

## Dip Brazing Specification Comparison

REQUIREMENT	Mil-B-7883	AWS C3.7
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**GENERAL ISSUES:**

- |   |           |                 |
|---|-----------|-----------------|
| <ul style="list-style-type: none"> <li>· <b><u>X-ray/Ultrasonic Inspection</u></b><br/><br/>Kittredge complies with exception.<br/>Class "B" will be noted on quote "less x-ray"</li> </ul>   | Class "A" | Class "A" & "B" |
| <ul style="list-style-type: none"> <li>· <b><u>Work Load Thermocouples</u></b><br/>Workload load thermocouples are used to monitor the temperature of the parts during thermal processing.<br/><br/>Kittredge takes exception to this requirement.</li> </ul> | N/A       | Required        |

**PROCEDURE RELATED ISSUES:**

- |  |                  |          |
|--|------------------|----------|
| <ul style="list-style-type: none"> <li>· <b><u>TPS (Temp Qualification Procedure)</u></b><br/>This is a process of qualifying the temperature of the preheat ovens and braze salt bath. Control and uniformity are specified and must adhere to AMS 2750 (pyrometry).<br/><br/>Kittredge complies with this requirement.</li> </ul>  | N/A              | Required |
| <ul style="list-style-type: none"> <li>· <b><u>Flux Bath Qualification</u></b><br/>Procedure with samples performed daily to qualify braze pot performance.<br/><br/>Kittredge complies with this requirement.</li> </ul>  | N/A              | Required |
| <ul style="list-style-type: none"> <li>· <b><u>Surface Preparation Procedure</u></b><br/>Materials and process defined.<br/><br/>Kittredge complies with this requirement.</li> </ul>  | Specified Within | Per BPS  |
| <ul style="list-style-type: none"> <li>· <b><u>Joint Clearance Procedure</u></b><br/>Joint clearance defined as .003 max., which is not always desirable.<br/><br/>Kittredge takes exception to this requirement. Joint clearances are controlled through component part design and fixturing which will vary .002-.006" depending on joint configuration.(.000" for clad alloys)</li> </ul> | Specified Within | Required |

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**PROCEDURE RELATED ISSUES CONT'D:**

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|---|-------------------------|-----------------|
| <ul style="list-style-type: none"> <li>· <b><u>Assembly Procedure</u></b><br/><br/>Kittredge complies with this requirement. Subassembly and assembly drawings are part of the standard manufacturing drawing package.</li> </ul>   | <b>Specified Within</b> | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>Filler Metal procedure</u></b><br/>Filler metal materials and application procedure required. Customer must specify braze filler alloy.<br/><br/>Kittredge complies with this requirement.</li> </ul>                              | <b>Specified Within</b> | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>Stopoff Procedure</u></b><br/>Stopoff material and application procedure Required.<br/><br/>Kittredge complies with this requirement</li> </ul>  | <b>Specified Within</b> | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>Flux Bath Maintenance Procedure</u></b><br/>Daily and monthly testing requirements with PH range of 6.4-7.0 specified.<br/><br/>Kittredge complies with this requirement</li> </ul>  | <b>Specified Within</b> | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>Brazing Procedure Specifications (BPS)</u></b><br/><br/>Kittredge will comply with this requirement. Standard joint configuration procedures are being developed and qualified.</li> </ul>   | <b>N/A</b>              | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>Flux Removal Procedure</u></b><br/>Procedure required for removal of residual brazing salts.<br/><br/>Kittredge complies with exception. Requirement of 5ppm is not the recognized industry standard. We work to 13ppm.</li> </ul> | <b>Specified Within</b> | <b>Required</b> |

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**PROCEDURE RELATED ISSUES CONT'D:**

- |  |     |                 |
|--|-----|-----------------|
| <ul style="list-style-type: none"> <li>· <b><u>Brazing Procedure Qualification</u></b><br/>           Brazing Procedure Specifications and equipment shall be qualified per one of the following:           <ol style="list-style-type: none"> <li>1) AWS B2.2 Standard for brazing procedure qual.</li> <li>2) Sections 4.2, 4.3, 4.4, &amp; 5.4.1 of AWS C3.7</li> <li>3) Organization Having Quality Responsibility</li> </ol> <p>Kittredge complies with option 2 noting previously stated exceptions.</p> </li> </ul> | N/A | <b>Required</b> |
|--|-----|-----------------|

**TESTING AND INSPECTION ISSUES:**

- |   |           |                 |
|---|-----------|-----------------|
| <ul style="list-style-type: none"> <li>· <b><u>Destructive Testing</u></b><br/>           Metallurgical analysis for silicon diffusion, undercutting and erosion required on all BPS qualification samples.           <p>Kittredge will comply with this requirement. Qualification testing underway.</p> </li> </ul> | N/A       | <b>Required</b> |
| <ul style="list-style-type: none"> <li>· <b><u>X-ray/Ultrasonic Inspection</u></b><br/>           Kittredge complies with exception. Class "B" will be noted on quote "less x-ray"         </li> </ul>  | Class "A" | Class "A" & "B" |
| <ul style="list-style-type: none"> <li>· <b><u>Flux Removal Testing</u></b><br/>           Silver Nitrate testing of all parts required.           <p>Kittredge complies with exception. Requirement of 5ppm is not the recognized industry standard. We work to 13ppm.</p> </li> </ul>                               | 13PPM     | 5 PPM           |