

SANITARY TAPWARE
Technical document
077-03

ECAU and/or EChAU ratings for mechanical mixer taps

Technical Document 077-03 Rev03
24/11/2022

CSTB (Centre Scientifique et Technique du Bâtiment), a public establishment supporting innovation in construction, has five key activities—research and expertise, assessment, certification, tests, and dissemination of knowledge—organised to meet the challenges of the ecological and energy transition in the construction sector. Their fields of expertise include construction materials, buildings and their integration into districts and towns.

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

Any reproduction or representation, in whole or in part, by whatever means, of the pages published in this technical document and executed without the authorisation of CSTB is illegal and constitutes a counterfeit. The only authorised exceptions are 1) reproductions strictly reserved for the use of the typist and not intended for any collective use or 2) analyses and short quotations required due to the scientific or informational nature of the work in which they appear (article L.122-5 of the Intellectual Property Code). This document has been drawn up under the initiative and direction of CSTB, which has gathered the opinions of all interested parties.

© CSTB

MODIFICATION HISTORY

Revision no.	Application date	Modifications
00	01/06/2017	<p>Update to the document layout and reference.</p> <p>Content modifications:</p> <ul style="list-style-type: none"> – Some technical changes
01	02/04/2019	<p>Cancels and replaces technical document 077-03_Rev 18</p> <p>Update of technical document according to the new frame:</p> <p><i>“Trame_doc_technique_VF_PC_DT_R3.”</i></p>
02	01/10/2020	<p>Reference to the regulation for use of marks (DT077-00)</p> <p>- Addition of the method for determining the scores in chapter 2.7 "E.C.A.U. and / or E.Ch.A.U. rating"</p>
03	24/11/2022	<p>Modification of the family title “jet regulators” by “Aerators (with or without integrated flow regulators)” and deletion of the family “flow regulator”.</p> <p>Modification at the ECAU classification in terms of flowrate, comfort and endurance classes. Implementation of “A B C D” performances for each class of the ECAU rating.</p> <p>Updating of the “Hydraulique et Equipements Sanitaires” Department name by “Direction de l’EAU” and the name of Division “Robinetterie et Appareils Sanitaires (RAS)” by Division “Equipements Sanitaires et du Bâtiment (ESB)”.</p> <p>Deletion of standards publication year.</p>

TABLE OF CONTENTS

1	NORMATIVE SUPPORT FOR ECAU AND/OR ECHAU RATINGS	6
1.1	Purpose	6
1.2	List of the tests involved	6
2	ECAU AND/OR ECHAU RATINGS	7
2.1	Foreword	7
2.2	Purpose	7
2.3	Field of application	7
2.4	References to standards and additional specifications	8
2.5	ECAU and/or EChAU rating principle	8
2.5.1	Meaning of E.....	8
2.5.2	Meaning of C and Ch.....	8
2.5.3	Meaning of A.....	9
2.5.4	Meaning of U.....	10
2.6	Performance level for ECAU and/or EChAU ratings	10
2.6.1	Marking and identification	10
2.6.2	Materials	10
2.6.3	Dimensional characteristics	10
2.6.4	Order of tests	14
2.6.5	Leaktightness characteristics.....	15
2.6.6	Pressure resistance characteristics - Mechanical behaviour under pressure	16
2.6.7	Hydraulic characteristics	16
2.6.8	Mechanical strength characteristics - Operating device torque test.....	24
2.6.9	Mechanical endurance characteristics	24
2.6.10	Protection against backflow	24
2.6.11	Acoustic characteristics	24
2.6.12	Resistance to alternating pressure stress	25
2.6.13	Verification of the installation system for sanitary tapware.....	26
2.6.14	C2 force verification	28
2.7	ECAU and/or EChAU ratings for mechanical mixer taps	29
2.7.1	Hydraulic or flow characteristic.....	29
2.7.2	Comfort characteristics	30
2.7.3	Acoustic characteristic.....	31
2.7.4	Mechanical endurance or wear resistance characteristic.....	31
2.8	Example of ECAU and/or EChAU ratings	32
2.9	Rating presentation.....	33
2.9.1	Specific information for the catalogue or other commercial media.....	33
2.9.2	Product information.....	33
3	ECAU AND/OR ECHAU RATING APPLICATION.....	34
3.1	For an initial rating application	34
3.2	For a complementary rating application.....	34

3.3	For a new rating application following a penalty of withdrawal of ECAU and/or EChAU ratings	34
3.4	For an application for the suspension of the ECAU and/or EChAU rating	34
3.5	For an application for renunciation of the ECAU and/or EChAU rating	34
4	PRICES	44
4.1	Services related to the ECAU and/or EChAU ratings	44
4.2	Paying for the services	45
4.2.1	Initial application/complementary application	45
4.2.2	Monitoring	45
4.2.3	Non-payment of amounts due	45
4.3	Prices	45

1 Normative support for ECAU and/or EChAU ratings

1.1 Purpose

The purpose of this chapter is to list the articles of the NF EN 817 standard 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 817.

Articles	Title of articles
4	Marking and identification
4.1	Marking
4.2	Identification
5	Materials
5.1	Chemical and hygienic requirements
5.2 A	State of visible surfaces (<i>neutral salt spray test</i>)
5.2 B	State of visible surfaces (<i>"air" thermal shock resistance test</i>)
6	Dimensional characteristics
6.2	Inlet dimensions
6.3	Outlet dimensions
6.4	Assembly dimensions
7	Test sequences
8	Leaktightness characteristics
8.3	Tightness of the obturator and mixer upstream of the obturator with the obturator in the closed position
8.4	Tightness of the mixer downstream of the obturator with the obturator in the open position
8.5	Tightness of the manual diverter
8.6	Tightness and operation of the automatic diverter
8.7	Obturator tightness test: Cold and hot water cross-feed
9	Pressure resistance characteristics - Mechanical behaviour under pressure
9.4	Mechanical behaviour upstream of the obturator - Obturator in the closed position
9.5	Mechanical behaviour downstream of the obturator - Obturator in the open position
10	Hydraulic characteristics
10.6	Flow rate determination
10.7	Sensitivity determination
11	Mechanical strength characteristics - Operating device torque test
12	Mechanical endurance characteristics
12.1	Mechanical endurance of the operating device
12.2	Mechanical endurance of diverters
12.2.3 A	Mechanical endurance of manual diverters
12.2.3 B	Mechanical endurance of automatic diverters
12.3	Mechanical endurance of swivel spouts
13	Protection against backflow
14	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 817 Standard.

For mechanical 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;
- Reliability to facilitate the search for mixed temperature;
- Constant mixed temperature according to the hot water temperature and the flow variation for the user's comfort;
- 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 817 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 mechanical mixer taps to qualify for ECAU and/or EChAU ratings.

2.3 Field of application

This chapter applies to mechanical mixer taps subject to standard NF EN 817.

ECAU and/or EChAU ratings are not provided for a single mixer tap to prevent differing ranges, with the exception of sink mixer taps.

The minimum standard range to be presented for ECAU and/or EChAU ratings includes a washbasin mixer tap + a mixer tap with a shower function.

The bidet mixer tap is considered optional in the presented range.

2.4 References to standards and additional specifications

NF EN 817:	Sanitary tapware. Mechanical mixer taps (PN 10)
NF EN 246:	Sanitary tapware - General specifications for aerators (with or without integrated flow 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 817. 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 3 classes for this characteristic. See Article 2.7.2.1.

	C	Ch
Field of application	<ul style="list-style-type: none"> Household (house, apartment, student residence) 	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> Dimensional; Operating force; Reliability; Constant temperature with hot water at 63 °C; Constant temperature with hot water at 50°C; Resistance to alternating pressure stress; Verification of installation system for fixed-spout single-hole taps; 	
Class 2 (Note 2)	<ul style="list-style-type: none"> 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; 	<ul style="list-style-type: none"> 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 regulator.
Class 3	<ul style="list-style-type: none"> Must be C1 C2; Must be E0 for washbasin, bidet and sink; Must be E1 for shower outlet; In the position with the handle centred on the axis of the fixed spout of the mixer tap or in the position recommended by the applicant/holder (if the handle is not centred with the mixer tap spout) there is no consumption of hot water when opening the tap to the "pressure point" position; Specific marking on the tap temperature control indicating the position and/or the cold water zone; It applies only to bath-shower mixer taps (shower outlets), showers, washbasins, bidets and sinks; 	<ul style="list-style-type: none"> Must be C1 (note 1) and Ch2; Must be E00 for washbasin, bidet; Must be E0 for shower outlet; In the position with the handle centred on the axis of the fixed spout of the mixer tap or in the position recommended by the applicant/holder (if the handle is not centred with the mixer tap spout) there is no consumption of hot water when opening the tap to the "pressure point" position; Specific marking on the tap temperature control indicating the position and/or the cold water zone; It applies only to bath-shower mixer taps (shower outlets), showers, washbasins and sinks;
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 considered for ECAU /EChAU rating, all tapware equipped with a "pressure point or button" system shall be classified as "C2". This means that holders may not request only a class C1 rating for a product equipped with a "pressure point or button" system. They must file a complementary ECAU rating application. "	

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;
- swivel spouts;
- bath-shower diverters.

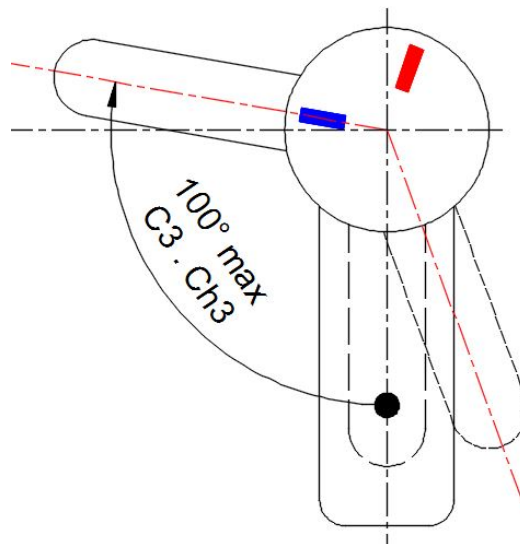
There is 1 class for this characteristic. See Article 2.7.4.1.

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 standard NF EN 817, for the C3 or Ch3 characteristic, the position of the identification must be indicated.



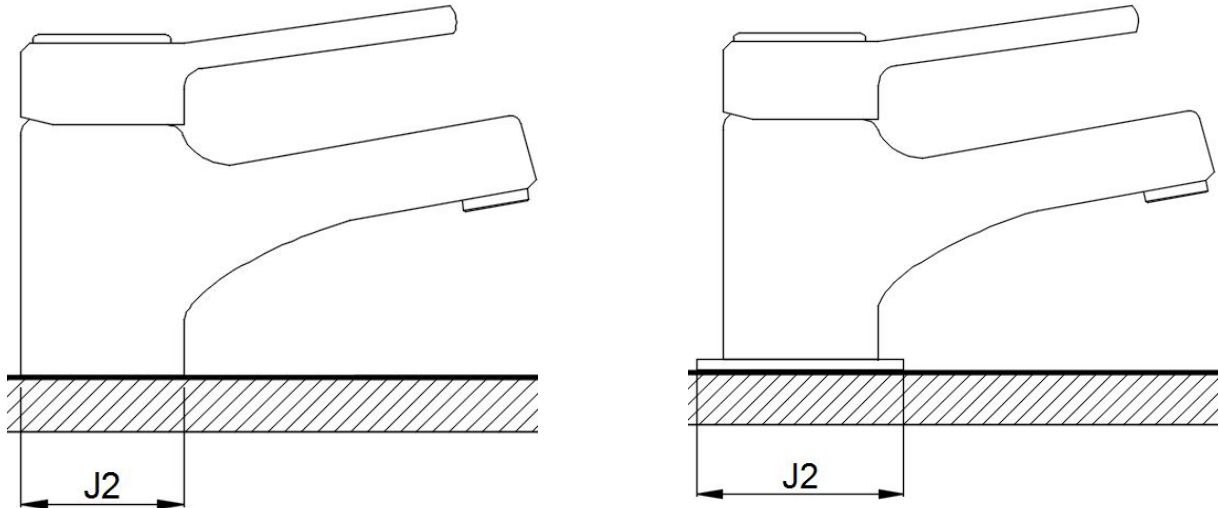
2.6.2 Materials

No requirements in addition to those under the NF EN 817 standard.

2.6.3 Dimensional characteristics

In addition to the NF EN 817 Standard, the following additional dimensions must be verified: J2, D4, P1, P2, angle C3 and Ch3.

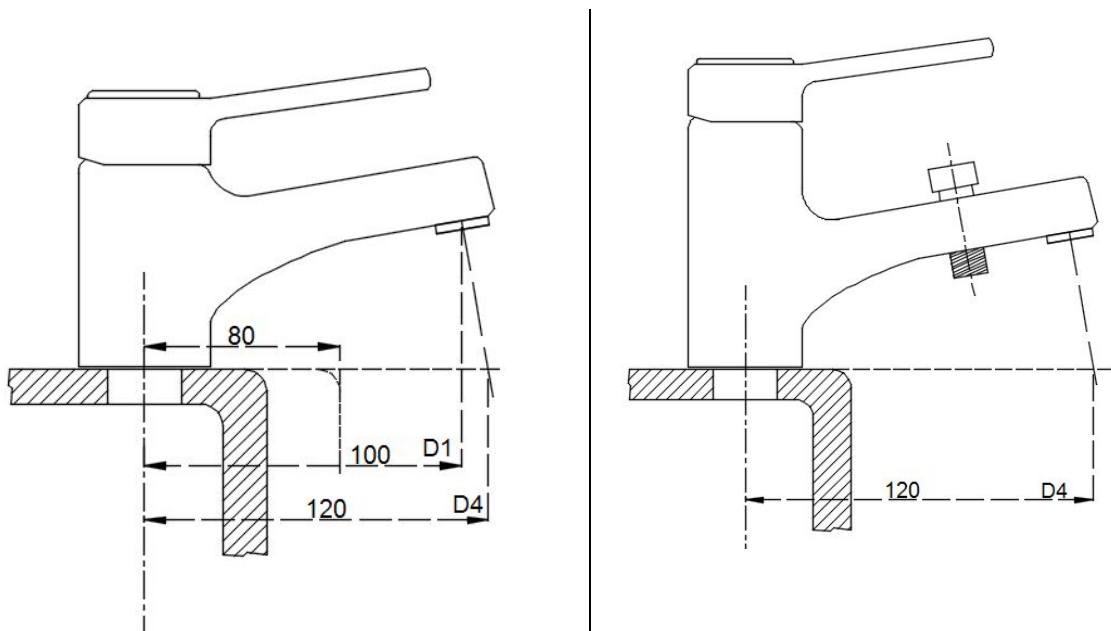
- The diameter of the tapware body base (J2, established at a minimum of 45 mm) must not be obtained by introducing an insert between the base of the body and the support.



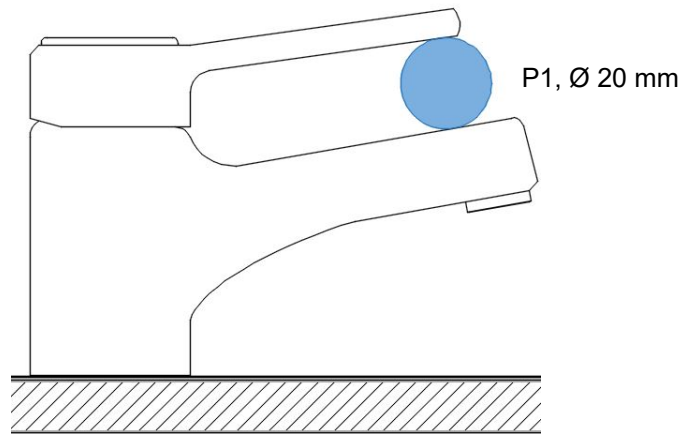
- for washbasin taps, the jet axis must intersect the washbasin surface (at the tap base) at least 120 mm from the tap base axis (D4).

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.

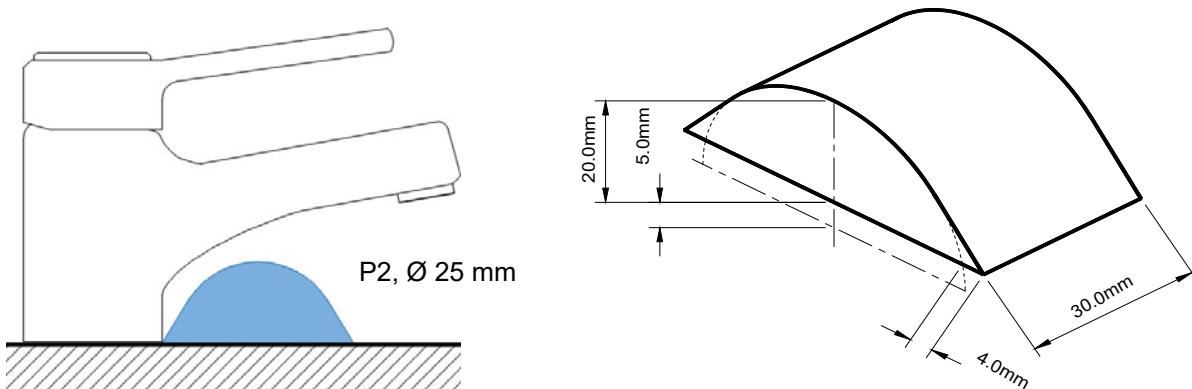
The figure below shows in dotted lines the maximum range for standard washbasins (80 mm) and for standard taps the minimum projection (100 mm, D1) with the minimum height (25 mm). It is clearly impossible to wash one's hands under the tap.



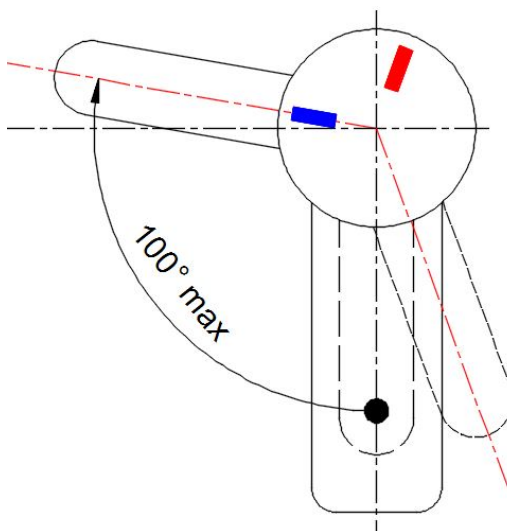
- the control devices must be separate from the top of the tap spout so that a cylindrical rod with a diameter of 20 mm can be inserted between them



- 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.



- The operating angle of rotation of the control must not exceed 100° with respect to the spout axis



2.6.4 Order of tests

In standard NF EN 817, under Chapter 6.4, in Table 6, the order of the tests for all of the samples was changed as follows 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 Please note that this test is only conducted for admission	
Sample 1 Materials	1.	§5.2A Materials (salt spray)	
Sample 2 Materials	2.	§5.2B Materials (air thermal shock)	
Sample 3 Cartridge endurance	3.	§4.1 Marking	
	4.	§4.2 Identification	
	5.	§13 Protection against backflow	
	6.	§2.6.14 C2 force verification	
	7.	§8.3 Leaktightness	
	8.	§8.4 Leaktightness	
	9.	§8.7 Leaktightness	
	10.	§12.1 Endurance	
	11.	§2.6.14 C2 force verification (after 30,000 cycles)	
	12.	8.3 Leaktightness	
	13.	§8.4 Leaktightness	
	14.	§8.7 Leaktightness	
	15.	§2.6.9 Endurance	
	16.	§8.3 Leaktightness	
	17.	§8.4 Leaktightness	
	18.	§8.7 Leaktightness	
Sample 4 Diverter endurance		Sample 4A – manual diverter	Sample 4B – automatic diverter
	1.	§4.1 Marking	§4.1 Marking
	2.	§4.2 Identification	§4.2 Identification
	3.	§13 Protection against backflow	§13 Protection against backflow
	4.	§8.5 Leaktightness	§8.6 Leaktightness
	5.	§12.2.3A Endurance	§12.2.3B Endurance
	6.	§8.5 Leaktightness	§8.6 Leaktightness
	7.	§2.6.9 Endurance	§2.6.9 Endurance
	8.	§8.5 Leaktightness	§8.6 Leaktightness
Sample 5 Spout endurance	1.	§4.1 Marking	
	2.	§4.2 Identification	
	3.	§13 Protection against backflow	
	4.	§8.4 Leaktightness	
	5.	§12.3 Endurance	
	6.	§8.4 Leaktightness	
	7.	§2.6.9 Endurance	
	8.	§8.4 Leaktightness	

Sample Sequence	Order	Tests				
Sample 6 Charact. Hydraulic		Sample 6 for C1	Sample 6 for C2	Sample 6 for C3	Sample 6 for Ch2	Sample 6 for Ch3
	1.	§4.1 Marking	§4.1 Marking	§4.1 Marking	§4.1 Marking	§4.1 Marking
	2.	§4.2 Identification	§4.2 Identification	§4.2 Identification	§4.2 Identification	§4.2 Identification
	3.			§2.6.1 Identification		§2.6.1 Identification
	4.	§13 Protection against backflow	§13 Protection against backflow	§13 Protection against backflow	§13 Protection against backflow	§13 Protection against backflow
	5.	§6 Dimensions	§6 Dimensions	§6 Dimensions	§6 Dimensions	§6 Dimensions
	6.	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions	§2.6.3 Dimensions
	7.	§10.6 Flow rate	§10.6 Flow rate	§10.6 Flow rate	§10.6 Flow rate	§10.6 Flow rate
	8.	§2.6.7.1.1 Class E for flow rate	§2.6.7.1.1 Class E for flow rate	§2.6.7.1.1 Class E for flow rate	§2.6.7.1.1 Class E for flow rate	§2.6.7.1.1 Class E for flow rate
	9.	§10.7 Sensitivity	§10.7 Sensitivity	§10.7 Sensitivity	§10.7 Sensitivity	§10.7 Sensitivity
	10.	§2.6.7.1.2 Reliability	§2.6.7.1.2 Reliability	§2.6.7.1.2 Reliability	§2.6.7.1.2 Reliability	§2.6.7.1.2 Reliability
	11.	§2.6.7.1.3 Temperature constant θ_M with hot water temperature at 63 °C	§2.6.7.1.3 Temperature constant θ_M with hot water temperature at 63 °C			
	12.	§2.6.7.1.4 Temperature constant θ_M with hot water temperature at 63 °C	§2.6.7.1.4 Temperature constant θ_M with hot water temperature at 63 °C			
	13.		§2.6.7.2.1 C2 flow rate in "Water saving" position	§2.6.7.2.1 C2 flow rate in "Water saving" position	§2.6.7.5.1 C2 flow rate in "Water saving" position	§2.6.7.5.1 C2 flow rate in "Water saving" position
	14.			§2.6.7.3.1 C3 energy saving		§2.6.7.6.1 C3 energy saving
	15.	§9.4 Upstream mechanical behaviour	§9.4 Upstream mechanical behaviour	§9.4 Upstream mechanical behaviour	§9.4 Upstream mechanical behaviour	§9.4 Upstream mechanical behaviour
	16.	§9.5 Downstream mechanical behaviour	§9.5 Downstream mechanical behaviour	§9.5 Downstream mechanical behaviour	§9.5 Downstream mechanical behaviour	§9.5 Downstream mechanical behaviour
Sample 7 Torsion	1.	§4.1 Marking				
	2.	§4.2 Identification				
	3.	§13 Protection against backflow				
	4.	§11 Torque				
	5.	§8.3 Leaktightness				
Sample 8-9-10 Acoustic	1.	§4.1 Marking				
	2.	§4.2 Identification				
	3.	§13 Protection against backflow				
	4.	§14 Acoustic				
	5.	§2.6.11 Class A for acoustics				
Sample 11 Alternating pressures	1.	§4.1 Marking				
	2.	§4.2 Identification				
	3.	§13 Protection against backflow				
	4.	§2.6.12 Resistance to alternating pressure				
	5.	§8.3 Leaktightness				

2.6.5 Leaktightness characteristics

No requirements in addition to those under the NF EN 817 Standard.

2.6.6 Pressure resistance characteristics - Mechanical behaviour under pressure

No requirements in addition to those under the NF EN 817 standard.

2.6.7 Hydraulic characteristics

2.6.7.1 Hydraulic characteristics for class C1

Particular case:

At bath outlet, the minimum flow rate must be of 20 L/min and be measured only in the area between (34 à 44) °C.

In addition to the NF EN 817 standard, the following hydraulic characteristics must be verified:

2.6.7.1.1 Flow rate in “fully open” position

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

2.6.7.1.2 Reliability

2.6.7.1.2.1 Definition

Reliability is characterised by the temperature difference for any position of the temperature control device after an indeterminate shift of the device and the return to its initial position.

2.6.7.1.2.2 Principle

It consists of determining the change in temperature of mixed water after a shift of the temperature control device and the return to its original position, for maximum mixed water flow.

2.6.7.1.2.3 Operating procedure

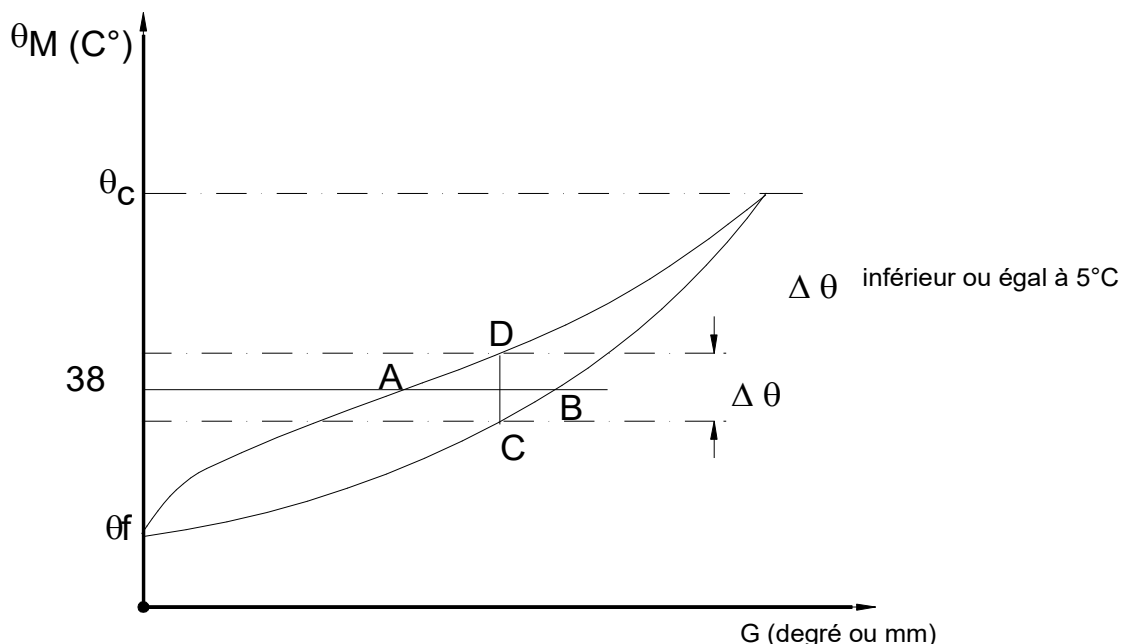
Identical to Article 10.6.2.3 of Standard NF EN 817.

2.6.7.1.2.4 Required characteristics

The temperature deviation $\Delta\theta$ must not be greater than 5 °C.

2.6.7.1.2.5 Analysing the results

Consider the curve $\theta_M = f(G)$.



Draw the AB line for $\theta_M = 38$ °C, then the bisection of the line.

Check that the CD part = $\Delta\theta$ of the bisection meets the requirement established under Article §2.6.7.1.2.4 i.e. $\Delta\theta \leq 5$ °C.

2.6.7.1.3 Temperature constant θ_M with hot water temperature at 63 °C

2.6.7.1.3.1 Definition

Temperature constancy is characterised by the variation of temperature θ_M of the mix when the flow control device is operated without affecting the mixing function

2.6.7.1.3.2 Principle

It consists in verifying that, for a given position of the temperature control device, the mixed water temperature variations remain limited when the flow control device is operated from its maximum value to two minimum values successively:

$$Q_1 = (6 \pm 0.5) \text{ L/min and}$$

$$Q_2 = (3 \pm 0.5) \text{ L/min.}$$

2.6.7.1.3.3 Operating procedure

- Set the temperature control device so that the θ_M temperature of the mixed water is equal to 38 (+0/-1) °C (for θ° Cold (13 \pm 1) °C and for θ° Hot (63 \pm 1) so that $\Delta t = 50$ K), with the flow control device at its maximum.
- Close and reopen the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar to initialise the test.
- Check or readjust the temperature control device so that the θ_M temperature of the mixed water is equal to 38 (+0/-1) °C.
- Close the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar with a speed of 0.5°/s or 0.8 mm/s.
- For different positions, measure the average flows ($Q_M = Q_F + Q_C$) and the M temperatures until a flow rate of 6 L/min is obtained and then a flow rate of 3 L/min.

2.6.7.1.3.4 Required characteristics

The variation of the mixed water temperature, when the flow rate varies from its maximum value to the values indicated in §2.6.7.1.3.2, must be at most equal to:

$$\Delta\theta_1 = 4 \text{ K for } Q_1 = (6 \pm 0.5) \text{ L/min and}$$

$$\Delta\theta_2 = 6 \text{ K for } Q_2 = (3 \pm 0.5) \text{ L/min}$$

2.6.7.1.3.5 Analysing the results

On the basis of the results obtained during the test carried out according to the average temperature curve θ_M based on the mixed water flow rate, check that the variation in the mixed water temperature between the established maximum and the minimum flow rates does not exceed the values specified in Article 2.6.7.1.3.4

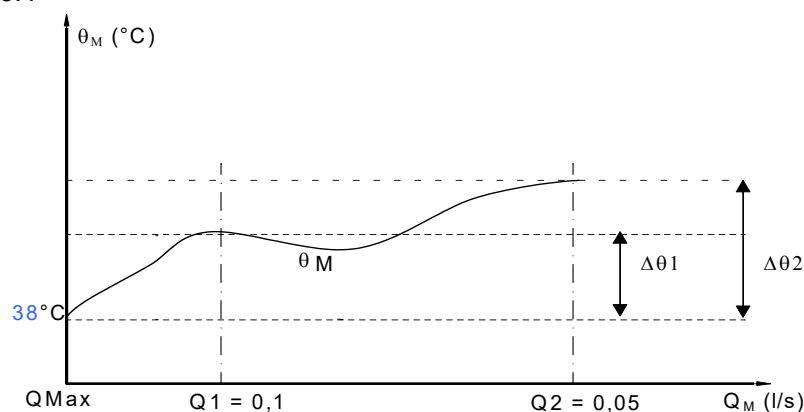


Figure 1 – Verification of constant temperature

2.6.7.1.4 Temperature constant θ_M with a hot water supply temperature limited to 50 °C (test for the sanitary hot water provision)

2.6.7.1.4.1 Definition

Temperature constancy is characterised by the variation of temperature θ_M of the mix when the flow control device is operated without affecting the mixing function.

2.6.7.1.4.2 Principle

It consists in verifying that, for a given position of the temperature control device, the mixed water temperature variations remain limited when the flow control device is operated from its maximum value to two minimum values successively:

$$Q_1 = (6 \pm 0.5) \text{ L/min and}$$

$$Q_2 = (3 \pm 0.5) \text{ L/min}$$

2.6.7.1.4.3 Operating procedure

- Set the temperature control device so that the θ_M temperature of the mixed water is equal to 38 (+0/-1) °C (for θ° Cold (13 \pm 1) °C and for θ° Hot (50 \pm 1) °C, with the flow control device at its maximum.
- Close and reopen the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar to initialise the test.
- Check or readjust the temperature control device so that the θ_M temperature of the mixed water is equal to (38 +0/-1) °C.
- Close the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar with a speed of 0.5°/s or 0.8 mm/s.
- For different positions, measure the average flows ($Q_M = Q_F + Q_C$) and the M temperatures until a flow rate of 6 L/min is obtained and then a flow rate of 3 L/min.

2.6.7.1.4.4 Required characteristics

The variation of the mixed water temperature, when the flow rate varies from its maximum value to the values indicated in §2.6.7.1.4.2, must be at most equal to:

$$\Delta\theta_1 = 4 \text{ K for } Q_1 = (6 \pm 0.5) \text{ L/min and}$$

$$\Delta\theta_2 = 6 \text{ K for } Q_2 = (3 \pm 0.5) \text{ L/min}$$

2.6.7.1.4.5 Analysing the results

On the basis of the results obtained during the test carried out according to the average temperature curve θ_M based on the mixed water flow rate, check that the variation in the mixed water temperature between the established maximum and the minimum flow rates does not exceed the values specified in Article §2.6.7.1.4.4

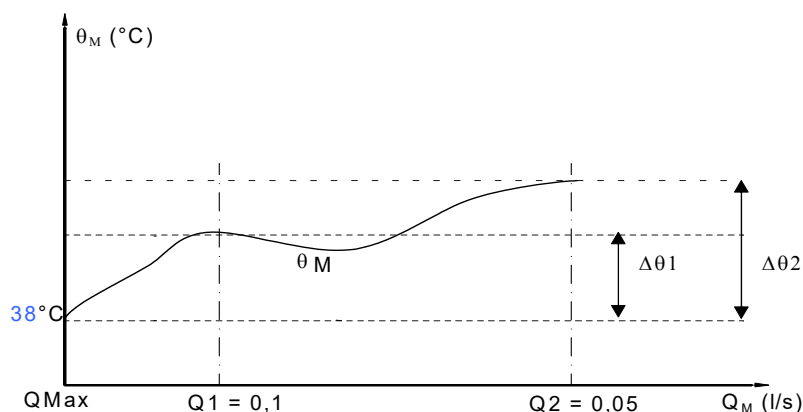


Figure 2 – Verification of constant temperature

2.6.7.2 Hydraulic characteristics for class C2

In addition to the NF EN 817 standard and Article 2.6.7.1 of this document, the following hydraulic characteristics must be verified:

2.6.7.2.1 C2 flow rate in “Water saving” position

All mechanical mixers “with a water saver” equipped with an eco button or a cartridge with a pressure point will be classified as C2.

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

Mixers used in a sanitary installation are subjected to a reduced flow rate when they are used for washbasins, bidets, sinks and showers. This position may be achieved by additional force to be applied to obtain the maximum flow or by a specific action. It is important for users to be able to obtain the full flow position in all cases, if they wish.

2.6.7.2.1.1 Test principle

The purpose is to determine, for the tested tap, the flow rate value for a reference pressure of 3 bar, also constant on each of the hot and cold water supplies within the temperature adjustment range (38 ± 2) °C.

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 14.3.3 of standard NF EN 817.

2.6.7.2.1.2 Equipment

See Article 10.3 of Standard NF EN 817.

2.6.7.2.1.3 Operating procedure

For a tap without a water saving system, see Article 10.3 of standard NF EN 817

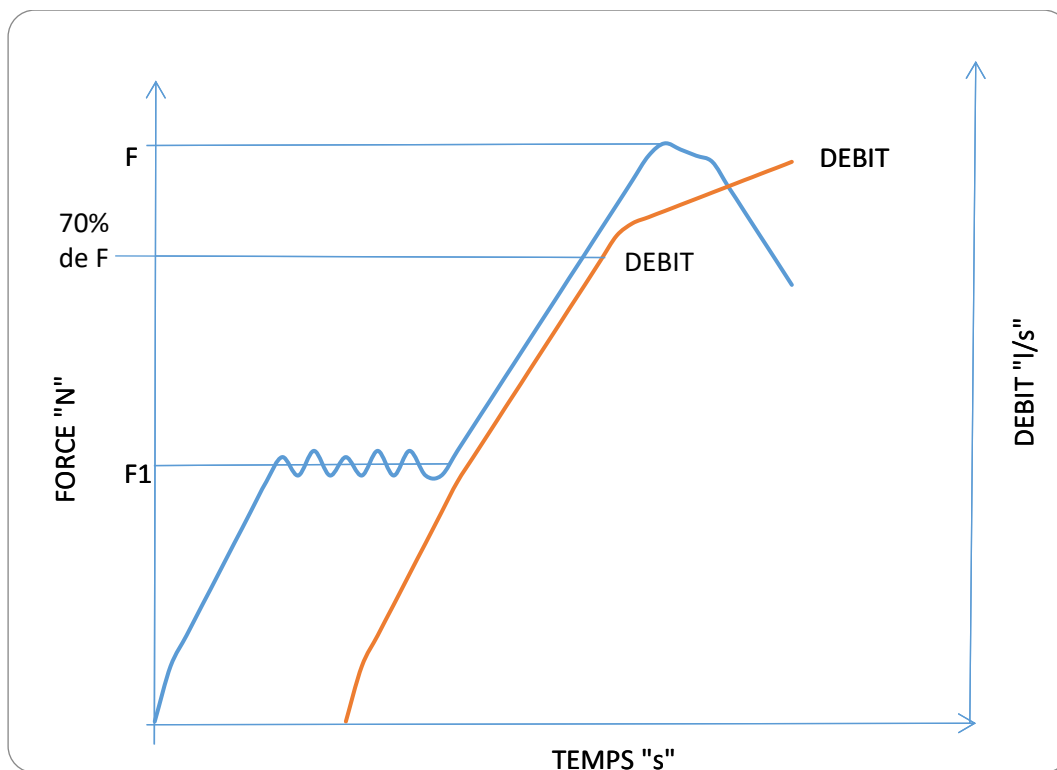
Operating procedure for a mixer with a water saving system equipped with a button

- 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 “water saving” position and operate the temperature control device to obtain a mixed water temperature of (38 ± 2) °C.
- Close the flow control device without changing the position of the temperature control device.
- Reopen the flow control device gradually (for 2 to 5 seconds) to achieve the “water saving” position and measure the QM mixed water flow ($QM = QF + QC$); the mixed water temperature must be (38 ± 2) °C.
- Take 5 measurements and determine the average flow rate in the “water saving” position.

Operating procedure for a mixer with a water saving system equipped with a pressure point

- 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 “water saving” position and operate the temperature control device to obtain a mixed water temperature of $(38 \pm 2) ^\circ\text{C}$.
- Operate the valve manually 3 times from the closed mixed position to the full flow mixed position for a break-in before the flow measurement.
- Operate the tap with a rotation speed of $0.5 ^\circ/\text{s}$ or a linear speed of 0.8 mm/s as follows:
- Mixed position closed towards the full flow mixed position
- During the operation, simultaneously record the flow rate and force F values
- Measure the flow rate value for a force at N with the following formulation:

$$F \text{ flow rate } C2 = F1 + 70\% \text{ of force } F \text{ of the pressure point } (F = F2 - F1)$$
- Take 5 measurements and determine the average flow rate values for the “water saving” position.



2.6.7.2.1.4 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: $4 \text{ L/min} \leq QM \leq 6 \text{ L/min}$
- for the shower “outlet”: $5 \text{ L/min} \leq QM < 9 \text{ L/min}$

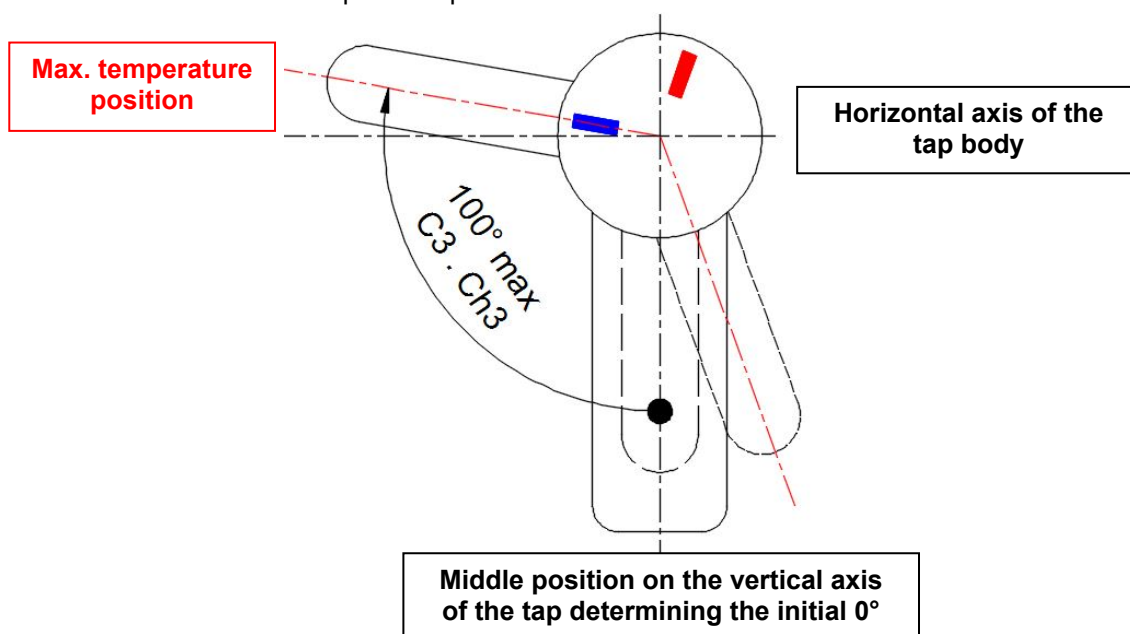
2.6.7.3 Hydraulic characteristics for class C3

In addition to standard NF EN 817 and Articles 2.6.7.1 and 2.6.7.2 (The tests described in Article 2.6.7.1.3 (Temperature constant θ_M with hot water temperature at 63 °C) and Article 2.6.7.1.4 (Temperature constant θ_M with a hot water supply temperature limited to 50 °C (test for the sanitary hot water provision)) are not applicable to a mixer with the “energy saving” function) of this document, the following hydraulic characteristics must be verified:

2.6.7.3.1 C3 energy saving

To guarantee the “energy saving” function, it seemed appropriate to measure the mixed water temperature value in the most frequently used position of a mechanical mixer.

For all applications for a C3 mechanical mixer, the control lever cannot exceed an angle of motion of 100° (**see diagram below - 100° MAX**) between the middle position in the fixed spout axis and the maximum temperature position. It should be noted that all C3 mechanical mixers must have this characteristic (except when the temperature stop is assembled on the cartridge). The flow rate when the handle is in the maximum temperature position must be the maximum hot water flow rate.



Top view of the tap

The measurement is performed on a C3 mixer to validate the C2 “water saving” requirement; it is not performed with mixed water at 38 °C but for the position of the handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder if there is no centring with the spout.

Specific marking on the temperature control is required to identify the mechanical mixer as type “C3”. This marking is made by the “Cold water or blue colour symbol” indication for the position of the handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder if there is no centring with the spout.

This “energy saving” function only applies to mechanical mixers such as washbasins, bidets and sinks.

2.6.7.3.1.1 Principle

It consists of verifying that for the position of the handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder (if there is no centring with the mixer spout), there is no consumption of hot water when the tap is opened to the “pressure point” position.

2.6.7.3.1.2 Operating procedure

- Supply the tap under a pressure of 0.3 (+ 0.02/0) MPa or 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 $\Delta t = 50 \pm 1$ K).
- Position the flow control device centred on the axis of the fixed spout of the mixer if this is possible or in the position recommended by the applicant/holder and record this position.
- Open and close the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar to initialise the test.
- Open the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar at a speed of 0.5°/s or 0.8 mm/s to the “pressure point” position if this is the option chosen by the applicant/ holder;
- Record the average flow rates ($Q_M = Q_F + Q_C$) and the mixed water temperature throughout the entire operation.

2.6.7.3.1.3 Required characteristics

On recording flow rates (Q_M) as a function of time, ensure that: There is no hot water flow between the closed position and the “pressure point” position.

2.6.7.4 Hydraulic characteristics for class Ch1

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

2.6.7.5 Hydraulic characteristics for class Ch2

In addition to standard NF EN 817 and Article 2.6.7.1 (The tests described in Article 2.6.7.1.3 (Temperature constant θ_M with hot water temperature at 63 °C) and Article 2.6.7.1.4 (Temperature constant θ_M with a hot water supply temperature limited to 50 °C (test for the sanitary hot water provision)) are not applicable to a mixer with the “controlled flow rate” function) of this document, the following hydraulic characteristics must be verified:

2.6.7.5.1 “Water saving” controlled flow rate

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

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

To ensure the flow rate in the full flow position, it seemed advisable to use a test described in Article 10.6.1 of the NF EN 817 standard and to measure the flow rate in the fully open position.

2.6.7.5.1.1 Principle

The purpose is to determine, for the tested mixer, 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 mixer in the full flow position with mixed water between 34 and 44 °C.

2.6.7.5.1.2 Equipment

See Article 10.3 of Standard NF EN 817.

2.6.7.5.1.3 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 1.5 (+ 0.2/0) MPa or 1.5 (+ 0.2/0) bar and 4.5 (+ 0.2/0) MPa or 4.5 (+ 0.2/0) bar.

2.6.7.5.1.4 Required characteristics

Flow rate according to the product

Type of product	Flow requirements in L/min		
Dynamic test pressures:	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	$4.0 \leq Q \leq 6.0$	≥ 2.0	≤ 9.0
Shower and bath-shower (shower outlet) within the setting range of 34 to 44 °C	$9.0 \leq Q < 12.0$	≥ 6.0	≤ 15.0

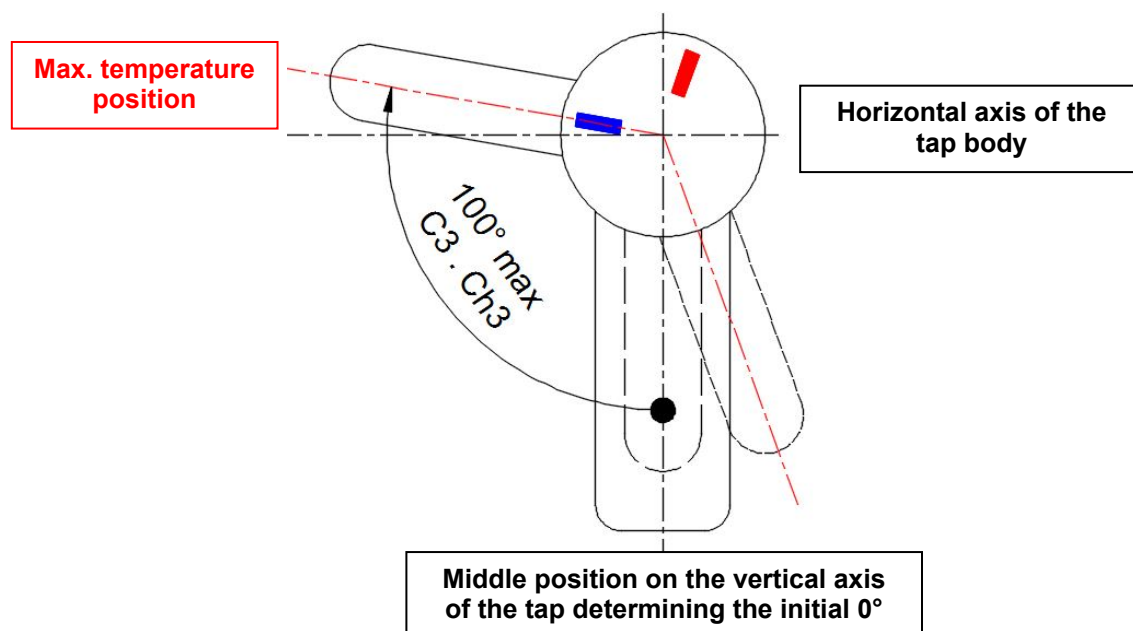
2.6.7.6 Hydraulic characteristics for class Ch3

In addition to standard NF EN 817 and Article 2.6.7.1 (The tests described in Article 2.6.7.1.3 (Temperature constant θ_M with hot water temperature at 63 °C) and Article 2.6.7.1.4 (Temperature constant θ_M with a hot water supply temperature limited to 50 °C (test for the sanitary hot water provision)) are not applicable to a mixer with the “controlled flow rate” function) of this document, the following hydraulic characteristics must be verified:

2.6.7.6.1 Ch3 energy saving

To guarantee the “energy saving” function, it seemed appropriate to measure the mixed water temperature value in the most frequently used position of a mechanical mixer.

For all applications for a Ch3 mechanical mixer, the control lever cannot exceed an angle of motion of 100° (**see diagram below - 100° MAX**) between the middle position in the fixed spout axis and the maximum temperature position. It should be noted that all Ch3 mechanical mixers must have this characteristic (except when the temperature stop is assembled on the cartridge). The flow rate when the handle is in the maximum temperature position must be the maximum hot water flow rate.



Top view of the tap

The measurement is performed on a Ch3 mixer to validate the Ch2 “water saving” requirement; it is not performed with mixed water at 38 °C but for the position of the handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder if there is no centring with the spout.

Specific marking on the temperature control is required to identify the mechanical mixer as type “Ch3”. This marking is made by the “Cold water or blue colour symbol” indication for the position of the

handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder if there is no centring with the spout.

This “energy saving” function only applies to mechanical mixers such as washbasins and bidets.

2.6.7.6.1.1 Principle

It consists of verifying that for the position of the handle centred on the axis of the fixed spout of the mixer or for the position recommended by the applicant/holder (if there is no centring with the mixer spout), there is no consumption of hot water when the tap is opened to the full flow position.

2.6.7.6.1.2 Operating procedure

- Supply the mixer under a pressure of 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar with pre-set temperatures (for θ° Cold (13 ± 0.5) $^\circ\text{C}$ and for θ° Hot (63 ± 0.5) $^\circ\text{C}$ so that $\Delta t = 50 \pm 1$ K).
- Position the flow control device centred on the axis of the fixed spout of the mixer if this is possible or in the position recommended by the applicant/holder and record this position.
- Open and close the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar to initialise the test.
- Open the flow control device maintaining the pressure at 0.3 (+ 0.02/0) MPa or 3 (+ 0.2/0) bar with a speed of 0.5 $^\circ/\text{s}$ or 0.8 mm/s up to the full flow position.
- Record the average flow rates ($Q_M = Q_F + Q_C$) and the mixed water temperature throughout the entire operation.

2.6.7.6.1.3 Required characteristics

On recording flow rates (Q_M) as a function of time, ensure that there is no hot water flow between the closed position and the full flow position.

2.6.8 Mechanical strength characteristics - Operating device torque test.

No requirements in addition to those under the NF EN 817 standard.

2.6.9 Mechanical endurance characteristics

Endurance performance is modified by multiplying by 2.5 the requirements for all mobile equipment under the standard NF EN 817.

Verification of the number of cycles obtained with class U, see Article 2.7.4.1.

In the NF EN 817 standard, under clause 12.1.2.2, in table 12, the hot water temperature for performing the endurance tests is 55 $^\circ\text{C}$ to 65 $^\circ\text{C}$ instead of (65 ± 2) $^\circ\text{C}$.

Under Article 12.1.2.4 of standard NF EN 817, set the maximum force F of the device for adjusting the temperature from cold to hot and from hot to cold at an M1 time point of (1.5 ± 0.15) Nm. The device must stop if this value of the resistive torque of the mechanism is reached.

In the NF EN 817 standard, under clause 12.2.2.2, in table 13, the hot water temperature for performing the endurance tests is 55 $^\circ\text{C}$ to 65 $^\circ\text{C}$ instead of (65 ± 2) $^\circ\text{C}$.

The operating mechanism for switching on the automatic diverter is limited to 25 N Max.

2.6.10 Protection against backflow

No requirements in addition to those under the NF EN 817 standard.

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, mechanical mixers must meet the following requirements:

- Mechanical 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 mechanical mixer inlets, with the mechanical 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 3).

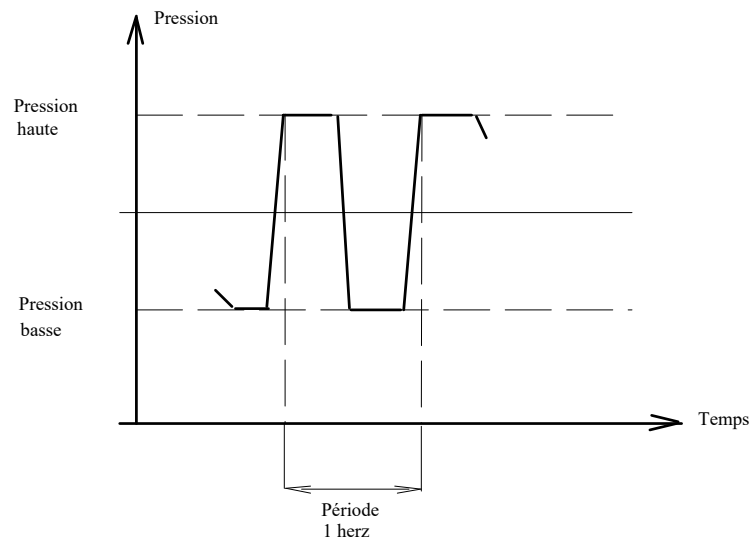


Figure 3 – Signal waveform – alternating pressures

- 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 $\pm 2\%$ 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 8.3 of standard NF EN 817.

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 817 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:

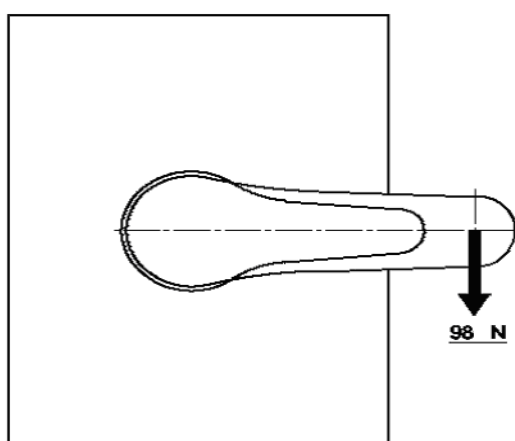
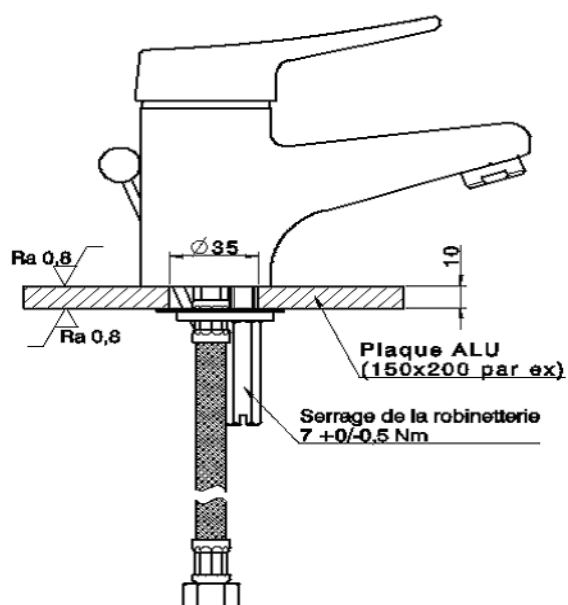
- Install the tapware on the test plate;
- Tighten the nut of the tap installation system to a torque of 7 (-0.5/0) N.m (if the installation system does not have a nut, tighten the installation system by hand);
- Apply a force of 98 (+2/0) N at the end of the spout (the point at which the force is to 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.



2.6.14 C2 force verification

To be examined for the **ECAU** rating, taps must meet the following requirements:

- Taps used in a sanitary installation are subjected to a certain number of operations during which the system used to achieve the water saving position is placed under stress.
- To ensure the efficacy of this system, it seemed appropriate to determine the additional force required to obtain the maximum flow rate of the tap before and after 30,000 endurance cycles as described in Article 12.1 of the Standard NF EN 817 and to limit the high and low value of the force.

2.6.14.1.1.1 Test principle

It consists of determining, for the tested tap, the value of the additional force necessary to exceed the maximum pressure point under a reference pressure.

The measurement is performed by shifting from the closed mixed position to the mixed full flow position.

2.6.14.1.1.2 Equipment

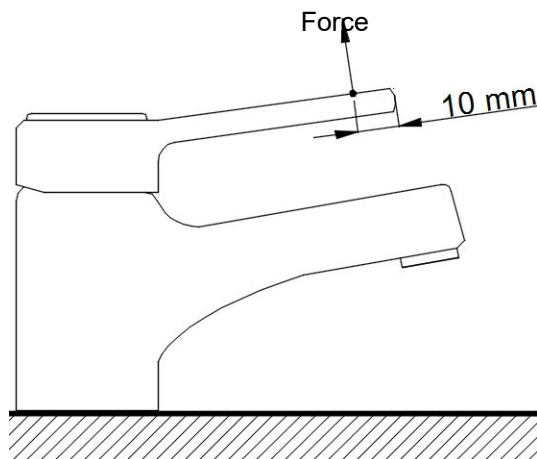


Figure 4 – Diagram for measuring Force

2.6.14.1.1.3 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 “water saving” position and operate the temperature control device to obtain a mixed water temperature of $(38 \pm 2) ^\circ\text{C}$.
- Operate the valve manually 3 times from the closed mixed position to the full flow mixed position for a break-in before the force measurement.
- Operate the tap with a rotation speed of 0.5 °/s or a linear speed of 0.8 mm/s as follows:
- Mixed position closed towards the full flow mixed position
- Measure force F1
- Next, measure the F2 force needed to pass the pressure point.
- Calculate the force of the pressure point with the following formula: $F = F2 - F1$
- Perform 5 measurements and determine the average of force F.
- After 30,000 opening and closing cycles (See test conditions in Article 12.1.2.3, table 12 of standard NF EN 817), repeat the 5 measurements and determine the average force F.

2.6.14.1.1.4 Required characteristics

The force F value must be:

- Before endurance testing: $4 \leq F \leq 9 \text{ N}$;
- After endurance testing: $3 \leq F \leq 9 \text{ N}$.

2.7 ECAU and/or EChAU ratings for mechanical 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. The highest level may apply for one characteristic, while the lowest level may apply for another.

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	
E ₀	9.0 L/min ≤ q < 12.0 L/min	
E ₁	12.0 L/min ≤ q < 16.0 L/min	
E ₂	16 L/min ≤ q < 20.0 L/min	
E ₃	20.0 L/min ≤ q < 25,2 L/min	
E ₄	25,2 L/min ≤ q < 30,0 L/min	
E ₅	30,0 L/min ≤ q < 36,0 L/min	
E ₆	36,0 l/min ≤ q < 42,0 l/min	
E ₇	42,0 l/min ≤ q < 48,0 l/min	
E ₈	48,0 l/min ≤ q < 51,0 l/min	
	Performance pour la classe C2 (débit au point dur ou au bouton)	
	4.0 L/min ≤ q ≤ 6.0 L/min	Lavabo, Bidet et Evier
	5.0 L/min ≤ q < 9.0 L/min	Douche
	Performance pour la classe Ch2 (débit avec une régulateur de débit)	
E ₀₀	4.0 L/min ≤ q ≤ 6.0 L/min	Lavabo et Bidet
E ₀	9.0 L/min ≤ q < 12.0 L/min	Douche

NOTE For bathtub tapware, the minimum class is E₃

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

Water saving for washbasin and bidet faucets

Flowrate at 3 bars (L/min)	1,5			6			12			16			20+	
Rating	A			B			C			D				
Technical score	E000 – E00			E01 – E0			E1			E2 +				

Water saving for sink faucets

Flowrate at 3 bars (L/min)	6	9				12				16				20+			
Rating	A				B				C				D				
Technical score	E01				E0				E1				E2 +				

Water saving for shower or bath-shower faucets (shower outlet)

Flowrate at 3 bars (L/min)	9	12	16	20	25,2+
Rating	A	B	C	D	
Technical score	E0	E1	E2	E3 +	

Concerning bath outlet of a faucet, there is no water saving notion related to this faucet.

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 Dimensions 2.6.7.1 Hydraulic characteristics for class C1 2.6.12 Alternating pressures 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 2.6.14 force verification
C3	Meets the requirements of Classes C1 and C2 2.6.4 Identification 2.6.7.3.1 C3 energy saving
Ch1	See C1 (Note 1)
Ch2	Meets the requirements of Class C1 (Note 1) 2.6.7.5.1 "Water saving" controlled flow rate
Ch3	Meets the requirements of Classes C1 (Note 1) and Ch2 2.6.4 Identification 2.6.7.6.1 Ch3 energy saving
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.

Comfort class for washbasin, bidet, sink, shower and bath-shower faucets

Rating	A	B	C	D
Technical score	C3 – Ch3	C2 – Ch2	C1 – Ch1	C0

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.

Noise level of washbasin, bidet, sink, shower and bath-shower faucets

Noise level at 3 bars (dB(A))	0	5	10	15	20	25	30	35	40+
Rating	A				B	C		D	
Technical score	A3				A2	A1		A0	

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	Obturator:	70 000 cycles
	Swivel spout:	80 000 cycles
	Bath-shower diverter:	30 000 cycles
U2	Obturator:	122 500 cycles
	Swivel spout:	140 000 cycles
	Bath-shower diverter:	50 000 cycles
U3	Obturator:	175,000 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.

Wear of washbasin, bidet, sink, shower and bath-shower faucets

Wear Rating	A	B	C	D
Technical score	U3	U2	U1	

2.7.4.2 Selection criteria

U₀: this score is not possible for this rating because it is lower than the product standard.

U₁: use.

U₂: intensive use.

U₃: intensive use and use in harsh conditions.

Concerning the mechanical mixers, only U₃: is possible for this rating.

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 (175,000 cycles (cartridge) - 80,000 cycles (diverter)) will be classified as:

E _{3/1} C ₁ A ₂ U ₃

Washbasin tapware with:

a usage flow rate of 5 L/min, with an L_{ap} of 13 dB (A) meeting level 3 requirements in the comfort tests and having passed the endurance tests (175,000 cycles (obturator)) will be classified as:

E ₀₀ Ch ₃ A ₃ U ₃

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 taps are as follows:

Flow	E	q L/min measured under 3 bar	E ₀₀	4.0 L/min ≤ q ≤ 6.0 L/min	
			E ₀	9.0 L/min ≤ q < 12.0 L/min	
			E ₁	12.0 L/min ≤ q < 16.0 L/min	
			E ₂	16.0 L/min ≤ q < 20.0 L/min	
			E ₃	20 L/min ≤ q < 25,2 L/min	
			E ₄	25,2 L/min ≤ q < 30,0 L/min	
			E ₅	30,0 L/min ≤ q < 36,0 L/min	
			E ₆	36,0 l/min ≤ q < 42,0 l/min	
			E ₇	42,0 l/min ≤ q < 48,0 l/min	
			E ₈	48,0 l/min ≤ q < 51,0 l/min	
			For bathtub tapware, the minimum class is E ₃		
			Comfort	C	Type
C ₂	Water saving characteristics				
C ₃	Water saving system				
Ch	Type	Ch ₁		Dimensions	
		Ch ₂		Water saving characteristics	
		Ch ₃		Water saving system	
Acoustics	A	Lap dB (A)	A ₁	20 dB (A) < Lap ≤ 30 dB (A)	
			A ₂	15 dB (A) < Lap ≤ 20 dB (A)	
			A ₃	Lap ≤ 15 dB (A)	
Wear	U	Number of cycles	U ₃	Obturator	70,000 cycles
				Swivel spout	80,000 cycles
				Bath-shower diverter	30,000 cycles
			U ₂	Obturator	122,500 cycles
				Swivel spout	140,000 cycles
				Bath-shower diverter	50,000 cycles
			U ₃	Obturator	175,000 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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 associated with this rating 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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 associated with this rating 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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 associated with this rating 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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 associated with this rating 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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 4 B
ECAU AND/OR EChAU RATINGS

(to be drawn up on the distributor's letterhead)

**APPLICATION FOR RENUNCIATION OF THE ECAU AND/OR EChAU RATING WITH A
REPRESENTATIVE
FOR APPLICANTS LOCATED OUTSIDE OF THE EUROPEAN ECONOMIC AREA**

For the attention of Mr Laurent Rousseau
Direction de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
CSTB
84 avenue Jean Jaurès
CHAMPS-SUR-MARNE
77447 MARNE LA VALLEE CEDEX 2 (France)

Subject: **Application for renunciation 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 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 admission no.:

for the following reasons:

Manufacturing is due to cease on:

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

The expected time for their depletion is:

Yours faithfully,

**Date and signature of the holder's legal
representative**

**Date and signature of the representative in the
European Economic Area**

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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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 de l'EAU
Division Equipements Sanitaires et du Bâtiment (ESB)
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	<ul style="list-style-type: none"> 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. 	<input type="checkbox"/> List sent <input type="checkbox"/> List not sent Comments:
	<ul style="list-style-type: none"> 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. 	<input type="checkbox"/> List sent <input type="checkbox"/> List not sent Comments:
	<ul style="list-style-type: none"> 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. <input type="checkbox"/> Letter of information duly implemented, corroborated by those affected <input type="checkbox"/> Letter of information not implemented or partially implemented Comments:
	<ul style="list-style-type: none"> Letter written by the Applicant's manager informing the customers of products that are inappropriately marked or products bearing the certification mark(s). 	CSTB will verify that this action has been carried out by contacting 5% of the customers or at least 5 customers <input type="checkbox"/> Letter of information duly implemented, corroborated by those affected <input type="checkbox"/> Letter of information not implemented or partially implemented Comments:
	<ul style="list-style-type: none"> Action undertaken against the person or persons responsible for approving and issuing the false attestations/false certificates and/or delivering inappropriately marked products. 	<input type="checkbox"/> Action is relevant <input type="checkbox"/> 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
<u>Management:</u> Development and implementation of ratings, examination of the rating application	<p>Participation in the implementation of the ratings, including preparation of the associated technical document.</p> <p>Services including examination of application files, relations with applicants, laboratories and assessment of inspection results.</p>	<p>➤ <i>Initial/complementary application: See § 4.2.1</i></p>
<u>Management:</u> Rating operation	<p>Services including management of rating files, relations with holders, laboratories, publication of ratings data on certificates, assessment of inspection results.</p>	<p>➤ <i>Monitoring: See § 4.2.2</i></p>
Tests	Laboratories' testing services	<p>The laboratories' price lists are provided upon request.</p> <p>The applicant/holder supplies samples free of charge and makes them available at the laboratory's address.</p> <p>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.</p> <p>➤ <i>Initial/complementary application: See § 4.2.1</i></p> <p>➤ <i>Monitoring: See § 4.2.2</i></p>

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 shall 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 shall 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.

[Trame_doc_technique_VF_R3_DT_PC-rev02]