DIN EN 1111:2026-07 (E)

Sanitary tapware - Thermostatic mixing valves (PN 10) - General technical specification

Contents

Page

European foreword 6

Introduction 7

1 Scope 8

2 Normative references 8

3 Terms and definitions 9

4 Symbols and units 10

5 Classification 11

6 Designation 11

7 Marking/identification 12
7.1 Marking 12
7.2 Identification 12

8 Materials 12
8.1 Chemical and hygiene requirements 12
8.2 Exposed surface condition and quality of coating 12

9 Dimensional characteristics 12
9.1 General remarks 12
9.2 Inlet dimensions 13
9.3 Outlet dimensions 15
9.4 Mounting dimensions 17
9.5 Special cases 20
9.6 Flexible hoses for outlet 2 20
9.7 Outlet 2 20

10 Backflow protection 20

11 Test sequence 21

12 Leaktightness 21
12.1 General 21
12.1.1 Principle 21
12.1.2 Apparatus 21
12.2 Leaktightness of the obturator and upstream thereof 21
12.2.1 General 21
12.2.2 Procedure 21
12.2.3 Requirements 22
12.3 Cross-flow between inlets 22
12.3.1 General 22
12.3.2 Procedure 22
12.3.3 Requirements 22
12.4 Leaktightness downstream of the obturator 22
12.4.1 General 22

12.4.2 Procedure 22
12.4.3 Requirements 22
12.5 Leaktightness of manually operated diverter 22
12.5.1 Procedure 22
12.5.2 Requirement 23
12.6 Leaktightness of diverters with automatic return 23
12.6.1 Procedure 23
12.6.2 Requirement 23

13 Performance 23
13.1 General 23
13.1.1 Initial settings 23
13.1.2 Apparatus 24
13.1.3 Procedure 24
13.2 Determination of flow rate 25
13.2.1 Principle 25
13.2.2 Procedure 25
13.2.3 Evaluation of the results 26
13.2.4 Requirements 26
13.3 Sensitivity 26
13.3.1 General 26
13.3.2 Principle 26
13.3.3 Procedure 26
13.3.4 Evaluation of results 27
13.3.5 Requirements 27
13.4 Fidelity 28
13.4.1 General 28
13.4.2 Principle 28
13.4.3 Procedure 28
13.4.4 Evaluation of results 28
13.4.5 Requirements 28
13.5 Temperature stability 29
13.5.1 Temperature control operation 29
13.5.2 Flow rate reduction 30
13.5.3 Cold supply failure and restoration 31
13.5.4 Supply pressure variation 32
13.5.5 Supply temperature variation 33
13.5.6 Temperature override stops 35

14 Pressure resistance 36
14.1 General 36
14.2 Apparatus 36
14.3 Testing of mechanical performance of the thermostatic mixing valve upstream of the obturator in the closed position 36
14.3.1 Procedure 36
14.3.2 Requirement 36
14.4 Mechanical behaviour downstream of the obturator - Obturator in the open position 36
14.4.1 Procedure 36
14.4.2 Requirement 36

15 Torsional resistance of the operating controls 37
15.1 General 37
15.2 Test method 37
15.2.1 Principle 37
15.2.2 Apparatus 37
15.2.3 Procedure 37

16 Mechanical endurance characteristics 37
16.1 General 37
16.2 Endurance test for single sequential control device 38
16.2.1 Principle 38
16.2.2 Apparatus 38

16.2.3 Procedure 38
16.2.4 Requirement 38
16.3 Endurance test for on/off flow control device operated by rotating the control handle 39
16.3.1 Principle 39
16.3.2 General 39
16.4 Endurance test for on/off flow control device, combined with diverter mechanism 39
16.4.1 Principle 39
16.4.2 Apparatus 39
16.4.3 Procedure 39
16.4.4 Requirement 40
16.5 Endurance test for other on-off flow control device 40
16.5.1 Principle 40
16.5.2 Apparatus 40
16.5.3 Procedure 40
16.5.4 Requirement 40
16.6 Mechanical endurance of diverters of thermostatic mixing valves 40
16.6.1 General 40
16.6.2 Test method 41
16.6.3 Requirements 42
16.7 Mechanical endurance of swivel spouts 42
16.7.1 General 42
16.7.2 Test method 42
16.7.3 Requirements 42
16.8 Thermal Element 43
16.8.1 Principle 43
16.8.2 Temperature adjustable valves (Type 1, 2, 4) 43
16.8.3 Temperature set valves (Type 5) 43
16.8.4 Other valves with special control devices (Type 6) 44

17 Acoustic characteristics 44
17.1 General 44
17.2 Procedure 44
17.2.1 Fitting and operating conditions for thermostatic mixing valves 44
17.2.2 Test method 44
17.3 Requirements 45
17.3.1 Expression of results 45
17.3.2 Determination of acoustic groups 45
17.3.3 Flow rate classes (thermostatic mixing valves Type 1, 2, 3) 45

Annex A (normative) Test set-up descriptions 46

A.1 General 46
A.2 Inlet pipework 46
A.2.1 Thermostat endurance 46
A.2.2 Performance 47
A.3 Outlet pipework 47
A.3.1 General 47
A.3.2 Outlet for valves without integral atmospheric discharge spouts 48
A.3.3 Outlet for valves with atmospheric discharge nozzles 51

Annex B (informative) Measurements 52

B.1 Pressure 52
B.2 Flow 52
B.3 Temperature 52
B.3.1 Mounting 52
B.3.2 Accuracy 52
B.3.3 Response time 52
B.4 Angular position 52
B.5 Duration of transients 52

Annex C (informative) Temperature transient 55

C.1 Positive temperature transient 55
C.2 Negative temperature transient 56

Annex D (informative) Acoustic classification (example) 57

D.1 TMV with nozzle 57
D.2 TMV with shower or shower head outlet 57
D.3 TMV with nozzle and shower or shower head outlet 57

Bibliography 59