



OKAZAKI
MANUFACTURING COMPANY
UK LIMITED

High Temperature Thermocouples

in Sulphur Recovery, Coal Gasification,

Incineration and Gasification Processes

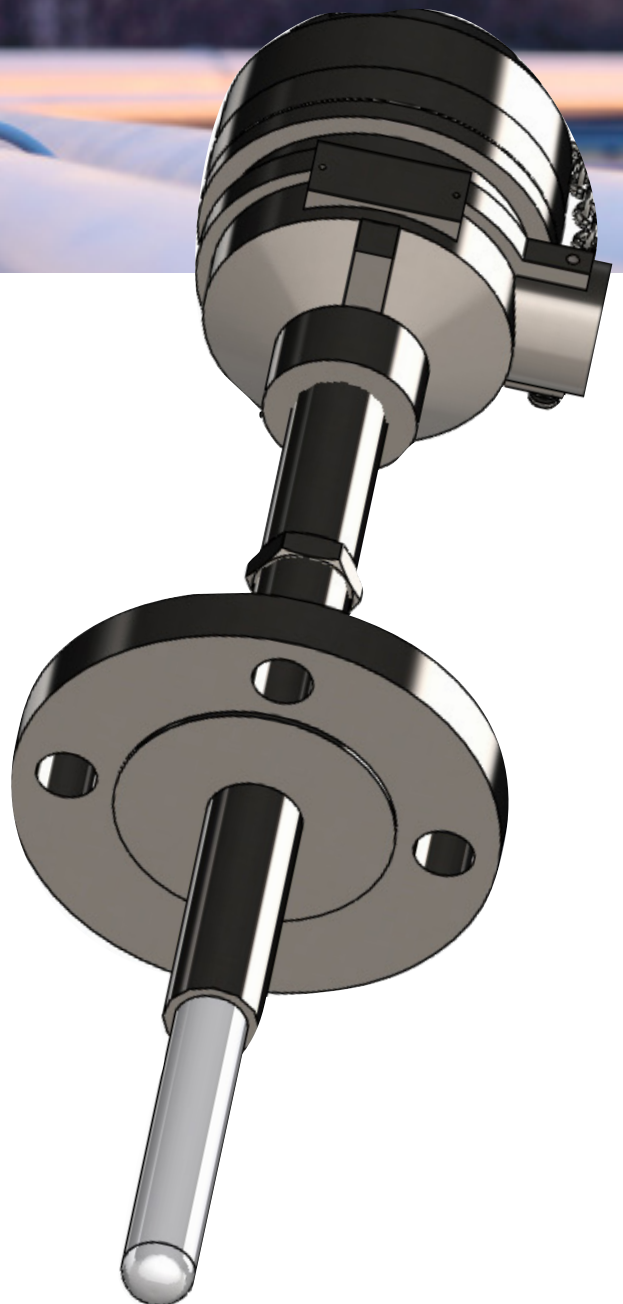




High Temperature Thermocouples *in Sulphur Recovery, Incineration and Gasification Processes*

The Okazaki High Temperature Thermocouple is used in applications where base metal thermocouples cannot be used because of excessive temperatures or severe atmosphere. Okazaki can provide a wide variety of wire combinations and sheath materials to meet the harshest demands. By selecting certain materials, temperature measurements up to 2300°C can be achieved.

Okazaki manufactures it's own mineral insulated cable and many of our high temperature thermocouples are available in bendable sheath and longer lengths. This in-house capability enables us to manufacture a variety of custom material combinations.



Industry

- Sulphur Recovery Plants
- Gasification
- Incineration and Gasification Process

Extreme Conditions

- High Temperatures
- High Pressures
- High Safety Requirements
- Toxic Media

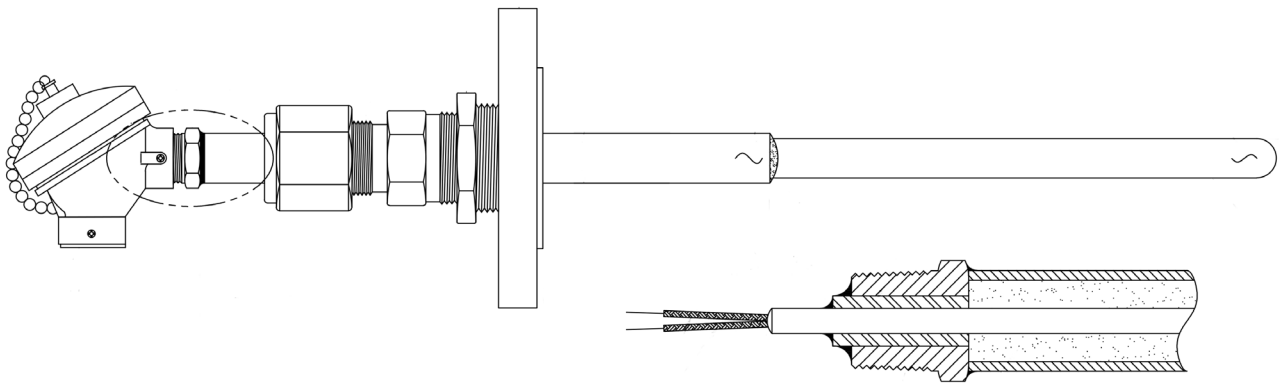


Fig 1. Using our Problem-solving approach Okazaki-Ari have designed the T-50230 thermocouple to meet all the conditions mentioned above. (Fig 1)

A Thermocouple Combination

We use a Tungsten-Rhenium Combination Type B thermocouple for use in temperatures up to 1700°C.

B Outer Protection Tube Section made from Halisc R (RSiC) to reduce the effects of failure due to thermal shock in start-up and thermal cycling. Alternatively, we also offer a Sapphire product called Sapphit™.

C Inner Protection Tube – Recrystallized Alumina is only permeable to H₂ and used for added protection against thermocouple contamination during start-up oxidising atmosphere.

D Inner Insulation – we use MgO powder to remove any void within the assembly construction.

E Inner Thermocouple Sheath – Disilicide Coated Molybdenum which we developed for sensors in the space industry where there was a strong oxidizing atmosphere at 1600 deg C. This inner sheath allows the transition to the mineral insulated thermocouple sheath and facilitates the first primary seal to ensure no vent to atmosphere in the failure of outer sheaths.

F Second Primary Seal – is achieved by the vacuum brazing of the AerOpak mineral insulated transition to the top connection thread pass.

G Flameproof Seal into Terminal Housing – our AerOpak cable is then terminated in a FLP sleeve which is incorporated into our OFP terminal head.



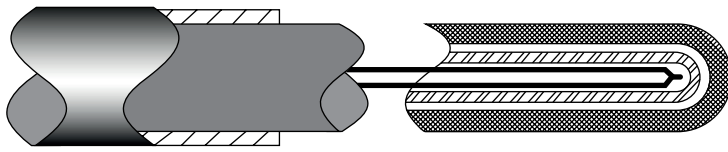


Fig 2.

Tube Coating

Halsic-R

It is an exceptional high performance ceramic from SiC and has the following characteristics:

- Absolute dimensional stability despite extreme mechanical strain in high temperature applications
- Long lifetime due to oxidation protection
- Very good thermal shock resistance due to low thermal expansion and high thermal conductivity
- High abrasion resistance
- Excellent high corrosion resistance
- Low specific weight

Sapphit™

Using a patented production method using the EFG growth method, Sapphit™ delivers the highest quality for instrumentation and measuring.

- Produced using a single crystal, Sapphit™ had no weak points.
- High resistance characteristics make Sapphit™ an ideal material for applications operating in extreme conditions such as high temperatures up to 2000°C, extremely high pressure or harsh chemical environments.
- At just one grade under diamond, sapphire is one of the hardest minerals. Sapphit™ components are scratch proof and extremely wear resistant.
- No process residue can penetrate a sealed Sapphit™ tube and compromise the wiring inside a thermocouple. Sapphit™ is very resistant to attacks from aggressive gasses.
- Solutions which use Sapphit™ in its construction offer a much longer service life than standard corundum ceramics, creating an effective and cost effective solution in the long term.

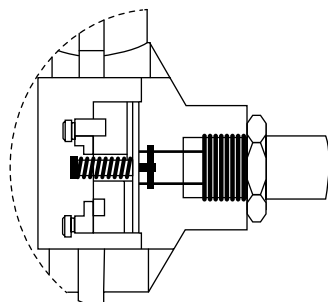


Fig 3.

