

FINAL REPORT

Report ID : 229149

Report Information

Submitting Organisation : 00121987 : Cla-Val
Account : 143091 : Cla-Val
AWQC Reference : 143091-2017-CSR-1 : Prod Test: DN40 Model 90 Valve
Project Reference : PT-3219
Product Designation : 90-01 AKX Hydraulic Control Valve (DN40 Representative Sample)
Composition of Product : Epoxy Coated Ductile Iron (see attachment).
Product Manufacturer : Cla-Val, Beamsville, ON, CANADA.
Use of Product : In-Line/Hydraulic Control Valve.
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-Jul-2018
Project Comment : The results presented herein demonstrate compliance of 90-01 AKX Hydraulic Control Valve (DN40 Representative Sample) to AS/NZS 4020 when tested at the 'in-the-product' exposure with a 0.05 scaling factor at 40°C ± 2°C.

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



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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 0.05 applied.
D – Appearance of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
E – Growth of Aquatic Micro-organisms	Passed at the in-use exposure.
F – Cytotoxic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
G – Mutagenic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
H – Extraction of Metals	Passed at the in-the-product exposure with a scaling factor of 0.05 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 : Product range to include DN40 - DN900.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	85°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	A scaling factor of 0.05 was applied.
Results	Not detected (sample and controls).
Evaluation	The product passed the requirements of clause 6.2 when tested at the in-the-product exposure with a scaling factor of 0.05 applied.
Number of Samples	4.
Test Comment	Panellists detected chemical, medicinal, phenolic and plastic tastes when tested with a 0.05 scaling factor at 85°C. Test repeated at 40°C with 0.05 scaling factor where no tastes were detected thus meeting the requirements of Clause 6.2.



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CLAUSE 6.3 Appearance of Water Extract

Sample Description The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 85°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor A scaling factor of 0.05 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 0.05 applied.

Number of Samples 3.

Test Comment Increase turbidity detected in the final extracts when tested with a 0.05 scaling factor at both 85°C and 40°C. The submitting organisation modified exposed threaded areas where corrosion was observed, test repeated to meet requirements of Clause 6.3.



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 170 mL

Scaling Factor Not applied.

Results			
	Mean Dissolved Oxygen	Control	8.0 mg/L
	Mean Dissolved Oxygen Differenc	Positive Reference	6.1 mg/L
		Negative Reference	0.3 mg/L
		Test	1.20 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 Not applicable.



Thuy Diep
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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 85°C ± 2°C.

Test Method Cytotoxic Activity of Water Extract (Appendix F)

Scaling Factor A scaling factor of 0.05 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 0.05 applied.

Number of Samples 1.

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 valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 85°C ± 2°C.

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor A scaling factor of 0.05 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	-	39, 32, 38	36, 49, 47	3637, 3539, 3475		<u>NPD</u> (20µg)
Mean ± Standard deviation		36.3 ± 3.8	44.0 ± 7.0	3550.3 ± 81.6		
	+	21, 16, 14	31, 25, 21	2878, 3094, 3563		<u>2-AF</u> (20µg)
Mean ± Standard deviation		17.0 ± 3.6	25.7 ± 5.0	3178.3 ± 350.2		
<i>Salmonella typhimurium</i> TA100	-	525, 564, 574	505, 525, 539	1054, 1209, 1139		<u>Azide</u> (1.0µg)
Mean ± Standard deviation		554.3 ± 25.9	523.0 ± 17.1	1134.0 ± 77.6		
	+	271, 306, 312	278, 254, 281	2031, 2024, 1926		<u>2-AF</u> (20µg)
Mean ± Standard deviation		296.3 ± 22.1	271.0 ± 14.8	1993.7 ± 58.7		
<i>Salmonella typhimurium</i> TA102	-	850, 923, 852	892, 926, 1010	3104, 3197, 3016		<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		875.0 ± 41.6	942.7 ± 60.7	3105.7 ± 90.5		
	+	919, 870, 725	961, 897, 946	2410, 3147, 3077		
Mean ± Standard deviation		838.0 ± 100.9	934.7 ± 33.5	2878.0 ± 406.8		

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 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



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CLAUSE 6.7 Extraction of Metals

Sample Description The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 85°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor A scaling factor of 0.05 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

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	0.0018	0.0009	0.003
Arsenic	0.0003	0.0003	<0.0003	<0.0003	0.007
Barium	0.0005	0.0016	0.0539	0.0536	0.7
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	<0.0001	0.0003	0.0003	0.05
Copper	0.0001	0.0011	0.0025	0.0021	2.0
Lead	0.0001	<0.0001	0.0005	0.0004	0.01
Mercury	0.00003	<0.00003	0.00006	0.00006	0.001
Molybdenum	0.0001	<0.0001	0.0002	0.0001	0.05
Nickel	0.0001	<0.0001	<0.0001	<0.0001	0.02
Selenium	0.0001	<0.0001	0.0003	0.0001	0.01
Silver	0.00003	<0.00003	<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 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



Dzung Bui
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Top Level Item: 27497587J

90-01AKX

E99TT91HDTBTB16 XG

Level material	material description	qty required	Wetted	Material	Drawing	Surface Area	Volume
0 27497587J	E99TT91HDTBTB16 XG	1			76551		
1 20000048A	X117DKX 1HBT	1			200000		
2 00711C	O-RING -011 NBR	2	x	NBR BUNA-N			
2 20000101A	PLATE,MTG X117D STL	1					
3 0600300J	STRIP.125X3.00 STL-AISI HRA36	0.271					
2 20000201A	HEX,COUPLER X117D 303	1					
3 0203821E	BAR,HX 303	0.175					
2 20000301A	NUT, COUPLER X117D 303	1					
3 0207521G	BAR, HX 303	0.094					
2 48588J	ADPTR X103A 1-1/4 316	1	x	316 Stainless Steel			
3 0103123G	BAR, RD 316/316L	0.083					
2 63398C	BESHG, GLAND X105L BRS	1	x	Brass			
2 64308A	ADPTR X105L +2-3 BRS	1	x	Brass			
2 6551201H	WSHR, FL #8 FIB	1	x	FIBER			
2 6757832J	SCR, FILH10-32X2.50 SST	2					
2 6758487A	LKWSHR, SPR 10 316	2					
2 6779511C	NUT, HX 10-32 316	2					
2 6779511C	NUT, HX 10-32 316	2					
2 6781511J	NUT, HX 7/8-14 JAM 316	1					
2 6824487A	SCR, RDH 8-32X3/8 316	1	x	316 Stainless Steel			
2 8851101K	ADPTR X105L BRS	1	x	Brass			
2 8961248F	TRAN X117D 1 1/4-2 1/2	1					
2 8970128J	STEM ASY, ACT 2-1/2 TT	1					
3 52797J	PIN, GRV 5-094X0500 316	1	x	316 Stainless Steel			
3 6423704D	CPLG, STEM X105L 2 316	1	x	316 Stainless Steel			
4 0204423J	BAR, HX 316	0.094					
3 8902214K	STEM, ACTG X105 8 316	1	x	316 Stainless Steel			
4 0103823B	BAR, RD 316	0.667					
4 8902214K-GRIND	STEM, ACTG X105 8 316	1					
2 C637403B	STUD, THD 10-32 316	1	x	316 Stainless Steel			
1 27497588H	100-01KX E99TT91HDT 16 XG	1			90842		
2 00731A	O-RING -031 NBR	1		NBR Rubber (Material Spec: ASTM D2000 M7BG915B14EO14EO34 Z1Z2)			
2 21115406B	BODY 100KCX 1HDEC 16 XG	1		Epoxy Coated (per Epoxy Proc 211154) Ductile Iron (ASTM 536 Gr 65-45-12)	211319	88.9819	38.2035
2 21115407A	COV 100KCX 1HDEC	1		Epoxy Coated (per Epoxy Proc 211154) Ductile Iron (ASTM 536 Gr 65-45-12)	209944	30.4372	6.0624
2 6760497F	BLT 5/16-18X1 316	8		316 Stainless Steel	67660	0	
2 6766074G	PLUG, P SQH 1/4 316	1		316 Stainless Steel	67660	0	

Australian Water Quality Centre

22/9/18

Date: 5/7/2018

Document reviewed by: M. Dawson

Signature: M. Dawson

Top Level Item: 27497587J 90-01AKX E99TT91HDTBTB16 XG

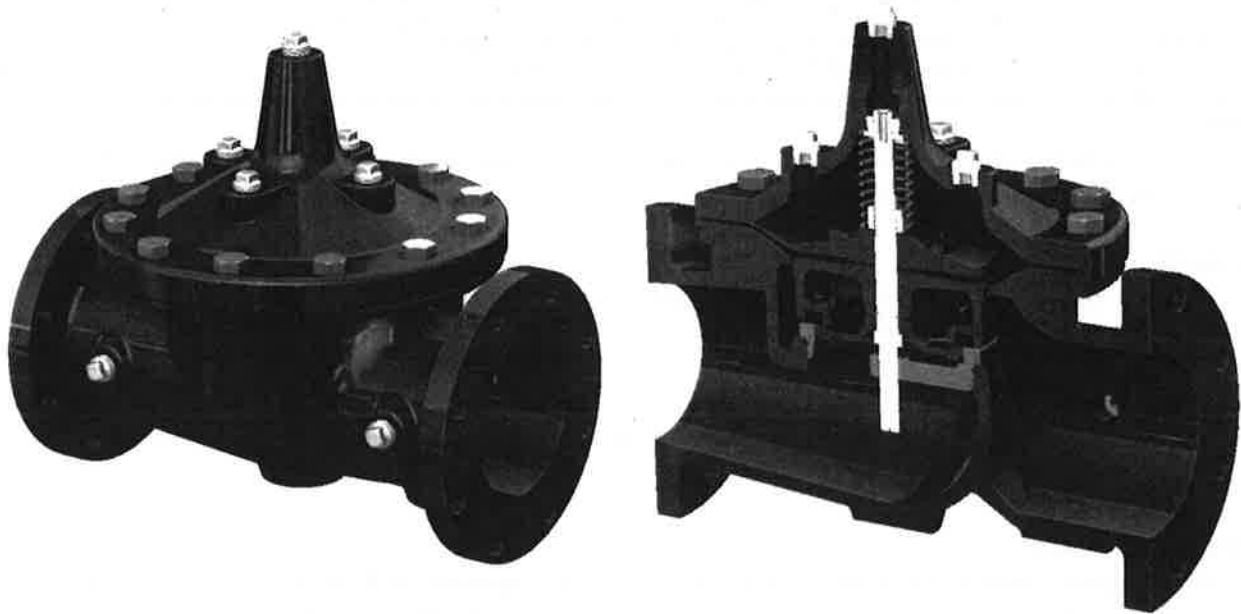
Level material	material description	qty required	Wetted	Material	Drawing	Surface Area	Volume
2 6766075D	PLUG,P SQH 3/8 316	6	x	316 Stainless Steel	67660	1.131	
2 6774704J	WSHR,FL 5/16N SST	8					
2 83239E	DIAPH 100 N/W 1HNBR ALL	1	x	NBR Rubber	83239	20.602	
3 67454K	DIAPH STK .050 N/W NBR	0.014					
3 67454K	DIAPH STK .050 N/W NBR	0.014					
2 8937502G	NUT,STEM 100 1H316	1	x	316 Stainless Steel	89375	1.197	-0.107
3 0206923F	BAR,HX 316	0.052					
2 C002201G	NPL BLANK BRS - C22	1					
2 C002201G	NPL BLANK BRS - C22	1					
2 C1425C	SEAT 100 1Q316	1	x	316 Stainless Steel	210602	9.2785	-0.6968
2 C1642C	GUIDE,DISC 100 1H316	1	x	316 Stainless Steel	210779	2.277	-0.3199
2 C5445G	WSHR,DIAPH 100 1H316	1	x	316 Stainless Steel	V1390	9.451	-0.9814
2 C6301A	RTNR,DISC 100 1H316	1	x	316 Stainless Steel	V1394	9.834	-2.7796
2 C6302J	STEM 100 1H316	1	x	316 Stainless Steel	V1388	3.4853	-0.4818
2 C7683A	BRG,COV 100 1H316	1	x	316 Stainless Steel	209635	2.465	-0.2552
2 C8477G	SPR 100 1H302	1	x	302 Stainless Steel	C8477	5.187	-0.0778
2 V5180E	WSHR,SPCR,RED 1HFIB	2		Hard Red Fiber (Mil-F-1148 GR CH)	V5180	0.11	
2 V5562D	DISC 100 1HRUB	1		SYN Rubber (ASTM D2000)			
1 41683E	X46A 3/8 X 3/8 TT	1	x	M7BG915B14EO14EO34 Z1Z2)	210781	1.954	-0.4885
2 36746G	BODY X46A TE316	1	x	316 Stainless Steel			
3 0208823F	BAR,HX 316	0.156					
2 36747E	SCRN X46 3/8 316	1	x	316 Stainless Steel			
1 1794318H	CRDKX 1/4S 20-105 TEBT 300S	1			70899		
2 20562002D	GUIDE,SPR CRD 20-105 316	1		316 Stainless Steel			
3 0110023K	BAR,RD 316	0.031					
2 20632103C	SPR CRD 20-105 316	1		316 Stainless Steel			
2 3713301E	RTNR A,DISC CRD TR	1					
3 3713301E-MOLD	RTNR A,DISC CRD TR	1	x	316 Stainless Steel			
3 3713401C	RTNR,DISC CRA-CRD+ TE316	1		SYN Rubber (ASTM D2000)			
				6BG907A14B14EA14EF2 1E034F17)			
2 37137H	YOKE CRD 3/8 316	1	x	316 Stainless Steel			
2 40174F	GSKT,PLUG FIB	1		RED FIBER (MIL-F-1148)			
2 6757895F	SCR,FILH10-32X0.63 316	8		316 Stainless Steel			
2 67628J	CAP CRD PL	1					
2 6766003F	PLUG,P SQH 3/8 BRS	1	x	Brass or Bronze			
2 6780111J	NUT,HX 3/8 -16 JAM 316	1	x	316 Stainless Steel			
2 7055007E	WSHR,BELLEVILLE STL	1					
2 7188201D	SCR,ADJ CRD & CRL BRS	1					

Top Level Item: 27497587J 90-01AKX E99TT91HDTBTB16 XG

Level material	material description	qty required	Wetted	Material	Drawing	Surface Area	Volume
2 7188302K	NUT, H 5/16-18 CRD 316	1		316 Stainless Steel			
2 71891G	WSHR,DIAPH CRD TE302	1		302 Stainless Steel			
2 8339714B	BODY&SEAT ASSY 1/4TEBT 250S	1					
3 8339301H	BODY CRD TEBRZLL250S	1	x	CuZn21S3P			
3 8339603G	SEAT THD CRD 1/4 316	1	x	316 Stainless Steel			
4 0205023F	BAR, HX 316	0.057					
2 C002201G	NPL BLANK BRS - C22	1					
2 C002201G	NPL BLANK BRS - C22	1					
2 C2544K	COV CRD TEBRS	1					
2 C6936D	DIAPH CDHS TENBR	1	x	NBR BUANA-N			
3 67454K	DIAPH STK .050 N/W NBR	0.005					
3 67454K	DIAPH STK .050 N/W NBR	0.005					
2 V5653A	PLUG, BODY CRA/CRD BRSLL	1	x	CuZn21S3P			
1 9787003E	X58C .094 3/8X3/8 TP	1					
2 9413205H	PLUG, ORF 1/8, .093 DEL	1	x	DELIRIN			
2 9786901A	CONN, T X58C3/8X3/8 316	1	x	316 Stainless Steel			
Total					186.3909	38.0779	
					in2	in3	
					120251.95	0.623984984	
					mm2	liter	
						192716.1007	
						mm2 per liter	



CLA-VAL Epoxy Coating Instructions for Australian Valves:



Epoxy Coating Instructions for Australian Valves DWG# 211154

**Cla-Val Automatic Controls
1701 Placentia Ave.
Costa Mesa, CA 92627**



CLA-VAL Epoxy Coating Instructions for Australian Valves:

RECORD OF REVISIONS AND ALTERATIONS				
REVISION	PAGE/PARAGRAPH	DESCRIPTION OF REVISION	JUSTIFICATION FOR REVISION	ECO #
-	-	Original Issue	N/A	26038

1.0 Scope

1.1 This procedure covers the requirements for applying protective coating of epoxy powder by the heat fusion process to valves and parts for use in Australia.

2.0 Material

2.1 Epoxy powder must meet the performance requirements of AS/NZS 4158:2003 and must comply with the water quality requirements of AS/NZS 4020:2005.

3.0 Procedure Standards

3.1 This procedure shall be in accordance with "AS/NZS 4158:2003 Thermal-bonded polymeric coatings on valves and fittings for water industry purposes. "

4.0 Surface Preparation

4.1 All deposits of oil or grease should be removed by placing parts in degreasing unit for minimum 15 min. Water should be 180°F at the nozzle. Use detergent that is a heavy duty alkaline. See tech. data for concentration.

4.2 All parts shall be blast cleaned to a "white metal finish" by using walk-in abrasive blasting room. Media to be used, 20/40 CARBOHSP ceramic.

Definition: a "white metal" blast cleaned surface finish is defined as a surface with a gray-white, uniform metallic color. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter.

4.3 Parts are moved from blasting machine to oven in shortest possible elapsed time to prevent rust or other contamination.

4.4 Blast cleaning operations shall be conducted in such a manner that no damage is done to partially or entirely completed portions of the work. Mask as required.

4.5 Blast operations shall not be conducted on surfaces that will be wet after blast cleaning and before epoxy application or when ambient conditions are such that any visible rusting might occur before the epoxy coating is applied.

4.6 If any rust forms after blast cleaning, the surfaces shall again be sandblasted before coating.

5.0 Interior & Exterior Protective Coating Procedure

5.1 Mask off all holes and surfaces marked "MASK" per individual part pages (pages 5 through 12) or otherwise specified.

5.2 Place parts in oven and heat the parts to 400°F. Leave in oven for sufficient time to ensure uniform surface temperature.

5.3 Remove parts from oven and immediately transfer them to the application booth.

5.4 Apply epoxy powder using an electrostatic spray gun. See pages 5 through 12 for epoxy thickness unless otherwise specified.

5.5 For 4" (100mm) or smaller bodies, return parts to oven and heat cure the applied epoxy for a minimum of twenty (20) minutes at 400°F. For larger bodies, leave in oven for sufficient time to ensure uniform curing surface temperature.

5.6 Remove parts from oven and allow to air cool.

5.7 Inspect parts to verify epoxy surface thickness per pages 4 through 12 or otherwise specified. No excessive sags, voids, pin holes, valleys or blisters shall be allowed. If found, repair as necessary.

5.8 Remove masking, check for overspray and/or seepage, and clean all machined surfaces as required.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

- 5.9 Apply a thin coat of oil to masked surfaces after coating.
- 5.10 Re-tap all unplugged tapped holes. Do not remove coated pipe plugs.
- 5.11 Note: The following uncoated surfaces must be coated with epoxy paint at time of assembly:
 - 5.11.1 Uncoated cover surfaces around cover bearing
 - 5.11.2 Uncoated body surfaces around seat
 - 5.11.3 Uncoated disc retainer surfaces around stem
 - 5.11.4 Uncoated diaphragm washer surfaces around stem nut
 - 5.11.5 Uncoated powertrol body surfaces around bearing

6.0 Quality Assurance

- 6.1 The quality assurance department shall perform periodic "in process" inspection to ensure compliance with this procedure.
- 6.2 The quality assurance department shall perform epoxy coating Holiday testing and reporting per invoice request only with extra charges.

7.0 Holiday Testing Procedure (only when requested)

- 7.1 Parts are routed to inspection area for Holiday test.
- 7.2 Each part is checked by means of a Holiday Detector. Grounding clamp is placed on bare metal area and sponge swept over epoxy surfaces. Any voids or thin areas will be detected by a beeping noise from the tester, caused by a complete electrical circuit through the part.
- 7.3 Any defects found are routed back to the epoxy department for repair or stripping and reapplication of epoxy until part passes Holiday test.
- 7.4 Production work order is stamped by inspector and part is routed to stock area. ***NOTE:** all parts subject to Holiday test are given specific Cla-Val part numbers in order to keep them separate from standard production.

APPROVED EPOXY COATING MATERIAL

(Epoxy material must be approved by Cla-Val Engineering)

- AkzoNobel Powder Coating, Interpon® Powder Coatings, Resicoat® R4-ES Fusion Bonded Epoxy (See Product Data Sheet for specifications).



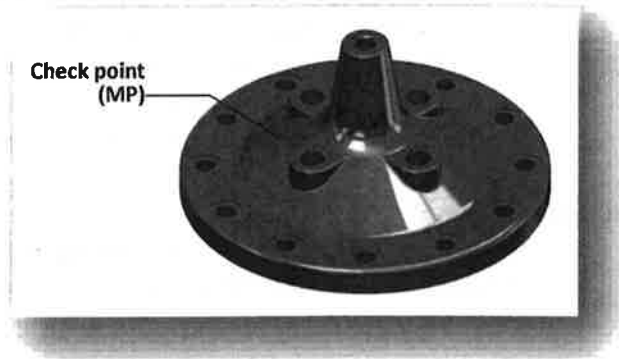
CLA-VAL Epoxy Coating Instructions for Australian Valves:

How to measure?

How to measure?

1 check point (MP) directly on the epoxy surface:

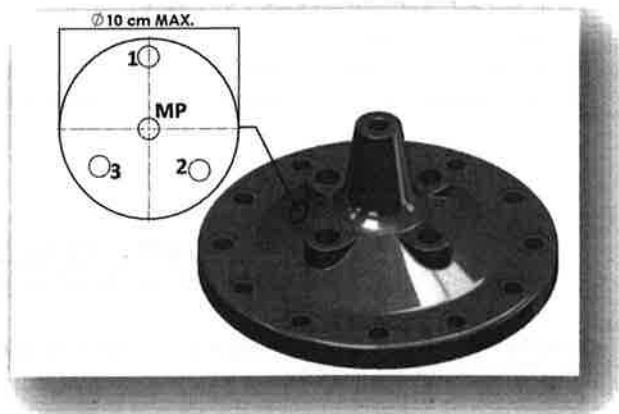
- If check point (MP) is equal or between min. / max. tolerances then check point is accepted.
- If check point (MP) < tolerance min. then apply rule "check point < tolerance min."
- If check point (MP) > tolerance max. then apply rule "check point > tolerance max."



Check point < tolerance min.

If 1 check point (MP) is out of tolerance, (< tolerance min.) we allow the average of measures 1-2-3 (within a 10cm MAX. radius) instead of the MP:

- If the average of measures 1-2-3 is \geq tolerance then check point (MP) is accepted.
- If the average of measures 1-2-3 is < tolerance then check point (MP) is rejected.



Check point > tolerance max.

If 1 check point (MP) is out of tolerance, (> tolerance min.) and the average of the measures 1-2-3 is > tolerance max. then check point (MP) is rejected:

If, in the table of thickness specification, the tolerance max. is with an indication (*), the check point can be accepted but pay special attention in the future to optimize thickness.

Without indication, epoxy thickness Must be \leq tolerance max.

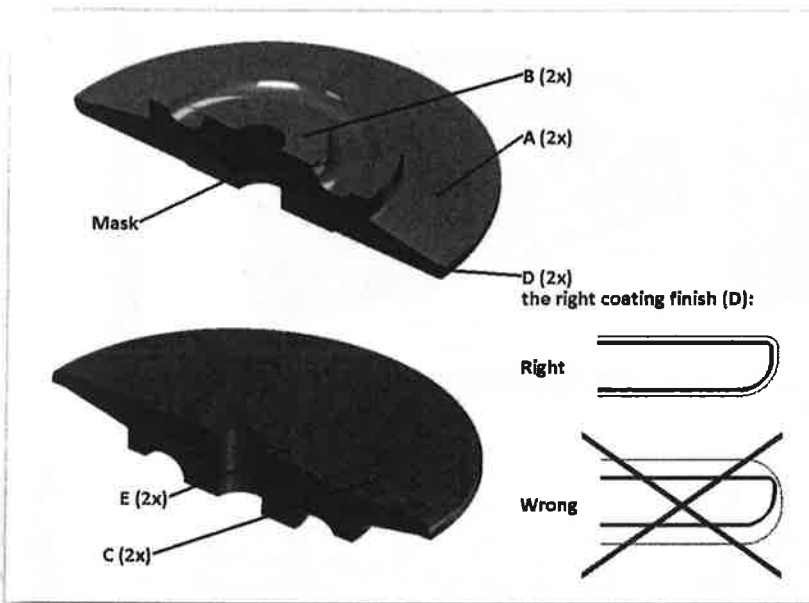
SIZE (in)	A	ToL.
1 1/2 - 10in DN40 - DN250	STD: 350	min 300 max 500
12 - 24in DN300 - DN600	STD: 350	min 300 *max 500
28in & larger DN700 & larger	STD: 350	min 300 *max 500

With indication, epoxy thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Diaphragm washer:



- (1) A/B/C/D/E: 10 check point thickness per table below.
- (2) D: Coating as per above drawing.
- (3) Internal hole to be masked as indicated.

Thickness specification for Diaphragm washers:

Check Points (μm)

SIZE (in)	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.
All Sizes	STD: 400	min 350 *max 500	STD: 400	min 350 max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 max 500

Acceptance Test:

All points equal or between min / max. tolerances.

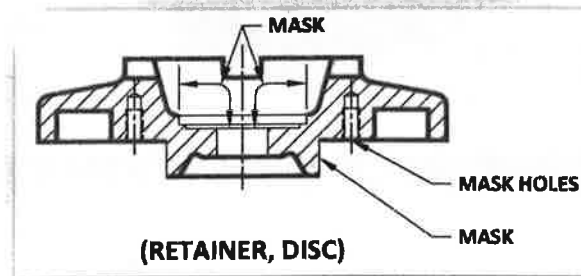
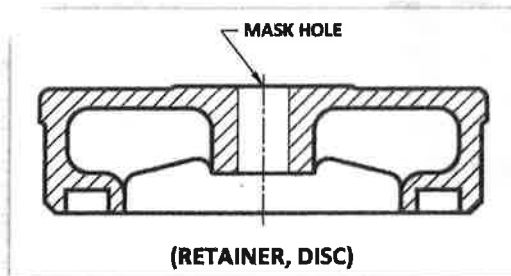
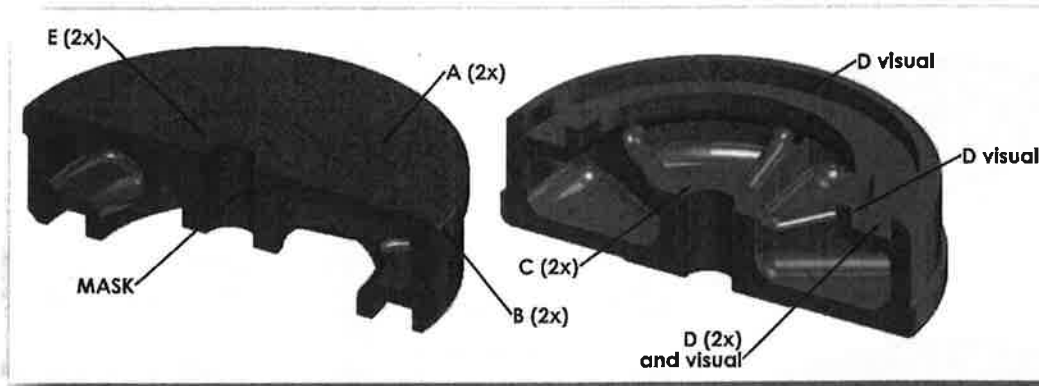
*max. tolerance is a recommendation and thickness can be > tolerance max.





CLA-VAL Epoxy Coating Instructions for Australian Valves:

Disc Retainer:



- (1) A/B/C/E: 8 check point thickness per table below.
- (2) D: Sizes 1 1/2" through 4", visual only. 6" and larger, 2 check point thickness per table below.
- (3) Internal hole to be masked as indicated.



Thickness specification for Disc Retainer:

Check Points (µm)

SIZE [in]	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.
1 1/2" - 10in DN50 - DN250	STD: 400	min 350 *max 500	STD: 400	min 350 max 500	STD: 400	min 350 max 500	STD: 100	min 70 max 150	STD: 400	min 350 max 500
12 - 24in DN300 - DN600	STD: 400	min 350 *max 500	STD: 400	min 350 max 500	STD: 400	min 350 max 500	STD: 200	min 150 max 250	STD: 400	min 350 max 500
28in & larger DN700 & larger	STD: 400	min 350 *max 600	STD: 400	min 350 max 600	STD: 400	min 350 max 600	STD: 300	min 250 max 400	STD: 400	min 350 max 500

Acceptance Test:

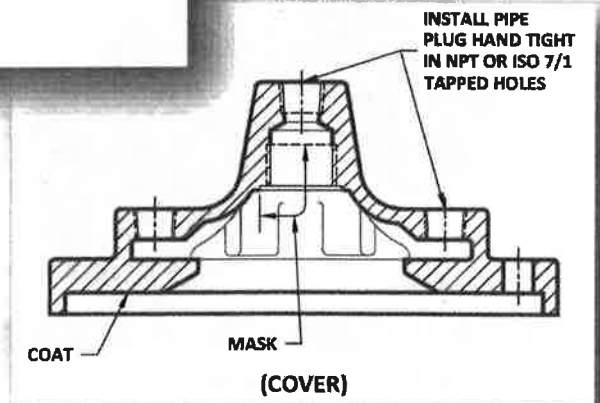
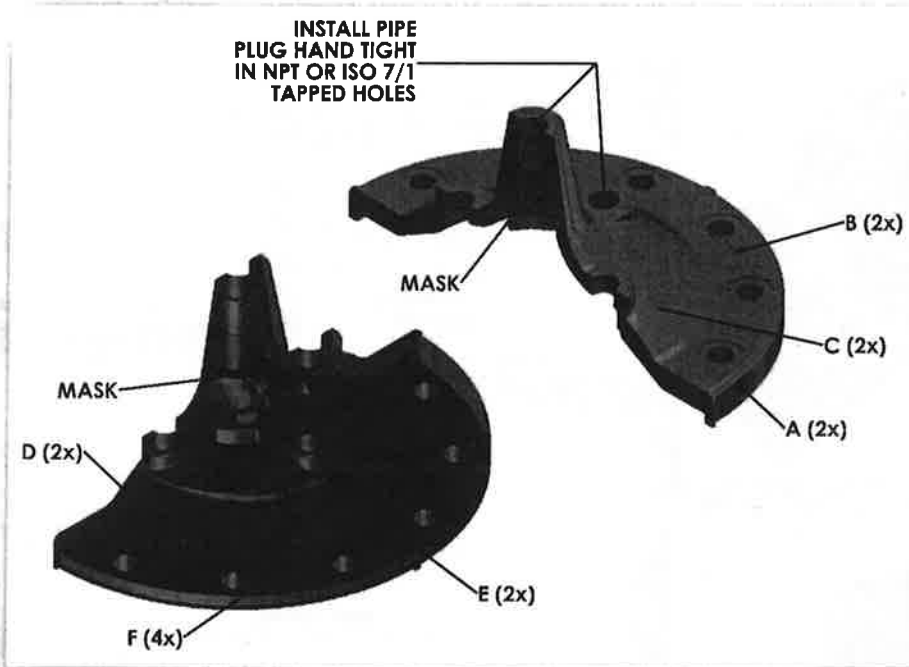
All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Cover:



- (1) A/B/C/D/E/F: 14 check point thickness per table below.
- (2) Internal hole to be masked as indicated.

Thickness specification for Cover:

Check Points (µm)

SIZE (in)	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.	F	Tol.
1 1/2 - 10in DN40 - DN250	STD: 350	min 300 *max 400	STD: 350	min 300 max 400	STD: 350	min 300 *max 400	STD: 400	min 350 max 500	STD: 400	min 350 max 500	STD: 325	min 300 max 350
12 - 24in DN300 - DN600	STD: 400	min 300 *max 500	STD: 400	min 300 max 500	STD: 400	min 300 *max 500	STD: 400	min 350 max 500	STD: 400	min 350 max 500	STD: 325	min 300 max 350
28in & larger DN700 & larger	STD: 500	min 300 *max 600	STD: 500	min 300 max 600	STD: 500	min 300 *max 600	STD: 400	min 350 max 500	STD: 400	min 350 max 500	STD: 325	min 300 max 350

Acceptance Test:

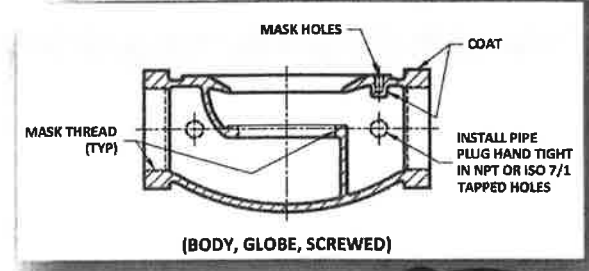
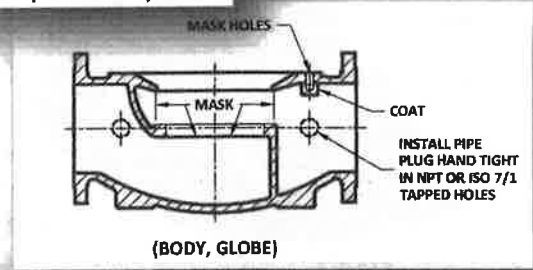
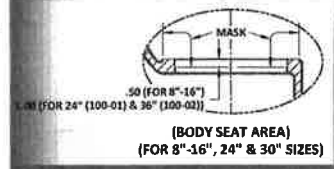
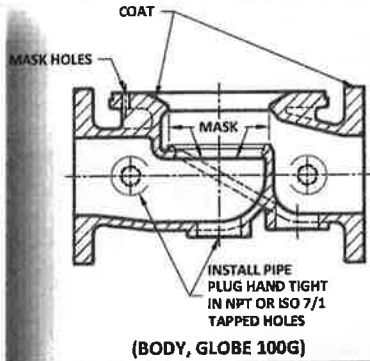
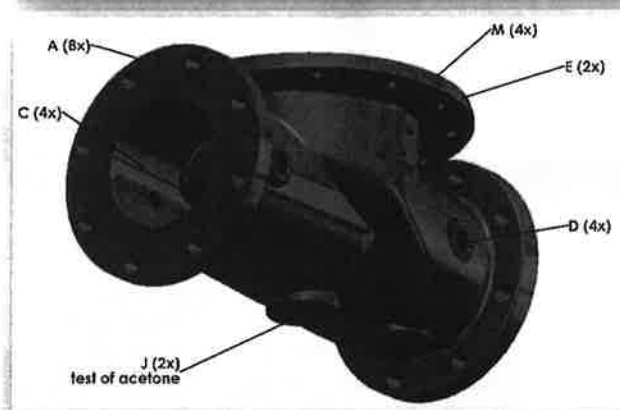
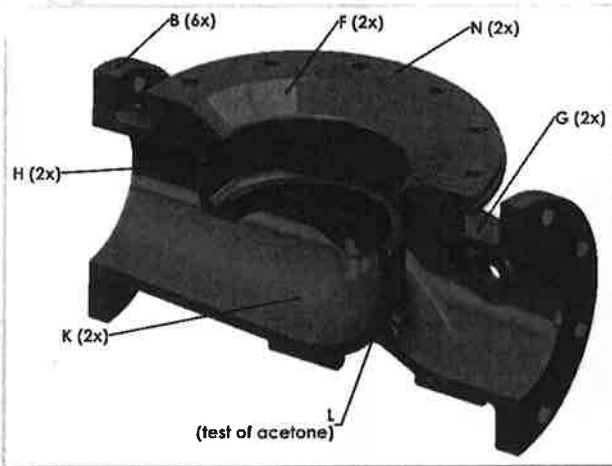
All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Body (Globe):



(1) 40 check point thickness per table below.

Thickness specification for Body (Globe):

Check Points (μm)

SIZE (in)	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.	F	Tol.
1 1/2 - 10in DN40 - DN250	STD: 400	min 350 *max 500	STD: 350	min 300 *max 400	STD: 400	min 350 *max 500	STD: 350	min 300 *max 400	STD: 350	min 300 *max 400	STD: 400	min 350 *max 500
12 - 24in DN300 - DN600	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500
28in & larger DN700 & larger	STD: 400	min 350 *max 600	STD: 400	min 300 *max 600	STD: 400	min 350 *max 600	STD: 400	min 300 *max 600	STD: 400	min 300 *max 600	STD: 400	min 350 *max 500
	G	Tol.			J	Tol.	K	Tol.			N	Tol.
1 1/2 - 10in DN40 - DN250	STD: 350	min 300 *max 400	STD: 400	min 350 *max 500	STD: 350	min 300 *max 500	STD: 400	min 350 *max 500	STD: 325	min 300 max 350	STD: 400	min 350 max 500
12 - 24in DN300 - DN600	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 325	min 300 max 350	STD: 400	min 350 max 500
28in & larger DN700 & larger	STD: 400	min 300 *max 600	STD: 400	min 350 *max 600	STD: 400	min 300 *max 600	STD: 400	min 350 *max 600	STD: 325	min 300 max 350	STD: 400	min 350 max 500

Acceptance Test:

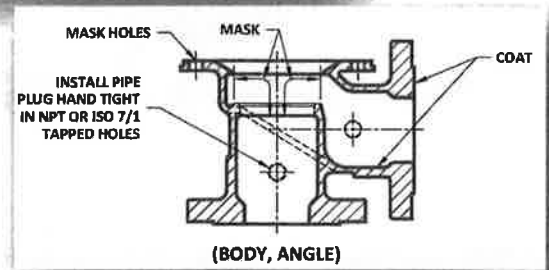
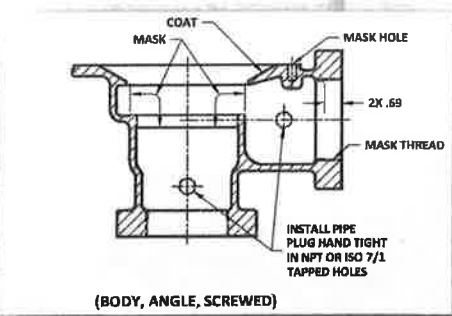
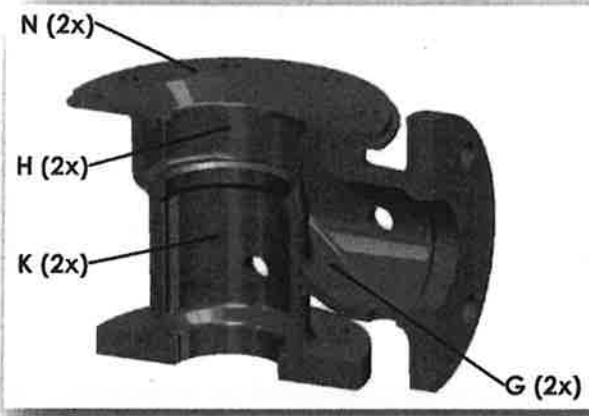
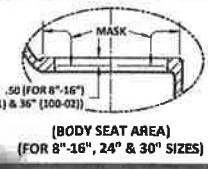
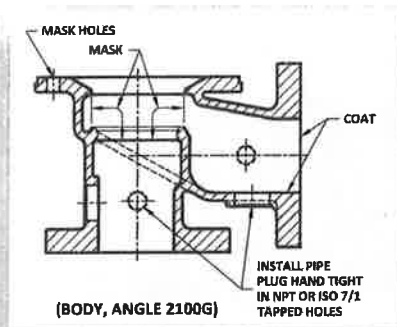
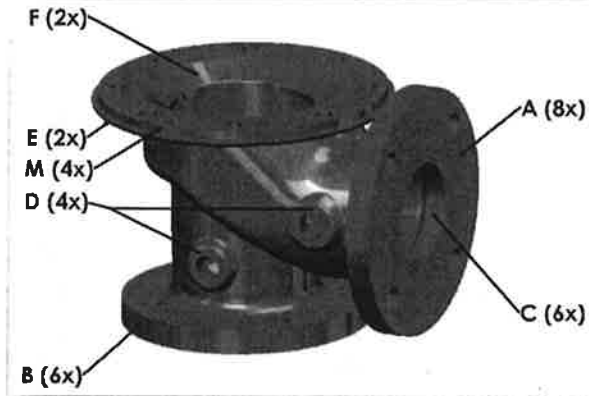
All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Body (Angle):



(1) 40 check point thickness per table below.

Thickness specification for Body (Globe):

Check Points (µm)

SIZE (in)	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.		
1 1/2 - 10in DN40 - DN250	STD: 400	min 350 *max 500	STD: 350	min 300 *max 400	STD: 400	min 350 *max 500	STD: 350	min 300 *max 400	STD: 350	min 300 *max 400		
12 - 24in DN300 - DN600	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 300 *max 500		
28in & larger DN700 & larger	STD: 400	min 350 *max 600	STD: 400	min 300 *max 600	STD: 400	min 350 *max 600	STD: 400	min 300 *max 600	STD: 400	min 300 *max 600		
		Tol.	G	Tol.	H	Tol.	K	Tol.	M	Tol.	N	Tol.
1 1/2 - 10in DN40 - DN250	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 325	min 300 max 350	STD: 400	min 350 max 500
12 - 24in DN300 - DN600	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 325	min 300 max 350	STD: 400	min 350 max 500
28in & larger DN700 & larger	STD: 400	min 350 *max 500	STD: 400	min 350 *max 600	STD: 400	min 350 *max 600	STD: 400	min 350 *max 600	STD: 400	min 300 max 350	STD: 400	min 350 max 500



Acceptance Test:

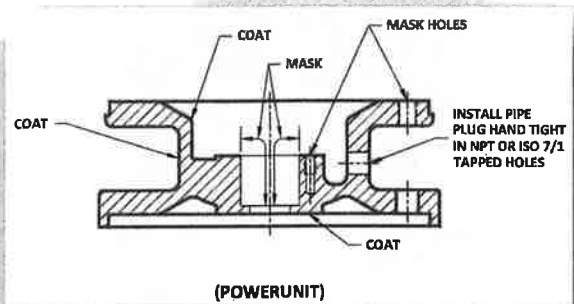
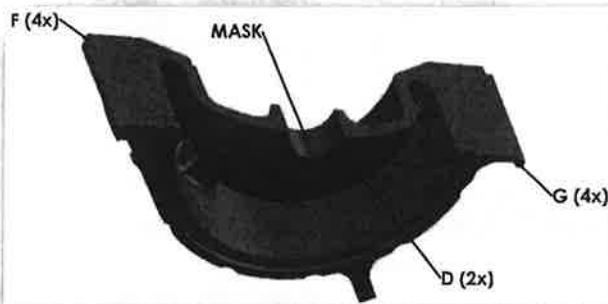
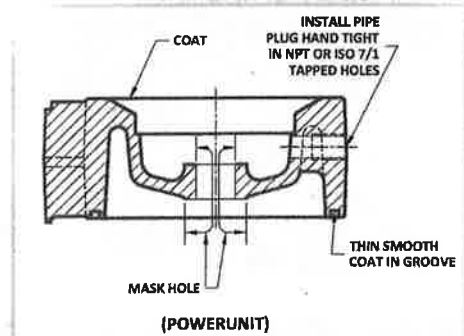
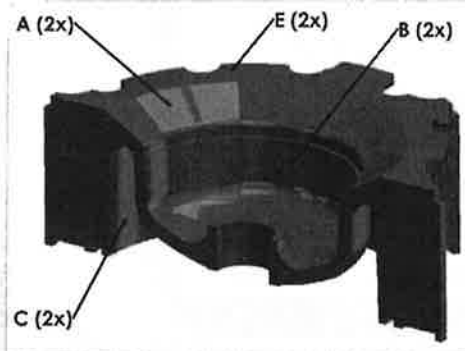
All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Powerunit:



- (1) A/B/C/D/E/F/G: 18 check point thickness per table below.
- (2) Internal hole to be masked as indicated.

Thickness specification for Powerunit:

Check Points (μm)

SIZE [in]	A	Tol.	B	Tol.	C	Tol.		
1 1/2 - 24in DN40 - DN600	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500		
28in & larger DN700 & larger	STD: 400	min 350 *max 500	STD: 400	min 350 *max 600	STD: 400	min 350 *max 600		
	D	Tol.	E	Tol.		Tol.	G	Tol.
1 1/2 - 24in DN40 - DN600	STD: 400	min 350 *max 500	STD: 400	min 350 max 500	STD: 325	min 300 max 350	STD: 325	min 300 max 350
28in & larger DN700 & larger	STD: 400	min 350 *max 600	STD: 400	min 350 max 500	STD: 325	min 300 max 350	STD: 325	min 300 max 350



Acceptance Test:

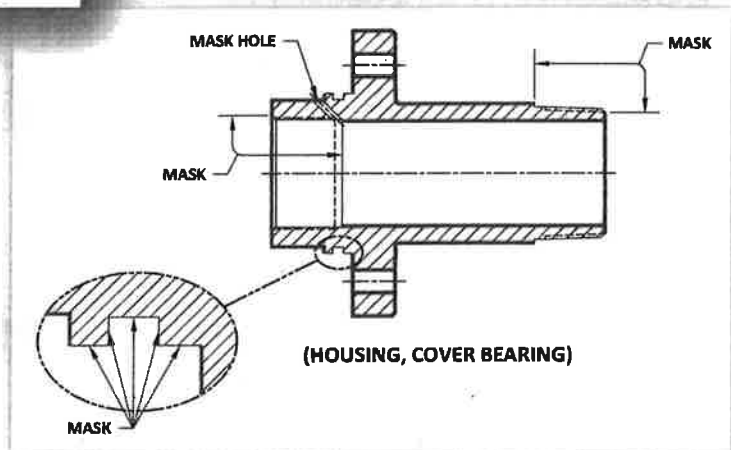
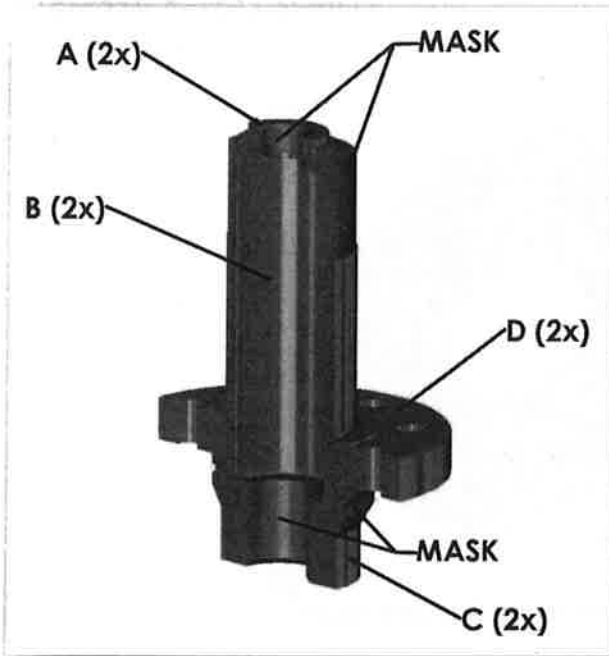
All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Cover Bearing Housing:



(1) A/B/C/D: 8 check point thickness per table below.

Thickness specification for Cover Bearing Housing:

Check Points (μm)

SIZE (In)	A	Tol.	B	Tol.	C	Tol.	D	Tol.
All Sizes	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500

Acceptance Test:

All points equal or between min / max. tolerances.

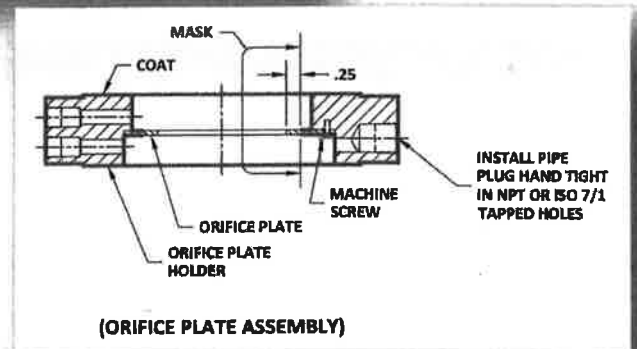
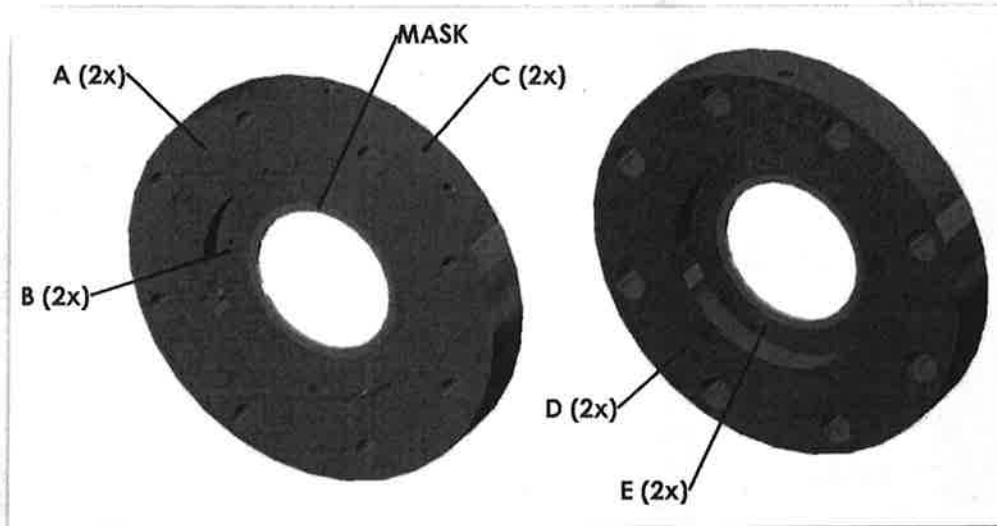
*max. tolerance is a recommendation and thickness can be > tolerance max.





CLA-VAL Epoxy Coating Instructions for Australian Valves:

Orifice Plate Assembly:



(1) A/B/C/D/E: 10 check point thickness per table below.

Thickness specification for Orifice Plate Assembly:

Check Points (μm)

SIZE (in)	A	Tol.	B	Tol.	C	Tol.	D	Tol.	E	Tol.
1 1/2 - 10in DN40 - DN250	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 350	min 300 *max 400	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500
12 - 24in DN300 - DN600	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500	STD: 400	min 300 *max 500	STD: 400	min 350 *max 500	STD: 400	min 350 *max 500

Acceptance Test:

All points equal or between min / max. tolerances.

*max. tolerance is a recommendation and thickness can be > tolerance max.



CLA-VAL Epoxy Coating Instructions for Australian Valves:

Epoxy Coating: Appendix A

Quick Reference sheet.



Resicoat R4-ES Fusion Bonded Epoxy

Product Data Sheet

Product Description: Resicoat R4-ES is a functional fusion bonded epoxy powder coating designed for use on valves and fittings in contact with potable water. Resicoat R4-ES typically offers full corrosion protection of valves and fittings with excellent adhesion, excellent resistance to cathodic disbondment, good flexibility, good chemical stability and excellent heat resistance. The fast cure properties of Resicoat R4-ES make it suitable for applications where consistent film thickness is required. The Resicoat R4-ES series meets the performance requirements of AS/NZS 4158:2003 and complies with the water quality requirements of AS/NZS 4020:2005.

Powder properties*:	Chemical type	Epoxy
	Particle size	Suitable for electrostatic spray or fluid bed
	Specific Gravity	1.3 +/- 0.1
	Moisture	0.7% max
	Stability	6 months at 25°C
	Gel Time	20 ± 7 seconds at 200°C
	Film Thickness	>300 µm external, >350 µm internal
	Stoving Schedule (For Valves and Fittings)	Spray - 10 minutes at 180°C (metal temperature) or equivalent Dip – preheat to (metal temperature) ≥ 195°C, no post cure required if > 6mm wall thickness

Film Properties*:	Impact Resistance	AS/NZS 4158 Section 2.3.5	> 2.0J
	Flexibility	AS 3862	No cracking @ 0°C and 1% strain
	Cathodic Disbondment	AS 3862 Appendix M	28 day r < 15mm
	Hot Water Immersion	AS 3862 14 days at 50°C	Rating < 1
	Water Absorption	AS 3862 100 days at 23°C	< 4%
	Abrasion Resistance	ASTM D4060 CS17, 1000g, 1000 cycles	< 40mg loss
	Thermal Stability	AS 3862 100 days at 100°C	No cracking at 1.0% strain
	Ultraviolet Radiation	ASTM D2565 Type B 100 days	No cracking at 1.0% strain

Effect on Water Quality*:	Taste of Water	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*
	Appearance of Water Extract	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*
	Growth of Aquatic Micro-Organisms	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*
	Cytotoxic Activity of Water Extract	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*
	Mutagenic Activity of Water Extract	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*
	Extraction of Metals	AS/NZS 4020 Part 1 AS/NZS 4020 Part 2	Complies*

* Resicoat R4-ES satisfies the criteria of AS/NZS 4020:2005 Products for use in contact

Resicoat R4-ES Fusion Bonded Epoxy

Product Data Sheet

- Pretreatment:**
- Remove any oil, grease, dust or graphite with suitable solvent, and any salt deposits with fresh water.
- (Cast Iron)**
- Grit blast to SA 2 ½ with a surface profile of 50-80 microns, cleaning blasted surface by air blast, brushing or suction. Use gloves to avoid hand contact.
 - Grind out any defects and reblast if necessary. Ensure < 4 hours from blast to coat.

Application: Preheat using furnace or induction heating as per above curing recommendations. Apply powder electrostatically or via fluidised bed application and test a sample of each product batch to AS/NZS 4158:2003 *Section 3 Requirements for Factory-applied Coating* for quality control purposes. Repair using Interseal 670HS repair coating if required.

Performance: Akzo Nobel's liability is strictly limited to replacing such quantity of powder coating as proved to be defective. Before using the powder coating the user shall determine its suitability for his intended use and the user assumes all risk and liability.

Safety Precautions: This product is intended for use only by professional applicators in industrial environments and should not be used without reference to the relevant health and safety data sheet which Akzo Nobel has provided to its customer. If for any reason a copy of the relevant health and safety data sheet is not immediately available the user should contact Akzo Nobel to obtain a copy before using the product. Minimum safety precautions in dealing with all powder coatings are as follows. All dusts are respiratory irritants. Therefore, inhalation of the dust or of the vapours resulting from the cure should be avoided. Take steps to prevent skin contact, but should contact occur, wash skin with soap and water. In case of eye contact flush immediately with clean water and seek medical advice. Dust clouds of any finely divided organic material can be ignited with an electric spark or open flame. Dust and powder should not be allowed to build up on surfaces or ledges. Dust collection equipment should be used which has provision for adequate explosion release. All equipment should be electrically earthed to prevent build up of static. Users are recommended to follow the guidelines laid down in the AS3754:1990, Safe Application of Powder Coatings by Electrostatic Spraying.

Disclaimer: Unless otherwise agreed by us in writing, any contract to purchase products referred to in this brochure and any advice which we give in connection with the supply of products are subject to our standard conditions of sale. The information contained in this data sheet is liable to modification from time to time in the light of experience and our policy of continuous product development.

* Typical minimum specifications. Performance may vary slightly between individual products.

Resicoat R4-ES Fusion Bonded Epoxy V.007 Akzo Nobel Coatings Ltd
Issued: July 2008

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