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Approved by: E. Stetter	Date Prep: 11/11/14	Date Rev: 01/11/21	Page **1** of **4**

Storage, Handling, and Soldering Specification

1. Scope

This document embodies recommendations concerning the storage, handling, and manual soldering conditions for SPEC SENSORS' modules. It is only applicable for modules guaranteed by SPEC SENSORS stated in SPEC SENSORS' certificate of conformity (CoC) or Sensor Specification Sheet. Moreover, SPEC SENSORS' modules are NOT warranted for and should NOT be used in high temperature soldering or pre-tinning baths.

2. Sensor & Module Handling

Handle sensors with care. Take precautions, including but not limited to the following:

A. **DO NOT** apply excessive pressure to the top or bottom of the sensor module
B. Whenever possible, handle or make contact with the sensor module from the sides of the PCB or substrate.
C. Light vacuum pressure is possible during handling, **DO NOT** apply vacuum over gas sensor port.
D. If the sealed sensor package is opened, **DO NOT** re-seal using vacuum or nitrogen gas. **DO NOT** reseal with desiccant.
E. **DO NOT** obstruct the gas sensor port by making direct contact with any tape, apparatus, weights, or other.
F. **DO NOT** use silicone or other conformal coatings around the sensor or gas port holes.
G. **AVOID** using alcohols and cleaning solutions on or near the sensors.
H. Operators are requested to wear antistatic gloves.

3. Manufacturing Assembly Floor Environment

SPEC SENSORS recommends that the manufacturing assembly floor environment be maintained at controlled conditions:

A. Temperature: 15 to 30 °C
B. Relative Humidity: 40 to 60%
C. Pressure: 1 ± 0.2 atm

Residuals from cleaning solutions, including alcohol and chlorine-based products may cause inaccuracies during calibration or test.

4. Sensor & Module Storage Conditions

The recommended shelf life for sealed, packaged components is 12 months from the pack seal date, when stored in the factory-sealed bag under the following conditions:

A. Temperature: 5 to 25 °C
B. Relative Humidity: 20 to 80%
C. Pressure: 1 ± 0.2 atm Storage Time: 12 months

5. Module Attach Soldering Process

Hand solder only. Keep the soldering iron or solder process tool away from the sensor. Do not use pre-heat techniques. A heat sink cover over the sensor may be applicable to protect the sensor during processing.

A. **DO NOT** heat sensor above 70 °C
B. **DO NOT** place in reflow, wave, or IR reflow type processes
C. **DO NOT** wash the sensor
D. Use hand-solder or peripheral process type approach
E. Use solder wire alloy with the lowest possible eutectic temperature. Acceptable alloys include:
    a. 57Bi/42Sn/1Ag (eutectic temperature: 138 °C)
    b. 63Sn/37Pb (eutectic temperature: 183 °C)
    c. 96.5Sn/3.0Ag/0.5Cu (eutectic temperature: 217 °C)
F. Use lowest possible soldering iron temperature
G. Contact the host board with the soldering iron at a 45° angle on the solder pad
H. Apply soldering iron and solder for < 5 seconds
I. Keep the soldering iron away from the top and bottom of the sensor module

6. Device Level Packaging Considerations

SPEC Sensors are intended for use in instruments and devices utilizing enclosures and device specific packaging for resale and shipping. The following are considerations and suggestions for those enclosures and packaging.

A. **Device Enclosure**: If possible, use low surface energy plastics (polycarbonate, PVDF, PEEK, etc) for the device enclosure or any portion thereof that is near the sensor gas inlet to avoid off-gassing or reaction with analytes you are intending to measure. Avoid adhesives with the potential to off-gas such as PVC cement.

B. **DO NOT** package with desiccants.

C. **For Packaging and Storage AVOID the following:**

   a. Avoid enclosing the sensor for extended periods with packing and storage material that has the potential to release Volatile Organic Compounds (VOCs) or other chemicals that can damage the sensor over time.
   b. Avoid substances containing Pinene, Styrene and related compounds.
   c. Avoid adhesives with the potential to off-gas.

D. **Recommendations For Packaging**:
   a. Whenever possible, package for shipment and extended storage in a sealed, antistatic moisture barrier bag (**DO NOT** include desiccant), similar to the packaging your SPEC Sensors arrived in.
   b. For packing material considerations use materials recommended for electronics, such as polyethylene, anti-static foam.

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Revision History

Rev Date	Description of Rev	Approved by:
2014-11-11	Standardized Format of SPEC EC Sensor Engineering Data Sheet, data current 2014-05	M. Findlay
2015-09-08	Created branch for C-SPEC Soldering Guidelines	B. Meulendyk
2015-09-10	Revise to add SMT Manufacturing Storage & Handling	B. Meulendyk
2015-09-30	Revised content	B.Meulendyk
2016-03-21	Revised content; Add acceptable solder alloys	B.Meulendyk
2021-01-11	Add packaging considerations	E. Stetter