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Project leader	Sign.	Responsible manager	Sign.	Quality assurance	Sign.
Geir Lippe Stavnes	GLS	Lars-Erik Fiskum		Lars Erik Fiskum	

Assignment Report

Testing of thermostatic mixers from Hafa Bathroom Group AB/Westerbergs. Test method NS-EN 1111.

NORSK AKKREDITERING
TEST 107

Sanitary laboratory

The test results are valid exclusively for the tested objects.

Summary

SINTEF Building and Infrastructure has on behalf of Hafa Bathroom Group AB, carried out testing of thermostatic shower and bath mixers, type Lime, Rain round, 38, Smartmix and Wave.

The tests have been carried out in accordance with NS-EN 1111:1999 "*Sanitary tapware - Thermostatic mixing valves (PN 10) - General technical specifications*".

Determination of lead and cadmium has been carried out in accordance with NKB 4 "*Product rules for sanitary taps for hot and cold water supply*", Clause 3.3.2. See Appendix 1.

Result: Passed

Address of the building			Built (year)
	Method NS-EN 1111	Keywords Thermostatic mixer	Filename 3B061904 Hafa EN 1111

1. INTRODUCTION

SINTEF Building and Infrastructure has on behalf of Hafa Bathroom Group AB, carried out testing of thermostatic shower and bath mixers, type Lime, Rain round, 38, Smartmix and Wave.

The tests in accordance with NS-EN 1111 were conducted by Monica Malmedal and Geir Lippe Stavnes. The analyses of Pb and Cd were performed by Eurofins according to NS-EN ISO 11885. Eurofins is accredited for this method.

2. TEST METHOD

The tests have been carried out in accordance with NS-EN 1111:1999 "*Sanitary tapware - Thermostatic mixing valves (PN 10) - General technical specifications*". See Table 4.1 for conducted tests.

Determination of lead and cadmium has been carried out in accordance with NKB 4 "Product rules for sanitary taps for hot and cold water supply", Clause 3.3.2. See Appendix 1.

3. TEST OBJECT

The test objects are thermostatic shower/bath mixes, see Fig. 3.1-3.7 and Table 3.1

The mixers were delivered by post on 5.12.2012; they were in good condition on arrival.

Table 3.1: Controlled mixers

Mixer	Number	Figure	Aerator	Remark
Lime – 1500045	3	3.1	-	
Rain round – 1500121	3	3.2	-	
38 – 1445380	3	3.3	-	
38 – 1445383	3	3.4	Neoperl D	
Smartmix – 1445385	3	3.5	-	
Smartmix – 1445386	1	3.6	-	C/C160 version of 1445385
Wave – 20030021	3	3.7	-	Branded Westerbergs

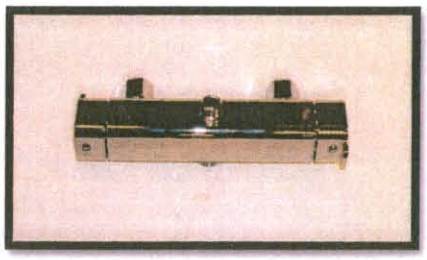


Figure 3.1: Lime – 1500045

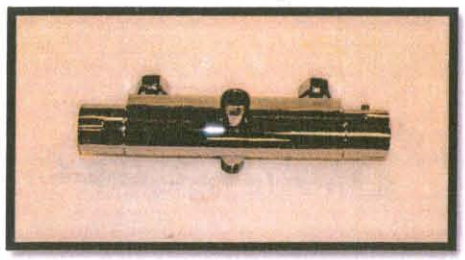


Figure 3.2: Rain round – 1500121

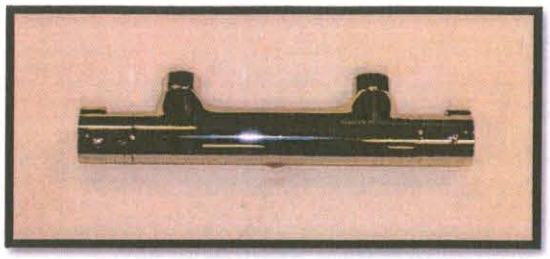


Figure 3.3: 38 – 1445380

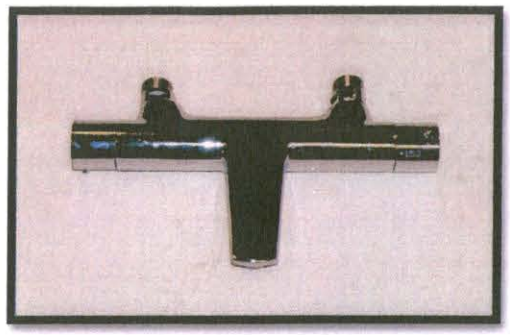


Figure 3.4: 38 – 1445383

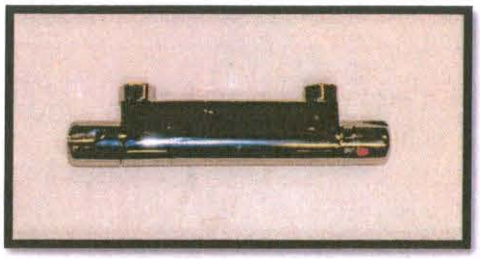


Figure 3.5: Smartmix – 1445385

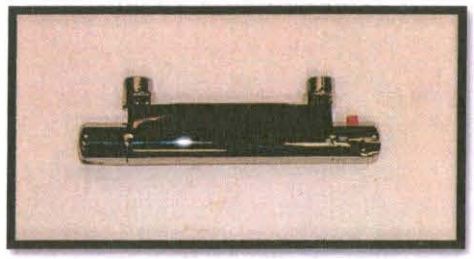


Figure 3.6: Smartmix – 1445386

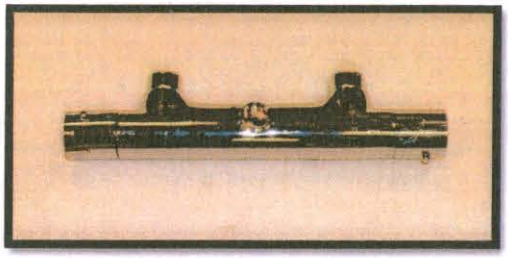


Figure 3.7: Wave – 20030021

4. TESTS, METHOD, REQUIREMENTS AND RESULTS

Table 4.1: Summary of results

Clause in NS-EN 1111	Test	Passed		Accredited test	
		Yes	No	Yes	No
6.1	Marking	x		x	
6.2	Identification	x		x	
7.1	Chemical and hygienic characteristics	x			x
9.3	Leaktightness of the mixing valve upstream of the obturator	x		x	
9.4	Leaktightness of the obturator: cross flow between hot water and cold water	x		x	
9.5	Leaktightness of the mixing valve downstream of the obturator	x		x	
9.6	Leaktightness of diverters with manual return	x		x	
9.7	Leaktightness of diverters with automatic return	-[1)]		x	
10.5	Hydraulic characteristics	x		x	
10.6	Sensitivity	x		x	
10.7	Test of safety with cold water failure	x		x	
10.8	Testing of temperature stability with varying inlet pressure	x		x	
10.9	Testing of temperature stability with varying inlet temperature	x		x	
11.3	Testing of mechanical performance of the thermostatic mixing valve upstream of the obturator in the closed position.	x		x	
11.4	Testing of mechanical performance of the thermostatic mixing valve downstream of the obturator in the open position.	x		x	
12.2	Mechanical endurance of the control device	x		x	
12.3	Mechanical endurance of diverters of thermostatic mixing valves	x		x	
12.4	Mechanical endurance of swivel nozzles	-[1)]		x	
13	Mechanical strength of control device	x		x	
14	Acoustic characteristics	x		x	

[1)] Not applicable

4.1 Marking (NS-EN 1111, Clause 6.1)

Mixer	Passed	Not passed
Lime – 1500045 [1)]	x	
Rain round – 1500121 [1)]	x	
38 – 1445380 [1)]	x	
38 – 1445383 [1)]	x	
Smartmix – 1445385 [1)]	x	
Smartmix – 1445386 [1)]	x	
Wave – 20030021 [2)]	x	

Remark: 1) The mixers are marked "HAFA"
2) The mixer is marked "Westerbergs"

4.2 Identification (NS-EN 1111, Clause 6.2)

Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	
38 – 1445383	x	
Smartmix – 1445385	x	
Smartmix – 1445386	x	
Wave – 20030021	x	

4.3 Chemical and hygienic characteristics (NS-EN 1111, Clause 7)

Method: NKB 4, Clause 3.3.2

Mixer	Passed	Not passed
Smartmix – 1445385	x	

Remark: See Appendix 1.

4.4 Leaktightness of the mixing valve upstream of the obturator (NS-EN 1111, Clause 9.3)

Method: Outlet orifice open and the obturator closed

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	1,6	x	
Rain round – 1500121	1,6	x	
38 – 1445380	1,6	x	
38 – 1445383	1,6	x	
Smartmix – 1445385	1,6	x	
Smartmix – 1445386	1,6	x	
Wave – 20030021	1,6	x	

4.5 Leaktightness of the obturator: cross flow between hot water and cold water (NS-EN 1111, Clause 9.4)

Method: Outlet orifice open and the obturator closed

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	0,4	x	
Rain round – 1500121	0,4	x	
38 – 1445380	0,4	x	
38 – 1445383	0,4	x	
Smartmix – 1445385	0,4	x	
Smartmix – 1445386	0,4	x	
Wave – 20030021	0,4	x	

4.6 Leaktightness of the mixing valve downstream of the obturator (NS-EN 1111, Clause 9.5)

Method: Outlet orifice closed and the obturator open

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	0,4	x	
Rain round – 1500121	0,4	x	
38 – 1445380	0,4	x	
38 – 1445383	0,4	x	
Smartmix – 1445385	0,4	x	
Smartmix – 1445386	0,4	x	
Wave – 20030021	0,4	x	

4.7 Leaktightness of diverters with manual return (NS-EN 1111, Clause 9.6)

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	0,4	x	
Rain round – 1500121	0,4	x	
38 – 1445383	0,4	x	

Remark: The diverter is the closing mechanism

4.8 Leaktightness of diverters with automatic return (NS-EN 1111, Clause 9.7)

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
	0,4		

Remark: Not applicable.

4.9 Hydraulic characteristics (NS-EN 1111, Clause 10.5)

Lime – 1500045 Down [1]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,20	x	
34 °C	0,20	x	
38 °C	0,20	x	
42 °C	0,20	x	
Fully open hot water	0,20	x	

Lime – 1500045 Up [2]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,21	x	
34 °C	0,22	x	
38 °C	0,22	x	
42 °C	0,22	x	
Fully open hot water	0,20	x	

Rain round – 1500121 Down/up [1]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,20	x	
34 °C	0,20	x	
38 °C	0,20	x	
42 °C	0,20	x	
Fully open hot water	0,20	x	

38 – 1445380 [2]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,21	x	
34 °C	0,23	x	
38 °C	0,23	x	
42 °C	0,23	x	
Fully open hot water	0,21	x	

38 – 1445383 Shower outlet [2]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,20	x	
34 °C	0,21	x	
38 °C	0,21	x	
42 °C	0,20	x	
Fully open hot water	0,20	x	

38 – 1445383 Bath outlet [3]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,27	x	
34 °C	0,30	x	
38 °C	0,30	x	
42 °C	0,30	x	
Fully open hot water	0,25	x	

Smartmix – 1445385 [2]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,20	x	
34 °C	0,22	x	
38 °C	0,22	x	
42 °C	0,22	x	
Fully open hot water	0,20	x	

Wave – 20030021 Down/up [2]	Flow rate (l/s)	Result	
	0,3 MPa	Passed	Not passed
Fully open cold water	0,21	x	
34 °C	0,22	x	
38 °C	0,22	x	
42 °C	0,22	x	
Fully open hot water	0,20	x	

The flow rate measured at 0,3 MPa shall be at least 0,20 l/s from fully open cold water to fully open hot water for shower outlets.
The flow rate measured at 0,3 MPa shall be at least 0,30 l/s from 34 °C to 42 °C for bath outlets.

[1] Hydraulic resistance Class A in accordance with NS-EN 1111, Clause 14.3.3.
[2] Hydraulic resistance Class S in accordance with NS-EN 1111, Clause 14.3.3.
[3] Hydraulic resistance Class D in accordance with NS-EN 1111, Clause 14.3.3.

4.10 Test of sensitivity (NS-EN 1111, Clause 10.6)

Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	
Smartmix – 1445385	x	

Remark: See Appendix 3.

4.11 Test of safety with cold water failure (NS-EN 1111, Clause 10.7)

Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	
Smartmix – 1445385	x	

Remark: See Appendix 2.

4.12 Testing of temperature stability with varying inlet pressure (NS-EN 1111, Clause 10.8)

Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	
Smartmix – 1445385	x	

Remark: See Appendix 2.

4.13 Testing of temperature stabiltity with varying inlet temperature (NS-EN 1111, Clause 10.9)

Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	
Smartmix – 1445385	x	

Remark: See Appendix 2.

4.14 Testing of mechanical performance of the thermostatic mixing valve downstream of the obturator in the closed position (NS-EN 1111, Clause 11.3)

Method: Outlet orifice open and the obturator closed

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	2,5	x	
Rain round – 1500121	2,5	x	
38 – 1445380	2,5	x	
Smartmix – 1445385	2,5	x	

4.15 Testing of mechanical performance of the thermostatic mixing valve downstream of the obturator in the open position (NS-EN 1111, Clause 11.4)

Method: Outlet orifice open and the obturator open

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
Lime – 1500045	0,4	x	
Rain round – 1500121	0,4	x	
38 – 1445380	0,4	x	
38 – 1445383	0,4	x	
Smartmix – 1445385	0,4	x	
Wave – 20030021	0,4	x	

4.16 Mechanical endurance of the control device (NS-EN 1111, Clause 12.2)

Method: Subjecting the control device to a specific number of movements

Mixer	Movements	Result	
		Passed	Not passed
Lime – 1500045	50 000	x	
Rain round – 1500121	50 000	x	
38 – 1445380	50 000	x	

4.17 Mechanical endurance of diverters of thermostatic mixing valves (NS-EN 1111, Clause 12.3)

Method: Subjecting the diverter to a specific number of movements

Mixer	Movements	Result	
		Passed	Not passed
Lime – 1500045	30 000	x	
Rain round – 1500121	30 000	x	
38 – 1445383	30 000	x	

4.18 Mechanical endurance of swivel nozzles (NS-EN 1111, Clause 12.4)

Method: Subjecting the swivel nozzle to a specific number of movements

Mixer	Movements	Result	
		Passed	Not passed
	80 000		

Remark: Not applicable.

4.19 Mechanical strength of control device (NS-EN 1111, Clause 13)

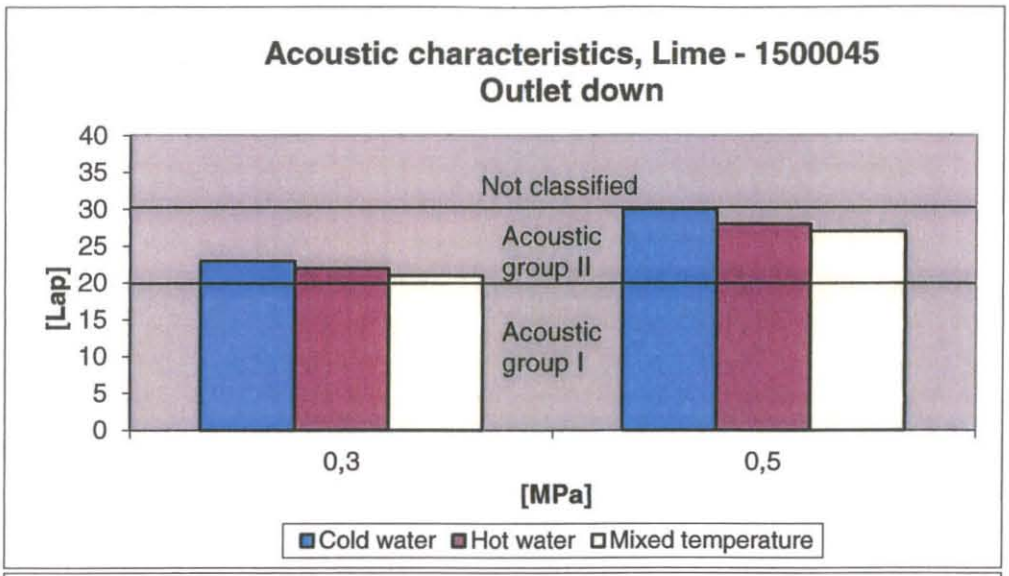
Mixer	Passed	Not passed
Lime – 1500045	x	
Rain round – 1500121	x	
38 – 1445380	x	

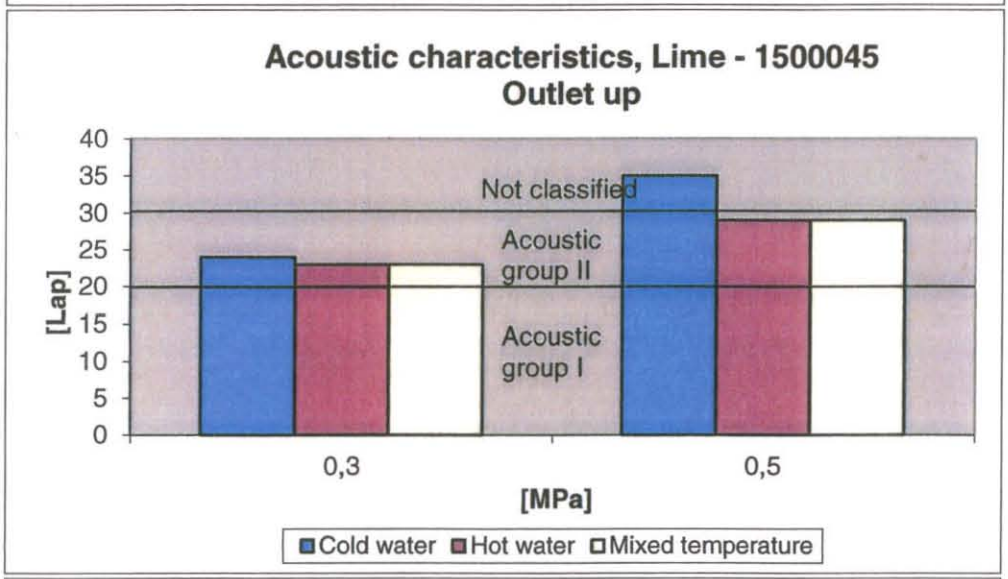
4.20 Acoustic characteristics (NS-EN 1111, Clause 14)

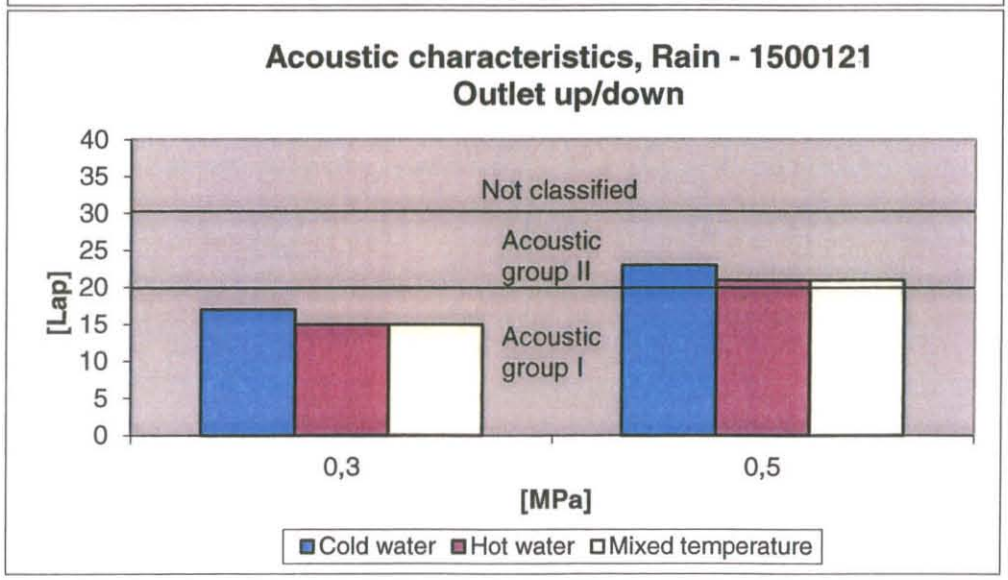
Method: EN ISO 3822

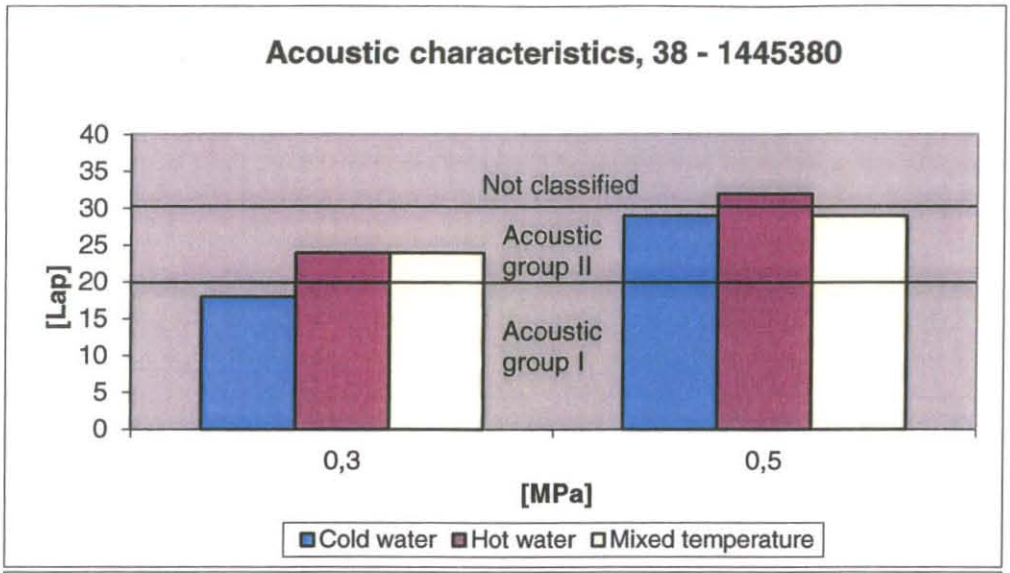
Mixer	Acoustic group			0,3 MPa			0,5 MPa		
				Cold	Hot	Mixed	Cold	Hot	Mixed
Lime – 1500045 [1] Down	II	Fully open	L_{ap}	17	17	18	23	20	21
			l/s	0,20	0,20	0,20	0,25	0,25	0,25
		Max sound pressure	L_{ap}	23	22	21	30	28	27
			l/s	0,13	0,06	0,06	0,16	0,12	0,12
Lime – 1500045 [2] Up	II	Fully open	L_{ap}	19	18	18	30	25	25
			l/s	0,22	0,22	0,22	0,29	0,29	0,28
		Max sound pressure	L_{ap}	24	23	23	35	29	29
			l/s	0,08	0,12	0,13	0,14	0,14	0,14
Rain round – 1500121 [1] Down/up	I	Fully open	L_{ap}	17	15	15	23	21	21
			l/s	0,20	0,20	0,20	0,25	0,25	0,25
		Max sound pressure	L_{ap}	17	15	15	23	21	21
			l/s	0,20	0,20	0,20	0,25	0,25	0,25
38 – 1445380 [2]	II	Fully open	L_{ap}	14	20	20	20	25	24
			l/s	0,21	0,21	0,23	0,27	0,27	0,27
		Max sound pressure	L_{ap}	18	24	24	29	32	29
			l/s	0,16	0,16	0,16	0,14	0,14	0,14
38 – 1445383 [2] Shower	II	Fully open	L_{ap}	22	22	22	33	32	33
			l/s	0,22	0,22	0,22	0,28	0,28	0,28
		Max sound pressure	L_{ap}	29	29	29	39	39	38
			l/s	0,15	0,15	0,15	0,23	0,23	0,23
38 – 1445383 [3] Bath	U	Fully open	L_{ap}	25	24	24	38	37	38
			l/s	0,27	0,26	0,28	0,35	0,35	0,35
		Max sound pressure	L_{ap}	37	38	37	43	42	42
			l/s	0,20	0,20	0,20	0,24	0,24	0,24
Smartmix – 1445385 [2]	II	Fully open	L_{ap}	18	19	19	24	25	25
			l/s	0,20	0,20	0,20	0,26	0,26	0,26
		Max sound pressure	L_{ap}	22	26	26	30	31	31
			l/s	0,13	0,13	0,13	0,18	0,18	0,18
Wave – 20030021 [2] down/up	II	Fully open	L_{ap}	20	21	21	34	27	27
			l/s	0,21	0,21	0,20	0,27	0,27	0,26
		Max sound pressure	L_{ap}	28	28	28	35	31	31
			l/s	0,15	0,14	0,15	0,24	0,24	0,24

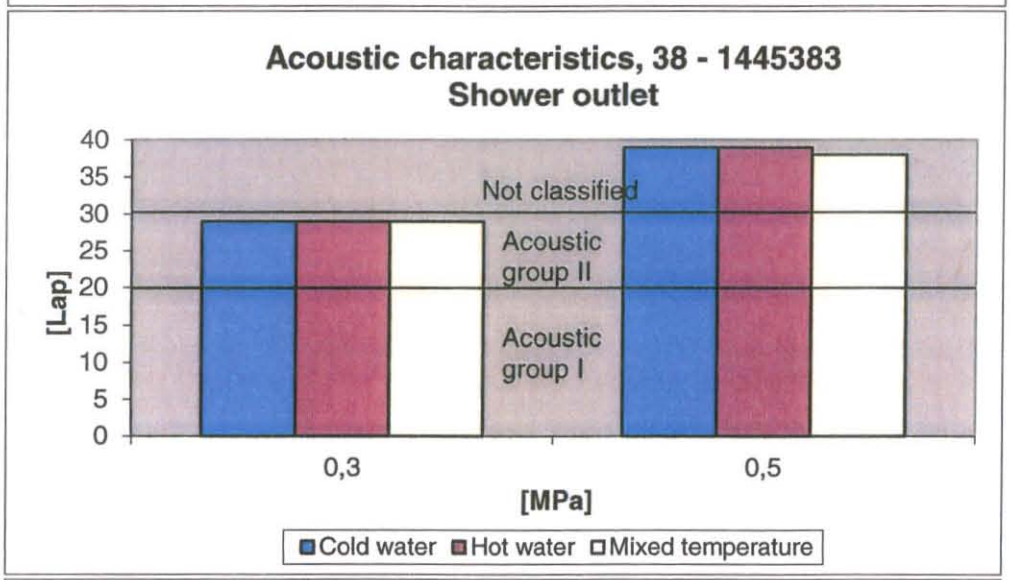
[1] Hydraulic resistance Class A in accordance with NS-EN 1111, Clause 14.3.3.
[2] Hydraulic resistance Class S in accordance with NS-EN 1111, Clause 14.3.3.
[3] Hydraulic resistance Class D in accordance with NS-EN 1111, Clause 14.3.3.

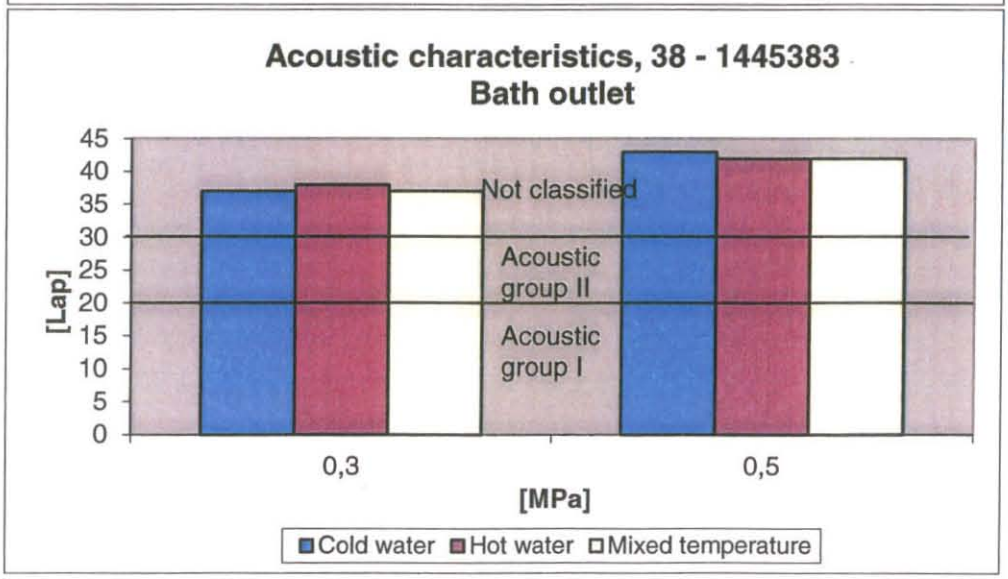

Acoustic characteristics, Lime - 1500045
Outlet down
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
Acoustic group II
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature


Acoustic characteristics, Lime - 1500045
Outlet up
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
Acoustic group II
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature


Acoustic characteristics, Rain - 1500121
Outlet up/down
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
Acoustic group II
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature


Acoustic characteristics, 38 - 1445380
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
Acoustic group II
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature


Acoustic characteristics, 38 - 1445383
Shower outlet
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
Acoustic group II
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature


Acoustic characteristics, 38 - 1445383
Bath outlet
45
40
35
30
25
20
15
10
5
0
[Lap]
Not classified
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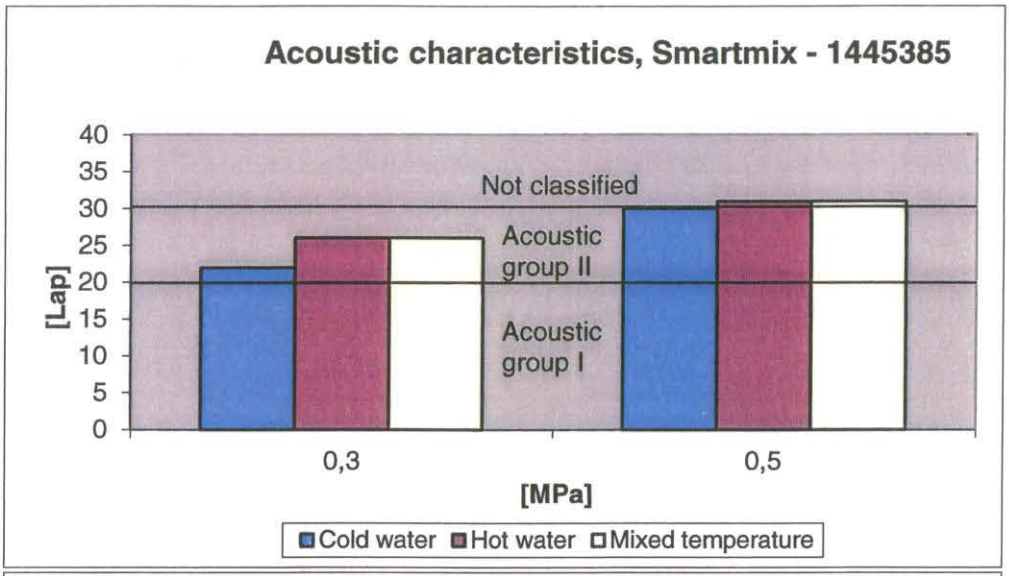
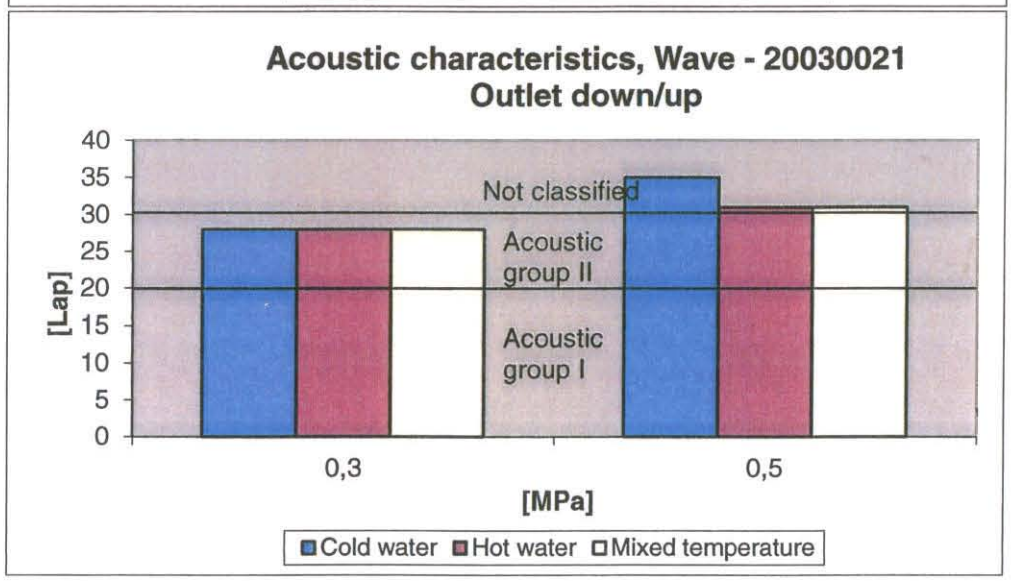
Acoustic group I
0,3
0,5
[MPa]
Cold water
Hot water
Mixed temperature





Oslo, 06.02.2012
SINTEF Building and Infrastructure

Geir Lippe Stavnes

SINTEF

Appendix 1

SINTEF Building and Infrastructure

REPORT

DETERMINATION OF LEAD AND CADMIUM IN SYNTHETIC SUPPLY WATER

Project no. :	3B061904	Date:	6.2.2012

Test method:	Determination of the leaching content of lead and cadmium in synthetic supply water according to the Norwegian Standard NS 3834 / NKB 4

Exposure conditions:	pH in test solution;	7.0
	Temperature (^{O}C);	22.0

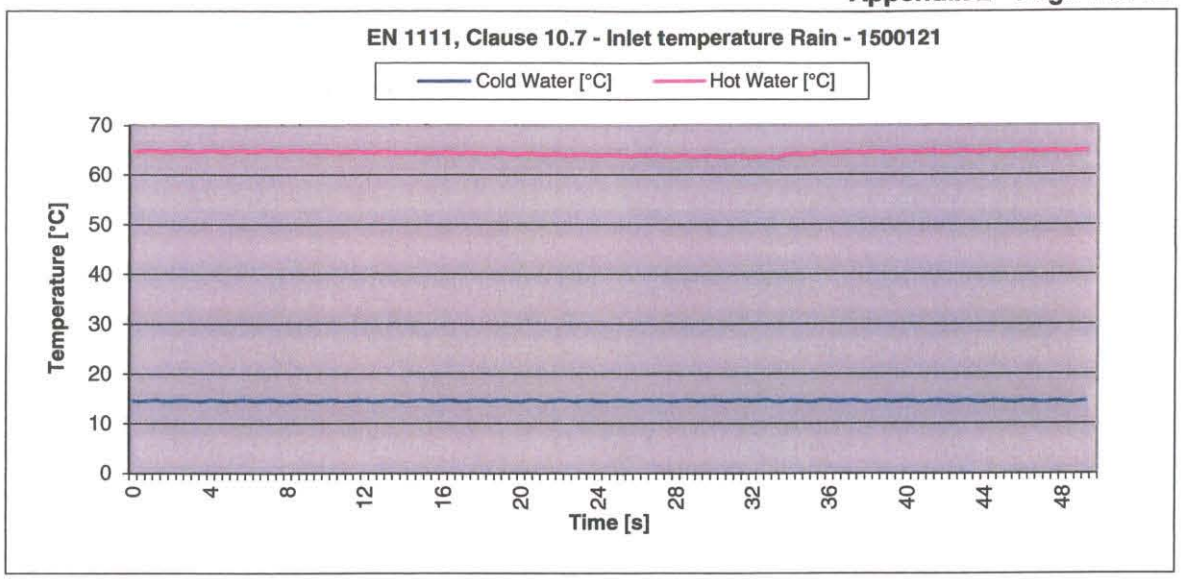
Sample name:	Hafa - 1445385
Number of samples:	1
Performed by:	GLS
Note:	Shower mixer

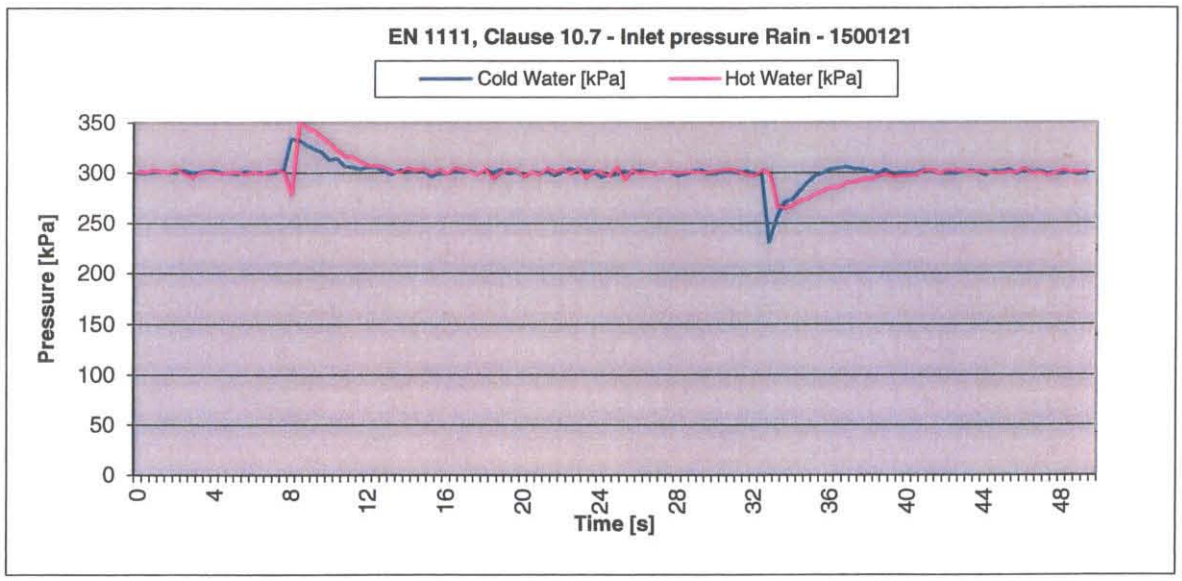
Criteria:	Cd (µg)	Pb (µg)
	< 2	< 200

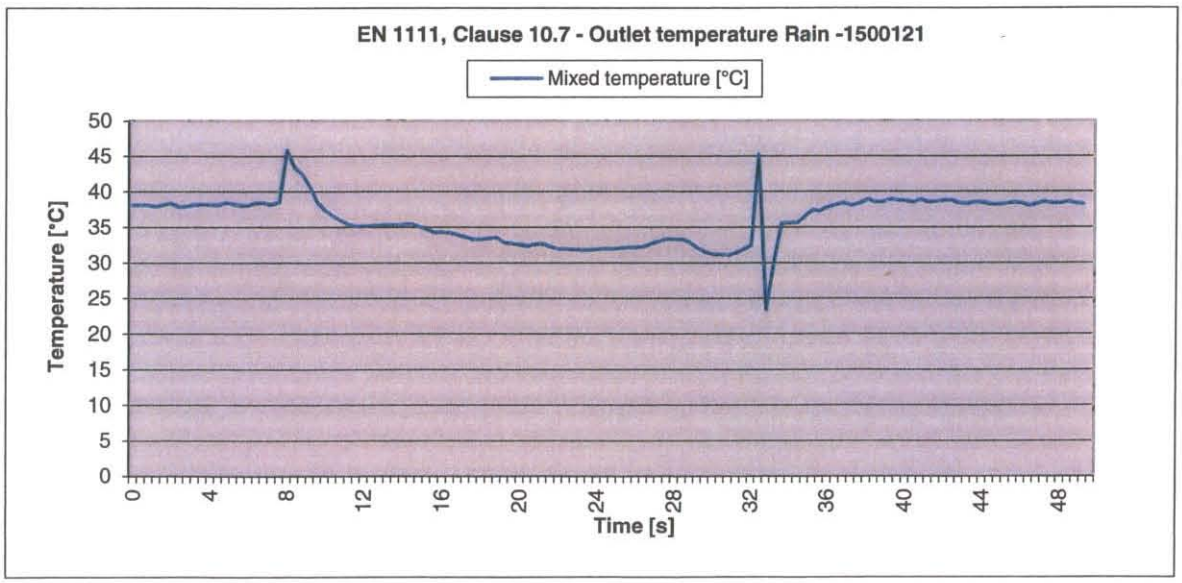
Results:		Concentration (µg/L)[1)]		Volume (mL)	Total amount (µg)	
		Cd	Pb		Cd	Pb
Hafa - 1445385	Day 9	< 1	140	58.2	< 0.06	8.15
	Day 10	< 1	130	58.2	< 0.06	7.57
Reference water	Day 9	< 1	< 5			
	Day 10	< 1	< 5			

[1)] Measurement uncertainty of the analyses, Cd = 10 % and Pb = 15 %

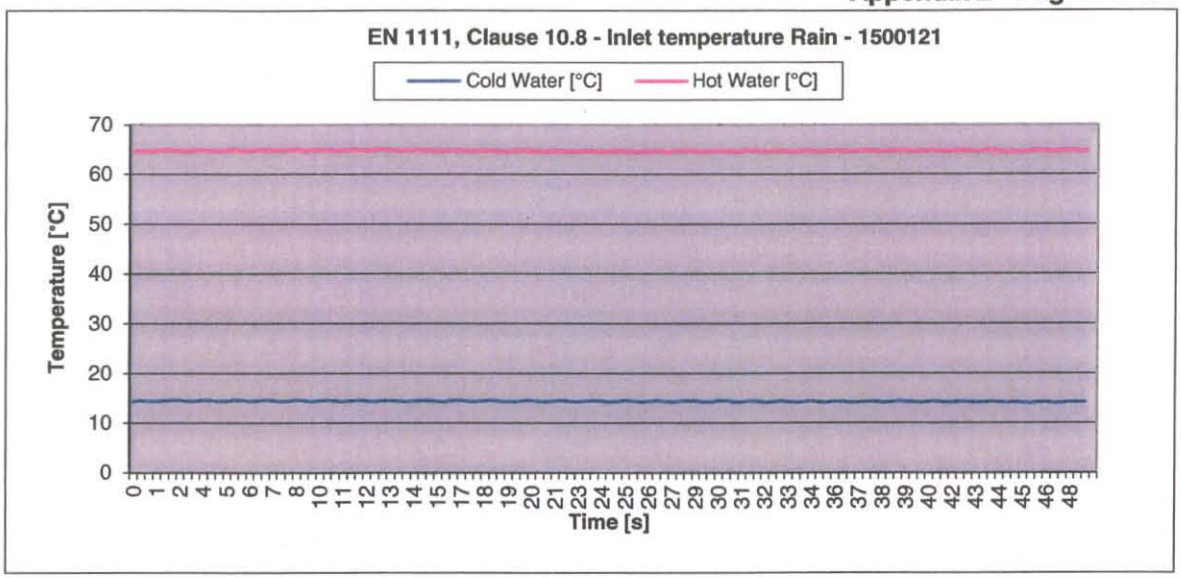
Date:	6.2.2012	Signature:	Monica N. Malmedal Monica Nodland Malmedal

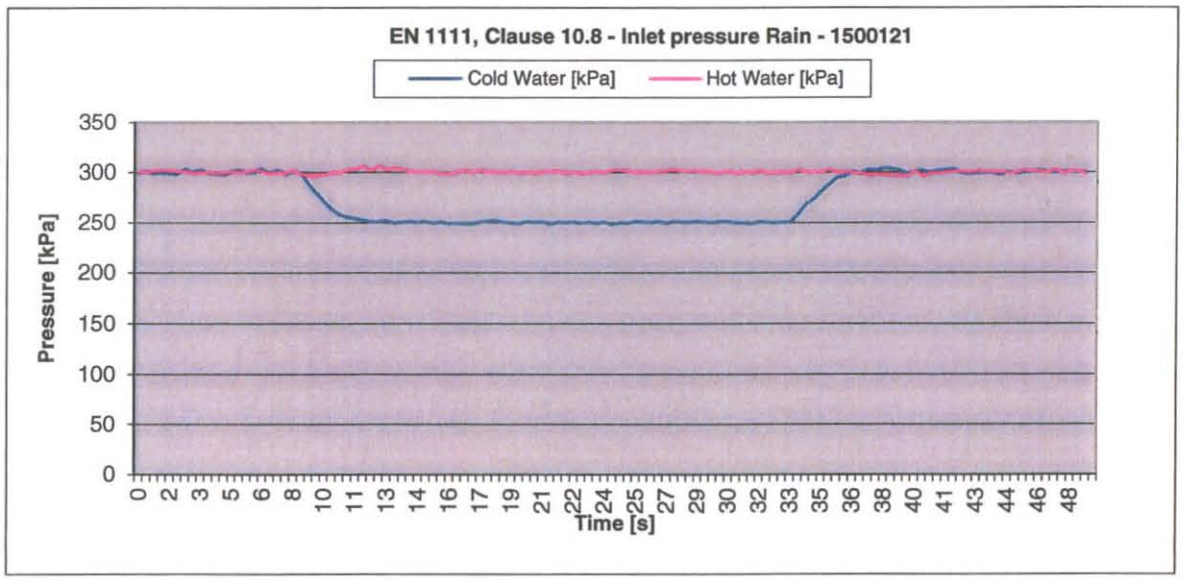


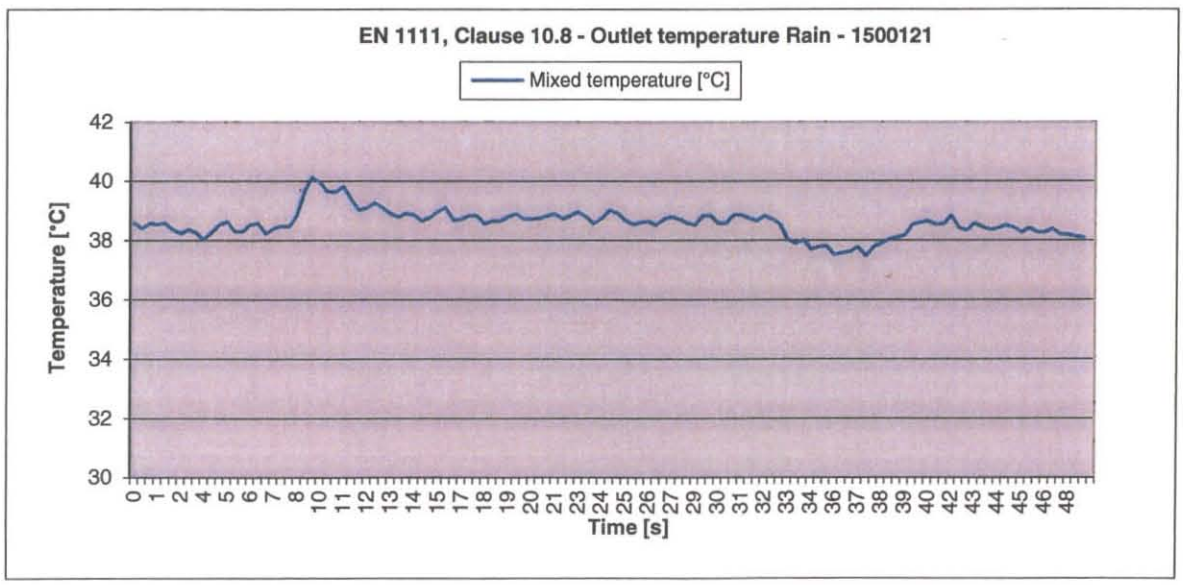


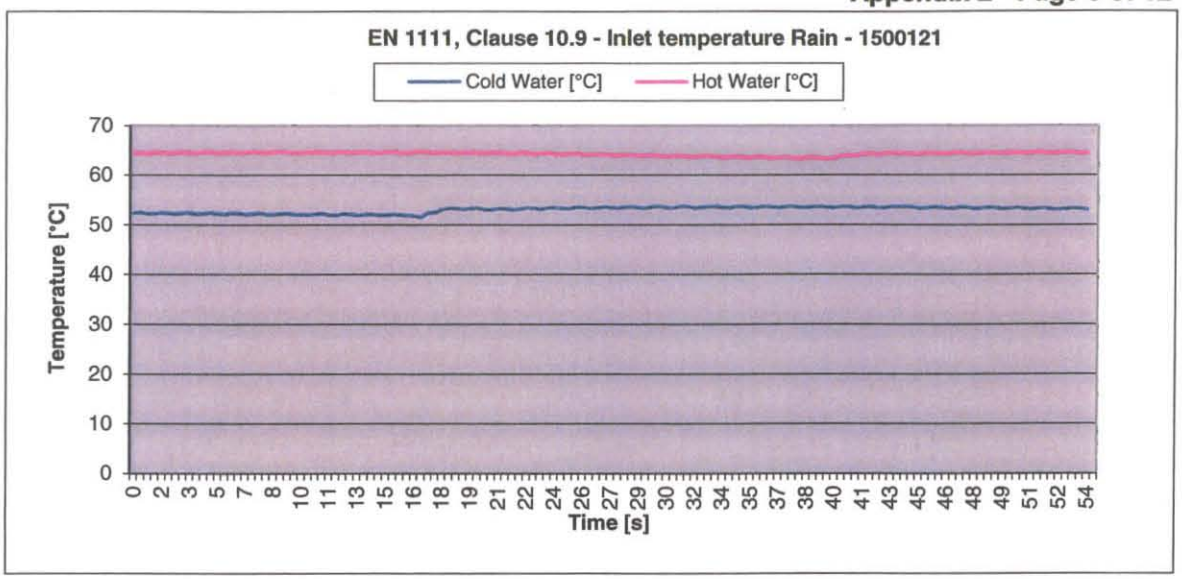


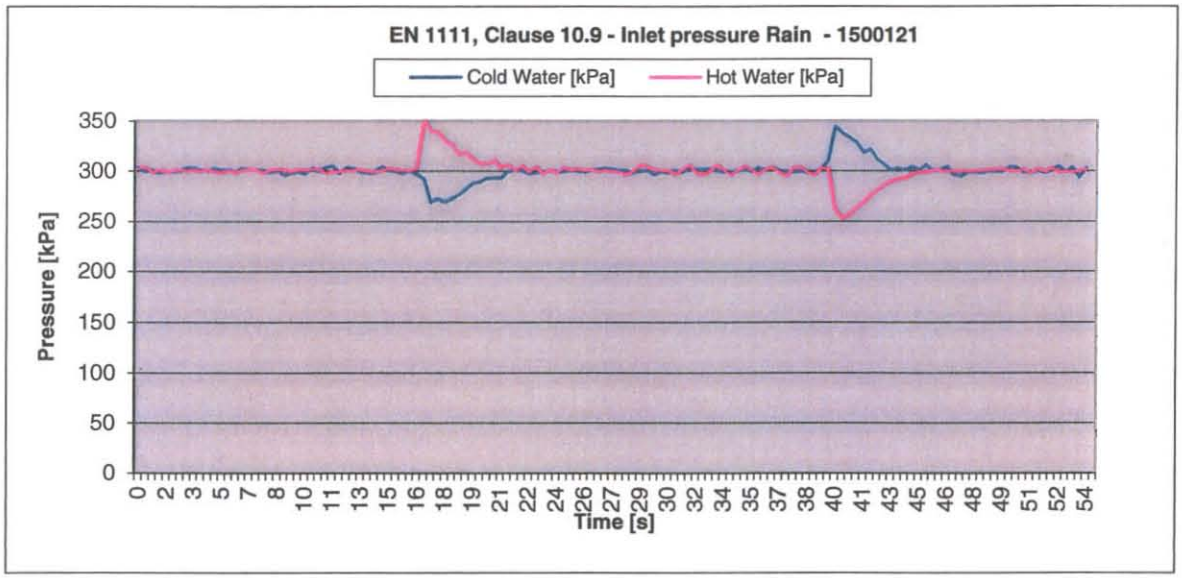
Water volume after 5 seconds: 20 ml. Water volume the next 30 seconds: 20 ml.

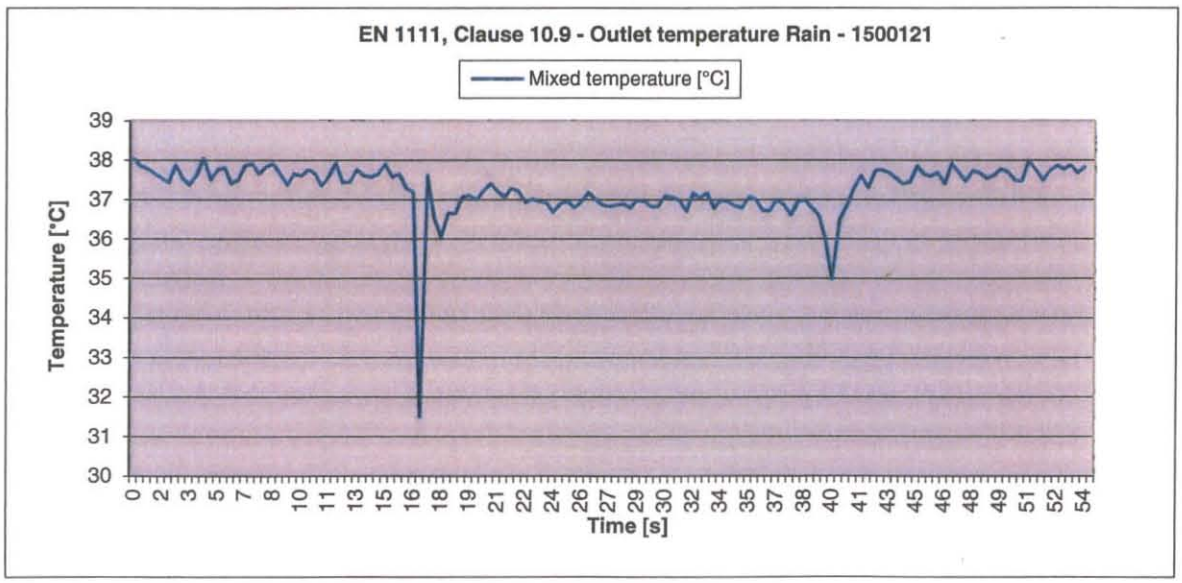

EN 1111, Clause 10.8 - Inlet temperature Rain - 1500121
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]

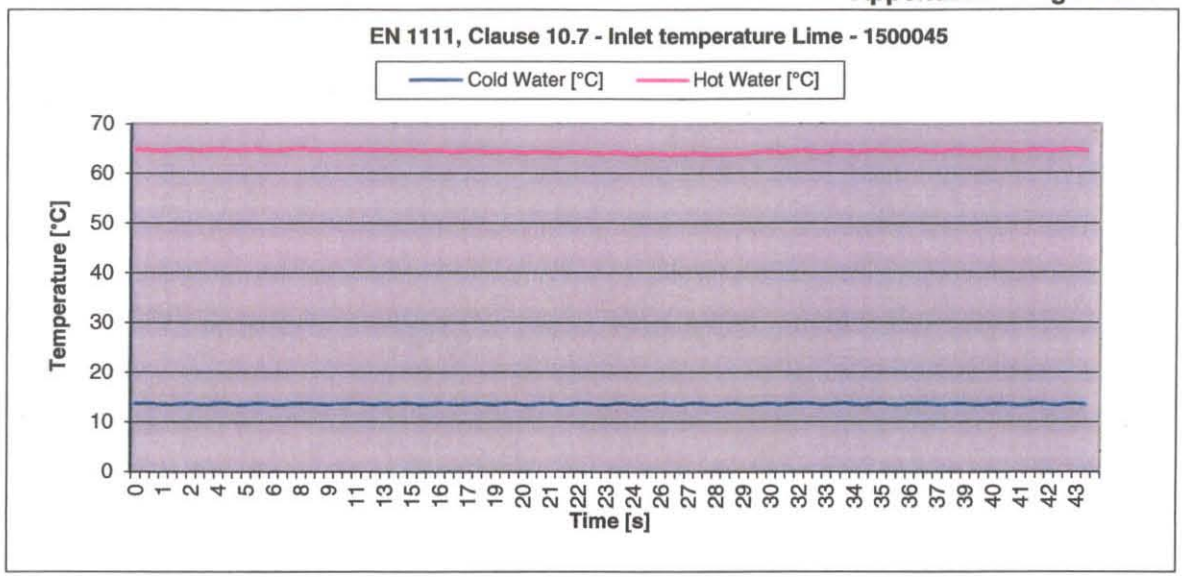

EN 1111, Clause 10.8 - Inlet pressure Rain - 1500121
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

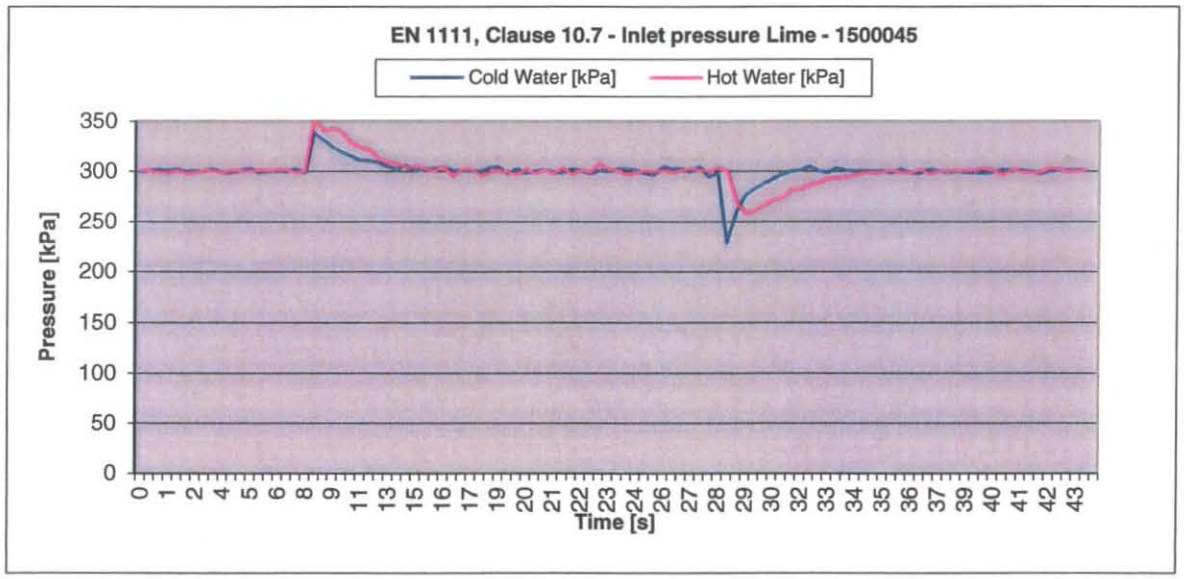

EN 1111, Clause 10.8 - Outlet temperature Rain - 1500121
Mixed temperature [°C]
Temperature [°C]
Time [s]

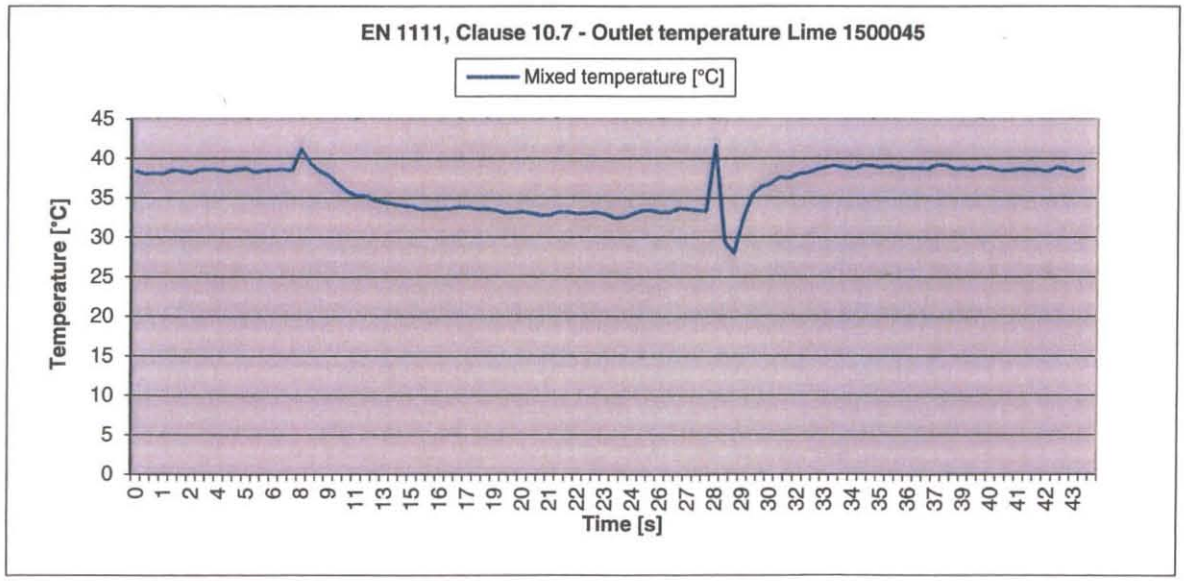

EN 1111, Clause 10.9 - Inlet temperature Rain - 1500121
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]


EN 1111, Clause 10.9 - Inlet pressure Rain - 1500121
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

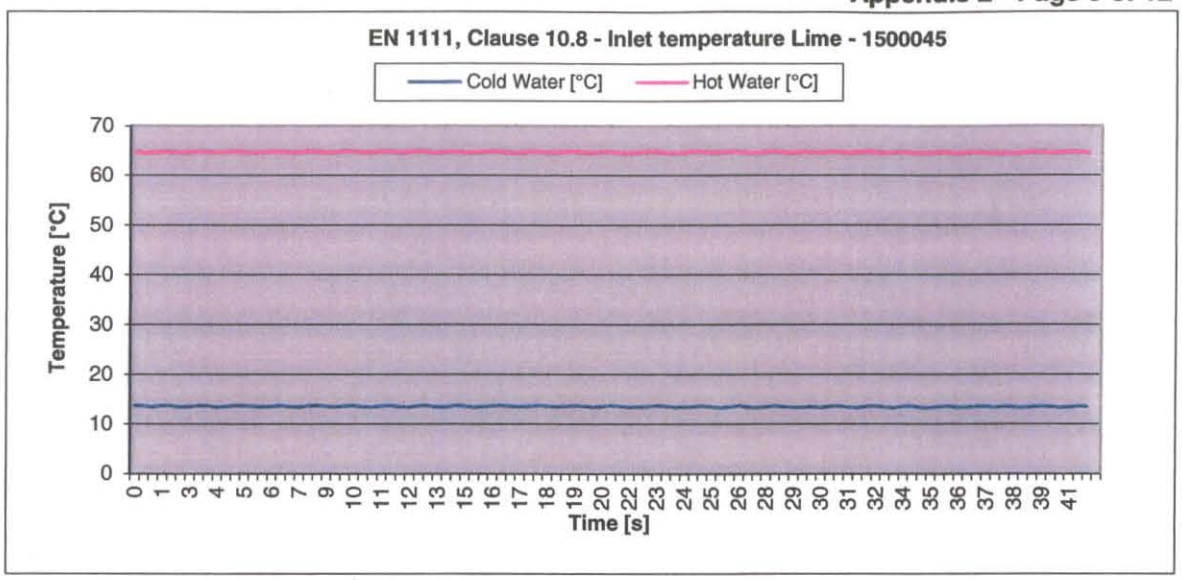

EN 1111, Clause 10.9 - Outlet temperature Rain - 1500121
Mixed temperature [°C]
Temperature [°C]
Time [s]

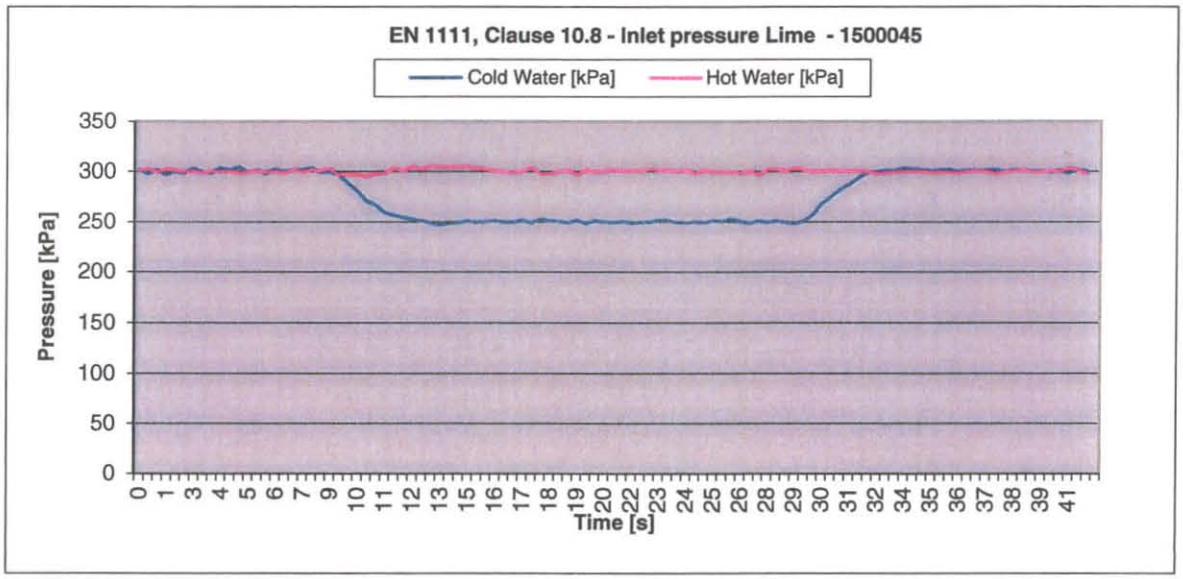


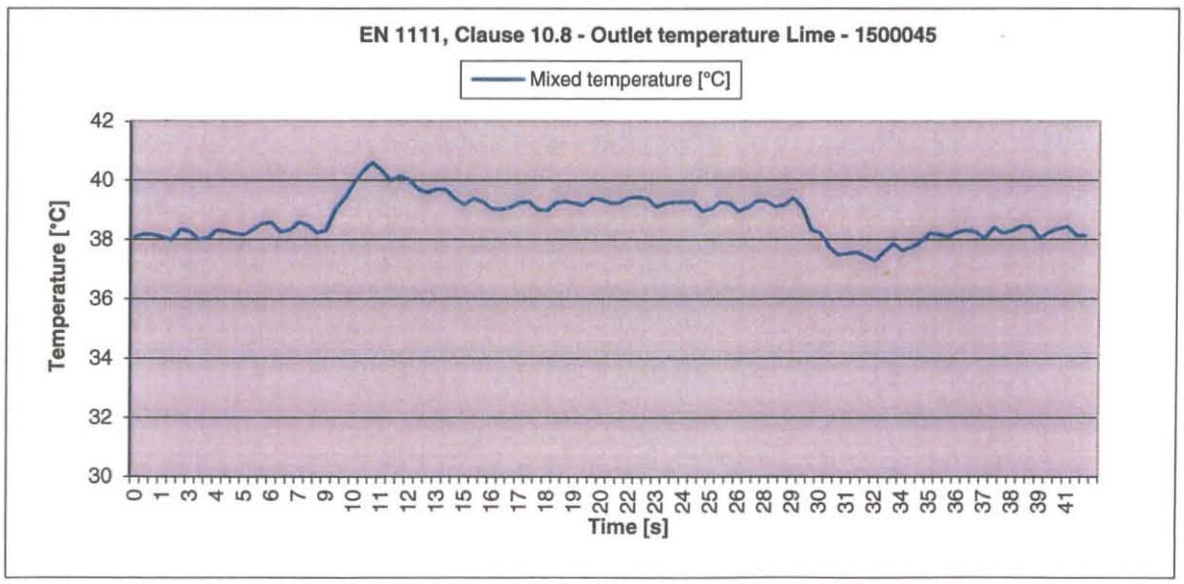


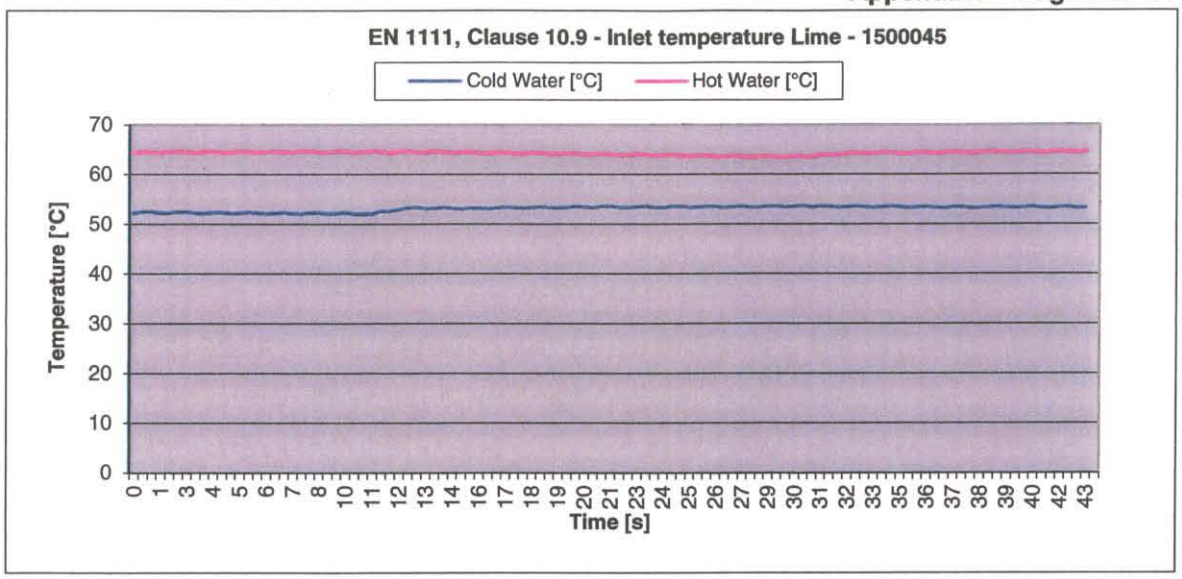


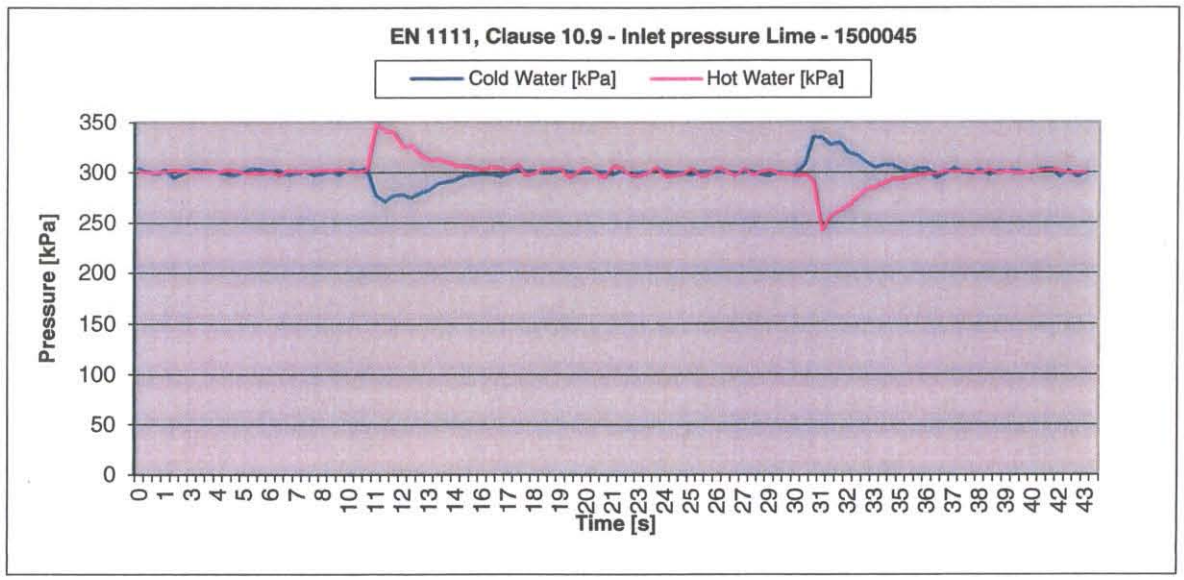
Water volume after 5 seconds: 20 ml. Water volume the next 30 seconds: 15 ml.

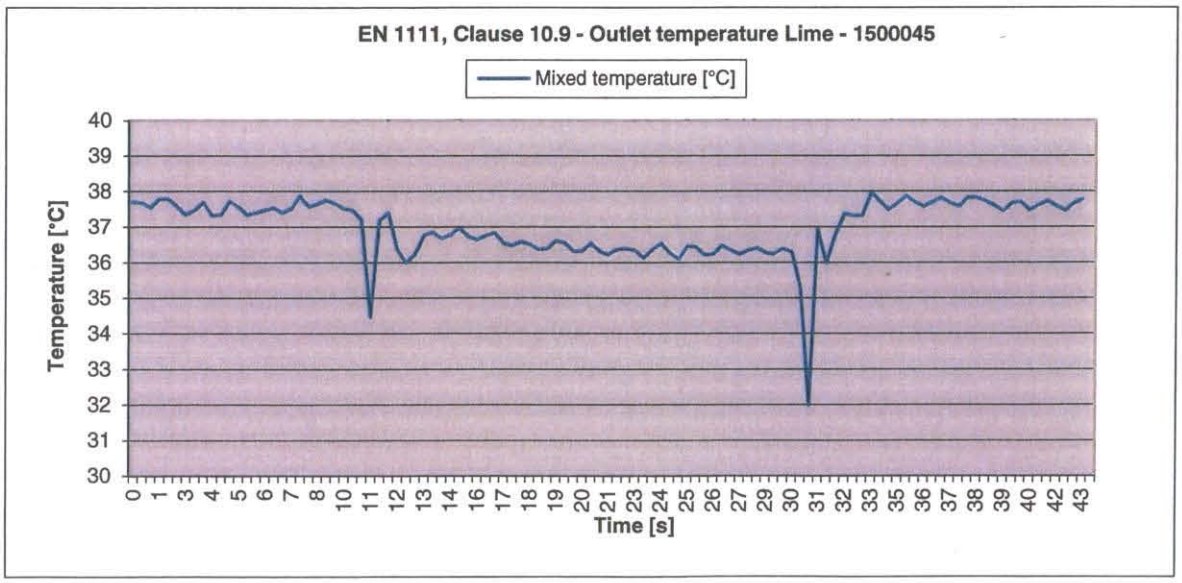

EN 1111, Clause 10.8 - Inlet temperature Lime - 1500045
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]

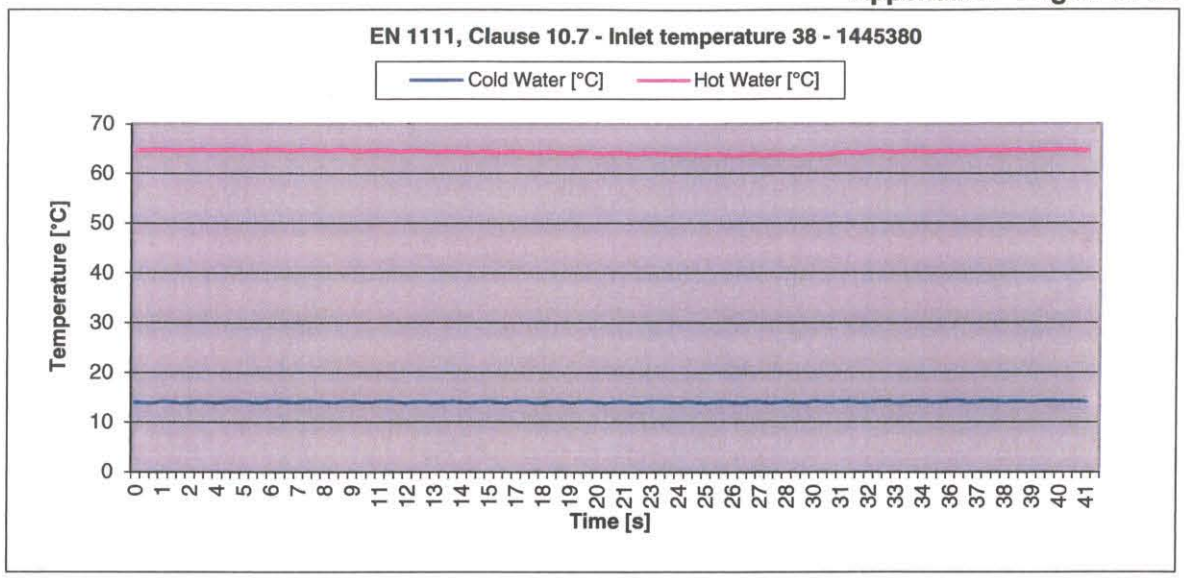

EN 1111, Clause 10.8 - Inlet pressure Lime - 1500045
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

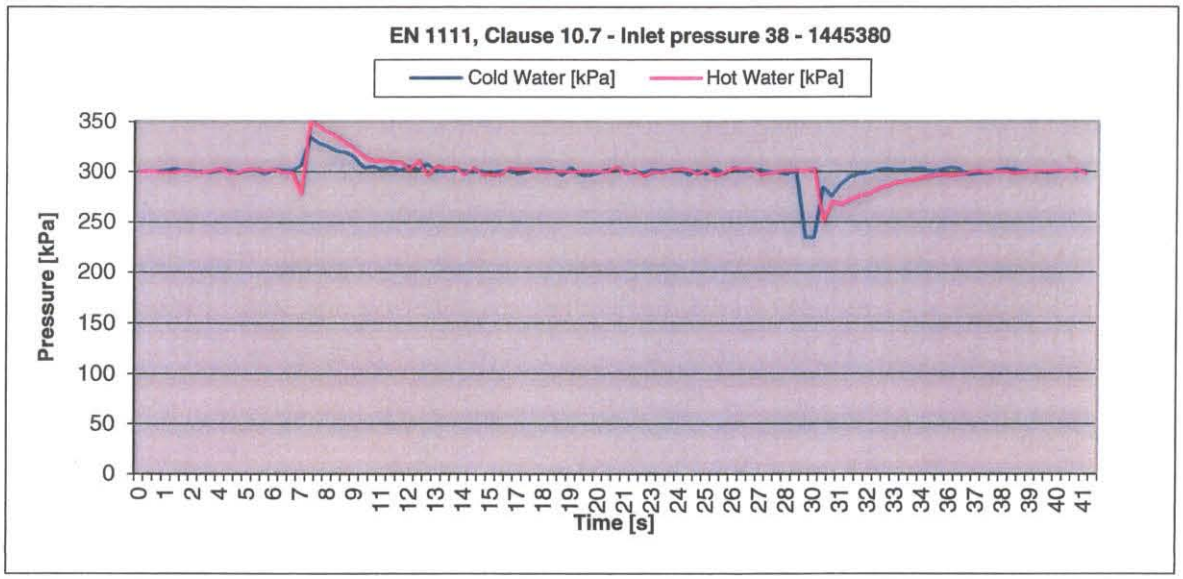

EN 1111, Clause 10.8 - Outlet temperature Lime - 1500045
Mixed temperature [°C]
Temperature [°C]
Time [s]

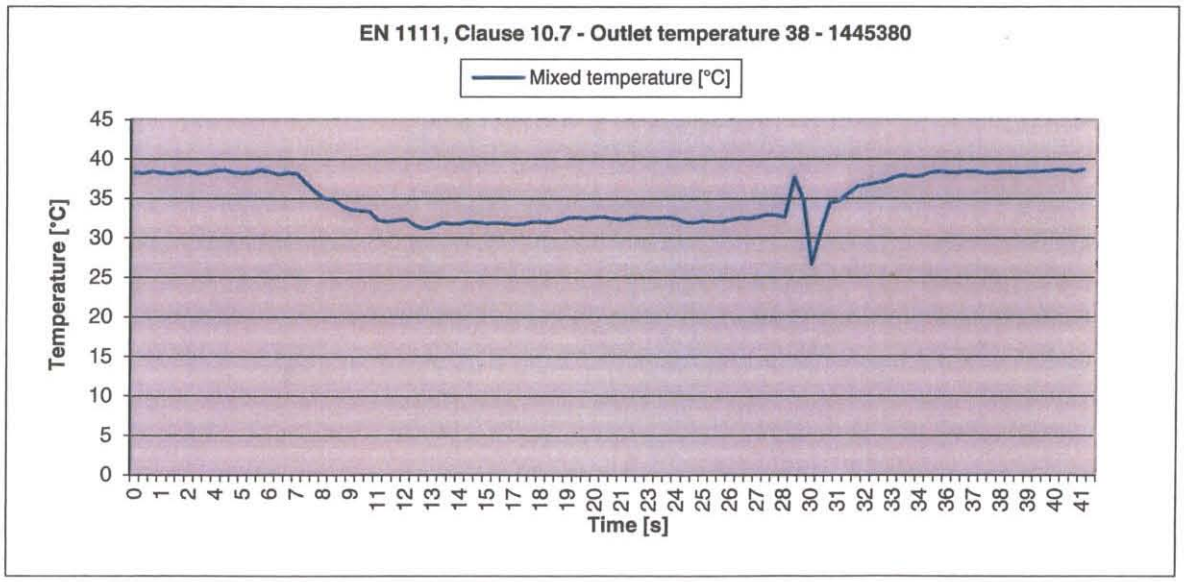

EN 1111, Clause 10.9 - Inlet temperature Lime - 1500045
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]


EN 1111, Clause 10.9 - Inlet pressure Lime - 1500045
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

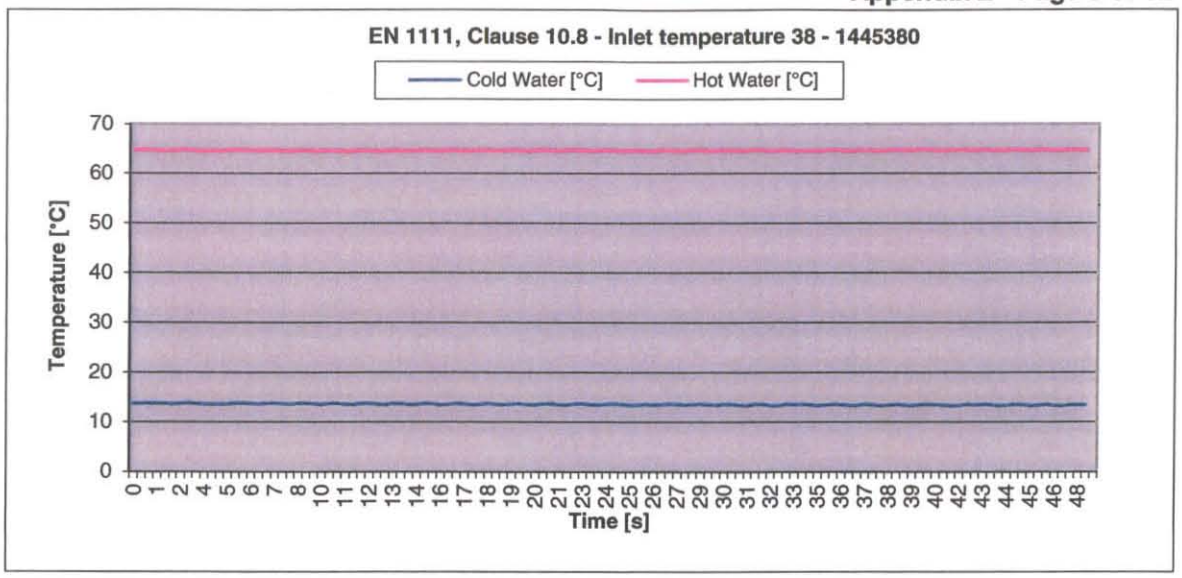

EN 1111, Clause 10.9 - Outlet temperature Lime - 1500045
Mixed temperature [°C]
Temperature [°C]
Time [s]

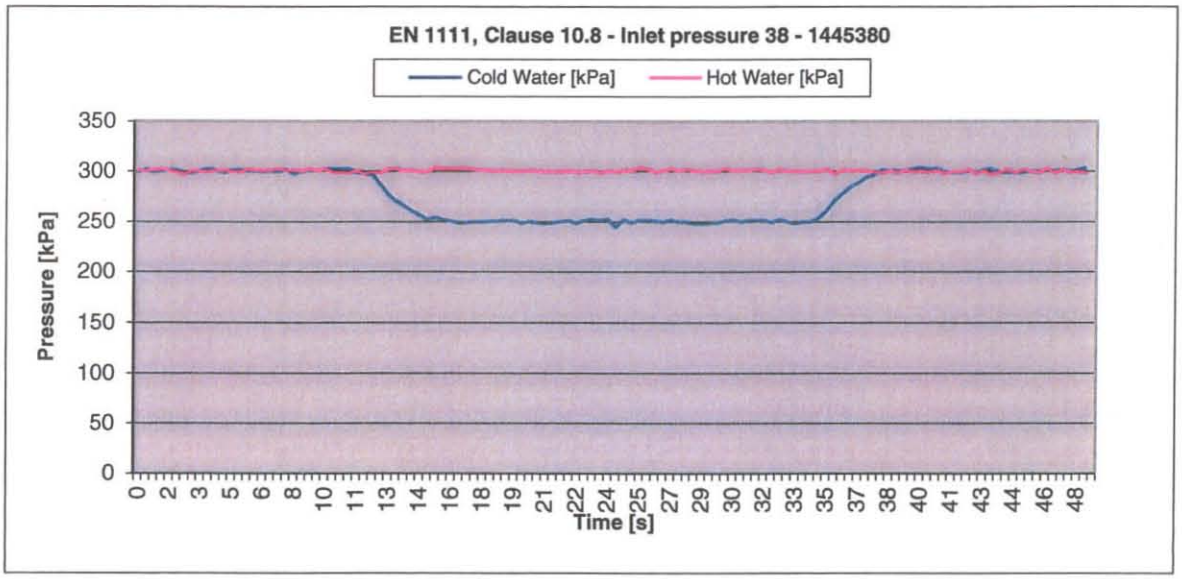


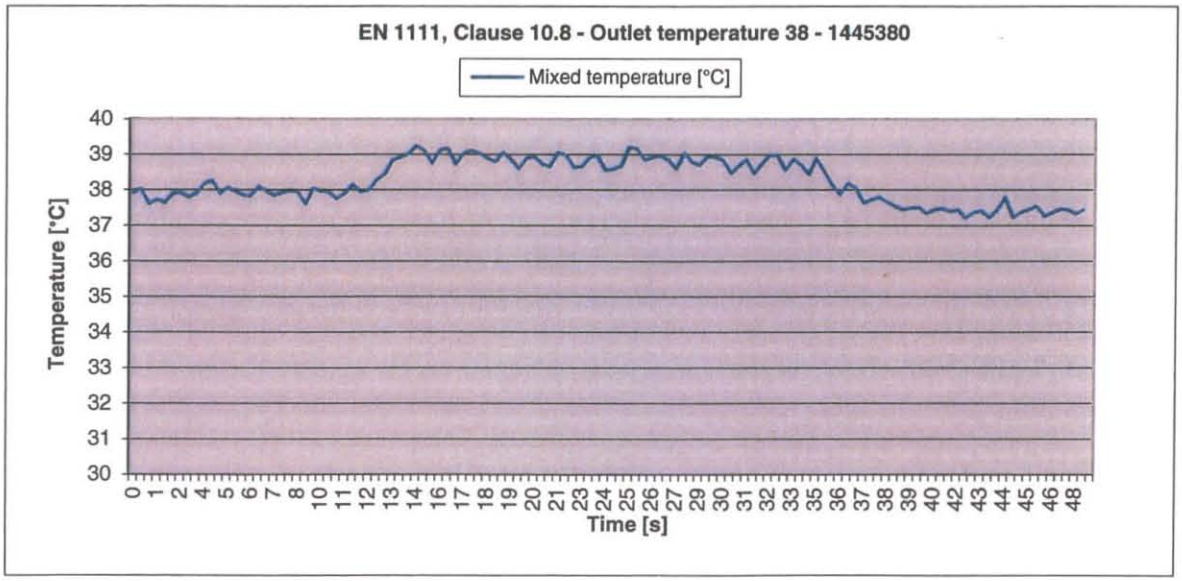


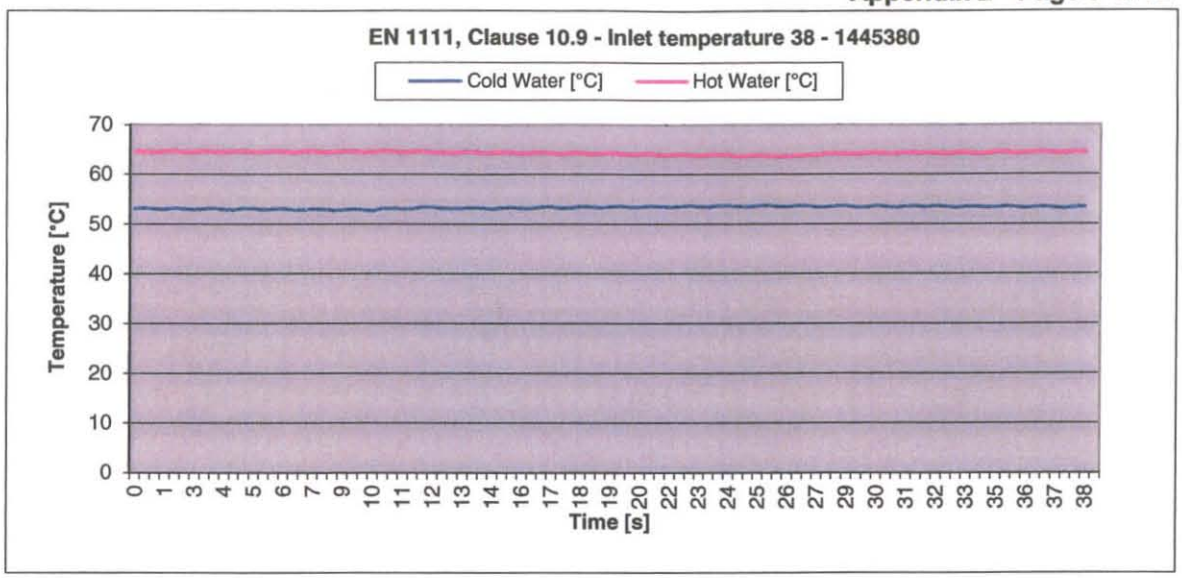


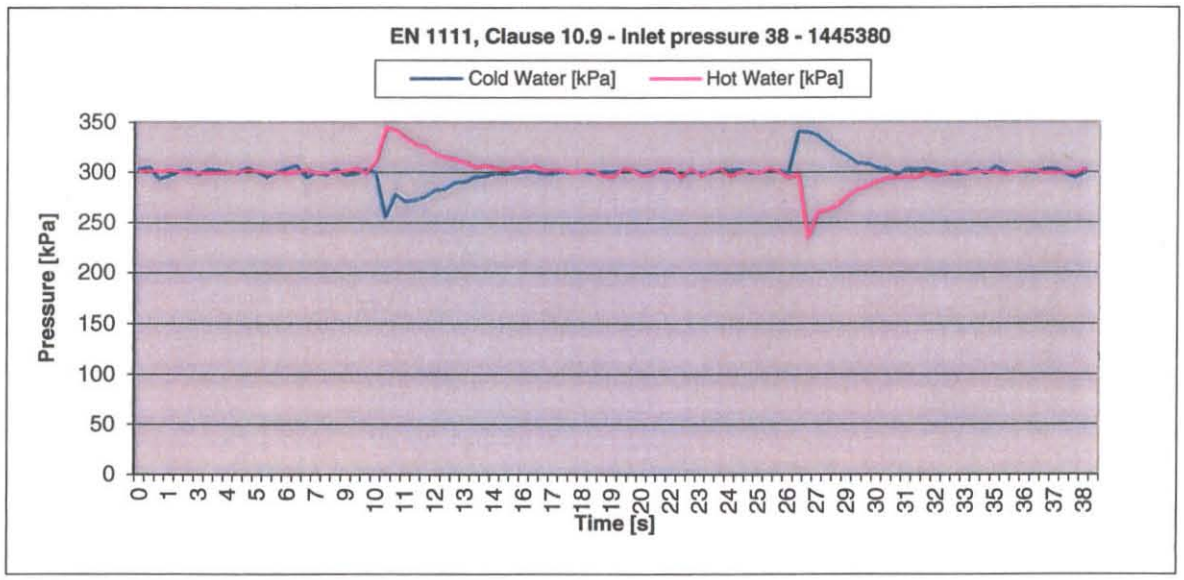
Water volume after 5 seconds: 10 ml. Water volume the next 30 seconds: 10 ml.

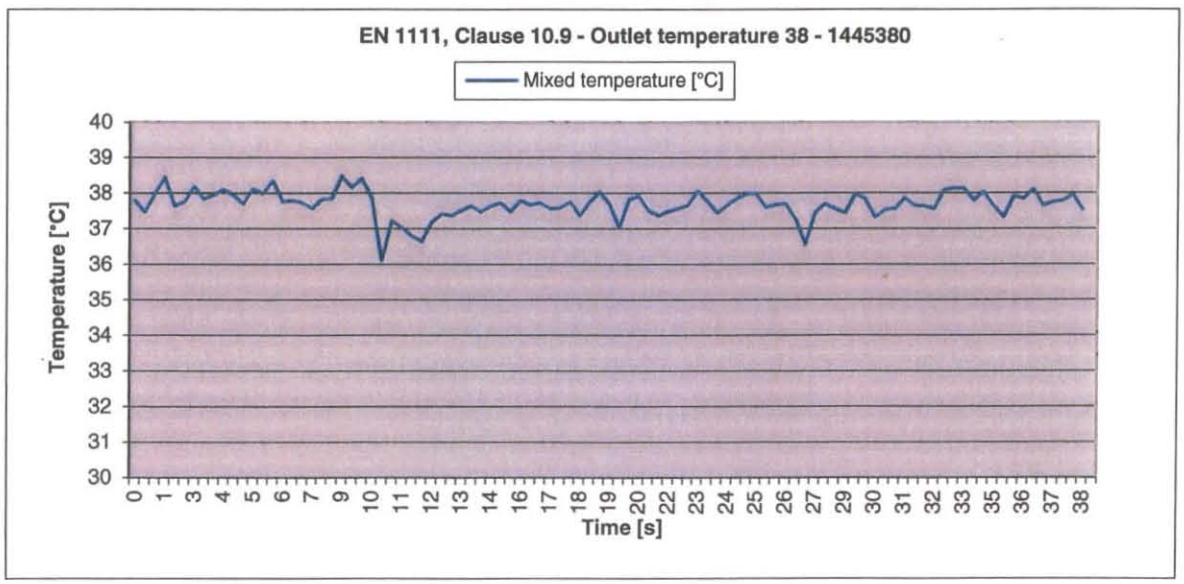

EN 1111, Clause 10.8 - Inlet temperature 38 - 1445380
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]

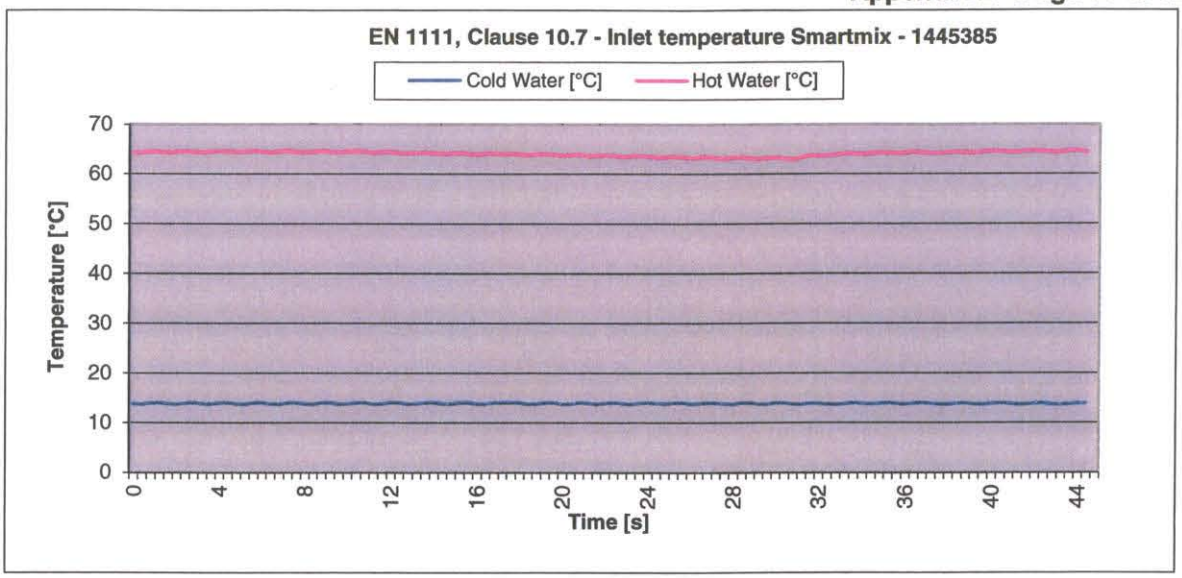

EN 1111, Clause 10.8 - Inlet pressure 38 - 1445380
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

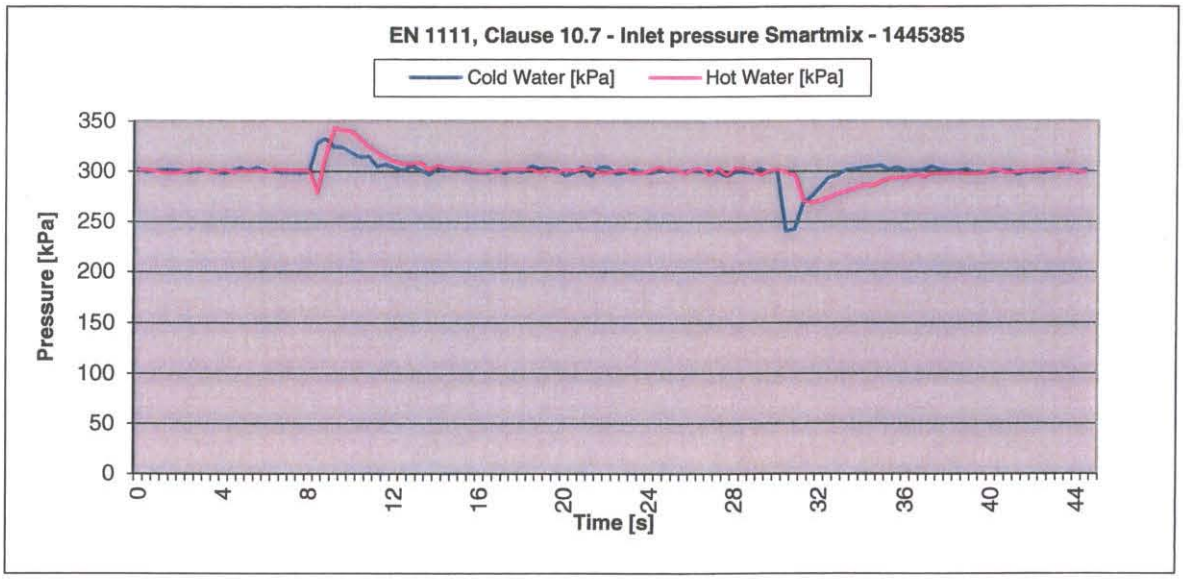

EN 1111, Clause 10.8 - Outlet temperature 38 - 1445380
Mixed temperature [°C]
Temperature [°C]
Time [s]

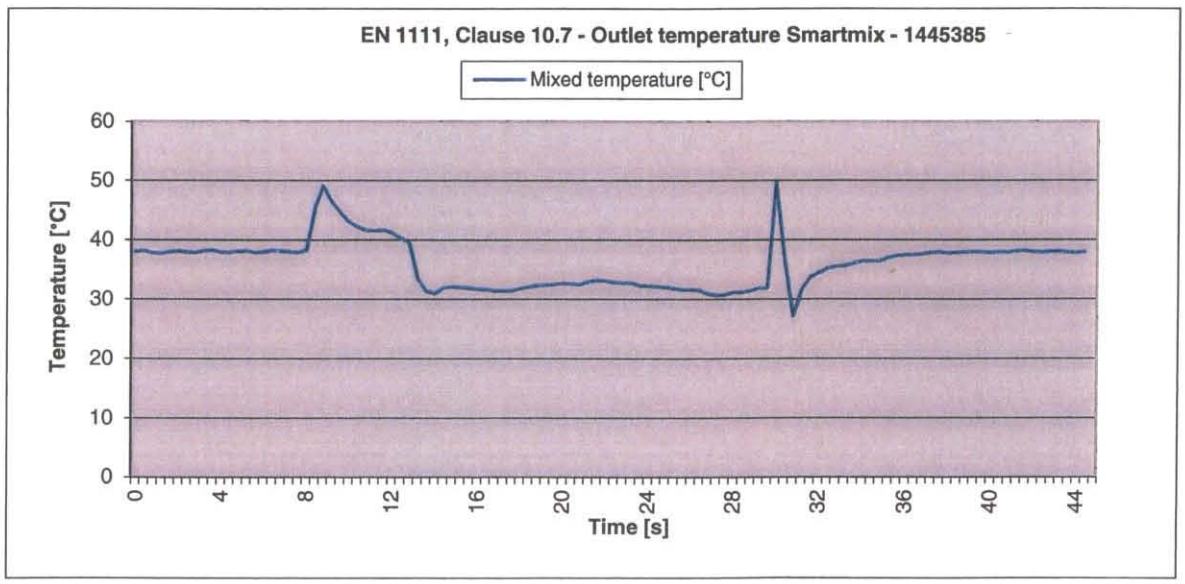

EN 1111, Clause 10.9 - Inlet temperature 38 - 1445380
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]


EN 1111, Clause 10.9 - Inlet pressure 38 - 1445380
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

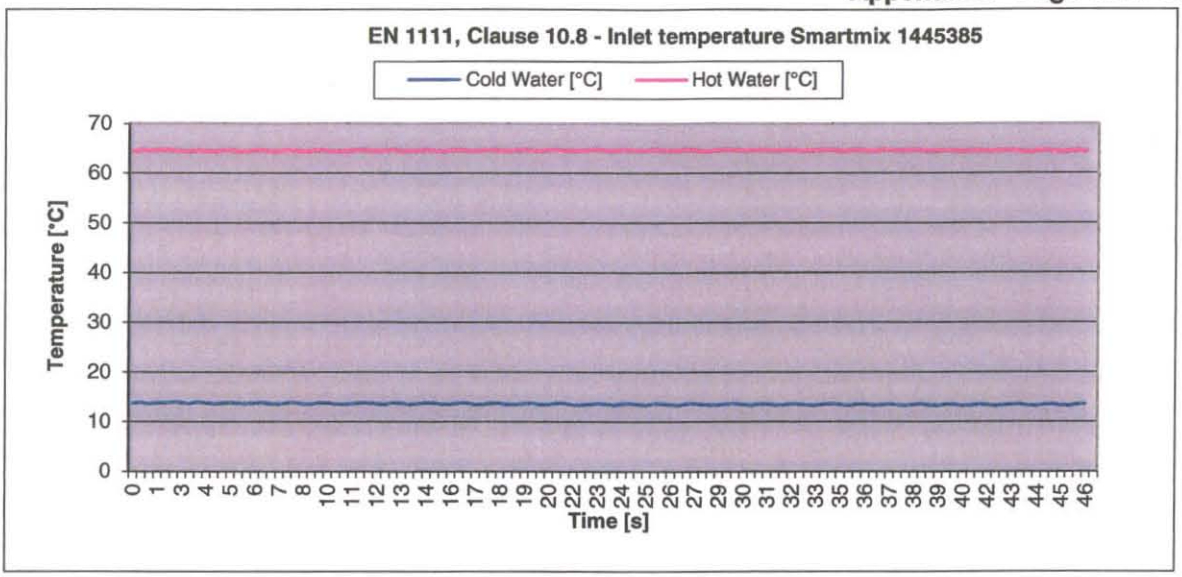

EN 1111, Clause 10.9 - Outlet temperature 38 - 1445380
Mixed temperature [°C]
Temperature [°C]
Time [s]

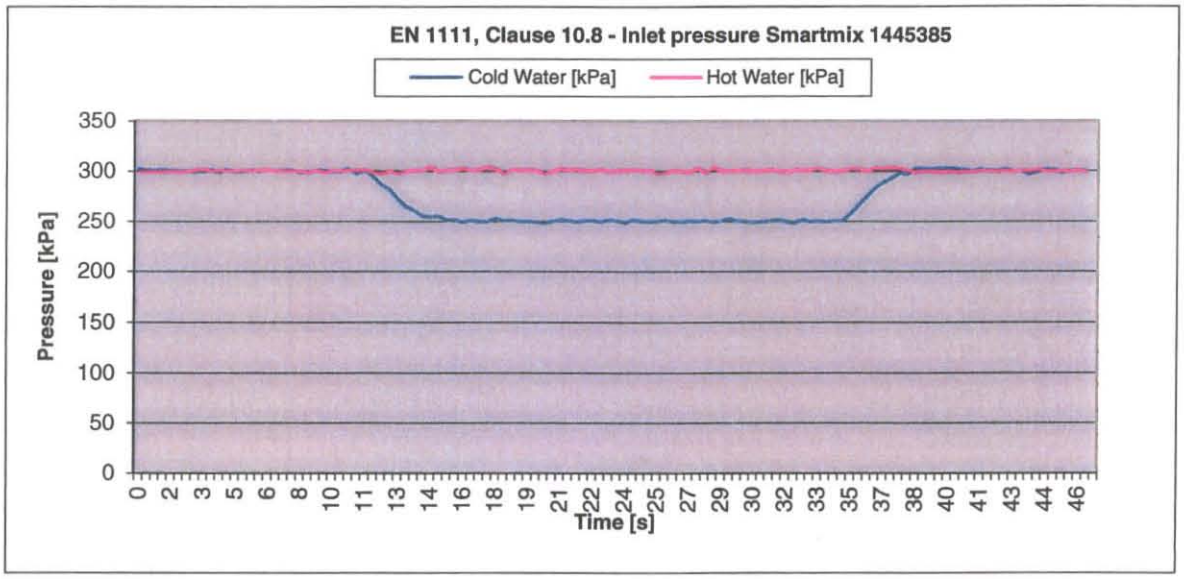


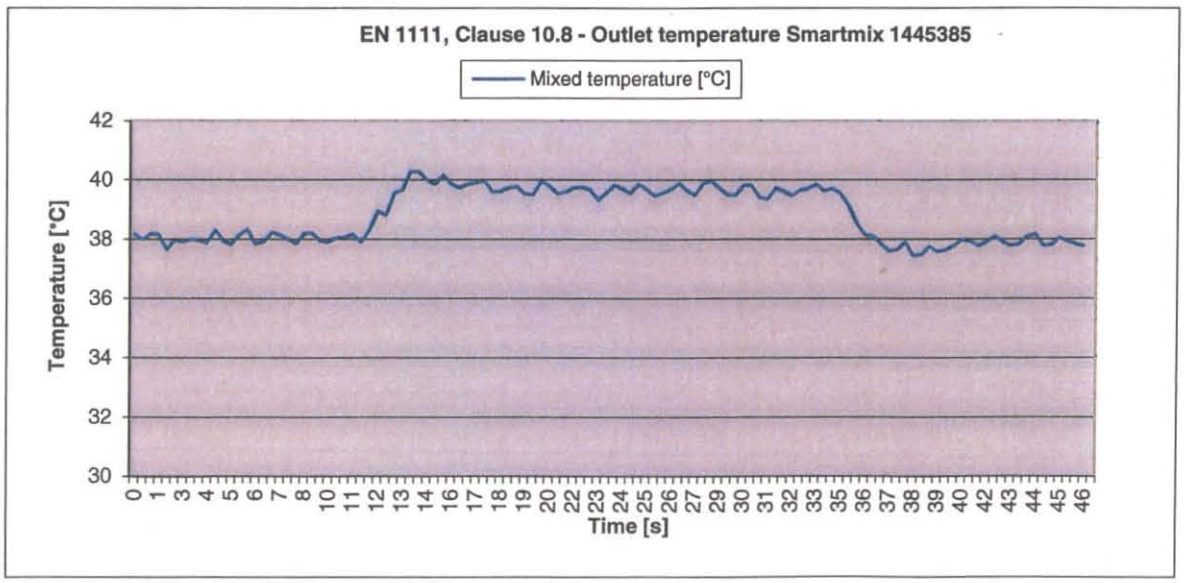


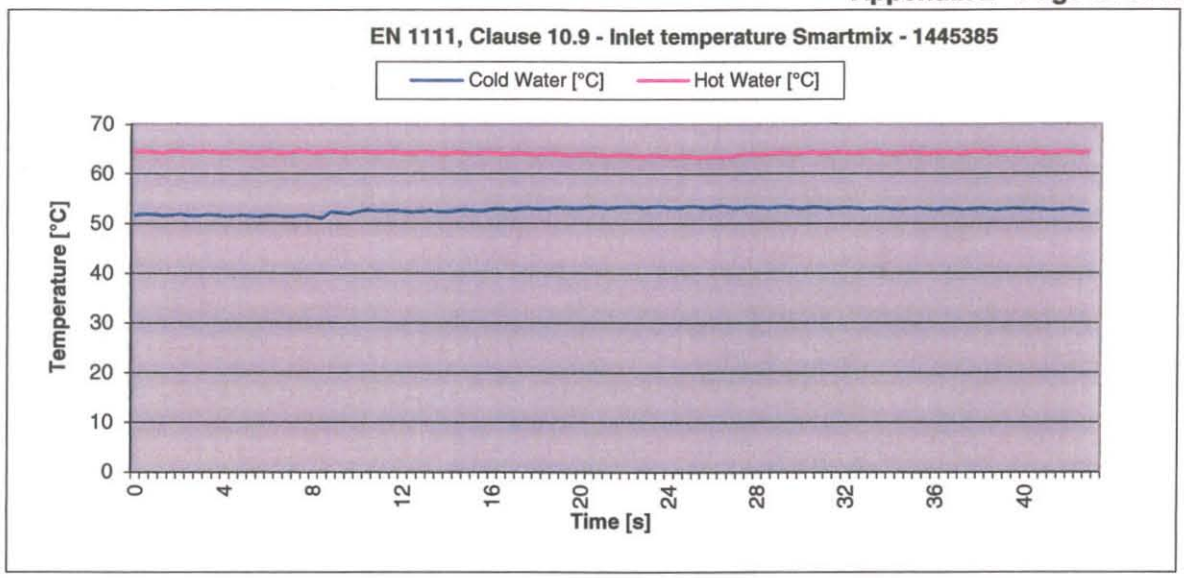


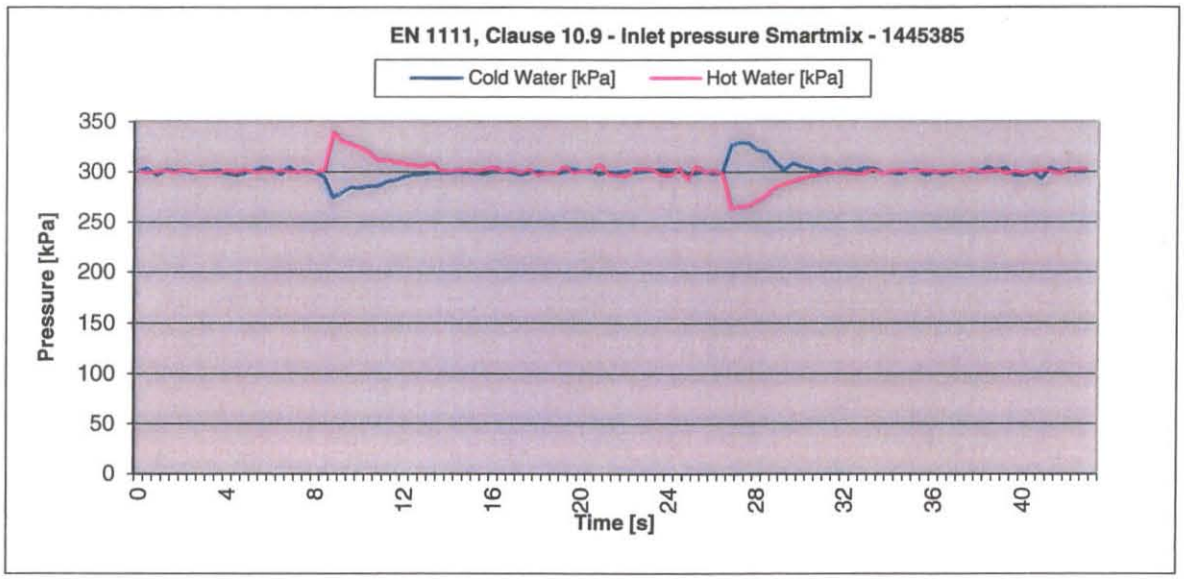
Water volume after 5 seconds: 60 ml. Water volume the next 30 seconds: 85 ml.

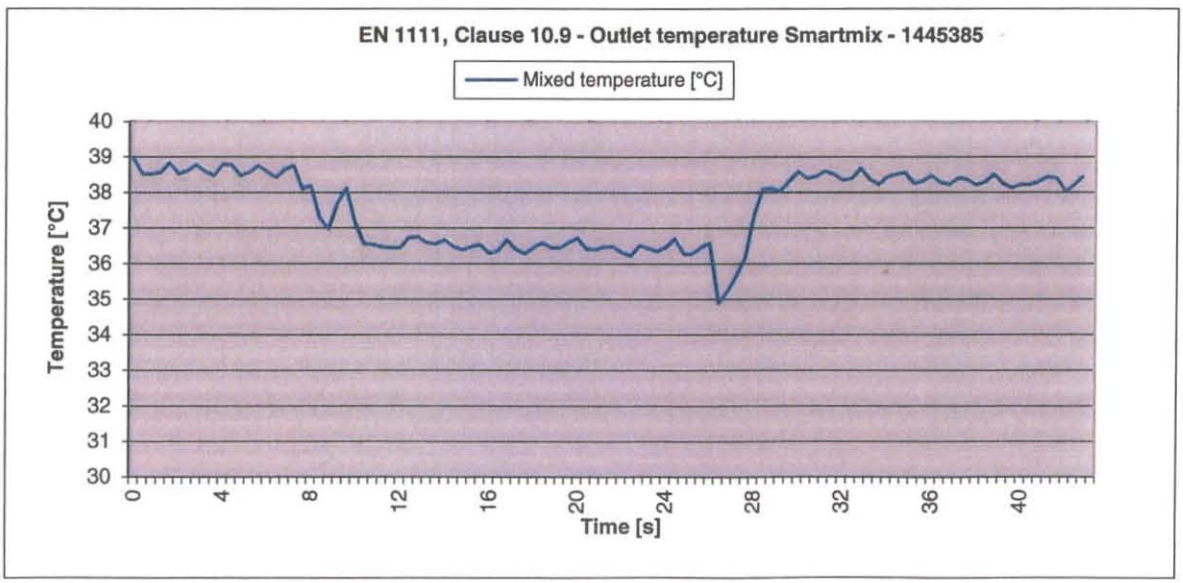

EN 1111, Clause 10.8 - Inlet temperature Smartmix 1445385
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
Time [s]

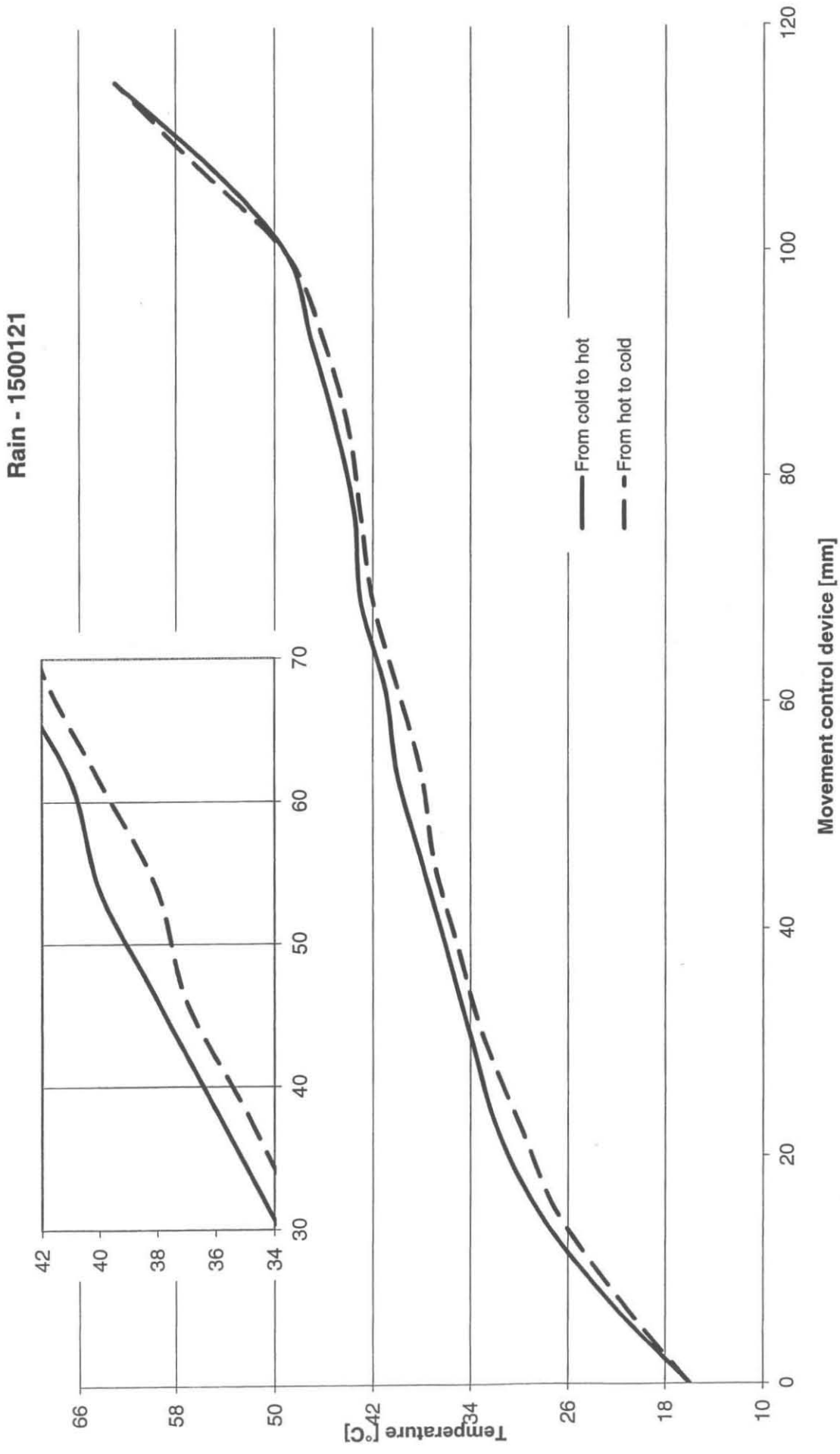

EN 1111, Clause 10.8 - Inlet pressure Smartmix 1445385
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
Time [s]

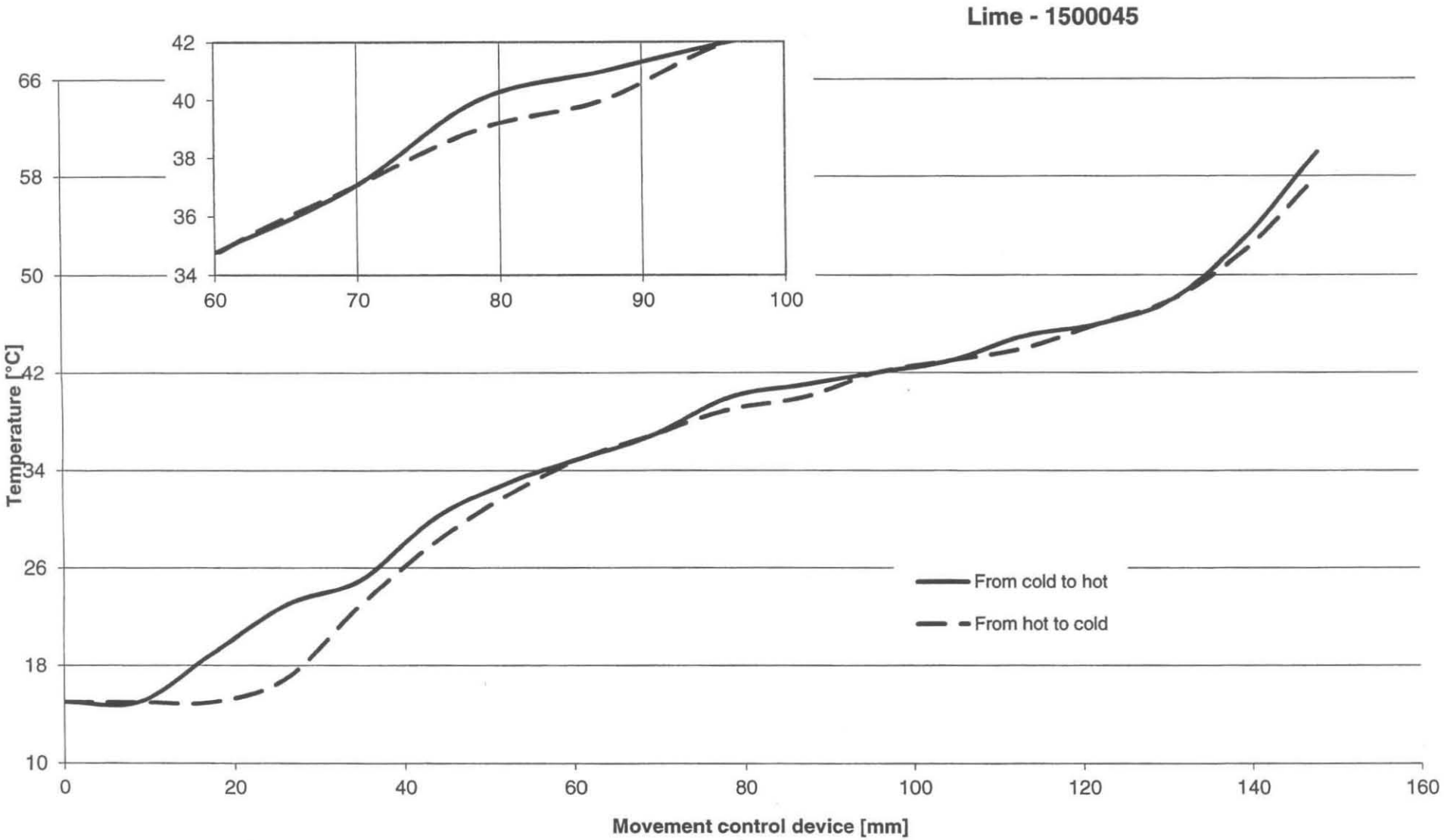

EN 1111, Clause 10.8 - Outlet temperature Smartmix 1445385
Mixed temperature [°C]
Temperature [°C]
Time [s]

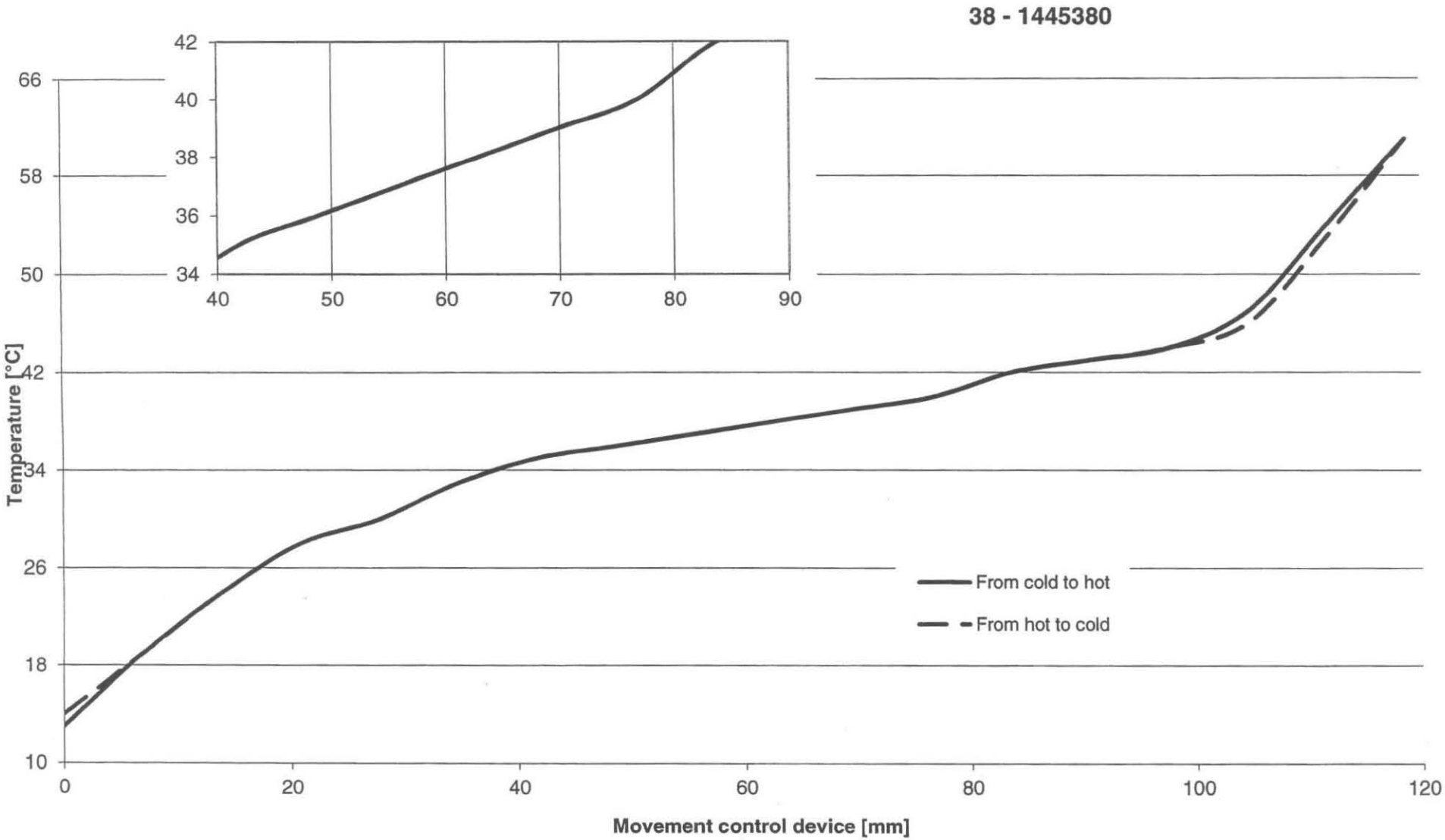

EN 1111, Clause 10.9 - Inlet temperature Smartmix - 1445385
Cold Water [°C]
Hot Water [°C]
Temperature [°C]
70
60
50
40
30
20
10
0
0
4
8
12
16
20
24
28
32
36
40
Time [s]

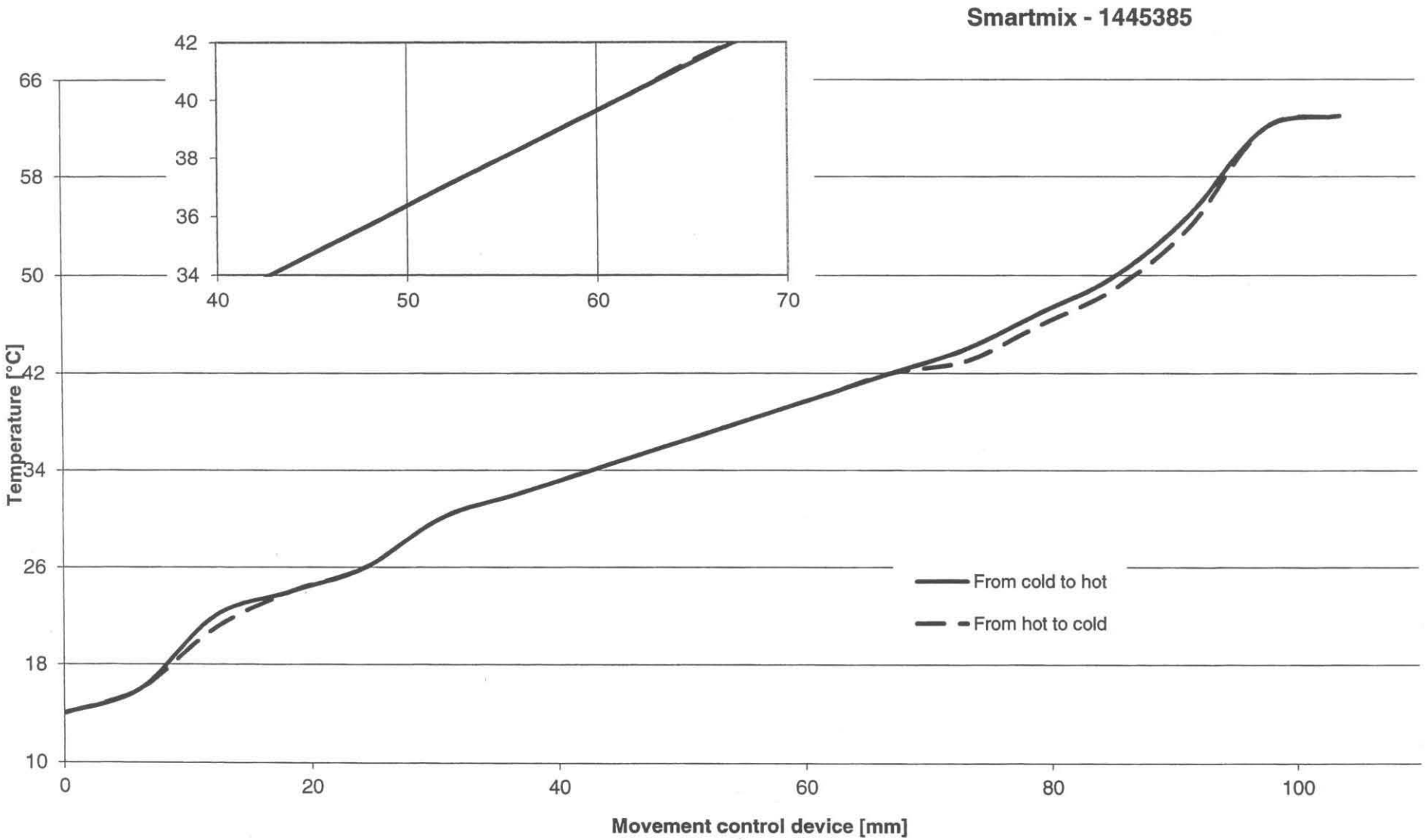

EN 1111, Clause 10.9 - Inlet pressure Smartmix - 1445385
Cold Water [kPa]
Hot Water [kPa]
Pressure [kPa]
350
300
250
200
150
100
50
0
0
4
8
12
16
20
24
28
32
36
40
Time [s]


EN 1111, Clause 10.9 - Outlet temperature Smartmix - 1445385
Mixed temperature [°C]
Temperature [°C]
40
39
38
37
36
35
34
33
32
31
30
0
4
8
12
16
20
24
28
32
36
40
Time [s]


Rain - 1500121
Temperature [°C]
Movement control device [mm]
From cold to hot
From hot to cold
66
58
50
42
34
26
18
10
0
20
40
60
80
100
120
42
40
38
36
34
30
40
50
60
70


Lime - 1500045
Temperature [°C]
66
58
50
42
34
26
18
10
0
20
40
60
80
100
120
140
160
Movement control device [mm]
From cold to hot
From hot to cold
42
40
38
36
34
60
70
80
90
100


38 - 1445380
Temperature [°C]
Movement control device [mm]
From cold to hot
From hot to cold
10
18
26
34
42
50
58
66
0
20
40
60
80
100
120
34
36
38
40
42
40
50
60
70
80
90


Smartmix - 1445385
Temperature [°C]
66
58
50
42
34
26
18
10
0
20
40
60
80
100
Movement control device [mm]
From cold to hot
From hot to cold
42
40
38
36
34
40
50
60
70