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TORCH SOLDERING (LOW-TEMP)

PROCEDURE # 099-A-W112

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TORCH SOLDERING (LOW TEMP)

1.0 PURPOSE

This standard is for establishing guidelines for soldering joints and connections that are required for Retech designed parts. With exception of filler metal and fluxes, all other details are suggested practices to ensure a reliable soldered connection.

2.0 SCOPE

N/A

3.0 RESPONSIBILITIES

3.1 Manufacturing will be responsible for performing the tasks as described in Section 6.0 below.

3.2 Engineering will be responsible for noting this Workmanship Standard on the drawing, as applicable.

3.3 Quality Control will be responsible for performing the tasks as described in Section 6.0 below, if applicable.

4.0 REFERENCES

4.1 QA Manual

5.0 DEFINITIONS

Soldering is defined as a group of welding processes which produce coalescence of materials by heating them to a suitable temperature and by using a filler metal (solder) having a liquidus not to exceed 840 °F and below the solidus of the base metals. The solder is usually distributed between the properly fitted surfaces of the joint by capillary attraction.

6.0 PROCEDURE

6.1 Soldering, Filler Metals and Fluxes:

Filler metal (solder) - J.W. Harris - Stay Brite
(96% tin, 4% silver)
Soldering temperature - 430 °F
Flux - J.W. Harris - Stay-Clean Liquid Flux
Optional flux - Markal CO.-LA-CO paste flux

6.2 Base Metals

Base metals listed may be joined to themselves or in combination — copper and copper alloys, carbon and low alloy steels, stainless steel, nickel and nickel alloys, tin and tin alloys, lead.

6.3 Precleaning

Deburr, degrease with suitable cleaner. Abrade area to be soldered with a suitable product such as sand paper, aluminum oxide flapper wheel, Scotch Brite pad, etc. Note: Abrading smooth surfaces will benefit capillary action. Reclean area with suitable cleaner. The importance of cleaning cannot be overemphasized.

6.4 Flux Application

Apply flux to protect cleaned surfaces from oxidation and to further clean base metals. Flux should be applied soon after cleaning to prevent reoxidation.

6.5 Fit Up

Fit parts together carefully to avoid contamination. Recommended joint clearance is .002 to .005 inch, but a tolerance range of .001 to .010 is acceptable. Rule of thumb for lap joints is, lap length minimum to be 3 x thickness of the thinner member being joined.

6.6 Soldering

Heat parts to proper temperature. Add filler metal (solder) as required to fill joint. Recommended torch flame setting to be a neutral flame, i.e., a flame that is neither oxidizing nor carburizing. When possible, torch

should not be applied directly on flux, use a deflective heat pattern to keep from “burning” flux.

6.7 Flux Removal

Residual flux should be removed completely and quickly (as soon as possible) after soldering is completed. Flux may cause damaging corrosion in the joint and adjacent areas if not removed. Clean area with water, hot preferred, and a fine S/S wire brush, Scotch Brite pad or other suitable means.

6.8 Summary

In the simplest application of the process, the surfaces to be joined are cleaned to remove contaminants and oxide. Next, they are coated with a flux. A flux is a material which is capable of dissolving solid metal oxides still present and also preventing new oxidation. The joint is then heated to proper temperature and filler metal (solder) is added to fill the joint. Capillary attraction between the base metal and the filler metal is much higher than between the base metal and the flux. Therefore, the flux is displaced by the filler metal. The joint, upon cooling to room temperature, will be filled with solid filler metal, and the flux will be found on the joint periphery.

7.0 RECORDS

N/A

8.0 ATTACHMENTS

N/A