

Temperature Measurement
for

STEEL
INDUSTRIES

Coke oven

Coke is the most important raw material fed into the blast furnace in terms of its effect on blast furnace operation and hot metal quality. The coke making process involves carbonization of coal to high temperatures (1300°C) in an oxygen deficient atmosphere in order to concentrate the carbon.

Temperature measurement of the coke oven flue provides vital information on the condition and the efficiency of the oven battery. In the coke oven battery, operators look for even heat distribution over the entire heating wall for coking process optimization and efficiency. Tempsens offers Temperature Sensors with high accuracy to achieve high quality finished product.

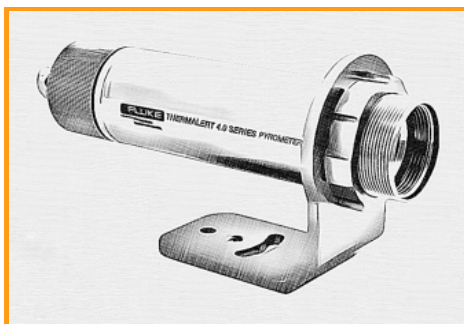


Key products



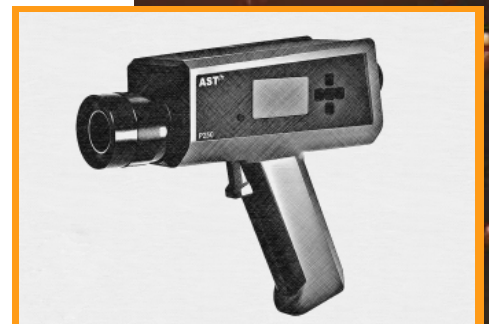
Thermocouple

S Type/ R Type/B Type
Upto 1500 °C



Pyrometer

A450C FOPL
600 °C to 2500 °C



P450

600 °C to 2500 °C

With Coke oven software



Stove Dome & Blast Furnace

Stove dome is one of the most critical section in the steel industry. Stove Dome has 3 stage operation, either on gas, on blast or bottled up (ready and waiting to be put on blast). Temperature is one of the major parameter for controlling of this critical process. The temperature inside the blast furnace is about 1100°- 1300°C and high pressure. The high temperature and high pressure makes the assembly very critical.

Tempens Temperature sensors are made specifically to withstand the extremely harsh environments found in the steel industry.

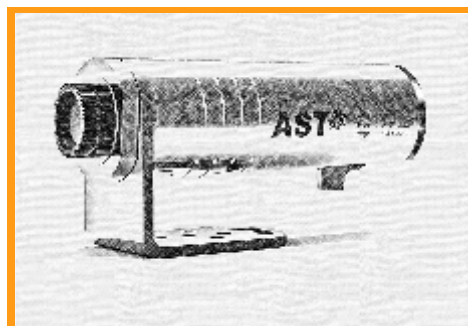
For Temperature measurement in Blast furnace (Hearth) Tempens provides K Type Refractory thermocouples, these are very important for the startup phase and running phase of the refractory in the steel plants. These are normally very long length thermocouples (up to 40 meters) in mineral insulated construction.

Key products



MI Thermocouple & RTD

K Type / S Type/ R Type/B Type



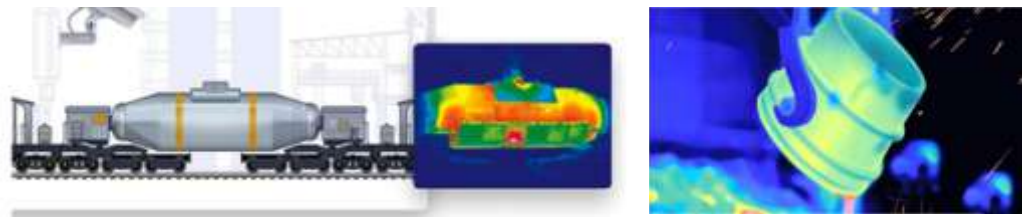
Pyrometer

AST A450/ A450+; 600 °C - 1600 °C;
800 °C - 2500 °C
(Sub Range Adjustable)

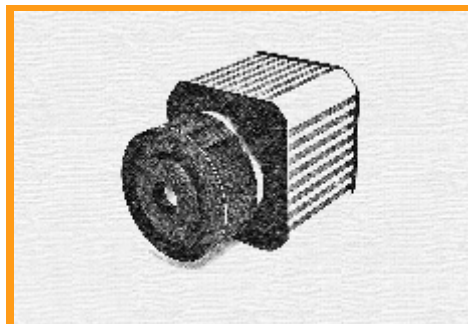
Ladles & Torpedo Cars

Ladles are vessels used to transport molten metal from one section to another section for further processes. When hot molten iron hits the cool surface of inner refractory of these vessels there are chances of damage due to sudden change in temperature. This degrades the refractory linings and outer metal wall which may lead to complete depletion and greater chances of accidents. By using the thermal camera, hot spots can be determined and precautions can be taken at early stages only.

Routine inspection of metal components help operators identify weak points in the lining and prevent damage. Operators can mount Tempsens pyrometer on top of the preheat ladle lid to view through the flame and down to the bottom of the refractory. This positioning provides accurate and reliable temperature measurements without the risk of burnout and can reduce ladle pre-heat time. In addition, thermal imaging allows operators to detect hot spots with consistent monitoring and inspection of the exterior condition of a steel ladle. Operators can quickly determine if the ladle's refractory can be reused or should be replaced and reduce the possibility of molten metal breaking through a torpedo car.



Key products



Thermal Imager

Model-AST LTE160; 0°C - 500°C;
Type : Uncooled FPA detector;
IR Resolution : 160x120



Pyrometer

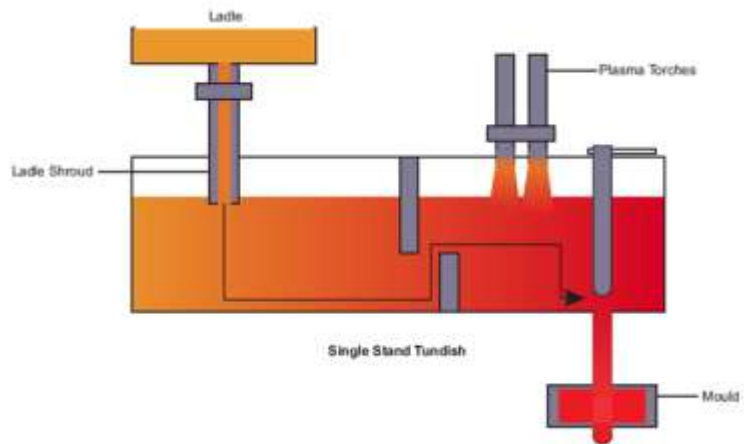
AST A450/ A450+; 600 °C - 1600 °C;
800 °C - 2500 °C
(Sub Range Adjustable)

Mould & Tundish in Continuous Casting

Continuous casting is the process where the molten steel is cooled and solidified into billets or slabs.

The operator's challenge is to keep the steel within the channel and control the cooling rate.

Accurately measuring cooling requirements of slabs, billets, or blooms to ensure product uniformity and provide equipment operators with immediate temperature information is critical to the cooling process.



Key products



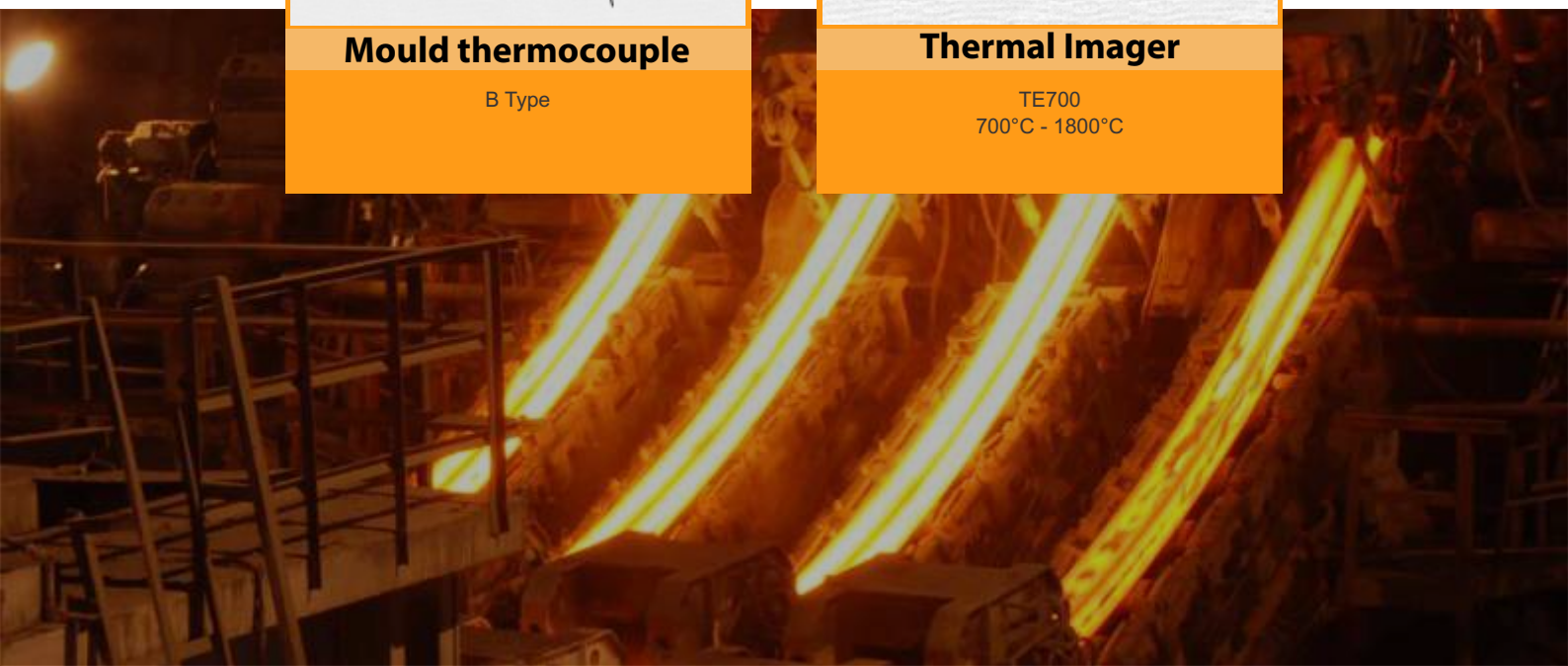
Mould thermocouple

B Type



Thermal Imager

TE700
700°C - 1800°C



Rolling- Preheating & Reheating

Temperature sensors measure strip and sheet temperature so that rolling mill stands can be efficiently set to match the steel's temperature. Sensors can be used to detect the presence of hot metal and accurately time the roll stand operation.

Sensors can be used to measure the roll temperature as water cools the roll during the quenching process. Steam is an issue with this application, requiring special spectral responses to accurately measure system temperature.

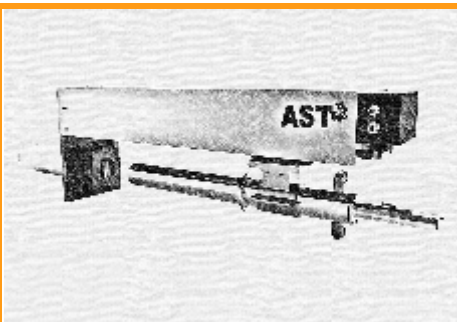


Key products



Ceramic Thermocouple

S Type / R Type



Furnace Monitoring Camera

TFV-750 / TE-750



Pyrometer

A450+C FOPL
600 °C to 2500 °C



Annealing Furnace

Annealing is a controlled heating and then cooling process that changes the metal's characteristics.

It is often a relatively slow process requiring significant energy. Inaccurate temperature measurement, non-uniform ovens, or poorly sealed furnaces lead to added costs and reduced quality.

DRI

Fast response thermocouple normally K type with miniature or Standard connector for DRI kiln application and normally used with a hand held indicator for checking immediate temperature.



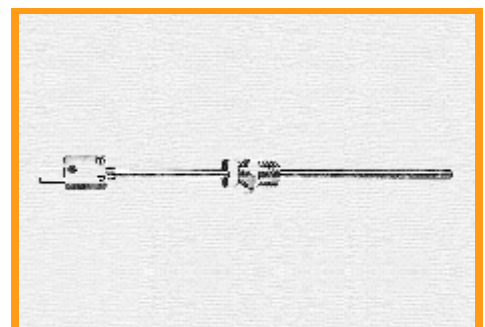
Key products



Thermocouple

A250/450
210°C to 3000°C
(Sub Range Adjustable)

Key products



Thermocouple & Protection Tube

k type Mineral Insulated
(Sub Range Adjustable)

Pellet Plant & Sinter Plant

Pelletizing feed preparation and mixing: The raw material (iron ore concentrate, additives—anthracite, dolomite—and binders) are prepared in terms of particle size and chemical specifications, dosed, and mixed together to feed the pelletizing process.

Balling process: The green pellet is the rolled pellet without any thermal process. It is obtained under strict control of moisture and has a spherical shape and diameter of 8–16 mm.

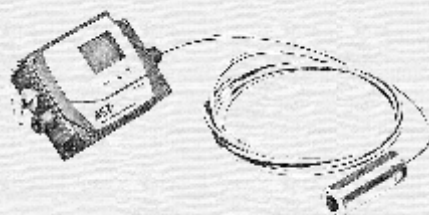
Kiln/Induration process: The green pellets are hardened in a high temperature processing at controlled heating rates, and aiming to achieve the physical and metallurgical requirements for handling, transportation, and final application.



Key products

Thermocouple

S Type / R Type / B Type



Pyrometer

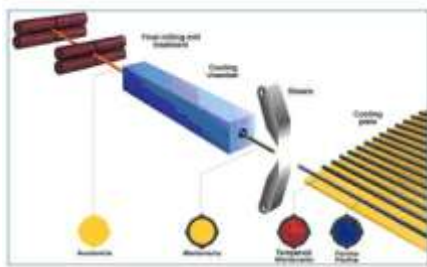
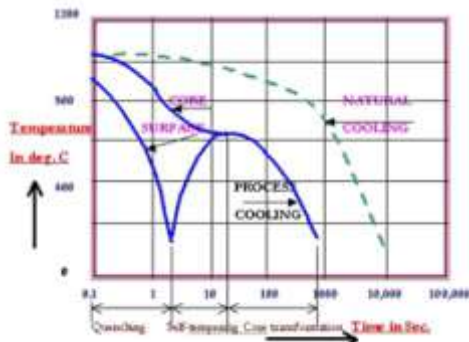
EL 50
0°C to 800°C/1000°C



MI Series

Additional Applications

TMT Quenching Applications



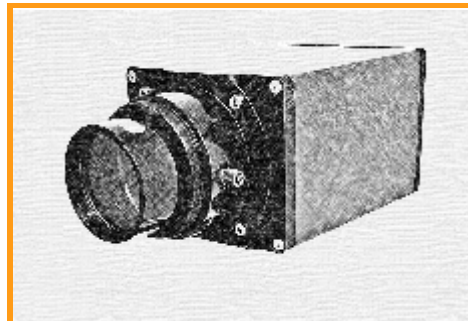
Temperature measurement is a critical factor in TMT Plants. In quenching stage, the surface temperature of the hot re-bars falls drastically from 900°C to around 400°C on account of the intense and uniform cooling; whereas the core temperature remains the same. Then at the cooling bed, temperature equalizing takes place around 600°C. This makes the surface of the re-bar a hardened structure called tempered martensite. The core remains soft and is known as feriteperlite. Regular monitoring and controlling of temperature at each stage is important to maintain the quality of Re-Bars.

Key products



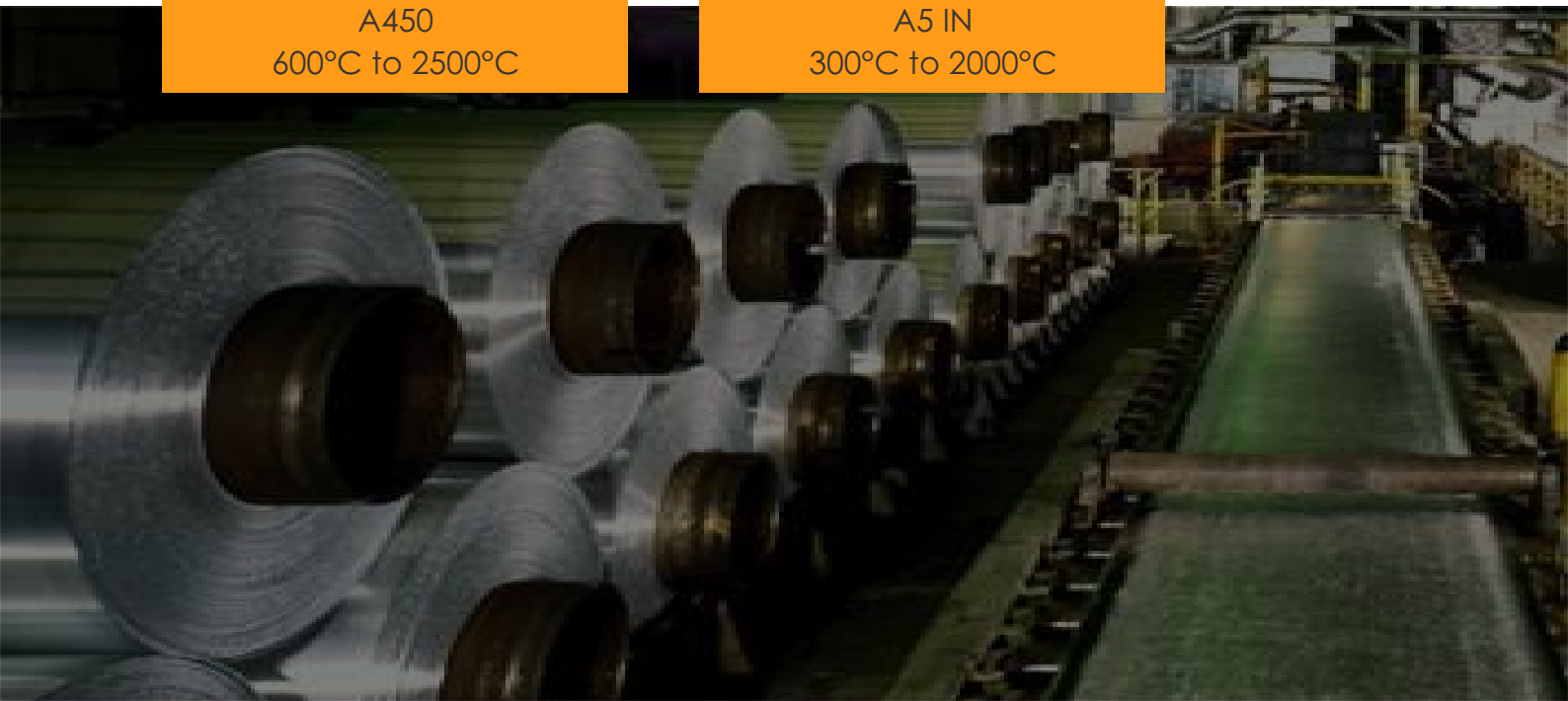
Pyrometer

A450
600°C to 2500°C



Thermal Imager

A5 IN
300°C to 2000°C



Induction Heating

Fiber optic version help to keep the electronic away from the high electromagnetic field.

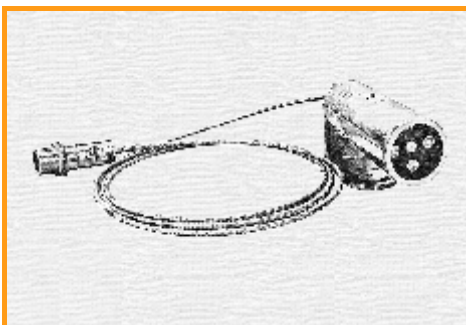
Very small spot size (down to 0.5mm) and the fast response time (2ms) enable to measure temperature accurately even through the gap of the coils.

Single color pyrometer with rugged cooling jacket with quartz Glass protection window

Integrated OLED Display & Parameterizing Keys



Key products



Pyrometer

A450+FOPL
250°C to 2500 °C



Pyrometer

A450
600°C to 2500 °C

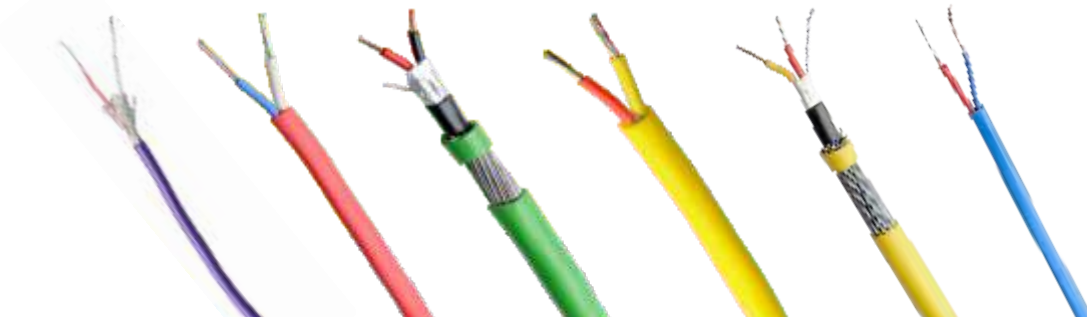


Additional Products:

Cables: Tempsens is manufacturing different type of cables used in steel industries such as power cable, compensating cables and instrumentation cable

Thermocouple Cables

Thermocouple Cables are used to measure the temperature directly. Thermocouple Extension or Compensating wires are only used to extend a thermocouple signal from a sensor to instrument for readings.



RTD Triad Cable

RTD triad cables are used to carry the RTD signals to the control room or field mounted instruments.



Instrumentation Signal Cables

Instrumentation Signal Cables minimize noise and signal interference, delivering clean signals in harsh environments and general manufacturing operations. These cables are designed for use in communication and instrumentation.



Heat Resistance Cables

A range of single & multi core Heat Resistance Cable for temperature range upto 800°C. Our Heat Resistance Power Cables are suitable to resist in chemical, fire and flame atmosphere.



MI Copper Cable

Mineral insulated cables are designed for high-temperature applications and particularly strict requirements with regard to mechanical, chemical and electrical stability.





 **TEMPSENS**
Thermal & Cable Solutions

 +91-9116554600
 info@tempsens.com
 www.tempsens.com
 A-190 Road No.-5
Madri Industrial Area
Madri, Udaipur - 313 003 (Raj) INDIA