



MULTI-SENSOR PASS-THROUGH FITTINGS

For Test and
Instrumentation Applications

JETSEAL Sensor Pass-Through Fittings

Founded in 1988, JETSEAL began in Spokane, Washington as a small manufacturer of metallic seals to the aerospace industry. Today, JETSEAL has evolved to become an industry leader providing cost-effective sealing solutions to many industries requiring absolute dependability, reliability and performance. Our products are found in major industries including

- Aviation
- Space
- Transportation
- Oil & Gas Power Generation
- Laser
- Alternative Energy

JETSEAL produces all of its products to the certified quality requirements of ISO 9001:2015/AS9100 Rev D and is NADCAP approved for welding. JETSEAL is also ISO 14001:2015 compliant.

Please visit us at www.jetseal.com or call (800) 644-5660 (509) 467-9133



Aviation



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AND EXTREME TEMPERATURE ENVIRONMENTS

Nuclear Energy & Propulsion



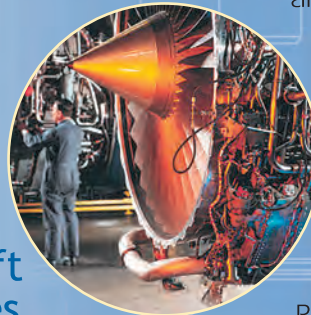
Semiconductor & Vacuum



Automotive Manufacturing



Aircraft Engines



Power Generation



A major gas turbine manufacturer was unsatisfied with their current pass-throughs used to run test wires from the inside of the turbines and test rigs to monitoring equipment. The pass-throughs suffered breakthroughs of gas at pressures, required regular replacement, took 24 hours before they could be used, and all of the wires needed to be replaced even if only a single wire needed replacement.

JETSEAL was able to solve their problem.

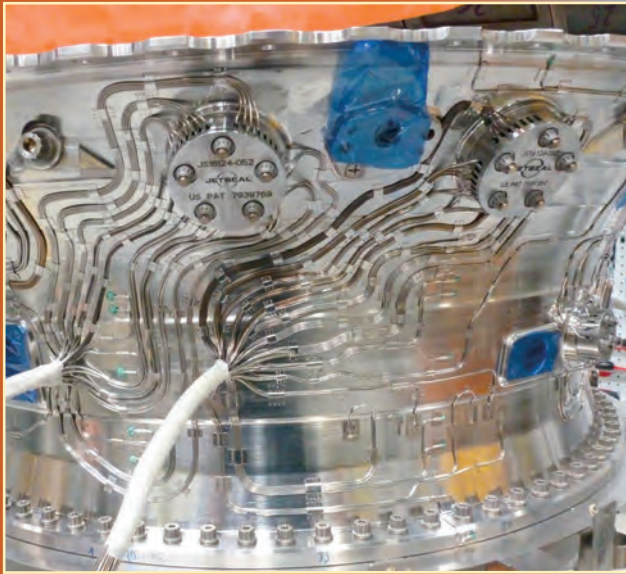
Specialized fittings were designed to mount on the turbines or test equipment. Gaskets were developed that would prevent

leakage at pressure while avoiding crushing of thermocouple wires and pressure tubes. Our engineers developed drawings, solid models and performed FEAs to prove the concept.

JETSEAL's Patented Sensor Pass-Through performed 100 times better than the customer's previous fitting. JETSEAL continues to develop many sizes and varieties of its Sensor Pass-Throughs to meet its customers' needs.

JETSEAL's AEROSPACE Sensor Pass-Through Used in Data Monitoring

JETSEAL's Aerospace Sensor Pass-Through Used in Combustion Chamber Data Monitoring



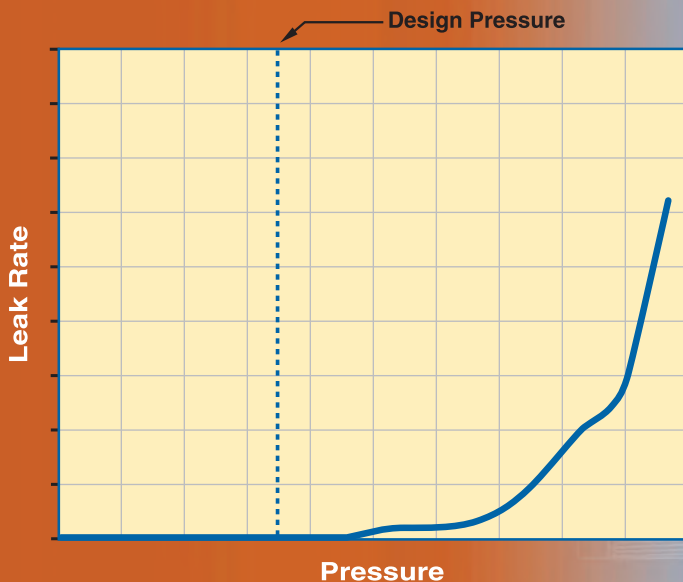
Allows Convenient Data Monitoring in Extreme Temperature and High Pressure Environments

JETSEAL's patented Multi-Sensor Pass-Through quickly and easily passes multiple sensor wires, thermocouples, pressure tubes, fiber optic cables, or electrical cables through a pressure vessel or test rig quickly and easily for a leak tight fit. Eliminate long cure times of cement or epoxies, or having to stuff packing materials or thread wire through individual holes in multiple components.

Designed to fit in smaller space envelopes common in aero turbine environments, these efficient units can accommodate up to 105 wires by adding additional tiers. Our smallest profile measures 1.34" (34mm) in diameter by 0.35" (9mm) high and holds 12 sensor wires. The 1.3" (33mm) and 2.0" (52mm) diameter sizes can accommodate from 10 to 105 wires. The recommended maximum sensor wire diameter is 0.07" (1.8mm). Custom designs are available to fit specific application requirements.

Interface definitions available upon request.

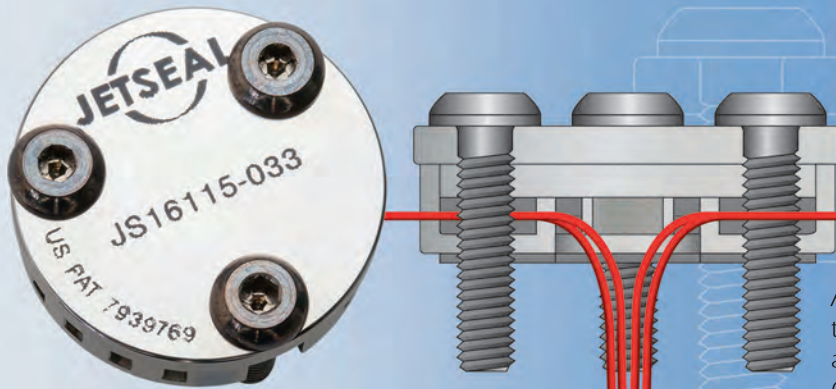
TYPICAL LEAK RATE vs. PRESSURE



Sensor Pass-Through Fittings:

- Requires no time-consuming threading of sensor wires or tubes through individual holes.
- Superior design ensures a low leak rate with each use.
- Accepts thermocouples with connectors.
- Eliminates the need for hole plugs in unused ports.
- Prevents crushing to failure sensor wires, pressure tubes, or thermocouples.
- Accommodates customization for different connection methods and changes in the number of wires or tubes.
- Permits quick replacement of broken sensor wires or tubes without disturbing other wires.
- Contains no sharp edges to damage sensor wires or tubes.
- Compatible with solid metal jacketed sensor wire or tubing.
- Not for use with braided wire jacketed sensors.

Aerospace Sensor Pass-Through Fittings Standard

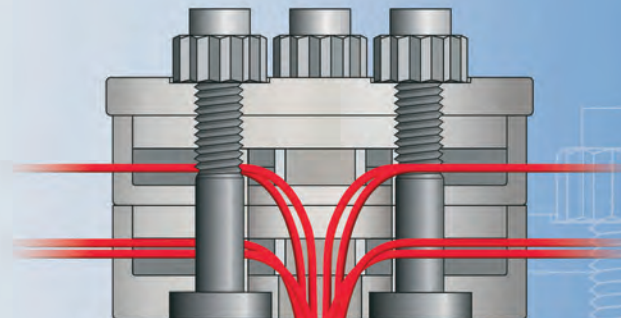


Aerospace Sensor Pass-Throughs bolt directly to the boss of the combustion chamber. They are capable of zero leakage up to 850° F (450° C) and 500 psi (40 bar).

Special adapters are available to mount the Aerospace Sensor Pass-Through onto female NPT fittings.

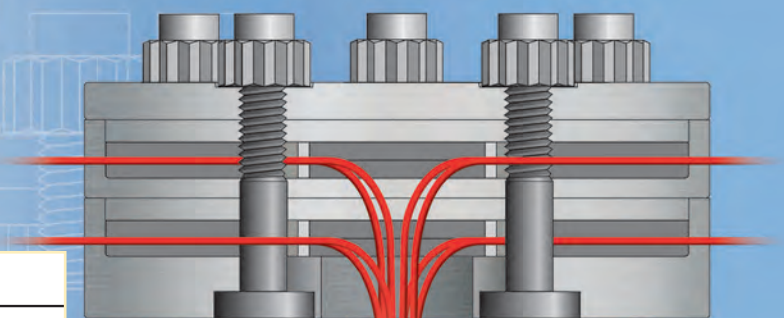
33mm Low Rise Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS16115-033-1AA	.45 (11.43mm)	3	12	.07 (1.8mm)	4.8 oz (0.15 kg)	1	1.340" (34.04mm)	.521" (13.23mm)



33mm Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS16093-033-1AA	.45 (11.43mm)	3	12	.07 (1.8mm)	4.8 oz (0.15 kg)	1	1.340" (34.04mm)	.815" (20.70mm)
JS16093-033-2AA	.45 (11.43mm)	3	24	.07 (1.8mm)	6.0 oz (0.18 kg)	2	1.340" (34.04mm)	1.035" (26.29mm)
JS16093-033-3AA	.45 (11.43mm)	3	36	.07 (1.8mm)	7.2 oz (0.21 kg)	3	1.340" (34.04mm)	1.255" (31.88mm)



52mm Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS16124-052-1AA	1 (25.40mm)	5	35	.07 (1.8mm)	7.9 oz (0.23 kg)	1	2.045" (51.94mm)	.815" (20.70mm)
JS16124-052-2AA	1 (25.40mm)	5	70	.07 (1.8mm)	9.5 oz (0.28 kg)	2	2.045" (51.94mm)	1.095" (27.81mm)
JS16124-052-3AA	1 (25.40mm)	5	105	.07 (1.8mm)	11.1 oz (0.32 kg)	3	2.045" (51.94mm)	1.375" (34.92mm)

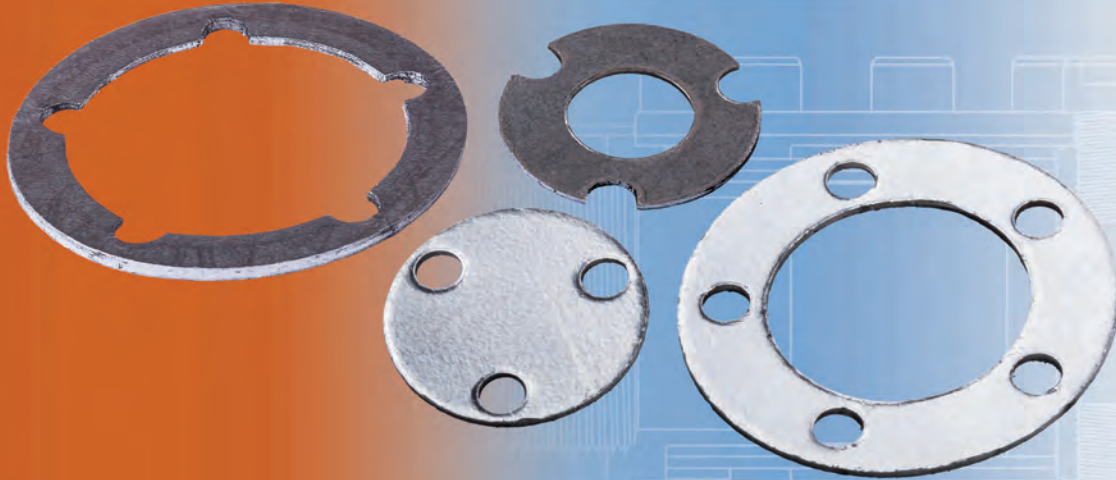
Sensor Pass-Through Gaskets

JETSEAL's patented graphite gaskets seal against the sensor wires to prevent leakage. These reliable and durable gaskets will last for extended periods of time during regular usage. Gaskets are intended for single-use only and should be replaced when wires are removed or replaced.

Low-Temp Environments



High-Temp Environments



Sensor Pass-Through Blanks

Sensor Pass-Through Blanks

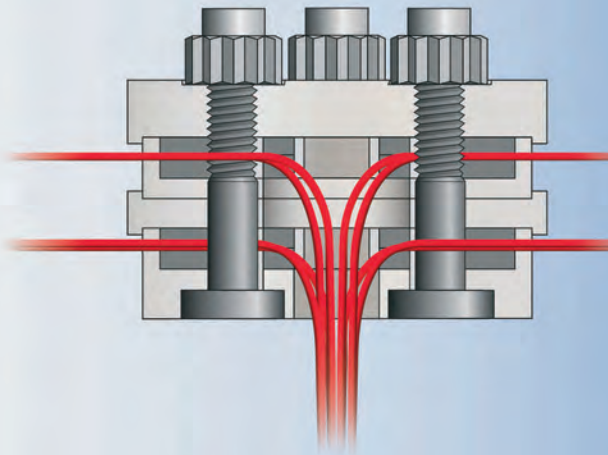
Style	Part Number	Outside Dimension	Height
Low Rise Blank	JS16115-033BLAA	1.34" (34.04mm)	0.20" (5.08mm)
33mm Blank	JS16093-033BLAA	1.34" (34.04mm)	0.20" (5.08mm)
52mm Blank	JS16124-052BLAA	2.045" (51.94mm)	.225" (5.715mm)
33mm XP Blank	JS20054-033-XBLA	1.340" (34.04mm)	.200" (5.08mm)
52mm XP Blank	JS20055-052-XBLA	2.045" (51.94mm)	.200" (5.08mm)

Blanks are used to cover the boss opening when the Aerospace Sensor Pass-Through is not needed for data monitoring. A graphite gasket is secured with JETSEAL's specifically designed cap to prevent pressure leakage.



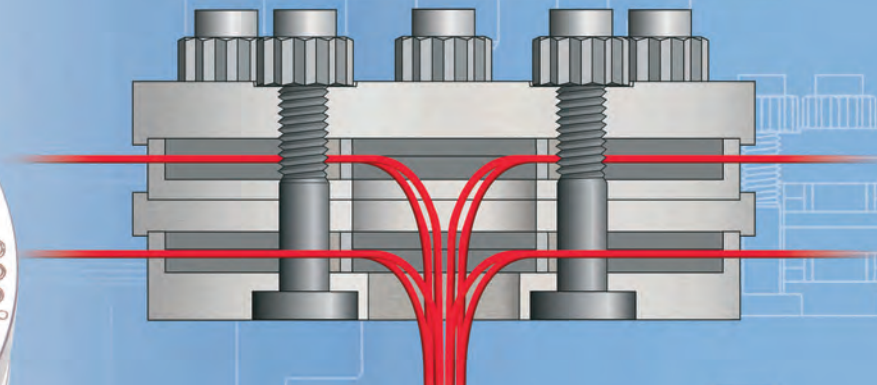
Aerospace Sensor Pass-Through Fittings *Low-Temp Environments*

Low-temp Sensor Pass-Through fittings are designed for low pressure compressor or combustion chambers when temperatures are below 400°F (200°C). They are an excellent choice when hydrocarbons or other petroleum products may impact the Sensor Pass-Through gaskets. The low seating force of the highly fluorinated carbon-based polymer gaskets will not crush the cables or PTFE-coated cables.



33mm Low Temp Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS16093-033-1CA	.45 (11.43mm)	3	12	.07 (1.8mm)	4.8 oz (0.15 kg)	1	1.438" (36.53mm)	.955" (24.25mm)
JS16093-033-2CA	.45 (11.43mm)	3	24	.07 (1.8mm)	6.0 oz (0.18 kg)	2	1.438" (36.53mm)	1.385" (35.17mm)



52mm Low Temp Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS16124-052-1CA	1 (25.40mm)	5	12	.07 (1.8mm)	7.9 oz (0.23 kg)	1	2.183" (55.45mm)	.815" (55.45mm)
JS16124-052-2CA	1 (25.40mm)	5	24	.07 (1.8mm)	9.5 oz (0.28 kg)	2	2.183" (55.45mm)	1.385" (35.17mm)

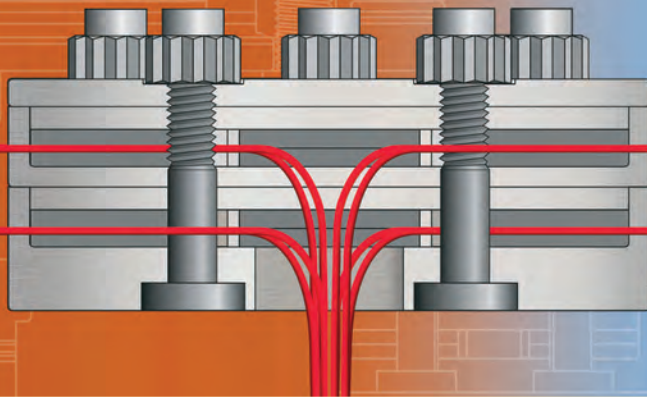
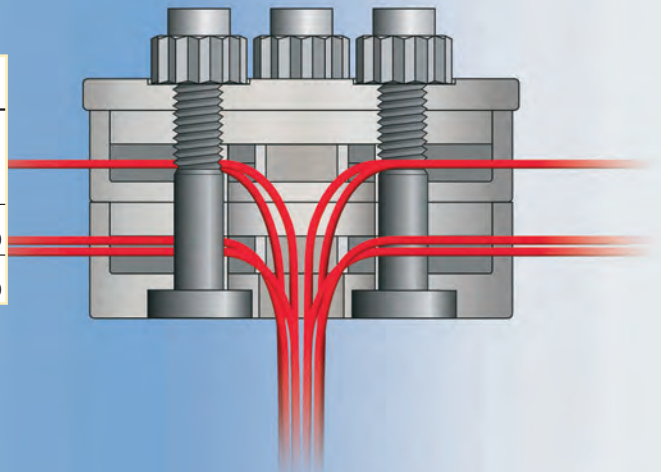
Aerospace Sensor Pass-Through Fittings High-Temp Environments



The high-temperature Sensor Pass-Through fittings are designed for temperatures up to 1100°F (600°C). Gold plated hardware and C-Seals provide the durability for the higher temperatures. Made from expanded pure graphite, the gaskets are extremely resilient to the thermal stresses in hotter environments.

33mm XP Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS20054-033-1XA	.45 (11.43mm)	3	12	.07 (1.8mm)	4.8 oz (0.15 kg)	1	1.340" (34.04mm)	.815" (20.70mm)
JS20054-033-2XA	.45 (11.43mm)	3	24	.07 (1.8mm)	6.0 oz (0.18 kg)	2	1.340" (34.04mm)	1.035" (27.81mm)



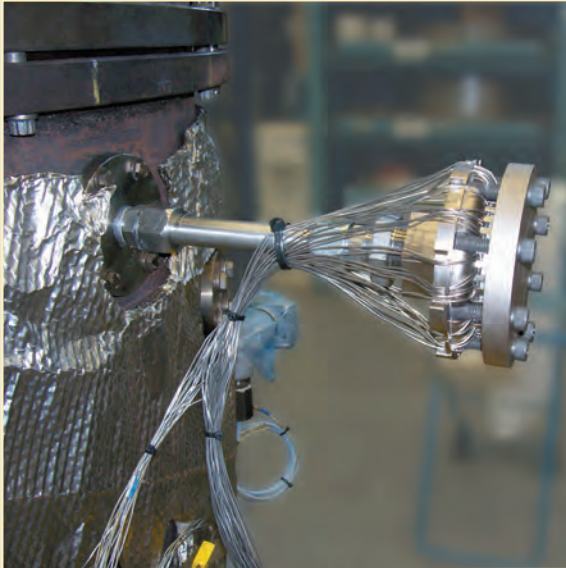
52mm XP Sensor Pass-Through

Part Number	Egress Opening	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter	Weight	Tier	Outside Dimension	Height
JS20055-052-1XA	1 (25.40mm)	5	12	.07 (1.8mm)	7.9 oz (0.23 kg)	1	2.045" (51.94mm)	.805" (20.44mm)
JS20055-052-2XA	1 (25.40mm)	5	24	.07 (1.8mm)	9.5 oz (0.28 kg)	2	2.045" (51.94mm)	1.035" (27.81mm)



JETSEAL's INDUSTRIAL Sensor Pass-Through Fittings

JETSEAL's Standard
Sensor Pass-Through Used in
High Volume Data Monitoring

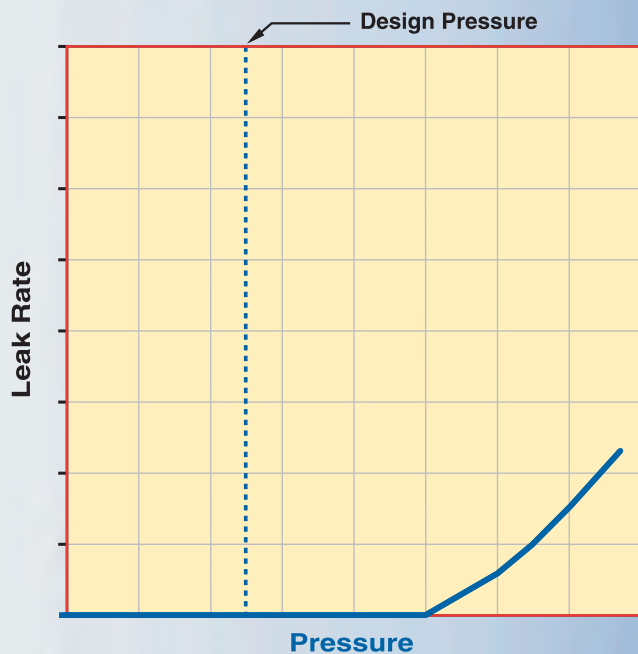


Allows Convenient Data Monitoring in High Temperature and High Pressure Environments

For monitoring and testing with as many as 168 sensor wires or tubes – of multiple diameters, the patented Sensor Pass-Through quickly and easily passes multiple sensor wires, thermocouples, pressure tubes, data cables, etc., through a pressure vessel or test rig opening quickly and easily for a leak tight fit. The Sensor Pass-Through eliminates the long cure times of cement or epoxies. Our Sensor Pass-Through's are ASME Boiler & Pressure Vessel Code compliant to 850 °F (450 °C) and 500 psi.

Installation of instrumentation wires or tubing is simple using the Sensor Pass-Through. Fasten the unit to a pressure vessel with a standard NPT threaded connection (other connection types are available). Feed the wires or tubes through without removing the sensor end fittings. Torque the grade-8 bolts to seat the seals around the wires.

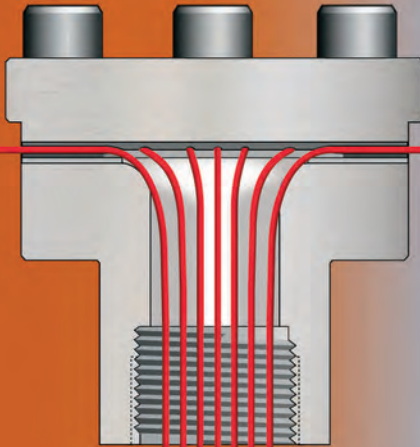
LEAK RATE vs. PRESSURE



Sensor Pass-Through Fittings:

- Requires no time-consuming threading of sensor wires or tubes through individual holes.
- Superior design ensures a low leak rate with each use.
- Accepts thermocouples with connectors.
- Eliminates the need for hole plugs in unused ports.
- Prevents crushing to failure sensor wires, pressure tubes, or thermocouples.
- Allows easy adaptation to pressure vessel openings with a range of standard NPT connections.
- Alternate connection styles are available.
- Accommodates customization for different connection methods and changes in the number of wires or tubes.
- Permits quick replacement of broken sensor wires or tubes without disturbing other wires.
- Features nickel plating to resist corrosion in extreme environments up to 850°F (454°C) and 500 psi.
- Contains no sharp edges to damage sensor wires or tubes.
- Designed to use with ASME Boiler and Pressure Vessel Code compliant test chambers.
- Compatible with solid metal jacketed sensor wire or tubing.
- Not for use with braided steel jacketed sensors.

Mini Capacity & Light Capacity Sensor Pass-Through

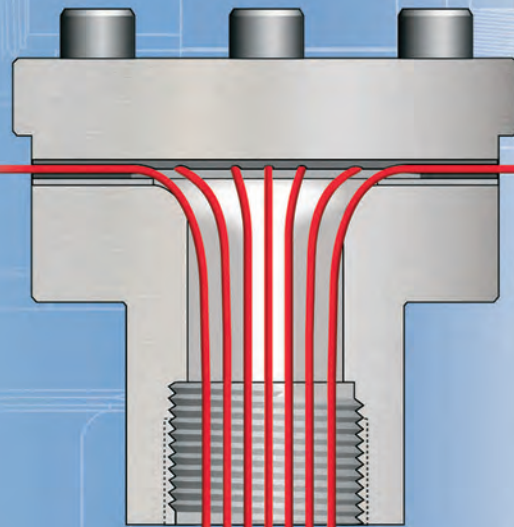


3-Bolt Mini Capacity Sensor Pass-Through

Part Number	Female NPT Size (in)	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter (in)	Weight	Outside Dimension	Height
JS14122-075	3/4	3	12	0.062	2 lb (0.9 kg)	2.25" (57.2mm)	3.125" (79.4mm)

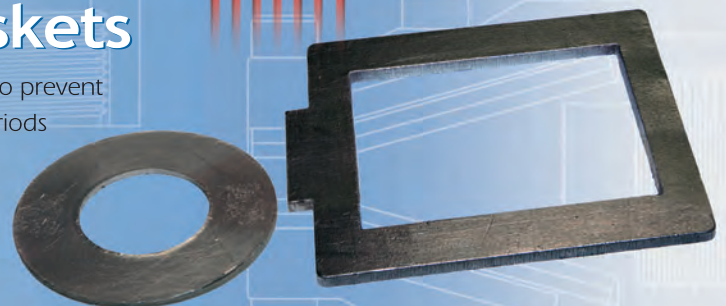
Light Capacity Sensor Pass-Through

Part Number	Female NPT Size (in)	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter (in)	Weight	Outside Dimension	Height
JS08070-100	1	6	18	0.062	4 lb (1.8 kg)	3.25" (82.5mm)	3.318" (84.3mm)

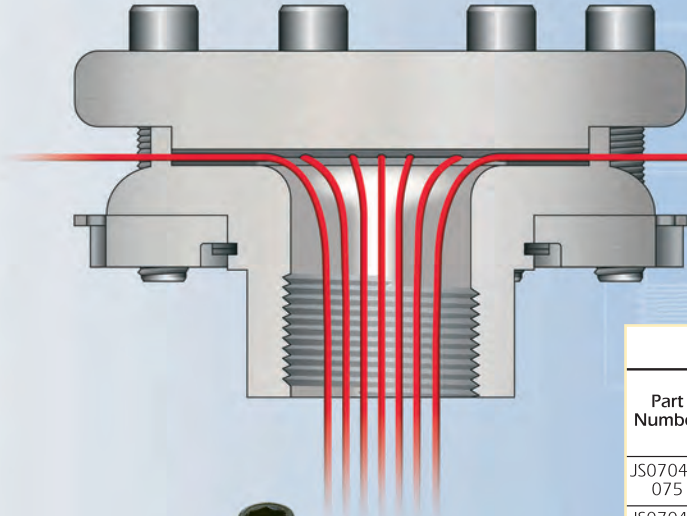


Sensor Pass-Through Gaskets

JETSEAL's patented graphite gaskets seal against the sensor wires to prevent leakage. The reliable and durable gaskets will last for extended periods of time during regular usage. Gaskets are intended for single-use only and should be replaced when wires are removed or replaced.



Medium Capacity Sensor Pass-Through



Medium Capacity (Round) Sensor Pass-Through

Part Number	Female NPT Size (in)	Number of Bolts	Recommended Maximum Number of Sensor Wires	Recommended Max. Sensor Diameter (in)	Weight	Outside Dimension	Height
JS07046-075	3/4	6	48	0.062	9 lb (4.1 kg)	5.00" (127.0mm)	3.178" (80.7mm)
JS07046-150	1-1/2	8	64	0.062	14 lb (6.4 kg)	6.00" (152.4mm)	3.812" (96.8mm)
JS07046-200	2	10	80	0.062	20 lb (9.1 kg)	7.00" (177.8mm)	3.812" (96.8mm)



Wedge Sensor Pass-Through

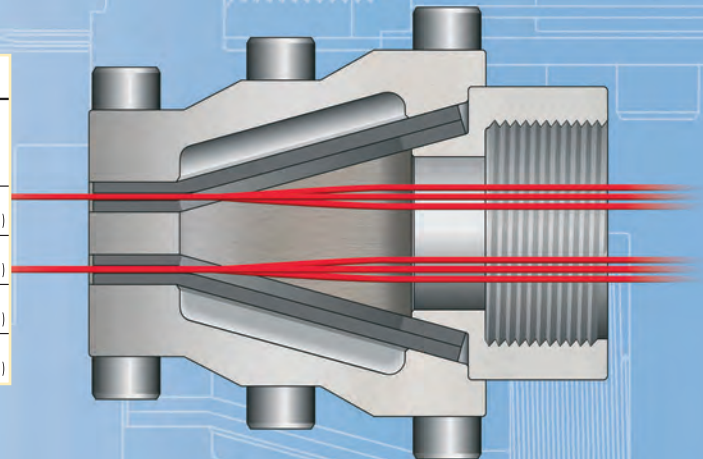
Allows sensing wires or tubes to pass through the unit without bending

JETSEAL's largest sensor wire diameter capacity Pass-Through is able to accommodate up to .250" diameter wires. This unit is used in applications where it is important that the sensor wire must exit without bending. The sensor wires are easily egressed from a pressurized container or piece of equipment via a convenient NPT threaded fitting. The wires exit the unit and are fed directly through the Sensor Pass-Through without bending. This unit is built to operate over a wide range of conditions. It is capable of zero leakage up to 850 °F (450 °C) and 500 psi. These units are nickel plated for durability.

Wedge Sensor Pass-Through

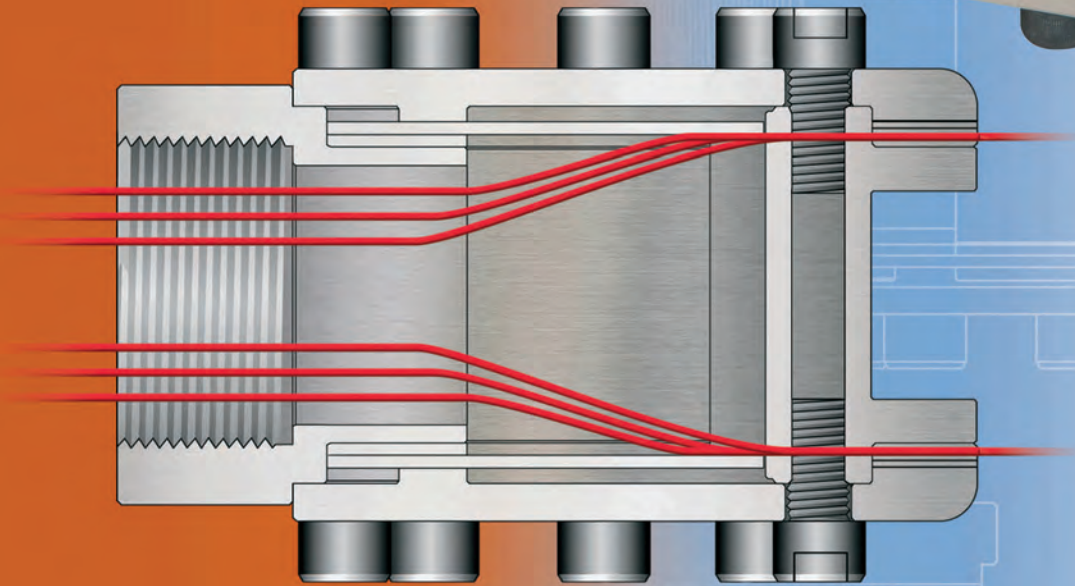
Part Number	Female NPT Size (in)	Number of Bolts	Recommended Maximum Number of Sensor Wires*	Recommended Max. Sensor Diameter (in)	Weight	Outside Dimension	Height
JS08047-100	1	12	28	0.094	10 lb (4.5 kg)	3.75x3.5" (95.3x88.9mm)	4.268" (108.4mm)
JS08069-150	1-1/2	12	28	0.094	15 lb (6.8 kg)	3.75x3.5" (95.3x88.9mm)	4.268" (108.4mm)
JS08087-200	2	12	6	0.250	25 lb (11.3 kg)	5.368x5.484" (136.3x139.3mm)	7.00" (177.8mm)
JS13137-200	2	12	12	0.250	25 lb (11.3 kg)	6.08x5.62" (154.4x142.7mm)	6.9" (175.3mm)

*Maximum number of sensor wires given for wires using maximum diameter. If wire diameter is less than recommended maximum, more sensor wires may be used.



Large Capacity Sensor Pass-Through

JETSEAL's largest wire count capacity Sensor Pass-Through, which is able to accommodate up to 168 individual .040" diameter wires. This unit is used in applications where conveniently exiting many sensor wires from a centralized location is required. The sensor wires are easily egressed from a pressurized container or piece of equipment via a convenient NPT threaded fitting. The wires exit the unit and are fed directly through the Sensor Pass-Through without bending. This unit is built to operate over a wide range of conditions. It is capable of zero leakage up to 850 °F (450 °C) and 500 psi. These units are nickel plated for durability.



Large Capacity Sensor Pass-Through

Part Number	Female NPT Size (in)	Number of Bolts	Recommended Maximum Number of Sensor Wires*	Recommended Max. Sensor Diameter (in)	Weight	Outside Dimension	Height
JS11052-250	2-1/2	18	168	0.040	16 lb (7.2 kg)	4.111x8.098" (104.4x205.7mm)	6.294" (159.9mm)
			144	0.062	16 lb (7.2 kg)	4.111x8.098" (104.4x205.7mm)	6.294" (159.9mm)

*Number of wires and wire size depend on wire comb use.

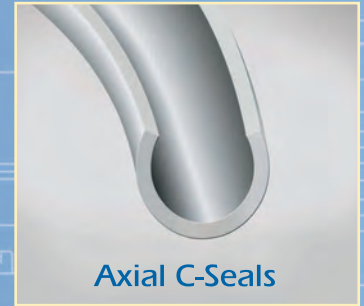
JETSEAL is a world class manufacturer of metal sealing solutions



C-Seals

Whether your company is seeking a standard metal seal or a custom metallic seal assembly, JETSEAL can solve difficult sealing issues.

In addition to the industry standard high temperature and high pressure metal E-Seals and C-Seals, JETSEAL produces specifically engineered seals to meet your specific sealing requirements. JETSEAL's resilient



Axial C-Seals



Super C-Seals

metal seals comprise a complete selection of cross-sections, sizes, shapes and materials capable of satisfying a vast variety of applications. Our resilient metal seals are found in major industries including aviation, space, power generation, laser, oil & gas and automotive, as well as research and development. Customers rely on JETSEAL's resilient metal seals whenever extreme temperature, pressure, vacuum or corrosive conditions are present.



U-Mega Seals



Multi-Convolution Seals



Omega Seals



E-Seals



Lever Seals



V-Seals



Non-Circular Seals

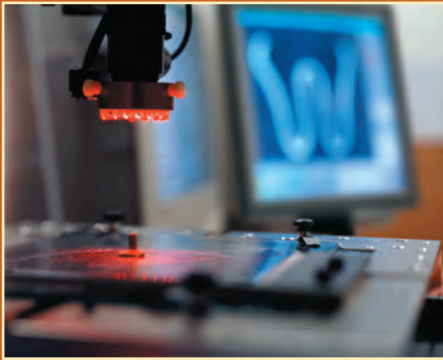


Custom Design

Our in-house engineering staff has the experience, tool-making capabilities and raw materials inventory necessary to complete new designs and specialty parts quickly. We'll work with our customers early in the design process to develop appropriate solutions for each application.

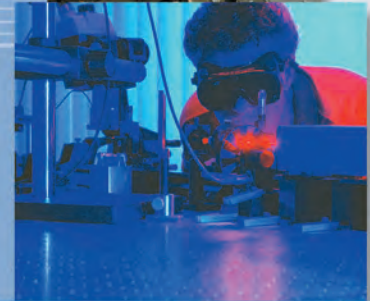
Call on us for custom design capabilities such as:

- Complete application evaluation for both seal and cavity recommendations using finite element analysis (FEA)
- Concurrent design and development
- Prototype development
- Products built to customer specifications
- Helium leak detection to 1×10^{-10} atm-cc/sec



Quality Testing

- ISO 9001:2015 Certified
- AS9100D Certified
- Welding processes are NADCAP approved
- Aerospace Fluid Distribution Systems are NADCAP approved
- ISO 14001:2015 Compliant
- FPI, Mag-particle, X-Ray, visual and dimensional
- Testing capabilities include:
 - Pressure to 2000 psi
 - Helium leakage for vacuum applications
 - Cyclic temperature to 1200°F (649°C)
 - High cycle fatigue to 1 million cycles
 - Load, deflection and spring back
 - Wear and friction



Customer Technical Support

- Highly trained and technically oriented customer service personnel
- Single direct point of contact for the customer
- Coordinates all internal functions such as:
 - Engineering support
 - Order tracking (real time)
 - Pricing
 - Lead-times / delivery
 - Shipping
 - Inspection





DEFENSE



POWER GENERATION



SPACE



AIRCRAFT ENGINES



LASER TECHNOLOGY



AVIATION



NUCLEAR



OIL & GAS



TRANSPORTATION TURBOCHARGERS & SENSORS



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