

**Test Report No. 719171152-MEC10/04-CLC**  
dated 12 MAY 2010



PSB Singapore

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**SUBJECT:**

Testing of Tap/Fitting/Mixers.

**TESTED FOR:**

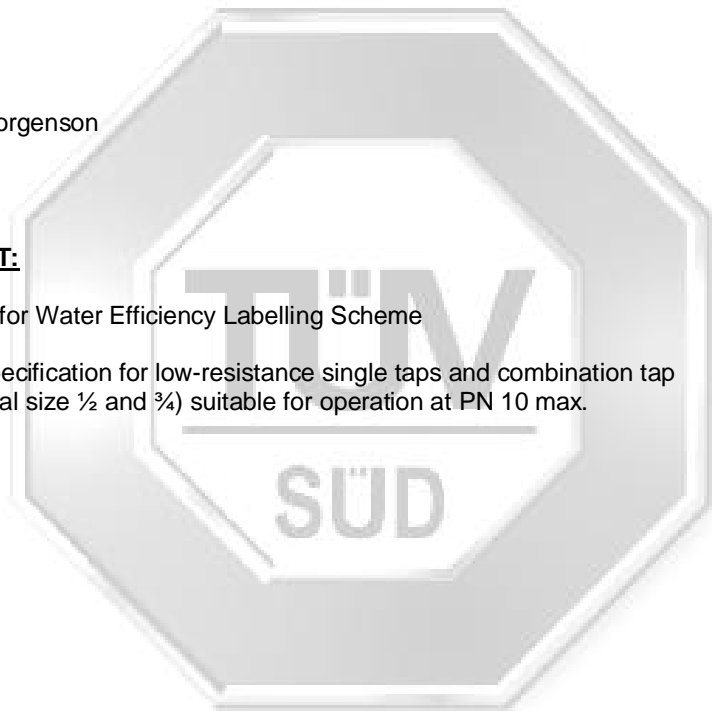
Vola A/S  
Lunavej 2  
DK 8700 Horsens  
Denmark

Attn: Mr. Tommy Jorgenson

**METHOD OF TEST:**

PUB Requirement for Water Efficiency Labelling Scheme

BS 5412 : 1996 Specification for low-resistance single taps and combination tap assemblies (nominal size ½ and ¾) suitable for operation at PN 10 max.



*Chr*

*Edithy*



TÜV SÜD PSB

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**DESCRIPTION OF SAMPLE:**

Product : Tap/Fittings/Mixers  
Brand Name : Vola

S/N	Description	Model
1.	One-handle mixer for bath filling	BK 2
2.	One-handle mixer for bath filling with Hand shower	BK 3
3.	Two-handle mixer for bath filling with Hand shower	BK 4
4.	Two-handle mixer for bath filling with 360° double swivel spout	BK 6
5.	Two-handle mixer for bath filling with swivel spout	BK 8
6.	One-handle mixer for bath filling with 360° double swivel spout and hand shower	BK 10
7.	Two-handle mixer for bath filling with 360° double swivel spout and hand shower	BK 11
8.	One-handle mixer for bath filling with swivel spout and hand shower	BK 12

**Note:**

Refer to APPENDIX for photo.



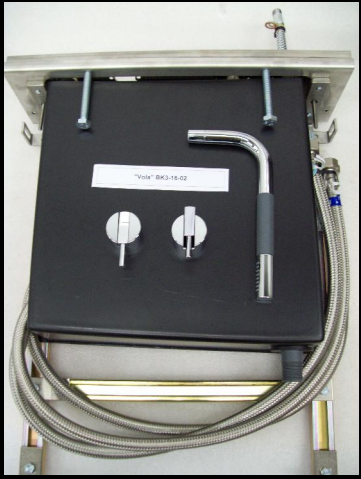
*Cher*

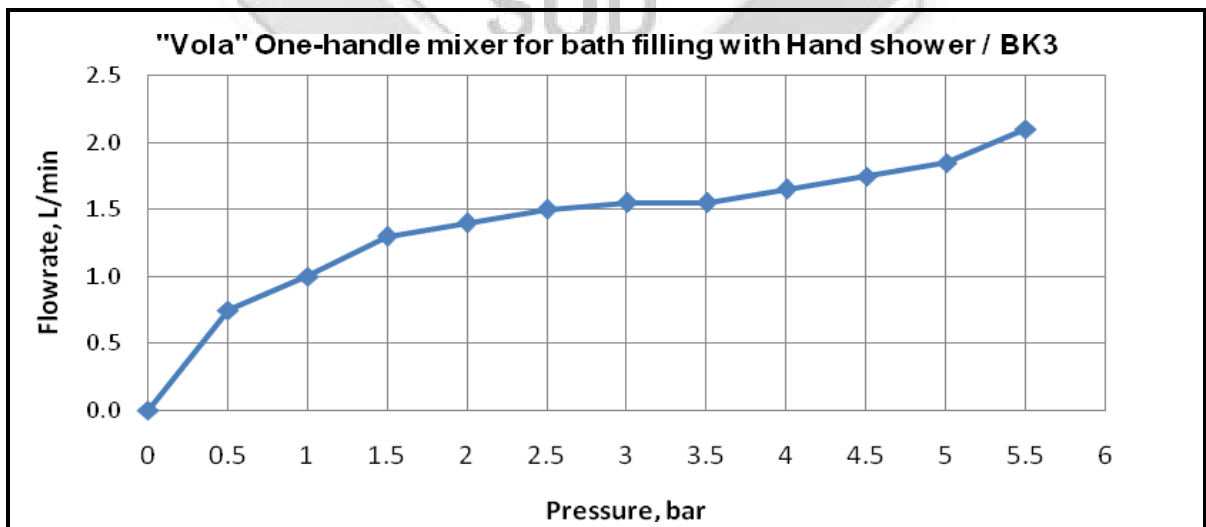
*Aldehmy*

**TEST RESULTS:**

**Hydraulic Characteristics**

- 1) Description: One-handle mixer for bath filling with Hand shower  
Model: BK3

Flow Pressure ( bar )	Flow Rate ( litres/min )	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p><b>Products/Fittings</b> Shower Taps &amp; 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	0.8		
1.0	1.0		
1.5	1.3		
2.0	1.4		
2.5	1.5		
3.0	1.6		
3.5	1.6		
4.0	1.7		
4.5	1.8		
5.0	1.9		
5.5	2.1		



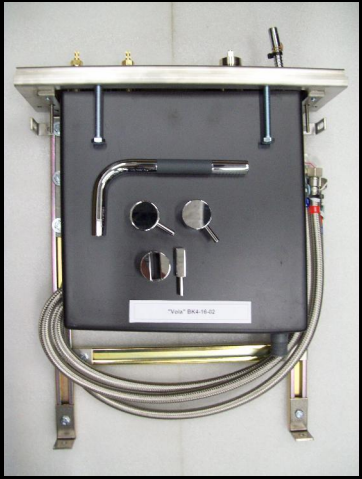
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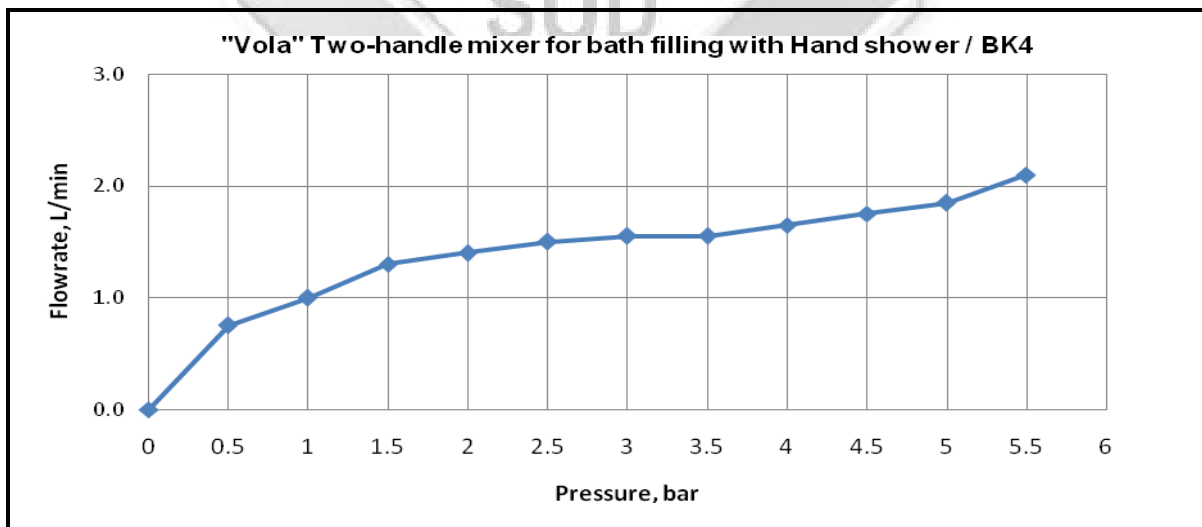
*Alshay*

**TEST RESULTS: (Cont'd)**

**Hydraulic Characteristics**

2) Description: Two-handle mixer for bath filling with Hand shower  
Model: BK4

Flow Pressure ( bar )	Flow Rate ( litres/min )	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p><b>Products/Fittings</b> Shower Taps &amp; 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	0.8		
1.0	1.0		
1.5	1.3		
2.0	1.4		
2.5	1.5		
3.0	1.6		
3.5	1.6		
4.0	1.7		
4.5	1.8		
5.0	1.9		
5.5	2.1		



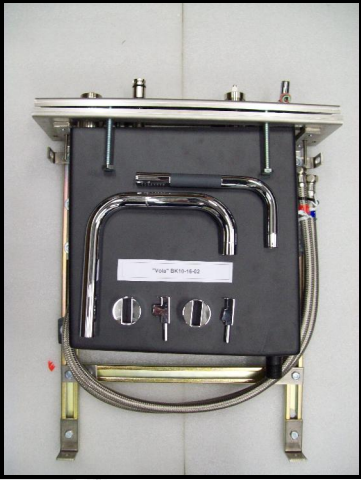
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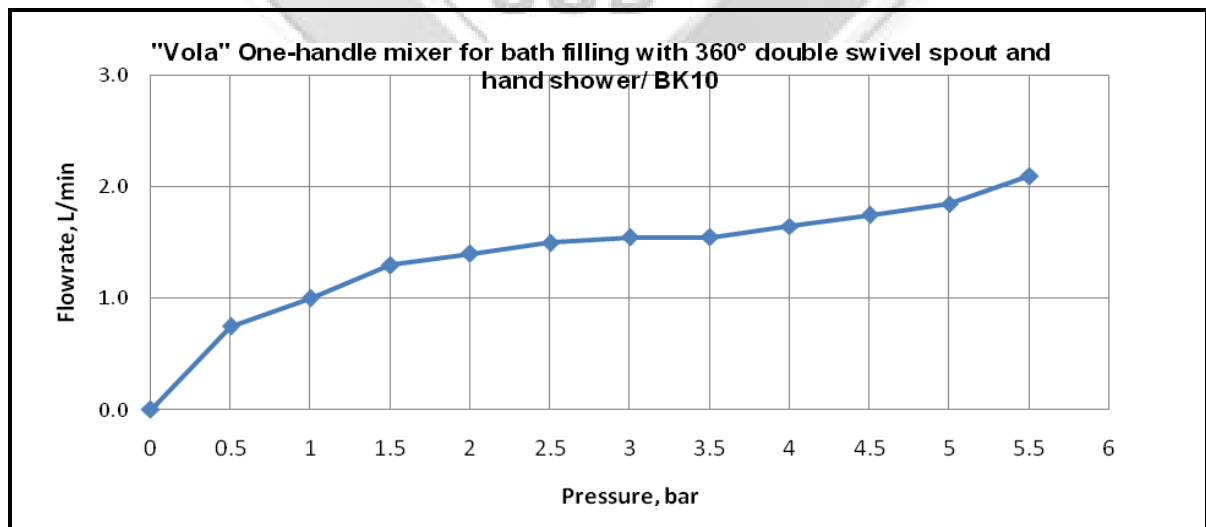
*Edshing*

**TEST RESULTS: (Cont'd)**

**Hydraulic Characteristics**

3) Description: One-handle mixer for bath filling with 360° double swivel spout and hand shower  
Model: BK10

Flow Pressure ( bar )	Flow Rate ( litres/min )	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p><b>Products/Fittings</b> Shower Taps &amp; 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	0.8		
1.0	1.0		
1.5	1.3		
2.0	1.4		
2.5	1.5		
3.0	1.6		
3.5	1.6		
4.0	1.7		
4.5	1.8		
5.0	1.9		
5.5	2.1		



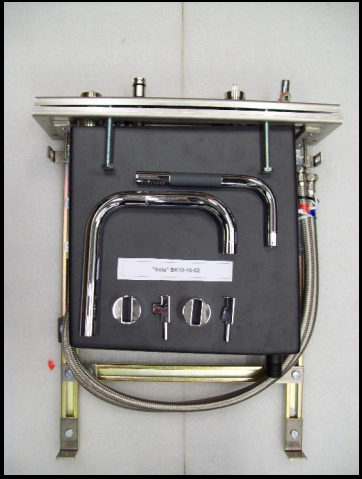
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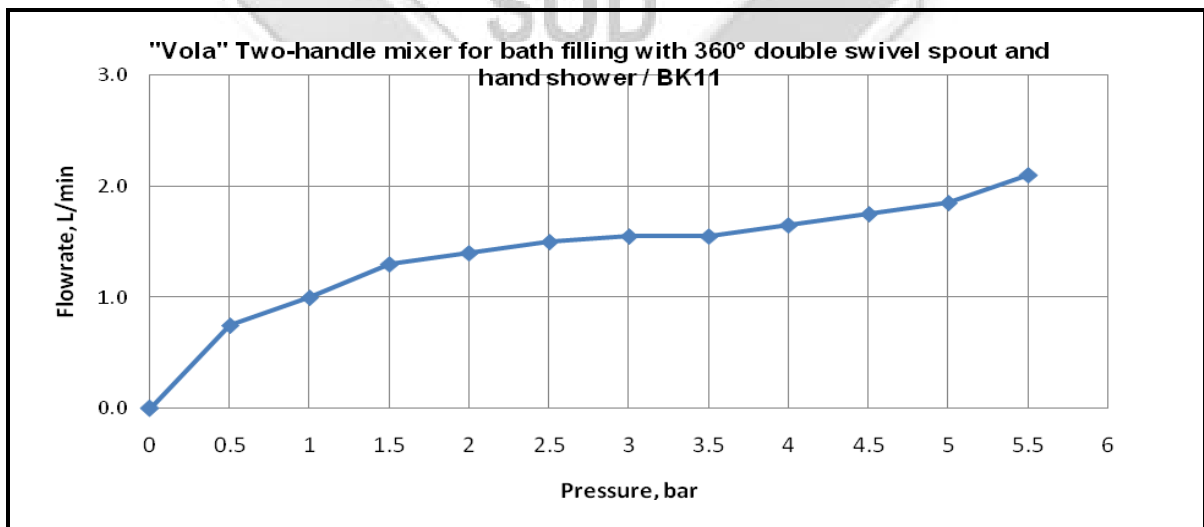
*Aldehuy*

**TEST RESULTS: (Cont'd)**

**Hydraulic Characteristics**

4) Description: Two-handle mixer for bath filling with 360° double swivel spout and hand shower  
Model: BK11

Flow Pressure ( bar )	Flow Rate ( litres/min )	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p><b>Products/Fittings</b> Shower Taps &amp; 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	0.8		
1.0	1.0		
1.5	1.3		
2.0	1.4		
2.5	1.5		
3.0	1.6		
3.5	1.6		
4.0	1.7		
4.5	1.8		
5.0	1.9		
5.5	2.1		



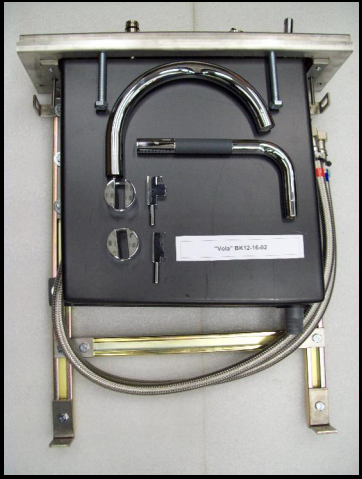
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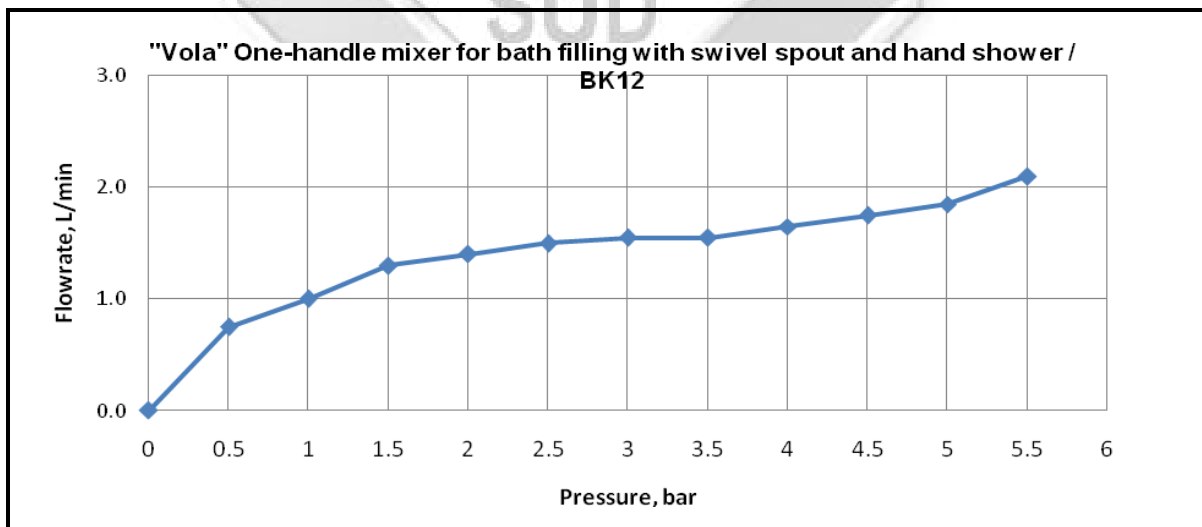
*Aldehuy*

**TEST RESULTS: (Cont'd)**

**Hydraulic Characteristics**

5) Description: One-handle mixer for bath filling with swivel spout and hand shower  
Model: BK12

Flow Pressure ( bar )	Flow Rate ( litres/min )	Flow Rate Requirements for Water Efficiency Labelling	Photo
0	0	<p><b>Products/Fittings</b> Shower Taps &amp; 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	0.8		
1.0	1.0		
1.5	1.3		
2.0	1.4		
2.5	1.5		
3.0	1.6		
3.5	1.6		
4.0	1.7		
4.5	1.8		
5.0	1.9		
5.5	2.1		



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**TEST RESULTS:**

**(A1) Water Tightness & Pressure Resistance Characteristics**

Sample Reference		Bath Filling Mixer	BS 5412 : 1996 Requirement
Characteristics		BK2, BK3, BK4, BK6 BK8, BK10, BK11, BK12	
Obturator on seat and upstream of obturator		Passed	Clause 8.2.2.1 (a) Watertightness of the obturator: Throughout the duration of the test, there shall be no leakage past the obturator.
		Passed	(b) Watertightness upstream: Throughout the duration of the test, there shall be no leakage or seepage through the walls.
Downstream of obturator		Passed	Clause 8.2.3.1 Throughout the duration of the test, there shall be no leakage, or seepage through the seals.
Mechanical behaviour upstream		Passed	Clause 9.2.2 There shall be no deformation or leakage.
Mechanical Behaviour Downstream	Tap without jet regulator	Passed	Clause 9.2.3 No permanent deformation shall be produced in that part of the tap situated downstream of the obturator.
	Tap with jet regulator	-	

**(B1) Hydraulic Characteristics**

Sample Reference		Bath Filling Mixer		BS 5412 : 1996 Requirement
Characteristics				
Flow rate test at 0.1 bar running pressure	Combined	BK2	2.5**	Combination taps assemblies (each side tested separately). ½" tap : 7.5 (l/min) min. Combination taps assemblies (both tap fully open). ½" tap : 10.8 (l/min) min.
		BK3	0.4**	
		BK4	0.4**	
		BK6	2.6**	
		BK8	2.5**	
		BK10	0.4**	
		BK11	0.4**	
		BK12	0.4**	

\*\*\*\*Non-compliance with BS 5412 : 1996 requirements (Please refer to page 10 of 12).

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**REMARKS:**

S/N	Type of tap fittings	Model	BS 5412: 1996 Requirements	Characteristics
1.	One-handle mixer for bath filling	BK 2	Complied	A. Watertightness & pressure resistance
2.	One-handle mixer for bath filling with Hand shower	BK 3	Complied	
3.	Two-handle mixer for bath filling with Hand shower	BK 4	Complied	
4.	Two-handle mixer for bath filling with 360° double swivel spout	BK 6	Complied	
5.	Two-handle mixer for bath filling with swivel spout	BK 8	Complied	
6.	One-handle mixer for bath filling with 360° double swivel spout and hand shower	BK 10	Complied	
7.	Two-handle mixer for bath filling with 360° double swivel spout and hand shower	BK 11	Complied	
8.	One-handle mixer for bath filling with swivel spout and hand shower	BK 12	Complied	

- a. The test sample complied with BS 5412 : 1996 requirements except hydraulic characteristics.
- b. The hydraulic characteristics complied with SS CP 48: 1989 requirements.
- c. Effect on Water Reference : S08MEC07709-1A&1B-LYP dated 08/04/2009 and S08MEC07709-2A&2B-LYP dated 08/04/2009.
- d. Headwork Endurance Reference : S08MEC07709/CLC dated 15/04/2009.
- e. Swivel 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:**

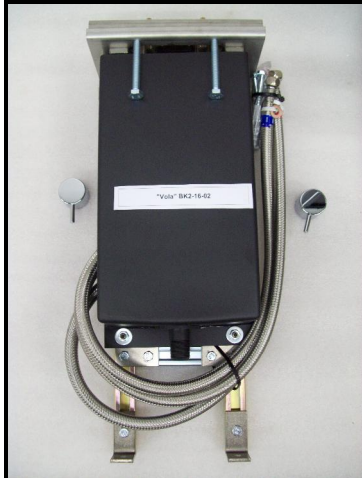


Photo 1 One-handle mixer for bath filling  
Model: BK2

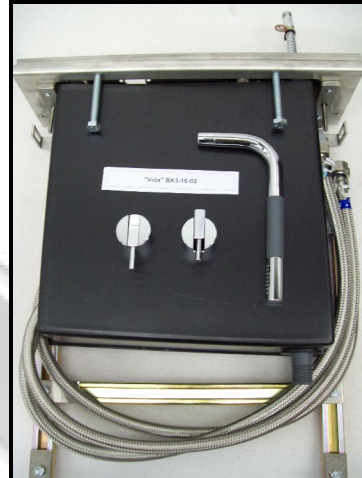


Photo 2 One-handle mixer for bath filling  
with Hand shower  
Model: BK3

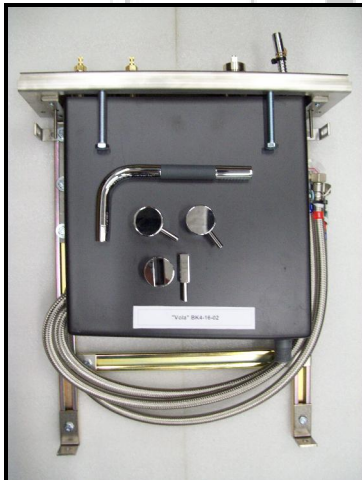


Photo 3 Two-handle mixer for bath filling  
with Hand shower  
Model: BK4



Photo 4 Two-handle mixer for bath filling  
with 360° double swivel spout  
Model: BK6

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**APPENDIX: (Cont'd)**



Photo 7 Two-handle mixer for bath filling  
with swivel spout  
Model: BK8

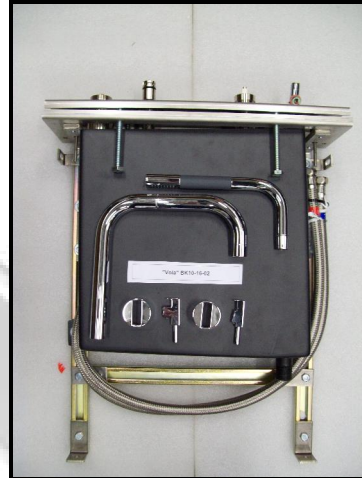


Photo 8 One-handle mixer for bath filling  
with 360° double swivel spout and hand shower  
Model: BK10



Photo 9 Two-handle mixer for bath filling  
with 360° double swivel spout and hand shower  
Model: BK11

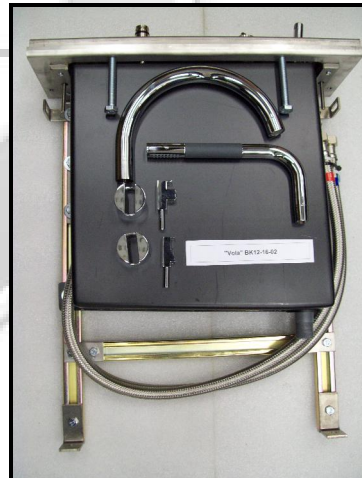


Photo 10 One-handle mixer for bath filling  
with swivel spout and hand shower  
Model: BK12

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March 2010