Pyrometer Encyclopedia Article

Pyrometer

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There are many types of devices used to measure temperature. Thermometers can reliably reflect temperatures from -32-37.4°F (0-100°C). For higher temperatures, modified thermometers such as the platinum resistance thermometer are best suited to the task. At several hundred degrees celsius, the most precise thermometer is a thermocouple, an electronic device that measures temperature by observing voltage changes. However, at temperatures greater than 2,400 °F (1,300°C) most thermometers are rendered unusable. For these extreme temperatures one must use a pyrometer.

There are two basic kinds of pyrometers: electrical and clay. Electrical pyrometers use a wire filament to measure very high temperatures. When a current is run through the filament it will heat up and glow. The temperature of the wire can be regulated by adjusting the current. Scientists then compare the color and brightness of the filament to the inside of a furnace. When the furnace matches the glowing wire the temperatures are known to be the same. This type of device is called an optical pyrometer. Other electrical pyrometers have no visible filaments, but rather an internal sensor that can be used to raise or lower the furnace's temperature.

Clay pyrometers are placed within a hot furnace. When they reach a certain sustained temperature the clay-salt cones will break down or melt. This type of pyrometer is used exclusively to measure, rather than regulate, temperature, and is often found in kilns.

The first pyrometer was invented by Josiah Wedgwood (1730-1795) in 1780. Further improvements on his design came in 1821 from John Frederic Daniell and later from Henri Louis Le Châtelier. French physicist Antoine-César Becquerel (1788-1878) was the first to introduce a practical electrical pyrometer.