SINTEF Community
Address:
P.O. box 124 Blindern
NO-0314 Oslo
Norway

Visit address:
Børrestuveien 3
Oslo

Test report

Testing of Kitchen mixers from Akvatur IVS, type Taurus.3-1, 4-1 and 5-1

Test method NS-EN 817:2008

NORSK AKKREDITERING
Test 107

Sanitary laboratory

Date:
14.05.2020

Project leader/writer:
Geir Lippe Stavnes

Client (s):
Akvatur IVS, Lillehøjvej 23, 8600 Silkeborg, Danmark

Client's reference:
Bent Iversen

Project number:
102000264-543

Number of Pages:
11 + 2 Appendices

Summary:
SINTEF Community has on behalf of Akvatur IVS, carried out testing of kitchen mixers, type Taurus 3-1, 4-1 and 5-1. Leaktightness testing of an additional water cooler was also carried out.

The tests have 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.

Result: Passed

Project leader/writer:
Geir Lippe Stavnes

Controlled by:
Karolina Stråby

Approved by:
Lars-Erik Fiskum

Report no.:
202000453

Classification
Restricted

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 = ISO 14001
OHSAS 18001

1. INTRODUCTION

SINTEF Community has on behalf of Akvatur IVS, carried out testing of kitchen mixers, type Taurus 3-1, 4-1 and 5-1. Leaktightness testing of an additional water cooler was also carried out.

The tests according to NS-EN 817 were conducted by Geir Lippe Stavnes (Research engineer). The tests were carried out in the Sanitary lab. (U47) between 14/4-2020 and 12/5-2020.

Evaluations of impartiality have been performed in all steps of the testing process, and impartiality has been found to be in accordance with SINTEF's quality management system and the current standard for the activity.

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.

3. TEST OBJECT

The test objects from Akvatur IVS are kitchen mixers, see Figure 3.1-3.3. All models are designed to be used with additional parts such as filters, coolers, and/or heaters. Only the water cooler unit (Fig. 3.4) was delivered to SINTEF in addition to the test objects. Leaktightness testing of the cooler was performed as a supplement to the testing of the mixer taps.

The mixers were delivered with flexible hoses from Neoperl and Tucai.

The mixers are produced by Eloira Sanitaryware Co.,Ltd. and they were delivered to SINTEF Community on 14.4.2020. They were selected by the customer and in good condition on arrival.

Table 3.1: Controlled mixers

Mixer	Number	Figure	Manufacturer	Hose
Taurus 3-1	3	3.1	Eloira Sanitaryware Co.,Ltd.	Tucai
Taurus 4-1	3	3.2		Neoperl
Taurus 5-1	3	3.3		Neoperl
Bioice HP	1	3.4	Aquabio.it. srl.	-

Fig. 3.1: Taurus 3-1

Fig. 3.2: Taurus 4-1

Fig. 3.3: Taurus 5-1

Fig. 3.4: Bioice HP

4. TESTS, METHODS, 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	- [2)]		x	
4.4	5.2	Exposed surface conditions	- [2)]			x
4.5	6	Dimensional characteristics	x		x	
4.6	8.3	Leaktightness of the mixing valve upstream of the obturator	x		x	
4.7	8.4	Leaktightness of the mixing valve downstream of the obturator	x		x	
4.8	8.5	Leaktightness of manually operated diverter	x		x	
4.9	8.6	Leaktightness and operation of diverter with automatic return	- [1)]		x	
4.10	8.7	Leaktightness of the obturator: cross flow between hot water and cold water	x		x	
4.11	9.4	Mechanical behaviour upstream of the obturator	x		x	
4.12	9.5	Mechanical behaviour downstream of the obturator	x		x	
4.13	10.6	Determination of flow rate	x		x	
4.14	10.7	Sensitivity	x		x	
4.15	11	Mechanical strength characteristics – torsion test for operating mechanism	x		x	
4.16	12.1	Mechanical endurance of the control device	x		x	
4.17	12.2	Mechanical endurance of diverters	x		x	
4.18	12.3	Mechanical endurance of swivel spouts	x		x	
4.19	13	Backflow protection	x			x
4.20	14	Acoustic characteristics	x		x	
4.21		Dry weight	x			x

1) Not applicable
2) Not considered

4.1 Marking (NS-EN 817, Clause 4.1)

Method: Visual inspection

Mixer	Passed	Not passed
Taurus 3-1	x	
Taurus 4-1	x	
Taurus 5-1	x	

Remark: The mixers are marked with a "drop" logo for Akvatur IVS

4.2 Identification (NS-EN 817, Clause 4.2)

Method: Visual inspection

Mixer	Passed	Not passed
Taurus 3-1	x	
Taurus 4-1	x	
Taurus 5-1	x	

4.3 Chemical and hygienic characteristics (NS-EN 817, Clause 5.1)

Method: NKB 4, Clause 3.3.2

Mixer	Passed	Not passed
	-	

Remark: Not considered

4.4 Exposed surface conditions (NS-EN 817, Clause 5.2)

Method: EN 248

Mixer	Passed	Not passed
	-	

Remark: Not considered

4.5 Dimensional characteristics (NS-EN 817, Clause 6)

Method: Measurements and visual inspection

Mixer	Passed	Not passed
Taurus 3-1	x	
Taurus 4-1	x	
Taurus 5-1	x	

4.6 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
Taurus 3-1	1,6	x	
Taurus 4-1	1,6	x	
Taurus 5-1	1,6	x	
Bioice HP	1,6	x	

4.7 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
Taurus 3-1	0,4	x	
Taurus 4-1	0,4	x	
Taurus 5-1	0,4	x	

4.8 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
Taurus 3-1	0,4	x	
Taurus 4-1	0,4	x	
Taurus 5-1	0,4	x	

Remark: The diverter is the valve on the DW-outlet.

4.9 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 applicable

4.10 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
Taurus 3-1	0,4	x	
Taurus 4-1	0,4	x	
Taurus 5-1	0,4	x	

4.11 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
Taurus 3-1	2,5	x	
Taurus 4-1	2,5	x	
Taurus 5-1	2,5	x [1)]	

Remark [1)]: The mixer is not leak tight above 19 bar, but no deformation is registered.

4.12 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
Taurus 3-1	0,4	x	
Taurus 4-1	0,4	x	
Taurus 5-1	0,4	x	

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

Method: Measuring the flow rate at 0,3 MPa

Mixer	Passed	Not passed
Taurus 3-1	x	
Taurus 4-1	x	
Taurus 5-1	x	

Remark: The flow rate measured at 0,3 MPa shall be at least 0,15 l/s from fully open cold water to fully open hot water when the tap is delivered with flexible supply hoses.
According to EN 817:2008, a flow rate of 0,06 l/s is permissible for water saving mixers.
See Table 4.2 for results.

Table 4.2: Measured flow rate

Taurus 3-1	Flow rate (l/s)			Result	
	0,1 MPa	0,3 MPa	0,5 MPa	Passed	Not passed
Fully open cold water	0,08	0,13	0,16	x	
34 °C	0,10	0,17	0,22	x	
38 °C	0,10	0,17	0,22	x	
42 °C	0,10	0,17	0,22	x	
Fully open hot water	0,08	0,13	0,16	x	

Taurus 4-1	Flow rate (l/s)			Result	
	0,1 MPa	0,3 MPa	0,5 MPa	Passed	Not passed
Fully open cold water	0,06	0,10	0,14	x	
34 °C	0,07	0,11	0,14	x	
38 °C	0,07	0,11	0,14	x	
42 °C	0,07	0,11	0,14	x	
Fully open hot water	0,06	0,10	0,14	x	

Taurus 5-1	Flow rate (l/s)			Result	
	0,1 MPa	0,3 MPa	0,5 MPa	Passed	Not passed
Fully open cold water	0,07	0,12	0,15	x	
34 °C	0,08	0,14	0,17	x	
38 °C	0,08	0,14	0,17	x	
42 °C	0,08	0,14	0,17	x	
Fully open hot water	0,07	0,12	0,16	x	

Measurement uncertainty ± 2 %

Remark: The test was carried out with the factory installed aerator

4.14 Sensitivity (NS-EN 817, Clause 10.7)

Method: Measuring the sensitivity at 0,3 MPa

Mixer	Passed	Not passed
Taurus 3-1	x	
Taurus 4-1	x	
Taurus 5-1	x	

Remark: See Appendix 1.

4.15 Mechanical strength 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
Taurus 3-1	6	x	
Taurus 4-1	6	x	
Taurus 5-1	6	x	

4.16 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
Taurus 3-1	70 000	x	
Taurus 4-1	70 000	x	
Taurus 5-1	70 000	x	

4.17 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
Taurus 3-1	30 000	x	
Taurus 4-1	30 000	x	
Taurus 5-1	30 000	x	

4.18 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
Taurus 3-1	80 000	x	
Taurus 4-1	80 000	-[1)]	
Taurus 5-1	80 000	x	

Remark 1): The mixer has a pull-out spout, hence there is no water pressure on the swivel joint.

4.19 Backflow protection (NS-EN 817, clause 13)

Method: EN 1717

Mixer	Result	
	Passed	Not passed
Taurus 3-1	x[1)]	
Taurus 4-1	x[2)]	
Taurus 5-1	x[1)]	

Remark 1: There is an airgap between the outlet and the highest level of sink
Remark 2: The mixers are equipped with a check valve on the outlet. The valve itself is not tested by SINTEF Community

4.20 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
Taurus 3-1	II	Fully open	L_{ap}	23	18	20	26	26	26
			l/s	0,13	0,13	0,17	0,16	0,17	0,22
		Max sound pressure	L_{ap}	23	18	20	26	26	26
			l/s	0,13	0,13	0,17	0,16	0,17	0,22
Taurus 4-1	I	Fully open	L_{ap}	15	15	19	19	23	24
			l/s	0,10	0,10	0,11	0,14	0,14	0,14
		Max sound pressure	L_{ap}	15	15	19	19	23	24
			l/s	0,10	0,10	0,11	0,14	0,14	0,14
Taurus 5-1	I	Fully open	L_{ap}	15	13	15	18	20	20
			l/s	0,12	0,12	0,14	0,15	0,16	0,17
		Max sound pressure	L_{ap}	18	16	18	21	22	26
			l/s	0,10	0,08	0,09	0,09	0,14	0,15

Measurement uncertainty ± 3 dB

Remark: The acoustic test was carried out with the factory installed aerator

4.21 Dry weight

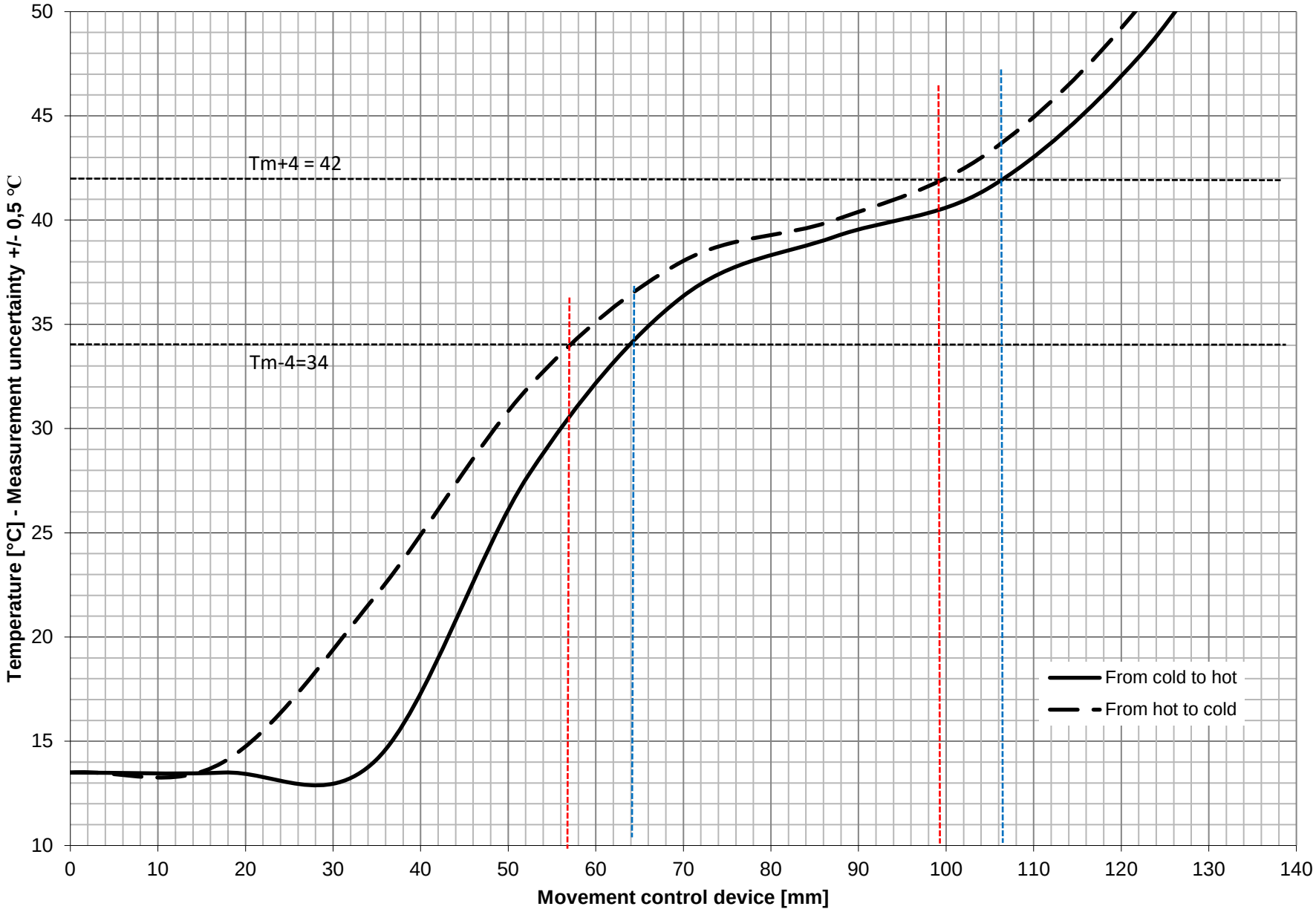
Method: Dry weight of mixer without connecting hose or copper pipe

Mixer	Result
	Weight (Grams)
Taurus 3-1	1680 [2)]
Taurus 4-1	2700 [1)]
Taurus 5-1	2007 [2)]

Remark 1: Weight is with supply hoses.
Remark 2: Weight is without supply hoses.

Oslo, 14.05.2020
SINTEF Community

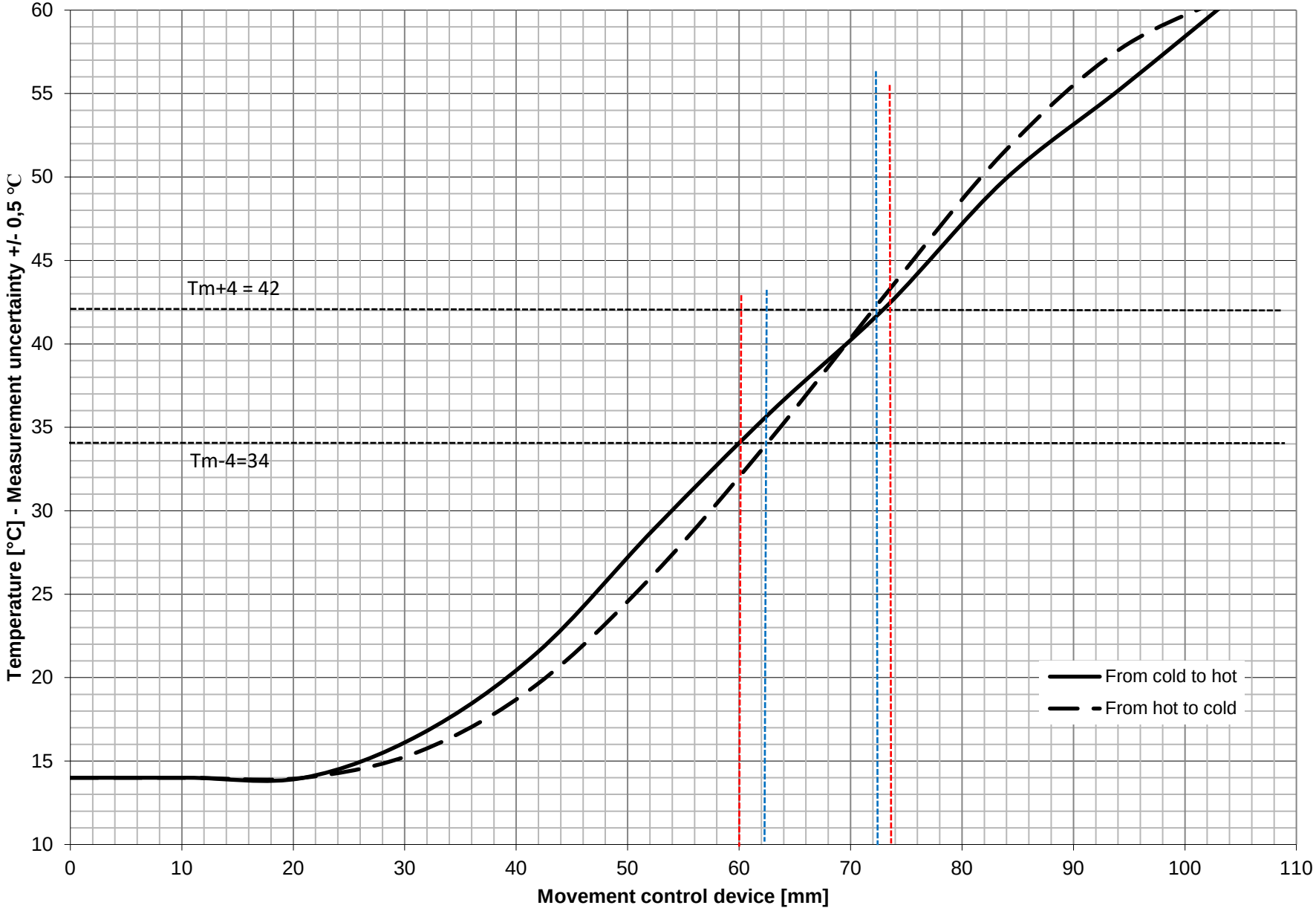
Geir Lippe Stavnes
Research Engineer



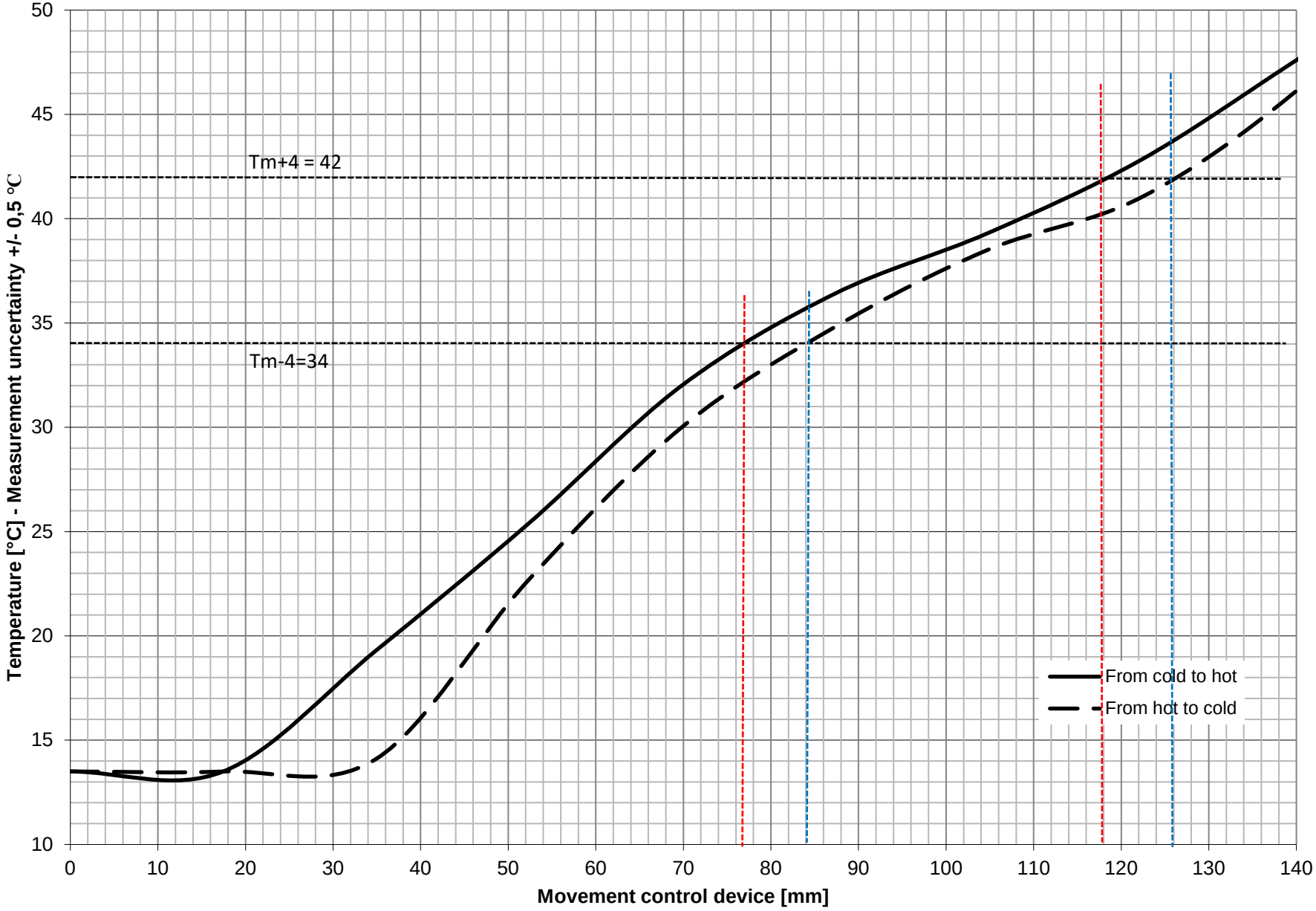
SINTEF Community

Taurus 3-1
Sensitivity

Appendix 1
Page 1



Taurus 4-1
Sensitivity



SINTEF Community

SINTEF

Taurus 5-1
Sensitivity

SINTEF Community

Appendix 2

Applied equipment - testing of Sanitary Tapware

		Equipment no.	*Type*
Capacity	Grundfos CR16-120		Pump
	Grundfos CR2		Pump
	Grundfos CR4		Pump
	Grundfos CRE4		Pump
	Heinrichs EP-H-309/UMF	3830 + 3832	Flow meter
	Heinrichs EP-P-010/UMF	3829 + 3831	Flow meter
	Heinrichs EP-P-008/UMF	3833 + 3834	Flow meter
Temperature	NBI Prod. Temp - Channel 40-45		Temperature sensor
	HMP233	M5335	Temperature sensor
Tightness	Leva M3 + P15RVA	M5344	Pump and pressure meter
	HMB Typ P4	M5807-5810	Pressure meter
	HBM/WE2108	M5332	Pressure meter
	HBM 1-TG001E	-	Logger/amplifier
	Kulite XTL-190SM-15BARA	4205	Pressure meter
	Druck PDCR 830	M5719	Pressure meter
Measurements	Saltuz DAZ	M5650	Torque meter
	NBI Prod. Torque	M6043	Torque meter
	Blankenholm thread gauges	M5232	Thread gauge
	Mitutoyo	M5386	Slide gauge
Acoustics	Norsonic environmental analyser 121	M5502	Sound analyser
	Norsonic environmental analyser 140		Sound analyser
	Norsonic sound calibrator type 1251	M5238	Calibrator
	Norsonic type 1201/18084		Microphone
Scales	Mettler AE 260 Deltarange	M5063	Scale
	Mettler PE 1600	M4906	Scale
	Sartorius Excellence	M5032	Scale
Misc.	Metrohm 794 Basic Titrino	M5950	pH meter
	HP3497A +HBM AE3407	M5655	Logger and amplifier
	Agilent Tech. A34980A + HBM AE3407	M5612	Logger and amplifier
	HBM 1-TG001E		Logger and amplifier
	Metrohm 827 pH lab	M5971	pH meter
	Ikamag RCT		heater/stirrer
	ELGA Purelab Option Q		Water deionizer
	Grundfos CR16-120		Pump