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Subject: This specification defines the standard coating requirements for hub parts.

1. For 3000, 4000 and 5000 Series Hub

1.1 Plates

1.1.1 Standard Coating – Hub Plate

All hub plates for 3000, 4000 and 5000 series shall be ASTM A-123 Hot Dip Galvanized as a standard coating.

- A. Remove all sharp edges.
- B. Hot Dip Galvanize per ASTM A-123 to a plating thickness of 2-3 mils.
- C. Zinc build up around bolt holes should be controlled so bolts can be installed without any interference.

1.1.2 Alternate Coating – Hub Plate

Upon customer request, Coal Tar Epoxy as per E.S. 14.33 can be used as a coating for hub plates.

- A. Remove all sharp edges. Round both sides of plate OD and ID to minimum 1/16” radius.
- B. All bolt hole edges must be free of burrs.
- C. All painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- D. Spray 5 - 7 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

1.1.3 Alternate Coating – Hub Plate

Upon customer request, coal tar epoxy applied over hot-dip galvanize can be used as a coating for hub plates and stiffener rings. This alternate coating will be represented by “CG” added to the end of the part number. “CG” stands for “coal tar epoxy over galvanize”.

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- A. Remove all sharp edges. For both hub plates and stiffener rings, round both sides of plate OD and ID to minimum 1/16" radius.
- B. All bolt hole edges must be free of burrs.
- C. Hot Dip Galvanize per ASTM A-123 to a plating thickness of 2-3 mils.
- D. Zinc build up around bolt holes should be controlled so bolts can be installed without any interference.
- E. Prior to painting coal tar epoxy over galvanized steel, the surfaces must be treated with an acid etch or wash primer to aid in paint adhesion and to prevent paint blistering. Follow the acid etch or wash primer manufacturer's directions for treatment of galvanized surfaces.
- F. Spray 5 - 7 mils DFT of coal tar epoxy on all galvanized surfaces. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- G. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

1.1.4 Alternate Coating – Hub Plate

Upon customer request, hub plates for 3000, 4000 & 5000 series shall be painted with two or three separate coats of Coal Tar Epoxy as per E.S. 14.33. "Double coating of coal tar epoxy" will be represented by "XC" and added to the end of the part number. "Triple coating of coal tar epoxy" will be represented by "XXC" and added to the end of the part number.

- A. Remove all sharp edges.
- B. For hub plates only, round both sides of plate OD and ID to minimum 1/16" radius.
- C. All bolt hole edges must be free of burrs.
- D. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- E. For double coating, spray multiple coats to achieve 5 - 7 mils DFT to all areas. For triple coating, spray multiple coats to achieve 15 - 23 mils DFT to all areas. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- F. Drying times for the first coat of paint is 45 min. at 70 ° F for touch, and 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

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1.2 Hub Spool and Ductile Iron Blade Clamps

1.2.1 Standard Coating – Hub Spool

Standard finish coating for the hub spool shall be a Zinc Rich Epoxy Coating as per E.S. 14.31.

- A. Remove all the sharp edges
- B. Painting surfaces should be Sand Blasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- C. Spray 2.5 - 3.5 mils DFT to all areas except shaft bore. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- D. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

1.2.2 Standard Coating – Ductile Iron Blade Clamp

Standard finish coating for the ductile iron blade clamp shall be epoxy powder coated.

- A. Remove all the sharp edges
- B. Painting surfaces should be Sand Blasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- C. Apply 2 - 4 mils DFT to entire surface area of clamp. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminants.

1.2.3 Alternate Coating – Hub Spool & Ductile Iron Blade Clamp

Upon customer request, Coal Tar Epoxy as per E.S. 14.33 can be used as a coating for the hub spool and the ductile iron blade clamp.

- A. Remove all sharp edges.
- B. All bolt hole edges must be free of burrs.
- C. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast. If the Coal Tar Epoxy is to be applied over the standard coating, the surfaces may be

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sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP7, brush-off blast.

- D. Spray 5 - 7 mils DFT to all areas except shaft bore and inside of blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

1.2.4 Alternate Coating – Hub Spool and Cast & Ductile Iron Blade Clamps

Upon customer request, hub spools and cast/ductile iron blade clamps for 3000, 4000 and 5000 series shall be painted with two separate coats of Coal Tar Epoxy as per E.S. 14.33. “Double coating of coal tar epoxy” will be represented by “XC” and added to the end of the part number. “Triple coating of coal tar epoxy” will be represented by “XXC” and added to the end of the part number.

- A. Remove all sharp edges, on hub spools and ductile iron clamps.
- B. For hub plates only, round both sides of plate OD and ID to minimum 1/16” radius.
- C. All bolt hole edges must be free of burrs.
- D. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- E. For double coating, spray multiple coats to achieve 5 - 7 mils DFT to all areas. For triple coating, spray multiple coats to achieve 15 - 23 mils DFT to all areas except shaft bore and inside blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- F. Drying times for the first coat of paint is 45 min. at 70 ° F for touch, and 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

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1.3 Aluminum Blade Clamp

1.3.1 Standard Coating

1.3.1.1 3000 Series

3000 series die cast aluminum blade clamps should be powder coated as per E.S. 14.34.

1.3.1.2 4000 Series

4000 series die cast aluminum blade clamps should be powder coated as per E.S. 14.35.

1.3.1.3 5000 Series

5000 series die cast aluminum blade clamps should be powder coated as per E.S. 14.32.

2. For 3000 Series AP Cast Iron Hub and 1000 Series AV Hub

2.1 Standard Coating

Standard finish coating shall be a Zinc Rich Coating as per E.S. 14.31.

- A. Remove all the sharp edges
- B. Painting surfaces should be Sand Blasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- C. Spray 2.5 - 3.5 mils DFT to all areas except shaft bore. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- D. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

3. For AVCT (Auto Variable Hub for Cooling Tower)

3.1 Standard Coating

Standard finish for all AVCT is Coal Tar Epoxy as per E.S. 14.33.

- A. Remove all sharp edges.
- B. All bolt hole edges must be free of burrs.

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- C. All painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- D. Spray 5 - 7 mils DFT to all areas except shaft bore and inside of blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4. For 6000, 10 Meter, 7000 & 8000 Series

4.1 Hub Plates and Stiffener Ring

4.1.1 Standard Coating – Hub Plates and Stiffener Ring

All hub plates and stiffener ring consist of 6000, 10M, 7000 and 8000 series shall be painted with Coal Tar Epoxy as per E.S. 14.33 as a standard coating.

- A. Remove all sharp edges. Round the both sides of edges of plate OD and ID to minimum 1/16” radius.
- B. All bolt hole edges must be free of burrs.
- C. All painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- D. Spray 5 - 7 mils DFT to all areas. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.1.2 Alternate Coating – Hub Plates & Stiffener Rings

Upon customer request, coal tar epoxy applied over hot-dip galvanize can be used as a coating for hub plates and stiffener rings. This alternate coating will be represented by “CG” added to the end of the part number. “CG” stands for “coal tar epoxy over galvanize”.

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- A. Remove all sharp edges. For both hub plates and stiffener rings, round both sides of plate OD and ID to minimum 1/16" radius.
- B. All bolt hole edges must be free of burrs.
- C. Hot Dip Galvanize per ASTM A-123 to a plating thickness of 2-3 mils.
- D. Zinc build up around bolt holes should be controlled so bolts can be installed without any interference.
- E. Prior to painting coal tar epoxy over galvanized steel, the surfaces must be treated with an acid etch or wash primer to aid in paint adhesion and to prevent paint blistering. Follow the acid etch or wash primer manufacturer's directions for treatment of galvanized surfaces.
- F. Spray 5 - 7 mils DFT of coal tar epoxy on all galvanized surfaces. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- G. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.1.3 Alternate Coating – Hub Plates & Stiffener Rings

Upon customer request, hub plates and stiffener rings for 6000, 10M, 7000 and 8000 series shall be painted with two or three separate coats of Coal Tar Epoxy as per E.S. 14.33. "Double coating of coal tar epoxy" will be represented by "XC" and added to the end of the part number. "Triple coating of coal tar epoxy" will be represented by "XXC" and added to the end of the part number.

- A. Remove all sharp edges.
- B. For hub plates only, round both sides of plate OD and ID to minimum 1/16" radius.
- C. All bolt hole edges must be free of burrs.
- D. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- E. For double coating, spray multiple coats to achieve 5 - 7 mils DFT to all areas. For triple coating, spray multiple coats to achieve 15 - 23 mils DFT to all areas. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.

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- F. Drying times for the first coat of paint is 45 min. at 70 ° F for touch, and 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.2 Hub Spool and Cast Iron (7000 & 8000) Blade Clamps

4.2.1 Standard Coating – Hub Spool and Cast Iron (7000 & 8000) Blade Clamps

All hub spools for 6000, 10M, 7000 and 8000 series and cast iron blade clamps for 7000 and 8000 series shall be painted with Coal Tar Epoxy as per E.S. 14.33 as a standard coating.

- A. Remove all sharp edges.
- B. All bolt hole edges must be free of burrs.
- C. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- D. Spray 5 - 7 mils DFT to all areas except shaft bore and inside blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.2.2 Alternate Coating – Hub Spool and Cast & Ductile Iron Blade Clamps

Upon customer request, hub spools and cast/ductile iron blade clamps for 6000, 10M, 7000 and 8000 series shall be painted with two separate coats of Coal Tar Epoxy as per E.S. 14.33. “Double coating of coal tar epoxy” will be represented by “XC” and added to the end of the part number. “Triple coating of coal tar epoxy” will be represented by “XXC” and added to the end of the part number.

- A. Remove all sharp edges, on hub spools and ductile iron clamps.
- B. For hub plates only, round both sides of plate OD and ID to minimum 1/16” radius.
- C. All bolt hole edges must be free of burrs.

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- D. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- E. For double coating, spray multiple coats to achieve 5 - 7 mils DFT to all areas. For triple coating, spray multiple coats to achieve 15 - 23 mils DFT to all areas except shaft bore and inside blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- F. Drying times for the first coat of paint is 45 min. at 70 ° F for touch, and 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.3 Ductilet Iron 6000 & 10M Blade Clamps (same as 5000 Ductile clamp)

4.3.1 Standard Coating – Ductile Iron 6000 & 10M Blade Clamp

Standard finish coating for the ductile iron blade clamp shall be epoxy powder coated.

- A. Remove all the sharp edges
- B. Painting surfaces should be Sand Blasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- C. Apply 2 - 4 mils DFT to entire surface area of clamp. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminants.

4.3.2 Alternate Coating – Ductile Iron 6000 & 10M Blade Clamp

Upon customer request, Coal Tar Epoxy as per E.S. 14.33 can be used as a coating for the hub spool and the ductile iron blade clamp.

- A. Remove all sharp edges.
- B. All bolt hole edges must be free of burrs.
- C. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast. If the Coal Tar Epoxy is to be applied over the standard coating, the surfaces may be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP7, brush-off blast.

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- D. Spray 5 - 7 mils DFT to all areas except shaft bore and inside of blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- E. Drying times at 70 ° F are 45 min. for touch, 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

4.3.3 Alternate Coating – Ductile Iron 6000 & 10M Blade Clamp

Upon customer request, hub spools and cast/ductile iron blade clamps for 6000, 10M, 7000 and 8000 series shall be painted with two separate coats of Coal Tar Epoxy as per E.S. 14.33. “Double coating of coal tar epoxy” will be represented by “XC” and added to the end of the part number. “Triple coating of coal tar epoxy” will be represented by “XXC” and added to the end of the part number.

- A. Remove all sharp edges.
- B. For hub plates only, round both sides of plate OD and ID to minimum 1/16” radius.
- C. All bolt hole edges must be free of burrs.
- D. For application to bare metal, all painting surfaces should be sandblasted to a minimum of SSPC (Steel Structures Painting Council) - Surface Preparation Specification SP6, commercial blast.
- E. For double coating, spray multiple coats to achieve 5 - 7 mils DFT to all areas. For triple coating, spray multiple coats to achieve 15 - 23 mils DFT to all areas except inside bore of blade clamps. Inside of blade clamp area shall be 2 - 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 ° F and 110 ° F.
- F. Drying times for the first coat of paint is 45 min. at 70 ° F for touch, and 12 hrs. for handling. If recoat is required, it should be made within 2 to 12 hrs.

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1 to 10	See master copy for revision detail.	1/12/98	P. Charean
11	<p><i>Added this revision page and page footer.</i></p> <p><i>Was</i> <i>Typical "Coal Tar Epoxy as per E.S. 14.33":</i> D. <i>Spray manufacturer's recommended thickness to all areas except inside of blade clamps. Inside of blade clamp area shall be 2 to 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 40 °F and 110 °F.</i> E. <i>If recoat is required, follow manufacturer's recommendations.</i></p> <p><i>Is</i> D. <i>Spray 5 - 7 mils DFT to all areas except shaft bore and inside of blade clamps. Inside of blade clamp area shall be 2 to 4 mils DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 °F and 110 °F.</i> E. <i>Drying times at 70 °F are 45 min. for touch, 2 to 4 hrs. for handle. If recoat is required, it should be made within 2 to 12 hrs.</i></p> <p><i>Was</i> <i>Typical "Zinc Rich Coating as per E.S. 14.31":</i> C. <i>Spray recommended DFT. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 40 °F and 110 °F.</i></p> <p><i>Is</i> C. <i>Spray 2.5 - 3.5 mils DFT to all areas except shaft bore. Application conditions should be completely dry surfaces and free from dirt, dust, debris, mill scale, oil, grease or other contaminators with relative humidity under 85% and surface temperatures between 50 °F and 110 °F.</i> D. <i>Drying times at 77 °F are 1 hr. for touch, 2 to 4 hrs. for handle. If recoat is required, it should be made within 45 min. to 12 hrs.</i></p>	1/12/98	P. Charean
12	Revised format.	8/12/04	CY
13	Added epoxy powder coat for cast iron blade clamps.	4/5/05	SR
14	Added "CG" and "XC" as alternate coatings for 6000, 10M, 7000 & 8000 hub parts, added powder coat for 4000 aluminum clamps.	9/15/08	SR

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15	Added "CG" and "XC" as alternate coatings for 3000, 4000 & 5000 hub parts. Added "XXC" to alternate coatings for 3000, 4000 & 5000, 6000, 10M ,7000 & 8000 hub parts.	10/10/08	SR
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