Test Report No. 719182235-MEC10-CLC
dated 23 AUG 2010

PSB Singapore

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SUBJECT:

Testing of Tap/Fitting/Mixers.

TESTED FOR:

Hoe Kee Hardware Pte Ltd
8 Genting Road
#02-00, The Blue Building
Singapore 349472

Attn : Ms. Nancy Quah

METHOD OF TEST:

PUB Requirement for Water Efficiency Labelling Scheme

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

TÜV SÜD PSB

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PSB Singapore

DESCRIPTION OF SAMPLE:

Product : Tap/Fittings/Mixers
Brand Name : Blanco

S/N	Description	Model
1.	Sink Mixer	512322
2.	Sink mixer	512324
3.	Sink Mixer	514019
4.	Sink Mixer	512402
5.	Sink Mixer	514209
6.	Sink Mixer	512580
7.	Sink Mixer	515584
8.	Sink Mixer	515585
9.	Sink Mixer	516526
10.	Sink Mixer	516671
11.	Sink Mixer	516672
12.	Sink Mixer	515987
13.	Sink Mixer	513649

Note:

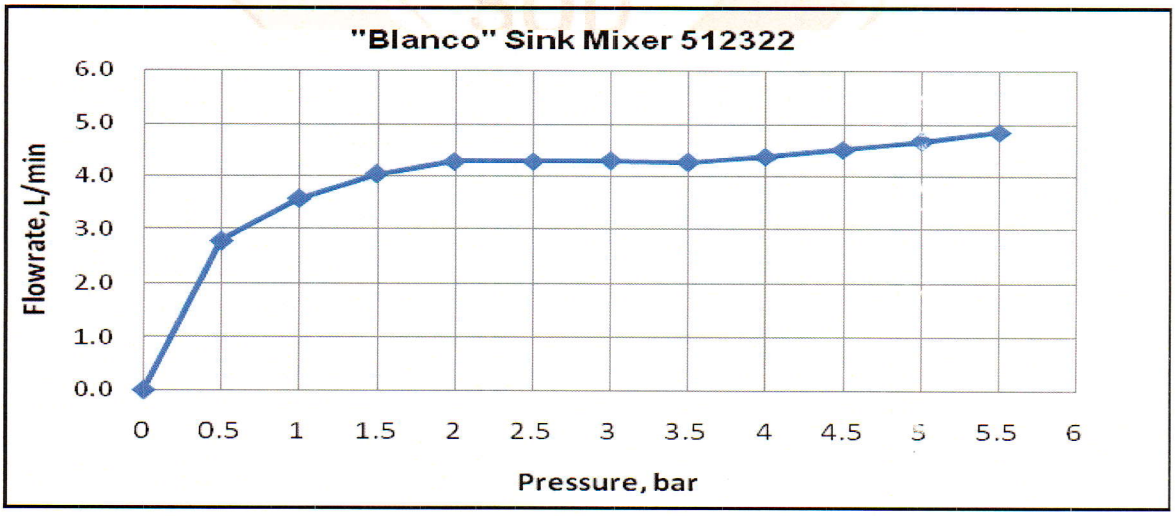
Refer to APPENDIX for photo.

TEST RESULTS:

Hydraulic Characteristics

1) **Description: Sink Mixer**
Model: 512322

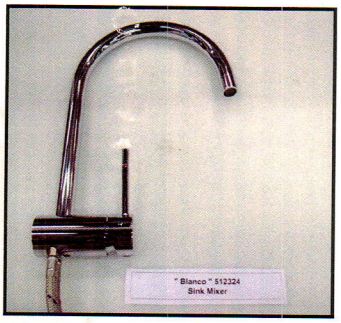
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.8		
1.0	3.6		
1.5	4.0		
2.0	4.3		
2.5	4.3		
3.0	4.3		
3.5	4.3		
4.0	4.4		
4.5	4.5		
5.0	4.7		
5.5	4.9		

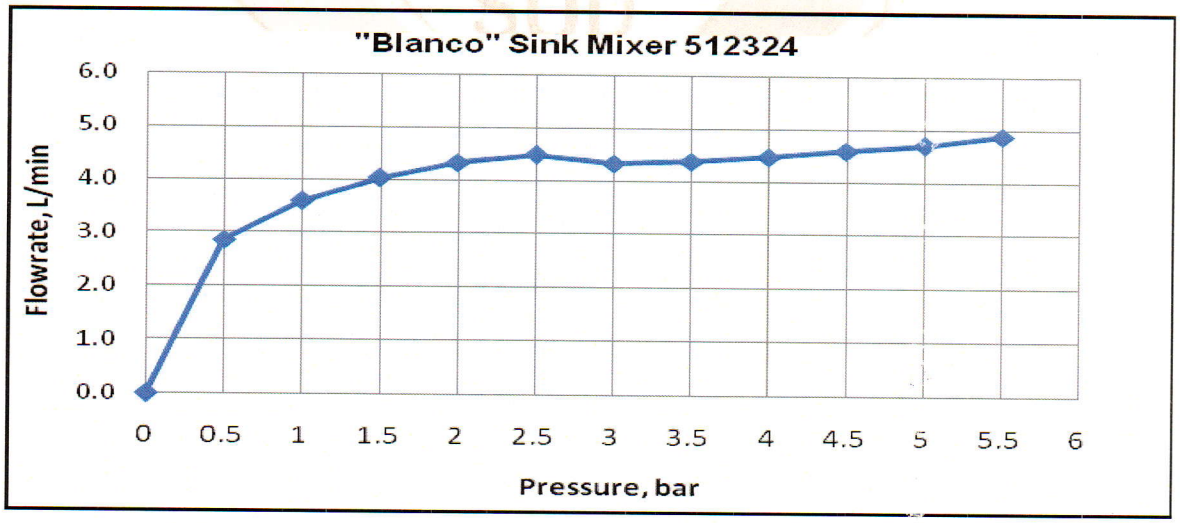


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

2) **Description: Sink mixer**
Model: 512324

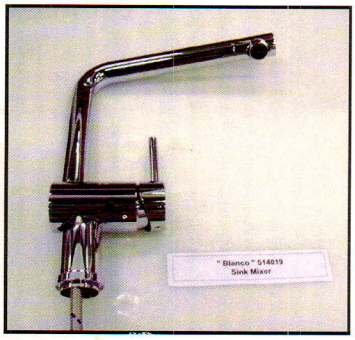
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.9		
1.0	3.6		
1.5	4.0		
2.0	4.3		
2.5	4.5		
3.0	4.3		
3.5	4.4		
4.0	4.5		
4.5	4.6		
5.0	4.7		
5.5	4.9		

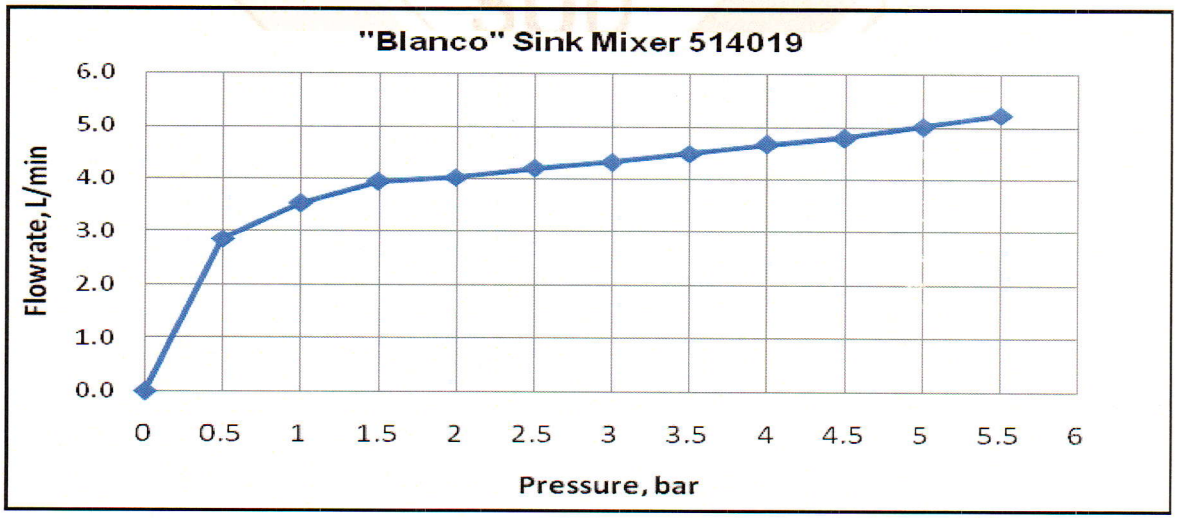


Hydraulic Characteristics

Hydraulic Characteristics

3) **Description: Sink Mixer**
Model: 514019

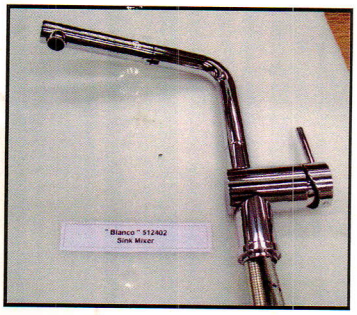
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.9		
1.0	3.5		
1.5	4.0		
2.0	4.0		
2.5	4.2		
3.0	4.3		
3.5	4.5		
4.0	4.7		
4.5	4.8		
5.0	5.0		
5.5	5.2		

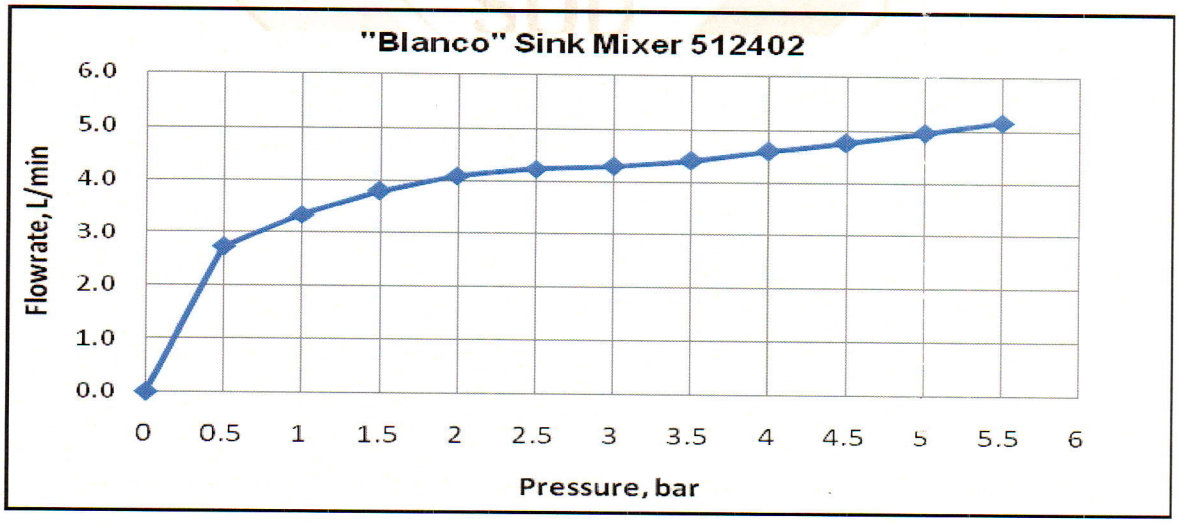


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

4) **Description: Sink Mixer**
Model: 512402

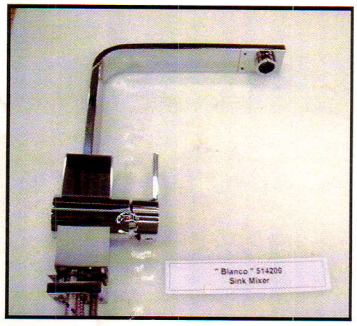
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.7		
1.0	3.4		
1.5	3.8		
2.0	4.1		
2.5	4.2		
3.0	4.3		
3.5	4.4		
4.0	4.6		
4.5	4.8		
5.0	5.0		
5.5	5.2		

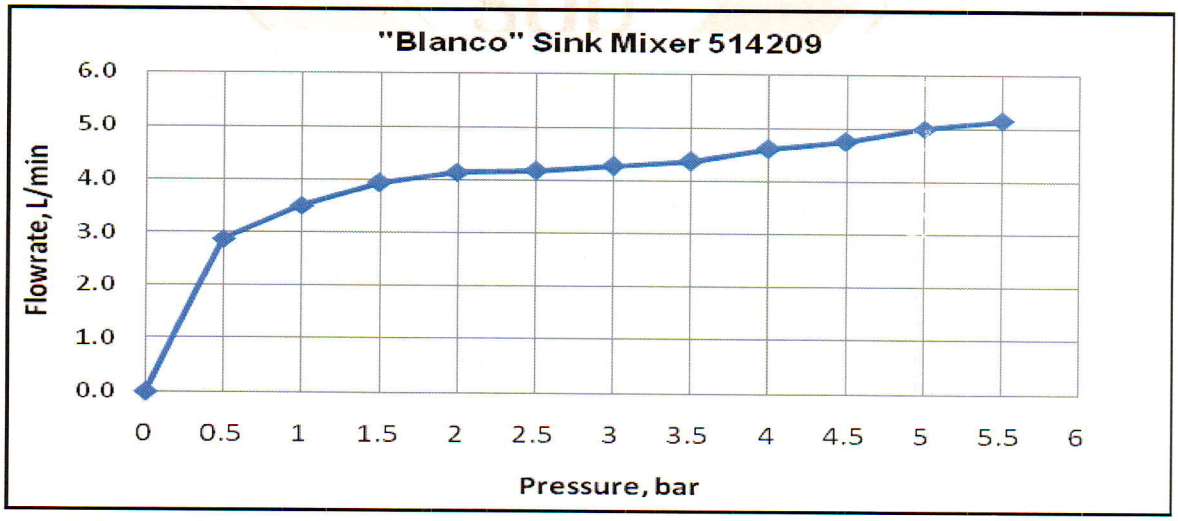


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

5) Description: Sink Mixer
Model: 514209

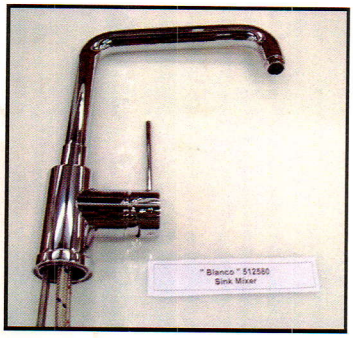
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.9		
1.0	3.5		
1.5	4.0		
2.0	4.2		
2.5	4.2		
3.0	4.3		
3.5	4.4		
4.0	4.6		
4.5	4.8		
5.0	5.0		
5.5	5.2		

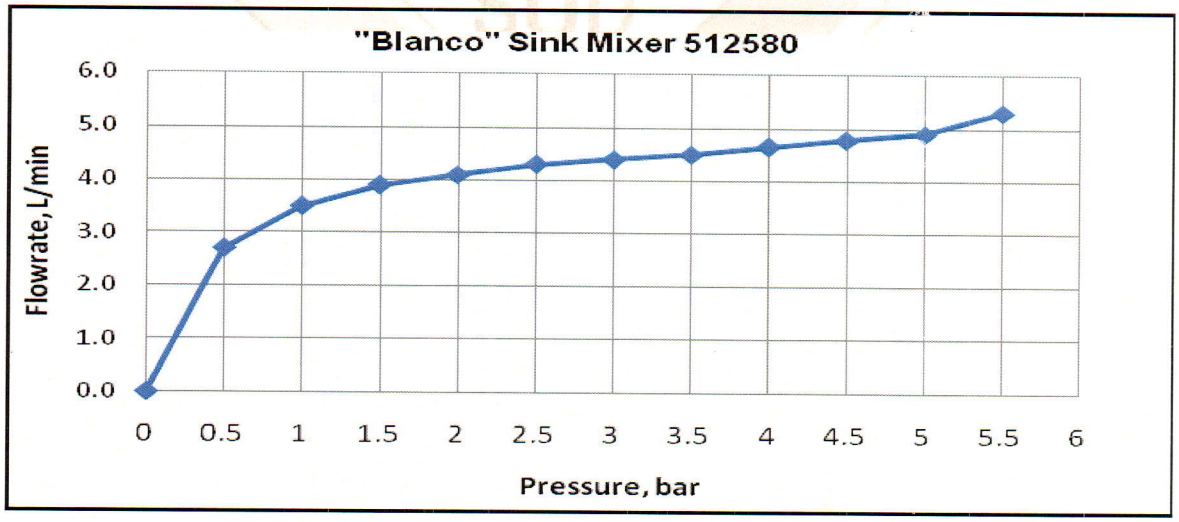


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

6) **Description: Sink Mixer**
Model: 512580

Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.7		
1.0	3.5		
1.5	3.9		
2.0	4.1		
2.5	4.3		
3.0	4.4		
3.5	4.5		
4.0	4.7		
4.5	4.8		
5.0	4.9		
5.5	5.3		

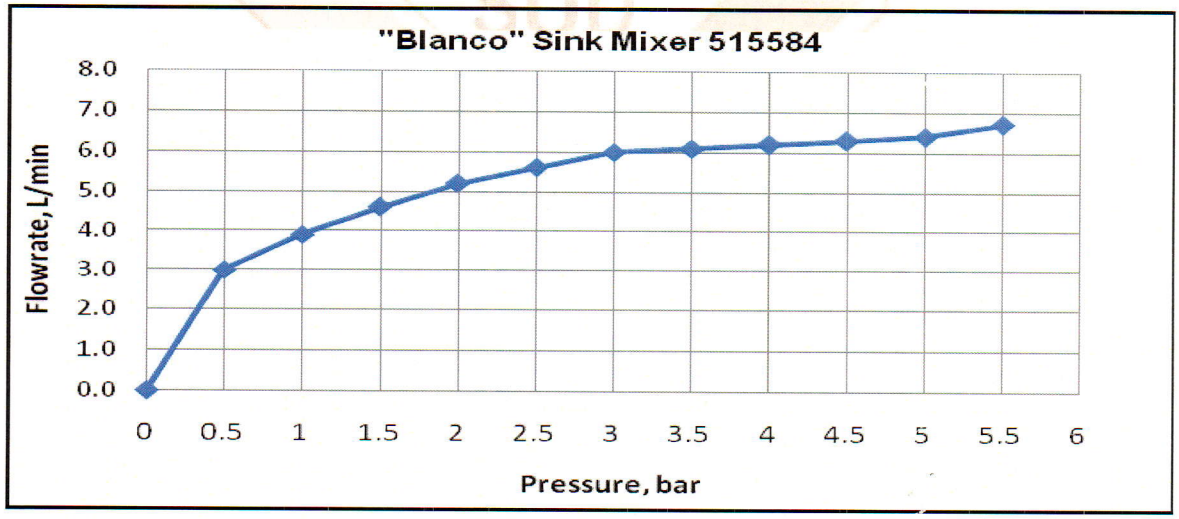


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

7) **Description: Sink Mixer**
Model: 515584

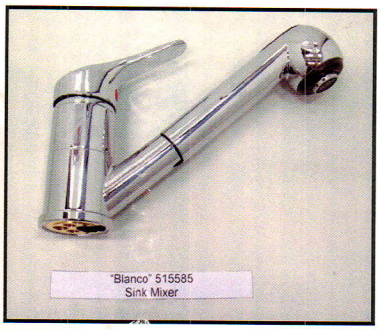
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks))	
0.5	3.0		
1.0	3.9		
1.5	4.6		
2.0	5.2		
2.5	5.6		
3.0	6.0		
3.5	6.1		
4.0	6.2		
4.5	6.3		
5.0	6.4		
5.5	6.7		

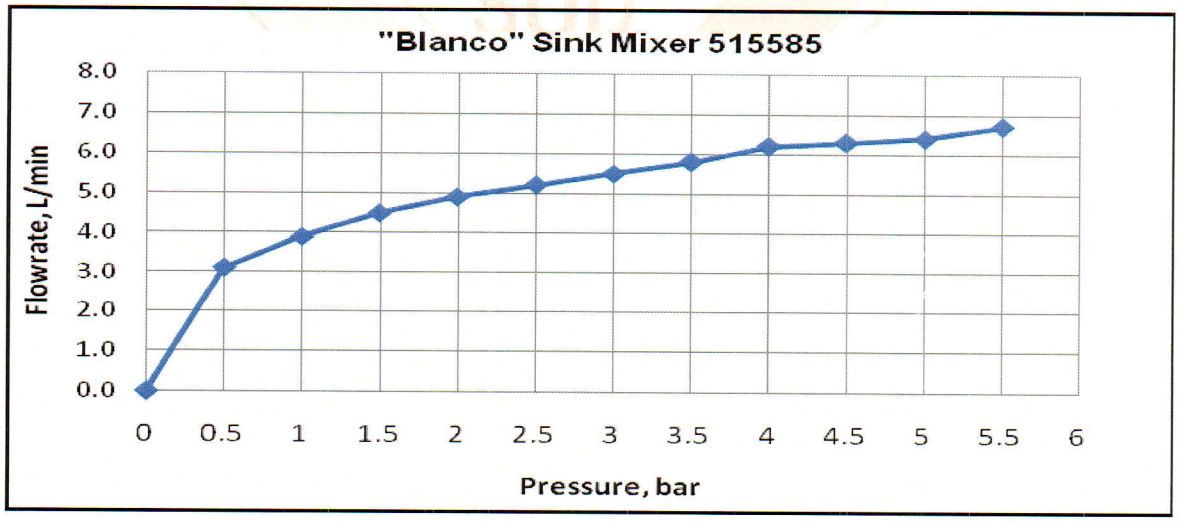


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

8) **Description: Sink Mixer**
Model: 515585

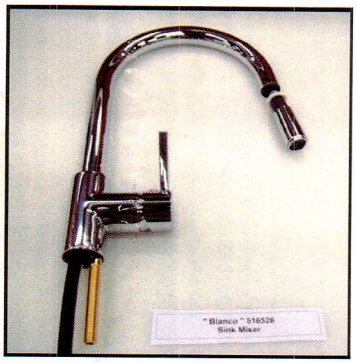
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks))	
0.5	3.1		
1.0	3.9		
1.5	4.5		
2.0	4.9		
2.5	5.2		
3.0	5.5		
3.5	5.8		
4.0	6.2		
4.5	6.3		
5.0	6.4		
5.5	6.7		

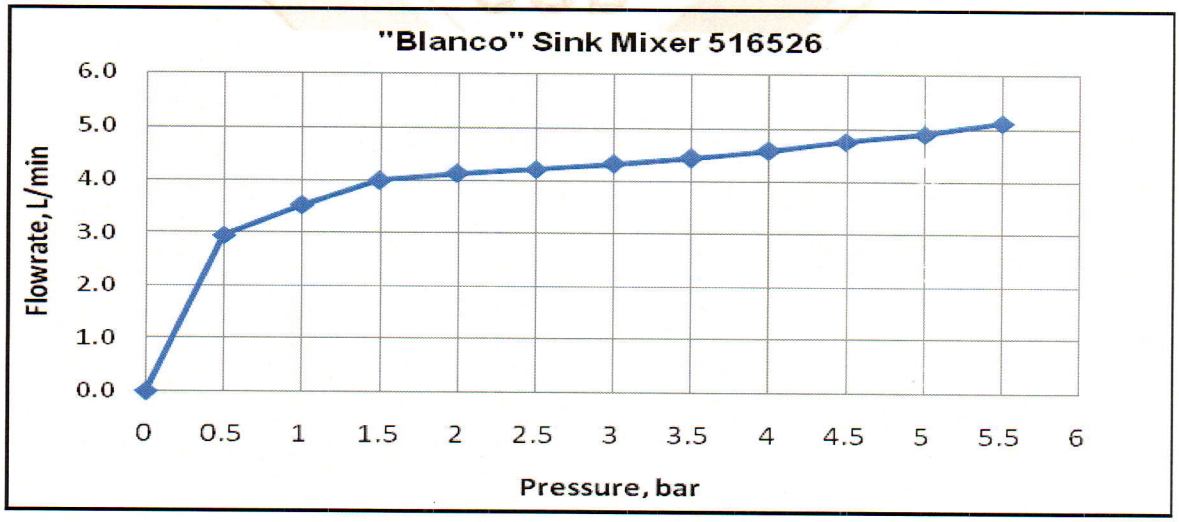


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

9) Description: Sink Mixer
Model: 516526

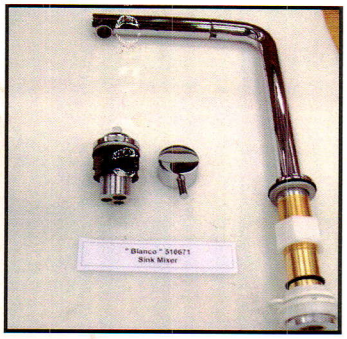
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks))	
0.5	3.0		
1.0	3.5		
1.5	4.0		
2.0	4.1		
2.5	4.2		
3.0	4.3		
3.5	4.4		
4.0	4.6		
4.5	4.8		
5.0	4.9		
5.5	5.1		

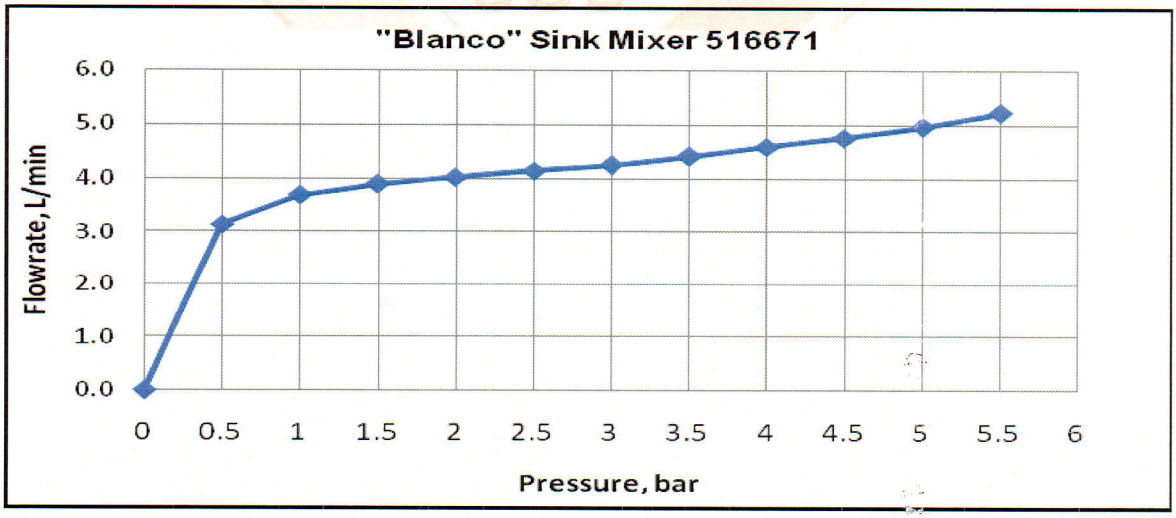


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

10) Description: Sink Mixer
Model: 516671

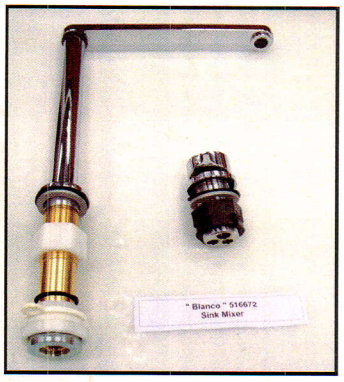
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	3.1		
1.0	3.7		
1.5	3.9		
2.0	4.0		
2.5	4.2		
3.0	4.3		
3.5	4.4		
4.0	4.6		
4.5	4.8		
5.0	5.0		
5.5	5.2		

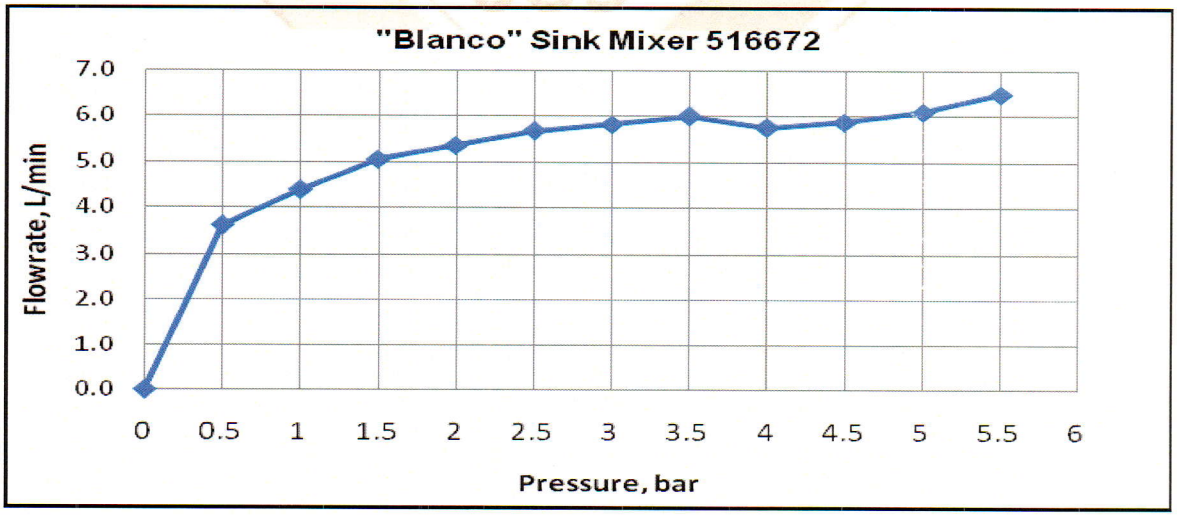


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

11) Description: Sink Mixer
Model: 516672

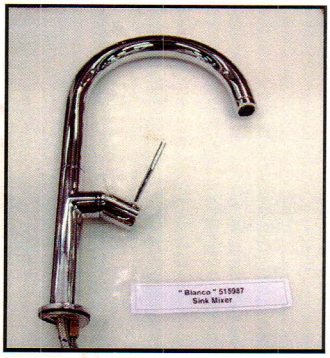
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks))	
0.5	3.6		
1.0	4.4		
1.5	5.1		
2.0	5.4		
2.5	5.7		
3.0	5.8		
3.5	6.0		
4.0	5.8		
4.5	5.9		
5.0	6.1		
5.5	6.5		

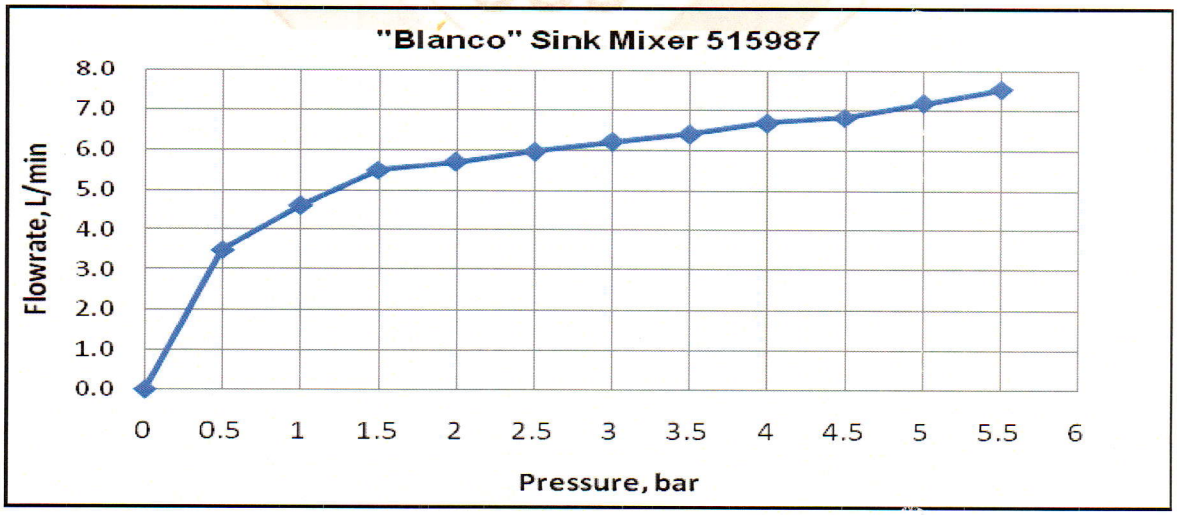


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

12) Description: Sink Mixer
Model: 515987

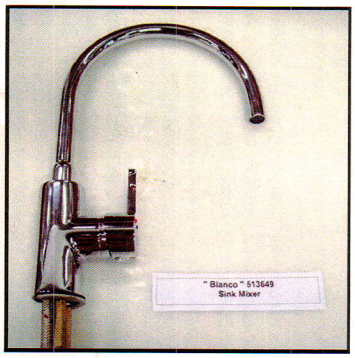
Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	3.5		
1.0	4.6		
1.5	5.5		
2.0	5.7		
2.5	6.0		
3.0	6.2		
3.5	6.4		
4.0	6.7		
4.5	6.8		
5.0	7.2		
5.5	7.5		

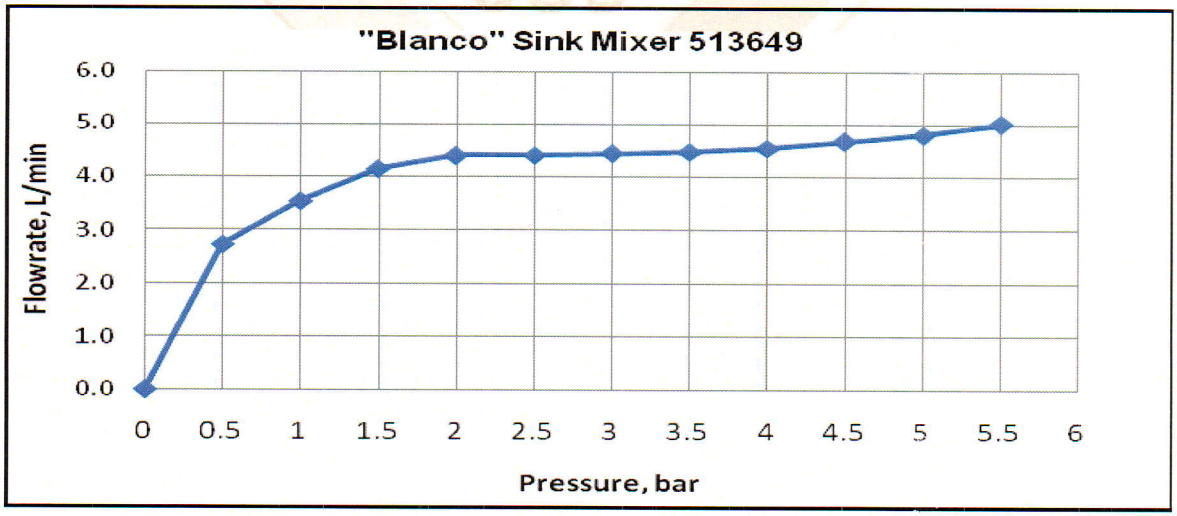


TEST RESULTS: (Cont'd)

Hydraulic Characteristics

13) Description: Sink Mixer
Model: 513649

Flow Pressure (bar)	Flow Rate (litres/min)	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	**Products/Fittings** Sink Taps & Mixers/Bib Taps 6 to 8 litres/min (1 tick) 4 to 6 Litres/min (2 ticks) 4 litres/min or less (3 ticks)	
0.5	2.7		
1.0	3.5		
1.5	4.2		
2.0	4.4		
2.5	4.4		
3.0	4.4		
3.5	4.5		
4.0	4.6		
4.5	4.7		
5.0	4.8		
5.5	5.0		



TEST RESULTS:

(A1) Leaktightness Characteristics

Sample Reference Characteristics	Sink mixer 516672	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed 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 Characteristics	Sink mixer 516672	BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	5.8**	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 28 of 35)

TEST RESULTS: Cont'd

(C1) Torsion Test

Sample Reference / Characteristics	Sink mixer 516672	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	Sink mixer 516672	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 Characteristics

Sample Reference / Characteristics	Sink mixer 516672	BS EN 817 : 2008 Requirements
70,000 cycles of opening & closing	Passed	Clause 12.1.2 During the test, no component fracture, sticking or leakage shall occur.

TEST RESULTS:

(A2) Leaktightness Characteristics

Sample Reference Characteristics	Sink mixer 512580	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed Passed	Clause 8.3.2 c) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls d) 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.

(B2) Hydraulic Characteristics

Sample Reference Characteristics	Sink mixer 512580	BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	4.4**	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 28 of 35)

TEST RESULTS: Cont'd

(C2) Torsion Test

Sample Reference / Characteristics	Sink mixer 512580	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.

(D2) Mechanical Performance under Pressure Characteristics

Sample Reference / Characteristics	Sink mixer 512580	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.

(E2)Mechanical Endurance Test of Swivel spout

Sample Reference / Characteristics	Sink mixer 512580	BS EN 817 : 2008 Requirements
Number of cycles : 80,000	Passed	Clause 12.3.4 During the test, there shall be no deformation, fracture of the swivel nozzle or the device connecting it to the body or any leakage of the assembly

(A3) Leaktightness Characteristics

Sample Reference Characteristics	Sink mixer 515584	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed Passed	Clause 8.3.2 e) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls f) 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.

(B3) Hydraulic Characteristics

Sample Reference Characteristics	Sink mixer 515584	BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	6.0**	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 28 of 35)

TEST RESULTS: Cont'd

(C3) Torsion Test

Sample Reference / Characteristics	Sink mixer 515584	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.

(D3) Mechanical Performance under Pressure Characteristics

Sample Reference / Characteristics	Sink mixer 515584	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.

(E3) Mechanical Endurance Characteristics

Sample Reference / Characteristics	Sink mixer 515584	BS EN 817 : 2008 Requirements
70,000 cycles of opening & closing	Passed	Clause 12.1.2 During the test, no component fracture, sticking or leakage shall occur.

TEST RESULTS:

(A4) Leaktightness Characteristics

Sample Reference Characteristics	Sink mixer 515585	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed Passed	Clause 8.3.2 g) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls h) 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.

(B4) Hydraulic Characteristics

Sample Reference Characteristics	Sink mixer 515585	BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	5.5**	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 28 of 35)

TEST RESULTS: Cont'd

(C4) Torsion Test

Sample Reference / Characteristics	Sink mixer 515585	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.

(D4) Mechanical Performance under Pressure Characteristics

Sample Reference / Characteristics	Sink mixer 515585	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.

(E4)Mechanical Endurance Test of Swivel spout

Sample Reference / Characteristics	Sink mixer 515585	BS EN 817 : 2008 Requirements
Number of cycles : 80,000	Passed	Clause 12.3.4 During the test, there shall be no deformation, fracture of the swivel nozzle or the device connecting it to the body or any leakage of the assembly

TEST RESULTS:

(A5) Leaktightness Characteristics

Sample Reference / Characteristics	Sink mixer 512322,512324 514019,512402	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed Passed	Clause 8.3.2 i) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls j) 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.

(B5) Hydraulic Characteristics

Sample Reference / Characteristics	Sink mixer		BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	512322	4.3**	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)
	512324	4.3**	
	514019	4.3**	
	512402	4.3**	
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 28 of 35)

TEST RESULTS: Cont'd

(C5) Torsion Test

Sample Reference / Characteristics	Sink mixer 512322,512324 514019,512402	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.

(D5) Mechanical Performance under Pressure Characteristics

Sample Reference / Characteristics	Sink mixer 512322,512324 514019,512402	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.

TEST RESULTS:

(A6) Leaktightness Characteristics

Sample Reference / Characteristics	Sink mixer 514209,516526 516671,515987 513549	BS EN 817 : 2008 Requirements
Leaktightness of the obturator and of the mixing valve upstream of the obturator with the obturator in the closed position	Passed Passed	Clause 8.3.2 k) Verification of leaktightness upstream of the obturator; Throughout the duration of the test there shall be no leakage or seepage through the walls l) 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.

(B6) Hydraulic Characteristics

Sample Reference / Characteristics	Sink mixer		BS EN 817 : 2008 Requirements
Determination of Flow rate; Test at 3.0 bar dynamic reference pressure	514209	4.4**	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)
	516526	4.3**	
	516671	4.3**	
	515987	6.2**	
	513549	4.4**	
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 28 of 35)

TEST RESULTS: Cont'd

(C6) Torsion Test

Sample Reference / Characteristics	Sink mixer 514209,516526 516671,515987 513549	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.

(D6) Mechanical Performance under Pressure Characteristics

Sample Reference / Characteristics	Sink mixer 514209,516526 516671,515987 513549	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.

REMARKS:

S/N	Type of tap fittings	Model	BS EN 817 : 2008 Requirements	Characteristics
1.	Sink Mixer	512322	Complied	A) Leaktightness Characteristics C) Torsion test D) Mechanical performance under pressure Characteristics E) Mechanical Endurance
2.	Sink mixer	512324	Complied	
3.	Sink Mixer	514019	Complied	
4.	Sink Mixer	512402	Complied	
5.	Sink Mixer	514209	Complied	
6.	Sink Mixer	512580	Complied	
7.	Sink Mixer	515584	Complied	
8.	Sink Mixer	515585	Complied	
9.	Sink Mixer	516526	Complied	
10.	Sink Mixer	516671	Complied	
11.	Sink Mixer	516672	Complied	
12.	Sink Mixer	515987	Complied	
13.	Sink Mixer	513649	Complied	

a. The test samples complied with BS EN 817 : 2008 requirements except hydraulic characteristics which complied with SS CP 48 : 2005 requirements.

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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)
[a]For 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>45mm	Min 10mm	Min 12 mm
Control deviceswith r≤45mm	Min 10° angular or min 10 mm	Min 12° angular or min 12 mm
[a]Basin, 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. [b]Including sequential mixing valve, joystick or any new technology		

*Table as per BS EN 817 : 2008

APPENDIX: Cont'd

Photo 1. Sink Mixer
Model: 512322

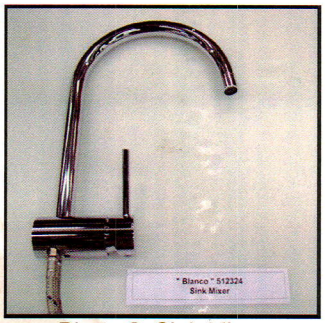

Photo 2. Sink Mixer
Model: 512324

Photo 3. Sink Mixer
Model: 514019

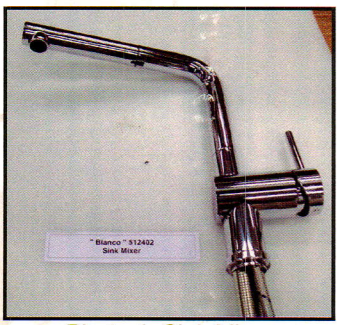

Photo 4. Sink Mixer
Model: 512402

APPENDIX: Cont'd

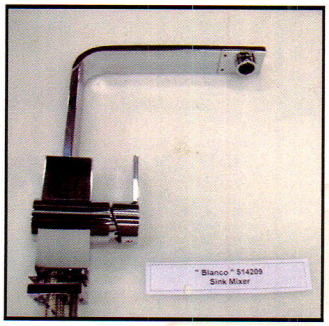

Photo 5. Sink Mixer
Model: 514209

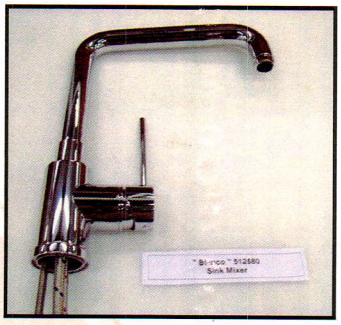

Photo 6 : Sink Mixer
Model: 512580

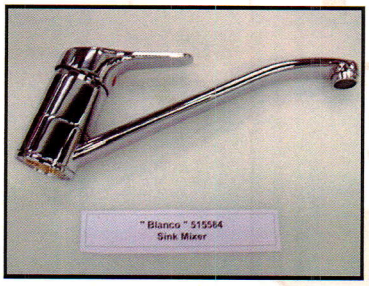

Photo 7 : Sink Mixer
Model: 515584

Photo 8 : Sink Mixer
Model: 515585

APPENDIX: Cont'd

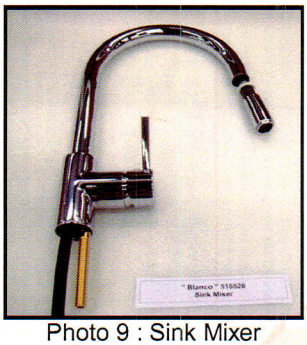

Photo 9 : Sink Mixer
Model: 516526

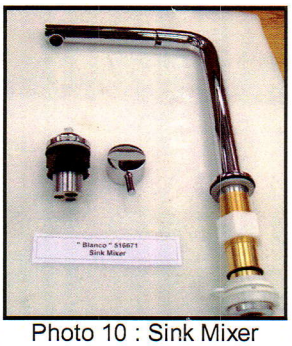

Photo 10 : Sink Mixer
Model: 516671

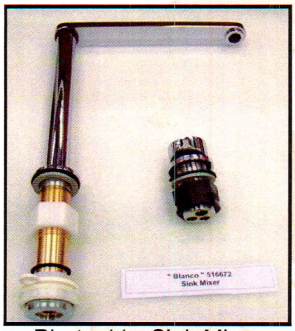

Photo 11 : Sink Mixer
Model: 516672

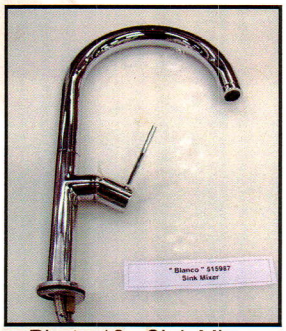

Photo 12 : Sink Mixer
Model: 515987

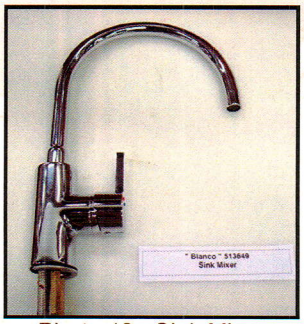

Photo 13 : Sink Mixer
Model: 513549

Test Results Summary (Ref : 719182235-MEC10-CLC)

Test Standard : BS EN 817:2008, BS EN 248:2002, AS/NZS:4020:2005, SS375 :2001

Product, Model	Tests Instructions	Leaktightness, Torsion Resistance & Mechanical Performance	Hydraulic	Endurance			Effect on Water	Metal Toxicity	Salt Spray
				Headwork	Swivel	Diverter			
Sink mixer 516672 512580 512322 512324 514019 512402	If done, Pass/Fail	Pass	Pass*	Pass 516672	Pass 512580	N.A.	Pass[1]	Pass[2]	Pass[3]
	If not done, reference	-	-	-	-	-	-	-	-
	If not done, no reference	-	-	-	-	-	-	-	-
Sink mixer 515584 515585	If done, Pass/Fail	Pass	Pass*	Pass 515584	Pass 515585	N.A.	Pass[1]	Pass[2]	Pass[3]
	If not done, reference	-	-	-	-	-	-	-	-
	If not done, no reference	-	-	-	-	-	-	-	-

"*"The test sample complied with BS EN 817 : 2008 requirements except hydraulic characteristics which complied with SS CP 48 : 2005 requirements.

"1" Effect on Water Reference : 719182235-CHM-A&B-LYP dated 17/Aug/2010
"2" Metal Toxicity Reference : 719182235-MEC10-EO dated 21/Aug/2010
"3" Salt Spray Reference : 719182235-CHM10-02-PGK(MEC) dated 29 Sep 2010

PSB Singapore

Test Results Summary (Ref : 719182235-MEC10-CLC)

Test Standard : BS EN 817:2008, BS EN 248:2002, AS/NZS:4020:2005, SS375 :2001

Product, / Model	Tests / Instructions	Leaktightness, Torsion Resistance & Mechanical Performance	Hydraulic	Endurance			Effect on Water	Metal Toxicity	Salt Spray
				Headwork	Swivel	Diverter			
Sink mixer 514209 516526 516671 515987 513549	If done, Pass/Fail	Pass	Pass*	-	-	N.A.	Pass[1]	Pass[2]	Pass[3]
	If not done, reference	-	-	Pass 516672	Pass 512580	-	-	-	-
	If not done, no reference	-	-	-	-	-	-	-	-

"*"The test sample complied with BS EN 817 : 2008 requirements except hydraulic characteristics which complied with SS CP 48 : 2005 requirements.

"1" Effect on Water Reference : 719182235-CHM-A&B-LYP dated 17/Aug/2010
"2" Metal Toxicity Reference : 719182235-MEC10-EO dated 21/Aug/2010
"3" Salt Spray Reference : 719182235-CHM10-02-PGK(MEC) dated 29 Sep 2010

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March 2010