Averaging RTD for Conveyor Oven

Case A111207

Application

Air handling ductwork, environmental chambers, and production rooms sometimes require a more accurate temperature measurement than is achievable with a typical bi-metal wall mounted thermostat. Clean rooms, semi-conductor manufacture, biotechnology processes are a few of the areas that require an accurate measurement and control of air temperature to insure product quality.

Another more demanding application is for control of temperature inside a conveyor oven for continuous batch production. Maximum temperature of 750°F was required across a large cross section. The temperature limit was beyond the capability of most averaging RTDs.

Challenge

Achieving an accurate measurement in these areas usually requires sensors at multiple locations. A single point RTD cannot indicate an accurate temperature of air because of the imperfect mixing of the air in the various locations along with potential radiation, convection, and conduction. A series of single point RTDs could be used but it would be difficult and expensive to combine all the readings to achieve an average. Standard averaging RTDs usually have a maximum temperature limit of wither 275°F or 400°F. The conveyor oven needed at least 750°F.

Series D Averaging Sensors

Solution

Burns engineers modified the internals of a standard averaging RTD to withstand the temperatures inside the oven. Specially cleaned tubing, modified wire insulation, and pure platinum wire were used to construct the 15 ft long sensor. The 3/16” diameter SS probe sheath was able to be bent to conform to the internal configuration of the oven to provide for optimal temperature measurement and control. Several of these were used along the length of the oven to control each zone to insure even heating of the product.