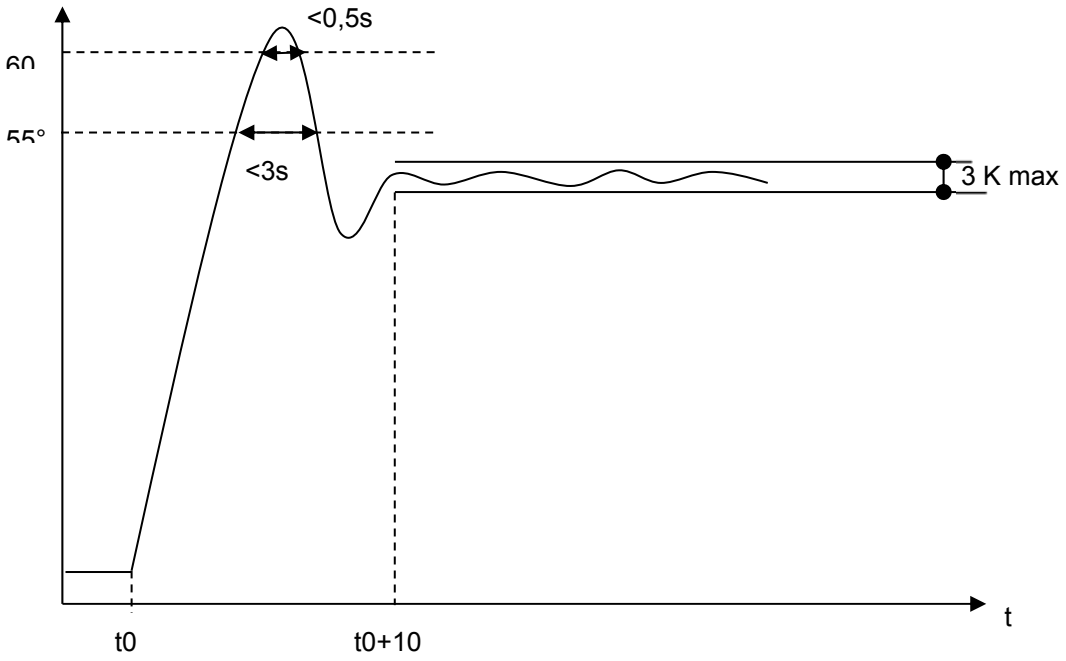


Figure 5 – C3 Initial draw-off curve

2.6.7.4 Hydraulic characteristics for class Ch1

Class Ch1 is identical to class C1. Only class C1 will be selected if the thermostatic mixer meets the requirements described in Article 2.6.7.1 of this document.

2.6.7.5 Hydraulic characteristics for class Ch2

To be considered in the framework of the EChAU rating, the “water saving” characteristic must meet the following requirements:

- Taps used in a sanitary installation are subject to a controlled flow rate when they are used for washbasins, bidets, showers and bath-showers (shower outlet).

In addition to the NF EN 1111 Standard, the following hydraulic characteristics must be verified:

2.6.7.5.1 Flow rate in “fully open” position (Class E)

Verification of the flow rate value obtained with class E, see Article 2.7.1.1.

2.6.7.5.2 Ch2 Failure and restoration of CW supply

2.6.7.5.2.1 Principle

It consists of verifying that for the position of the control handle at the safety stop, water flow is negligible in the event of sudden drop in cold water pressure and is consistent with the value specified in Article 2.6.7.5.2.3 of this document. Flow is set to the maximum position.

This test is performed only on washbasin, bidet and shower outlets

2.6.7.5.2.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (50 $\pm$ 0.5) °C
- Bring the mixed water control device to the safety stop position at a maximum flow rate.
- Cut off the cold water pressure abruptly (in up to 1 s).
- Increase the amount of tap water to the previous level three seconds after the cut-off over a period of 10 seconds.
- Reopen the cold water supply to the thermostatic mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) in less than 2 s and after 10 s record the temperature of the mixed water, for about 5 s.

2.6.7.5.2.3 Required characteristics

a) Three seconds after cutting off the cold water, the amount of water collected in 10 s shall not exceed 0.1 l.

b) The deviation of the mixed water temperature after the reopening of the cold water and stabilisation must not exceed $\pm$ 2 K compared to the initial temperature.

2.6.7.5.3 Ch2 Accuracy of displayed temperature

2.6.7.5.3.1 Principle

It consists of verifying that for the mixed water control position at the safety stop, the mixed water temperature complies with the specifications established for supply pressures of 0.3 MPa (3 bar).

This test is performed only on washbasin, bidet and shower outlets

2.6.7.5.3.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the temperature control device to the safety stop position and the flow control device to the maximum position.
- Set the temperature control device to the minimum temperature position.
- Operate the temperature control device to bring it, within up to 3 s, from the minimum temperature position to the safety stop.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.
- Repeat this operation 5 times and record 5 average mixed water temperatures.
- Repeat the same test for the following supply pressures:

- CWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar)) and HWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar))
- CWP = ((0.4 ± 0.02) MPa or (4 +0.2/0) bar)) and HWP = ((0.2 ± 0.02) MPa or (2 +0.2/0) bar))

2.6.7.5.3.3 Required characteristics

a) The temperature difference of the mixed water obtained for each type of supply pressure (5 measurements) must be less than 1 K.

b) Ensure that the difference between the average (θ_M) temperatures of the mixed water does not exceed 2.5 K regardless of the supply pressures and without additional calibration according to the types of supply

2.6.7.5.3.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curves as a function of time. Check that the average temperatures are below that indicated in the specification of Article 2.6.7.5.3.3 of this document.

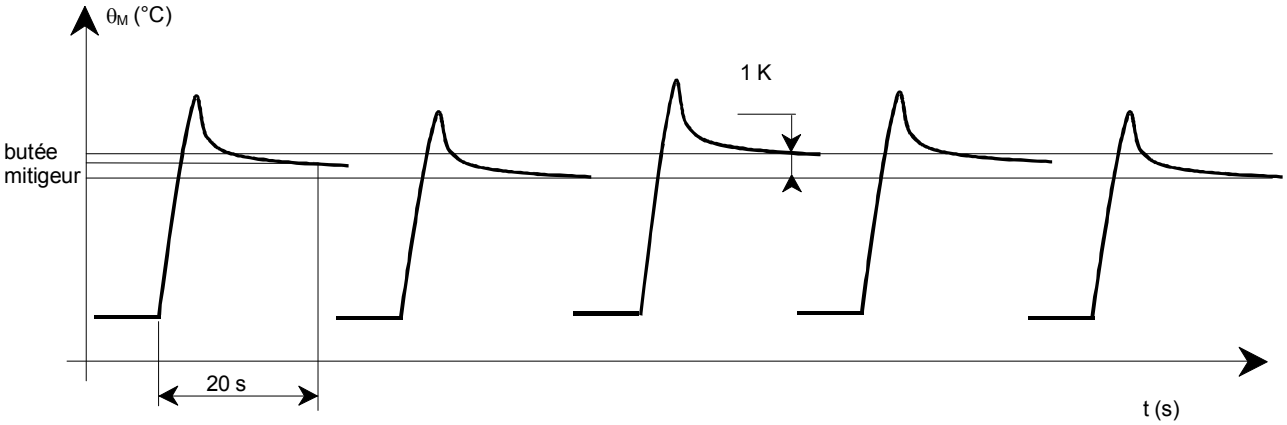


Figure 6 – Ch2 Accuracy of displayed temperature curve

2.6.7.5.4 Ch2 Safety stop effectiveness

2.6.7.5.4.1 Principle

It consists of verifying the effectiveness of the safety stop. Flow is set to the maximum position.

This test is performed only on washbasin, bidet and shower outlets.

2.6.7.5.4.2 Operating procedure

- Shift from the minimum temperature position to the maximum position.
- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 ± 0.5) °C and
  - For θ° Hot (63 ± 0.5) °C
  - So that Δt = 50 ± 1 K.
- Set the flow control device to the maximum position.
- Record the minimum temperature position and the safety stop position.
- Operate the temperature control device to bring it, within up to 5 s, from the minimum temperature position to the safety stop.

- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.

Repeat this operation 5 times and record 5 average mixed water temperatures.

2.6.7.5.4.3 Required characteristics

a) The mixed water temperature before endurance must be between 37 °C and 40 °C for the 5 measurements with a difference ≤ 1K.

2.6.7.5.5 "WATER SAVING" controlled flow rate

2.6.7.5.5.1 Principle

The purpose is to determine, for the tested tap, the value of the flow rate for reference pressures of 1.5 - 3 and 4.5 bar, also constant on each of the hot and cold water supplies.

The measurement is carried out on a tap in the full flow position with mixed water between 34 and 44 °C.

2.6.7.5.5.2 Operating procedure

- Supply the tap with a dynamic pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar.
- Open the flow control device in the fully open position
- Switch the temperature control device from cold to warm.
- Measure and record the flow rate values in the full flow position with a mixed water temperature between 34 and 44 °C.
- Repeat this test with dynamic pressures of 0.15 (+0.02/0) MPa or 1.5 (+ 0.2/0) bar and 0.45 (+0.02/0) MPa or 4.5 (+ 0.2/0) bar.

2.6.7.5.5.3 Required characteristics

Type of product	Flow requirements in L/min		
Dynamic test pressures (bar)	3 (+0.2/0)	1.5 (+0.2/0)	4.5 (+0.2/0)
Washbasin and bidet within the setting range of 34 to 44 °C	4 ≤ Q ≤ 6	≥ 2	≤ 9
Shower and bath shower (shower outlet) within the setting range of 34 to 44 °C	9 ≤ Q ≤ 12	≥ 6	≤ 15

2.6.7.6 Hydraulic characteristics for class Ch3

To be examined for the EChAU rating, the “Limitation of hot water temperature to 50 °C” characteristic must meet the following requirements:

Mixers used in a sanitary installation are subject to temperature limitation in the maximum temperature position when they are used for washbasins, bidets, showers and bath showers (shower outlets).

The 50 °C setting cannot be changed by the user; however, the temperature stop at 50 °C can be changed by a professional for network disinfection for thermostatic mixers. This point will be verified by consulting the instructions.

Specific marking on the temperature control part is required to indicate that the thermostatic mixer is rated “Ch3”. This marking is defined by the indication “50° Max or 50° Maxi”.

In addition to the NF EN 1111 Standard and Article 2.6.7.5 of this document, the following hydraulic characteristics must be verified:

2.6.7.6.1 Ch3 Failure and restoration of CW supply in the maximum temperature position

2.6.7.6.1.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, the water volume is negligible in the event of a sudden drop in cold water pressure and is consistent with the value specified in Article 2.6.7.6.1.3 of this document.

Flow is set to the maximum position.

2.6.7.6.1.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Bring the mixed water control device to the maximum temperature position and the flow rate device to the maximum position.
- Cut off the cold water pressure abruptly (in up to 1 s).
- Increase the amount of tap water to the previous level three seconds after the cut-off over a period of 10 seconds.
- Restore the cold water supply to the thermostatic mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) in less than 2 s and after 10 s record the temperature of the mixed water, for about 5 s.

2.6.7.6.1.3 Required characteristics

a) Three seconds after cutting off the cold water, the amount of water collected in 10 s shall not exceed 0.3 l.

b) The temperature difference of the mixed water after reopening the cold water and stabilisation must not exceed $\pm$ 2 K compared to the initial.

2.6.7.6.2 Ch3 Accuracy of displayed temperature

2.6.7.6.2.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, the mixed water temperature complies with the specifications established for supply pressures of 0.3 MPa (3 bar) in Article 2.6.7.6.2.3 of this document.

2.6.7.6.2.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the mixing device to the maximum temperature position and the flow control device in the maximum position.
- Set the temperature control device to the minimum temperature position.
- Operate the temperature control device to bring it, within up to 3 s, from the minimum temperature position to the maximum temperature position.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.
- Repeat this operation 5 times and record 5 average mixed water temperatures.
- Repeat the same test for the following supply pressures:

CWP = ((0.2 $\pm$ 0.02) MPa or (2 +0.2/0) bar)) and HWP = ((0.4 $\pm$ 0.02) MPa or (4 +0.2/0) bar))

CWP = ((0.4 $\pm$ 0.02) MPa or (4 +0.2/0) bar)) and HWP = ((0.2 $\pm$ 0.02) MPa or (2 +0.2/0) bar))

2.6.7.6.2.3 Required characteristics

a) The average temperature of the mixed water obtained for each operation of the temperature control device and for each type of supply pressure must not exceed 50 °C.

b) The temperature difference of the mixed water obtained after the 5 operations of the temperature control device for each type of supply pressure must be less than 2 K.

2.6.7.6.2.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curves as a function of time. Check that the average temperatures are below that indicated in the specification of Article 2.6.7.6.2.3 of this document.

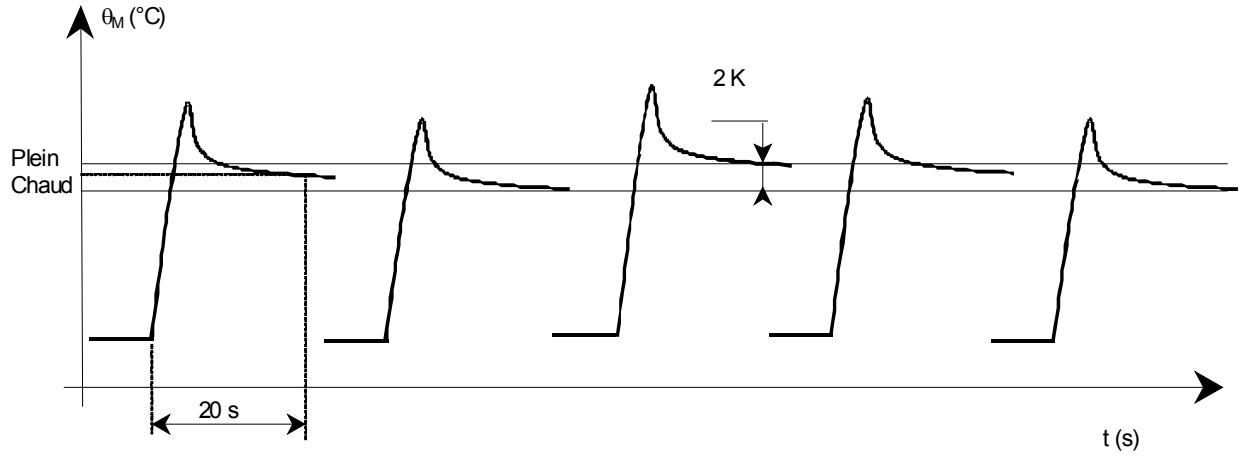


Figure 7 – Ch3 Accuracy of displayed temperature curve

2.6.7.6.3 Ch3 end stop effectiveness

2.6.7.6.3.1 Principle

It consists of verifying the effectiveness of the “maximum temperature” stop of the temperature control device. Flow is set to the maximum position.

2.6.7.6.3.2 Operating procedure

- Shift from the minimum temperature position to the maximum temperature position.
- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 ± 0.5) °C and
  - For θ° Hot (63 ± 0.5) °C
  - So that Δt = 50 ± 1 K.
- Set the flow control device to the maximum position.
- Record the minimum temperature position and the maximum temperature stop position.
- Operate the temperature control device to bring it, within up to 5 s, from the minimum temperature position to the maximum temperature position.
- Record the average mixed water temperature 13 s after the start of the variation for approximately 7 s.
- Repeat this operation 5 times and record 5 average mixed water temperatures.

2.6.7.6.3.3 Required characteristics

The mixed water temperature before or after the endurance test must be between 43 °C and 50 °C max.

2.6.7.6.4 Ch3 Constant temperatures θ_M in the maximum temperature position with respect to pressure variations.

2.6.7.6.4.1 Principle

It consists of verifying that in the maximum temperature position of the temperature control device, variations in the mixed water temperature remain limited when supply pressures drop suddenly by 0.1 MPa (1 bar).

Flow is set to the maximum position.

2.6.7.6.4.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 ± 0.5) °C and
  - For θ° Hot (63 ± 0.5) °C
  - So that Δt = 50 ± 1 K.
- Set the mixing device to the maximum temperature position and the flow control device in the maximum position.
- Record the mixed water temperature for about 15 s.
- Reduce the hot water pressure to (0.2 + 0.02/0) MPa or ((2 + 0.2/0) bar) over 1 s and record the mixed water temperature for about 15 s.
- Restore the supply of hot water to the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) and after 5 s record the mixed water temperature for about 15 s.
- Reduce the cold water pressure to (0.2 + 0.02/0) MPa or ((2 + 0.2/0) bar) over 1 s and record the mixed water temperature for about 15 s.
- Restore the supply of cold water to the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) and after 5 s record the mixed water temperature for about 15 s.

2.6.7.6.4.3 Required characteristics

On recording the temperature (θ_M) of the mixed water as a function of time, ensure that:

a) The peak temperature of the mixed water does not exceed 3 K for more than 1 s;

b) 5 s after the start of the alteration observed in the mixed water, **the average temperature of the mixed water is not greater than 50 °C**;

c) 5 s after the start of the alteration, the temperature does not vary within a range greater than **± 1.5 K**;

d) The difference in the mixed water temperature after restoring the supply of hot or cold water and the average temperature of the mixed water is not greater than 50 °C.

2.6.7.6.4.4 Analysing the results

Based on the results obtained during the tests, plot the average temperature θ_M curve as a function of time. Verify that the temperature variation of the mixed water does not exceed the values specified in Article 2.6.7.6.4.3 of this document.

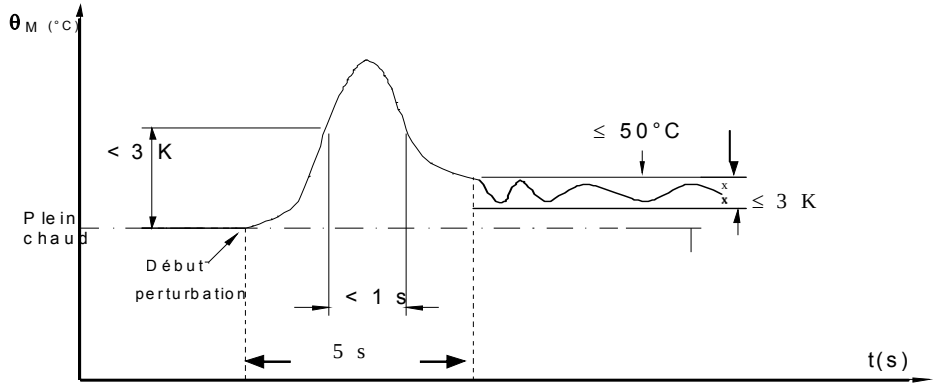


Figure 8 – Ch3 Curve of constant temperature θ_M with respect to pressure variations

2.6.7.6.5 Ch3 Constant temperatures θ_M in the maximum temperature position with respect to temperature variations.

2.6.7.6.5.1 Principle

It consists of verifying that for the maximum temperature position of the temperature control device, variations in the mixed water temperature remain limited when hot water temperature drops by 10 K within a time frame of up to 10 s.

2.6.7.6.5.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 $\pm$ 0.5) °C and
  - For θ° Hot (63 $\pm$ 0.5) °C
  - So that Δt = 50 $\pm$ 1 K.
- Set the mixing device to the maximum temperature position and the flow control device in the maximum position.
- Record the average mixed water temperature for about 15 s.
- Reduce the hot water temperature by 10 K in less than 10 s and record the mixed water temperature for about 20 s.
- Restore the initial temperature of the hot water in less than 10 seconds and record the mixed water temperature after 10 seconds over approximately 12 seconds.

2.6.7.6.5.3 Required characteristics

On recording the temperature of the mixed water (θ_M) as a function of time, ensure that:

a) The peak temperature of the mixed water does not exceed 3 K for more than 1 s;

b) 10 s after the start of the alteration observed in the mixed water, the average temperature of the mixed water is not greater than 50 °C;

c) 10 s after the start of the alteration, the temperature does not vary within a range greater than $\pm$ 1.5 K;

d) The difference in the mixed water temperature restoring the hot water temperature and the average temperature of the mixed water is not greater than 50 °C.

2.6.7.6.5.4 Analysing the results

Based on the results obtained during the test, plot the average temperature θ_M curve as a function of time. Verify that the temperature variation of the mixed water does not exceed the values specified in Article 2.6.7.6.5.3 of this document.

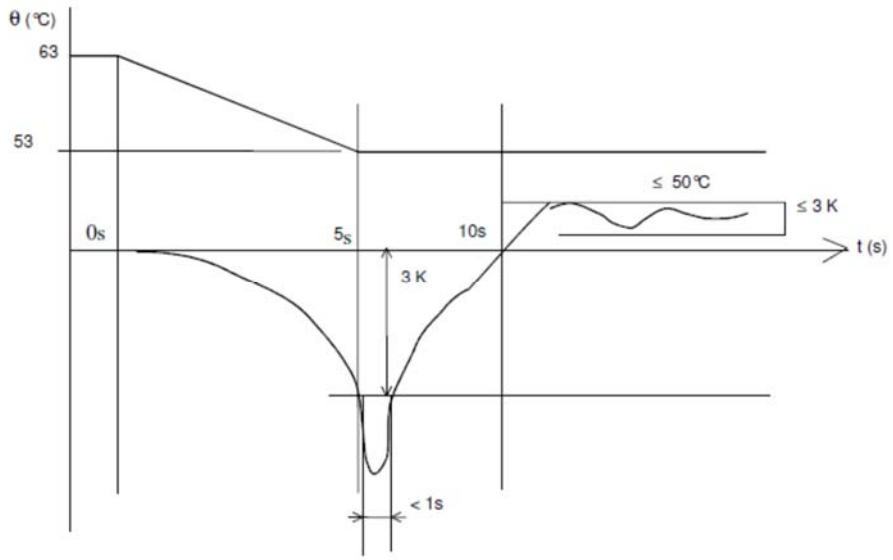


Figure 9 – Ch3 Curve of constant temperature θ_M with respect to temperature variations

2.6.7.6.6 Ch3 Initial draw-off

2.6.7.6.6.1 Principle

The principle is to make sure that after a rest period (cooled thermostatic mixer), the first draw-off does not lead to an excessive peak temperature (risk of burning) and that the mixer succeeds in stabilising itself.

2.6.7.6.6.2 Operating procedure

- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at pre-set temperatures:
  - For θ° Cold (13 ± 0.5) °C and
  - For θ° Hot (63 ± 0.5) °C
  - So that Δt = 50 ± 1 K.
- Set the mixing device to the maximum temperature position and the flow control device in the maximum position.
- Record the flow control device position at the maximum position.
- Supply the mixer at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at a temperature for θ° Cold (13 ± 0.5) °C on the hot water supply side over (15 ± 2) s to cool the mixer.
- Close the flow control device once the mixer is cool.
- Supply the mixer again at a pressure of (0.3 + 0.02/0) MPa ((3 + 0.2/0) bar) at a temperature for θ° hot (63 ±0.5) °C on the hot water supply side without operating the flow control device.
- Operate the flow control device from 0 to the maximum flow rate in up to 1 to 2 s.
- Record the average mixed water temperature after the start of the variation for approximately 30 s.

2.6.7.6.6.3 Required characteristics

a) The outlet water temperature must not exceed:

- 55 °C over more than 3 s and

- 60 °C over more than 0.5 s.

b) The mixed water temperature must be stabilised at ± 1.5 K, 10 s after the draw-off and must not be greater than 50 °C.

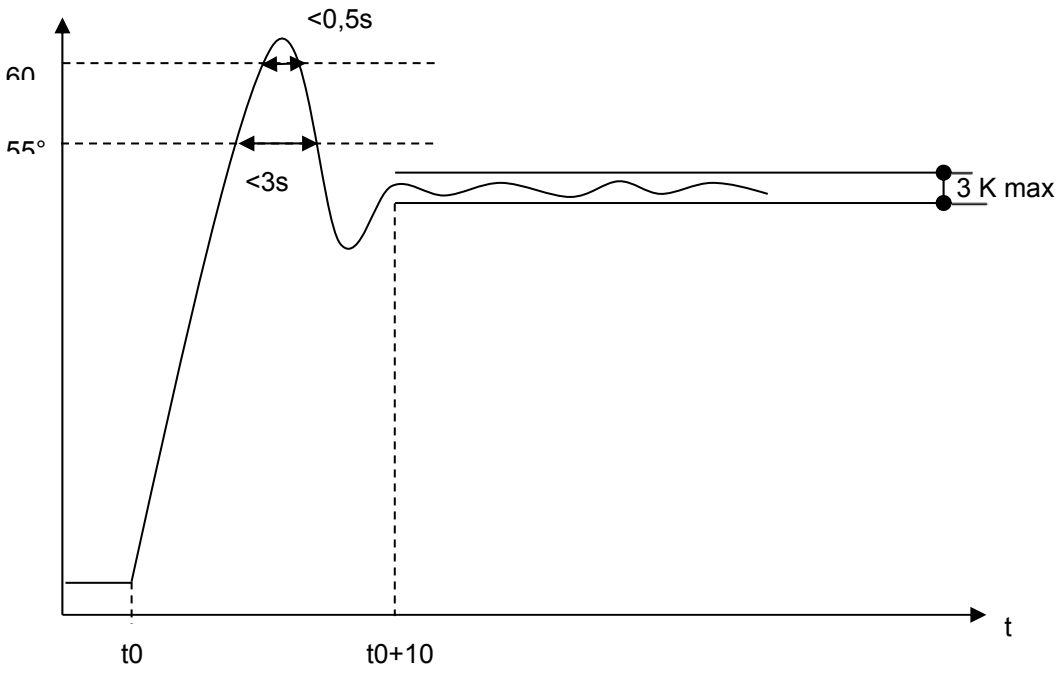


Figure 10 – Ch3 Initial draw-off curve

2.6.7.7 Required characteristics after mechanical endurance of the temperature control system

2.6.7.7.1 Required characteristics for class C1 and/or Ch1

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of standard NF EN 1111);
- The following hydraulic requirements under standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.
  - Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
  - Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.
- The following hydraulic requirements (for Class C1) under this document:
  - Article 2.6.7.1.2 (Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.1.3 (Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.1.4 (Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).

2.6.7.7.2 Characteristics required for class C2

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of standard NF EN 1111);
- The following hydraulic requirements under standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.
  - Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
  - Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.
- The following hydraulic requirements (for Class C1) under this document:
  - Article 2.6.7.1.2 (Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.1.3 (Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.1.4 (Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).
- The following hydraulic requirements (for Class C2) under this document:
  - No specific test after the endurance test in the thermostatic component.

2.6.7.7.3 Characteristics required for class C3

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of Standard NF EN 1111);
- The following hydraulic requirements under Standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.
  - Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
  - Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.
- The following hydraulic requirements (for Class C1) under this document:
  - Article 2.6.7.1.2 (Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.1.3 (Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.1.4 (Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).
- The following hydraulic requirements (for Class C2) under this document:
  - No specific test after the endurance test in the thermostatic component.
- The following hydraulic requirements (for Class C3) under this document:
  - Article 2.6.7.3.1 (C3 Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.3.3 (C3 end stop effectiveness): No change in the characteristics required under this document.
  - Article 2.6.7.3.4 (C3 Constant temperatures θ_M in the maximum temperature position with respect to pressure variations.): No change in the characteristics required under this document.
  - Article 2.6.7.3.6 (C3 Initial draw-off): No change in the characteristics required under this document.

2.6.7.7.4 Characteristics required for class Ch1

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of standard NF EN 1111);
- The following hydraulic requirements under standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K.
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.

- Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
- Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.

- The following hydraulic requirements (for Class C1/ Ch1) under this document:
  - Article 2.6.7.1.2 (Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.1.3 (Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.1.4 (Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).

2.6.7.7.5 Characteristics required for class Ch2

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of Standard NF EN 1111);
- The following hydraulic requirements under Standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.
  - Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
  - Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.
- The following hydraulic requirements under this document:
  - Article 2.6.7.5.2 (Ch2 Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.5.3 (Ch2 Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.5.4 (Ch2 Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).
- The following hydraulic requirements (for Class Ch2) under this document:
  - No specific test after the endurance test in the thermostatic component.

2.6.7.7.6 Characteristics required for class Ch3

After 50,000 cycles for the temperature control system, the following requirements are established:

- Leaktightness requirements (Articles 12.2 and 12.3 of standard NF EN 1111);
- The following hydraulic requirements under standard NF EN 1111:
  - Article 13.3 (Sensitivity): No change in the characteristics required in the standard.
  - Article 13.4 (Reliability): The required characteristic is increased from 1 K to 2 K
  - Article 13.5.2 (Flow reduction): No change in the characteristics required in the standard.
  - Article 13.5.3 (Failure and restoration of cold water supply): No change in the characteristics required in the standard.
  - Article 13.5.4 (Variation of supply pressure): No change in the characteristics required in the standard.
  - Article 13.5.6 (Retractable temperature stops): No change in the characteristics required in the standard.
- The following hydraulic requirements under this document:
  - Article 2.6.7.5.2 (Ch2 Failure and restoration of CW supply): No change in the characteristics required under this document.
  - Article 2.6.7.5.3 (Ch2 Accuracy of displayed temperature): The characteristic required under this document is increased from 2.5 K to 3 K.
  - Article 2.6.7.5.4 (Ch2 Safety stop effectiveness): The characteristic required under this document is increased from (37 °C and 40 °C) to (37 °C and 42 °C).
- The following hydraulic requirements (for Class Ch2) under this document:
  - No specific test after the endurance test in the thermostatic component.
- The following hydraulic requirements (for Class Ch3) under this document:
  - Article 2.6.7.6.1 (Ch3 Failure and restoration of CW supply in the maximum temperature position): No change in the characteristics required under this document.
  - Article 2.6.7.6.3 (Ch3 end stop effectiveness): No change in the characteristics required under this document.
  - Article 2.6.7.6.4 (Ch3 Constant temperatures θ_M in the maximum temperature position with respect to pressure variations.): No change in the characteristics required under this document.
  - Article 2.6.7.6.6 (Ch3 Initial draw-off): No change in the characteristics required under this document.

2.6.8 Pressure resistance characteristics - Mechanical behaviour under pressure

No requirements in addition to those under the NF EN 1111 Standard.

2.6.9 Mechanical strength characteristics - Operating device torque test.

No requirements in addition to those under the NF EN 1111 Standard.

2.6.10 Mechanical endurance characteristics

Endurance performance is modified by multiplying by 2.5 the requirements for all mobile equipment under the Standard NF EN 1111, with the exception of the temperature control system which remains at 50,000 cycles.

2.6.11 Acoustic characteristics

Tapware with Lap > 30 cannot be admitted for these ECAU and/or EChAU ratings

Verification of the acoustic value obtained with class A; see article 2.7.3.1.

2.6.12 Resistance to alternating pressure stress

To be examined for the ECAU and/or EChAU ratings, thermostatic mixers must meet the following requirements:

- Thermostatic mixers used in a sanitary installation are subject to considerable pressure variations due to the closing of installed devices - solenoid valves of washing machines, mixers, valves, etc.
- To ensure their resistance to such stress, it seemed advisable to use a test described in the T 54-094 standard for the rating of supply hoses and piping components.

2.6.12.1 Test principle

Application during 200 cycles of a variable and defined internal hydraulic pressure at the thermostatic mixer inlets, with the thermostatic mixer in the closed position.

2.6.12.2 Equipment

The equipment essentially includes:

A pressure generator capable of generating variable pressure that can vary at constant frequency between a low limit and a high limit, establishing constant amplitude. The diagram of that variation takes the form of a generally rectangular signal (see Figure 11).

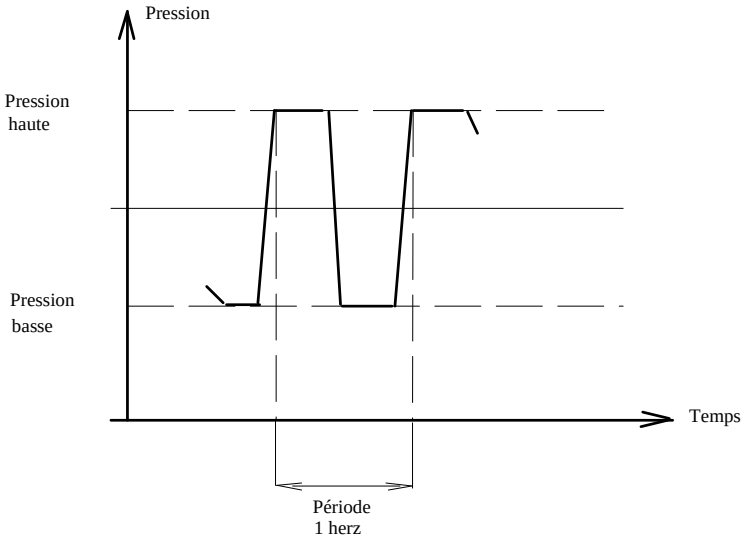


Figure 11

- The time needed to shift from low pressure to high pressure and vice versa must be as short as possible and never longer than one-tenth of the period;
- The low and high pressure values must be obtained and checked to within ± 2% of the desired values;
- To check the waveform of the signal representing the pressure variation, the generator must be combined with a device that can verify the pressure changes in the test specimen (low-inertia pressure sensor and graphic data recorder or oscilloscope).

2.6.12.3 Operating procedure

Apply 100 cycles to the closed tap (filled with water and cleared of air):

- Low pressure of (8 ± 1) bar;
- High pressure of (50 ± 1) bar;
- Frequency of (1 ± 0.5) Hertz.

1) On one of the inlets, (the other being in the open air);
2) On the other inlet.

Note: A “slight” leak is allowed during the test if it does not have an influence on the low and high pressures of the test.

After the alternating pressure test, perform the leak test in accordance with Article 12.2 of standard NF EN 1111.

2.6.12.4 Required characteristics

During the leak test, no visible deterioration or leakage should be observed.

2.6.13 Verification of the installation system for sanitary tapware

In view of the lack of a tightening system verification test under standard NF EN 1111 for single-hole taps with a fixed spout (washbasin, bidet and bathtub) which are installed on horizontal planes, it is necessary to verify tightening performance according to the following steps:

2.6.13.1 Test principle

The test consists of verifying the tightening behaviour by applying a specific force to the end of the tapware spout

2.6.13.2 Test method

The test is performed by conducting the following operations:

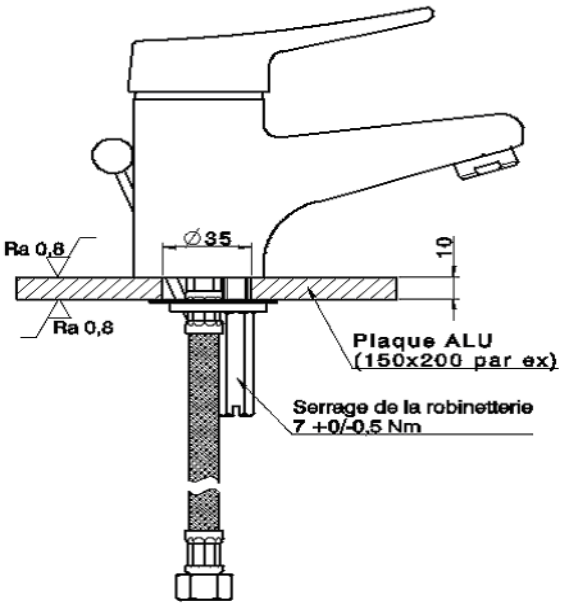
- Install the tapware on the test plate;
- Tighten the nut of the tap installation system to a torque of 7 (-0.5/0) N.m (if the installation system does not have a nut, tighten the installation system by hand);
- Apply a force of 98 (+2/0) N at the end of the spout (the point at which the force is to be applied is located on the axis of the aerator);
- Maintain the force during (60 ± 5) s;
- Verify any rotation of the tapware;

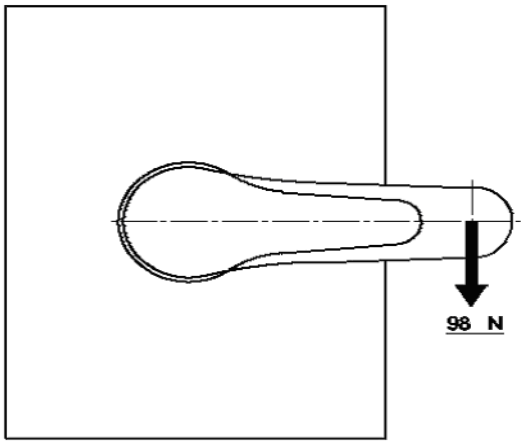
2.6.13.3 Requirements

There should be no rotation of the tapware during the test.

2.6.13.4 Frequency

The tightening test is carried out when new products are admitted and/or when one of the components of the tapware installation system and/or the tapware component in contact with the table is modified.


Ra 0,8
Ø35
10
Ra 0,8
Plaque ALU
(150x200 par ex)
Serrage de la robinetterie
7 +0/-0,5 Nm


98 N

2.7 ECAU and/or EChAU ratings for thermostatic mixer taps

The essential principle of ECAU and/or EChAU ratings is that the different characteristics are independent of one another. The level of each characteristic is to be selected as needed.

2.7.1 Hydraulic or flow characteristic

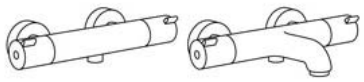
2.7.1.1 Classification

Depending on their performance level, tapware can be classified as follows:

Class	Flow rate value	
E0	9 L/min ≤ q < 12 L/min	
E1	12 L/min ≤ q < 16 L/min	
E2	16 L/min ≤ q < 20 L/min	
E3	20 L/min ≤ q < 25.2 L/min	
E4	25.2 L/min ≤ q	
	Performance for class C2 (flow rate at pressure point or button)	
E00	4 L/min ≤ q ≤ 6 L/min	Washbasin, Bidet and Sink
E02	5 L/min ≤ q < 9 L/min	Shower
	Performance for class Ch2 (flow rate with a flow controller)	
E00	4 L/min ≤ q ≤ 6 L/min	Washbasin and Bidet
E0	9 L/min ≤ q < 12 L/min	Shower

NOTE For bathtub tapware, the minimum class is E_3

Depending on their level of performance, the valves have a score of type A, B, C, D.



Bath-shower / shower faucets

Flow rate at 3 bar (L/min.)	6	8	10	12	14	16	18	20	22	24 and +
Rating	A				B		C		D	
Technical score if Comfort score = C0, C1, Ch2 or Ch3	E02		E0		E1		E2		E3	
Technical score if Comfort score = C2 or C3	E0		E1		E2		E3		E4	

Washbasin / bidet / sink faucets

Flow rate at 3 bar (L/min.)	4	6	8	10	12	14	16	18	20 and +
Rating	A			B	C	D			
Technical score if Comfort score = C0, C1, Ch2 or Ch3	E00			E0	E1	E2			
Technical score if Comfort score = C2 or C3	E0			E1	E2	E3			

2.7.1.2 Selection criteria

Flow rate class selection will be based on: the supplied device; the building comfort level; the type of room to be equipped.

2.7.2 Comfort characteristics

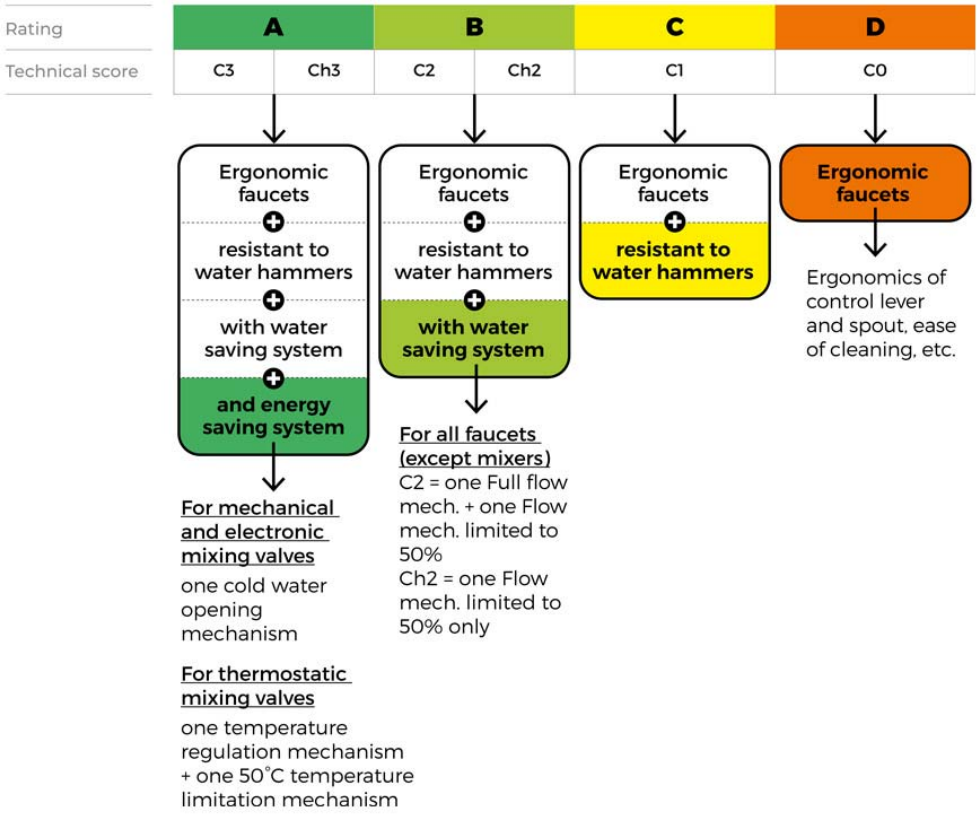
2.7.2.1 Classification

Depending on their performance level, tapware can be classified as follows:

Class	The tap must comply with the requirements of the following articles
C1 (Note 1)	§2.6.3 Dimensional characteristics §2.6.7.1 Hydraulic characteristics for class C21 §2.6.12 Resistance to alternating pressure stress §2.6.13 Verification of installation system for fixed-spout single-hole taps
C2	Meets the requirements of Class C1 §2.6.7.2 Hydraulic characteristics for class C2
C3	Meets the requirements of Classes C1 and C2 §2.6.7.3 Hydraulic characteristics for class C3
Ch1	See C1 (note 1)
Ch2	Meets the requirements of Class C1 (Note 1) §2.6.7.5 Hydraulic characteristics for class Ch2
Ch3	Meets the requirements of Classes C1 (Note 1) and Ch2 §2.6.7.6 Hydraulic characteristics for class Ch3
Note 1:	In cases in which the requirements of C and Ch are identical, only the letter C is used (e.g. for class 1, only C1 is used and there is no Ch1 rating)

Depending on their level of performance, the valves have a score of type A, B, C, D.

Performance criterion C depends on the tapware design:



2.7.2.2 Selection criteria

The comfort class selection will mainly depend on the characteristics and use of the building.

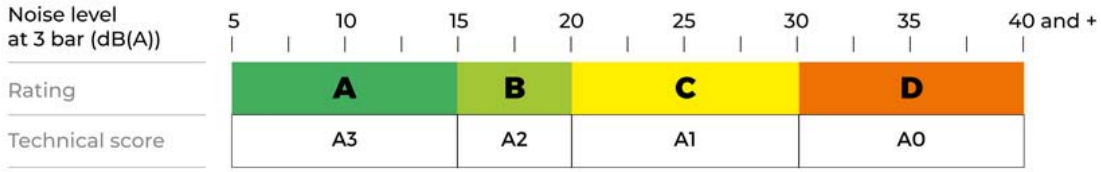
2.7.3 Acoustic characteristic

2.7.3.1 Classification

Depending on their performance level, tapware can be classified as follows:

Acoustic group	Class	Lap
II	A1	20 dB (A) < Lap ≤ 30 dB (A)
I	A2	15 dB (A) < Lap ≤ 20 dB (A)
I	A3	Lap ≤ 15 dB (A)

Depending on their level of performance, the valves have a score of type A, B, C, D.



2.7.3.2 Selection criteria

The acoustic class selection will mainly depend on the characteristics and use of the building.

2.7.4 Mechanical endurance or wear resistance characteristic

2.7.4.1 Classification

Depending on the actual level of wear resistance of its various components, tapware can be classified as follows:

Class	Number of cycles	
U1	Temperature control:	50 000 cycles
	Obturator:	200 000 cycles
	Swivel spout:	80 000 cycles
	Bath shower diverter:	30 000 cycles
U2	Temperature control:	50 000 cycles
	Obturator:	350 000 cycles
	Swivel spout:	140 000 cycles
	Bath shower diverter:	50 000 cycles
U3	Temperature control:	50,000 cycles
	Obturator:	500,000 cycles
	Swivel spout:	200,000 cycles
	Bath shower diverter:	80,000 cycles

Depending on their level of performance, the valves have a score of type A, B, C, D.

Performance criterion U corresponds to the service life of moving parts of the faucet :

Rating	A	B	C	D
Technical score	U3	U2	U1	U0
 Rotating valve	500 000	350 000	200 000	< 200 000
 Mechanical cartridge	175 000	122 500	70 000	< 70 000
 Automatic diverter	80 000	50 000	30 000	< 30 000
 Spout	200 000	140 000	80 000	< 80 000
	Number of cycles before wear			

2.7.4.2 Selection criteria

For thermostatic mixers, only class U3 is possible.

U_3: intensive use and use in harsh conditions.

2.8 Example of ECAU and/or EChAU ratings

Bath shower tapware with:

A flow rate during use of 24 L/min (bath outlet) and 13 L/min (shower outlet), that passes comfort level 1 tests, with an L_{ap} of 18 dB (A) and that passes the endurance tests (500,000 cycles (obturator) - 80,000 cycles (diverter) – 50,000 cycles (temperature control)) will be classified as:

E3/1 C1 A2 U3

Shower tapware with:

A flow rate during use of 10 L/min, that passes comfort level 3 tests, with an L_{ap} of 15 dB (A) and that passes the endurance tests (500,000 cycles (obturator) - 50,000 cycles (temperature control)) will be classified as:

E00 Ch3 A3 U3

2.9 Rating presentation

2.9.1 Specific information for the catalogue or other commercial media

See Chapter 6.1 of the regulations for use of DT077-00.

The specific information on the methods for rating thermostatic mixing valves are as follows:

Flow	E	Q L/min measured under 3 bar	E00	4 L/min ≤ Q ≤ 6 L/min	
			E02	5 L/min ≤ Q < 9 L/min	
			E0	9 L/min ≤ Q < 12 L/min	
			E1	12 L/min ≤ Q < **16** L/min	
			E2	**16** L/min ≤ Q < **20** L/min	
			E3	**20** L/min ≤ Q < 25.2 L/min	
			E4	Q ≥ 25.2 L/min	
			For bathtub tapware, the minimum class is E_3		
Comfort	C	Type	C1	Dimensions, alternating pressures Verification of installation system for fixed-spout single-hole taps	
			C2	Water saving characteristics	
			C3	Water saving system	
	Ch	Type	C1	Dimensions	
			Ch2	Water saving characteristics	
			Ch3	Water saving system	
Acoustics	A	Lap dB (A)	A1	20 dB (A) < Lap ≤ 30 dB (A)	
			A2	15 dB (A) < Lap ≤ 20 dB (A)	
			A3	Lap ≤ 15 dB (A)	
Wear	U	Number of cycles	U3	Obturator	500,000 cycles
				Temperature control:	50,000 cycles
				Swivel spout	200,000 cycles
				Bath shower diverter	80,000 cycles

2.9.2 Product information

See Chapter 6.2 of the regulations for use of DT077-00.

3 ECAU and/or EChAU rating application.

The rating application must be issued by the applicant/holder in one copy (**1 original on the applicant's letterhead paper in French or English**) according to the cases and models indicated below. All the documents are to be remitted to CSTB.

In the event that the product comes from a manufacturing unit located outside the European Economic Area, the applicant shall designate a representative within the European Economic Area who co-signs the application.

Note: Electronic versions of template letters and sheets may be obtained from CSTB.

The applicant produces a file that contains the elements described in the following table depending on the type of application.

Summary Applications Table

Type of application / Elements	Initial application	Complementary application	Admission following a penalty of withdrawal	Suspension application	Renunciation application
Application and commitment letter	Standard letter 1A or 1B (for a representative)	Standard letter 2A or 2B (for a representative)	Standard sheet 7 specific items	Standard letter 5A or 5B (for a representative)	Standard letter 4A or 4B (for a representative)
Sales literature	YES	If applicable	YES	Instructions or extract from the catalogue	

3.1 For an initial rating application

The applicant shall prepare a dossier which includes:

- an application and commitment letter in accordance with standard letter 1 A;
- **if a representative**, application and commitment letter as per standard letter 1 B;

3.2 For a complementary rating application

The holder shall prepare a file containing the following:

- an application and commitment letter in accordance with standard letter 2 A;
- **if representative**, application and commitment letter as per standard letter 2 B;

3.3 For a new rating application following a penalty of withdrawal of ECAU and/or EChAU ratings

The holder shall prepare a file containing the following:

- specific items that all applicants must submit as part of a new admission application where the right of use has been withdrawn as a result of a sanction, using standard sheet 7.

3.4 For an application for the suspension of the ECAU and/or EChAU rating

The holder shall prepare a file containing the following:

- a suspension letter as per standard letter 5 A;
- **if a representative,** a suspension letter as per standard letter 5 B.

3.5 For an application for renunciation of the ECAU and/or EChAU rating

The holder shall prepare a file containing the following:

- a renunciation letter as per standard letter 6A;
- **if a representative,** a renunciation letter as per standard letter 6B.

STANDARD LETTER 1A
ECAU AND/OR EChAU RATINGS

ECAU OR EChAU RATING APPLICATION FORM FOR APPLICANTS LOCATED IN THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: ECAU and/or EChAU rating admission application
Attachment(s): a technical file.

Dear Sir, Madam,

I would like to request an ECAU and/or EChAU rating:

- for the following product/range of products: …… (detailed list of the product/range of products or specify "as set out in the list included with this application");
- produced at the following production unit: …… (company name, address);
- and for the following trade name: …… (trademark and/or specific trade reference, which may be on the list included with this application).

For this purpose, I declare that I have read and accept technical document 077-03 and undertake to comply with it and to inform my commercial network during the entire validity period of the ECAU and/or EChAU rating and in particular to comply without restrictions or reservations with the decisions made by CSTB.

Yours faithfully,

Date, signature and name in full of the applicant/holder's legal representative

STANDARD LETTER 1B
ECAU AND/OR EChAU RATINGS

ECAU OR EChAU RATING APPLICATION FORM FOR APPLICANTS LOCATED OUTSIDE OF THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: ECAU and/or EChAU rating admission application (with a representative) Attachment(s): a technical file.

Dear Sir, Madam,

I would like to request an ECAU and/or EChAU rating:

- for the following product/range of products: …… (detailed list of the product/range of products or specify "as set out in the list included with this application");
- produced at the following production unit: …… (company name, address);
- and for the following trade name: …… (trademark and/or specific trade reference, which may be on the list included with this application).

For this purpose, I declare that I have read and accept technical document 077-03 and undertake to comply with it and to inform my commercial network during the entire validity period of the ECAU and/or EChAU rating and in particular to comply without restrictions or reservations with the decisions made by CSTB.

Furthermore, I appoint the Company …… (company name), …… (company legal form), …… (registered office) represented by Mr/Ms …… (name of the legal representative) in that person's capacity as …… (position) to represent me in the European Economic Area for all matters relative to ECAU and/or EChAU ratings.

I undertake to immediately notify CSTB of any new appointment of the representative designated above.

In this regard, I request that the expenses that are to be borne by me be invoiced directly to the representative. They will make the payments on my behalf and in my name as soon as the invoices are received, as agreed when accepting the role of representative.

Yours faithfully,

Date, signature and name in full of the applicant's legal representative

preceded by the handwritten wording "Approving representation"

Date, signature and name in full of the representative in the European Economic Area

preceded by the handwritten wording "Accepting representation".

STANDARD LETTER 2A
ECAU AND/OR EChAU RATINGS

COMPLEMENTARY APPLICATION FORM FOR ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED IN THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Complementary application for the ECAU and/or EChAU rating

Attachment(s): a technical file.

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating for the product(s) of our manufacture identified below:

- designation of the product(s): .....
- production unit: .....
- right of use granted on ..... (date) and bearing the following number: ..... *(number of valid certificate)*

I am writing to apply for the ECAU and/or EChAU rating for the following product/range of products that we manufacture:

- detailed list of the product/range of products: .....
- specific trade reference: .....

(This information may be included in a list attached to this application)

For an extension application, please provide the information below:

This product deviates from the certified product/range of products due to the following modifications: ..... <description of the modifications>.

The product/range of products for which I am seeking an extension will replace the certified product listed above:

- NO (1);
- YES (1).

I declare that the products/product range covered by this application are, with relation to the other characteristics, strictly in conformity with the products/product range already certified and manufactured under the same conditions.

For this purpose, I declare that I have read and accept technical document 077-03 and undertake to comply with it and to inform my commercial network during the entire validity period of the ECAU and/or EChAU rating and in particular to comply without restrictions or reservations with the decisions made by CSTB.

Yours faithfully,

Date, signature and name in full
of the applicant/holder's legal representative

(1) Delete as appropriate.

STANDARD LETTER 2B
ECAU AND/OR EChAU RATINGS

COMPLEMENTARY APPLICATION FORM FOR ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED OUTSIDE OF THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Complementary application for the ECAU and/or EChAU rating (with a representative)
Attachment(s): a technical file.

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating for the product(s) of our manufacture identified below:

- designation of the product(s): ……
- production unit: ……
- right of use granted on …… (date) and bearing the following number: …… *(number of valid certificate)*

I am writing to apply for the ECAU and/or EChAU rating for the following product/range of products that we manufacture:

- detailed list of the product/range of products: ……
- specific trade reference: ……

(This information may be included in a list attached to this application)

For an extension application, please provide the information below:

This product deviates from the certified product/range of products due to the following modifications: …… <description of the modifications>.

The product/range of products for which I am seeking an extension will replace the certified product listed above:

- NO (1);
- YES (1).

I declare that the products/product range covered by this application are, with relation to the other characteristics, strictly in conformity with the products/product range already certified and manufactured under the same conditions.

For this purpose, I declare that I have read and accept technical document 077-03 and undertake to comply with it and to inform my commercial network during the entire validity period of the ECAU and/or EChAU rating and in particular to comply without restrictions or reservations with the decisions made by CSTB.

Furthermore, I appoint the Company …… (company name), …… (company legal form), …… (registered office) represented by Mr/Ms …… (name of the legal representative) in that person's capacity as …… (position) to represent me in the European Economic Area for all matters relative to ECAU and/or EChAU ratings.

I undertake to immediately notify CSTB of any new appointment of the representative designated above.

In this regard, I request that the expenses that are to be borne by me be invoiced directly to the representative. They will make the payments on my behalf and in my name as soon as the invoices are received, as agreed when accepting the role of representative.

Yours faithfully,

Date, signature and name in full of the applicant's legal representative

preceded by the handwritten wording "Approving representation"

Date, signature and name in full of the representative in the European Economic Area

preceded by the handwritten wording "Accepting representation".

(1) Delete as appropriate.

STANDARD LETTER 4A
ECAU AND/OR EChAU RATINGS

APPLICATION FORM FOR RENUNCIATION OF THE ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED IN THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Application for renunciation of the ECAU and/or EChAU rating

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating, I would like to renounce the ECAU and/or EChAU rating for the product(s) that we manufacture identified by the following references:

- designation of the product(s):
- manufacturing unit: …… (company name, address): ……
- brand name: ……
- commercial reference: ……
- date of ECAU and/or EChAU rating admission: …… or certificate No.: ……

for the following reasons:

- ……

for a maximum duration of 6 months, renewable once.

Manufacturing is due to cease on: ……

The inventories of these products with packaging marked ECAU or EChAU are the following: ……

The anticipated time it will take to deplete them is: ……

Yours faithfully,

Date, signature and name in full of the holder's legal representative

STANDARD LETTER 4A
ECAU AND/OR EChAU RATINGS

APPLICATION FORM FOR RENUNCIATION OF THE ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED IN THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Application for renunciation of the ECAU and/or EChAU rating

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating, I would like to renounce the ECAU and/or EChAU rating for the product(s) that we manufacture identified by the following references:

- designation of the product(s):
- manufacturing unit: …… (company name, address): ……
- brand name: ……
- commercial reference: ……
- date of ECAU and/or EChAU rating admission: …… or certificate No.: ……

for the following reasons:

- ……

for a maximum duration of 6 months, renewable once.

Manufacturing is due to cease on: ……

The inventories of these products with packaging marked ECAU or EChAU are the following: ……

The anticipated time it will take to deplete them is: ……

Yours faithfully,

Date, signature and name in full of the holder's legal representative

STANDARD LETTER 5A
ECAU AND/OR EChAU RATINGS

APPLICATION FORM FOR SUSPENSION OF THE ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED IN THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Application for suspension of the ECAU and/or EChAU rating

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating, I would like to request the suspension of the ECAU and/or EChAU rating for the product(s) that we manufacture identified by the following references:

- designation of the product(s):
- manufacturing unit: …… (company name, address): ……
- brand name: ……
- commercial reference: ……
- date of ECAU and/or EChAU rating admission: …… or certificate No.: ……

for the following reasons:

- ……

for a maximum duration of 6 months, renewable once.

Manufacturing is due to cease on: ……

The inventories of these products with packaging marked ECAU or EChAU are the following: ……

The anticipated time it will take to deplete them is: ……

Yours faithfully,

Date, signature and name in full of the holder's legal representative

STANDARD LETTER 5B
ECAU AND/OR EChAU RATINGS

APPLICATION FORM FOR SUSPENSION OF THE ECAU AND/OR EChAU RATING FOR APPLICANTS LOCATED OUTSIDE OF THE EUROPEAN ECONOMIC AREA

(to be drawn up on the applicant's/holder's letterhead paper)

Centre Scientifique et Technique du Bâtiment (CSTB)
Direction Hydraulique et Equipements Sanitaires, (HES)
Division Robinetterie et Appareils Sanitaires (RAS)
For the attention of Mr. Laurent Rousseau
84, avenue Jean Jaurès
Champs sur Marne
F-77447 Marne La Vallée Cedex 2

Subject: Application for suspension of the ECAU and/or EChAU rating (with a representative)

Dear Sir, Madam,

As holder of the ECAU and/or EChAU rating, I would like to request the suspension of the ECAU and/or EChAU rating for the product(s) that we manufacture identified by the following references:

- designation of the product(s):
- manufacturing unit: …… (company name, address): ……
- brand name: ……
- commercial reference: ……
- date of ECAU and/or EChAU rating admission: …… or certificate No.: ……

for the following reasons:

- ……

for a maximum duration of 6 months, renewable once.

Manufacturing is due to cease on: ……

The inventories of these products with packaging marked ECAU or EChAU are the following: ……

The anticipated time it will take to deplete them is: ……

Yours faithfully,

Date, signature and name in full of the holder's legal representative

Date, signature and name in full of the representative in the European Economic Area

STANDARD SHEET 7
ECAU AND/OR EChAU RATINGS

SPECIFIC ITEMS ALL APPLICANTS (INDUSTRIALISTS, IMPORTERS, DISTRIBUTORS, ETC.) MUST PRODUCE AS PART OF A NEW ADMISSION APPLICATION WHEN THE RATING HAS BEEN WITHDRAWN AS A RESULT OF A SANCTION

In the event of an act of deceptive commercial practice under Articles L 121-2 to L121-5 of the Consumer Code (Indication of a false rating of a certified product or a false label).

The applicant is responsible for determining and carrying out a course of action that will fully address and remedy the causes and consequences of their commitments as regards the correct usage of the certification mark.

ACTIONS	MINIMUM PROOF TO BE SUPPLIED BY THE CSTB APPLICANT SHOWING THE ACTIONS THEY HAVE UNDERTAKEN TO FULLY ADDRESS AND REMEDY THE CAUSES AND CONSEQUENCES	VALIDITY OF THE PROOF RECEIVED
CURATIVE ACTIONS	• A list of those affected including full contact details (customers, prospects, technical controllers, etc.) who have received false attestations/false certificates; failing that, a list of those affected (customers, prospects, technical controllers, etc.) who have been contacted over the preceding 24 months.	☐ List sent ☐ List not sent Comments: .....
	• List of customers, including full contact details, who have received products with inappropriately marked packaging information; otherwise, the list of customers of the past 24 months.	☐ List sent ☐ List not sent Comments: .....
	• Letter written by the Applicant's manager informing those affected of the invalidity of the false attestations/false certificates they have been sent.	CSTB will verify that this action has been carried out by contacting 5% of those affected or at least 5 customers and technical controllers. ☐ Letter of information duly implemented, corroborated by those affected ☐ Letter of information not implemented or partially implemented Comments: ....
	• Letter written by the Applicant's manager informing the customers of products that are inappropriately marked or	CSTB will verify that this action has been carried out by contacting 5% of the customers or at least 5 customers

	products bearing the certification mark(s).	☐ Letter of information duly implemented, corroborated by those affected ☐ Letter of information not implemented or partially implemented Comments: .....
	• Action undertaken against the person or persons responsible for approving and issuing the false attestations/false certificates and/or delivering inappropriately marked products.	☐ Action is relevant ☐ Action is not relevant Comments: .....

4 Prices

The purpose of this chapter is to determine the amount due for services related to the ECAU and EChAU ratings and describe the terms of payment.

The ECAU and EChAU ratings include the following services:

- Development, examination of application and implementation of ECAU and/or EChAU ratings;
- Operation of ECAU and/or EChAU ratings;
- Testing;

4.1 Services related to the ECAU and/or EChAU ratings

Nature of the service	Definition of the service	Paying for the services
Management: Development and implementation of ratings, examination of the rating application	Participation in the implementation of the ratings, including preparation of the associated technical document. Services including examination of application files, relations with applicants, laboratories and assessment of inspection results.	➢ **Initial/complementary application: See § 4.2.1**
Management: Rating operation	Services including management of rating files, relations with holders, laboratories, publication of ratings data on certificates, assessment of inspection results.	➢ **Monitoring: See § 4.2.2**
Tests	Laboratories' testing services	The laboratories' price lists are provided upon request. The applicant/holder supplies samples free of charge and makes them available at the laboratory's address. The costs related to the import duties and taxes are to be borne by the test applicant; the applicant shall pay all duties and taxes before sending the samples. ➢ **Initial/complementary application: See § 4.2.1** ➢ **Monitoring: See § 4.2.2**

4.2 Paying for the services

4.2.1 Initial application/complementary application

Management and testing fees related to examination services are invoiced in the framework of an initial or complementary ECAU and/or EChAU rating application. They are payable in one instalment, at the time at which the application is filed, for official registration.

Such fees will remain payable even if the ECAU and/or EChAU rating is not granted or extended or if the application is withdrawn during the examination.

4.2.2 Monitoring

Fees for annual services related to management and testing of ECAU and/or EChAU ratings are invoiced during the first quarter of each year and will remain payable in the event of non-renewal, withdrawal, cancellation or suspension of the ECAU and/or EChAU rating during the year.

4.2.3 Non-payment of amounts due

The applicant or holder of the ECAU and/or EChAU rating must pay all fees in accordance with the established terms of payment. Any failure on their part is an obstacle to the fulfilment by CSTB of the responsibilities of inspection and corrective action that are incumbent upon it hereunder.

If a first official notice by registered letter with acknowledgement of receipt does not result in the payment of all amounts due within one month, any established penalties may be applied for all of the products accepted for such holder.

4.3 Prices

Prices are reviewed annually, in the form of a price list drawn up by CSTB. This revision is reported by CSTB.

If holders refuse to recognise the annual revision of fees, they shall be deemed to have voluntarily terminated the ratings for their products.

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