

# Environmental Testing Terminology

**Absolute Humidity:** The amount of water vapor in the air, typically expressed in grains/lb.

**Air Velocity:** The rate or speed which air moves through a space.

**Air Volume:** The amount of air.

**Average Change Rate:** Chamber may pull down or heat up in temperature at different rates. It may be fast at the high end and slow at the low end. This is the standard air flow design used in most chambers.

**Chamber Operating Environment:** The conditions at which exterior of the test chamber will be exposed to such as temperature, humidity, etc.

**Change Rate/Ramp Rate:** The rate at which environmental chamber heats up or cools down.

**Control Tolerance:** The Temperature Controller uses a Thermocouple control sensor, which is located in the discharge airflow. Control tolerance is a measure of how much the temperature varies after stabilization at the control sensor. It is a measure of the relative variations, NOT the absolute accuracy of the readout. The control tolerance specification for this chamber is  $\pm 1^{\circ}\text{C}$ , or a total of  $2^{\circ}\text{C}$ . For example, the temperature set point may be  $-65.0^{\circ}\text{C}$ . The actual temperature varies between  $-64^{\circ}\text{C}$  and  $-66^{\circ}\text{C}$ . These specifications are for an empty chamber. Tighter tolerances may be achieved across different temperature ranges. The addition of a test sample may affect the control variations. In some instances, the test sample will reduce these variations.

**Controller Accuracy:** This is the ability of the temperature controller to accurately display a temperature measurement when compared to a standard. The standard factory calibration accuracy is  $\pm 2^{\circ}\text{C}$  for thermocouple and  $0.4^{\circ}\text{C}$  for RTD. However, the total measurement accuracy in the chamber includes the thermocouple or RTD sensor accuracy as well as lead wire resistance affects. CSZ thermocouple accuracy is  $0.5^{\circ}\text{C}$  or 0.4% of reading, whichever is greater. For an RTD, the accuracy is  $\pm 1^{\circ}\text{C}$  or 0.75% of reading, whichever is greater. Therefore, total system accuracy over the chamber's typical operating range is  $\pm 2.1^{\circ}\text{C}$  for thermocouple or  $\pm 1.7^{\circ}\text{C}$  for RTD. This is not a measurement of chamber performance.

**Dead Load:** Any mass that is in the test chamber that does not produce added heat. This is used to size the correct refrigeration & heating system for your chamber.



**Device Under Test (DUT):** Product that will be tested in the chamber.

**Dew Point Temperature:** The temperature at which moisture will condense on a surface.

**Dry Bulb Temperature:** The temperature of a given sample of air.

**Frequency:** The rate of movement, measured in cycles, of a wave within a set time frame, usually one second. Frequency is often measured in hertz (Hz), which equals one wave cycle per second.

**Linear Change Rate:** Consistent rate of change at each temperature.

**Live Load:** The portion of the test chamber load that produces heat. Live load could be electrical, mechanical, chemical, air purge or a continuous product process.

**Relative Humidity (RH):** The amount of water in an amount of air at a given temperature as compared to the maximum water that the air can hold at that same temperature.

**Transfer Time:** The amount of time it takes for an object to be moved from one chamber to another in thermal shock applications.

**Uniformity:** Also known as Gradients. This is a measure of variations in temperature at different locations throughout the chamber interior, at the same time, after stabilization. The uniformity specification is  $\pm 1^{\circ}\text{C}$  ( $\pm 2^{\circ}\text{F}$ ) or a total of  $2^{\circ}\text{C}$  ( $\pm 4^{\circ}\text{F}$ ), when measured at least 2" away from the chamber interior walls. These specifications are for an empty chamber. The addition of a test sample may effect the temperature uniformity. For example, an energized test sample will produce a higher temperature near the sample.

**Recovery Time:** This is the time required for the air temperature to recover after the transfer from one chamber to another. Recovery time can be measured in the air stream prior to or following the test load.

**Wet Bulb Temperature:** The temperature that results when water evaporates and cools a sensor.

