INTEGRITY PRODUCTS

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INTEGRITY PRODUCTS

CRYOGENIC INSPECTION PLUG

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EXTREME COLD?
WE CAN HANDLE IT

Integrity Products Cryogenics Plugs are designed for durability and consistent performance in sub-zero environments. All components are manufactured from high-performance, cryogenic-rated materials proven to withstand extreme cold, thermal cycling, and mechanical stress.

Key Performance Features

PRECISION-FIT CAP FOR A SECURE SEAL

Engineered for exact tolerance and mechanical stability, the cap interlocks securely onto the plug body to form a durable, air- and moisture-tight seal. This prevents frost and ice accumulation in cryogenic applications, even under repeated thermal cycling.

CUSTOM-FIT PTFE SLEEVE AND CLOSED-CELL FOAM INSERT

The PTFE sleeve can be supplied with pipe adaptors or can be field trimmed to various insulation thickness, and acts as an effective vapor barrier, and air seal. Its low surface energy (non-stick behavior) prevents bonding with the foam insert, maintaining structural integrity and enabling repeatable access for inspection. The foam insert completely fills the plug cut out area, preventing buildup of ice. Combined, the sleeve and insert significantly reduce air infiltration and conductive heat transfer.

SUPERIOR INSULATION PERFORMANCE

Minimizes heat ingress and maintains vapor tightness, enhancing energy retention and protecting system performance. Outperforms conventional plug systems in thermal efficiency and long-term reliability, safeguarding cryogenic system integrity and energy efficiency.

VERSATILE INSTALLATION OPTIONS

Two secure attachment methods for various jacketing systems:

Metal Collar for Banding secures externally, eliminating the risk of penetrating the vapor barrier.

Direct Fastening using Screw or Rivets ideal for rigid or fixed jacketing systems requiring direct fastening.

TECHNICAL DATA

CRYOGENIC PLUG

Product Description

Integrity's Cryogenic Plugs are specifically engineered for cold service applications, offering a simple yet effective three-part assembly for insulated piping systems.

1. **Plug Assembly**
   The primary plug face assembly features a durable plug with an integrated aluminum ring and inserts, designed for secure banding applications.

2. **Insulation Insert**
   Made from closed-cell foam, this insert includes a mechanically mounted PTFE strap for enhanced, reliable operation.

3. **PTFE Sleeve**
   Customizable to insulation thickness, this sleeve prevents air infiltration into the sealed insulation system. It also forms a tight fit with the closed-cell foam insert, leaving no void space for ice to build up, acts as a barrier for the foam pillow, and creates a suction-like fit. Additionally, we provide 3 options of pipe adapters to closely match the curve of the pipe ensuring a close fit and minimizing the use of sealant.

Designed for maximum efficiency and protection, Integrity's Cryogenic Plugs ensure superior insulation performance in extreme cold environments.

Product Application

Integrity's Cryogenic Inspection Ports are specially engineered for cryogenic applications, providing secure, repeated access for non-destructive testing (NDT) on insulated pipes, vessels, tanks, and equipment.

Crafted from advanced materials specifically designed to withstand fluctuating and sub-zero temperatures, these inspection ports ensure durability and performance in extreme conditions. Their innovative design creates a reliable vapor and moisture barrier, significantly reducing the risk of frost and ice buildup on insulated systems.

For superior protection and efficiency in cryogenic environments, Integrity's Cryogenic Inspection Ports deliver unmatched reliability.

Material Specifications

	PLUG CAP	PLUG EDGE TRIM	PLUG FOAM	PLUG SLEEVE	PULL STRAP
MATERIAL(S)	Silicone	Aluminum (3003-H14)	Low-Density Polyethylene (LDPE)	PTFE (Polytetra-fluoro-ethylene)	PTFE (Polytetra-fluoro-ethylene)
COLOR(S)	Blue	Black	Blue	White	White
TEMP RANGE	−55 to 230°C (−67 to 446°F)	−196 to 150°C (−321 to 302°F)	−60 to 90°C (−76 to 195°F)	−240 to 260°C (−400 to 500°F)	−240 to 260°C (−400 to 500°F)
ELONGATION	234%	10%	200%	280%	220%
TENSILE STRENGTH	9.1 MPa (1,320 psi)	140 MPa (20,300 psi)	8.0 MPa (1,160 psi)	23 MPa (3,330 psi)	23 MPa (3,330 psi)
DENSITY	1.25 g/cm³ (78 lb/ft³)	2.73 g/cm³ (170 lb/ft³)	0.910 g/cm³ (56 lb/ft³)	2.18 g/cm³ (136 lb/ft³)	2.18 g/cm³ (136 lb/ft³)

CRYOGENIC PLUG

EXPANDED VIEW

BANDING APPLICATION

SCREW/RIVET APPLICATION

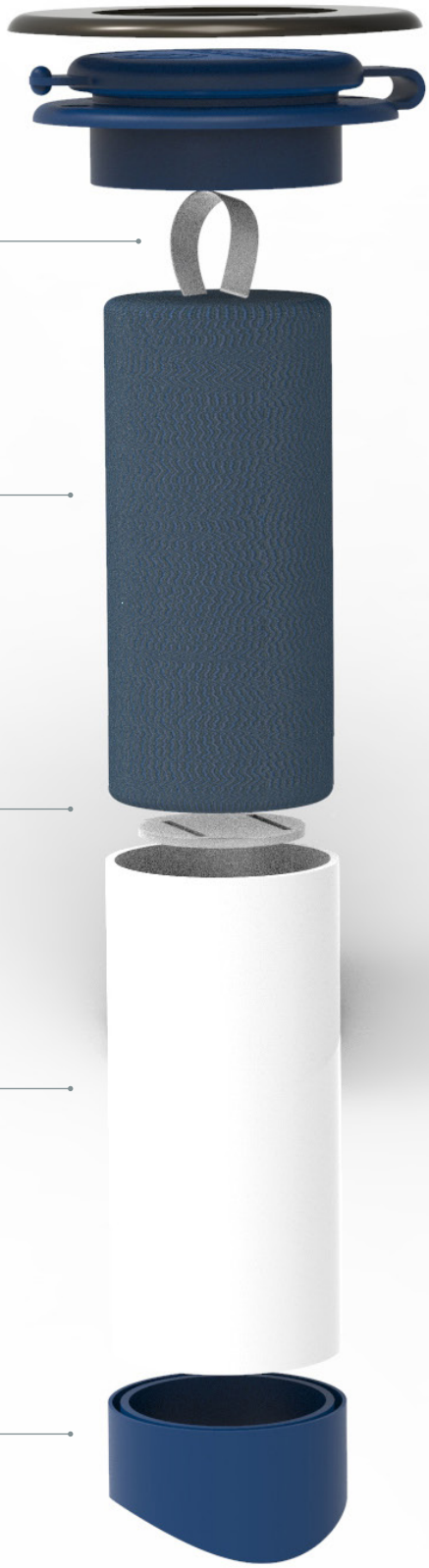
PTFE PULL STRAP

CLOSED CELL FOAM INSERT

PTFE STRAP CLIP

PTFE SLEEVE

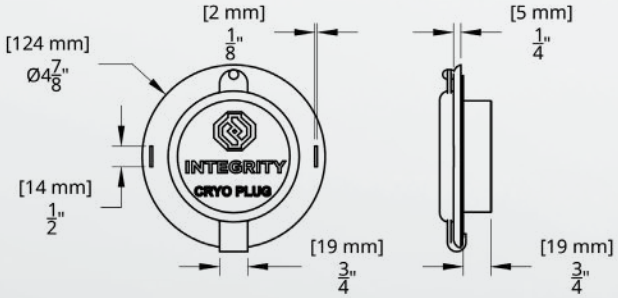
PTFE PIPE ADAPTORS

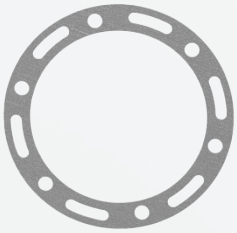


CRYOGENIC PLUG

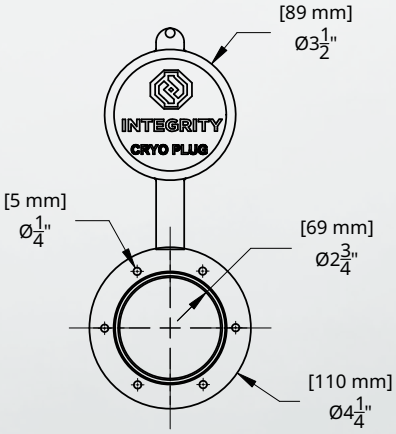
MOUNTING OPTIONS

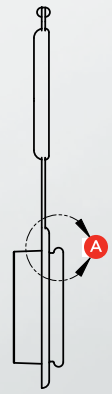
Banding Application

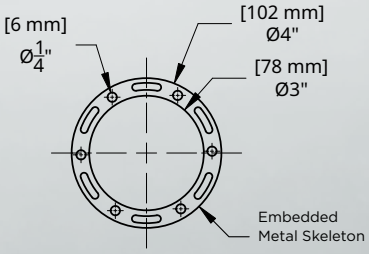


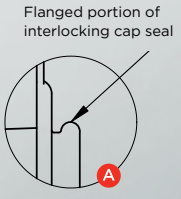


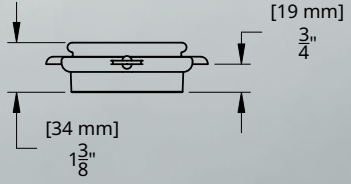
Screw/Rivet Application





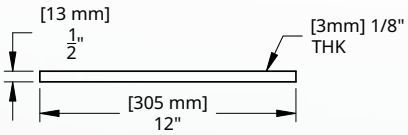




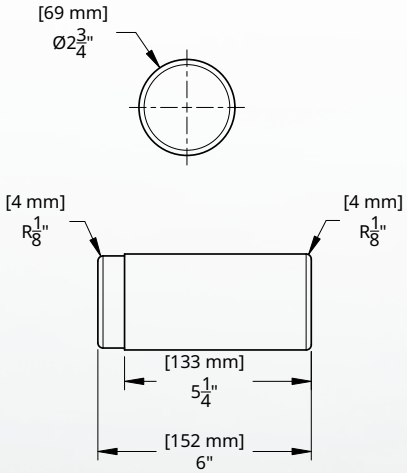


COMPONENTS

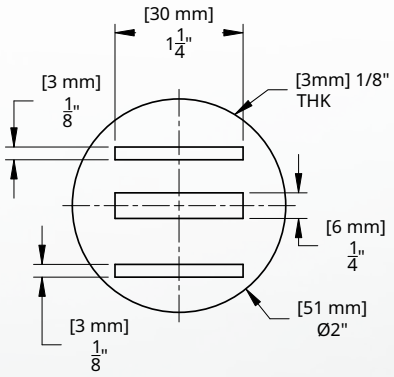
PTFE Pull Strap



Closed Cell Foam Insert

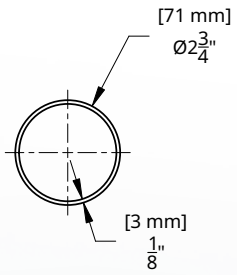


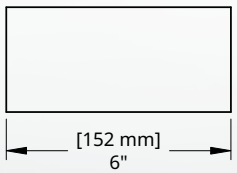
PTFE Strap Clip



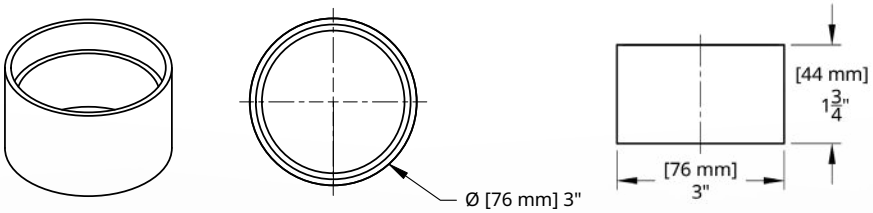
COMPONENTS

PTFE Sleeve

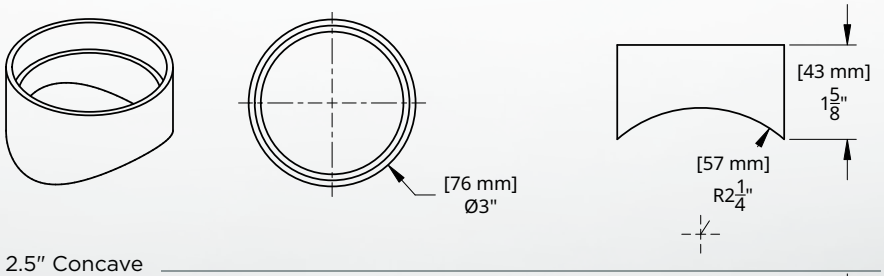




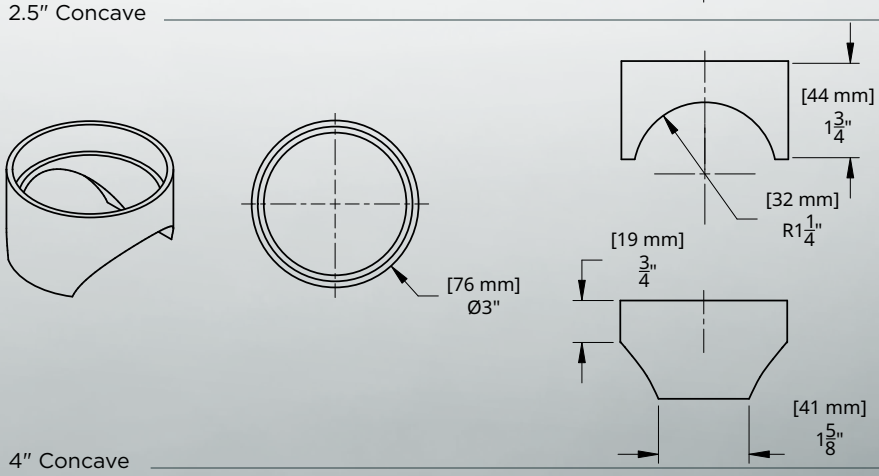
PTFE Pipe Adaptors



Flat



2.5" Concave



4" Concave

INSTALLATION GUIDE

CRYOGENIC PLUG

Always wear appropriate PPE (personal protective equipment) which conforms to applicable work safe standards.

TOOLS REQUIRED

TIN SNIPS

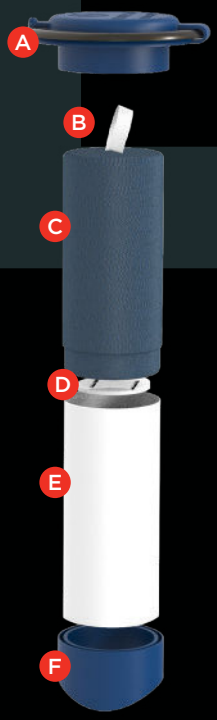
Use tin snips to cut a 3" hole in jacketing.

KEY-HOLE SAW

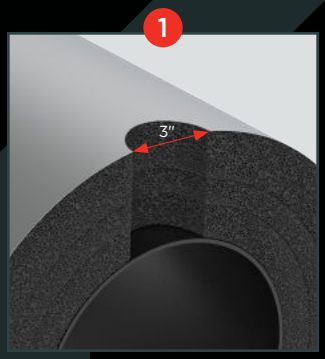
Use key-hole saw to core-out insulation.

MASTIC CRYO-BOND VAPOR STOP SEALANT

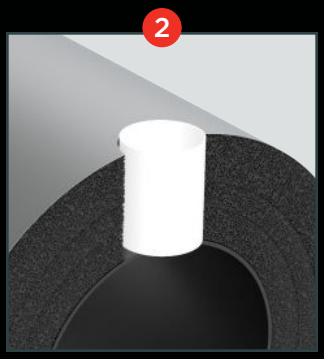
Apply a mastic cryo-bond sealant to the exterior surface of the PTFE sleeve and the underside of the aluminum ring.



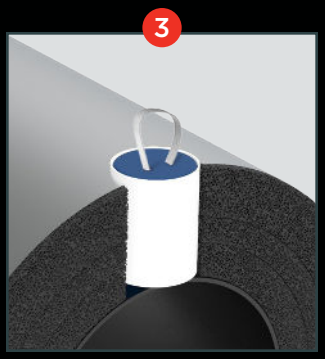
- A PLUG
- B PTFE PULL STRAP
- C CLOSED CELL FOAM INSERT
- D PTFE STRAP CLIP
- E PTFE SLEEVE
- F PTFE PIPE ADAPTOR



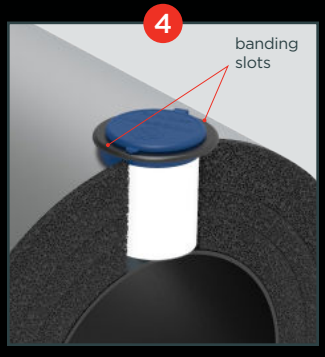
STEP 1
Mark a 3" circle on the jacketing and cut the jacketing using tin snip and core-out insulation using key-hole saw. See the cross-section of the cavity created by coring.



STEP 2
Apply a mastic cryo-bond vapor stop sealant on the outer circumference of the PTFE sleeve followed by insertion of PTFE sleeve in the cavity.



STEP 3
Insert the closed-cell foam containing the PTFE pull strap inside the PTFE sleeve.



STEP 4
Insert the plug and aluminum ring over the protruded portion of PTFE sleeve. During installation of plug, ensure that banding slots of aluminum ring are facing in the circumference (radial) direction of the pipe.

STEP 5
Loop each stainless steel (SS) band through the underside of each banding slot located on both sides of the aluminum ring. Secure into place with banding clips.

Two stainless steel (SS) bands are required to secure the plug and aluminum ring in place.

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t. 1.800.673.0925
sales@integrity-products.com

56 Liberty Road
Sherwood Park, AB, Canada
T8H 2J6

integrity-products.com