

# Shipment, Storage, Packaging and Handling Guidelines

## Purpose

The purpose of this application note is to provide Ecliptek Corporation customers with guidelines on shipment, storage, packaging, and handling procedures for devices such as quartz crystals, crystal oscillators, and MEMS oscillators.

Ecliptek Corporation recognizes that quartz crystals, quartz crystal oscillators, and MEMS oscillators have specific electro-static discharge (ESD), moisture sensitivity level (MSL), vibration, and mechanical shock requirements which may not be exceeded without causing the possibility of immediate or latent defects.

This application note is not an all encompassing document in which every possible defect cause and prevention practice is listed. It is important that users of these types of devices understand that specific defect causes and prevention practices be determined by customer personnel for its own specific environmental operating conditions.

## ESD Guidelines

All Ecliptek products are electro-static discharge (ESD) sensitive. The ESD susceptibility specification can be found in the 'Environmental and Mechanical Specifications' section of the product datasheets found on our website. Ecliptek has engineered storage, packaging, handling, and shipment methods that afford suitable ESD protection for its many products.

Unit ESD packaging for quartz crystals is comprised of one of the following configurations: Bulk in bags, Carrier Tape and Reel, or Foam Padding. Unit ESD packaging for crystal oscillators and MEMS oscillators are comprised of one of the following configurations: Bulk in bags, Carrier Tape and Reel, or Foam Padding.

All Ecliptek products are shipped in ESD protected packaging and should be handled as ESD sensitive devices at the customer's facility and in-process locations.

Although protection circuitry has been designed into many Ecliptek oscillator devices, customer personnel should take proper precautions to avoid device exposure to ESD during storage and handling. The components should be handled at static-safeguarded workstations and placed in ESD safe containers when removed from the Ecliptek provided packaging.

Customers should take precautions to remove and prevent static build-up or charge through grounding metal trays, conductive containers, and personnel via conductive floors, conductive table mats and conductive wrist straps. Static free finger cots should be worn whenever crystals or oscillators are handled.

## Moisture Sensitivity

All Ecliptek products are moisture sensitive. The moisture sensitivity level (MSL) specification can be found in the 'Environmental and Mechanical Specifications' section of the product datasheets found on our website. Ecliptek has engineered storage, packaging, handling, and shipment methods that afford appropriate moisture sensitivity protection for its many products.

All Ecliptek products are shipped in appropriately protected packaging and should be handled as moisture sensitive devices at the customer's facility and in-process locations.

All devices should be stored in a dry environment and should remain in their unit packaging until ready to be mounted on boards.

Customer personnel should take proper precautions to avoid device exposure exceeding the shelf life and floor life during processing. The devices should follow storage requirements and facility environmental conditions for temperature and humidity necessary to avoid damage from moisture absorption and high temperature reflow-related failure modes that can result in yield and reliability degradation.

### **Shipping Guidelines**

Ecliptek has engineered unit, intermediate, and outer packaging that afford suitable protection for its many products. The supplied packaging and packing materials provide protection from the normal conditions of transportation.

Products that endure transportation mishandling can exceed its specified mechanical shock and vibration requirements and thus may result in failure modes that can lead to yield and reliability degradation.

Customers need to insure packages that they receive are free of damage that may have been induced by a transportation company during transit. Ecliptek Corporation recommends the documentation of all damaged packaging for use with root cause and corrective action activity.

### **Storage and Handling Guidelines**

All Ecliptek products are subject to stringent storage and handling guidelines. Ecliptek has engineered storage and handling methods that afford protection for its many products.

Ecliptek recommends that customers store all devices in areas that protect the parts from being hit by foreign objects or dropped. This includes main inventory staging areas as well as storage areas on the manufacturing floor.

Due to their design and construction, crystals and oscillators are susceptible to damage and subsequent failure due to mechanical shock and vibration. Units should not be dropped onto hard surfaces such as counter tops or floors. There are several failure modes which result from dropping these devices, including open interconnects, damaged packages, broken resonators, or fractured glass seals.

Ecliptek recommends that customers select ESD storage bins and holding containers to insure the safety of the devices. It is important to give due consideration in placing devices into and taking them out of the storage area. It is essential that the customer plan processes and methods to minimize mechanical shock and vibration.

When the products move within the customer's facility, ensure that they do not receive undue shock or vibration by securing the products in a manner that restricts movement.

Customers should review all automatic handling and mounting machine processes to insure methods minimize mechanical shock and vibration.

Customer assembly and test personnel who use these devices must give due consideration to handling practices. Most often, products receive irreparable damage from unconscious acts of mishandling. For example: tossing

parts into an assembly bin; accidentally dropping a unit from a worktable onto the floor; or forcibly inserting parts into circuit assemblies.

All devices should be stored in a dry environment and should remain in their unit packaging until ready to be mounted on boards. When not in the supplied packaging, units should have their leads placed in foam or in a tray in a single layer, leads facing upwards. Should lead forming or cutting become necessary at the customer location, a leak test should be subsequently performed to insure package integrity prior to PCB mounting and reflow.

If incoming electrical test inspection is required at the customer's facility, Ecliptek recommends the use of zero insertion force sockets to eliminate the possibility of lead damage, glass to metal seal interface damage, and lead plating damage. All devices should be handled by the case or cover and not the leads or pads.

Damage to the device may occur immediately or it may occur at a later time in the product life cycle. Ecliptek Corporation recommends that all devices subjected to suspect mishandling be removed from inventory and placed in a separate area for quality assurance material review.

### **Training**

It is recommended that the customer use this document as a guideline to create their own operating procedures and work instructions to train all personnel on the storage, packaging and handling of quartz crystals, crystal oscillators, and MEMS oscillators.