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Thanks for your question, Mark. In HDT and Vicat machine, temperature accuracy can refer to both the temperature measurement and ramp rate control. For HDT testing, the ramp rate for ASTM D648 is $20\text{C} \pm 0.20\text{C}/\text{minute}$ and is considered to be met if the temperature of the heat transfer medium (usually silicon oil) is made rise $100\text{C} \pm 10\text{C}$ every 5 minutes until the maximum temperature is reached. ISO 75 has essentially the same requirement but it is stated as $1200\text{C} \pm 100\text{C}/\text{hour}$ and is considered met if the temperature of the heat transfer medium is made to rise $120\text{C} \pm 10\text{C} /6\text{ min}$. For vicat testing, there are 2 ramp rates for ASTM D1525. Rate A is $500\text{C} \pm 50\text{C} /\text{hour}$, which considered to be met if the heat transfer medium is made to rise $100\text{C} \pm 10\text{C}$ every 12 minutes. Rate B is $1200\text{C} \pm 100\text{C}/\text{hour}$ which considered to be met if the heat transfer medium is made to rise $120\text{C} \pm 10\text{C} /6\text{ min}$. ISO 306, also has 2 rates, $500\text{C} \pm 50\text{C} /\text{hour}$ ($50\text{C} \pm 0.50\text{C} /6\text{ min}$) and $1200\text{C} \pm 100\text{C}/\text{hour}$ ($120\text{C} \pm 10\text{C} /6\text{ min}$) For the temperature measurement system (probe & readout), ASTM D648 requires an accuracy of at least $\pm 0.50\text{C}$. The Tinius Olsen 603 HDTM and 303HDTM meet this requirement with the use of individual RTD's located by the specimen in each test frame. You may hear someone refer to temperature gradient, which is the difference in temperature displayed for a test frame vs. the temperature displayed on a test frame at the opposite side of the bath. There is no requirement for this in either the ASTM or the ISO standards for temperature gradient. It is usually a function of heat transfer medium viscosity, bath circulation and temperature. Bath temperature gradients generally do not affect test results. Typically, when the test is first started and the heat transfer medium is at room temperature, you may see some variability from test station to test station. However, any temperature gradient between stations usually goes away quickly after the heat transfer media warms and circulation starts. Also, all TO equipment produced since 1994 has an RTD at each individual station to monitor and record the temperature of penetration or deflection of each individual specimen under test. Hope this helps.