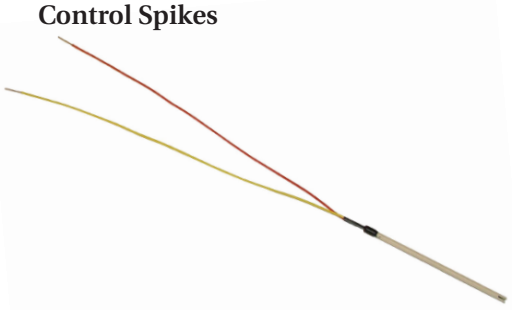
Thermocouples for Silicon Process Technologies

Vulcan

Control Spikes

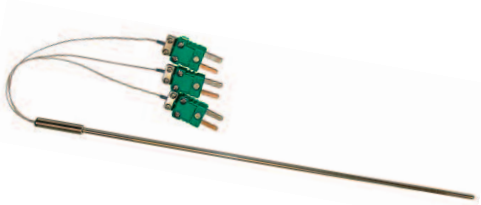


Numerous OEM designs;
Single, dual and triple junctions;
Large selection of ceramic diameters, leads, plugs, and terminations

Calibrations- R, S, B, PII, K, N

Control and over temperature

Epitaxial Furnaces



Metal sheath swaged tip;
Custom designs;

Calibrations- C, R, S, B, PII

Profile of Epi Furnaces

Ultra Pure Steam Processors

Designed for Hydrogen Water Torch
Single and Dual Element

Calibrations- R, K

Pure steam process control

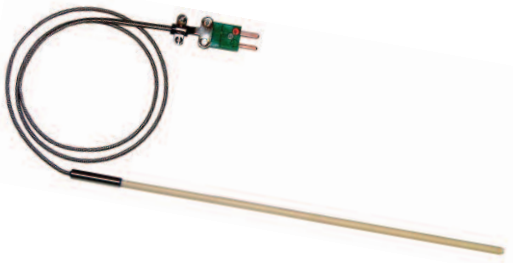
Bayonet Style

Custom designs for measuring temperatures with chamber movement

Calibrations- R, S, B, K, N

Control and over temperature

Transition Style



Designs to fit every application
for control and profiles;
Variety of sheaths and terminations

Calibrations- R, S, B, PII, K, N

Control and over temperature

Ultra High Temperature Bayonet Style

Traditional Horizontal Furnaces

Horizontal Furnaces

Vertical Furnaces Five Junction

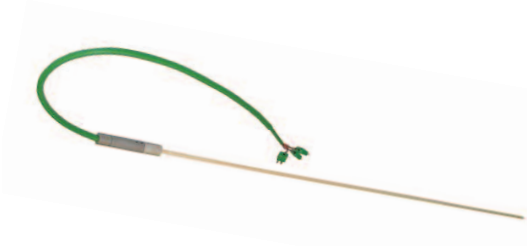
Auto Vertical Processors

Extreme temperature measurements;
Design allows accuracy with the movement of the chamber

Calibrations- R, S, B, PII, K, N

Control and over temperature

European Style Furnaces



Engineered to OEM specifications;
Single ceramic notched junctions, six and ten bore

Calibrations- R, S, B, PII, K, N

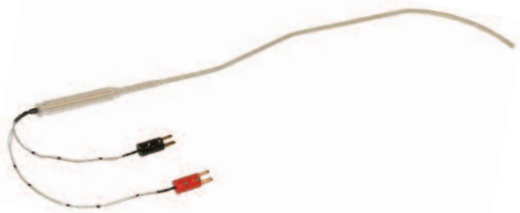
100 and 200 mm furnace profiles

Available in a variety of diameters;
Single ceramics or 6 & 10 bore;
Mini plugs with Teflon leads

Calibrations- R, S, B, PII, K, N

100 and 200 mm furnace profiles

Epitaxial Furnaces



Variety of quartz sheaths;
Custom designs;
Teflon leads with mini plugs

Calibrations- R, S

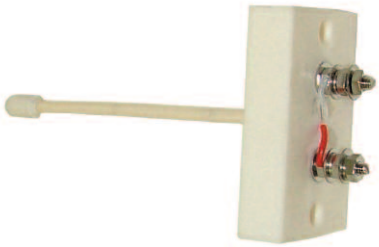
Furnace process control

Cost effective design;
Single and multi-zones;
Mini plugs with Teflon leads

Calibrations- R, S, B, PII, K, N

100 and 200 mm furnace profiles

Vertical Furnaces Control Spikes



Manufactured to factory specifications;
.020" diameter wire, 24 AWG;
Alumina Oxide materials

Calibrations- R, S, B, PII

200 and 300 mm furnaces

Engineered to exacting specifications;
Quartz 90 degree elbow;
Variety of leads and terminations

Calibrations- R, S, B

200 and 300 mm furnace profiles

Rapid Thermal Processors

Traditional control thermocouple;
Ceramic protection tube;
Ceramic terminal block

Calibrations- S, R, B

Single wafer furnaces

Small ceramic segments;
Multi-bore, notched, flexible;
Variety of lead configurations

Calibrations- R, S, B, PII

200 and 300 mm furnace profiles

Vertical Furnaces Five Junction

Engineered to exacting specifications;
Quartz three or four tube constructions;
Variety of lead configurations

Calibrations- R, S, B

200 and 300 mm furnace profiles

Heavy Duty Design for Horizontal Furnaces

Engineered for easy handling;
Single ceramics or 6 & 10 bore notched;
Unique handle and leads

Calibrations- R, S, B, PII, K, N

100 and 200 mm furnace profiles

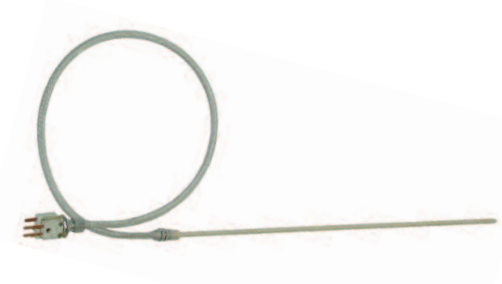
Custom Designed Horizontal Processors

Simple design configuration;
Single and multi-zone;
Integral plug and bracket

Calibrations- R, S, B

100 and 200 mm furnace profiles

Rapid Thermal Processors



Designed for extreme temperatures;
All alumina construction;
Ceramic sleeve lead constructions

Calibrations- R, S, B

300 mm single wafer processes

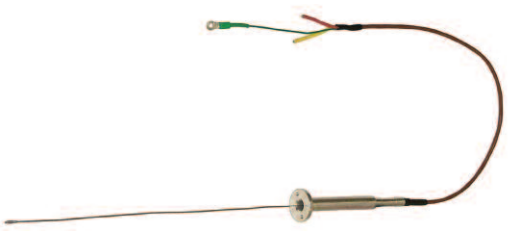
Vertical Furnaces Multi-Junction

High precision construction with
90 degree quartz elbow;
Variety of leads and terminations

Calibrations- R, S, B

200 and 300 mm furnace profiles

Susceptor Thermocouples



Custom designs for unique process control;
Inconel 600 sheath, high purity MGO
insulation; Special limits of error wire

Calibrations- K, N

Furnace control

Vulcan

Headquartered in Porter, Maine USA, we take pride in our traditional values and the importance at providing our customers with quality engineered products and exceptional service. We realize that in today's competitive global environment we must continually strive for superior product performance, excellence in our manufacturing operations, and deliver outstanding value to our customers. Our success depends on your success with every Vulcan product purchased.

In addition to the Thermocouples for Silicon Process Technologies, we design and manufacture the following product lines:

Metal sheathed Heating Elements including Tubulars, Finned Tubulars, Cartridge, Strips, and Finned Strips in standard and custom configurations

Heater Assemblies including Bushing Immersions, Flanged Immersions, Circulation, Duct, Over-the Side, Process Air, Preweld, and numerous custom designs

Temperature switches including the versatile Cal-stat cartridge thermostats in 1/4", 1/2" and 5/8" diameters with several mounting constructions

Temperature Sensor assemblies including capabilities with a complete range of Thermocouples, RTDs, and Thermistors

Flexible Thermocouple Management Programs

TC ROD Program

The Vulcan (ROD) or Replace On Demand program allows trade in of used thermocouples for new ones without the need of worrying about scrap credits. Eliminates the variable repair cost of R&R and inhomogeneity due to used wire. Less accounting paperwork and reduced lead times.

Calibration

In many cases profile thermocouples used in processes below 900 degrees Celsius can be recalibrated and returned back to service with just the test cost. Calibrations are performed in our state of the art comparison systems with direct NIST standards Calibration reports are available in Modes 2, 4, 6, 7 & 8. Please consult your Vulcan Electric representative for accuracy details. Profile thermocouples used above 900 degrees Celsius are recommended to be recalibrated after 6 months of continual use and replaced after one year in operation.

Repair

Profile thermocouple life cycles depend on the time and temperatures. During normal cycle times where deterioration due to excessive grain growth or breakage occurs, assemblies can still be rebuilt to like new condition. After comprehensive evaluation in conjunction with recalibration, a quote is generated. Depending on the actual repair cost, the customer may decide to continue with repair or use the precious metal credit towards a new assembly.

Reclaim Service

Customers have the convenience of instant credit with no refining charges for their precious metal. This provides one-stop service, which offsets the price of new profile or spike thermocouple purchase while eliminating disposal cost. Old, no longer in service, assemblies are reclaimed for the precious metal content and a credit or payment is offered.

Materials, Technical Data and Specifications

Material 214LD Quartz Protection Tubes:

Typical Trace Element Composition (ppm by weight)

Al	As	B	Ca	Cd	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	P	Sb	Ti	Zr	OH
14	<0.002	<0.2	0.4	<0.01	<0.05	<0.05	0.2	0.6	0.6	0.1	<0.05	0.7	<0.1	<0.2	<0.003	1.1	0.8	10

Material 99.7% Alumina Ceramic Insulators:

Typical Trace Element Composition (percentage by weight)

Material		Percentage
Silica	SiO2	0.06%
Calcia	CaO	0.04%
Magnesia	MgO	0.035%
Iron Oxide	Fe2O3	0.025%
Sodium Oxide	Na2	0.005%
Titania	TiO2	0.005%
Chromic Oxide	Cr2O3	0.025%
Potassium Oxide	K2O	0.001%

Thermocouple Wire

In addition to the table below, we also offer type K, N, C, & PII

Thermocouple Type	Material Description	Useful Application Range
B	Platinum 30% Rhodium(+) Platinum 6% Rhodium(-)	2500-3100F 1370-1700C
R	Platinum 13% Rhodium(+) Platinum 100%(-)	1600-2640F 870-1450C
S	Platinum 10% Rhodium(+) Platinum 100%(-)	1600-2640F 870-1450C

Vulcan

Vulcan Electric Company
28 Endfield Street
Porter, ME 04068
(207) 625-3231
(207) 625-8938

Email:
sensorsales@vulcanelectric.com

Web: www.vulcanelectric.com