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### 1 PURPOSE

To inform all MTS employees and contractors of the EH&S requirements associated with hand soldering processes at MTS.

### 2 SCOPE – APPLIES TO WHERE & WHEN THE WORK INSTRUCTION IS USED

This program applies to all designated hand soldering workstations where only soldering activities are authorized and can be performed at MTS Test-Eden Prairie (ie.. main production floor identified/signed locations – Checkout, Custom Electronics, Transducer Manufacturing, Extensometer Machine Shop, Actuator assembly, Engineering floor test labs (PD and E-Dev Areas) etc... .


### 3 DEFINITIONS AND ACRONYMS (IF NEEDED)

#### 3.1 EH&S:

Environmental, Health and Safety

#### 3.2 RCRA: (Resource Conservation Recovery Act)


US Federal legislation that regulates materials and wastes currently being generated, treated, stored, disposed of or distributed.

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**4 GRAPHIC (IF NEEDED)**

**5 RESPONSIBILITIES**

- 5.1 EH&S Manager
  - 5.1.1 Ensure content quality of the hand soldering program on a regular basis.
  - 5.1.2 When reviewing designated hand soldering locations, coordinate involvement from other resources when appropriate.
  - 5.1.3 Coordinating air and wipe sampling to ensure that lead based contaminants are controlled to an acceptable risk level.
- 5.2 Janitorial Supervisor
  - 5.2.1 Will coordinate and ensure the mopping of lead workstation floor surfaces to reduce lead contaminants at a frequency sufficient to mitigate the accumulation of potential lead particulates in these areas.
- 5.3 Managers / Supervisors
  - 5.3.1 Maintain that any deviations from this program are reviewed and approved by EH&S.
  - 5.3.2 Provide that only authorized employees, who are trained to this process and are aware of the hazards of lead materials can perform hand soldering activities.
  - 5.3.3 Ensure all safety equipment, cleaning support items and personal protective equipment is stocked, stored, maintained, and readily available for employee use.
  - 5.3.4 Verify that all affected employees are trained on the safe work practices and hazards associated with the use of lead material and any new chemicals prior to their initial utilization in the work place (all new chemicals = require an SDS copy sent to the EH&S dept).
  - 5.3.5 Confirm that all lead hazardous waste containers are properly labeled in their respective areas with the words “Lead Hazardous Waste”.

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#### 5.4 Employees

5.4.1 All affected employees shall understand and follow this program.

5.4.2 Are responsible to clean the work surfaces thoroughly, preferably with alcohol or d-lead based wipes, following any soldering operations, (benchtops), and floor surfaces, as needed or appropriate with Swiffer type wet mops directly under and around the bench workstations, upon completion of their work period (typically following heavy or continued bench/station use and soldering activity).

5.4.3 Will properly dispose of any and all suspected lead contaminated debris, (wipes, rags, gloves, mop heads, sleeves etc..) into the designated “Lead Hazardous Waste Collection containers.

## 6 PROCEDURE

6.1 Specific work area designated for soldering purposes is a non-food area.

6.2 Good housekeeping should be utilized to minimize the potential of spreading lead particulate to other areas.

6.3 Engineering controls designed to minimize the potential for fire or accidental burns are required for all hand soldering work stations. An example of engineering controls is an automatic shut-off device.


6.3.1 Ensure all combustible materials and flammable chemicals are removed from the hand soldering operation. If the combustibles cannot be removed, they must be separated by a distance of no less than 12 inches.

6.3.2 Labeling-Small quantities of flux and alcohols are allowed in correctly labeled containers. Original chemical product containers or packaging containing hazardous chemicals will be labeled with the following information:

6.3.2.1 Trade name or chemical name of the hazardous substance

6.3.2.2 Name and address of the chemical product manufacturer

6.3.2.3 Appropriate hazard warning in the form of words, pictures or symbols that convey the hazard of the substance in the

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container

**6.3.2.4** Target organs affected by the chemical

**6.3.2.5** All containers shall be compatible with the chemical

**6.3.2.6** All containers shall have the name of the material, appropriate hazard warnings and the body organs affected on the label.

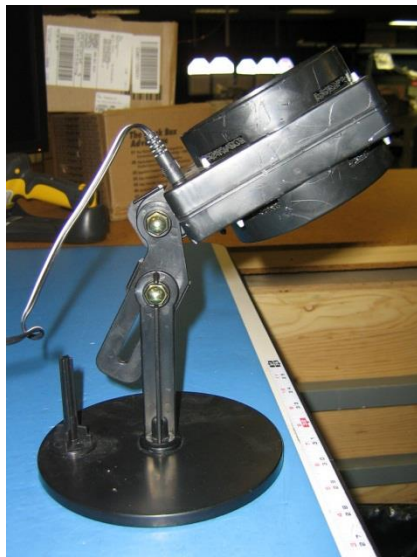
- 6.4** Any secondary use containers shall have a label depicting the NFPA hazard identification diamond system and the name of the chemical at a minimum.
- 6.5** Soldering iron / gun temperatures shall be kept below 800 degrees F to minimize the potential for generation of lead fumes. High temperature solder tips shall not be used with lead based solder. Each soldering iron / gun should be housed in their proper cradle when not in use.
- 6.6** Solder tip changes should be done in accordance with the manufacturer's procedures.
- 6.7** All chemicals must be appropriately labeled.
- 6.8** All lead contaminated or suspected lead contaminated debris and related material must be disposed of in the proper "Lead Hazardous Waste" identified containers.
- 6.9** Each employee must wash hands thoroughly once the hand soldering is complete or before breaks (to include smoke breaks) and at the end of each shift
- 6.10** Personal Protective Equipment
  - 6.10.1** Safety glasses with side shields must be worn when performing hand soldering or when in close proximity of hand soldering operations unless using microscopes with eyecups.
  - 6.10.2** Protective, disposable sleeves should be donned during all soldering activities and reused, as applicable, at the workstation, or disposed properly when soiled/contaminated, in the lead hazardous waste collection containers (Grainger Part #4T062).
  - 6.10.3** Protective gloves should be used for clean-up and disposal of soldering debris and when changing out soldering tips to prevent skin contact.
  - 6.10.4** Eyewash stations should be located in areas and readily accessible to employees.

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**6.11 Control of Soldering Contaminants**

6.11.1 To reduce indoor air quality concerns, local exhaust shall be utilized with hand soldering operations for continuous operations greater than one hour or totaling over two hours per day on a consistent basis. If soldering operations is less than two hours per day or performed for durations less than an hour continuous or on an infrequent basis, fume extraction (see picture 1) should be considered or if requested by an employee.

**Picture 1-(Fume Extractor)**




**6.11.2** Local exhaust units must contain HEPA and organic vapor filters or exhaust to the outside.

**6.11.3** Preventative maintenance and filter change out frequency should meet the manufacturer's recommendations or be replaced when obviously dirty in the event manufacturing recommendations do not exist.

**6.11.4** To ensure containment of soldering contaminants, exhaust should be placed within 6 inches of the point of operation.

**6.11.5** Clean the work surfaces thoroughly, preferably with alcohol based wipes,

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following any soldering operations (benchtops). Dispose of wipes in appropriate lead hazardous waste containers as outlined in the disposal section. Floor areas below bench workstations should also be wet mopped (as needed or appropriate) with Swiffer type disposal pads that are disposed in the proper lead hazardous waste collection containers.

**6.11.6** Air sampling and wipe samples will be coordinated through the EHS Manager (annually) to ensure that operational controls are effective in reducing contaminants to an acceptable risk level.

**6.11.7** Floors will be mopped by janitorial staff, at a frequency determined by MTS to reduce contaminants to an acceptable risk level, and supplemented with the Swiffer wet mopping of workstation floors by solder use staff as needed or appropriate (after heavy, continuous use etc.. and at the users discretion)(Grainger Part# Sweeper – 20L003, Mop head – 20L002).

**6.12 Disposal**

**6.12.1** Soldering operations may result in the generation of the following wastes:

**6.12.1.1** Recyclable solder scrap (non-RCRA hazardous waste if sent for metal reclaim), e.g., dross, solder balls, wick and wire.

**6.12.1.2** Lead contaminated debris (RCRA hazardous waste), e.g., wipes, sponges, swabs, sleeves, gloves etc...


**6.12.2** All RCRA hazardous waste containers that contain lead waste or residue must be labeled with the words "Lead Hazardous Waste".

**6.12.3** Satellite Accumulation containers must be managed and labeled in accordance with the Hazardous Waste Operational Control procedure EHS-300-100.

**6.12.4** Containers must be in the immediate area of where the waste is being generated and must be closed at all times when not in use.

**6.12.5** Once full, the contents must be transferred to the hazardous waste storage area into designated/labeled collection containers.

**6.12.5.1** Close and tie the trash can liner

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**7 ASSOCIATED QUALITY RECORDS – AS STATED IN THE QUALITY RECORDS LIST**

Required Record
Air Monitoring and wipe sampling report (annual)


**8 REFERENCE FORMS / TEMPLATES / DOCUMENTS (IF NEEDED)**

Form / Template / Document Title	Location
ANSI Z358.1-2009	EHS Department
Hazardous Waste Operational Control EHS-300-100	\\mspdata1\Environmental_Health_and_Safety\Operational_Control_Procedures\Environmental\Hazardous Waste

**9 CURRENT REVISION'S TRAINING REQUIREMENTS**

Training requirements are determined by the document owner.

1. Select Awareness **and/or** Formal training requirements.
2. List (below) the functions or groups that require the training.


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Select (mark X)	Training Type	Training Definition
	Awareness	Awareness training is conducted by communication, which is sent/delivered by the approver/author/owner of the document to the affected employees/groups.
X	Formal	Formal training requires the approver/author/owner to collect/store evidence that the affected employees/groups were trained.

**Functions/Groups that require training:**

- Employees designated by their supervisor to perform soldering operations are required to complete EHS049\_OLT “Soldering Guidelines” read and acknowledge training in accordance with the training needs assessment.



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**10 REVISION HISTORY & APPROVAL**

Revision History			
Rev	Description of Change	Author	Effective Date
A	Document created	M. Glowack	8/19/08
B	Added footer and revision history to document	M. Glowack	7/29/09
C	Changed to new Controlled Document format	B. Klenotich	1/3/12
D	Added requirements for wiping horizontal work surfaces, and mopping floors. Updated janitorial and EHS responsibilities sections. Added clarification on hazardous waste requirements.	B. Klenotich	2/12/14
E	Additional ppe requirements for wearing disposable sleeves and additional cleaning requirements for workstation area flooring, target groups for procedure and training	J. Kinney	12/31/2015

Approval of Current Revision		
Name / Function	Signature	Date
Tom Milas Vice President Operations - EHS Management		
James Kinney, EHS Manager		