High Temperature Thermocouple Assemblies

Operating Temperatures Up to 4200°F (2315°C)

Industry Applied High Temperature Applications

Platinum thermocouple assemblies with support tubes for limit and control. Used in a vacuum environment, heat-treat furnace with inert gas purge.

R24-MO12-AL-U-T3(36")-18.00"

Single-point platinum thermocouple with molybdenum sheath to manually profile fast-response epitaxial reactors.

Molybdenum-sheathed platinum thermocouple, terminated with quick disconnect male plug and flexible leadwire.

R24-MO18-AL-U-T3(5")-PJ-16.00"

R24-MO18-AL-U-T5SS(S4BLC4)-10.00"

Platinum thermocouple assemblies with support tubes for limit and control. Used in a vacuum environment, heat-treat furnace with inert gas purge.

Tungsten-rhenium Type C assemblies with sintered alpha silicon carbide sheath tube well for use in semiconductor sintering applications.

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

S24-AL25-AL-U-T5CI(S4BLD4)PG4AG-16.00"

Thermocouple for monitoring surface temperature during the manufacturing process of flat panel glass. A unique 44 AWG wire hot junction (0.002" diameter) maximizes time response while minimizing surface contact.

R30-SASIC25-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-PJ-48.00"SP

C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"

C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"

Platinum thermocouple assemblies with support tubes for limit and control. Used in a vacuum environment, heat-treat furnace with inert gas purge.

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C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"

R30-SASIC25-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-T5SS(S4BLC4)-10.00"

R24-MO12-AL-U-T3(36")-18.00"

S24-AL18-AL-U-T5SS(S4BLC4)-10.00"

C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

R24-MO18-AL-U-T3(5")-PJ-16.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

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S24-AL18-AL-U-T5CI(PG4BL)-6.00"

R24-MO12-AL-U-T3(36")-18.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

R24-MO12-AL-U-T3(36")-18.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

S24-AL18-AL-U-T5CI(PG4BL)-6.00"

C24-SASIC37-AL-U-T5CI(PG4BL)-6.00"
Reliable Thermocouples for High Temperature Applications

Conax Buffalo High Temperature Thermocouples are specifically designed for durability and reliability in high temperature applications up to 4200°F (2315°C). Such applications generally involve oxidizing, reducing, inert gas or contamination atmospheres that challenge the life and reliability of thermocouples in these environments. This catalog reviews the primary characteristics of materials used in thermocouple elements, sheaths and insulations and outlines our standard configurations. For further assistance in determining the appropriate temperature sensing assembly for your application or for custom needs, contact a Conax sales engineer at 800-223-2389.

Thermocouple Types

Choose the thermocouple type from the temperature range table below. Minimum requirements for all Conax Buffalo thermocouples are standard limits of error and are denoted by a single letter (e.g. S). For limits of error, see the Tolerance Chart on page 15.

<table>
<thead>
<tr>
<th>Catalog Type</th>
<th>Calibration</th>
<th>Upper Service Temperature</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Platinum- 10% Rhodium vs. Platinum</td>
<td>2700°F (1482°C)</td>
<td>For use in oxidizing, inert and vacuum atmospheres</td>
</tr>
<tr>
<td>R</td>
<td>Platinum- 13% Rhodium vs. Platinum</td>
<td>2700°F (1482°C)</td>
<td>For use in oxidizing, inert and vacuum atmospheres</td>
</tr>
<tr>
<td>B</td>
<td>Platinum- 30% Rhodium vs. Platinum- 6% Rhodium</td>
<td>3100°F (1699°C)</td>
<td>For use in oxidizing, inert and vacuum atmospheres</td>
</tr>
<tr>
<td>C’</td>
<td>Tungsten- 5% Rhenium vs. Tungsten- 25% Rhenium</td>
<td>4200°F (2315°C)</td>
<td>For use in hydrogen or inert atmospheres For use in vacuum atmospheres</td>
</tr>
</tbody>
</table>

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High Temperature Operating Temperatures Up to 4200°F (2315°C)

Insulation Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Upper Service Temperature</th>
<th>Melting Point</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumina (Al2O3)</td>
<td>3685°F (2030°C)</td>
<td>3685°F (2030°C)</td>
<td>High-purity aluminum oxide is the standard insulation material supplied for Conax Buffalo high temperature thermocouple assemblies. Alumina offers high thermal conductivity and high electrical resistivity.</td>
</tr>
<tr>
<td>Hafnia (HfO2)</td>
<td>4230°F (2320°C)</td>
<td>5034°F (2793°C)</td>
<td>Hafnia is usually present in zirconia mix in amounts ranging from 5 to 2 percent. Refined high-purity hafnia offers a higher electrical resistivity at elevated temperatures than zirconia or zircon. Hafnia’s resistivity is comparable to that of beryllium oxide, but hafnia does not present the potential health problems associated with beryllium oxide. Hafnia is therefore replacing beryllium oxide in many applications. Hafnia is the commonly recommended insulation for Conax Type C thermocouples.</td>
</tr>
</tbody>
</table>

Other Insulation Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Chemical Symbol</th>
<th>Upper Service Temperature</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium Oxide</td>
<td>BeO</td>
<td>4200°F (2315°C)</td>
<td>High electrical resistivity, toxic dust, special handling required</td>
</tr>
<tr>
<td>Magnesium Oxide</td>
<td>MgO</td>
<td>2500°F (1370°C)</td>
<td>Used primarily with compacted sheathed thermocouples</td>
</tr>
<tr>
<td>Thorium Oxide</td>
<td>ThO2</td>
<td>4552°F (2516°C)</td>
<td>Low electrical resistivity, good resistance to reducing environments</td>
</tr>
<tr>
<td>Yttrium Oxide</td>
<td>Y2O3</td>
<td>3632°F (2000°C)</td>
<td>Low electrical resistivity, stabilizer material for zirconium</td>
</tr>
</tbody>
</table>

Sheath Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Upper Service Temperature</th>
<th>Melting Point</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molybdenum (Mo)</td>
<td>3450°F (1900°C)</td>
<td>5034°F (2793°C)</td>
<td>High-purity molybdenum offers excellent mechanical properties at elevated temperatures and is exceptional for use in reducing or neutral atmospheres. Molybdenum offers superb thermal shock resistance and has potentially unlimited life at high temperatures in a vacuum. Pure hydrogen, argon and helium atmospheres are completely inert to molybdenum. Performance is poor in oxidizing atmospheres. Above 800°F (427°C), molybdenum will react with oxygen.</td>
</tr>
<tr>
<td>Tungsten (W)</td>
<td>4200°F (2315°C)</td>
<td>6100°F (3380°C)</td>
<td>Tungsten has the best strength at high temperatures of all the common refractory metals. Tungsten provides good abrasion resistance. It can be used in hydrogen at all temperatures, and in dry argon and helium. Tungsten is not recommended for use in oxygen bearing environments, as oxygen is known to cause physical degradation in only a few hours depending on temperature and oxygen content.</td>
</tr>
<tr>
<td>Tantalum (Ta)</td>
<td>4550°F (2516°C)</td>
<td>5425°F (2996°C)</td>
<td>Tantalum is used in reducing or neutral atmospheres and in a vacuum environment. Its performance is poor in oxidizing atmospheres, and it must be protected from gases such as oxygen and nitrogen of temperatures above 570°F (300°C). Tantalum is outmatched by tungsten for high temperature strength. Tantalum is excellent for thermal cycling applications and is the most corrosion resistant of the refractory materials. It is almost completely immune to attack by acids except hydrofluoric acid.</td>
</tr>
<tr>
<td>Alumina (Al2O3)</td>
<td>3685°F (2030°C)</td>
<td>3685°F (2030°C)</td>
<td>High-purity aluminum oxide offers high thermal conductivity, high electrical resistivity and good resistance to thermal shock. It also offers excellent resistance to chemical attack. Aluminum oxide functions well in oxidizing, reducing or high vacuum applications, but is not recommended for high vacuum environments in the presence of graphite at temperatures exceeding 2372°F (1300°C).</td>
</tr>
</tbody>
</table>

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High Temperature Operating Temperatures Up to 4200°F (2315°C)

Thermocouple Assemblies with PJFC-Plug/Jack Termination

Plug & Jack Assembly
Standard polarized plug and jack termination for use with all calibration types. Plug and jack assemblies are made from molded glass filled thermoset compounds and are designed to operate in temperatures to 300°F (150°C). Polarity identification marks are molded in the bodies for installation assistance.

Progressive Description Example: C24-M018-AL-U-PJFC-12.50"'

<table>
<thead>
<tr>
<th>Diameter &quot;A&quot;</th>
<th>Material</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>.125&quot;</td>
<td>Molybdenum</td>
<td>12 = 125&quot;</td>
</tr>
<tr>
<td>.187&quot;</td>
<td>Tantalum</td>
<td>18 = 187&quot;</td>
</tr>
<tr>
<td>.250&quot;</td>
<td>Tungsten</td>
<td>25 = 250&quot;</td>
</tr>
</tbody>
</table>

Notes:
- .125" diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125" diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375" diameter.

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- .125" diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125" diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375" diameter.
- Lava sealant not recommended for high vacuums.
- Support tube materials: 21635 body and tube, 30555 cap and follower.
- Support tube assembly torque values, see page 14.

For Tubewell Diameter .125", & .187", use code S1A*C4
For Tubewell Diameter .250", use code S2A*D4
For Tubewell Diameter .375", use code S4A*F4

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High Temperature Operating Temperatures Up to 4200°F (2315°C)

**T3/T4 Assembly**

This exclusive Conax Buffalo design provides a practically unbreakable connection between the leadwire and probe lead. The T3 epoxy-filled transition is supplied with Teflon-insulated extension wire as standard; silicone-impregnated fiberglass insulation is also available. Standard extension end leads are 24” long (longer leads available on request). When the progressive description specifies 24 gauge probe wire, 20 gauge extension wire is standard. When the progressive description specifies 30 gauge probe wire, 24 gauge extension wire is standard. T4 termination provides a stainless steel overload for maximum flexibility and abrasion resistance. Available in all sheath materials and wire types. Both termination types function to 300°F (150°C) continuous temperature.

**Thermocouple Assemblies with T3/T4 Leadwire Termination**

**Progressive Description Example:**

```
R24-AL18-AL-U-T3 - 18.00”
```

**Notes:**

- .125” diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125” diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375” diameter.
- Extension grade leadwire.

Optional mounting fitting provides pressure or vacuum sealing.

Progressive description example: **R24-AL18-AL-U-T3-PG2AV-18.00”**

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**SUPPORT TUBE DATA**

<table>
<thead>
<tr>
<th>Leadwire Diameter “A”</th>
<th>Diameter “B”</th>
<th>Code</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>.125”</td>
<td>.312”</td>
<td>C</td>
<td>1.12”</td>
</tr>
<tr>
<td>.187”</td>
<td>.312”</td>
<td>C</td>
<td>1.12”</td>
</tr>
<tr>
<td>.250”</td>
<td>.375”</td>
<td>D</td>
<td>1.50”</td>
</tr>
<tr>
<td>.375”</td>
<td>.500”</td>
<td>F</td>
<td>2.00”</td>
</tr>
</tbody>
</table>

Notes:

- Leadwire diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125” diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375” diameter.
- Extension grade leadwire.
- Support tube materials: 316SS body and tube, 303SS cap and follower.
- Support tube assembly torque values, see page 14;
- Select joint styles: S1=MPG Series, S2=PG2 Series, S4=PG4 Series.

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**For Tubewell Diameter .125” & .187”, use code S1A/C4**

**For Tubewell Diameter .250”, use code S2A/F4**

**For Tubewell Diameter .375”, use code S4A/F4**

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**Optional Mounting Fitting**

For longer lead length specify, example: 36” leadwire requested - T3 (36”)

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Conax Buffalo provides high temperature assemblies with T5, T8 and T11 termination heads in aluminum, stainless steel or cast iron to meet application needs. T5 termination heads meet NEMA 4 requirements providing protection against windblown dust and rain, splashing water, hose-directed water and external ice formation. (See page 11 for details on termination heads.)

The sheath is affixed to the terminal head using a Conax Buffalo packing gland Type PG4 with lava sealant. Terminal heads with terminal blocks and gasket seal are rated to 275˚ F (135˚ C).

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The direct mount style features a B Cap with .50 NPT mounting.

### Progressive Description

**Example:**

- S - 24 - AL - 37 - AL - U - T5CI (PG4AL) - 12.00"

### Table of Specifications

<table>
<thead>
<tr>
<th>Diameter “A”</th>
<th>Length</th>
<th>Style</th>
<th>Material</th>
<th>Junction</th>
<th>Sealing Gland</th>
</tr>
</thead>
<tbody>
<tr>
<td>.25&quot; increments</td>
<td>12.00&quot;</td>
<td>T5CI</td>
<td>Cast Iron NEMA 4</td>
<td>Ungrounded</td>
<td>PG4AL</td>
</tr>
<tr>
<td>.25&quot; increments</td>
<td>12.00&quot;</td>
<td>T5AL</td>
<td>Aluminum NEMA 4</td>
<td>Ungrounded</td>
<td>PG4AL</td>
</tr>
<tr>
<td>.25&quot; increments</td>
<td>12.00&quot;</td>
<td>T5SS</td>
<td>Stainless Steel NEMA 4</td>
<td>Ungrounded</td>
<td>PG4AL</td>
</tr>
</tbody>
</table>

### Notes:
- .125" diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125" diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375" diameter.
- Lava sealant not recommended for high vacuum.

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High Temperature

Thermocouple Assemblies with Terminal Head and Support Tube

Terminal Head Assembly
Conax Buffalo provides high temperature assemblies with T5, T8 and T11 termination heads in aluminum, stainless steel or cast iron to meet application needs. T5 termination heads meet NEMA 4 requirements providing protection against windblown dust and rain, splashwater, hose-directed water and external ice formation. (See page 11 for details on termination heads.)

The sheath is affixed to the terminal head using a Conax Buffalo packing gland Type PG4 with lava sealant. Terminal heads with terminal blocks and gasket seal are rated to 275˚ F (135˚ C).

The support tube supports the sheath from cantilever deflection and offers protection during penetration of the vessel/furnace wall. The rigid, thick wall provides additional sheath protection from potential damage during mounting/compression fitting installation.

Support Tube

****Progressive Description Example: S24-AL37-AL-U-T5CI (S4BVC4) - 12.00”****

Notes:
- .125” diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125” diameter.
- Molybdenum, tantalum and tungsten are not available in .375” diameter.
- Lava sealant not recommended for high vacuum.

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Progressive Description Example: S24-MO18(W6”)-AL-U-PJ-15.75”

High Temperature

Operating Temperatures Up to 4200˚F (2315˚C)

Tungsten-Coated Molybdenum for Graphite-Lined Furnaces

At temperatures above 2010˚ F (1100˚ C), graphite dust from graphite liners/shields or heating elements can attack and carburese molybdenum sheaths. This causes the sheath to crystallize and become porous, losing its protective properties. The thermal elements in turn crystallize and open. Coating the heat-affected length of the molybdenum sheath with a thick layer of tungsten reduces this carburation action and extends probe life. The tungsten coating also provides increased abrasion resistance.

Termination Styles

T5
The T5 terminal head is a highly versatile, gasket-sealed head that meets NEMA 4 standards with termination styles T5AL (aluminum) and T5CI (cast iron). Termination style T5SS stainless steel meets NEMA 4X standards and provides a degree of corrosion resistance. T5 heads feature 6 terminal posts. Covers are tethered to the body with a ball-chain. Temperature rating with gasket is 300˚ F (150˚ C).

T8
The T8 terminal head is Conax Buffalo’s standard weatherproof, gasket-sealed, screw cover head, constructed of cast iron with black-epoxy coating (E-COAT) for corrosion resistance. It accepts up to 8 leads. Covers are tethered to the body with a ball-chain. Explosion-proof models are available. Temperature is rated at 700˚ F (370˚ C).

T11
The T11 termination provides a screw cover with chain leash and a 6-post terminal block. The T11 is available in cast aluminum with a high gloss silver-painted finish designed to resist weak acids, organic solvents, alkalies, sunlight and dust. Temperature is rated at 275˚ F (135˚ C).

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High Temperature Measurement Using Sapphire and Fiber Optics

High Reliability In Adverse Conditions
Conax Buffalo Technologies' Fiber Optic temperature measurement system provides extremely accurate and reliable measurement in high temperature applications. In this system, an emissive material at the probe tip is inserted into the process or flow path. As the process or flow stream heats the probe tip, the emissive material generates thermal radiation in both the visible and non-visible spectrum. This energy is transmitted along a sapphire light guide within the probe housing and then through a rugged yet flexible fiber optic cable to the Electro Optic Unit (EOU). The rugged construction of this cable allows it to survive the harsh environmental conditions often found in applications ranging from aircraft engines to steel mills.

The Electro Optic Unit receives the broadband optical radiation from the probe, analyzes it over two wavelengths, and converts it into a digital signal that is transmitted to the Digital Signal Processor (DSP). The Digital Signal Processor then computes the correct temperature and generates the specified output type.

This system offers the following advantages over traditional thermocouple measurement systems:

Stability & Repeatability - The fiber optic system is not subject to the base metal contamination and resultant signal degeneration found with traditional thermocouples using precious metals and refractory metals. The signal is consistently stable with superior repeatability.

High Reliability - All electronic modules use state-of-the-art surface mount technology with high reliability electronic components.

Cost of Ownership - Extended usage, these probes can be rebuilt and returned to service. Refurbished temperature probes are installed and re-mated with the factory-supplied digital signal processor.

High Temperature Measurement Using Sapphire and Fiber Optics

Component Parts
Tip Configurations
OSP1: Open emissive sapphire sensor for static environment
OSP2: Protected emissive sapphire sensor for high velocity environment
OSP3: Protected emissive sapphire fiber sensor for high velocity environment

Support Tubes & Tubewells
Material: Service Temperature
Alumina (AL): 3400˚F (1871˚C) (Support Tube)
Hesycarb-SASiC: 3000˚F (1650˚C) oxidizing, (Tubewell)
Hesycarb*: SASiC: 3360˚F (1850˚C) inert or vacuum (Tubewell)

Termination Styles
TF1: Small Diameter Termination Head
TF2: Large Heavy Duty Inlet

Electro Optic Unit (EOU)
EOU 500
Digital Signal Processors (DSP)
DSP500: 4-20 mA Output
DSP501: 0-5 VDC Output
DSP502: RS-485 Interface Output Only

Specifications
Input power: 115-230 VAC, 47-63 Hz
Available output signal: 4-20 mA, 0-5 VDC, RS485, etc.
Sensing range: +460°F to +2800°F (+350˚C to +1500˚C) to +1292°F to +3000°F (+700˚C to +1650˚C)
System accuracy: ±3% over the range of +460°F to +1292°F (+350˚C to +700˚C) and ±1% over the range of +1292°F to +3000°F (+700˚C to +1650˚C)
System response time: <1 sec.
Environmental temperature: +32°F to +122°F (+0˚C to +50˚C) (electro-optic unit and digital signal processor)
Probe vibration: 20g random vibration on mutually perpendicular axes

Support Tubes & Tubewells
Material: Service Temperature
Alumina (AL): 3400˚F (1871˚C) (Support Tube)
Hexoloy®-SASiC: 3000˚F (1650˚C) oxidizing, (Tubewell)
Hexoloy®-SASiC: 3360˚F (1850˚C) inert or vacuum (Tubewell)

Termination Styles
TF1: Small Diameter Termination Head
TF2: Large Heavy Duty Inlet

Electro Optic Unit (EOU)
EOU 500
Digital Signal Processors (DSP)
DSP500: 4-20 mA Output
DSP501: 0-5 VDC Output
DSP502: RS-485 Interface Output Only

Specifications
Input power: 115-230 VAC, 47-63 Hz
Available output signal: 4-20 mA, 0-5 VDC, RS485, etc.
Sensing range: +662˚F to +2462˚F (+350˚C to +1350˚C)
System accuracy: ±3% over the range of +662˚F to +1292˚F (+350˚C to +700˚C)
System response time: <1 sec.
Environmental temperature: +32˚F to +122˚F (+0˚C to +50˚C) (electro-optic unit and digital signal processor)
Probe vibration: 20g random vibration on mutually perpendicular axes

PROGRESSIVE DESCRIPTION EXAMPLE:
OSP2-SASIC37-TF1-(10)EOU500(350-1300)-XX
OSP2: SASIC 37 (0.375”)
TF1: Large Heavy Duty Inlet
EOU500: Digital Signal Processor
(350˚C Low Limit Length Required)
(25 Meters Maximum)

RAIL ASSEMBLY

PROGRESSIVE DESCRIPTION EXAMPLE:
DSP500-8(FR)-PC600-D
DSP500: Digital Signal Processor
8 maximum for Model FR
FR: Full Rack
PC 600: Power Converter
Up to 2 DSPs
PC 600: Power Cord
(Up to 2 DSPs)
D = Domestic
I = International

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High Temperature
Operating Temperatures Up to 4200˚F (2315˚C)

Single Thermocouple Assembly
Conax Buffalo Packing Glands provide pressure or vacuum sealing of thermocouples. The reusable stainless steel fitting with replaceable sealant can be used in gas or liquid environments. Listed sealing gland torque values are determined for supplied thermocouple and support tube assemblies operating at 300 psig maximum pressure and 609 F (200˚C) temperature.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Tube or Probe Diameter</th>
<th>Thread NPT</th>
<th>Length &quot;A&quot;</th>
<th>Hex Size</th>
<th>Torque (in-lbs except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPG-125-*</td>
<td>.125&quot;</td>
<td>1/8&quot;</td>
<td>34-40</td>
<td>70-75</td>
<td>55-60</td>
</tr>
<tr>
<td>MPG-187-*</td>
<td>.187&quot;</td>
<td>1/4&quot;</td>
<td>34-40</td>
<td>70-75</td>
<td>55-60</td>
</tr>
<tr>
<td>P6G-125-*</td>
<td>.125&quot;</td>
<td>1/4&quot;</td>
<td>55-60</td>
<td>160-170</td>
<td>150-160</td>
</tr>
<tr>
<td>PG4-250-*</td>
<td>.250&quot;</td>
<td>1/4&quot;</td>
<td>2-1/2&quot;</td>
<td>50-50 lbs</td>
<td>80-85 lbs</td>
</tr>
<tr>
<td>PG4-400-*</td>
<td>.400&quot;</td>
<td>1/4&quot;</td>
<td>2-1/2&quot;</td>
<td>50-50 lbs</td>
<td>80-85 lbs</td>
</tr>
</tbody>
</table>

Other ceramic tubewell materials are available for selective applications.

<table>
<thead>
<tr>
<th>Material</th>
<th>Chemical Symbol</th>
<th>Maximum Operating Temperature</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sintered Alpha</td>
<td>SASIC</td>
<td>3000˚F (1650˚C)</td>
<td>No free silicon, higher density than SiC, low porosity, excellent thermal shock resistance, high chemical, corrosion and abrasion resistance, excellent thermal conductivity.</td>
</tr>
<tr>
<td>Silicon Carbide</td>
<td>SiC</td>
<td>3000˚F (1650˚C)</td>
<td>Excellent thermal conductivity, corrosion resistance and abrasion resistance, good thermal shock resistance.</td>
</tr>
<tr>
<td>Fused Quartz</td>
<td>SiO2</td>
<td>3050˚F (1677˚C)</td>
<td>Excellent thermal shock resistance, unreactive to most acids and metals, performs well in oxidizing, inert or neutral atmospheres.</td>
</tr>
<tr>
<td>Mullites</td>
<td>3A0.025SiO2</td>
<td>2750˚F (1515˚C)</td>
<td>Low thermal expansion, good thermal shock resistance, excellent mechanical strength.</td>
</tr>
</tbody>
</table>

Power Lead (PL) Glands
Wire Seals for Pressure/Vacuum Service
Insulated power lead sealing glands provide versatility for sealing against gas or liquid in applications such as vacuum and gas-fed burners. PL Glands are designed to seal pressures ranging from vacuum to 10,000 psi (690 bar) in temperatures ranging from -300 F (240˚C) to 1050 F (565˚C). Seals 1-12 wires, 18 to 8 gauge, 5 to 55 amps, 600-volt rated.

Electrode (EG) Glands & Electrode Thread Teflon (EGT) Glands
Electrode Seals for Pressure/Vacuum Service
Electrode Glands with ceramic insulators or one-piece teflon insulator sealant are available for use in vacuum furnaces, environmental chambers and other applications requiring the thermal and/or electrical isolation of electrodes, tubes or temperature sensors. The EG Series with ceramic insulators are rated for 2000 VDC voltage. EGT Series with Teflon insulator are rated for 8000 VDC voltage.

For further information on any of these products, contact Conax Buffalo for a Product Bulletin or visit our website at www.conaxbuffalo.com/products.