SOLDERING

OF

ELECTRICAL AND ELECTRONIC EQUIPMENT

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1.0 SCOPE

1.1 This procedure defines the requirements for Electrical and Electronic Soldering.

2.0 APPLICABLE DOCUMENTS

2.1 The following documents are for use with this specification. Terms and Definitions are in accordance with ANSI/IPC-T-50.

2.1.1 ANSI/IPC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies

2.1.1.1 ANSI/IPC J-STD-002 Solderability Tests for Components Leads, Terminations, Lugs Terminals and Wires.

2.1.1.2 ANSI/IPC J-STD-003 Solderability Tests for Printed Circuit Boards

2.1.1.3 ANSI/IPC J-STD-004 Requirements for Soldering Fluxes

2.1.1.4 ANSI/IPC J-STD-005 Requirements for Soldering Paste

2.1.1.5 ANSI/IPC J-STD-006 Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications

2.1.1.6 ANSI/IPC-WHMA-620 Requirements and Acceptance for Cable and Wire Harness Assemblies

2.1.2 ANSI/IPC-HDBK-001 Handbook and Guide to the Requirements of Soldered Electronic Assemblies

2.1.3 ANSI/IPC A-610 Acceptability of Electronic Assemblies

2.1.4 ANSI/IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits

2.1.5 ANSI/ESD-S-20.20 Protection of Electrical and Electronic Parts, Assemblies and Equipment.

2.1.6 MIL-STD-1686 Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment

2.1.7 MIL-HDBK-263 Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment

2.1.8 QC-1202 Breeze-Eastern MRB Form

2.1.9 QP-151 Soldering Training

2.2 Conflict

2.2.1 In the event of conflict between any requirements specified herein and the applicable engineering blueprints and documentation, the following precedence shall be used to determine which document prevails:

1. Deviations approved by the affected customer and/or MRB
2. Contractually imposed requirements.
3. Project/product specified engineering blueprints and documentation. (Note: Deviations include waivers and concessions)

3.0 REQUIREMENTS

3.1 ESD Control Program

3.1.1 An ESD control program based on the requirements of the Breeze-Eastern ESD Specifications QP-116, QP-216 and QP-162 or ANSI/ESD-S20.20 or MIL-STD-1686 shall be actively used with the soldering process. All ESD programs are subject to audit by Breeze-Eastern L.L.C.

3.1.2 Records of ESD Awareness Training shall be available for review. Training shall be completed for all personnel involved in the soldering process on a regular basis and shall include not only operators, but all personnel involved in handling of ESD sensitive components.

3.2 Environmental Conditions

3.2.1 All areas used for electrical and electronic soldering shall be environmentally controlled unless stated otherwise.

3.2.1.1 Temperature shall be maintained between 64.4ºF (18ºC) and 86ºF (30ºC).

3.2.1.2 Relative humidity has a significant impact on the generation of static electricity and its control is recommended where practicable. ESD controls must allow soldering processes, assembly equipment and materials to function correctly based on vendor recommendations and/or documented evidence of process performance for all relative humidity levels $\leq$ 70%. Relative humidity should not exceed 70%.

3.3 Soldering Requirements

3.3.1 Electrical and electronic soldering, including all supplier soldering operations, shall be in accordance with ANSI/IPC J-STD-001.

3.3.2 Specification ANSI/IPC-HDBK-001 may be used to help clarify the contents of ANSI/IPC J-STD-001 and specification ANSI/IPC-A-610 may be used for referee purposes when inspecting electronic assembly workmanship.

3.3.3 Interim cleaning with isopropyl alcohol must be performed within 30 minutes of soldering.

3.3.4 100% Inspection of all soldered connections is required. For electrical and electronic assemblies being reworked or repaired, only the reworked or repaired areas require 100% inspection.

3.4 Additional Requirements for Repair Station and Field Service Activity

3.4.1 For Repair Station soldering activity: No temperature and humidity controls are required where the assembly repair is not a PWA or an ESD sensitive component. However the repair of PWA's or ESD sensitive components must be done in a controlled environment with full ESD controls.

3.4.2 For Field Service activity: It is recognized that Field Service can occur in difficult conditions in some cases and PWA or ESD sensitive component repair may be performed on an emergency basis in ambient conditions. Such activity is outside the control of this procedure. It is expected that the activity report of the service person will document the work performed and precautions taken during soldering and repair.

3.4.3 Repair operations in ambient conditions are permissible only on connector or switch to wire, wire to wire and wire to terminal connections. Only rework of solder connections, splicing of wires, and repair jumper wires is permissible by this procedure. Any other specific or special case repair including repair of PWA's is only permissible when a specific approved repair procedure is available.

3.5 Special Handling of Electrical Assemblies

3.5.1 Some electrical assemblies are easily damaged in handling or storage. This is particularly true of some solenoid assemblies and motors. Care must be taken in assuring that any loose wiring, prior to trimming and finishing, is kept safe and undamaged. All assembly personnel are cautioned to examine the condition of the semi-finished assemblies and assure the wires are undamaged.

3.5.2 Damaged wiring in the unused portion of a wiring harness may be cut off and discarded as long as the undamaged wiring of the harness is in accordance with the drawing or work instruction. Any repair of a wiring harness that will effect or be a part of a finished electrical assembly must be repaired as part of an MRB action.

3.6 Supplier MRB Action

3.6.1 Electrical assembly suppliers do not have Breeze-Eastern MRB authority and must submit all MRB requests using the Breeze-Eastern MRB form QC-1202.

3.7 Training Requirements

3.7.1 A soldering training program based on the requirements of ANSI/IPC J-STD-001 and/or ANSI/IPC A-610 is required for all operators and inspectors prior to soldering and inspection of production hardware.

3.7.2 Training shall be completed for all personnel involved in the soldering process on a regular basis. Supervised on-the-job training is acceptable until proficiency is demonstrated.

3.7.3 Records of soldering training, including the latest worksmanship samples, shall be available for review.

3.7.4 All supplier soldering training programs may be subject to audit by Breeze-Eastern.

3.7.5 QP-151 defines the Breeze-Eastern Soldering Trainng requirements.