

Test Report No. 719189135-MEC10/01-CLC
dated 10 NOV 2010



PSB Singapore

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SUBJECT:

Testing of Tap/Fitting/Mixers.

TESTED FOR:

Vola A/S
Lunavej 2
DK 8700 Horsens
Denmark

Attn: Mr. Tommy Jorgenson

METHOD OF TEST:

PUB Requirement for Water Efficiency Labelling Scheme

BS EN 817 : 2008
Sanitary tapware – Mechanical mixer (PN 10) – General technical specifications

DESCRIPTION OF SAMPLE:

Product : Tap/Fittings/Mixers
Brand Name : Vola

S/N	Description	Model
1.	Free Standing Bathtub Faucet (with hand shower)	FS1

Note: Refer to APPENDIX for photo.



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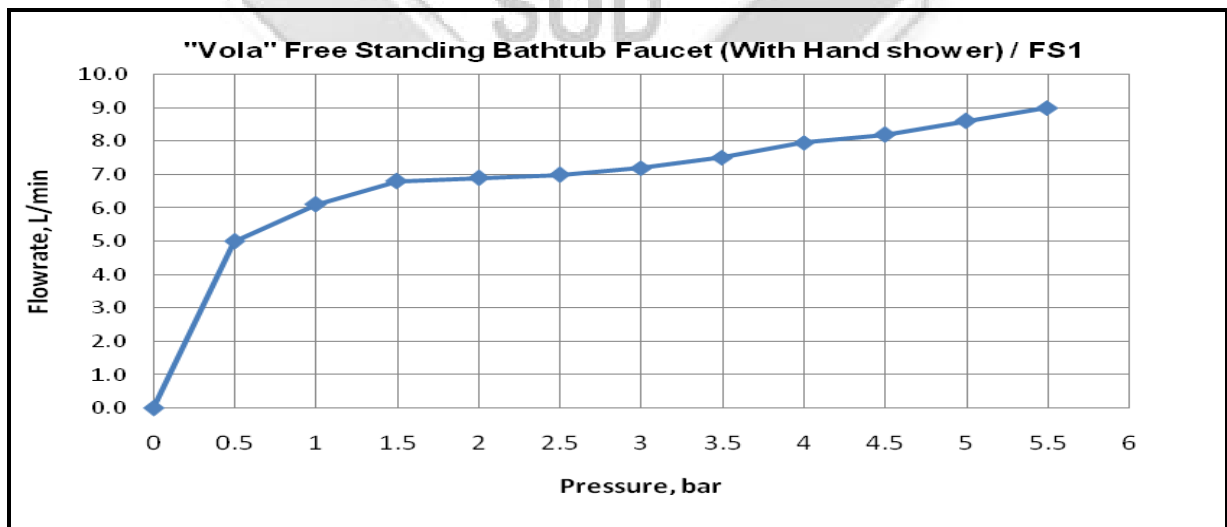
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TEST RESULTS:

Hydraulic Characteristics

- 1) Description: Free Standing Bathtub Faucet (With Hand shower)
Model: FS1

Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p>Products/Fittings Shower Taps & Mixers</p> <p>7 to 9 litres/min (1 tick) 5 to 7 litres/min (2 ticks) 5 litres/min or less (3 ticks)</p>	
0.5	5.0		
1.0	6.1		
1.5	6.8		
2.0	6.9		
2.5	7.0		
3.0	7.2		
3.5	7.5		
4.0	8.0		
4.5	8.2		
5.0	8.6		
5.5	9.0		



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TEST RESULTS:

(A1) Leaktightness Characteristics

Sample Reference	Free Standing Bathtub Faucet (with hand shower) FS1	BS EN 817 : 2008 Requirements
Characteristics		
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed	Clause 8.3.2 a) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls b) Verification of leaktightness of the obturator; Throughout the duration of the test there shall be no leakage of the obturator
Leaktightness of the mixing valve downstream of the obturator with the obturator open	Passed	Clause 8.4.3 Throughout the duration of the test there shall be no leakage or seepage through the walls
Leaktightness of the obturator: cross flow between hot water and cold water	Passed	Clause 8.7.2 Throughout the duration of the test, there shall be no leakage or seepage at the outlet or at the end of the unconnected inlet.

(B1) Hydraulic Characteristics

Sample Reference	Free Standing Bathtub Faucet (with hand shower) FS1	BS EN 817 : 2008 Requirements
Characteristics		
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	7.2**	Clause 10.6.3 The flow rate measured at 3.0 bar shall, depending on the type of appliance for which the mixing valve is intended, be as specified in Table 10 (Refer Appendix)
Determination of sensitivity; Supply pressure of 3.0 bar	Passed	Clause 10.7.5 The sensitivity measured shall, depending on the type of appliance for which the mixing valve is intended, be as specified in Table 11 (Refer Appendix)

****Non-compliance with BS EN 817 : 2008 requirements (Please refer to page 5 of 7)

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TEST RESULTS: Cont'd

(C1) Torsion Test

Sample Reference Characteristics	Free Standing Bathtub Faucet (with hand shower) FS1	BS EN 817 : 2008 Requirements
Submitting the operating mechanism to a given torque to verify its strength with no water supplied	Passed	Clause 11.2.5 There shall be no deformation or other deterioration which impairs the function of the mixing valve; the mixing valve shall satisfy the requirement for leaktightness.

(D1) Mechanical Performance under Pressure Characteristics

Sample Reference Characteristics	Free Standing Bathtub Faucet (with hand shower) FS1	BS EN 817 : 2008 Requirements
Mechanical behaviour upstream of the obturator - Obturator in the close position	Passed	Clause 9.4.2 Throughout the duration of the test, there shall be no permanent deformation of any part of the mixing valve
Mechanical behaviour downstream of the obturator - Obturator in the open position	Passed	Clause 9.5.2 There shall be no permanent deformation in any part of the mechanical mixing valve.

(E1) Mechanical Endurance Test of Diverter

Sample Reference Characteristics	Free Standing Bathtub Faucet (with hand shower) FS1	BS EN 817 : 2008 Requirements
Number of cycles : 30,000	Passed	Clause 12.2.4 Throughout the test, there shall be no incidents of leaks, failure of diverter to reset, blockage, etc.

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
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REMARKS:

S/N	Type of tap fittings	Model	BS EN 817 : 2008 Requirements	Characteristics
1.	Free Standing Bathtub Faucet (with hand shower)	FS1	Complied	A) Leaktightness Characteristics C) Torsion test D) Mechanical performance under pressure Characteristics E) Mechanical Endurance Characteristics (Diverter)

- a. The test samples complied with BS EN 817 : 2008 requirements except hydraulic characteristics.
- b. The hydraulic characteristics complied with SS CP 48: 2005 requirements.
- c. Effect on Water Reference : S08MEC07709-1A&1B-LYP dated 08/04/2009 and S08MEC07709-2A&2B-LYP dated 08/04/2009
- d. Metal toxicity Reference : S08MEC07709-EO dated 24/Apr/2009.
- e. Salt Spray Reference : S08MEC07709-PGK dated 01/Apr/2009.
- f. Head work Endurance Reference : 719171152-MEC10/01-CLC dated 12/Apr/2010.


Chua Lee Choong
Associate Engineer


Chua Peck Cheong
Product Manager
Automotive & Industrial Group
Mechanical Centre

APPENDIX:

Table 10- Flow rates according to application

Application of mixing valve	Requirement
With water saving:	
Basin, bidet, sink	(4.0 to 9.0) l/min [(0.066 to 0.15) l/s]
Without water saving:	
Basin, Bidet, sink, shower	Min 12.0 l/m (0.2 l/s) ^a
Bath	Min 19.0 l/min (0.316 l/s) (Full cold or full hot position)
	Min 20.0 l/min (0.33 l/s) in the range of (34°C to 44°C)

^aFor mixing valve with pull out spray or spray attachments or flexible supply hoses a minimum flow rate of 9.0 l/min (0.15 l/s) shall apply

*Table as per BS EN 817 : 2008

Table 11- Performance levels

Actuation of the mixing valve ^b	Basin, sink, bidet ^a	Shower, bath/shower at shower outlet only
Control devices with $r > 45\text{mm}$	Min 10mm	Min 12 mm
Control devices with $r \leq 45\text{mm}$	Min 10° angular or min 10 mm	Min 12° angular or min 12 mm

^aBasin, bidet or sink mixing valve are not tested if they are equipped with the same valve and control device as the shower and bath/shower mixing valve.

^bIncluding sequential mixing valve, joystick or any new technology

*Table as per BS EN 817 : 2008

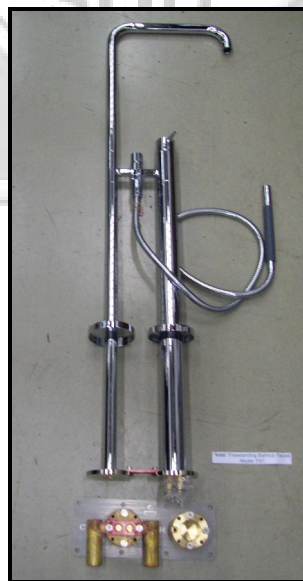


Photo 1. Free Standing Bathtub Faucet (with hand shower)
Model: FS1

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March 2010