

FINAL REPORT

Report ID : 148208

Report Information

Submitting Organisation : 00121312 : Arad Ltd
Account : 142320 : Arad Ltd
AWQC Reference : 142320-2014-CSR-3 : Prod Test: Water Meter Woltman WST SB Type (6"-12")
Project Reference : PT-2368
Product Designation : Water Meter - Woltman WST SB Type 6" (representative model)
Composition of Product : Polyester Coated Cast Iron (see attachment for additional information).
Product Manufacturer : Arad Ltd. Kibbutz Dalia, ISRAEL.
Use of Product : In-Line/Metal Body Water Meter.
Sample Selection: As provided by the submitting organisation.
Testing Requested : **AS/NZS 4020:2005 TESTING OF PRODUCTS FOR USE IN CONTACT WITH DRINKING WATER**
Product Type : Composite
Samples : Samples were prepared and controlled as described in Appendix A of AS/NZS 4020:2005
Extracts : Extracts were prepared as described in Appendix C, D, E, F, G, H.
Project Completion Date : 05-Dec-2014
Project Comment : The results presented herein demonstrate compliance of Water Meter - Woltman WST SB Type 6" (representative model) to AS/NZS 4020 when tested at the 'in-the-product' exposure with a 0.1 scaling factor at 20°C ± 2°C. Product range to include 6" to 12".

PLEASE NOTE THAT THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL

THE RESULTS STATED IN THIS REPORT RELATE TO THE SAMPLE OF THE PRODUCT SUBMITTED FOR TESTING. ANY CHANGES IN THE MATERIAL FORMULATION, PROCESS OF MANUFACTURE, THE METHOD OF APPLICATION, OR THE SURFACE AREA-TO-VOLUME RATIO IN THE END USE, COULD AFFECT THE SUITABILITY OF THE PRODUCT FOR USE IN CONTACT WITH DRINKING WATER



Michael Glasson
APPROVED SIGNATORY



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Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
D – Appearance of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
E – Growth of Aquatic Micro-organisms	Passed when tested at the in-use exposure.
F – Cytotoxic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
G – Mutagenic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
H – Extraction of Metals	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.

Test Methods

Test(s) in Appendix	AWQC Test Method	Reference Method
C	T0320-01	AS/NZS 4020:2005
D	TO029-01 & TO018-01	APHA 2130b
E	TO014-03	APHA 4500 O C
F	TM-001	AS/NZS 4020:2005
G	TM-002	AS/NZS 4020:2005
H	TIC-006	EPA 200.8

Summary Comment : Not applicable.

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CLAUSE 6.2 Taste of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 7000 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Taste of Water Extract (Appendix C)

Test Information

Scaling Factor A scaling factor of 0.1 was applied.

Results Not detected.

Evaluation The product passed the requirements of clause 6.2 when tested at the in-the-product exposure with a scaling factor of 0.1 applied.

Number of Samples 2.

Test Comment Not applicable.



Peter Christopoulos
APPROVED SIGNATORY



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CLAUSE 6.3 Appearance of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 7000 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor A scaling factor of 0.1 was applied.

Results

	<u>Test (- Blank)</u>	<u>Maximum Allowed</u>	<u>Units</u>
Colour	<1	5	HU
Turbidity	<0.1	0.5	NTU

Evaluation The product passed the requirements of clause 6.3 when tested at the in-the-product exposure with a scaling factor of 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.



Andrew Ford
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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The non-metallic components were immersed at the in-use exposure. The surface area was in the range 1000 mm² per Litre and 15,000 mm² per Litre. Extracts were prepared using 1000 mL volumes of test water.

Test Method Growth of Aquatic Micro-organisms (Appendix E)

Inoculum The volume of the inoculum was 200 mL

Scaling Factor Not applicable.

Results

Mean Dissolved Oxygen	Control	7.5 mg/L
Mean Dissolved Oxygen Difference	Positive Reference	4.6 mg/L
	Negative Reference	0.1 mg/L
	Test	6.60 mg/L

Evaluation Refer to attachment 1.

Number of Samples 1.

Test Comment See attachment 1 for additional information on repeat testing where the product passed the requirements of clause 6.4 when tested at the in-use exposure.



Thuy Diep
APPROVED SIGNATORY



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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The meter was tested at the in-the-product exposure. Each meter held approximately 7000 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	20°C ± 2°C.
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	A scaling factor of 0.1 was applied.
Results	Non Cytotoxic.
Evaluation	The product passed the requirements of clause 6.5 when tested at the in-the-product exposure with a scaling factor of 0.1 applied.
Number of Samples	2.
Test Comment	The test extracts and blank extracts were used to prepare nutrient growth medium and subsequently used to grow a cell line (ATCC Number CCL 81) in the analysis. In addition zinc sulphate (0.4 mmol) was used for the positive control in the analysis.



Brendon King
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CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 7000 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor A scaling factor of 0.1 was applied.

Results

	<u>Bacteria Strain</u>		<u>Number of Revertants per Plate</u>			
	S9	Blank	Sample Extract	Positive Controls		
<i>Salmonella typhimurium</i> TA98	-	35, 28, 34	35, 38, 43	1924, 1865, 1873		<u>NPD</u> (20µg)
Mean ± Standard deviation		32.3 ± 3.8	38.7 ± 4.0	1887.3 ± 32.0		
	+	33, 35, 34	32, 34, 37	1980, 2118, 2625		<u>2-AF</u> (20µg)
Mean ± Standard deviation		34.0 ± 1.0	34.3 ± 2.5	2241.0 ± 339.6		
<i>Salmonella typhimurium</i> TA100	-	380, 378, 403	311, 348, 375	924, 898, 791		<u>Azide</u> (1.0µg)
Mean ± Standard deviation		387.0 ± 13.9	344.7 ± 32.1	871.0 ± 70.5		
	+	155, 190, 219	195, 190, 222	1530, 1991, 2261		<u>2-AF</u> (20µg)
Mean ± Standard deviation		188.0 ± 32.0	202.3 ± 17.2	1927.3 ± 369.6		
<i>Salmonella typhimurium</i> TA102	-	716, 628, 590	670, 604, 579	2439, 2567, 2733		<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		644.7 ± 64.6	617.7 ± 47.0	2579.7 ± 147.4		
	+	440, 463, 523	464, 609, 504	2028, 2519, 2910		
Mean ± Standard deviation		475.3 ± 42.9	525.7 ± 74.9	2485.7 ± 441.9		

Comments S9 was used as a metabolic activator. NPD (4-nitro-o-phenylenediamine), Azide, and Mitomycin C are specific positive controls for strains TA98, TA100 and TA102 respectively while 2 - AF (2-aminofluorene) when used in conjunction with S9 is a positive control for both TA98 and TA100

Evaluation The product passed the requirements of clause 6.6 when tested at the in-the-product exposure with a scaling factor of 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.



Peter Christopoulos
APPROVED SIGNATORY



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CLAUSE 6.7 Extraction of Metals

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 7000 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor A scaling factor of 0.1 was applied.

Method of Analysis All methods used to determine concentrations of metals are based on those described in the 21st edition of Standard Methods for the Examination of Water and Wastewater published by the APHA, AWWA and WEF (2005). The methods have been adapted for the instrumentation in use at the Australian Water Quality Centre. Concentration of the metals described in Table 2 of the AS/NZS 4020:2005 are determined as follows:
Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium and Silver by Inductively Coupled Plasma Mass Spectrometry.

Results	Limit of Reporting mg/L	Blank mg/L	Test 1 mg/L	Test 2 mg/L	Max Allowed mg/L
Final Extract					
Antimony	0.0005	<0.0005	<0.0005	<0.0005	0.003
Arsenic	0.0003	<0.0003	<0.0003	<0.0003	0.007
Barium	0.0005	<0.0005	0.0022	0.0025	0.7
Cadmium	0.0001	<0.0001	<0.0001	0.0004	0.002
Chromium	0.0001	<0.0001	<0.0001	<0.0001	0.05
Copper	0.0001	<0.0001	<0.0001	<0.0001	2.0
Lead	0.0001	<0.0001	<0.0001	0.0001	0.01
Mercury	0.00003	<0.00003	<0.00003	0.00005	0.001
Molybdenum	0.0001	<0.0001	<0.0001	<0.0001	0.05
Nickel	0.0001	<0.0001	<0.0001	<0.0001	0.02
Selenium	0.0001	<0.0001	<0.0001	<0.0001	0.01
Silver	0.00003	0.00004	<0.00003	<0.00003	0.1

Evaluation The product passed the requirements of clause 6.7 when tested at the in-the-product exposure with a scaling factor of 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.



Dzung Bui
APPROVED SIGNATORY



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ACCREDITATION

AS/NZS 4020:2005

Attachment 1

REPORT NUMBER 148208
PROJECT REFERENCE PT-2368
DATE 04/12/2014
PRODUCT DESIGNATION Water Meter – Woltman WST SB Type 6" (representative sample).

CLAUSE 6.4 GROWTH OF AQUATIC MICROORGANISMS (REPEAT TEST)

SAMPLE DESCRIPTION The non-metallic components were immersed at the in-use exposure. The surface area was in the range 1000 mm²/L and 15,000 mm²/L. Extracts were prepared using 1000 mL volumes of test water.

TEST METHOD Growth of Aquatic Microorganisms (Appendix E)

INOCULUM 600 mL

SCALING FACTOR Not applicable.

RESULTS

Mean Dissolved Oxygen	Control	7.5	mg/L
Mean Dissolved Oxygen Difference	Positive Reference	6.0	mg/L
	Negative Reference	< 0.1	mg/L
	Test	0.4	mg/L

EVALUATION The product passed the requirements of clause 6.4 when tested at the in-use exposure.

NUMBER OF SAMPLES 1.

TEST COMMENT Test repeated utilising a new sample directly from the submitting organisation.

There were no changes made to the composition or manufacturing process of the water meter from the submitting organisation.

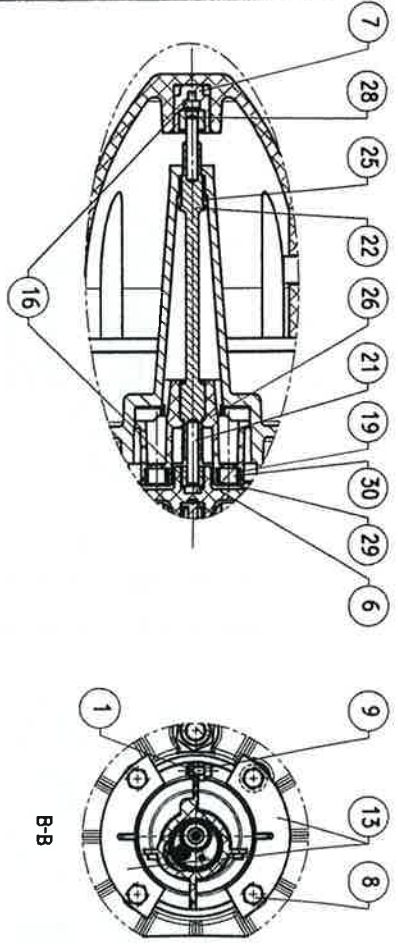
Australian Water Quality Centre

Report Number **1482008**

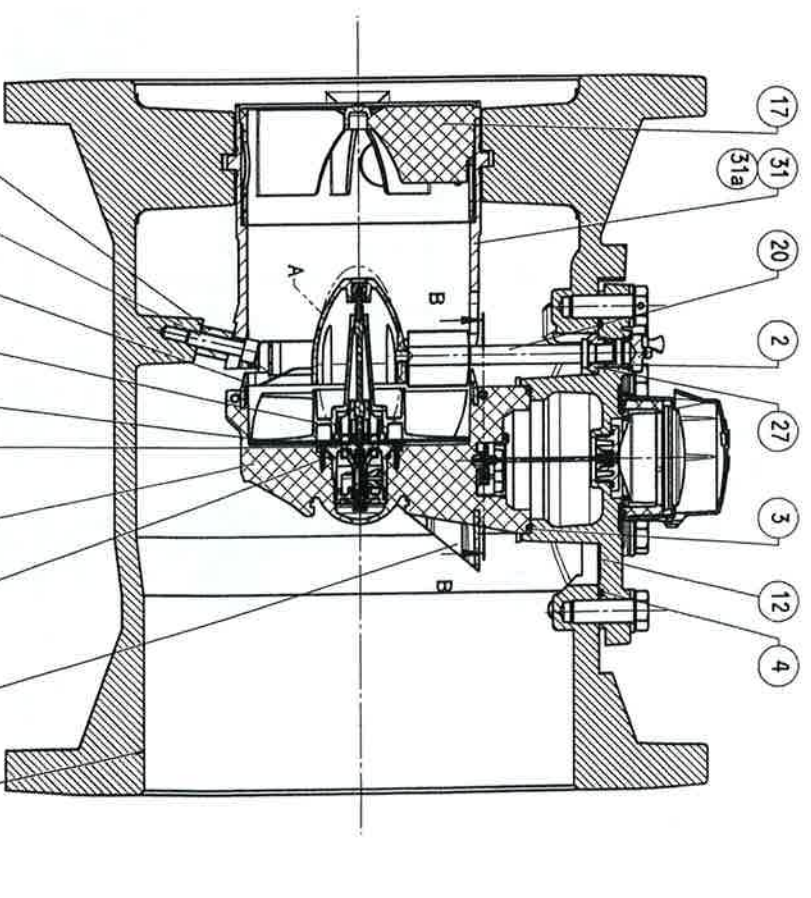
Date **5/12/2014**

Document reviewed by **MULTHOFF & HAYSON**

Signature **M. Brennan**



Item No.	Qty	Remarks	REV.
1	6	Hex nut M5 A2 DIN 934	
2	1	O-ring PARKER 2-112 E-12-3T W-282 NBR 70 WRAS	
3	1	O-ring BUSHAK E-95 W-4 NBR 50 WRAS	
4	1	O-ring PARKER 2-263 E-103 7A W-153 NBR 70 WRAS	
5	1	O-ring D-38 W-3 NBR 50 WRAS	
6	1	Worm gear housing W1710 6-12	
7	1	Housing bearing W1-6-43 Singapore	
8	4	Hex cap screw M6X12 A2 DIN 934	
9	4	Socket head cap screw M6X12 A2 DIN 934	
10	1	Pin head pinless screw 2.8X13 DIN 7981-41	
11	4	Rear spider washer W1	
12	2	Chemung plate for spider W1710 2-12	
13	2	Reinforcer W1 6-12	
14	2	Reinforcer W1 6-12	
15	2	Reinforcer W1 6-12	
16	2	Front stopper W1 6-12	
17	2	Hydrat cover disk	
18	2	Hydrat regulator shaft W1 10-12 S-ST	
19	2	Carbons steel W1710 6-12	
20	2	Spacers W1710 6-12	
21	1	Carbons steel 316 W1710 6-12	
22	1	Carbons steel 316 W1710 6-12	
23	1	Carbons steel 316 W1710 6-12	
24	1	Carbons steel 316 W1710 6-12	
25	1	Carbons steel 316 W1710 6-12	
26	1	Carbons steel 316 W1710 6-12	
27	1	Carbons steel 316 W1710 6-12	
28	1	Carbons steel 316 W1710 6-12	
29	1	Carbons steel 316 W1710 6-12	
30	1	Carbons steel 316 W1710 6-12	
31	1	Carbons steel 316 W1710 6-12	
31a	1	Carbons steel 316 W1710 6-12	



ARAD Approved for Production

Material (generic name): **W1710 10"-12"**

Product Name: **FOR DRINKING WATER APPROVAL**

Scale: **1:2.5**

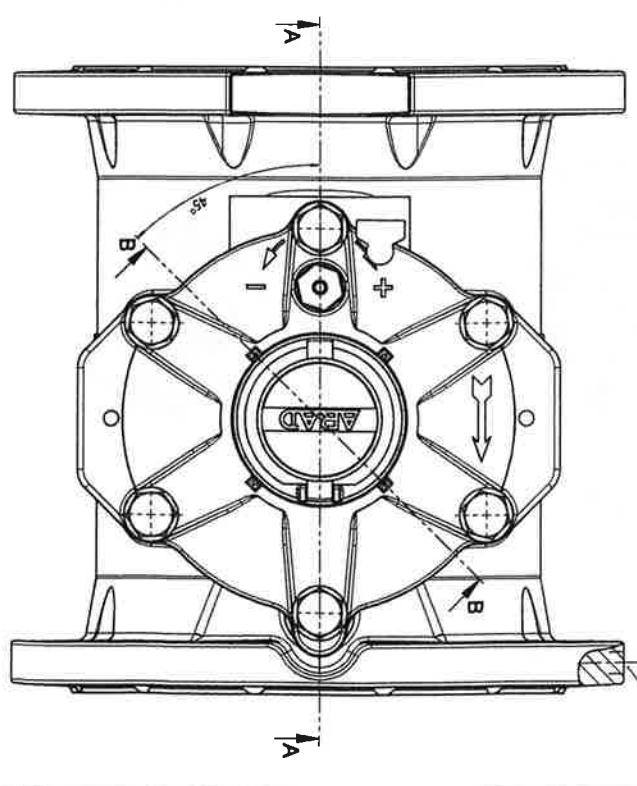
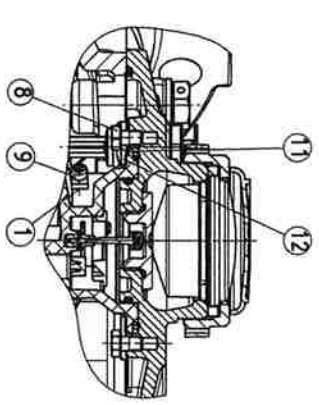
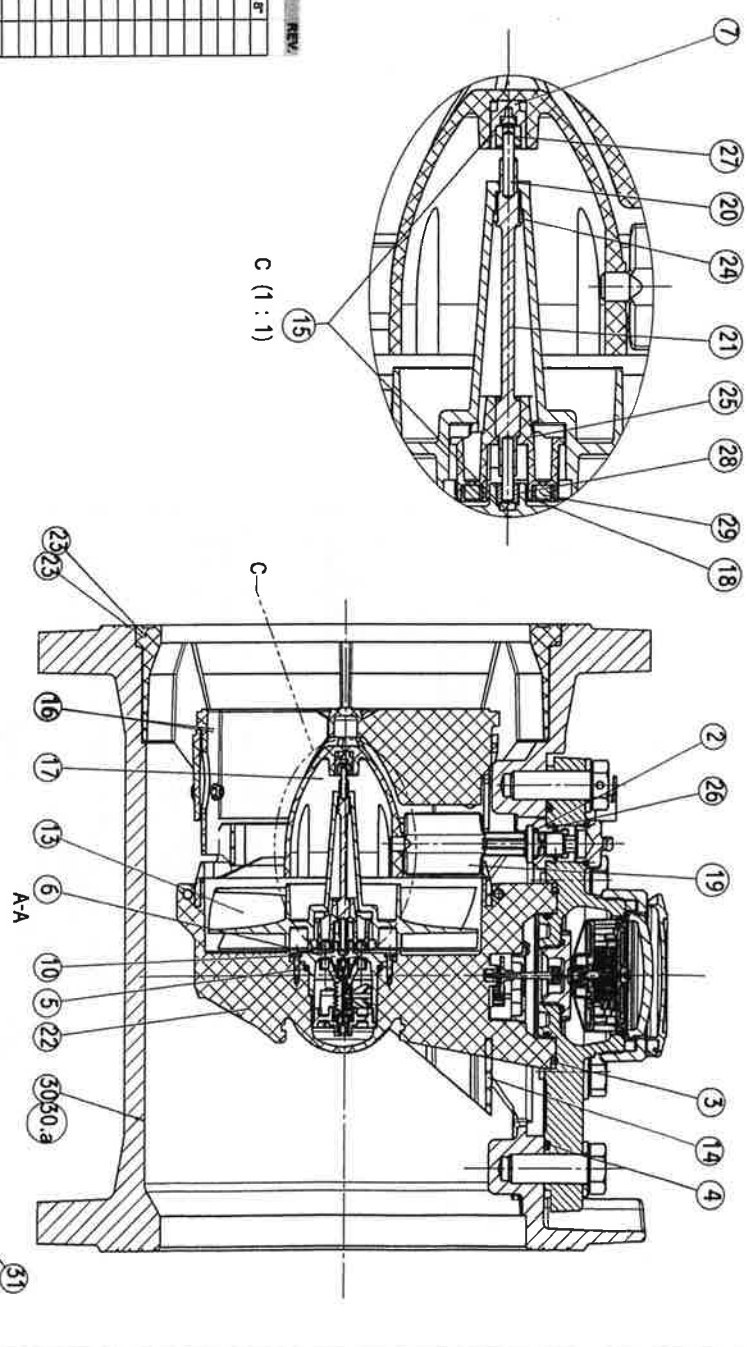
ARAD logo

DR 1 CAT.NO./REV. 1 38 806 55DWA /00

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Item No. Cat. No. Description QTY Remarks REV.

Item No.	Cat. No.	Description	QTY	Remarks	REV.
1	20382609	Hex nut M6 A2 DIN 934	2 of 6	2 parts for 6"	
2	20607200	O-ring PARKER 2-112 ID-12.37 W-2.62 NBR 70 WFRAS	1		
3	20607200	O-ring BUSAK ID-96 W-4 NBR 50 NSF51 WFRAS	1		
4	20607200	O-ring PARKER 2-263 ID-161.74 W-3.53 NBR 70 WFRAS	1		
5	20607210	O-ring ID-98 W-3 NBR 50 WFRAS	1		
6	20901409	Hexm gear housing WSTab 6-12	1		
7	20940709	Housing bearing WT 4 6-8 Singapore	4		
8	21081709	Hex cap screw M6X12 A2 DIN 933	4		
9	21181709	Socket head cap screw M6X12 NSF504	6		
10	21570808	Print head Phillips screw 2.0X13 DIN 7981-C-A4	4		
11	23482004	Rear spider washer WT	2		
12	23483309	Clamping plate for spider WSTab 2-12"	2		
13	23742509	Impeller WT 6-12	1		
14	24626809	Rear flow arrangement WT 6-12C	1		
15	24802309	Truss cartride 4.5x2	2		
16	25048108	Straightener WT 4 6 Singapore	1		
17	25048209	Front spider WT 6-12	2		
18	25290609	Magnet cover 5x4	2		
19	26525009	Regulator WT 6 8 Black	1		
20	26600609	Cartridge shaft 3x18	2		
21	26754509	Impeller shaft WSTab 6-12	1		
22	27046609	Spider WSTab 6-12	1		
23	24626809	Adapter WT 8	1		
24	26415109	Cartridge impeller shaft bearing WTR-12	1		
25	26530109	Cartridge bearing impeller WSTab 6-12	1		
26	26530209	Regulator bearing impeller WSTab 6-12	1		
27	26530309	Cartridge bearing 7.0X3.3 L=5.5	1		
28	26530310	Cartridge bearing 6.0X3.3 L=5.5	1		
29	86201310	Magnet shaft 3	2	Not contact with water	
30	26417250	Polyester powder blue PRL5010 WFRAS	1	Difference wt area for 6"	
31	21031409	Plug TK 1/4 brass	1		
30 a	26417250	Polyester powder blue PRL5010 WFRAS	1	Difference wt area for 6"	



B-B
ROTATED

ARAD Approved for Production
Approved for Production
Date: 17/02/2014

WSTab 6-12

PROG. PROC. ASSY A2

NAME: WSTab 6-8"
DATE: 17/02/2014
FOR DRINKING WATER APPROVAL

DR	REV	DESCRIPTION
1	1	CAT.NO/REV: 1 38 631 55WFRAS /00 (1:1)

SCALE: 1:1
ARAD
Dwg: D:\Mech\ARAD\WTR\011345155WFRAS_WSTab 6-8
Mod: D:\Mech\ARAD\WTR\011345155WFRAS_WSTab 6-8
Mod: Rev:

A
B
C
D
E
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Item No.	Cat. No.	Description	QTY
1	20382609	Hex nut M5 A2 DIN 985	2 or 6
2	20602630	O-ring PARKER 2-112 ID-12.37 W-2.62 NBR 70 WRAS	1
3	20602930	O-ring BUSAK ID-95 W-4 NBR 50 NSF61 WRAS	1
4	20603030	O-ring PARKER 2-263 ID-183.74 W-3.53 NBR 70 WRAS	1
5	20607710	O-ring ID-38 W-3 NBR 50 WRAS	1
6	20901409	Worm gear housing WSTsb 6-12	1
7	20940709	Housing bearing WT-II 6-8 Singapore	1
8	21081709	Hex cap screw M8X12 A2 DIN 933	4
9	21181709	Socket head cap screw M5X12 AISI304	6
10	21570609	Pan head phillips screw 2.9X13 DIN 7981c-A4	4
11	23026009	Rear spider washer WT	1
12	23493309	Clamping plate f/spider WT 2-4	2
13	23742509	Impeller WT 6-12	1
14	24626609	Rear flow straightener WT 8-12C	1
15	24902309	Thrust carbide 4.5x2	2
16	25048109	Straightener WT-II 6 Singapore	1
17	25048209	Front spider WT 6-12	1
18	25280809	Magnet cover 5x4	2
19	26552009	Regulator WT 6-8 black	1
20	26600609	Carbide shaft 3x0.3x18	2
21	26754509	Impeller shaft WSTsb 6-12	1
22	27046609	Spider WSTsb 6-12	1
23	24620509	Adaptor WT 8	1
24	28415109	Carbide impeller shaft bushing WT6-12	1
25	28530109	Correlation bushing impeller WSTsb 6-12	1
26	28530609	Regulator bushing WT 6-12	1
27	28535009	Carbide bushing 7.03x3.3 L=5.5	1
28	28535010	Carbide bushing 5.96x3.3 L=5.5	1
29	95001310	Magnet 5x4.3	2
30	29417550	Polyester powder blue RAL5010 WRAS	1
31	21031409	Plug R 1/4 brass	1
13852291 WST 6 "			
30.a	29417550	Polyester powder blue RAL5010 WRAS	1

Item No.	Cat. No.	Description	QTY
1	20382609	Hex nut M5 A2 DIN 985	6
2	20602630	O-ring PARKER 2-112 ID-12.37 W-2.62 NBR 70 WRAS	1
3	20602930	O-ring BUSAK ID-95 W-4 NBR 50 NSF61 WRAS	1
4	20603030	O-ring PARKER 2-263 ID-18.37 W-3.53 NBR 70 WRAS	1
5	20607710	O-ring ID-38 W-3 NBR 50 WRAS	1
6	20901409	Worm gear housing WSTsb 6-12	1
7	20940709	Housing bearing WT-II 6-8 Singapore	1
8	21081709	Hex cap screw M8X12 A2 DIN 933	4
9	21181709	Socket head cap screw M5X12 AISI304	6
10	21480409	Socket head cap screw M10X40 DIN 912 A2	1
11	21570609	Pan head phillips screw 2.9X13 DIN 7981c-A4	4
12	23026009	Rear spider washer WT	1
13	23493309	Clamping plate f/spider WT 2-4	2
14	23742509	Impeller WT 6-12	1
15	24626609	Rear flow straightener WT 8-12C	1
16	24902309	Thrust carbide 4.5x2	2
17	25048009	Flow straightener WT 6-12	1
18	25048209	Front spider WT 6-12	1
19	25280809	Magnet cover 5x4	2
20	26572209	Integral regulator shaft WT 10-12 S.ST	1
21	26600609	Carbide shaft 3x0.3x18	2
22	26754509	Impeller shaft WSTsb 6-12	1
23	27046609	Spider WSTsb 6-12	1
24	28400309	Adapter pipe bushing WT 10-12	1
25	28415109	Carbide impeller shaft bushing WT6-12	1
26	28530109	Correlation bushing impeller WSTsb 6-12	1
27	28530609	Regulator bushing WT 6-12	1
28	28535009	Carbide bushing 7.03x3.3 L=5.5	1
29	28535010	Carbide bushing 5.96x3.3 L=5.5	1
30	95001310	Magnet 5x4.3	2
31	29417550	Polyester powder blue RAL5010 WRAS	1
		13870609	
		WSTsb 10"	
		Polyester powder blue RAL5010 WRAS	1
		13880609	
		WSTsb 12"	

Item No. Cat. No. Description QTY

