

## Verification Testing

---

Elma offers a wide range of services to assist our customers with new product introduction (NPI). From custom design and verification testing through agency certification, Elma has the experience to function as an extension of your company's design and compliance engineering team. Combined with Elma's level 4/5 integration capability for both embedded systems and switches. Elma provides a single solution to your outsourcing needs.

Allow Elma to take your latest product from prototype to production quickly, cost effectively and with reduced risk. Customization is the standard at Elma. With an extensive offering of modular products as a foundation, Elma is able to leverage existing solutions and proven design concepts to meet any custom application. This approach ensures that Elma will provide quality, complaint solutions with significantly reduced lead time, cost and risk. Elma uses the most advanced software and testing equipment to ensure our products comply with military and commercial standards. Elma has the capability to perform environmental testing, thermal testing and EMC testing to meet the desired specifications.

Elma has the capability to undertake and oversee design verification testing to ensure that your/our products comply with the following military or commercial standards depending on the specification requirements.

---

## Environmental Chamber

The Environmental Chamber is used to test products within various levels of temperature and humidity. The chamber used by Elma has a temperature range of -73 degrees C to +177 degrees C and a humidity range of 10% to 90%. The unit has a chart recorder to record temperature and humidity. The chamber can have LN2 attached to increase the ramp rate for lower temperatures.

---

## Airflow & Thermal Analysis

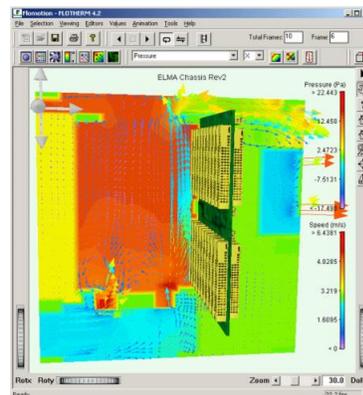
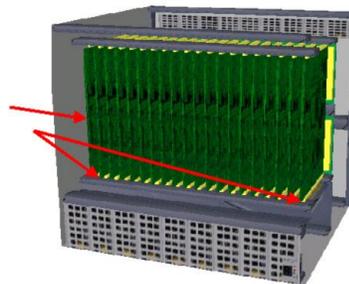
Elma has invested in modern simulation tools to insure that all Elma designs, both custom and standard, are able to provide optimum cooling protection for your electronics. Elma uses Flowtherm, Flowmerics Thermal Analysis Software.

Although Elma utilizes the latest in thermal simulation software, it is often critical to verify simulation predictions through "actual testing"

Elma has a comprehensive set of thermal verification tools that allow measurement of all thermal parameters for a given design.

### Tools include:

- Variable system load cards
- Error velocity sensors
- Thermal couples
- Air volume measurement
- Cambridge Acu-Sense



## Airflow Chamber

The Airflow test chamber can determine the aerodynamic performance of a fan or blower, the

CFM (cubic feet per minute) in a chassis, or the thermal resistance. The airmover is mounted on the front of the chamber and the static pressure versus volume flow is measured. The performance of different fans may be compared to select the optimum airmover for a given application. By energizing the system, a given volume of air may be drawn through the system and the temperature rise measured. By determining several points, the plot of temperature rise versus mass flow shows thermal resistance.

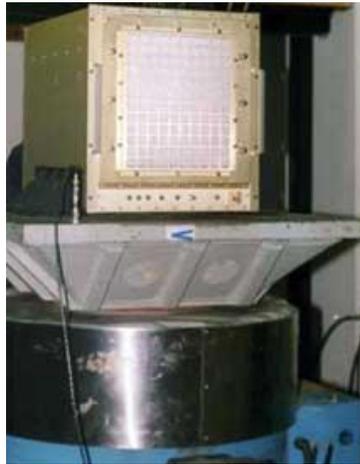
The 2000 CFM chamber is 30 inches in diameter and approximately 8 feet in length. The standard flow range is from 3 to 2000 CFM. The nozzle array is on a separate plate and is sealed between the front and aft section with inflatable seals. The front plate is also sealed with an inflatable seal. The motorized blast gate is powered with 115VAC, 1 ph, 60Hz and is controlled with a hand operated toggle switch. Limit switches control the extreme ends of the travel to prevent overrun of the gate. The counter blower is connected to the blast gate with a flexible duct. The 2000CFM chamber has a 5 horsepower motor and solid state speed controller. The power input is 208VAC, 3 ph, 50/60Hz.

---

### Shock & Vibration

Elma has the capability to undertake and oversee design verification testing to ensure that your/our products comply with the following military or commercial standards depending on the specification requirements.

- Shock and Vibration Testing to meet MIL STD-810E, MIL-STD-167 and MIL-STD-901D
- EMC testing to meet MIL-STD-461D, FCC class A, FCC class B and CE emissions.
- NEBS testing to meet levels 1, 2 and 3
- In house cooling analysis and testing to meet thermal requirements
- Environmental testing: Temperature, Humidity, Fungus, etc
- Preliminary Reliability analysis per MIL-HDBK-217F



---

### EMI

#### Pre-scanning for Radiated Emission:

- Computer controlled Spectrum Analyzer
- --10KHz to 1GHz coverage
- --CISPER 16 compliant
- --Auto compensation to test site errors
- Broadband Receiving antenna
- --30MHz to 1GHz Frequency Range.
- --Calibrated at National Physics Lab in U.K.
- --Preamplifier
- --Vertical and Horizontal
- Emission Reference Source
- --Used to calibrate the system to site conditions.
- --Calibrated at National Physics Lab in U.K.
- EMC software designed for use with the Spectrum Analyzer



- Near Field EM probes to help pinpoint trouble spots

### **EMI Chamber**

The Elma EMI Chamber is an 8081 series chamber 10'X10'X 8'. The RFI Modular Shielding System consists of modular panels and a unique clamping system. Designed for EMC and FCC Compliance testing, the Series 8081 enclosure panel system consists of a three quarter inch, high density particle board core, with 26 gauge galvanized steel laminated on both sides. The panels are clamped together with uniquely formed zinc plated, steel clamps, to form in-line and right angle connections. RFI High Performance RF Doors employ a recessed contact mechanism (RCM) with multiple rows of beryllium copper fingers to insure RF performance above 100dB @ 10 GHz.