

STAR GUARDIAN

FLUOROPLASTIC LINING & PIPE TECH

PVDF
PTFE
ECTFE
PFA
PP



PT. Fajar Benua Indopack
Our Value, Solution for You



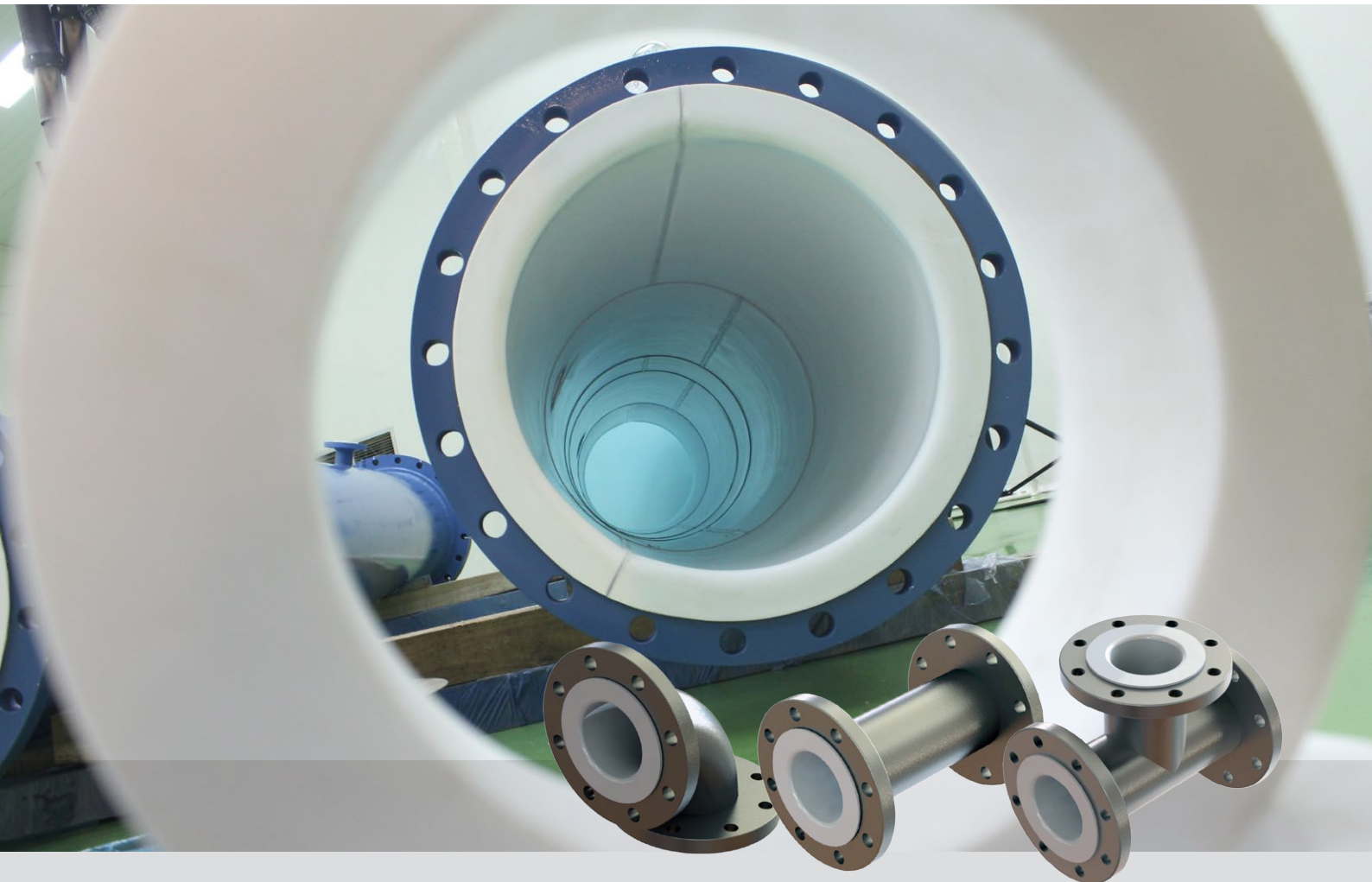
General Introduction Star Guardian Lined Pipe Systems

Lining is a method by applying some material on surface to prevent rusting and has characteristic Protective or Decorative

To meet demands from chemical processing industry such as biochemical, pharmaceutical, petrochemical, fertilizer and chemical industries for corrosion-resistant application. PT. Jeil Fajar Indonesia keeps developing and improving the manufacture and design capabilities. We offer our customer the best product with high satisfaction.

The PTFE Plastic we use has some unique properties, they are chemically inert having near universal corrosion resistance which we specifically use to convey the most corrosive and toxic to convey the most corrosive and toxic chemical processing

in every critical industry process. PTFE has the best coefficient of friction of any solid - giving excellent non-stick properties keeping pressure drops to a minimum and preventing blockages of viscous lines etc. it is also used in high purity applications and an alternative to exotic materials such as Hastelloy



General Terminology and Specifications

A105	ASTM Specification for Forged Steel.	PFA	Perfluoroalkoxy, manufactured by Allied Supreme Taiwan, Guarniflon Italy
A106	ASTM Specification for Seamless Carbon Steel Pipe	FEP	Perfluoro [Ethylene - Propylene] Copolymer, manufactured by Agru Austria
A216	ASTM Specification for Cast Steel [Grade WCB]	ETFE	Ethylentetrafluoroethylene, manufactured by Chemours [formerly known as DuPont] under the name Tefzel®.
A395	ASTM Specification for Ferritic Ductile Iron	ECTFE	Ethylene ChloroTriFluoroEthylene, manufactured by Agru Austria
F1545	ASTM Specification for Consolidated Plastic Lined Piping Standards	NPS	Nominal Pipe Size.
ASTM	American Society for Testing and Materials.	DI	Cast Ductile Iron.
ANSI	American National Standards Institute	FS	Forged Steel.
DIN	German Industrial Standard	CS	Cast Steel.
JIS	Japanese Industrial Standard	Class 150	Pressure rating standard to 150 Psi [steam].
PTFE	Polytetrafluoroethylene, manufactured by Allied Supreme Taiwan, Guarniflon Italy or Jeil Korea	Class 300	Pressure rating standard to 300 Psi [steam]
PVDF	Polyvinylidene Fluoride, manufactured by Agru Austria	Full Vacuum	29.6 inches of mercury



**Don't let this happen
to your system!**

PTFE LINED PIPES AND FITTINGS

SCOPE

In most of Industry and almost every company handling highly corrosive and hazardous acids and solvents for their processing requirements the lined pipe systems fit their applications.

These are also used in Food Industries, Pharmaceutical Industry where the challenge is to maintain high level of cleanability and durability. Being highly acidic and corrosive in nature, these chemicals have a tendency to corrode and eat away the steel piping which are used as conveyors, leaving the system useless and unsafe for use.

To avoid depleting of the material and arrest the growth of corrosion inside the conveying system, a long sleeve or tube made of PTFE is inserted/molded inside the Steel pipes, bends, tees, reducers, spacers, valves and tank storage all such fittings are installed in the whole pipeline. Due to the inertness of PTFE to almost all chemicals and solvents, it acts as an effective barrier between the chemical and steel, thus not only protecting the conveying system, but also very friendly to the environment.

Enveloping steel tube from inside with PTFE has proved to be economical in the long run as the structural cost for the conveying system, the losses occurring due to leakages, and the downtime for repairing and maintenance is reduced to significant extent.

The main advantages of using DufLine lined pipe systems are as follows:

- The life of pipeline systems increases due to absence of rust formation.
- A specialized processing of PTFE lining safeguards and enhances better working conditions as leakages does not occur and subsequent harmful gases and vapors do not evaporate to the atmosphere.
- The cost incurred in maintenance, repairing and time lost can be minimized.
- A wide variety of chemicals can be used through a PTFE lined system, making it more flexible and economical.

Lining Material Specification

Property	Unit	ASTM Standard	PTFE	Modified PTFE	FEP	PFA	ETFE	PVDF	PVDF Flex	ECTFE
Mechanical	Specific gravity	D792	2.14-2.2	2.16-2.19	2.13-2.17	2.12-2.17	1.75-1.78	1.70	1.78	1.68-1.69
	Tensile Strength	D638	280-350	280-350	250-350	250-350	350-440	460	317-387	490
	Elongation at break	D638	200-400	200-400	275-380	300	80-300	50-250	300-400	200-300
	Compression strength	D695	120	120	-	170	680-980	500	422-598	
	Impact strength	D256A	16.3	16.3	-	-	16.3-38.1	-	-	-
	Rocks well hardness	D785	-	-	-	-	R77-83	-	-	-
	Shore hardness	D2440	D50-55	D58	D55	D60	D75-77	D70	D75	55
	Bending elasticity	D790	5.6	-	-	6.7-7.0	20.4-25.3	14	-	-
	Tensile elasticity	D638	4.1-5.6	-	-	-	13.4-15	8.4	-	16.8
	MIT flex life	D2176	>1,000,000	-	50,000~	-	-	-	-	-
	Coefficient of friction [static]	D1894	0.02	-	-	0.04	0.20-0.40	0.60	0.26	0.26
	Coefficient of friction [Dynamic]	D1894	0.1	0.18	-	0.2	0.39	0.40	0.19	
	Melting point	D1894	0.02	-	-	0.04	0.20-0.40	0.60	0.26	220-245
	Thermal conductivity	C117	6.0	6.0	-	6.0	2.4-3.0	1.2	1.0-1.25	3.8
	Thermal	Specific heat	-	0.25	0.25	-	0.33	0.46-0.47	0.28-0.36	
Linear expansion		D696	10	12	-	12	7-14	12.5	14	8
Deformation under load		D648	55	-	-	47	87-115	74		
18.5 kgf/cm2		D648	121	-	-	74	149	104		
4.6 kgf/cm2		-	>95	-	>95	>95	44	30	-	
Oxygen index		D2683	V-0	V-0	V-0	V-0	V-0	V-0	V-0	
Flame rating		UL-94	260	260	220-230	260	150	130-150	130-150	165-180
Max. temperature [continuously]		-	>300	>300	-	-	-	-	-	-
Dielectric constant		D150/1MHz	2.1	2.1	2.03	2.1	7.5	7.5	7.5-10.5	
Dissipation factor		D150/1MHz	0.0001	0.00007	0.0004	0.0001	0.15	0.15	0.02-0.05	
Volume resistivity		D257	>10 ¹⁸	-	-	>10 ¹⁸	>10 ¹⁴	1.5x10 ¹⁶	2 x 10 ¹⁴	
Surface resistivity		D257	>10 ¹⁸	-	-	>10 ¹⁷	>10 ¹³	>10 ¹⁴	>10 ¹⁴	
Arc resistivity		D495	Good	Good	-	>180	-	75	75	
Chlorin [Cl ₂]		Most - Liquid	Good	Good	-	Good	-	max 80	max 80	max 60
Hydrochloric Acid [HCl]		5% - 36% Aqueous	Good	Good	-	Good	-	max 80	max 80	max 60
Nitric Acid [HNO ₃]	Aqueous	Good	Good	-	Good	-	max 100	max 100	max 40	
Sulfuric Acid [H ₂ SO ₄]	40% - 98% Aqueous	Good	Good	-	Good	-	max 80	max 80	max 80	

Industry Standard

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ASTM F1545	Standard Specification for Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges. PT JEIL FAJAR INDONESIA fully complies with ASTM F1545, including all qualification testing on representative pipe/fittings. This qualification testing includes high/low temperature aging, steam/cold water temperature cycling, and vacuum testing. All finished lined piping components are electrostatically tested at 15 KV. Hydrostatic testing is available on request. , at an additional charge.
A395	ASTM standard pertaining to ferritic ductile iron for flanges and fittings.
A105	ASTM standard pertaining to forged steel used for flanges
A234	ASTM standard pertaining to cast steel [grade WCB]
A587	ASTM standard pertaining to electric-resistance-welded low-carbon steel pipe, for use as process lines in chemical industries.
A53	ASTM standard pertaining to steel pipe, seamless or welded

Hardware Material

Pipe	A53	American National Standards Institute
	A395	ASTM standard pertaining to steel pipe, seamless or welded
	A587	ASTM standard pertaining to electric-resistance-welded low-carbon steel pipe, for use as process lines in chemical industries.
Fitting	A234	ASTM standard pertaining to cast steel [grade WCB]
Flange	A105	ASTM standard pertaining to forged steel used for flanges.
Other materials available upon request, please contact Jeil Fajar.		

Steel

Carbon Steel Pipes:

Pipes material used are according to ASTM A 53 Gr-B Seamless, sizes 25 NB to 200 NB in schedule 40 wall thickness. Sizes 250NB to 350NB are supplied in sch 30. Above 400NB schedule 20 pipes are supplied. Pipes of material such as SS304/SS304L, SS316/SS316L or LTCS-[Low temperature carbon steel] -are also used depending upon customer request.

Flanges:

Flanges used are forged as per ASTM A 105, Slip-on [SOFF/SORF]/ Lap Joint as per ANSI B 16.5 Class 150. For special requirements 300# flanges are also used based on customer request.

Pipe Fittings:

Elbows are made from casting A234 WPB. Flanges are fixed welded at both the ends. For special requirement [if any] both side loose flanges can be supplied. Housing material for tee is made from casting A234 WPB or pipe.

Tees are generally made with flanges welded at all the ends, however loose flanged tee's can also be supplied. Housing material for Reducing flanges are Ductile Iron.

Dimensional Standard

Lined Pipe and Fittings dimensions and tolerance are as per ANSI B 16.5, Lining and testing as per ASTM F 1545

Construction

Inserted & Flared PTFE Lining:

Paste Extruded tubes of required thickness being inserted into steel pipes of pre-determined lengths and are flared on the either ends of the flanges. Fajar Benua Indopack applies special interference fit lining method and the relaxation method which gives greater performance in vacuum resistance.

Isostatic Molding:

In-situ fitting of PTFE by using isostatic pressing followed by sintering. This process compresses the PTFE

Fluoroplastic Lining

resin under high pressure, so as to result in a uniform lining of PTFE along the length of steel pipe and flange. The material has uniform grain strength giving least possibility of seepage of corrosive fluids. Due to the careful processing method, sensitive properties like impact resistance, bending stress, tensile stress, and the crystallinity are preserved to a high degree.

The strength of the PTFE pipes are practically identical in both circumferential and longitudinal directions irrespective of the method of safety, which results in vacuum resistance and protection against stresses due to pressure changes.

The high density and high crystallinity of the PTFE used, and the generous dimensions of the wall thickness give rise to a favorable vacuum resistance and at the same time give minimal permeability to gases and steam.

The homogeneous formation of the lining, also in places not easily accessible, rules out any weakening of the structure or reduction of the wall thickness. A small constant shrinkage minimizes the changes in shape during the sintering process.

Venting

- Each pipe and fitting shall be provided with a venting system that will release any pressure between the liner and the housing.
- One or more holes in the housing, or a helical groove system inside the housing, that connects flange vents, has provided adequate venting.
- Venting is not required with PVDF, PP, ETFE, or PVDC liners (using PFA liner).

Testing

Hydrostatic Test

In this test all PTFE lined pipes and fittings are subjected to 29 Bar (425 psig) for hydro pressure test at room temperature. The test is carried out according to ASTM F 1545. In this test vent holes and the pressure gauge are observed for any leakage in the pipeline which may cause the rejection.

Electrostatic Test

In this test all the pipes and fittings are subjected to 15 kV nondestructive spark test for PTFE /PFA Lined Items. The test is carried out as specified in ASTM F 1545. This test is carried to detect any defects, cracks pin holes in the liner. Spark occurs which is audible and visible if there is any defect in the lined part.

Marking

The marking shall be applied in such a manner that it remains legible even after installation and inspection is complete. The full traceability can be derived from unique serial number punched on the flange.

Certificates

Certificates shall show for each piece:

Manufacturer, Traceability Number, DIPL-Tag-No., Manufacturing Date, Inspector's Name, ASTM-Designation, Component Type, Pressure Rating, Pipe Size, Pipe Schedule, Housing Material, Flange Material, Liner Material, Test Pressure, Pipe Spool Length. The request for a Test certificate must be made while ordering for PTFE lined pipe systems.

Packaging

Packaging shall be in accordance with ASTM F 1545. The Flare face of each spool or fitting shall be protected by end plates of wooden or plastic covers

Storage and Handling Requirement

Straight pipes are packed in wooden crates on specific request. Protective caps are provided on the flange joining areas, which have to be removed only before installation. The center of gravity of the pipe can be very deceptive. Use extra care in handling, transfer, and storage of the product to avoid sudden load shifting causing possible personal injury and/or product damage.

Quality Assurance and Control

At PT. Jeil Fajar Indonesia, quality is paramount. Our quality inspection team ensures that all products meet ASTM specifications. Fajar Benua Indopack is TUV Certified ISO 9001:2008, ISO 14001:2004 and BS OHSAS 1800:2007.

Fluoroplastic Lining

Metal pipe and fittings are visually inspected prior to lining. Interior shall be smooth, clean and free of burrs, scale or any other deposits. Internal welds shall be ground smooth prior to lining.

Pipe liners are examined for pinholes, cracks, gouges, nicks, or foreign objects prior to the lining process. Also tube flattening test [roller test] performed on PTFE liner to ensure the inherent defect if any. Each component is hydro-tested at 29 bar pressure and Electrostatic spark test of 15,000 volts.

Lined pipe and fittings are checked for dimensional accuracy and tolerances in accordance to dimensional data listed within this catalog and ANSI specifications. After final inspection, a flange protector is installed on each flange prior to further handling of the part. **PTFE products are tested and certified as per ASTM F 1545.**

Standards of Construction

Pipe and Fittings manufactured by Jeil Fajar Indonesia are in full compliance with ASTM F 1545. Standard Specification for Plastic Lined Ferrous Metal Pipe, Fittings and Flanges. PT. Jeil Fajar Indonesia products also meet the following specifications:

Pipe & Fitting

The carbon steel pipe and wrought fittings shall be welded or seamless steel, Schedule 40 or 80, except Schedule 30 pipe may be used in 8, 10, and 12 in. nominal size. Schedule 20 or standard wall may be used in nominal sizes 12 in. and larger.

Table Specification Coverage

Code Name	Material	ANSI Class	Nominal Pipe Size		Temperature Range
			in	mm	°C
ETFE	Ethylene Tetrafluoroethylene Copolymer	150/300	1 to 10	25 to 254	-29 to 149
PFA	Perfluoro [Alkoxyalkane] Copolymer	150/300	1/2 to 12	13 to 305	-29 to 260
PVDF	Poly [Vinylidene Fluoride]	150/300	1 to 10	25 to 254	-18 to 135
PVDF	Poly [Vinylidene Fluoride] Copolymer	150/300	1 to 10	25 to 254	-29 to 135
PTFE	Polytetrafluoroethylene	150/300	1/2 to 24	13 to 610	-29 to 260

Flange Construction

- Threaded flanges shall be secured in position to prevent inadvertent/accidentally turning of the flange.
- Socket-type flanges, except threaded, shall be fully back-welded to the pipe housing and the inside surfaces of the socket flanges shall be ground smooth.
- Slip-on flanges shall be fully back-welded.
- No welding shall be done on lined components in the field.
- Modified slip-on flanges used as lap-joint flanges may be used with flared laps formed by flaring the pipe. The backing flange for the flared metallic lap shall have a 1/8 in bevel or 1/8 in corner radius at the bore to provide clearance for the fillet of the flared lap.
- Lap-joint [or Van Stone] flares shall have a fillet radius compatible with the corner radius of the mating flange and shall not contain any cracks or buckles. Van Stone flares and stub ends shall have a radius to provide a smooth transition for the plastic flare.

Plastic Liner

The pipe and fitting liners shall have minimum wall thickness and thickness according to table below :

Pipe Size	Liner Material Thickness			
	in	PTFE	PVDF	PFA	PVDC
1	3.05	2.54	2.54	2.39
1½	3.05	2.54	2.54	2.39
2	3.05	2.54	2.54	2.39
2½	3.05	2.54	2.54	2.39
3	3.05	2.54	2.54	2.39
4	3.05	2.54	2.54	2.39
6	3.18	2.54	2.54	2.39
8	3.18	2.54	2.54	2.39
10	3.18	2.54	2.54	...
12	3.18	...	...	...
14	3.18	...	...	...
16	3.18	...	...	...
18	3.18	...	...	...
20	3.81	...	...	...
24	3.81	...	...	...

Lining Flare Diameter

- The outside diameter of the flange or the full face of the lap-joint stub end shall not be less than the diameter specified in Table below.
- The flared portion of the lining shall be concentric with the flared portion of the pipe within 1.6 mm.

NPS (in)	Minimum Flare Diameter (mm)
½	31.8
¾	39.7
1	47.6
1½	68.3
2	87.3
3	117.5
4	150.8
6	203.2
8	255.6
10	311.2
12	365.1
14	393.7
16	450.9
18	514.4
20	565.2
24	666.8

Standard

Plastic Liner Standard :

- ASTM F1545 – “Standard Specification for Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges”. Pipeline Dimension Standard :
- ASTM A53 – “Standard Spec. for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless”.

Acceptance Criteria

Processing

- Pipe and fittings shall show no evidence of pinholes, porosity, or cracks when inspected.
- The linings shall fit snugly, inside the pipe and fitting housings.
- Any bulges or other obvious indications of poor contact with the housing shall be cause for rejection.
- The gasket seating surface of the lining will be free of surface defects that could impair sealing effectiveness.
- Scratches, dents, nicks, or tool marks on the surface surface will not be deeper than 10% of the face thickness.

Surface Finish

The inner surface of the pipe must be clean and free of any mold, rust, scale or protrusion that may affect the performance of the lining. The outside surface of all lined pipe and fittings, other than stainless steel, shall be coated with a corrosion-resistant primer over a properly prepared surface.

Welding

All metal welding should be done by welders or welding operators by using welding procedures that meet the requirements of ASME Boiler and Pressure Vessel Code [Section IX].

Inspection Tests

Hydrostatic Pressure Test

- Internal test pressure shall be 250 psi [1.7 MPa] minimum for Class 125 [0.9-MPa] components.
- Internal test pressure shall be 425 psi [2.9 MPa] minimum for Class 150 [1.0-MPa] and Class 300 [2.1-MPa] components.
- Conduct the test at ambient temperature.
- Completely fill the pipe and fitting with clean water and bleed the system free of all air prior to the application of pressure.
- Reach full test pressure within 1 min and maintain for a further 3 min. Observe the pressure gage throughout the test for any evidence of leakage, which shall be cause for rejection.

Electrostatic Test [Pin Hole Test]

- Conduct the test with a nondestructive high-voltage tester at an output voltage of 10 kV.
- A visible or audible spark, or both, that occurs at the probe when electrical contact is made with the housing because of a defect in the liner shall be cause for rejection.

Standards of Construction

Liner Material

PTFE is used in a variety of applications and industries where excellent impact resistance, high tensile strength, low moisture absorption and chemical and corrosion resistance properties are required

- Met FDA/USDA food handling guidelines (natural color)
- Light-Weight
- Non-toxic
- No Moisture absorption
- Non-Staining
- Chemical-and Corrosion-resistant
- High tensile Strength
- Thermoforming Performance

Application

- Heavy duty chain guides
- Secondary containment
- Thermoformed material handling devices
- Orthotic and prosthetic devices
- Tanks
- Water Storage

Standards of Construction

	Property	Unit	ASTM Standard	PTFE
Mechanical	Specific gravity		D792	2.14-2.2
	Tensile Strength	Kgf/cm2	D638	280-350
	Elongation at break	%	D638	200-400
	Compression strength	Kgf/cm2	D695	120
	Impact strength	Kgfc/cm	D256A	16.3
	Rocks well hardness	-	D785	-
	Shore hardness	-	D2440	D50-55
	Bending elasticity	-	D790	5.6
	Tensile elasticity	10 ³ kgf/cm	D638	4.1-5.6
	MIT flex life	Cycles	D2176	>1.000.000
	Coefficient of friction (static)		D1894	0.02
	Coefficient of friction (Dynamic)	7 kgf/cm2 3m/min	D1894	0.1
Thermal	Melting point	°C	D1894	0.02
	Thermal conductivity	10 ⁻⁴ cal/cm ² .sec/°C	C117	6.0
	Specific heat	Cal/°C/g	-	0.25
	Linear expansion	10 ⁻⁴ /°C	D696	10
	Deformation under load 18.5 kgf/cm2	°C	D648	55
	4.6 kgf/cm2	°C	D648	121
	Oxygen index	%	D2683	>95
	Flame rating		UL-94	V-0
	Max. temperature (continuously)	°C	-	260
	Thermal	Dielectric constant		D150/1MHz	2.1
Dissipation factor			D150/1MHz	0.0001
Volume resistivity		Ohm-cm	D257	>10 ¹⁸
Surface resistivity		Ohm/cm2	D257	>10 ¹⁸
Arc resistivity		Sec	D495	>300
Chemical Resistant from 20 - 120 Deg C Application	Chlorin [Cl ₂]	Most - Liquid		Good
	Hydrochloric Acid [HCl]	5% - 36% Aqueous		Good
	Nitric Acid [HNO ₃]	Aqueous		Good
	Sulfuric Acid [H ₂ SO ₄]	40% - 98% Aqueous		Good

Standards of Construction

Liner Material

Mechanical Property

Lining Material-Resin Type	Minimum Tensile Strength	Minimum Elongation
	psi [MPa]	%
PVDF [Poly Vinylidene Fluoride]	4500 [31.0]	10
PVDF [Poly Vinylidene Fluoride Copolymer]	4000 [27.6]	300
PTFE [Polytetrafluoroethylene]	3000 [20.7]	250
PFA [Perfluoro Alkoxyalkane Copolymer]	3800 [26.2]	300
ETFE [Ethylene Tetrafluoroethylene Copolymer]	6500 [44.8]	275

Specific Gravity:

Lining Material	Specific Gravity
Polytetrafluoroethylene [PTFE] Type I and IV	2.14 to 2.19
Polytetrafluoroethylene [PTFE] Type III	2.13 to 2.21

Material Specifications

Flange Construction

- Threaded flanges shall be secured in position to prevent inadvertent/accidentally turning of the flange.
- Socket-type flanges, except threaded, shall be fully back-welded to the pipe housing and the inside surfaces of the socket flanges shall be ground smooth.
- Slip-on flanges shall be fully back-welded.
- No welding shall be done on lined components in the field.
- Modified slip-on flanges used as lap-joint flanges may be used with flared laps formed by flaring the pipe. The backing flange for the flared metallic lap shall have a 1/8 in bevel or 1/8 in corner radius at the bore to provide clearance for the fillet of the flared lap.
- Lap-joint [or Van Stone] flares shall have a fillet radius compatible with the corner radius of the mating flange and shall not contain any cracks or buckles. Van Stone flares and stub ends shall have a radius to provide a

ANSI Lined Pipes (Class 150)

Housing Materials

Pipe: made from A53 grd B ,1" to 8" [sch. 40] , 10" to 12" [sch 30]

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

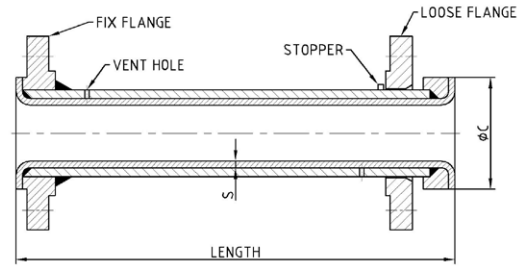
PTFE as per ASTM D 4895,

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14"and above please contact Fajar Benua Indopack sales

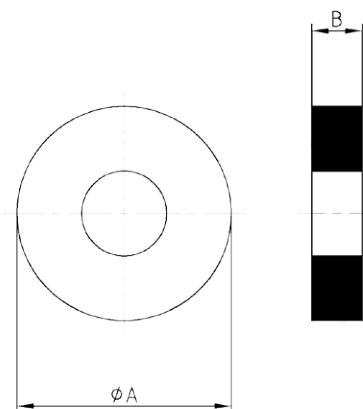
We can also offer Lined Pipes in Stainless Steel material



Size	C [mm]	Min Lining thick(s) [mm]	Min. Length [mm]	Max. Length [mm]	Manufacturing Process	Lining Material	Housing Material	Vacuum Rating [in Hg/*F]
1"	50.8	3.05	100	6000	Paste Extrusion	PTFE	Fabricated Steel	FV/450
1.5"	73	3.05	100	6000				
		3.2						
2"	92.1	3.05	120	6000				
		3.8						
3"	127	3.05	120	6000				
		4						
4"	157.2	3.05	135	6000				
		4						
6"	216	4.5	150	3000				
		5		6000				
		7.2						
8"	270	4.5	170	6000				
		5						
		7.8						
10"	324	5	185	3000				
		7						
		7.8						
12"	381	5	220	3000				
		6.8						
		10.4						

Spacer Type 1

Size Inches	Maximum Length mm	Diameter [A] mm
1"	25	64
1.5"	25	83
2"	25	102
3"	25	133
4"	25	171
6"	25	219
8"	25	275
10"	25	336
12"	25	405



Type 1 spacers are manufactured from solid PTFE and used to fill short gaps up to 25mm maximum.

Spacer Type 2

Housing Materials

Body As per Carbon Steel

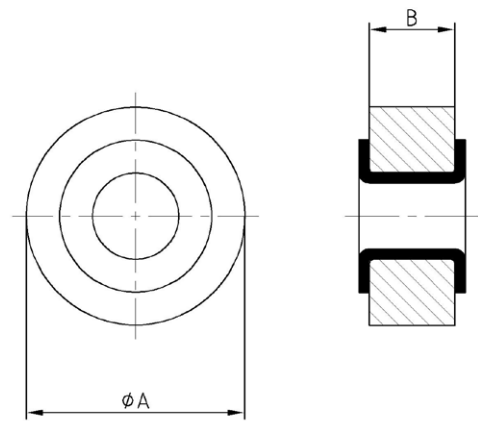
Dimension as per ANSI B 16.5#150

PTFE as per ASTM D 4895

Lining and testing as per ASTM F1545(2009), vent hole shall be provided

Paint: Two layer of epoxy red oxide

Size	Length B		Raised Face Diameter [A]	PTFE Liner Thickness
	Inches	mm		
1"	26	60	64	3.1
1.5"	26	60	83	3.2
2"	26	60	102	3.8
3"	26	70	133	4.0
4"	26	70	171	4.0
6"	26	70	219	5.0
8"	26	80	275	5.0
10"	26	80	336	7.0
12"	26	80	405	7.0



Type 2 spacers are manufactured from heavy wall steel tube with a PTFE lining flared at each end.

Spacer Type 3

Housing Materials

Pipe: made from A53 grd B ,1" to 8" [sch. 40] , 10" to 12" [sch 30]

Collar As Carbon Steel

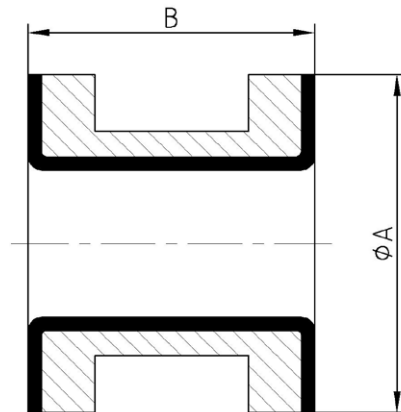
Dimension as per ANSI B 16.5#150

PTFE as per ASTM D 4895

Lining and testing as per ASTM F1545(2009), vent hole shall be provided

Paint: Two layer of epoxy red oxide

Size	Length B		Raised Face Diameter [A]	PTFE Liner Thickness
	Inches	mm		
1"	61	90	64	3.1
1.5"	61	90	83	3.2
2"	61	110	102	3.8
3"	71	120	133	4.0
4"	71	125	171	4.0
6"	71	140	219	5.0
8"	81	150	275	5.0
10"	81	165	336	7.0
12"	81	170	405	7.0



Type 3 spacers are manufactured from 2 stub ends and a steel pipe welded to form the housing with a PTFE liner flared at each end to provide sealing faces.

Elbow 45° [Class 150]

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless benc

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4895

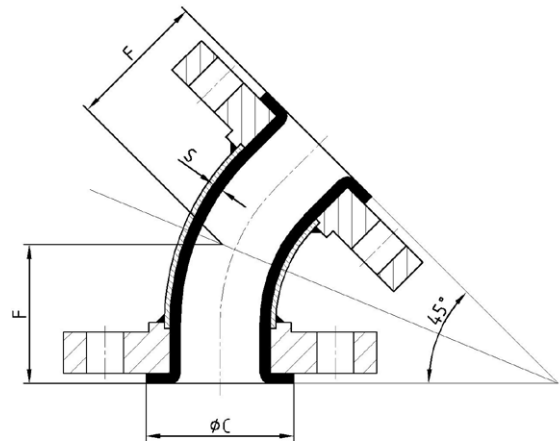
Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14"and above please contact Fajar

Benua Indopack sales

We can also offer Elbow 45° in Stainless Steel material



Size	C [mm]	F [mm]	Max Liner Thick "s" [mm]	Lining Material	Flange Type	Vacuum Rating (in Hg/*F)
1"	51	44	3.5	PTFE	F	FV/450
1.5"	73	57	3.5	PTFE	F	
2"	92	64	4.3	PTFE	F	
3"	127	76	4.4	PTFE	F	
4"	157	102	4.4	PTFE	F	
6"	216	127	5.5	PTFE	F	
8"	270	140	8	PTFE	F	FV/320
10"	324	165	7.5	PTFE	F	No Vacuum*
12"	381	190	7.5	PTFE	F	

F - Fixed Flange , R - Rotating Flange

***under testing-contact us**

Elbow 90° (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless bend

CAST STEEL: ASTM A216 WCB

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4895

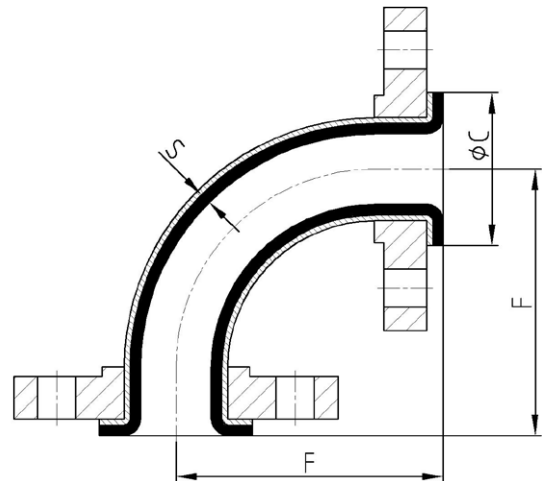
PFA as per ASTM D 3307

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua Indopack sales

We can also offer Elbow 90° in Stainless Steel material



Size	C [mm]	F [mm]	Max Liner Thick "s" [mm]	Lining Material	Housing Material	Flange Type	Vacuum Rating (in Hg/*F)
1"	51	89	3.5	PTFE	Fabricated steel	R	FV/450
	51	89	3.5	PTFE	Fabricated steel	F	
	51	89	3.5	PFA	Cast steel	F	
1.5"	73	102	3.5	PTFE	Fabricated steel	R	
	73	102	3.5	PTFE	Fabricated steel	F	
	73	102	3.8	PFA	Cast steel	F	
2"	92	114	4.3	PTFE	Fabricated steel	R	
	92	114	4.3	PTFE	Fabricated steel	F	
	92	114	4	PFA	Cast steel	F	
3"	127	140	4.4	PTFE	Fabricated steel	R	
	127	140	4.4	PTFE	Fabricated steel	F	
	127	140	4	PFA	Cast steel	F	
4"	157	165	4.4	PTFE	Fabricated steel	R	
	157	165	4.4	PTFE	Fabricated steel	F	
	157	165	4	PFA	Cast steel	F	
6"	216	203	5.5	PTFE	Fabricated steel	R	
	216	203	5.5	PTFE	Fabricated steel	F	
	216	203	6	PFA	Cast steel	F	
8"	270	229	8	PTFE	Fabricated steel	R	FV/320
	270	229	6	PTFE	Fabricated steel	F	
	270	229	6	PFA	Cast steel	F	V/212
10"	324	279	7.5	PTFE	Fabricated steel	F	No Vacuum*
	315	279	8	PFA	Cast steel	F	
12"	381	305	7.5	PTFE	Fabricated steel	F	
	370	305	9.5	PFA	Cast steel	F	

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Equal Tee (Class 150)

Housing Materials

FAB STEEL: made from ASTM A106,A234 grd WPB CS

Seamless

CAST STEEL: ASTM A216 WCB

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4894

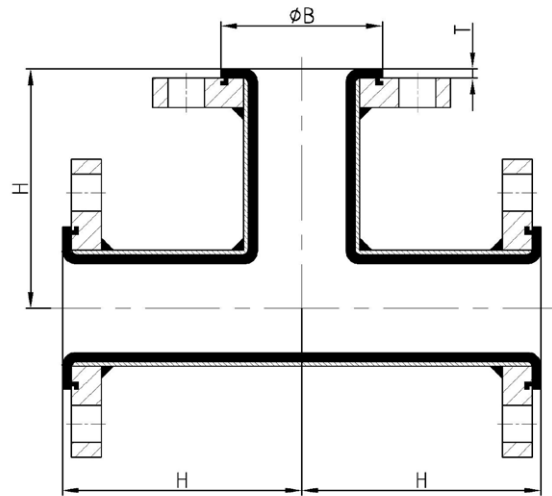
PFA as per ASTM D 3307

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua Indopack sales

We can also offer Equal Tee in Stainless Steel material



Size	C [mm]	F [mm]	Max Liner Thick "s" [mm]	Lining Material	Housing Material	Vacuum Rating (in Hg/*F)
1"	48	89	3.3	PTFE	Fabricated steel	FV/450
	48	89	3.2	PTFE	Fabricated steel	
	51	89	3.3	PFA	Cast steel	
1.5"	69	102	3.8	PTFE	Fabricated steel	
	69	102	3.2	PTFE	Fabricated steel	
	73	102	3.8	PFA	Cast steel	
2"	88	114	4	PTFE	Fabricated steel	
	88	114	3.4	PTFE	Fabricated steel	
	92	114	4	PFA	Cast steel	
3"	118	140	5	PTFE	Fabricated steel	
	118	140	3.8	PTFE	Fabricated steel	
	127	140	4	PFA	Cast steel	
4"	151	165	6	PTFE	Fabricated steel	
	151	165	4.8	PTFE	Fabricated steel	
	157	165	4	PFA	Cast steel	
6"	204	203	7	PTFE	Fabricated steel	
	204	203	5.7	PTFE	Fabricated steel	
	216	203	7	PFA	Cast steel	
8"	256	229	8	PTFE	Fabricated steel	FV/RT
	266	229	8	PFA	Cast steel	
10"	312	279	8	PTFE	Fabricated steel	FV/320
12"	376	305	11	PTFE	Fabricated steel	No Vacuum*

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Reducing Tee (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless,
pipe ASTM A 106 Gr.B

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

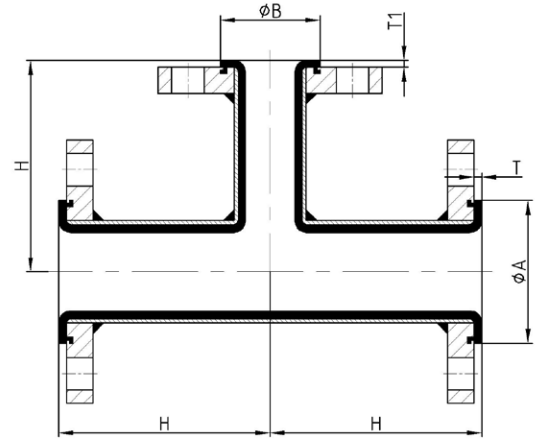
PTFE as per ASTM D4894

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua
Indopack sales

We can also offer Reducing Tee in Stainless Steel material



Size	Ordering codes	A [mm]	B [mm]	H [mm]	T [mm]	T1 [mm]	Lining Material	Housing Material	Flange	Vacuum Rating [in Hg/*F]	
1.5x1	LPS-1011-1.5X1	69	48	102	3.8	3.3	PTFE	Fabricated Steel	F	FV/450	
2x1	LPS-1011-2X1	88	48	114	4	3.3					
2x1.5	LPS-1011-2X1.5		69			3.8					
3x1	LPS-1011-3X1	118	48	140		3.3					
3x1.5	LPS-1011-3X1.5		69			3.8					
3x2	LPS-1011-3X2	151	88	165		4					4
4x1	LPS-1011-4X1		48			3.3					
4x1.5	LPS-1011-4X1.5		69		3.8						
4x2	LPS-1011-4X2		88		4						
4x3	LPS-1011-4X3	204	118	203	7	4					
6x1	LPS-1011-6X1		49			3.3					
6x1.5	LPS-1011-6X1.5		69			3.8					
6x2	LPS-1011-6X2		88			4					
6x3	LPS-1011-6X3		118			5					
6x4	LPS-1011-6X4		151			6					
8x1	LPS-1011-8X1	255	48	229	8	3.3					
8x1.5	LPS-1011-8X1.5		69			3.8					
8x2	LPS-1011-8X2		88			4					
8x3	LPS-1011-8X3		118			5					
8x4	LPS-1011-8X4		151			6					
8x6	LPS-1011-8X6		204			7					
10x1	LPS-1011-10X1	312	48	279	8	3.3					
10x1.5	LPS-1011-10X1.5		69			3.8					
10x2	LPS-1011-10X2		88			4					
10x3	LPS-1011-10X3		118			5					
10x4	LPS-1011-10X4		151			6					
10x6	LPS-1011-10X6		204			7					
10x8	LPS-1011-10X8	256	8								
12x1	LPS-1011-12X1	376	48	305	10.8	3.3					
12x1.5	LPS-1011-12X1.5		69			3.8					
12x2	LPS-1011-12X2		88			4					
12x3	LPS-1011-12X3		118			5					
12x4	LPS-1011-12X4		151			6					
12x6	LPS-1011-12X6		204			7					
12x8	LPS-1011-12X8		256			8					
12x10	LPS-1011-12X10		312			8					

*under testing-contact us

Short Stack Tee (Class 150)

Housing Materials

DI Casted ASTM A395

Dimension as per ANSI B 16.5#150

PFA as per ASTM D3307

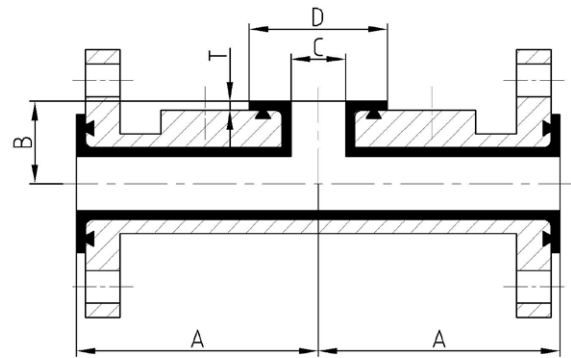
Lining and testing as per ASTM F1545[2009]

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above

please contact Fajar Benua Indopack sales

We can also offer Short Stack Tees in Stainless Steel material



Size	C [inch]	D [inch]	A [inch]	B [inch]	T [inch]	Stack bolt holes	Run bolt holes	Lining Mat.	Housing Mat.	Vacuum Rating [in. O Hg/ F]
1"	0.787	2.000	3.5	1.19	0.13	1/2-13*	1/2-13	PFA	DI CASTED	No Vacuum***
1.5"	1.310	2.874	4.0	1.46	0.15	1/2-13*	1/2-13			
2"	1.747	3.622	4.5	1.69	0.16	5/8-11*	3/4			
3"	2.747	5.000	5.5	2.19	0.16	5/8-11*	3/4			
4"	3.708	6.181	6.5	2.69	0.16	5/8-11*	3/4			
6"	5.516	8.504	8.0	3.69	0.28	3/4-10**	7/8			
8"	7.283	10.394	9.0	4.94	0.31	3/4-10**	7/8			
10"	9.272	12.559	11.0	6.00	0.31	7/8-9**	1			
12"	10.992	14.921	12.0	7.03	0.39	7/8-9**	1			

***under testing-contact us

**4 holes closest to centerline are tapped. The other bolt holes are bored smooth.

* All bolts are tapped

Instrument - Tees (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

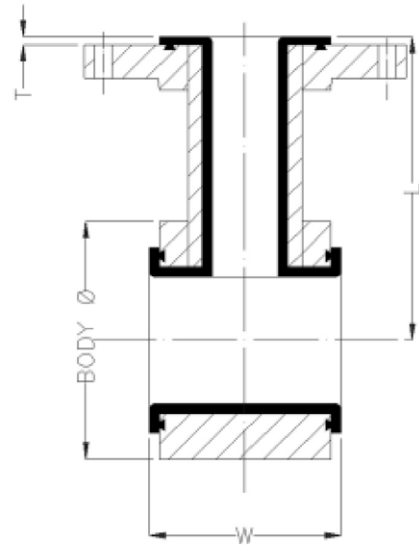
PFA as per ASTM D3307

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua Indopack sales

We can also offer Instrument Tees in Stainless Steel material



Size	Body Ø [mm]	L [mm]	W [mm]	T [mm]	Lining Material	Housing Material	Vacuum Rating [in Hg/*F]
1"x1"	66.7	89	51.2	3.3	PTFE	Fabricated steel	FV/450
1.5"x1"	85.7	102					
2"x1"	104.7	114					
3"x1"	136.5	140					
4"x1"	174.6	165					
6"x1"	222.3	203					
8"x1"	279.4	229					
10"x1"	339.7	279					
12"x1"	409.8	305					
2"x1.5"	104.7	114						76.6	3.3	FV/450
3"x1.5"	136.5	140					
4"x1.5"	174.6	165					
6"x1.5"	222.3	203					
8"x1.5"	279.4	229					
10"x1.5"	339.7	279					
12"x1.5"	409.8	305	100	3.3	FV/212		
3"x2"	136.5	140					
4"x2"	174.6	165					
6"x2"	222.3	203					
8"x2"	279.4	229					
10"x2"	339.7	279					
12"x2"	409.8	305				No Vacuum*	

*under testing-contact us

Eccentric Reducer (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

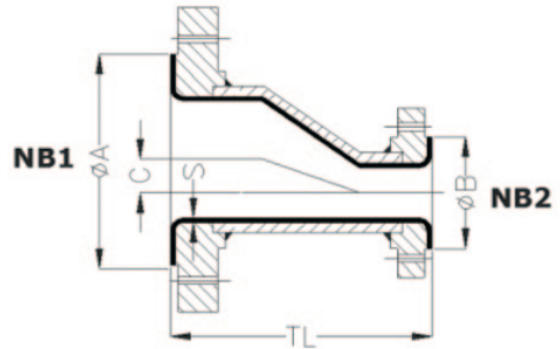
PTFE as per ASTM D4894,95

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua Indopack sales

We can also offer Eccentric reducer in Stainless Steel material



Size NB1xNB2 [inches]	A [mm]	B [mm]	B [mm]	Max Liner Thick "s" [mm]	TL [mm]	Lining Material	Housing Material	Flange	Vacuum Rating [in Hg/*F]
1.5"x 1"	73	51	6	3.5	114	PTFE	Fabricated steel	F	FV / 450
2"x 1"	88	48	12.2	4	127	PTFE	Fabricated steel	F	
2"x 1.5"	92	73	6	4.3	127	PTFE	Fabricated steel	F	
3"x 1"	118	48	25	5	152	PTFE	Fabricated steel	F	
3"x 1.5"	118	69	18.3	5	152	PTFE	Fabricated steel	F	
3"x 2"	127	92	14	4.4	152	PTFE	Fabricated steel	F	
4"x 2"	151	88	25	6	178	PTFE	Fabricated steel	F	
4"x 3"	157	127	13	4.4	178	PTFE	Fabricated steel	F	FV / 212
6"x 3"	204	118	35.2	7	229	PTFE	Fabricated steel	F	
6"x 4"	216	157	27	5.5	229	PTFE	Fabricated steel	F	
8"x 4"	256	151	46.4	8	279	PTFE	Fabricated steel	F	No Vacuum*
8"x 6"	270	216	25	6	279	PTFE	Fabricated steel	F	
10"x 6"	312	204	52	6	305	PTFE	Fabricated steel	F	
10"x 8"	324	270	27	7.5	305	PTFE	Fabricated steel	F	
12"x 8"	381	270	52	7.5	356	PTFE	Fabricated steel	F	
12"x 10"	381	324	25	7.5	356	PTFE	Fabricated steel	F	

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Reducing Flanges (Class 150)

Style A

Flange Materials

Ductile Iron ASTM A395 / Carbon Steel

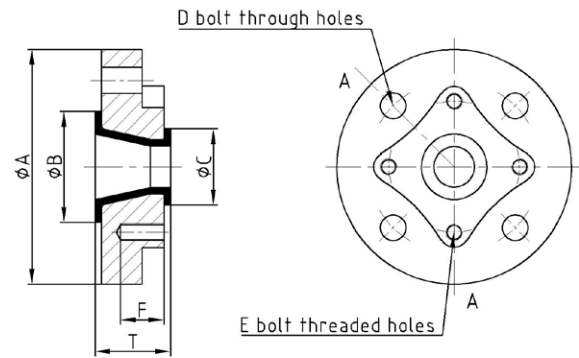
Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4894

Lining and testing as per ASTM F1545(2009)

For details on sizes 12" and above please contact

Fajar Benua Indopack sales.



SECTION A-A

Size [inches]	A [mm]	B [mm]	C [mm]	D Bolt Holes			E Bolt Holes			F [mm]	T [mm]	Lining Material	Vacuum Rating [in. O Hg/ F]
				NO	Size Inches	Bolt circle dia [mm]	NO	Size Inches	Bolt circle dia [mm]				
1"x0.5"	108	51	35	4	5/8	79.4	4	1/2-13	60.3	22	34.7	PTFE	FV/450
1"x0.75"	108	51	43	4	5/8	79.4	4	1/2-13	69.8	22	34.7		
1.5"x1"	127	73	51	4	5/8	98.4	4	1/2-13	79.4	22	39.7		
2"x1"	152.4	92	51	4	3/4	120.7	4	1/2-13	79.4	22	39.7		
2"x1.5"	152.4	92	73	4	3/4	120.7	4	1/2-13	98.4	22	40.2		
3"x2"	190.5	127	92	4	3/4	152.4	4	5/8-11	120.7	22	44.5		
4"x3"	228.6	157	127	8	3/4	190.4	4	5/8-11	152.4	22	44.5		
6"x4"	279.4	216	157	8	7/8	241.3	8	5/8-11	190.5	22	47.7		
8"x6"	343	270	216	8	7/8	298.5	8	3/4-10	241.3	28.6	50.8	FV/212	
10"x6"	406.4	323.8	216	12	1	362	8	3/4-10	241.3	25.4	60	No Vocuum*	

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Reducing Flanges (Class 150)

Style B

Flange Materials

Ductile Iron ASTM A395 / Carbon Steel

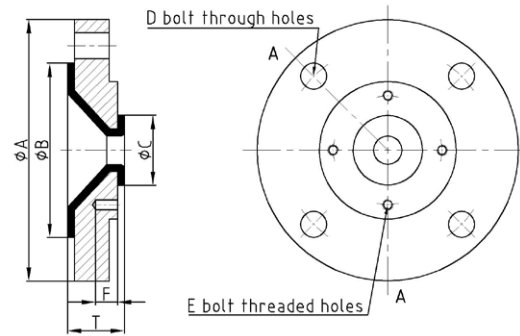
Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4894

Lining and testing as per ASTM F1545(2009)

For details on sizes 10" and above please contact Fajar Benua Indopack sales

We can also offer Reducing Flange in Stainless Steel material



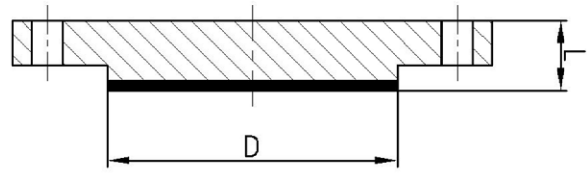
Size (inches)	A (mm)	B (mm)	C (mm)	D Bolt Holes			E Bolt Holes			F (mm)	T (mm)	Lining Material	Vacuum Rating (in. O Hg/ F)
				NO	Size Inches	Bolt circle dia (mm)	NO	Size Inches	Bolt circle dia (mm)				
3"x1"	190.5	127	51	4	3/4	152.4	4	1/2-13	79.4	22	41.3	PTFE	FV/450
3"x1.5"	190.5	127	73	4	3/4	152.4	4	1/2-13	98.4	22	41.3		
4"x1"	228.6	157	51	8	3/4	190.5	4	1/2-13	79.4	22	47.7		
4"x1.5"	228.6	157	73	8	3/4	190.5	4	1/2-13	98.4	22	47.7		
4"x2"	228.6	157	92	8	3/4	190.5	4	5/8-11	120.6	22	47.7		
6"x2"	279.4	216	92	8	7/8	241.3	4	5/8-11	120.6	22	47.7		
6"x3"	279.4	216	127	8	7/8	241.3	4	5/8-11	152.4	22	44.5		
8"x4"	343	270	157	8	7/8	298.5	8	5/8-11	190.5	22	50.8	FV/212	

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Blind Flanges (Class 150)

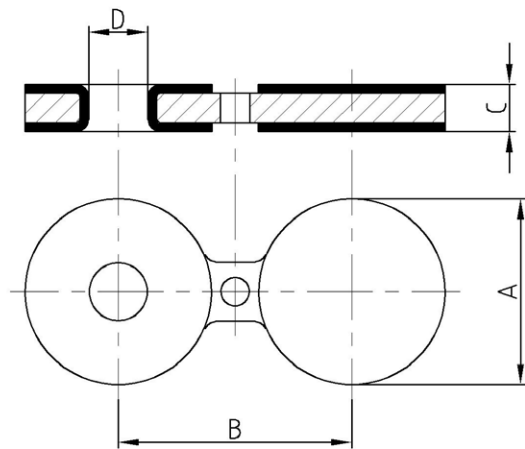
Flange Materials
 Forged steel Flange
 As per A105
 Dimension as per ANSI B 16.5#150
 PTFE as per ASTM D4895
 Lining and testing as per ASTM F1545(2009)
 Paint: Two layer of epoxy red oxide



Size	D [mm]	I [mm]	Lining Material
0.5"	35	14	PTFE
1"	51	17	
1.5"	73	21	
2"	92	22	
3"	127	27	
4"	157	27	
6"	216	29	
8"	270	33	
10"	324	35	
12"	381	37	

Spectacle Blind (Class 150)

Flange Materials
 Forged steel Flange
 As per A105, also supplied in ASTM A 516, grade 70
 normalized carbon steel
 Dimension as per ANSI B 16.48#150
 PTFE as per ASTM D4895
 Lining and testing as per ASTM F1545(2009)
 Paint: Two layer of epoxy red oxide



Size	A [inch]	B [mm]	C [mm]	D [inch]	Lining Material
1"	2.50	3.12	0.38	0.79	PTFE
1.5"	3.35	3.88	0.51	1.64	
2"	4.00	4.75	0.53	2.10	
2.5"	4.75	5.50	0.53	2.60	
3"	5.25	6.00	0.56	3.19	
4"	6.75	7.50	0.69	4.19	
6"	8.62	9.50	0.89	6.23	
8"	10.88	11.75	0.89	8.23	
10"	13.25	14.25	1.17	10.20	
12"	16.00	17.00	1.30	12.20	

Note : Total length "C" inclusive of PTFE thickness minimum 1/8"

Continuously Lined PTFE Dip Pipe (Class 150)

Housing Materials

FAB STEEL: made from ASTM A106,

Flange Materials

As per A105

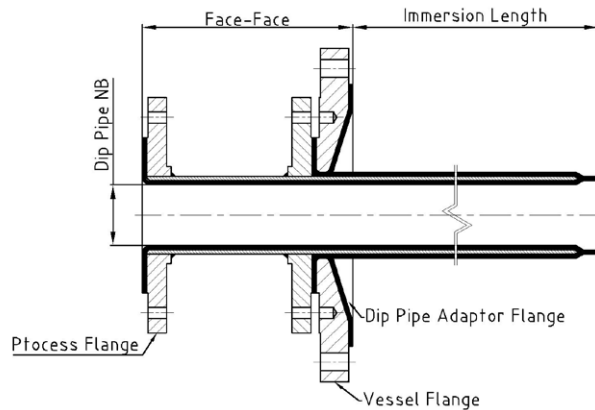
Dimension as per ANSI B 16.5#150

PTFE as per ASTM D4895

Lining and testing as per ASTM F1545(2009)

Paint: Primer Zink Silicate

Top Coat Polyurethane



Size	Ordering codes	Face to Face	Maximum Immersion	PTFE Liner Thickness	Vessel Flange Range
(inch)		mm	Meter	mm	Inches
1"	LPS-1008-1	150	5.5	3.1	1.5" - 24"
1.5"	LPS-1008-1.5	150	5.5	3.2	2" - 24"
2"	LPS-1008-2	150	5.5	3.8	3" - 24"
3"	LPS-1008-3	150	5.5	4.0	4" - 24"
4"	LPS-1008-4	150	5.5	4.0	6" - 24"
6"	LPS-1008-6	150	5.5	5.0	8" - 24"
8"	LPS-1008-8	150	5.5	5.0	10" - 24"
10"	LPS-1008-10	150	2.5	7.0	12" - 24"
12"	LPS-1008-12	150	2.5	7.0	14" - 24"

Dip pipes have a wide array of uses. Typically they are used to charge a reactor below the liquid level to extract samples from the reactor as part of sampling systems Or to drain liquid from a vessel without the need of side or bottom outlet.

Dip pipes are manufactured from a carbon steel fabricated construction with a continuously lined paste extrusion PTFE liner. Having all vetted parts in PTFE gives excellent corrosion resistance.

45 Degree Equal Lateral Tee (Class 150)

Housing Materials

FAB STEEL: made from seamless Pipe ASTM A53 Gr.B ,Sch 40

Flange

As per A105

Dimension as per ANSI B 16.5#150

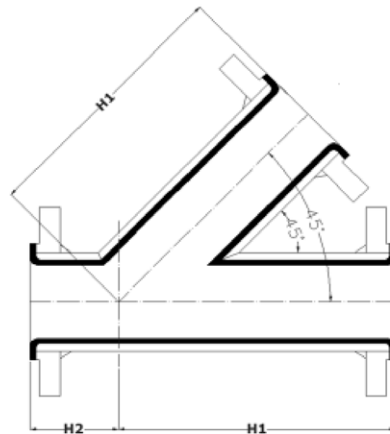
PFA as per ASTM D 3307

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 6”and above please contact Fajar Benua Indopack sales

We can also offer Lateral Tee in Stainless Steel material



Size	Body O [mm]	L [mm]	W [mm]	T [mm]	Lining Material	Housing Material	Flanges	Vacuum Rating [in Hg/*F]
1"	51	44	4	Moulding	PFA	Fabricated steel	F	No Vacuum*
1.5"	73	51	4.5					
2"	92	64	4.8					
3"	127	76	6.5					
4"	157	76	9					
6"	216	89	9.5					

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Equal Cross (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

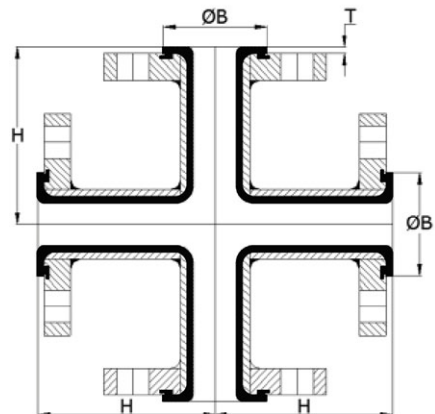
PTFE as per ASTM D4894

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14”and above please contact Fajar Benua Indopack sales

We can also offer Equal Cross in Stainless Steel material



Size	B [mm]	H [mm]	T [mm]	Lining Material	Housing Material	Flanges	Vacuum Rating [in Hg/*F]				
1"	48	89	3.3	PTFE	Fabricated steel	F	FV/212				
1.5"	69	102	3.8								
2"	88	114	4.0								
3"	118	140	4.0								
4"	151	165	4.0								
6"	204	203	7.0								
8"	256	229	8.0				FV/RT				
10"	312	279	8.0								
12"	376	305	10.8								
								No Vacuum*			

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Short Stack Cross [Class 150]

Housing Materials

DI Casted ASTM A395

Dimension as per ANSI B 16.5#150

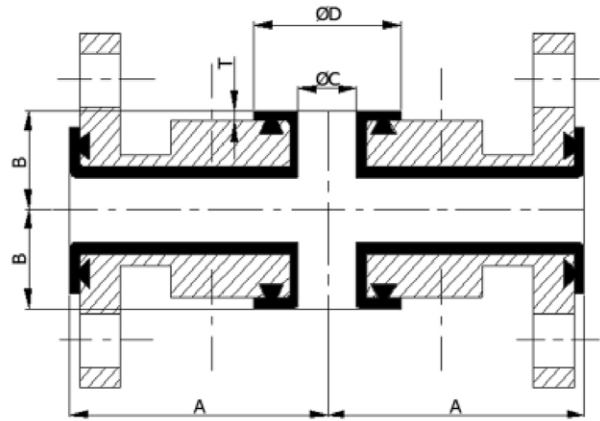
PFA as per ASTM D3307

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14"and above please contact

Fajar Benua Indopack sales



Size	C [mm]	D [mm]	A [mm]	B [mm]	T [mm]	Stack bolt holes	Run bolt holes	Lining Material	Housing Material	Vacuum Rating (in Hg/*F)
1"	0.787	2.000	3.5	1.19	0.13	1/2-13*	1/2-13	PFA	DI CASTED	No Vacuum***
1.5"	1.310	2.874	4.0	1.46	0.15	1/2-13*	1/2-13			
2"	1.747	3.622	4.5	1.69	0.16	5/8-11*	3/4			
3"	2.747	5.000	5.5	2.19	0.16	5/8-11*	3/4			
4"	3.708	6.181	6.5	2.69	0.16	5/8-11*	3/4			
6"	5.516	8.504	8.0	3.69	0.28	3/4-10**	7/8			
8"	7.283	10.394	9.0	4.94	0.31	3/4-10**	7/8			
10"	9.272	12.559	11.0	6.00	0.31	7/8-9**	1			
12"	10.992	14.921	12.0	7.03	0.39	7/8-9**	1			

***under testing-contact us

**4 holes closest to centerline are tapped. The other bolt holes are bored smooth.

* All bolts are tapped

Conc Reducer (Class 150)

Housing Materials

FAB STEEL: made from A234 grd WPB CS Seamless

Cast Steel - Ductile Iron ASTM A395

Flange Materials

As per A105

Dimension as per ANSI B 16.5#150

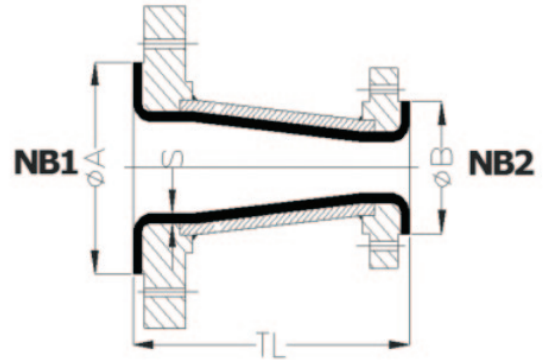
PTFE as per ASTM D4894,95

Lining and testing as per ASTM F1545(2009)

Paint: Two layer of epoxy red oxide

For details on sizes 14" and above please contact Fajar Benua Indopack sales

We can also offer conc reducer in Stainless Steel material



Size NB1 x NB2 [inches]	A [mm]	B [mm]	Max Liner Thick "s" [mm]	TL [mm]	Lining Material	Housing Material	Flange	Vacuum Rating (in Hg/*F)
1"x 0.5"	51	35	3.5	114	PTFE	Fabricated steel	F	FV / 450
1"x 0.75"	51	43	3.5	114	PTFE	Fabricated steel	F	
1.5"x 1"	73	51	3.5	114	PTFE	Fabricated steel	F	
2"x 1.5"	92	73	4.3	127	PTFE	Fabricated steel	F	
2"x 1"	88	48	4.1	127	PTFE	Ductile Iron	F	
3"x 1"	118	48	5	152	PTFE	Ductile Iron	F	
3"x 1.5"	118	69	5	152	PTFE	Ductile Iron	F	
3"x 2"	127	92	4.4	152	PTFE	Fabricated steel	F	
4"x 1"	151	48	6	178	PTFE	Ductile Iron	F	
4"x 1.5"	151	69	6	178	PTFE	Ductile Iron	F	
4"x 2"	151	88	6	178	PTFE	Ductile Iron	F	
4"x 3"	157	127	4.4	178	PTFE	Fabricated steel	F	
6"x 1"	204	48	7	229	PTFE	Ductile Iron	F	
6"x 1.5"	204	69	7	229	PTFE	Ductile Iron	F	
6"x 2"	204	88	7	229	PTFE	Ductile Iron	F	
6"x 3"	204	118	7	229	PTFE	Ductile Iron	F	
6"x 4"	216	151	5.5	229	PTFE	Fabricated steel	F	
8"x 3"	256	118	8	279	PTFE	Fabricated steel	F	FV / 212
8"x 4"	256	151	8	279	PTFE	Fabricated steel	F	
8"x 6"	270	216	6	279	PTFE	Fabricated steel	F	
10"x 6"	312	204	8.1	305	PTFE	Fabricated steel	F	No Vacuum*
10"x 8"	324	270	7.5	305	PTFE	Fabricated steel	F	
12"x 6"	376	204	10.8	356	PTFE	Fabricated steel	F	
12"x 8"	376	270	10.8	356	PTFE	Fabricated steel	F	
12"x 10"	381	324	10.8	356	PTFE	Fabricated steel	F	

F - Fixed Flange , R - Rotating Flange

*under testing-contact us

Material Specification

Specific Material properties PVDF and ECTFE

	Property	Standard	Unit	PVDF	PVDF Flex	ECTFE
	Specific Density at 23°C	ISO 1183	g/cm ³	1.78	1.78	1.68
	Melt flow index	ISO 1133	g/10min	6	6	0,85
	MFR 190/5					
	MFR 190/2, 16					
	MFR 230/5					
	MFI range					
Mechanical Properties	Tensile stress at yield	ISO 527	MPa	50	20-35	30
	Elongation at yield	ISO 527	%	9	10-12	5
	Elongation at break	ISO 527	%	80	200-600	250
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²	124	-	no break
	Impact strength unnotched at -30°C					
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²	11	17	no break
	Impact strength unnotched at 0°C					
	Impact strength unnotched at -30°C					
	Ball indentation hardness acc. Rockwell	ISO 2039-1	MPa	80	-	90
	Flexural Strength	ISO 178	MPa	80	-	47
	Modulus of elasticity	ISO 527	MPa	2000	1000-1100	1690
Thermal Properties	Vicat-Softening point VST/B/50	ISO 306	°C	140	150	
	Heat deflection temperature HDT/B	ISO 75	°C	145	-	90
	Linear coefficient of thermal expansion	DIN 53752	k ⁻¹ x 10 ⁻⁴	1,2	1,4 - 1,6	0,8
	Thermal conductivity at 20°C	DIN 52612	W/(mxK)	0,20	0,2	0,15
	Flammability	UL94 EN 13501 FM 4910	-	V-0 B Yes	V-0	V-0
Electrical Properties	Specific Volume resistance	VDE 0303	VDE 0303	>10 ¹³	≥10 ¹⁴	>10 ¹⁶
	Specific Surface Resistance	VDE 0303	VDE 0303	>10 ¹²	≥10 ¹⁴	>10 ¹⁴
	Relative dielectric constant at 1 MHz	DIN 53483	-	7,25	7	2,6
	Dielectric Strength	VDE 0303	kV/mm	22	20	30 bis 35
	Physiologically non-toxic	EEC 90/128	-	Yes	Compliant	Yes
	FDA	-	-	Yes		in preparation
	UV Stabilized	-	-	Yes		Yes
	Colour	-	-	natural	natural	natural

Success Key for PTFE Sheet Lining



Adhesive Selection

Type of adhesives must be properly selected for joining component. The selected adhesives should be

- **Having high bonding strength.**
- **Chemically resistance**
- **Low shrinkage during cure.**
- **Cured at room temperature**

Hot Gas Welding

is a technique which basically consists of using a stream of hot gas to soften both filler rod and parent metal. The filler rod becomes tacky on its surface when suitably softened and the same applies to the surface of the material to be welded. The tacky surfaces bond together under pressure of shoe.



Tank Lining - Surface Lining Process



For special case, please contact us



Thermoplastic

Thermoplastics can be softened and reshaped repeatedly by the application of heat. Thermoplastic provides excellent chemical compatibility, noise-level reduction and ultraviolet and corrosion resistance, while fiber reinforcement retains flexibility

Thermoplastics have a good range of properties and are energy efficient both in their manufacture and processing.

Thermoplastics can replace metals with a considerable weight savings, providing proper care is taken in design. Most thermoplastics have better fatigue properties than metals and will tolerate larger deflections than metals without deforming. Our Star Guardian thermoplastic are design to handle high temperatures for chemical and corrosive environments for wide range industrial application.

We driven by the single purpose to find the best solutions for your requirements.

For specific recommendations of applications, engineering data related to plastic system design and installation and maintenance instructions please see the detail in this catalog.

Standards of Construction

Thermoplastic Piping Material

HDPE is used in a variety of applications and industries where excellent impact resistance, high tensile strength, low moisture absorption and chemical and corrosion resistance properties are required

- Met FDA/USDA food handling guidelines [natural color]
- Light-Weight
- Non-toxic
- No Moisture absorption
- Non-Staining
- Chemical-and Corrosion-resistant
- High tensile Strength
- Thermoforming Performance

Application

- Light duty chain guides
- Secondary containment
- Thermoformed material handling devices
- Orthotic and prosthetic devices
- Tanks
- Water Storage

HDPE High density Polyethylene

Property	ASTM Test Method	Units	HDPE
Physical			
Density	D-792	lbs/ft ³	59.88
Water Absorption	D-570	%	Slight
Mechanical			
Yield Point	D-638	psi	4,279
Elongation at Yield	D-638	%	18
Tensile Break	D-638	psi	4,423
Elongation at Break	D-638	%	1,350
Tensile Modulus	D-638	psi	224.812
Flexural Modulus	D-790	psi	166,796
Izod Impact	D-4020	ft-lbs/in	1.3
Tensile Impact	DIN 53448	ft-lbs/in ²	570
Hardness	D-2240	Type D	67
Thermal			
Melt Point	D-3417	oF	259-267
Electrical			
Volume Resistivity		ohm-cm	>10 ¹⁵
Surface Resistivity	D-255	ohm/Square	>10 ¹⁵

NOTE : The information contained herein are typical values intended for reference and comparison purpose only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturer's complete material property datasheets. All values at 73°F [23°C] unless otherwise noted

Specific Material properties PE

	Property	Standard	Unit	PE80	PE 1000	HDPE-el
	Specific Density at 23°C	ISO 1183	g/cm ³	1.78	1.78	1.68
	Melt flow index	ISO 1133	g/10min	0,9	0,3 <0,1 T003	T001
	MFR 190/5					
	MFR 190/2, 16					
	MFR 230/5					
	MFI range			ISO1872/1873			T012
Mechanical Properties	Tensile stress at yield	ISO 527	MPa	20	20-35	26
	Elongation at yield	ISO 527	%	10	10-12	7
	Elongation at break	ISO 527	%	>600	200-600	
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²	no break no break	no break no break	
	Impact strength unnotched at -30°C					
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²	12	16	5,0
	Impact strength unnotched at 0°C					
	Impact strength unnotched at -30°C						4,5	6	3,0
	Ball indentation hardness acc. Rockwell	ISO 2039-1	MPa	36	46	
	Flexural Strength	ISO 178	MPa	18	24	
	Modulus of elasticity	ISO 527	MPa	750	1100	1150
Thermal Properties	Vicat-Softening point VST/B/50	ISO 306	°C	63	77	83
	Heat deflection temperature HDT/B	ISO 75	°C	60	75	
	Linear coefficient of thermal expansion	DIN 53752	k ⁻¹ x 10 ⁻⁴	1,8	1,8	1,8
	Thermal conductivity at 20°C	DIN 52612	W/(mxK)	0,4	0,4	0,43
	Flammability	UL94 DIN 4102	-	94-HB B2	94-HB B2	B2
	Specific Volume resistance	VDE 0303	OHM cm	>10 ¹⁶	>10 ¹⁶	≤10 ⁸
	Specific Surface Resistance	VDE 0303	OHM	>10 ¹³	>10 ¹³	≤10 ⁶
	Relative dielectric constant at 1 MHz	DIN 53483	-	2,3	2,3	
	Dielectric Strength	VDE 0303	kV/mm	70	70	
Electrical Properties	Physiologically non-toxic	EEC 90/128	-	Yes	Yes	Nein
	FDA	-	-	Yes	Yes	Nein
	UV Stabilized	-	-	Carbon/Black	Carbon/Black	Carbon/Black
	Colour	-	-	Black	Black	Black

Specific Material properties PP

	Property	Standard	Unit	PP-H	PP-R	PP-B	PP-s	PP-s-el
	Specific Density at 23°C	ISO 1183	g/cm ³	0,91	0,91	0,91	0,93	1,13
	Melt flow index	ISO 1133 ISO1872/1873	g/10min	0,5	0,5	0,5	0,8	0,6
	MFR 190/5							
	MFR 190/2, 16							
	MFR 230/5							
	MFI range							
Mechanical Properties	Tensile stress at yield	ISO1872/1873	MPa	30	25	26	30	30
	Elongation at yield	ISO 527	%	10	12	10	10	
	Elongation at break	ISO 527	%	>300	>300	>50	>50	43
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²	no break no break	no break	no break	no break	no break
	Impact strength unnotched at -30°C							
	Impact strength unnotched at +23°C	ISO 179	kJ/m ²					
	Impact strength unnotched at 0°C							
	Impact strength unnotched at -30°C							
	Ball indentation hardness acc. Rockwell	ISO 2039-1	MPa	36	46			
	Flexural Strength	ISO 178	MPa	18	24			
Modulus of elasticity	ISO 527	MPa	750	1100			1150	
Thermal Properties	Vicat-Softening point VST/B/50	ISO 306	°C	91	65	68	85	133
	Heat deflection temperature HDT/B	ISO 75	°C	96	70	75	85	47
	Linear coefficient of thermal expansion	DIN 53752	k ⁻¹ x 10 ⁻⁴	1,6	1,6	1,6	1,6	
	Thermal conductivity at 20°C	DIN 52612	W/(mxK)	0,22	0,24	0,2	0,2	
	Flammability	UL94 EN 13501 DIN 4102	-	94-HB B2	94-HB B2	94-HB B2	V-2 E[d2] B1	V-0
Electrical Properties	Specific Volume resistance	VDE 0303	OHM cm	>10 ¹⁶	>10 ¹⁶	>10 ¹⁵	>10 ¹⁵	0.1^8
	Specific Surface Resistance	VDE 0303	OHM	>10 ¹³	>10 ¹³	>10 ¹⁵	>10 ¹⁵	0.1^6
	Relative dielectric constant at 1 MHz	DIN 53483	-	2,3	2,3			
	Dielectric Strength	VDE 0303	kV/mm	75	70	30 bis 40	30 bis 45	
	Physiologically non-toxic	EEC 90/128	-	Yes	Yes	Yes	Yes	No
	FDA	-	-	Yes	Yes	No	No	No
	UV Stabilized	-	-	No	No	No	No	Yes
	Colour	-	-	Ral 7032 grey	RAL 7032 grey	RAL 7032 grey	RAL 7037 dark grey	black

Polypropylene is a crystalline material is noted for its high strength-to-weight ratio, excellent chemical resistance and high performance in thermoforming and corrosive environments.

- Appropriate for applications to 180oF [82oC]
- Meets FDA 21CFR 177.1520
- Chemical and corrosion-resistant
- Meets USDA Guidelines for use in federally inspected meat and poultry packing facilities
- Resists most acids, alkalist and solvents
- Thermoforming performance
- No Moisture absorption

Application

- Orthotic and prosthetic devices
- Plenums and manifolds
- Secondary Containment
- Valve bodies
- Plating and anodizing process equipment
- Pump Component
- Storage Tanks

Polypropylene Homopolymer

Property	ASTM Test Method	Units	Polypropylene Homopolymer
Physical			
Density	ASTM D-792	lbs/ft ³	56.3
Water Absorption	ASTM D-570	%	.008
Mechanical			
Yield Point	ASTM D-638	psi	5.150
Elongation at Yield	ASTM D-638	%	11
Tensile Break	ASTM D-638	psi	5.150
Elongation at Break	ASTM D-638	%	400
Tensile Modulus	ASTM D-638	psi	190.240
Flexural Modulus	ASTM D-790	psi	212.425
Flexural Strength	ASTM D-790	psi	7.250
Izod Impact	ASTM D-4020	ft-lb/in	1.2
Tensile Impact	DIN 53448	ft-lbs/in ²	269
Hardness	ASTM D-2240	Shore D	78
Thermal			
Heat Deflection Temperature @66psi	ASTM D-648	°F	210
Maximum Long Term operating Temp	UL746B	°F	180
Coefficient of Linear thermal Expansion	ASTM D696	in/in/oF	4.3 x 10 ⁵
Melt Point	ASTM D-3417	oFohm-cm	329
Flammability	UL94		HB
Electrical			
Volume Resistivity	ASTM D-257	ohm	>10 ¹⁵
Surface Resistivity	ASTM D-257	ohm/cm	>10 ¹⁵

NOTE : The information contained herein are typical valves intended for reference and comparison purpose only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturer’s complete material property datasheets. All values at 73°F [23°C] unless otherwise noted

PVC is a normal impact, high corrosion resistant polyvinyl chloride. Because of its exceptional corrosion resistance, it is ideally suited for applications where maximum chemical resistance is necessary. Its high strength-to-weight ratio, cost efficiency, ease of fabrication and economic balance make it the material of choice.

PVC conforms to ASTM D-1784-95 Class 12454-B [Formerly Type I Grade 1] and is manufactured without the uses of plasticizers or fillers. It can be used in self-supporting construction up to 140°F [depending of chemistry], It exhibits excellent fire ratings [UL-94V-0] and has a flame spread under 20 per ASTM-E-84.

Strength - PVC combines tensile strength and stiffness for the toughest applications

Chemical Resistance - PVC is resistant to most acids and alkali solutions

Workability - PVC can be machined, cut, welded and glued for fabrication versatility

Low Cost - PVC is an economical choice for fabricating equipment, tanks, pumps etc

Consistency - PVC is extruded through most of the available gauges for dimensional consistency

Flammability - PVC is self-extinguishing

PVC (Polyvinyl Chloride)

Property	ASTM Test Method	Units	PVC
Physical			
Density	D-792	g/cc	1.42
Water Absorption	D-570	%	0.06
Cell Class	1784		12454-B
Rockwell Hardness	D 785	R Scale	115
Shore Durometer	D 2240	O	89
Mechanical			
Tensile Modulus	D-638	psi	411,000
Yield Strength	D-638	psi	7,500
Flexural Modulus	D-790	psi	481,000
Yield Strength	D-790	psi	12,800
Izod Impact	D-256	psift-lb/in	1.0
Thermal			
Vicat Softening point	D 1525	°F	181
Heat Deflection Temperature	D 648	°F	179
Linear Coefficient of Expansion		in/in/ °F	3.2 x 10 ⁻⁵
Flammability	D 635	-	Self-Extinguishing
Flammability	UL 94	-	V-0
Flame Spread	E 84	-	15
Electrical			
Volume Resistivity	D 257	ohm/cm	5.4 x 10 ¹⁵
Dielectric Constant	D 150	60 Hz	3.19
Dissipation Factor	D 150	60 Hz	0.0096
Loss Index	D 150	60 Hz	0.030
Dielectric Strength	D 149	V/mil	544
Chemical			
Chemical Resistance	D 1784	-	Class B

NOTE : The information contained herein are typical values intended for reference and comparison purpose only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturer's complete material property datasheets. All values at 73°F [23°C] unless otherwise noted

Thermoplastic Piping Process

Process cooling water pipeline for thermal power station PE 100

Project data:

- Location: East Kalimantan [RI]
- **Date:** 2011 - 2012
- **Pipes:**
OD 1400 mm SDR 17 - ca. 1.6 km
OD 1200 mm SDR 17 to OD 110 mm SDR 17 - about 3.5 km
- **Fittings:**
injection moulded, machined or segmented - up to OD 1400 mm
- Specially prefabricated spool-pieces



Figure 5: Segmented tees OD 1400 mm SDR 17

The construction of a fertiliser plant requires a cooling water supply pipeline used for the thermal power station. Due to local circumstances the owner decided on a seawater intake pipeline.



Figure 6: Specially prefabricated spool-pieces.



Figure 7: Welding on-site with a WIDOS 16000.

Star Guardian fabricated pipes and fittings suitable for container shipment and provided the entire welding equipment as well as the supervising on-site.



Figure 8: supervising on-site.

Key benefit of HDPE pipes:

- Best suitability for seawater, no corrosion
- Fast installation by butt welding
- Low transport costs
- Full availability of fittings

Pipe PTFE Lining - Inquiry Data Sheet

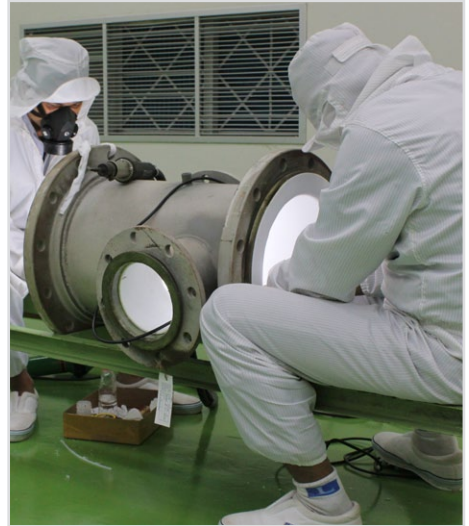
1	GENERAL		
	a.	Date	
	b.	Customer	
	c.	Equipment Location	
	d.	Tag No	
	e.	PHD No	
	f.	QTY [ea]	
	g.	Closing Date	
	h.	<input type="checkbox"/> Replacement	<input type="checkbox"/> by Items
	i.	<input type="checkbox"/> Existing Drawing	<input type="checkbox"/> Specs, Drw no
2	RUNNING PARAMETER		
	a.	MAX WORKING PRESS [kg/cm2] *]	
	b.	MEDIA *]	
	c.	CONCENTRATION [%]	
	d.	MAX WORKING TEMP [Deg C] *]	
	e.	OPERATION CONDITION *]	
	f.	PIPE SIZE DIAMETER *]	
	g.	FLANGE STANDARD & CLASS *]	
3	SCOPE OF SUPPLY		
	<input type="checkbox"/>	PIPE LINING	<input type="checkbox"/> FASTENER <input type="checkbox"/> INSTALLATION
4	MATERIAL ORIGIN		
	<input type="checkbox"/>	NON CHINA, INDIA, EAST EUROPE	
5	DOCUMENTATION		
	<input type="checkbox"/>	PRELIMINARY DRAWING	<input type="checkbox"/> COUNTRY OF ORIGIN
	<input type="checkbox"/>	MATERIAL CERTIFICATE	<input type="checkbox"/> R
	<input type="checkbox"/>	CERTIFICATE OF TEST	
6	LAY OUT		

*] Mandatory

Tank PTFE Lining - Inquiry Data Sheet

1	GENERAL		
a.	Date		
b.	Customer		
c.	Equipment Location		
d.	Tag No		
e.	PHD No		
f.	QTY [ea]		
g.	Closing Date		<input type="checkbox"/>
h.	Inquiry Status	<input type="checkbox"/> Replacement	<input type="checkbox"/> Items
i.	Existing Drawing	<input type="checkbox"/> Yes, Drw no	No
2	RUNNING PARAMETER		
a.	MAX WORKING PRESS [kg/cm2] *)		
b.	MEDIA *)		
c.	CONCENTRATION [%]		
d.	MAX WORKING TEMP [Deg C] *)		<input type="checkbox"/>
e.	OPERATION CONDITION *)	<input type="checkbox"/> CYCLIC	NON CYCLIC
f.	CYCLIC DURATION		
3	REQUESTED SCOPE OF SUPPLY *)		
	<input type="checkbox"/> TANK	<input type="checkbox"/> PTFE LINING	INSTALLATION
	<input type="checkbox"/> ASME STAMP	<input type="checkbox"/> NON ASME STAMP	
4	MATERIAL ORIGIN		
	<input type="checkbox"/> NON CHINA, INDIA, EAST EUROPE		
5	DOCUMENTATION		
	<input type="checkbox"/> PRELIMINARY DRAWING		<input type="checkbox"/> INTRTY OF ORIGIN
	<input type="checkbox"/> MATERIAL CERIFICATE		MDR
	<input type="checkbox"/> CERTIFICATE OF TEST		
6	NOTE		

*) Mandatory





FAJAR BENUA INDOPACK
Our Value, Solution for you

Head Office

Jl. Mayor Oking Jayaatmaja No. 88
Cibinong 16911 - Jawa Barat, Indonesia
Phone [+62-21] 8791 8838
Fax [+62-21] 8791 8841/42
Email hotline@fajarbenua.co.id

Jakarta

Jl. Mayor Oking Jayaatmaja No. 88
Cibinong 16911 - Jawa Barat, Indonesia
Phone [+62-21] 8791 8838
Fax [+62-21] 8791 8841/42
Email jkt@fajarbenua.co.id

Project and Oil & Gas

Jl. Mayor Oking Jayaatmaja No. 88
Cibinong 16911 - Jawa Barat, Indonesia
Phone [+62-21] 8791 8838
Fax [+62-21] 8791 8841/42
Email prj@fajarbenua.co.id

Medan

Jl. Murai I Blok G No. 47, Komplek Tomang Elok
Medan, Sumatera Utara 20122 - Indonesia
Phone [+62-61] 845 8136 / 37
Fax [+62-61] 845 8139
Email mdn@fajarbenua.co.id

Cilacap

Jl. Gatot Subroto No. 76 A
Cilacap 53223, Jawa Tengah - Indonesia
Phone [+62-282] 536 610
Fax [+62-282] 536 610
Email clp@fajarbenua.co.id

Surabaya

JL. Darmo Permai Timur 19-F Kav 31
Putat Gede, Sukomanunggal, Surabaya, 60226
Phone [+62-31] 7327000
Fax [+62-31] 7327301
Email sby@fajarbenua.co.id

Balikpapan

Ruko Sentra Eropa III, Blok AC 1 No. 33
Komplek Balikpapan Baru, Balikpapan 76114
Phone [+62-542] 872 073 / 74
Fax [+62-542] 872 075
Email blp@fajarbenua.co.id

Cilegon

Jl. Anyar Merak Ruko Bonakarta Blok A No. 26
Cilegon 42414, Banten - Indonesia
Phone [+62-254] 387 315/16
Fax [+62-254] 387 314
Email clg@fajarbenua.co.id

Pekanbaru

Jl. Tuanku Tambusai, Komplek Pertokoan Taman
Mella Blok D-3, Pekanbaru Riau 28282 - Indonesia
Phone [+62-761] 34475 / 571499
Fax [+62-761] 34475
Email pkb@fajarbenua.co.id

Balangan

Jl. Alpukat No. 3 BTN Bumi Mekar Permai
Indramayu 45212, Jawa Barat - Indonesia
Phone [+62-234] 273 470
Fax [+62-234] 273 470
Email blg@fajarbenua.co.id

Semarang

Jl. Permata Hijau BB/30, Pondok Hasanudin
Semarang 50142, Jawa Tengah - Indonesia
Phone [+62-24] 351 0619
Fax [+62-24] 351 4473
Email smg@fajarbenua.co.id

Makasar

Jl. Poros Taman Sudiang Indah No. 9
Kel. Pai Kec. Biringkanaya, Makassar 90243
Phone [+62-411] 551 889
Fax [+62-411] 551 889
Email mks@fajarbenua.co.id

Palembang

Jl. Sapta Marga No. 60C Kel. Bukit Sangkal
Kec. Kalidoni, Palembang - Indonesia
Phone [+62-711] 819190 / 818861
Fax [+62-711] 5700 570
Email plb@fajarbenua.co.id

www.fajarbenua.co.id

GET IN TOUCH

Jl. Mayor Oking Jayaatmaja No. 88
Cibinong 16911, Jawa Barat - Indonesia
[+62-21] 87918838, 8753870
[+62-21] 87918841/42
www.fajarbenua.co.id



HD GROUP

One Source Engineering Solutions

GROUP COMPANIES



PT. Fajar Benua Indopack
Our Value Solution for You



PT. TRI GRAHA SEALISINDO
Where Innovation meet Efficiency



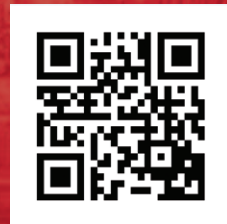
PT. Global Mandira Semesta
Engineering • Procurement • Construction



HIDROFLEX
PT. Hidroflex Indonesia



PT. JEIL FAJAR INDONESIA
Seals with Solutions



Innovative Engineering Products Supply

Exotics Metal Fabrication

Engineering Procurement
and Construction

Plant Maintenance Services

Project Management
Services

