PIPE PENETRATION COLLARS

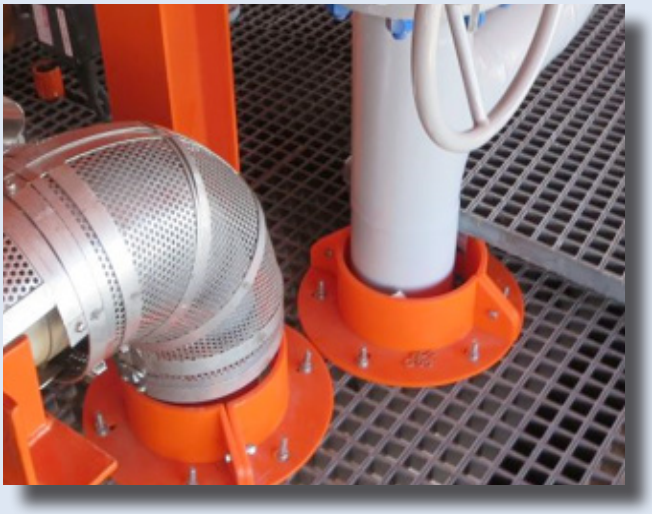
AIMS INTERNATIONAL

AIMS International, LLC is a world leader in offshore vortex induced vibration (VIV) suppression, engineered fiberglass structural systems, and platform dock fendering systems. Since 1982, AIMS has been the leader in supplying, engineering, and fabricating fiberglass grating and structural systems. AIMS supplies a full line of platforms, dock fenders, fiberglass signs, vortex breakers, VIV suppression products, blast panels, and mudmats. In addition, we are a leading supplier of fiberglass handrail and stair systems, as well as and other specialty fiberglass products.

AIMS prides itself on its ability to take the customer project from the initial design and engineering phase to the implementation and installation of the finished product.

In an effort to continually improve services, AIMS actively seeks expansion opportunities within the United States and in overseas markets. In 1993, we purchased Teledyne Monarch Rubber's platform fender product line, moved the product tooling to Houston, and began manufacturing and marketing a platform fender product line, i.e., energy cells, rubstrips, and barge bumpers. In 2017, AIMS began fabricating aluminum structures and handrails.

To market our products and services around the world, AIMS forms partnerships with local companies in various countries, including Malaysia, Australia, Korea, Singapore, India, United Arab Emirates, Nigeria, Brazil, and Mexico. Everywhere there is offshore oil and gas, you will find AIMS International.



Pipe Penetration Collars

AIMS' penetration collars provide the most economical solution when there are a large number of penetrations to manage. The collars are available in either...

** Polyurethane,*

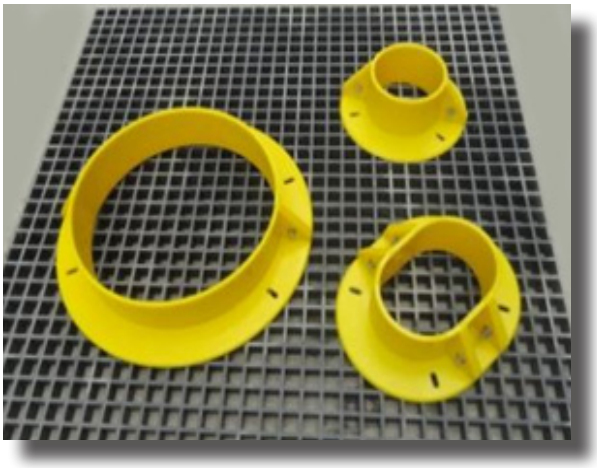
** Vinylester FRP, or*

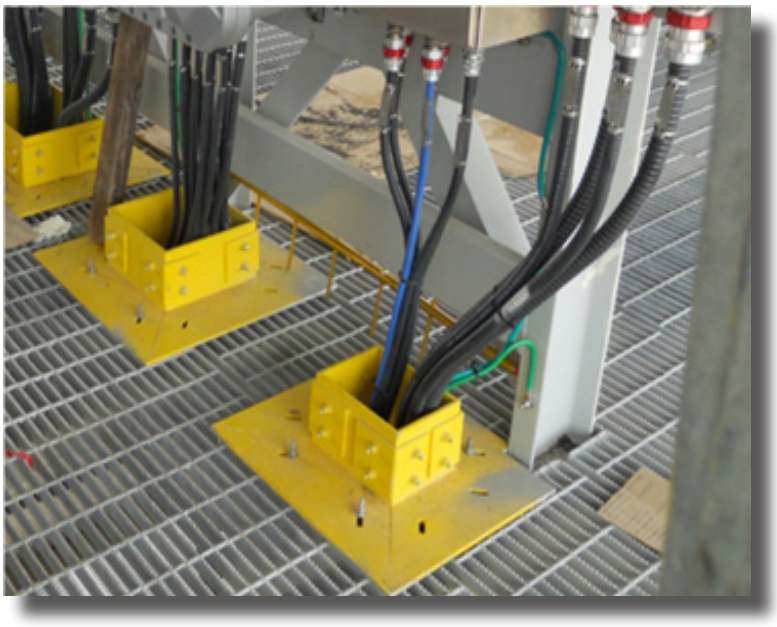
** Roto-molded Polyethylene*

If quantities are high and the environment is corrosive or caustic, roto-molded polyethylene will be the most cost effective approach. If quantities are low and the environment is corrosive and conducive to FRP, vinylester is a good choice. If a quantity of five or more collars are required and if the environment is suitable for urethane, this material would be a good candidate. The collars are always made of one homogeneous material. Please contact us to discuss what product is best for your application.

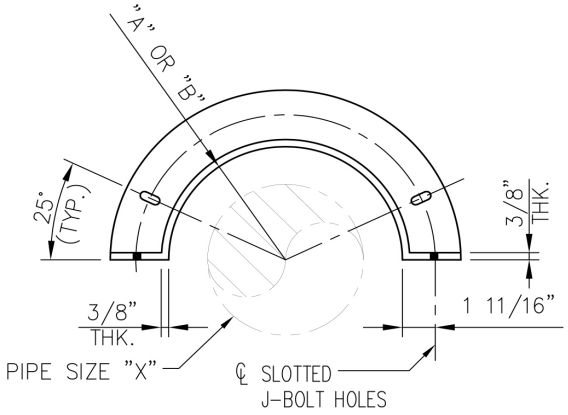
Benefits

- Corrosion-resistant
- Easy to Install and Remove
- Maintenance Free
- Attractive in Appearance
- Available in Any Color
- Available in Any Geometric Shape
- Modular System



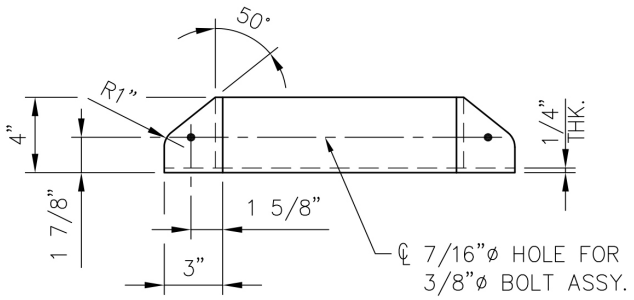


Pipe Penetration Collar Specifications



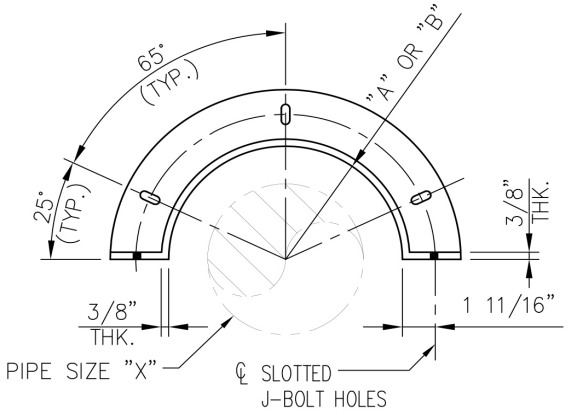
PIPE PENETRATION COLLAR TYPE I

SCALE: 1 1/2"=1'-0"



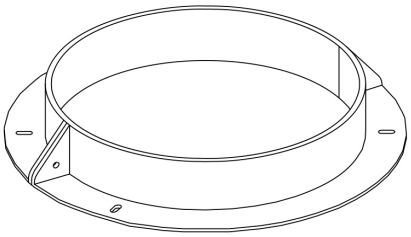
PIPE PENETRATION COLLAR PROFILE

SCALE: 1 1/2"=1'-0"



PIPE PENETRATION COLLAR TYPE II

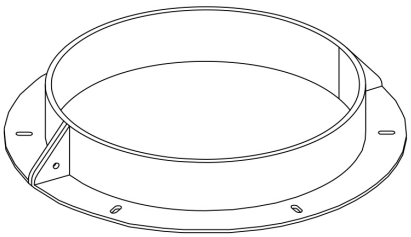
SCALE: 1 1/2"=1'-0"



PIPE PENETRATION COLLARS

TYPE I (2 HOLES PER HALF)

NOMINAL PIPE SIZE "X"	(1" ANNULUS) "A"	(2" ANNULUS) "B"
2	2 3/16	3 3/16
2 1/2	2 7/16	3 7/16
3	2 3/4	3 3/4
3 1/2	3	4
4	3 1/4	4 1/4
5	3 13/16	4 13/16
6	4 5/16	5 5/16
8	5 5/16	6 5/16



PIPE PENETRATION COLLARS

TYPE II (3 HOLES PER HALF)

NOMINAL PIPE SIZE "X"	(1" ANNULUS) "A"	(2" ANNULUS) "B"
10	6 3/8	7 3/8
12	7 3/8	8 3/8
14	8	9
16	9	10
18	10	11
20	11	12
22	12	13
24	13	14
26	14	15
30	16	17
32	17	18
34	18	19
36	19	20

NOTE:
ADDITIONAL SIZES AVAILABLE UPON REQUEST.

AIMS INTERNATIONAL
CONFIDENTIAL & PROPRIETARY

AIMS DWG : 403
REV No. : B
DATE : 7/2/14

Chemical, Oil, & Solvent Resistance of Adiprene®/Vibrathane® Elastomers

In numerous end-use applications, cured polyurethane (PU) elastomers can be exposed to oils, chemicals, and solvents. There are many factors which can influence the resistance of the PU elastomer to such exposures, and these factors must always be considered by the end user when deciding if a PU elastomer is suitable for the end application. Examples of these factors are:

- Intermittent or continuous exposure
- Immersion or atomised spray
- Environmental operating temperature
- Full concentration/dilution level
- Physical and dynamic performance requirements

With regards to the PU elastomer formulation/final cured PU elastomer, there are also factors to be considered related to its suitability of an end environment where oils, chemicals, and solvents will exist. Examples of factors to be considered by the PU processor are:

Type of prepolymer - isocyanate.....TDI, MDI, PPDI, HDI, H_{12}MDI

Type of prepolymer - polyol.....ester (type), ether (type), caprolactone, carbonate

Type of curative.....amine, diol, triol, blends

Hardness of formulation.....soft formulations are usually more severely effected than hard ones

The table below gives comparative information between a TDI/PTMG - Ether versus a TDI/Ester. Samples of both PTMG-ether and polyester-based elastomers were immersed for seven days at 75°F (24°C) in various chemicals. Samples were then removed, dried, and measured for volume swell. Ratings were given based on the following key:

Grading	Comment	Volume Swell %
1	Excellent	0 - 3
2	Good	4 - 15
3	Fair	16 - 35
4	Poor	36 upwards

Chemical, Oil, & Solvent Resistance Guide

Chemical	Ether	Ester
Acetaldehyde	4	4
Acetic Acid	4 - 3	4 - 3
Acetic Anhydride	4	4
Acetone	4	4
Acetyl Bromide	3 - 4	4
Acetyl Chloride	3 - 4	4
Acetylene	2 - 3	3
Adipic Acid	1	2
Aluminum Chloride	2	2
Aluminum Sulfate	2	2
Aluminum Sulfide	2	2
Ammonia	2	2 - 3
Ammonium Acetate	3 - 4	3 - 4
Ammonium Carbonate	2	2
Ammonium Hydroxide	1 - 2	2
Ammonium Nitrate	2	2 - 3
Ammonium Persulfate	2	2
Ammonium Sulfate	2	2
Ammonium Sulfide	2	2
Ammonium Thiocyanate	2	2
Amyl Acetate	4	4
Amyl Alcohol	3	3 - 4
Amyl Chloride	3	3
Aniline	4	4
Aniline Hydrochloride	4	4
Animal Fats & Oils	2 - 3	2 - 3
Antimony Salts	2	2
Aqua Regia	4	4
Arsenic Salts	2 - 1	2
ASTM Oil #1	1 - 2	1
ASTM Oil #2	2	1
ASTM Oil #3	2	1
ASTM Reference Fuel A	1	1 - 2
ASTM Reference Fuel B	2	2
Atlantic Oil	1	1 - 2
Barium Carbonate	2	2
Barium Hydroxide	1	2
Benzaldehyde	3 - 2	4
Benzene	4	4
Benzene (Gasoline) (aromatic)	2 - 3	3
Benzoic Acid	2 - 3	3 - 4
Boric Acid	1	2
Bromine	2 - 3	2 - 3
Bunker Oil	1 - 2	2

Chemical	Ether	Ester
Butane	1	2 - 3
Butyl Acetate	4	4
Butyl Alcohol	2	3
Calcium Carbonate	2	2
Calcium Chloride	1	2
Calcium Hydroxide	1	2
Calcium Nitrate	2	2
Calcium Sulfate	2	2
Carbon Dioxide	1	1
Carbon Disulfide	2 - 3	2 - 3
Carbon Monoxide	1	1
Carbon Tetrachloride	3	4
Chloroacetic Acid	3 - 4	4
Chloroform	4	4
Chromic Acid	3 - 4	4
Chromium Potassium Sulfate	2	2
Citric Acid	2	2
Cottonseed Oil	1	2
Cresol (meta)	4	4
Cupric Chloride	1	2
Cupric Nitrate	2	2
Cupric Sulfate	2	2
Cyclohexanone	4	4
Cyclohexane	2	2
Dibutyl Phthalate	3 - 4	4
Dibutyl Ether	2	2
Dichlorobenzene (Ortho)	3	3
Dodecyl Mercaptan	2 - 3	2
Diester Oil	2	2
Dimethyl Acetamide	4	4
Dimethyl Formamide	4	4
DTE Oil (heave, medium)	2	2 - 3
Ether	2 - 3	2 - 3
Ethyl Acetate	4	4
Ethyl Alcohol (Ethanol)	3	2 - 3
Ethyl Bromide	3	3 - 4
Ethyl Chloride	3	3 - 4
Ethylene Glycol	2	2 - 3
Esso #90 Lub. Oil	1	2
Ferric Chloride	2	2
Ferric Nitrate	2	2
Ferrous Chloride	2	2
Ferrous Sulfate	2	2
Formaldehyde	3	2
Formic Acid	3 - 4	4
Freon, 12 or 113	1	2

Chemical, Oil, & Solvent Resistance Guide

Chemical	Ether	Ester
Fuel Oil	2	2
Gasoline	2	2 - 3
Glycerine (Glycerol)	1	2
Glycolic Acid	2	2 -3
Greases	1 - 2	2
Heptane	1	2
Hexane	1	2
Hydrazine	4	4
Hydrobromic Acid	2	2
Hydrocarbon Oil	1	2
Hydrochloric Acid, 20%	2	2 -3
Hydrofluoric acid	2 -3	3
Hydrogen	1 -2	2
Hydrogen Peroxide	2	2
Hydrogen Sulfide	3 - 4	4
Hydrolodic Acid	2	2
Iodine Solution	1	2
Isooctane	2	2
Isopropyl Alcohol (Isopropanol)	2 - 3	3
Isopropyl Ether	2	2 -3
JP-4 oil	2 - 3	3
JP-5 & 6	4	4
Kerosene	2	2 - 3
Lactic Acid	2	2
Lead Acetate	2	2
Linseed Oil	2	2 -3
Lubricating Oil	2	2 -3
Magnesium Hydroxide	1	1 -2
Magnesium Salts	2	2
Malaic Acid	3 -4	4
Mercury	1 -2	2
Methyl Alcohol (methanol)	4	3
Methyl Ethyl Ketone	4	4
Methylene Chloride	4	4
MIL-D-5606 Oil	3	3 -4
MIL-L-7808	1 -2	2 -3
Mineral Oil	1	1
Mobil Artic Oil	1	2
Naphthalene	2	2 - 3
Natural Gas	2	2
Nickel Salts	3	3 -4
Nitric Acid	4	4
Nitrobenzene	4	4
Nitrogen	1	1
Oleic Acid	1 -2	2
Oxalic Acid (5%)	1	1 - 2
Oxygen	1	1
Ozone	1	1

Chemical	Ether	Ester
Palmitic Acid	1	2
Paints	1 -2	2
Perchloric Acid	4	4
Perchloroethylene	3 -4	4
Petroleum	1 -2	2
Phenol (carbolic acid)	4	4
Phosphoric Acid (dil.)	2 -3	3
Phosphoric Acid (conc.)	3	4
Potassium Cyanide	1	2
Potassium Salts	2	2
Propane	2	2
Propyl Alcohol	2 -3	3
Propylene Glycol	2	2
Pydraul Oil	4	4
SAE #10 Oil	1	1
Seawater	1 -2	2
Silicic Acid	2 -1	2
Skydrol Oil (500)	4	3
Silver Nitrate	2	2
Soap	2 -3	2 - 3
Sodium Acetate	1 - 2	2
Sodium Bicarbonate	2	2
Sodium Bisulfate	2	2
Sodium Borate	2	2
Sodium Carbonate	2	2
Sodium Chlorate	2	2
Sodium Chloride	2	2
Sodium Cyanide	2	2
Sodium Dichromate	2	2
Sodium Ferrocyanide	2	2
Sodium Fluoride	2	2 -3
Sodium Hydrosulfite	2	2
Sodium Hydroxide, 45%	2	2
Sodium Nitrate	2	2
Sodium Silicate	1 - 2	2
Sodium Sulfate	2	2
Sodium Sulfide	2	2
Sodium Hypochlorite, 5%	4	4
Sperry Oil	2	2 - 3
Steam	4	4
Stoddard Solvent	1	2
Styrene	2	2
Sulfur Dioxide	2	2 - 3
Sulfuric Acid, 10-50%	3 -4	4
Tannic Acid, 10%	1	2
Tartaric Acid	1	2 - 3
Tin Salts	2	2
Titanium Salts	2	2

Chemical, Oil, & Solvent Resistance Guide

Chemical	Ether	Ester
Toluene	4	4
Transformer Oil	2 -3	3
Trichloroacetic Acid	4	4
Trichloroethylene	4	4
Tricresyl Phosphate	3 - 4	4
Triethanol Amine	2	2
Trisodium Phosphate	2	2
Turpentine	3	2
Urea	2	2
Varnish	2	2 - 3
Vegetable	1	2
Water	2	2
Xylene	3	3 - 4
Xylol	3 - 4	4
Zinc Chloride	2	2
Zinc Sulfate	2	2

For applications requiring resistance to oils, chemicals, or solvents, such swell numbers are only a starting point for evaluation of the urethane. They are not an indication of fitness for use and do not determine the extent to which physical properties are maintained. It is recommended that a controlled evaluation of the final cured PU elastomer be performed in the environment before commencement of full commercial production.

Market Applications

AIMS' products and services have been successfully used in various applications in many different industries. Wherever there is value placed on safety, eliminating maintenance expenditures, ease of installation, and long service life, AIMS should be consulted. The following are industries and locations where our products are found:

Offshore Drilling & Production Facilities
wellhead access platforms around wells & vessels, stair towers, grating systems, electrical cable trays, mudmats

Petrochemical Plants & Refineries
walkways & platforms around vessels and equipment, stair towers, trench grating

Industrial & Municipal Wastewater Facilities
walkways & catwalks in and around clarifiers, settling basins, and platforms used as storage areas

Pulp & Paper Mills
walkways & catwalks in and around their waste water plants, including bleaching and washing areas

Metal Plating & Mining Facilities
platforms in processing areas, catwalks, stair towers, and storage areas

Commercial Warehouses
grating systems for additional storage areas and mezzanines

Beverage & Food Processing Plants
grating systems & platforms in and around wash-down areas, access platforms, and storage areas

Hi-tech Computer Industry Facilities
grating systems in clean rooms and etching areas

Water Park & Recreational Facilities
trench grating in and around pools, structural systems for flowing streams

Cooling Tower Industry
access walkways & towers, de-misters

Federal & State Parks
bridges & erosion control

Valuable features of AIMS' products for these and other industries include:

- Excellent corrosion resistance and elimination of maintenance
- Lightweight and ease of installation
- High strength-to-weight ratio
- Excellent non-skid characteristics, safety, and ergonomics
- Fire resistance
- Electrical and thermal non-conductivity
- Durability and long service life
- Great return on investment

AIMS International, LLC

... dedicated to customer service and support

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