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Project/archive no. 3B038303	Date 14.03.2011	Rev. date	No. of pages 16	Appendixes 2	Classification Restricted	Author(s) Geir Lippe Stavnes
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## Assignment Report

# Testing of seven single hand mixers from Tapwell AB. Test method NS-EN 817.



Sanitary laboratory

The test results are valid exclusively for the tested objects.

Summary			
<p>SINTEF Building and Infrastructure has, on behalf of Tapwell AB, carried out testing of six basin mixers and one shower/bath mixer, type SY 071, BR 071, EVM 071, MI 071, ELY 071, EVO 070 and LEC 022.</p> <p>The tests have been carried out in accordance with NS-EN 817:2008 "Sanitary tapware – Mechanical mixing valves (PN 10) - General technical specification". See Table 4.1 for conducted tests.</p> <p>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.</p> <p>Result: Passed</p> <p>Remark: The flow rate measured at 0,3 MPa shall be at least 0,15 l/s when the tap is supplied with flexible supply hoses. The flow for shower mixers must be 0,20 l/s, while the flow rate for bath mixers must be 0,33 l/s. According to NS-EN 817:2008, a flow rate of 0,066 l/s is permissible for water saving valves if appropriate information is provided. In this case, EVM 071 and EVO 070 must have this information.</p>			
Address of the building			Built (year)
Method NS-EN 817	Keywords Tap ware	Filename 3B038303 Tapwell EN 817	

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## 1. INTRODUCTION

SINTEF Building and Infrastructure has, on behalf of Tapwell AB, carried out testing of six basin mixers and one shower/bath mixer, type SY 071, BR 071, EVM 071, MI 071, ELY 071, EVO 070 and LEC 022.

The tests according to NS-EN 817 were conducted by Geir Lippe Stavnes.

## 2. TEST METHOD

The tests have been carried out in accordance with NS-EN 817:2008 "Sanitary tapware – Mechanical mixing valves (PN 10) - General technical specification". 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 1-2.

## 3. TEST OBJECT

The test objects Tapwell AB from are six basin mixers and one shower/bath mixer, all single hand operated, see Figures 3.1 -3.7.

All basin mixers are delivered with flexible hoses, see Table 3.1.

The mixers are manufactured by Paffoni rubinetteria.

The mixers were delivered to SINTEF Building and Infrastructure by post on 20.8.2010. They were in good condition on arrival.

Table 3.1: Controlled mixers

Mixer	Number	Figure	Aerator	Supply hoses
SY 071	3	3.1	Airforce one P858ID	Parinox SPX
BR 071	3	3.2	Airforce one P858ID	Parinox SPX
EVM 071	3	3.3	Neoperl	Parinox SPX
MI 071	3	3.4	Neoperl	Parinox SPX
ELY 071	3	3.5	Airforce one P858ID	Parinox SPX
EVO 070	3	3.6	-	Parinox SPX
LEC 022	3	3.7	Neoperl M	-

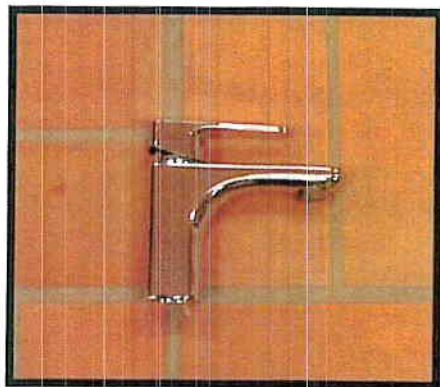
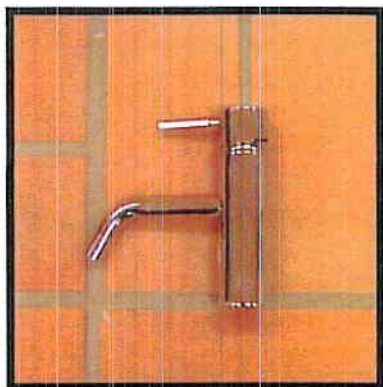


Fig. 3.1: SY 071



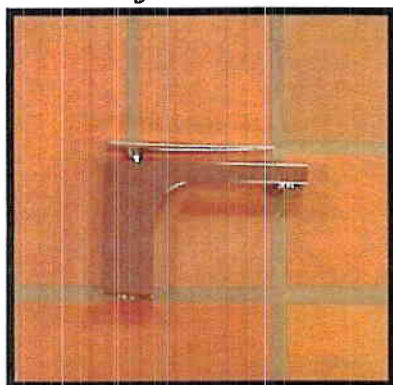
Fig. 3.2: BR 071



*Fig. 3.3: EVM 071*



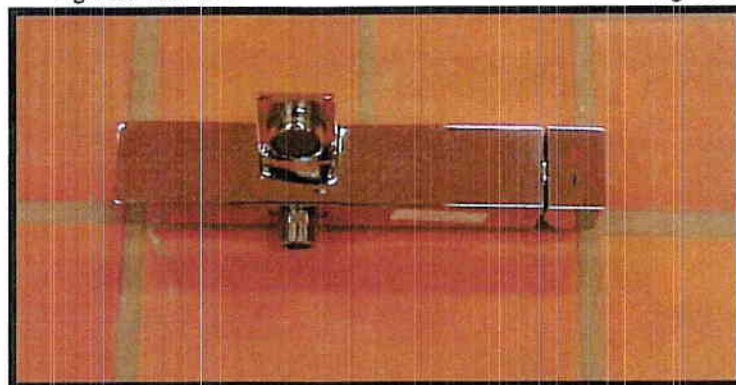
*Fig. 3.4: MI 071*



*Fig. 3.5: ELY 071*



*Fig. 3.6: EVO 070*



*Fig. 3.7: LEC 022*

## TESTS, METHOD, REQUIREMENTS AND RESULTS

Table 4.1: Summary of results

Chapter	Clause in NS-EN 817	Test	Passed		Accredited test	
			Yes	No	Yes	No
4.1	4.1	Marking	x		x	
4.2	4.2	Identification	x		x	
4.3	5.1	Chemical and hygiene requirements	x			x
4.4	6	Dimensional characteristics	x		x	
4.5	8.3	Leaktightness of the mixing valve upstream of the obturator	x		x	
4.6	8.4	Leaktightness of the mixing valve downstream of the obturator	x		x	
4.7	8.5	Leaktightness of manually operated diverter <sup>1)</sup>	-		x	
4.8	8.6	Leaktightness and operation of diverter with automatic return <sup>2)</sup>	-		x	
4.9	8.7	Leaktightness of the obturator: cross flow between hot water and cold water	x		x	
4.10	9.4	Mechanical behaviour upstream of the obturator	x		x	
4.11	9.5	Mechanical behaviour downstream of the obturator	x		x	
4.12	10.6	Determination of flow rate	x		x	
4.13	11	Mechanical strength characteristics – torsion test for operating mechanism	x		x	
4.14	12.1	Mechanical endurance of the control device	x		x	
4.15	12.2	Mechanical endurance of diverters <sup>2)</sup>	-		x	
4.16	12.3	Mechanical endurance of swivel spouts <sup>1)</sup>	-		x	
4.17	13	Backflow protection <sup>2)</sup>	-			x
4.18	14	Acoustic characteristics	x		x	

<sup>1)</sup> Not applicable

<sup>2)</sup> Not tested by SINTEF Building and Infrastructure

**4.1 Marking (NS-EN 817, Clause 4.1)**
*Method: Visual inspection*

Mixer	Passed	Not passed
SY 071	x	
BR 071	x	
EVM 071	x	
MI 071	x	
ELY 071	x	
EVO 070	x	
LEC 022	x	

Remark: The mixers are marked with the Tapwell logo "T".

**4.2 Identification (NS-EN 817, Clause 4.2)**
*Method: Visual inspection*

Mixer	Passed	Not passed
SY 071 <sup>1)</sup>	x	
BR 071 <sup>2)</sup>	x	
EVM 071 <sup>1)</sup>	x	
MI 071 <sup>1)</sup>	x	
ELY 071 <sup>2)</sup>	x	
EVO 070 <sup>1)</sup>	x	
LEC 022 <sup>1)</sup>	x	

Remark:

- 1) The mixers are marked with red for hot water and blue for cold water on the handle
- 2) The mixers are marked with "hot" for hot water and "cold" for cold water on the handle.

**4.3 Chemical and hygienic characteristics (NS-EN 817, Clause 5.1)**
*Method: NKB 4, Clause 3.3.2*

Mixer	Passed	Not passed
EVM 071	x	
LEC 022	x	

Remark: See Appendix 1-2.

**4.4 Dimensional characteristics (NS-EN 817, Clause 6)**
*Method: Measurements and visual inspection*

Mixer	Passed	Not passed
SY 071	x	
BR 071	x	
EVM 071	x	
MI 071	x	
ELY 071	x	
EVO 070	x	
LEC 022	x	

**4.5 Leaktightness of the mixing valve upstream of the obturator (NS-EN 817, Clause 8.3)**
*Method: Outlet orifice open and the obturator closed*

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
MI 071	1,6	x	
BR 071	1,6	x	
ELY 071	1,6	x	

**4.6 Leaktightness of the mixing valve downstream of the obturator (NS-EN 817, Clause 8.4)**
*Method: Outlet orifice closed and the obturator open*

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
SY 071	0,4	x	
BR 071	0,4	x	
EVM 071	0,4	x	
MI 071	0,4	x	
ELY 071	0,4	x	
EVO 070	0,4	x	
LEC 022	0,4	x	

**4.7 Leaktightness of manually operated diverter (NS-EN 817, Clause 8.5)**
*Method: flow to bath and bath to flow*

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

Remark: Not applicable.

**4.8 Leaktightness and operation of diverter with automatic return (NS-EN 817, Clause 8.6)**
*Method: flow to bath and bath to flow*

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

Remark: Not tested by SINTEF Building and Infrastructure

**4.9 Leaktightness of the obturator: cross flow between hot water and cold water (NS-EN 817, Clause 8.7)**
*Method: Outlet orifice open and the obturator closed*

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
MI 071	0,4	x	
BR 071	0,4	x	
ELY 071	0,4	x	

**4.10 Mechanical behaviour upstream of the obturator (NS-EN 817, Clause 9.4)**
*Method: Outlet orifice open and the obturator closed*

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
MI 071	2,5	x	
BR 071	2,5	x	
ELY 071	2,5	x	

**4.11 Mechanical behaviour downstream of the obturator (NS-EN 817, Clause 9.5)**

*Method: Outlet orifice open and the obturator open*

Mixer	Water pressure (MPa)	Result	
		Passed	Not passed
MI 071	0,4	x	
BR 071	0,4	x	
ELY 071	0,4	x	

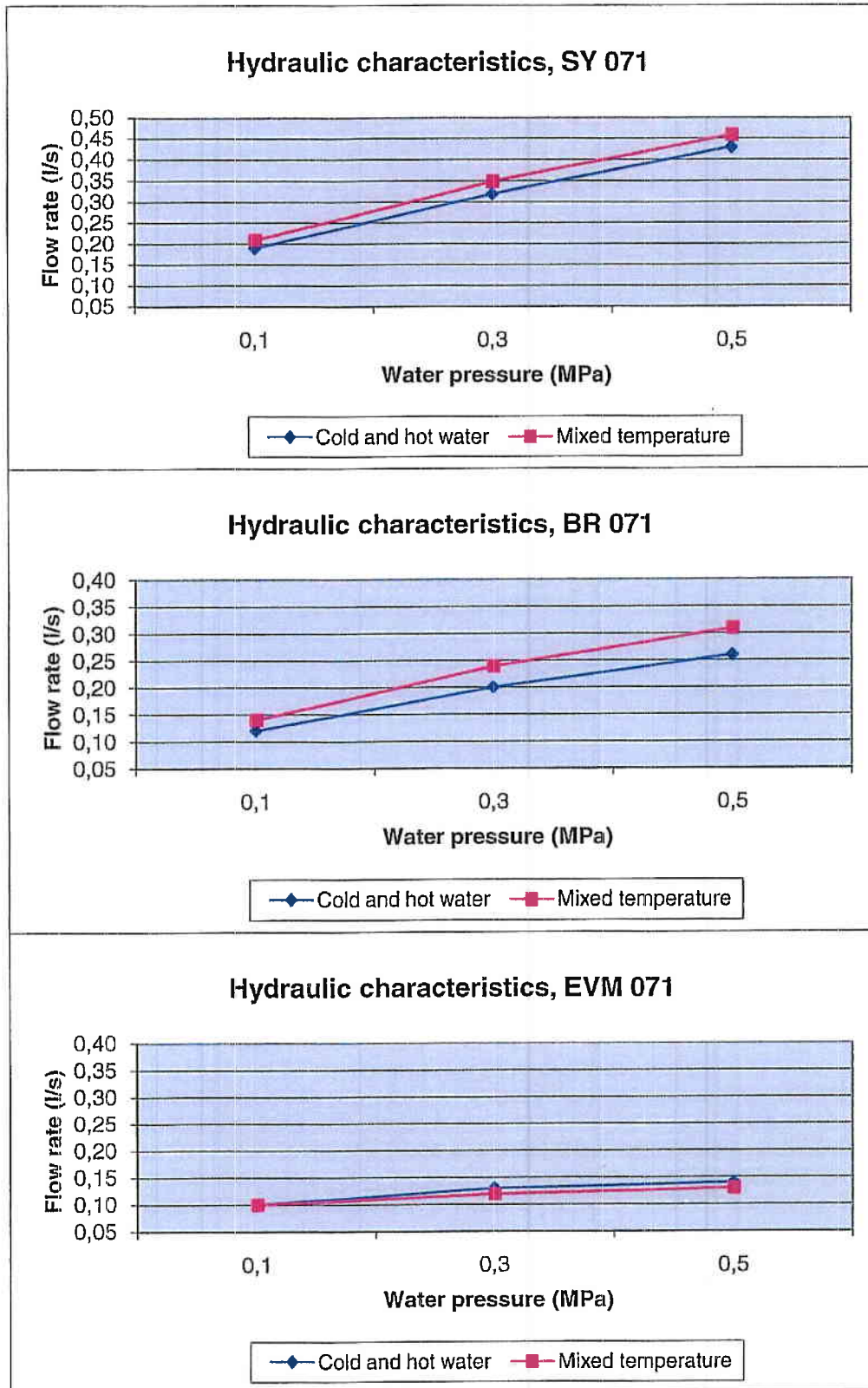
**4.12 Determination of flow rate (NS-EN 817, Clause 10.6)**

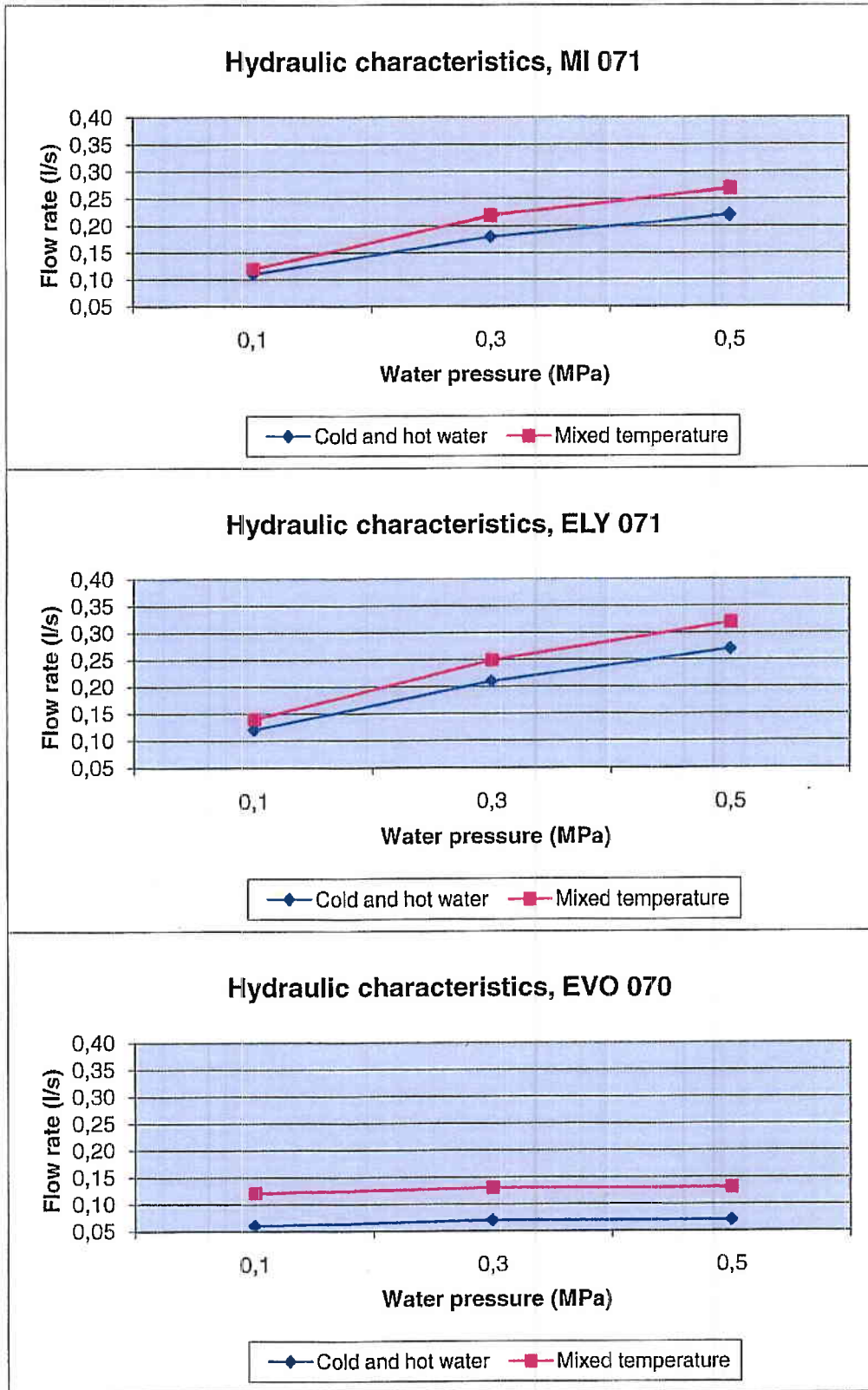
*Method: Measuring the flow rate at 0,3 MPa*

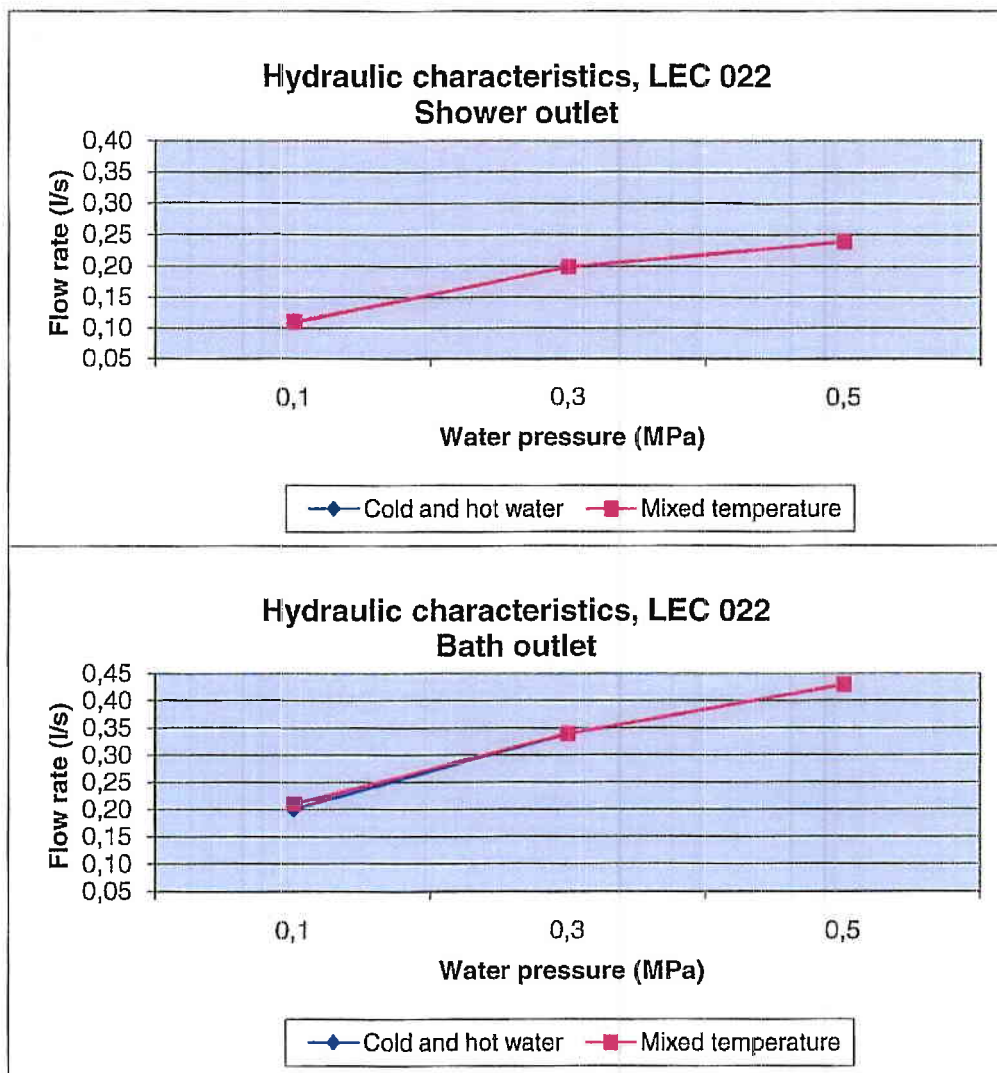
Mixer	Passed	Not passed
SY 071	x	
BR 071	x	
EVM 071	x	
MI 071	x	
ELY 071	x	
EVO 070	x	
LEC 022	x	

Remark 1: The flow rate measured at 0,3 MPa shall be at least 0,15 l/s when the tap is supplied with flexible supply hoses. The flow for shower mixers must be 0,20 l/s, while the flow rate for bath mixers must be 0,33 l/s. According to NS-EN 817:2008, a flow rate of 0,066 l/s is permissible for water saving valves if appropriate information is provided. In this case, EVM 071 and EVO 070 must have this information.









**4.13 Mechanical strenght characteristics - torsion test for operating mechanism (NS-EN 817, Clause 11)**

*Method: Subjecting the handle to a given torque*

Mixer	Torque (Nm)	Result	
		Passed	Not passed
MI 071	6	x	
BR 071	6	x	
ELY 071	6	x	

**4.14 Mechanical endurance of the control device (NS-EN 817, Clause 12.1)**

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

Mixer	Movements	Result	
		Passed	Not passed
MI 071	70 000	x	
BR 071	70 000	x	
ELY 071	70 000	x	

**4.15 Mechanical endurance of diverters (NS-EN 817, Clause 12.2)**

*Method: Subjecting the diverter to a specific number of movements*

Mixer	Movements	Result	
		Passed	Not passed
	30 000		

Remark: Not tested by SINTEF Building and Infrastructure

**4.16 Mechanical endurance of swivel spouts (NS-EN 817, clause 12.3)**

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

Mixer	Movements	Result	
		Passed	Not passed
	80 000		

Remark: Not applicable

**4.17 Backflow protection (NS-EN 817, clause 13)**

*Method: EN 1717*

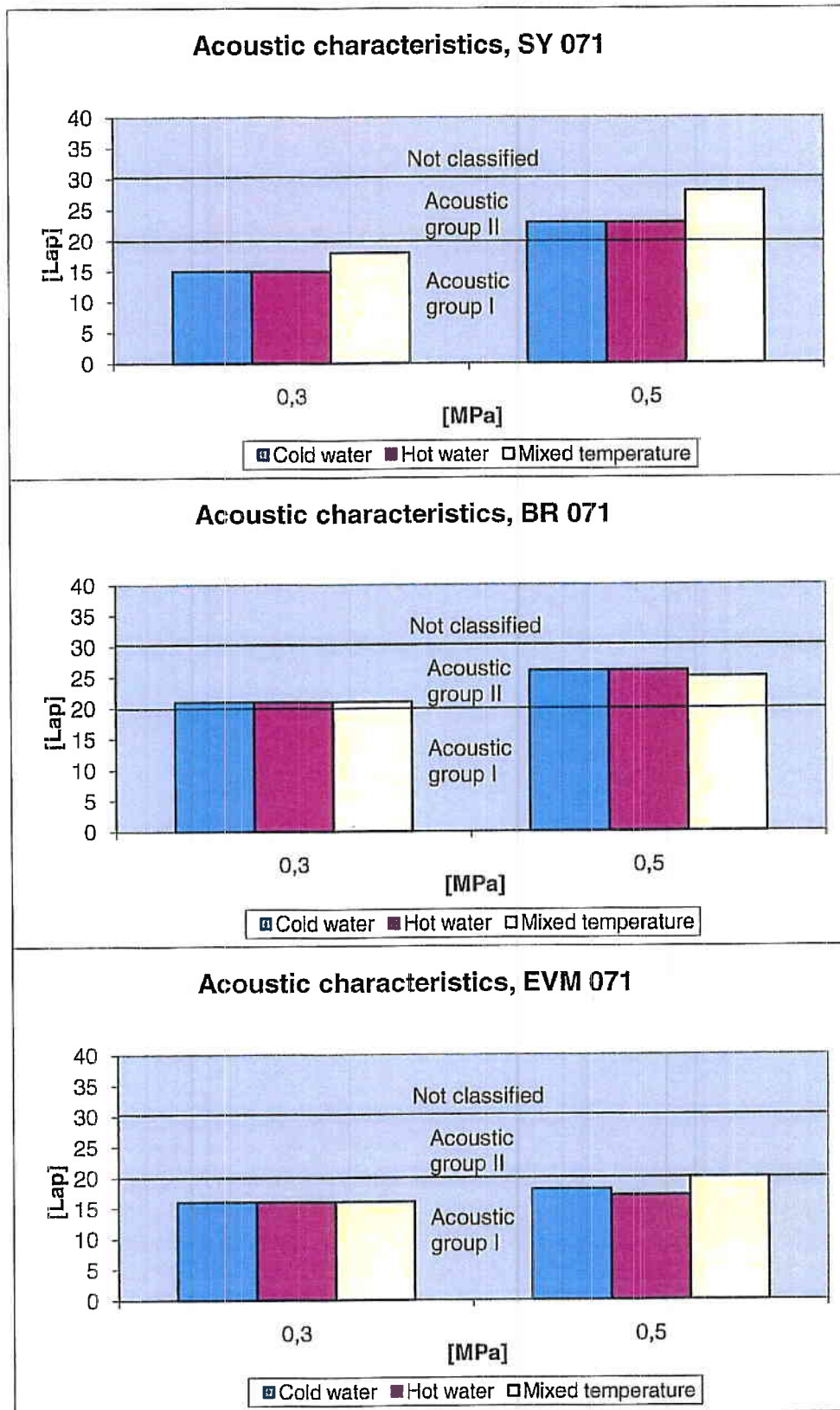
Mixer	Result	
	Passed	Not passed
LEC 022	x	

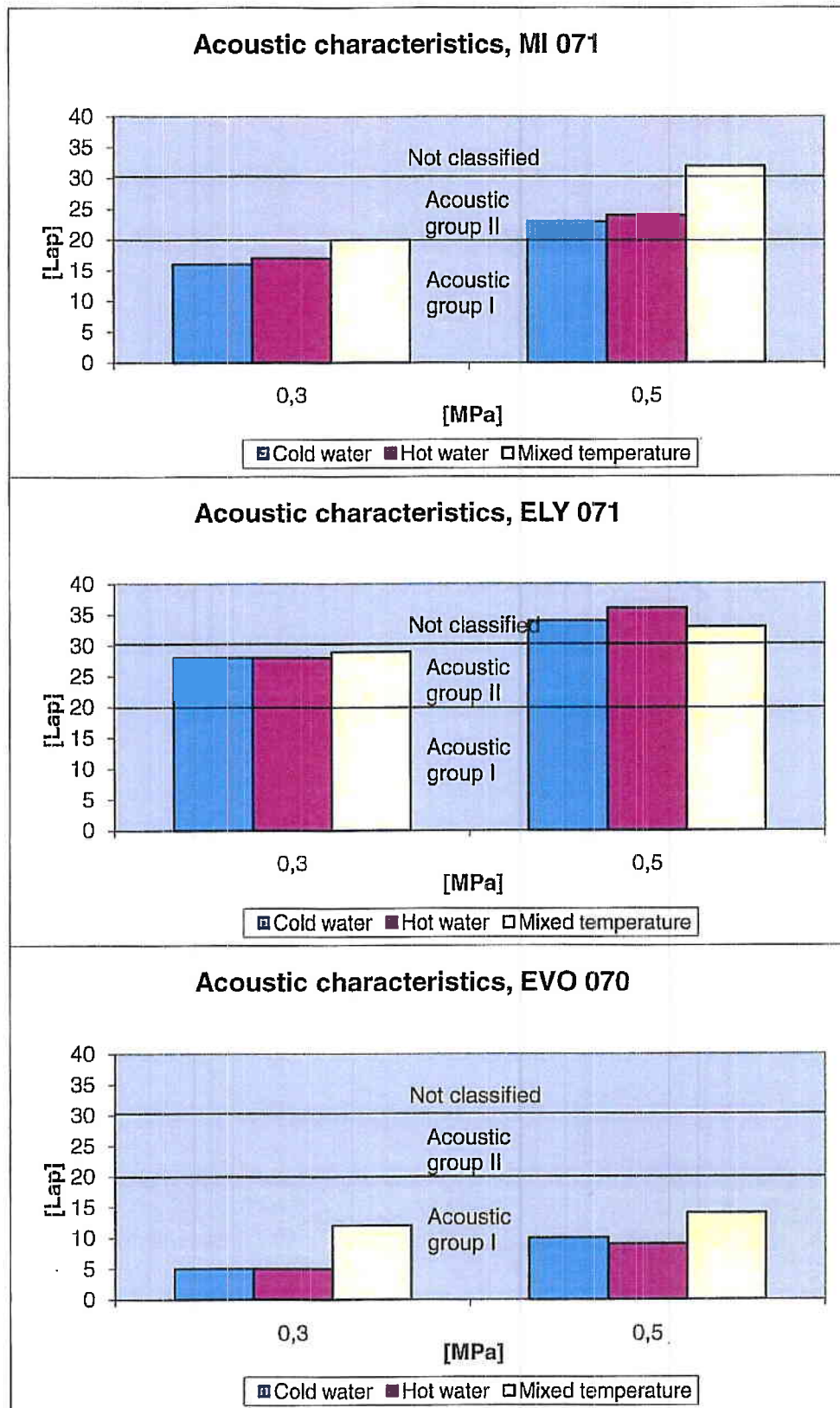
Remark: The diverter acts as a backflow prevention. The diverter itself is not tested by SINTEF Building and Infrastructure.

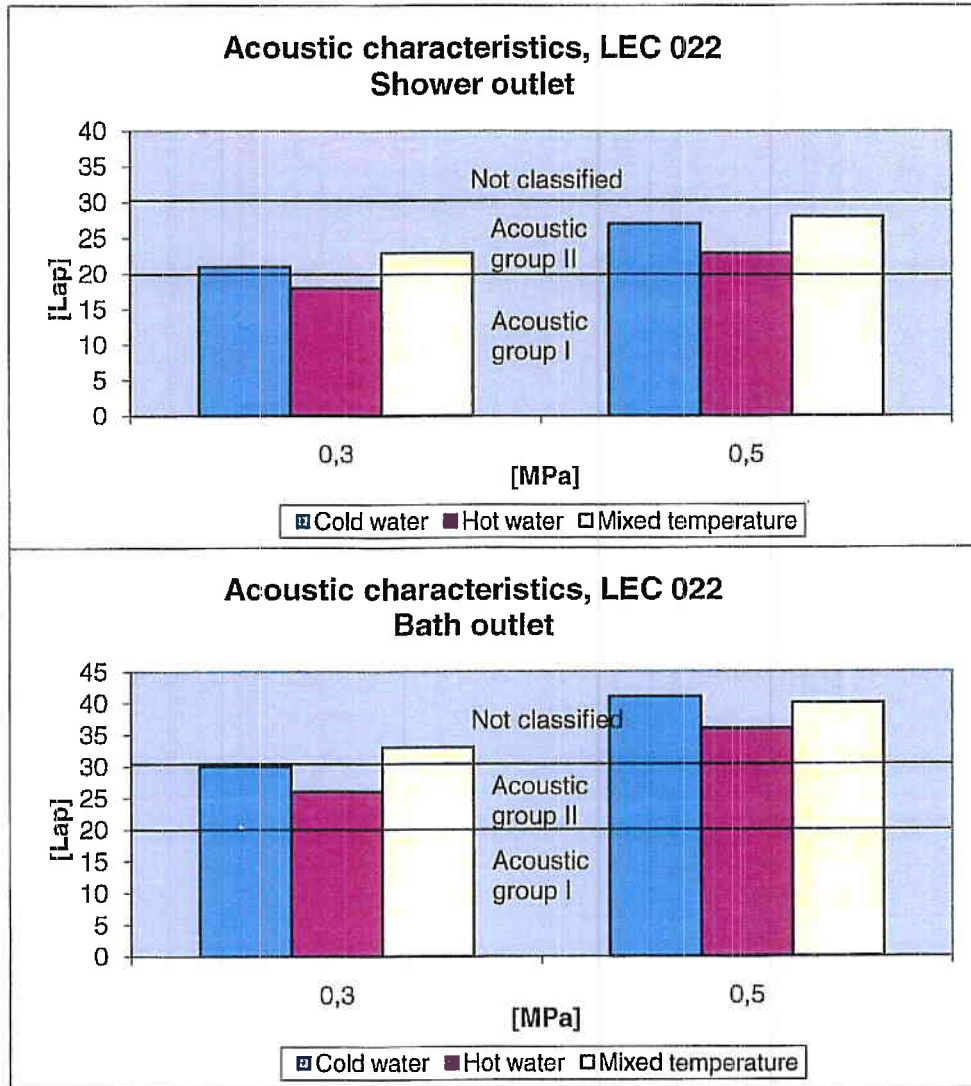
**4.18 Acoustic characteristics (NS-EN 817, clause 14)**

Method: EN ISO 3822

Mixer	Acoustic group			0,3 MPa			0,5 MPa		
				Cold	Hot	Mixed	Cold	Hot	Mixed
SY 071	I ✓	Fully open	L <sub>ap</sub>	15	15	18	23	23	28
			I/s	0,32	0,32	0,35	0,43	0,43	0,46
		Max sound pressure	L <sub>ap</sub>	15	15	18	23	23	28
			I/s	0,32	0,32	0,35	0,43	0,43	0,46
BR 071	II	Fully open	L <sub>ap</sub>	21	21	21	26	26	25
			I/s	0,20	0,20	0,24	0,26	0,26	0,31
		Max sound pressure	L <sub>ap</sub>	21	21	21	26	26	25
			I/s	0,20	0,20	0,24	0,26	0,26	0,31
EVM 071	I	Fully open	L <sub>ap</sub>	16	16	16	18	17	20
			I/s	0,13	0,13	0,12	0,14	0,14	0,13
		Max sound pressure	L <sub>ap</sub>	16	16	16	18	17	20
			I/s	0,13	0,13	0,12	0,14	0,14	0,13
MI 071	I ✓	Fully open	L <sub>ap</sub>	16	17	20	23	24	32
			I/s	0,18	0,18	0,22	0,22	0,22	0,27
		Max sound pressure	L <sub>ap</sub>	16	17	20	23	24	32
			I/s	0,18	0,18	0,22	0,22	0,22	0,27
ELY 071	II	Fully open	L <sub>ap</sub>	28	28	29	34	36	33
			I/s	0,21	0,21	0,25	0,27	0,27	0,32
		Max sound pressure	L <sub>ap</sub>	28	28	29	34	36	33
			I/s	0,21	0,21	0,25	0,27	0,27	0,32
EVO 070	I	Fully open	L <sub>ap</sub>	5	5	12	10	9	14
			I/s	0,07	0,07	0,13	0,07	0,07	0,13
		Max sound pressure	L <sub>ap</sub>	5	5	12	10	9	14
			I/s	0,07	0,07	0,13	0,07	0,07	0,13
LEC 022 Shower outlet	II	Fully open	L <sub>ap</sub>	21	18	23	27	23	28
			I/s	0,20	0,20	0,20	0,24	0,24	0,24
		Max sound pressure	L <sub>ap</sub>	21	18	23	27	23	28
			I/s	0,20	0,20	0,20	0,24	0,24	0,24
LEC 022 Bath outlet	U	Fully open	L <sub>ap</sub>	30	26	31	41	36	40
			I/s	0,34	0,34	0,34	0,43	0,43	0,43
		Max sound pressure	L <sub>ap</sub>	30	26	33	41	36	40
			I/s	0,34	0,34	0,25	0,43	0,43	0,43







Oslo, 14.3.2011  
 SINTEF Building and Infrastructure

*Geir Lippe Stavnes*  
 Geir Lippe Stavnes



**SINTEF Building and Infrastructure**
**REPORT**
***DETERMINATION OF LEAD AND CADMIUM IN SYNTHETIC SUPPLY WATER***

Project no. :	3B038303	Date:	16.09.2010
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Test method:	Determination of the leaching content of lead and cadmium in synthetic supply water according to the Norwegian Standard NS 3834 / NKB 4
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Exposure conditions:	pH in test solution;	7,0
	Temperature (°C);	22,0

Sample name:	Tapwell LEC022
Number of samples:	1
Performed by:	GLS
Note:	

Criteria:	Cd (µg)	Pb (µg)
	< 2	< 200

Results:		Volume (mL)	Concentration (µg/L)		Total amount (µg)	
			Cd	Pb	Cd	Pb
	Day 9	43,6	<1	46	<0,1	2,0
	Day 10	58,7	<1	70	<0,1	4,1

Date:	16.09.2010	Signature:	Hanne Røberg-Larsen Hanne Røberg-Larsen
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SINTEF Building and Infrastructure

**REPORT**
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Exposure conditions:	pH in test solution;	7,0
	Temperature (°C);	22,0

Sample name:	Tapwell EVM071
Number of samples:	1
Performed by:	GLS
Note:	

Criteria:	Cd (µg)	Pb (µg)
	< 2	< 20

Results:		Volume (mL)	Concentration (µg/L)		Total amount (µg)	
			Cd	Pb	Cd	Pb
	Day 9	23,8	<1	8	<0,02	0,2
	Day 10	22,3	<1	<5	<0,02	<0,1

Date:	16.09.2010	Signature:	Hanne Røberg-Larsen Hanne Røberg-Larsen
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