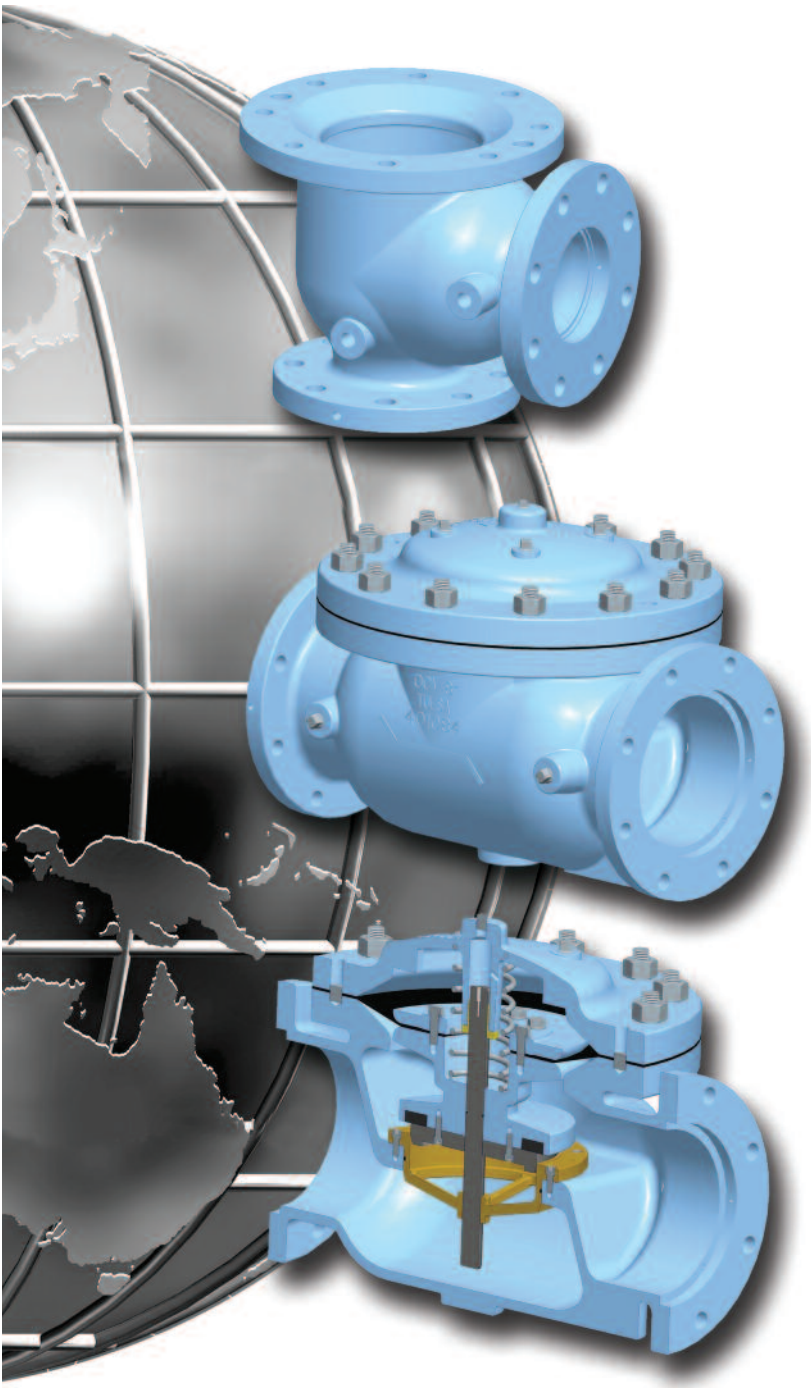
DESCRIPTION: Two-Part Epoxy, NSF 61 Approved, Potable Water Application Instructions



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Two-Part Epoxy, NSF 61 Approved, Potable Water Application Instructions

Procedure

SCOPE

▶This document gives the correct procedure for applying a protective two-part epoxy to OCV's Series 65/66 globe & angle valve casting and internal parts. These valve castings are sold with either a flanged, grooved or threaded end connection.This epoxy is NSF 61 certified and shall be used in a potable water environment.

MATERIAL

▶The two-part epoxy coating material information is listed under *Product Specs and Testing Data* in this document.

PROCEDURE STANDARDS

▶This procedure shall be in accordance with AWWA standard C550-90 "protective interior coating for valves and hydrants."

SURFACE PREPARATION

1. All deposits of oil or grease should be removed by placing parts in burn-off oven at 450° Fahrenheit.
2. All parts shall be blast clean to a "white metal finish" by using a walk-in abrasive blasting room. Media to be used: steel grit.
3. **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. "White metal blast cleaning" shall conform to the following surface preparation standards: steel structures painting council (sspc-sp-5).
4. Parts are taken from the blaster and coated as soon as possible to prevent rust or other contamination.
5. **Note:** Blast cleaning operations shall be conducted in such a manner that no damage is done to any portion of completed work. Mask parts as listed in the '*Masking Valve and Parts*' section.
6. **Note:** 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.
7. **Note:** If any rust forms after blast cleaning, the surfaces shall again be sandblasted before coating.

INTERIOR & EXTERIOR PROTECTIVE COATING PROCEDURE

1. Mask all parts in accordance with the requirements listed in the *Masking Valve and Parts* section of this document.
2. Place parts in a well-ventilated booth.
3. Apply two-part epoxy by using HVLP spray gun. The average coating thickness is 4 mils.
4. Allow sufficient time to let the epoxy cure. The curing schedule for this epoxy is listed in Product Specs and Testing Data section of this document.
5. After product has cured, inspect parts as required to verify epoxy surface thickness. Refer to *'Inspecting Coated Surfaces'* in this document. No excessive sags, voids, pin holes, valleys or blisters shall be allowed. If a discrepancy is found, return part to the *Surface Preparation* step, remove bad epoxy coat from part, and then reapply a new coat.
6. If no defects are found after inspecting part, then remove masking and clean all assembly surfaces.
7. **Note:** For epoxy thicknesses above 4 mils, repeat the coating process until desired thickness has been achieved. Maximum epoxy thickness is 17 mils.

QUALITY ASSURANCE

1. The Quality Assurance department shall perform periodic "in process" inspections to ensure compliance with this procedure.
2. After the epoxy has fully cured a routine inspection is performed before the valve is assembled. This procedure is covered in more detail in the *Inspecting Coated Surfaces* section of this document.
3. Holiday testing and reporting is performed by the Quality Assurance Department only upon request and might be subject to additional charges.

HOLIDAY TESTING PROCEDURE

1. Parts are routed to inspection area for holiday test.
2. Each part is checked by means of Tinker-Rasor M-1 wet sponge holiday tester. First, grounding clamp is placed on bare metal area and sponge is swept over epoxy surfaces. Then, any voids or thin areas will be detected by a beeping noise from the tester, which is caused by a complete electrical circuit through the part.
3. Any defects found are routed back to the Epoxy Application department for repair or stripping and reapplication of epoxy until part passes holiday test.
4. A Production work order is stamped by inspector and part is routed to stock area. ***NOTE**: all parts subject to holiday test are given specific OCV part numbers in order to keep them separate from standard production.
5. ***Note:** This testing is not performed regularly within OCV's standard coating process. This test is only performed upon customer request and might be subject to additional charges.

ADDITIONAL COSTS

▶Holiday Testing
▶Additional coating thicknesses above the OCV standard 4 mil coat will incur an extra cost. Carboguard 891 has a maximum coat thickness of 17 mils (425 microns).

▶**Documentation requested after shipment is not possible; therefore, requests for documentation and testing must be specified up front on customer purchase order and might be subject to additional charges.**

Products Specs and Testing Data

Two-Part Epoxy: Carboguard® 891, NSF 61 Certified, Blue Stock# (4169)

The specification and testing data regarding Carboguard is from Carboline's website, last updated in November 2004. Visit www.carboline.com to check for more current information.

SPECIFICATION DATA

Generic Type:
Cycloaliphatic Amine Epoxy

Description:
High solids, high-build potable water coating widely used for lining interior steel and concrete tanks, valves and pipe. Formulated for application at conventional builds (4.0-6.0 mils or 100-150 microns per coat) as well as high builds (10.0 mils or 250 microns per coat).

Features:
- Excellent film build and edge protection.
- VOC compliant to current AIM regulations.
- Meets or exceeds all requirements of:
  - ANSI/NSF Std. 61 for potable water tanks of 1000 gallons or larger.
  - AWWA D102 Inside System 1 and 2.
  - AWWA C210 for use on interior of steel water pipe.
  - Complies with FDA 21CFR 175.300 criteria for food contact.
  - AWWA C550 when used in conjunction with OCV Control Valves.

Color:
Blue (4169);
Other colors may be available upon customer request.

Finish:
Gloss

Primers:
Self-Priming

Topcoats:
Acrylics, Alkyds, Epoxies, Polyurethanes for non-immersion applications.

Dry Film Thickness:
4.0-10.0 mils (100-250 microns) per coat. Do not exceed 17 mils (425 microns). Where mechanical surfaces meet during assembly be sure to limit coating or mask properly.

Solids Content:
By volume: 75% (+/-2%)

Dry Temp Resistance:
Continuous: 250°F (121°C)
Non-Continuous: 300°F (149°C)
Discoloration and loss of gloss is observed above 200°F (93°C).

Wet Temp. Resistance:
Immersion temperature resistance depends upon exposure. Consult Carboline Technical Service for specific information. It is recommended that metal tanks operating above 140°F (60°C) be insulated.

Limitations:
Epoxies lose gloss, discolor and eventually chalk in sunlight exposure.

PERFORMANCE DATA DURING TESTING

Purpose:
To test the performance of Carboguard 891 with ANSI/AWWA C550 standards.

Field Test
Two pieces of valve coated with Carboguard 891 were received by the customer to use for testing. One sample had a scribe etched across the sample to see how the valve material underneath the epoxy would react to the chemical immersion. The other sample was unscribed and fully covered with epoxy.

Substrate:	Valve Stock Sample
Pretreatment:	Sand blasted and painted with Carboguard® 891
Film thickness:	4 MILS
Cure:	Air Dried Epoxy

Mechanical Test

Adhesion:	AWWA	100%
Hardness:	ASTM	3H
Impact:	D3363	100/100 at 4.0 mils (100 microns)

Chemical Immersion

Sodium Carbonate @160° F for 90 Days
Potassium Biphthalate @160° F for 90 Days

Results and Conclusions:
1. After 90 days of immersion in sodium carbonate at 160°F, Carboguard 891 exhibited excellent resistance showing:
   - No visible evidence of disbandment, undercutting, or blistering on plane areas.
   - Very slight rusting and no undercutting at the scribe.
2. After 90 days of immersion in potassium biphthalate at 160°F, Carboguard 891 exhibited:
   - No visible evidence of disbandment, undercutting, or blistering on the plane area.
   - Solution discoloration and surface staining of the coating in the liquid phase.
   - Rusting and 2 mm undercutting at the scribe.
3. Carboguard 891 exhibited no visible cracking or disbanding of the coating after direct impact testing at 20 in/lbs.

The unscribed panels of Carboguard 891 fulfilled the requirements of ANSI/AWWA C550 for immersion in sodium carbonate, immersion in potassium biphthalate, and direct impact resistance. However, in areas where the substrate is not protected by an intact layer of Carboguard 891 and the substrate is exposed to potassium biphthalate for extended periods of time, extensive corrosion of the substrate can be expected.

Note: the ANSII/AWWA C550 specification does not require the use of scribed panels in potassium biphthalate and sodium carbonate immersion testing.

APPLICATION EQUIPMENT

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General):

This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray:

Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

Airless Spray:

Pump Ratio:	30:1 (min.)*
GPM Output:	3.0 (min)
Material Hose:	3/8" I. D. (min.)
Tip Size:	.017-.021"
Output PSI:	2100-2300
Filter Size:	60 mesh

*Teflon packings are recommended and available from the pump manufacturer. Use 45:1 pump ratio for elevated applications and ½'' I. D. for hose lengths greater than 60'.

Brush & Roller (General)

Not recommended for tank lining applications except when striping welds. Multiple coats may be required to obtain desired appearance,

recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie-in within 10 minutes at 75°F (24°C).

Brush Roller

Use a medium bristle brush. Use a short-nap synthetic roller cover with phenolic core.

MIXING AND THINNING

Mixing: Power mix separately, then combine and power mix.

Ratio: 1:1 Ratio (A to B)

Thinning:

Spray:	Up to 8 oz/gal (6%) w/#2 (NSF Std.61 approved)
Brush:	Up to 16 oz/gal (13%) w/#33 (Non-NSF Std.61)
Roller:	Up to 16 oz/gal (13%) w/#33 (Non-NSF Std.61)

Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life:

Material begins to lose film build in 90 minutes at 75°F (24°C), and less at higher temperatures.

CLEANUP & SAFETY

Cleanup: Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety: Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation: When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHN/NIOSH approved respirator.

Caution: This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Normal	60°-85°F	60°-85°F	60°-90°F	0-80%
Min.	50°F	50°F	50°F	0%
Max.	90°F	125°F	110°F	80%

CURING SCHEDULE

Surface temp & 50% relative humidity	Dry to recoat	Dry to topcoat with other finishes	Final cure for immersion service	Maximum recoat time
50°F	12 hours	24 hours	N/R	60 Days
60°F	8 hours	16 hours	10 Days	30 Days
75°F	4 hours	8 hours	5 Days	30 Days
90°F	2 hours	4 hours	3 Days	15 Days

These times are based on a 4.0-6.0 mil (100-150 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat time is exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. For force curing, contact Carboline Technical Service for specific requirements.

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Products Specs and Testing Data

HANDLING & STORAGE

Flash Point (Part A):	75°F
Flash Point (Part B):	81°F
Storage (Indoors):	40°F-110°F
Shelf Life (Part A):	36 months @75°F
Shelf Life (Part B):	6 months @75°F

FIELD TOUCHUP PROCEDURE

If a valve or part is received with a discrepancy in the painted surface, follow these guidelines to touchup the painted surface. First, clean the surface by making sure that all foreign debris such as dirt, moisture, or grease is removed. In addition to cleaning the surface, the part should be lightly sanded so that the touchup paint properly adheres to the surface. Next, mix the necessary amount of 1:1 ratio mixture of Part A and Part B Carboguard 891 epoxy. Then apply this epoxy using a bristle brush or roller brush. After the product has cured, the touchup procedure is complete.

Note: Field touchup procedures are only for an epoxy coating and will not adhere properly for a part that has been powder coated.

Additional Coatings

The current document specifies how to apply the standard epoxy coating for valves used in potable water systems. OCV does offer additional products to coat the valve. These coatings are generally available upon customer request, but might incur extra cost. Spec sheets for the coatings listed below are also available upon request.

- Abranon- Salt water coating; typically used in an abrasive environment.
- Flexcoat 707 Primer- Applied prior to coating with Abranon and is also used on petroleum products.
- Valspar Powder Coat- Banner Blue; NSF 61 approved.

Masking Valve and Parts

PROCEDURE

1. Cover open areas with masking tape and threads with plastic plugs.
2. After coating has been applied to part and epoxy has fully cured, remove masking material.
3. Upon removal of masking material check that no excessive sags, voids, pin holes, valleys, or blisters are found. If discrepancies are found, address as necessary.
4. **Note:** Valves that have a grooved connection are masked identically like a flanged valve body.
5. **Note:** Only standard parts are illustrated in this document. Contact OCV Control Valves for additional parts and information.

CONTINUED ON NEXT PAGE

Masking Valve and Parts

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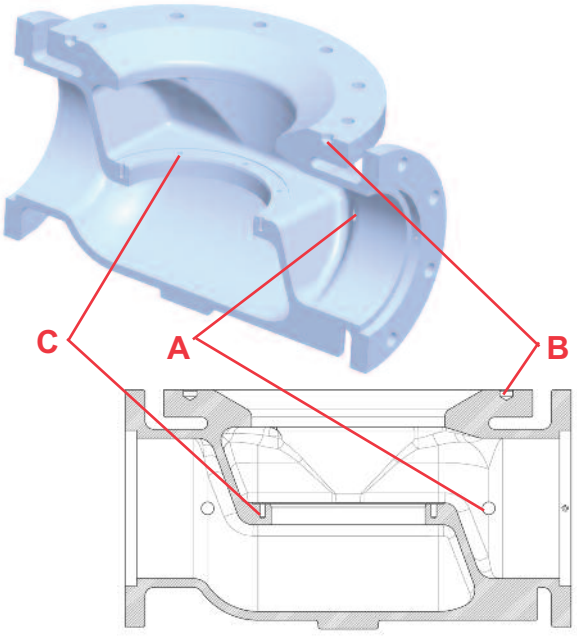
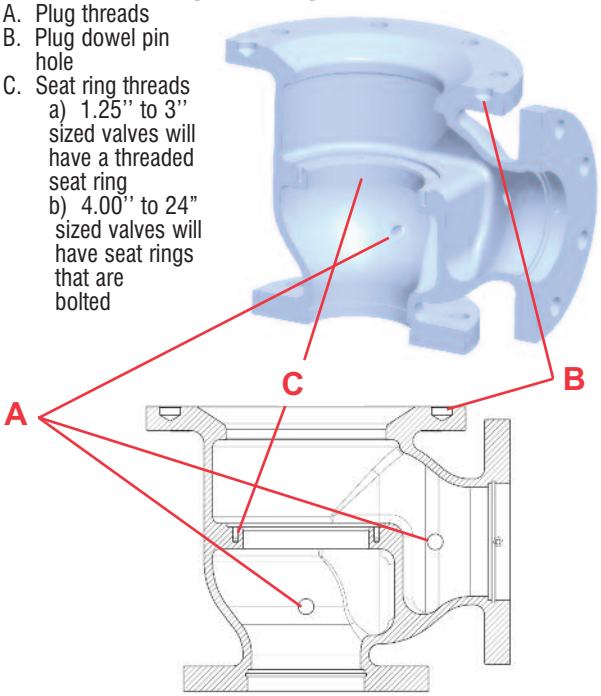
BODY (Flanged Globe)

A. Plug threads
B. Plug dowel pin hole
C. Cover seat ring threads
   a) 1.25 -3'' sized valves will have a threaded seat ring
   b) 4.00-24'' sized valves will have seat rings that are bolted



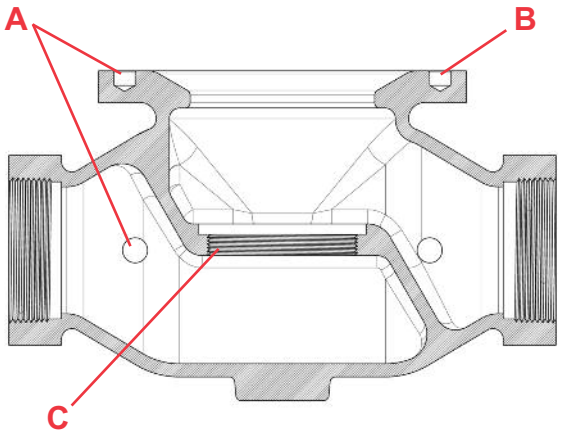
BODY (Flanged Angle)

A. Plug threads
B. Plug dowel pin hole
C. Seat ring threads
   a) 1.25'' to 3'' sized valves will have a threaded seat ring
   b) 4.00'' to 24" sized valves will have seat rings that are bolted



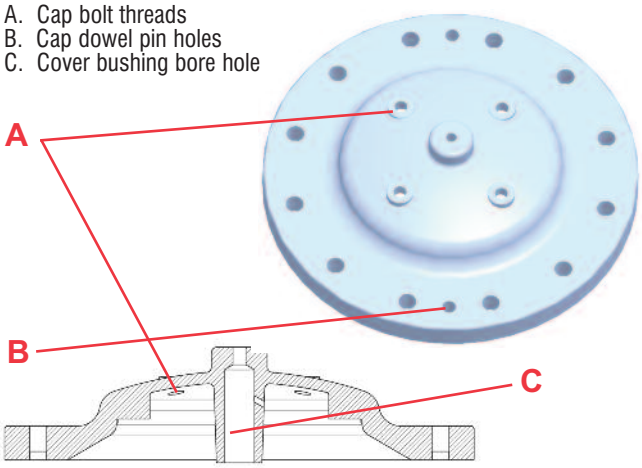
BODY (Screwed Globe)

A. Plug threads
B. Plug dowel pin hole
C. Seat ring threads
   a) 1.25'' to 3'' sized valves will have a threaded seat ring
   b) 4.00" to 24'' sized valves will have seat rings that are bolted



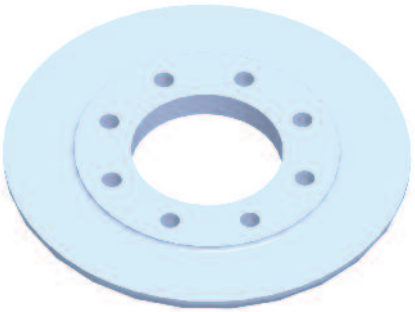
BONNET

A. Cap bolt threads
B. Cap dowel pin holes
C. Cover bushing bore hole



DIAPHRAGM PLATE

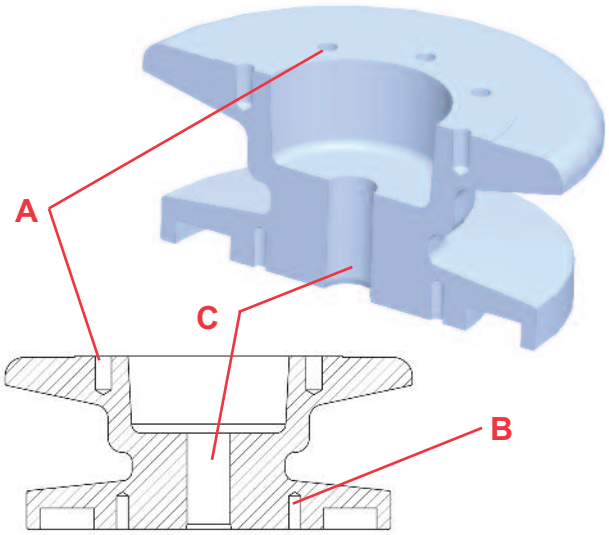
A. It is unnecessary to mask anything on this part.



Masking Valve and Parts

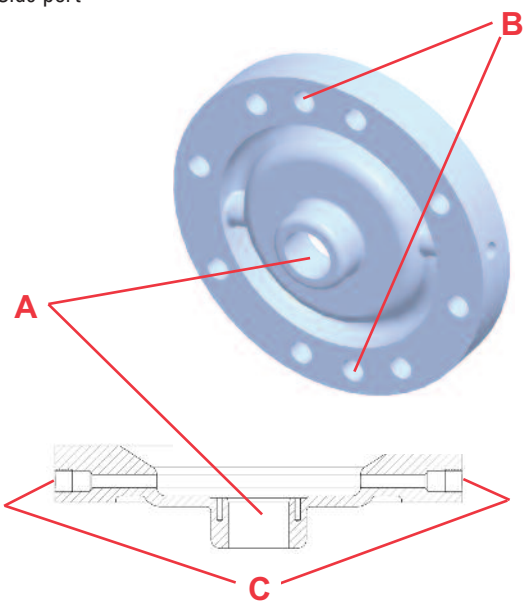
SPOOL

A. Cap thread holes on top
B. Cap thread holes on bottom
C. Cover inner bearing surface



INTERMEDIATE PLATE

A. Mask center bore
B. Plug dowel pin hole
C. Side port



Inspecting Coated Surfaces

PROCEDURE

1. Once the epoxy has fully cured, the product is ready to be inspected. First, remove masking material and then make a visual inspection of the whole valve or part and make sure that no excessive sags, voids, pin holes, valleys, or blisters are found.
2. If no visual discrepancies are found, then follow the part diagram and take thickness readings on the check points that are called out. This can be done by using a calibrated nondestructive measuring device.
3. If any visual discrepancies are noticed, follow the *Touchup Procedure* listed under the *Product Specs and Testing Data* section of this document. If the discrepancy cannot be touched up, then blast and recoat the part.
4. Check to make sure that none of these thickness readings are out of tolerance by using the tolerance table listed below.
5. If a reading is out of tolerance, take three thickness readings within a 4 inch (aprx. 10 cm) radius of the discrepancy area. Then take the average of these three readings. If this average is within the tolerance, the paint thickness is OK. If the average is out of tolerance, then the part should be blasted and recoated.
6. **Note:** "2x" indicates the inspecting procedure should be repeated twice on the general surface area specified by the check point; "3x" indicates three areas; "4x" indicates four areas, etc.

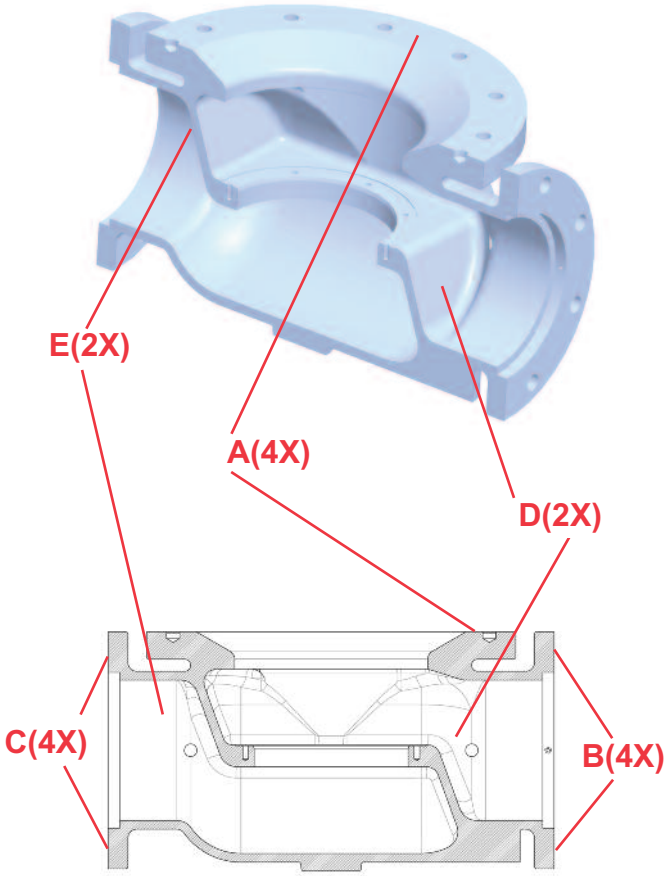
CHECK POINT TOLERANCE

Size	A (mils/microns)	Tolerance
1.25"-24"	STD: 4/100	min 3 mil (75 microns) max 5 mil (125 microns)

CHECK POINT LOCATIONS
BODY (Flanged Globe)

Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)

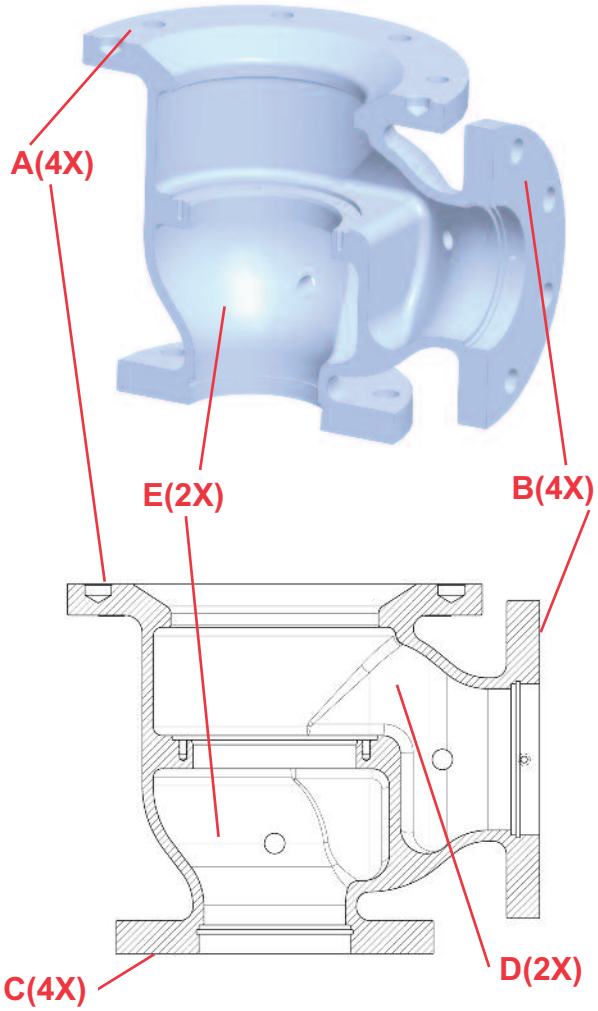
Size (in.)	D	Tol. (+/-)	E	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



BODY (Flanged Angle)

Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)

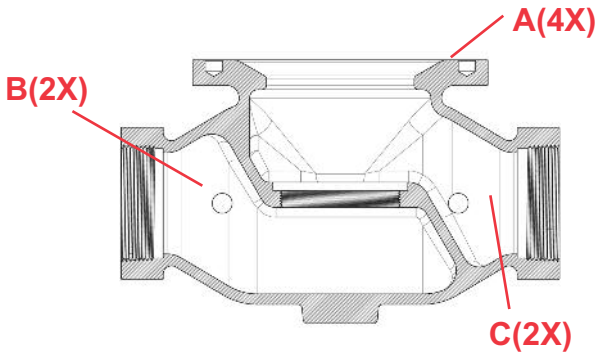
Size (in.)	D	Tol. (+/-)	E	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



Inspecting Coated Surfaces

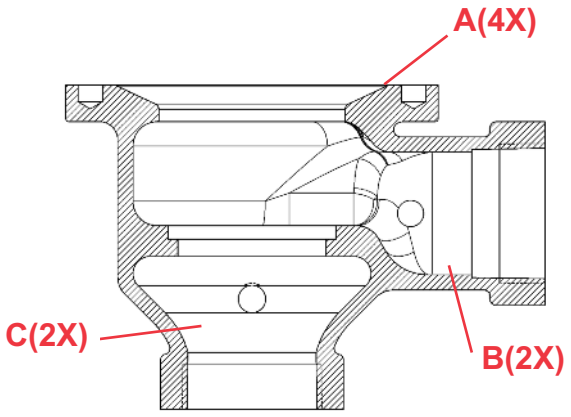
BODY (Globe Screwed)

Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



BODY (Angle Screwed)

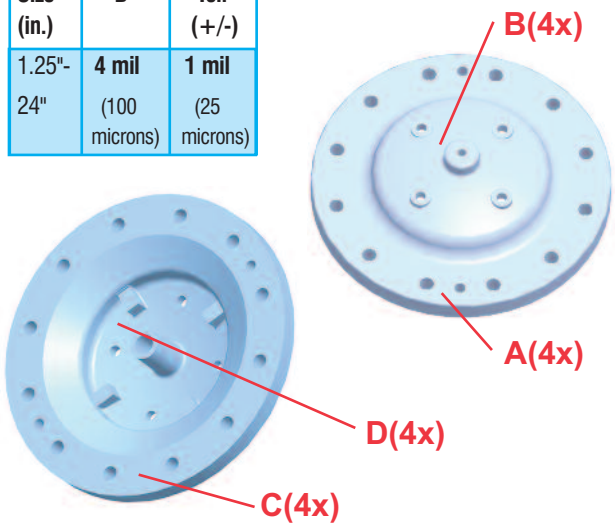
Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



BONNET

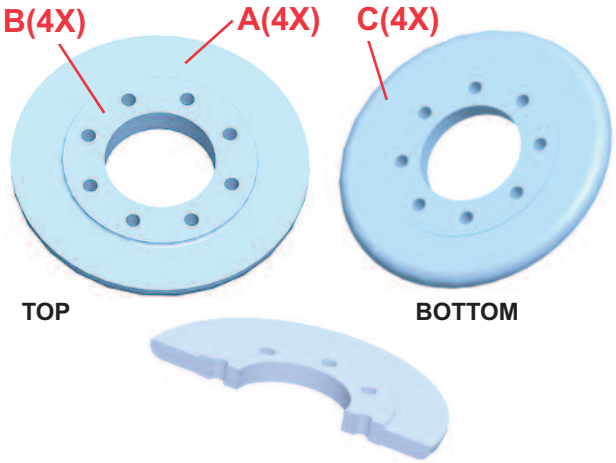
Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)

Size (in.)	D	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)



DIAPHRAGM PLATE

Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



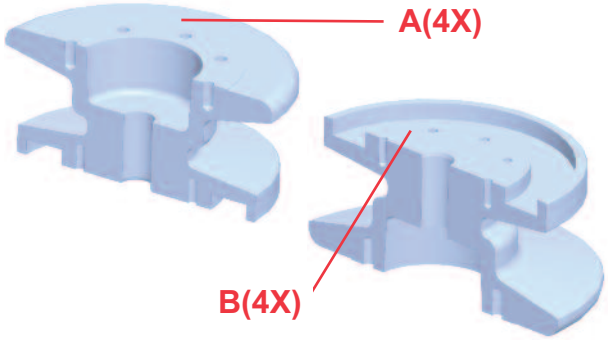
Two-Part Epoxy, NSF 61 Approved, Potable Water Application Instructions

Two-Part Epoxy, NSF 61 Approved, Potable Water Application Instructions

Inspecting Coated Surfaces

SPOOL

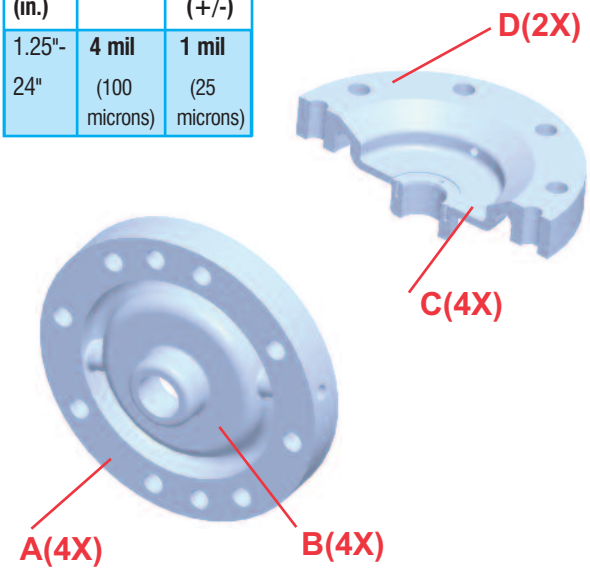
Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)



INTERMEDIATE PLATE

Size (in.)	A	Tol. (+/-)	B	Tol. (+/-)	C	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)	4 mil (100 microns)	1 mil (25 microns)

Size (in.)	D	Tol. (+/-)
1.25"-24"	4 mil (100 microns)	1 mil (25 microns)



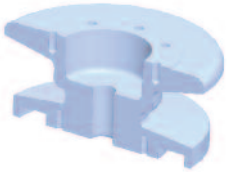
Part Reference

ANGLE BODY

GLOBE BODY

INTERMEDIATE PLATE

SPOOL



BONNET

DIAPHRAGM PLATE

DISCLAIMER

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