



# PTFE Lined Pipe Systems

**RMB Products Catalog**

High-grade plastic lined pipe and fittings in standard sizes



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# General Terminology and Specifications

**ANSI** American National Standards Institute

**ASTM** American Society for Testing and Materials

**ASTM specifications:**

- A105 ..... Standard specification for forged steel
- A106 ..... Standard specification for seamless carbon steel pipe
- A216 ..... Standard specification for cast steel (grade WCB)
- A395 ..... Standard specification for ferritic ductile iron
- F1545 ..... Standard specification for plastic-lined ferrous metal pipes, fittings and flanges

**DIN** German industrial standard

**JIS** Japanese industrial standard

**Measurement terms:**

- ID ..... Inside diameter
- NPS ..... Nominal pipe size
- OD ..... Outside diameter

**Metallurgical terms:**

- CS..... Cast steel
- DI..... Cast ductile iron
- FS..... Forged steel
- SS..... Stainless steel

**Polymers:**

- ECTFE..... Ethylene chlorotrifluoroethylene; manufactured by Solvay under the trade name Halar®
- ETFE ..... Ethylene tetrafluoroethylene; manufactured by DuPont under the trade name Tefzel®
- FEP ..... Fluorinated ethylene propylene
- PFA..... Perfluoroalkoxy; manufactured by DuPont under the trade name Teflon® PFA
- PP..... Polypropylene
- PTFE..... Polytetrafluoroethylene; manufactured by DuPont under the trade name Teflon®
- PVDF..... Polyvinylidene fluoride; manufactured by Arkema under the trade name Kynar®

**Pressure ratings:**

- Class 150..... Pressure rating standard to 150 psi (steam)
- Class 300..... Pressure rating standard to 300 psi (steam)
- Full vacuum..... 29.6 inches of mercury

# About RMB Products

RMB Products is a leading supplier of engineered polymer products for critical applications in the chemical processing, aerospace, semiconductor and biopharmaceutical industries. We have produced more rotationally lined pipe, fittings and vessels for chemical processing, mining and oil and gas companies than any other manufacturer in the world.

RMB Products was founded in 1963. Since 1978, we have specialized in helping customers lower capital cost and operating expenses through innovative manufacturing processes utilizing high-performance polymer materials. We have built a solid reputation on solving complex challenges requiring exacting standards. Our lined pipe systems and rotational lining solutions provide the highest level of corrosion protection for costly equipment and infrastructure.

## Our PTFE Lined Pipe Systems

Standard PTFE lined pipe systems can be the most economical solution for conveying or treating highly corrosive fluids under severe service conditions. Originally developed by DuPont™, PTFE is sold under the Teflon® trade name. Other manufacturers market PTFE under other trade names.

RMB Products is the sole distributor of DuFlon™ PTFE lined spools and fittings for the U.S. market. All lined pipe system components are manufactured exclusively from Teflon® PTFE. We distribute the following liners and fittings:

- Paste-extruded PTFE liners up to 12" in diameter
- Single-piece isostatically molded PTFE lined fittings up to 12" in diameter

## Our Rotational Lining Solutions

In addition to standard PTFE lined pipe systems, RMB Products provides standard and custom rotational lining solutions. Our specialized technologies and materials let us bond a seamless polymer layer to the interior of virtually any metallic structure, regardless of shape or complexity. We offer a full range of vertically integrated manufacturing services to deliver complete turnkey solutions.

Maximum dimensions for rotationally lined structures:

- 8' diameter × 20' length
- 10' diameter × 12' length

Available lining materials:

- PFA (Teflon®)
- ETFE (Tefzel®)
- PVDF (Kynar®)
- ECTFE (Halar®)
- Nylon 12 (RMB 421E2)
- HDPE (high-density polyethylene)

RMB Products is ISO 9001:2008 certified. To learn more about RMB Products, visit our website at **[rmbproducts.com](http://rmbproducts.com)**.

# Lining Data

Liner Properties	Unit	PTFE	PFA
Operating temperature range	°F	-20 – 450	0 – 500
Specific gravity	g/cm <sup>3</sup>	2.14 – 2.19	2.12 – 2.17
Liner color	NA	white	natural
Tensile strength of liner at yield (average)	psi	3500	4200
Elongation of liner at yield	%	350 – 400	300
Melt point	°F	625	580
Thermal conductivity k-factor of liner	BTU-in/(hr-ft <sup>2</sup> -°F)	1.7	1.3

## Lined Pipe Dimensions

RMB Products distributes PTFE lined pipe in 1" to 12" sizes in various grades of metal systems, from carbon steel to stainless steel. These systems are available in ANSI Class 150, Class 300 and DIN flange dimensions. The lined pipe can be easily field fabricated. Options such as vent hole extensions and special paint are available.

NPS (inches)	Steel Pipe Dimensions (inches)		Liner Thickness (inches) PTFE
	OD	Wall	
1	1.315	0.133	0.130
1 1/2	1.900	0.145	0.150
2	2.375	0.154	0.160
3	3.500	0.216	0.160
4	4.500	0.237	0.160
6	6.625	0.280	0.197
8	8.625	0.322	0.217
10	10.750	0.307	0.275
12	12.750	0.250	0.275

## Notes

- Liners and fittings meet the following specifications:
  - 1" – 8" liners and fittings are fully rated for vacuum at 450°F
  - 10" – 12" liners are fully rated for vacuum at 450°F
  - 10" – 12" lined fittings are not vacuum rated
- Certain chemicals may affect vacuum ratings; consult RMB Products for more information.
- Standard 1" – 8" fittings meet or exceed pipe liner thickness and vacuum ratings for same-sized liner. Consult RMB Products for 10" and larger sizes.

# Standards of Construction

All lined pipe and fittings fully comply with the ASTM F1545 standard. Products are manufactured to the following specifications and requirements.

<b>LINERS</b>	
Polymer	Standards
PTFE (polytetrafluoroethylene)	ASTM D4894, D4895
PFA (perfluoroalkoxy)	ASTM D3307

<b>PIPE</b>		
NPS (inches)	Material	Standards
1 – 8	Schedule 40 carbon steel	ASTM A53, Grade B Type E
1 – 8	Schedule 40 carbon steel	ASTM A587, ERW
1 – 8	Schedule 40 carbon steel	ASTM A106
10	Schedule 30 carbon steel	ASTM A106/A53, Grade B Type E
12	Schedule 20 carbon steel	ASTM A106/A53, Grade B Type E

<b>FLANGES</b>			
Type	NPS (inches)	Material	Standards
Lap joint	1 – 12	Ductile iron	ASTM A395, ANSI B16.42 Class 150
Lap joint	1 – 12	Carbon steel	ASTM A105, ANSI B16.5 Class 150

<b>FITTINGS</b>	
Type	Standards
Fabricated carbon steel	ASTM A587, A53 and A234 per manufacturer's drawings; dimensions ANSI B16.5 Class 150
Ductile iron casting (60-40-18)	ASTM A395; dimensions ANSI B16.42 Class 150
Cast steel	ASTM A216, Grade WCB; dimensions ANSI B16.5 Class 150
Rotating lap joint or fixed flanges	See Flanges

<b>FABRICATION TOLERANCES FOR PIPE AND FITTINGS</b>	
Dimensions	Tolerance (inches)
Length and centerline	± 1/8
Fixed flange bolt hole alignment	± 1/16
Perpendicular of flange with centerline of pipe	3/32 per foot of pipe diameter

# Standards of Construction

## MINIMUM ID RADIUS

NPS (inches)	Radius (inches)
1	1/8
1 1/2	1/4
2	1/4
3 and over	3/8

## PRESSURE CAPABILITIES

Temperature (°F)	ANSI Class 150 (psig)	ANSI Class 300 (psig)
100	250	450
150	242	415
200	235	390
300	215	345
400	200	295
500	170	245

### Venting

PTFE fittings other than blind flanges, reducing flanges, reinforced spacers and instrument connections are vented with one vent hole near the center of the fitting. PTFE lined pipe spools 3 feet or less have one vent hole near the center of the spool. Pipe spools longer than 3 feet have two vent holes, one near each flange.

### External Protective Coating and Marking

Metal surfaces of pipe and fittings are given a protective coating of primer prior to leaving the manufacturing facility to protect the metal surfaces from rust. For all other primer and paint requirements, contact RMB Products.

### Processes

Our performance piping systems are manufactured using innovative fluoropolymer processing technology, ensuring products are of the highest quality and will provide long-term performance. Pipe liners are manufactured using the paste extrusion process to increase permeation resistance, produce a smooth interior surface and provide improved structural stability. Various customized processes, such as isostatic molding; paste extrusion; and injection and transfer molding, are used in the manufacture of the fittings.



The performance and longevity of PTFE lined pipe system components depends on the quality control of design and fabrication processes, as well as shipping, handling and storage practices. RMB Products considers quality of paramount importance. Quality control teams inspect and test all PTFE lined pipe components to ensure they meet or exceed ASTM F1545 specifications. RMB Products is ISO 9001:2008 certified.

### **Inspections Performed Prior to Lining**

All metal pipe and fittings are visually inspected before lining. The interior will be smooth, clean and free of burrs, scale or any other deposits. Internal welds are ground smooth.

Pipe liners are examined for pinholes, cracks, gouges, nicks or foreign objects.

### **Tests and Inspections Performed After Lining**

Fittings are hydrotested at 1.5 times the design pressure; spools are hydrotested upon request. All components are subjected to an electrostatic spark test per the NACE SP0274 standard.

The liner forming the flange gasket sealing face is visually inspected for smoothness. The liner will be free of defects (pinholes, cracks, gouges, nicks or foreign objects). Any imperfection will not exceed 10% of the surface.

Lined pipe and fittings are checked for dimensional accuracy and tolerances in accordance with dimensional data listed within this catalog and ANSI specifications.

After final inspection, a flange protector is installed on each flange prior to any further handling of the part.

### **Shipping, Handling and Storage**

Prior to shipment, all sealing surfaces of lined products are covered by a flange protector. Removal of the flange protector should occur only at installation. For cases in which testing is required before installation, flange protectors need to be reinstalled immediately after testing.

Slings, chains or lifting equipment should not be placed inside lined products or otherwise come in contact with the plastic liner. Extreme care must be taken at all times when loading, transporting and unloading products to and from a truck or trailer. Use chains and slings to lift the spools rather than drag them.

Avoid storage in direct sunlight or other severe conditions. Storage under cover is recommended.

Consult RMB Products when handling and installing components in extreme temperatures. Liners become brittle in temperatures below 40°F.

Protection of the flare faces is necessary during handling, sandblasting and painting. Do not plug vent holes.

Failure to follow shipping, handling and storage instructions will void the product warranty.

# Installation Instructions

Do not remove flange protectors prior to installation to prevent damage to the sealing surface. Flange protectors should be replaced any time the item is removed from service.

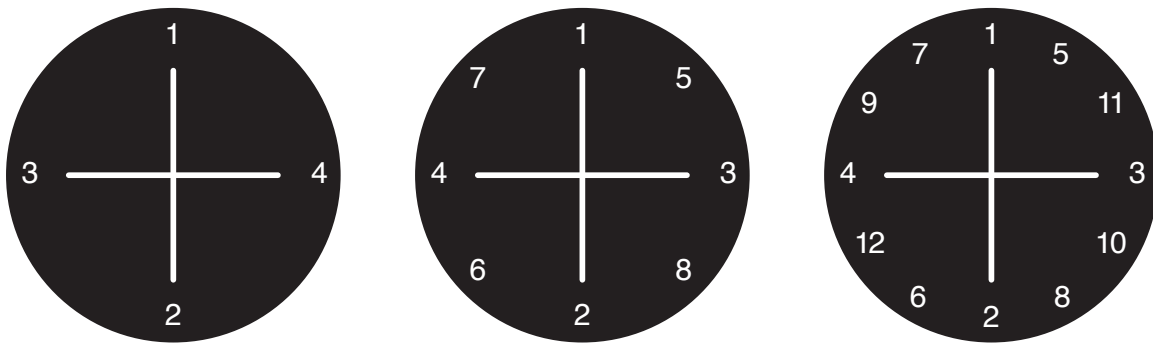
## Recommended Bolt Torque

Recommended torque ratings are based on lightly lubricated A193 B7 bolts and A194 2H nuts. When bolting dissimilar liner materials, use the lower torque value.

<b>ANSI Class 150 System</b>									
Lightly lubricated A193 B7 bolts and A194 2H nuts.									
Use the lower torque value when bolting dissimilar liner materials.									
NPS (inches)	1	1 1/2	2	3	4	6	8	10	12
<b>PTFE</b>									
<b>Maximum Bolt Torque</b> (foot-pounds)	10	15	25	30	40	60	70	75	95

## Bolt Torque Sequence

Finger-tighten all nuts and bolts. With a calibrated torque wrench, tighten each flange connection in a crisscross pattern (refer to figure). Using this pattern, tighten in 20% increments up to 80% of the final bolt torque. To achieve the final torque value, tighten bolts in a sequential clockwise pattern once around the flange. Maximum recommended torque is suggested for systems that will be operating at or near the maximum pressure and temperature limits of the liner or conveying small molecular gasses.



## Retorquing

After the initial installation, we recommend checking the torque of each bolt after 24 hours have elapsed or a temperature cycle or pressure cycle (hydrostatic test) has occurred. Any bolts falling below the recommended value should be retorqued. Values should only be exceeded by 10% increments when necessary to reseal. All torquing on the process system should be done when the system is ambient and cool.

Retorquing should be performed annually, especially if the system experiences elevated temperatures or extreme temperature swings.

# Installation Instructions

## Other Installation Guidelines

Welding should not be performed before or after the installation of lined pipe components.

Gaskets must be used when bolting components to dissimilar products made from metal, glass, fiberglass or other materials. Otherwise, gaskets are not required for bolting together lined piping systems unless repeated connections and disconnections are made.

Vent holes should not be plugged. Do not use sharp tools to clean plugged holes. We recommend vent hole extensions for insulated pipe and fittings.

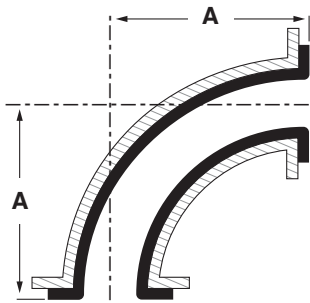
Do not remove pipe spools and fittings from systems at elevated temperatures. Always install a flange protector immediately after the component is removed.

### ANSI Class 150 Bolt and Stud Lengths

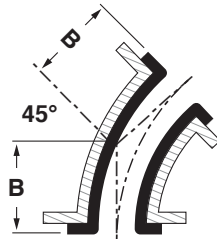
Thicknesses calculated using A193 B7 bolts, A194 2H nuts and flat washers on both sides.

NPS (inches)	Bolt Length (inches)		Stud Length (inches)	
	Fixed	Lap Joint	Fixed	Lap Joint
1	2 1/2	2 3/4	3	3 1/4
1 1/2	2 3/4	3	3 1/4	3 1/4
2	3 1/4	3 1/2	4	4 1/4
3	3 1/2	4	4 1/4	4 1/2
4	3 1/2	4	4 1/4	4 1/2
6	4 1/4	4 1/2	5	5 1/4
8	4 1/4	4 3/4	5	5 1/2
10	4 1/2	5 1/4	5 1/2	6
12	4 3/4	5 1/2	5 1/2	6 1/4

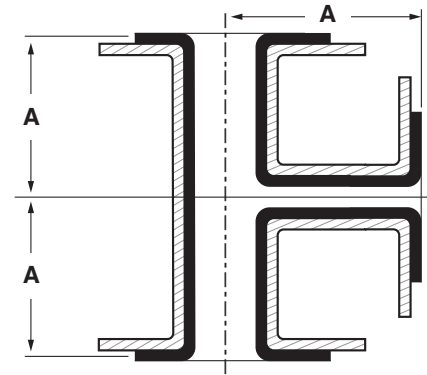
# Flanged Fittings



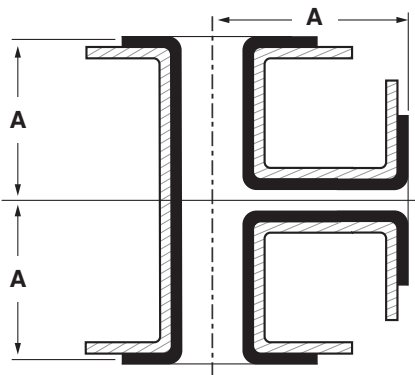
**90° Elbow**  
 Figure# D100 - Fixed  
 Figure# D100L - Lap Joint



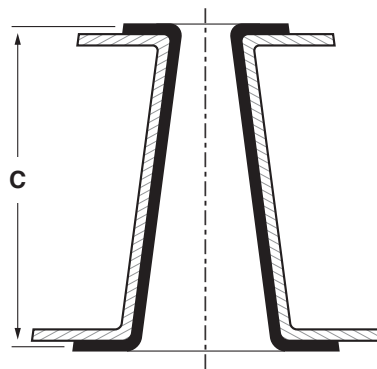
**45° Elbow**  
 Figure# D200 - Fixed  
 Figure# D200L - Lap Joint



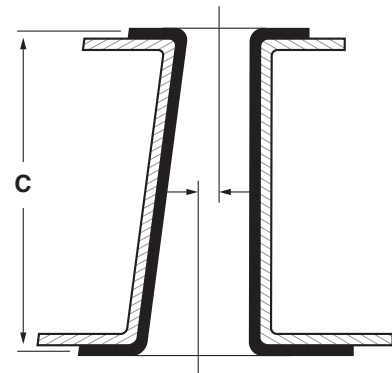
**Equal Tee**  
 Figure# D300 - Fixed  
 Figure# D300L - Lap Joint



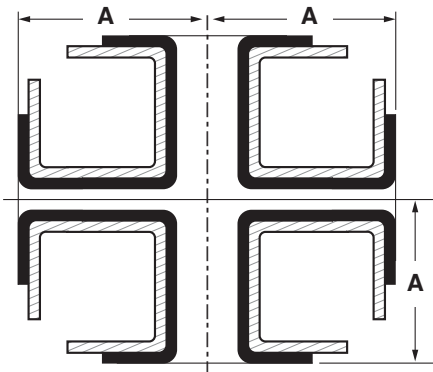
**Reducing Tee**  
 Figure# D350 - Fixed  
 Figure# D350L - Lap Joint



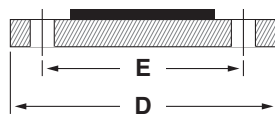
**Concentric Reducer**  
 Figure# D400 - Fixed



**Eccentric Reducer**  
 Figure# D450 - Fixed



**Cross**  
 Figure# D500 - Fixed  
 Figure# D500L - Lap Joint



**Blind Flange**  
 Figure# D700

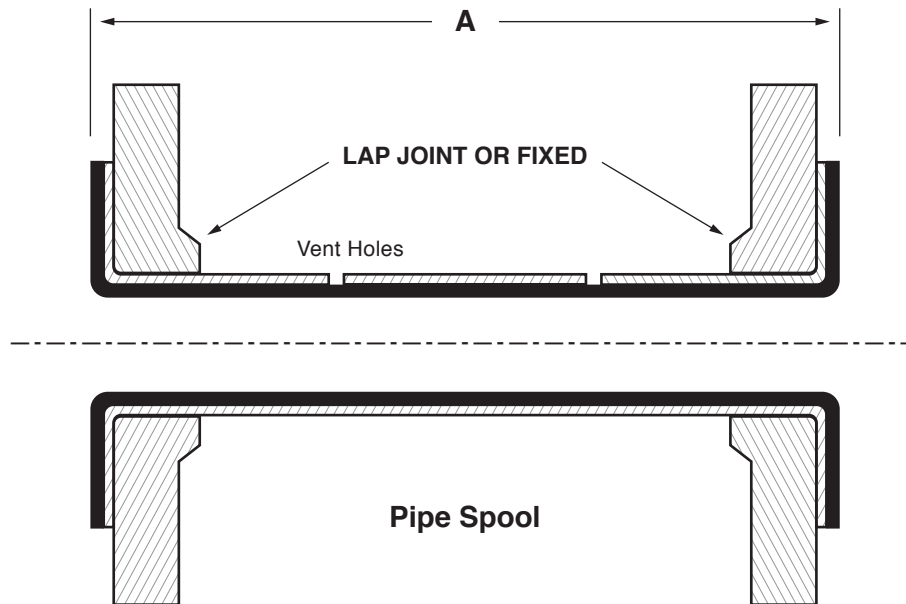
# ANSI Class 150 Flanged Fittings

DIMENSIONS AND WEIGHT

Dimensions (inches)					
NPS	A	B	C	D	E
1	3 1/2	1 3/4	4 1/2	4 1/4	3 1/8
1 1/2	4	2 1/4	4 1/2	5	3 7/8
2	4 1/2	2 1/2	5	6	4 3/4
3	5 1/2	3	6	7 1/2	6
4	6 1/2	4	7	9	7 1/2
6	8	5	9	11	9 1/2
8	9	5 1/2	11	13 1/2	11 3/4
10	11	6 1/2	12	16	14 1/4
12	12	7 1/2	14	19	17

Weight (pounds)							
NPS (inches)	90° Elbow	45° Elbow	Tee	Concentric Reducer	Eccentric Reducer	Cross	Blind Flange
1	6	4	10	6	6	12	2
1 1/2	9	7	13	7	7	20	3
2	15	11	19	10	10	26	4
3	25	21	38	16	16	48	8
4	41	37	68	28	28	87	16
6	75	64	121	48	48	148	27
8	124	108	179	80	80	221	45
10	202	155	219	131	131	312	71
12	244	209	315	180	180	328	101

# Flanged Pipe Spool



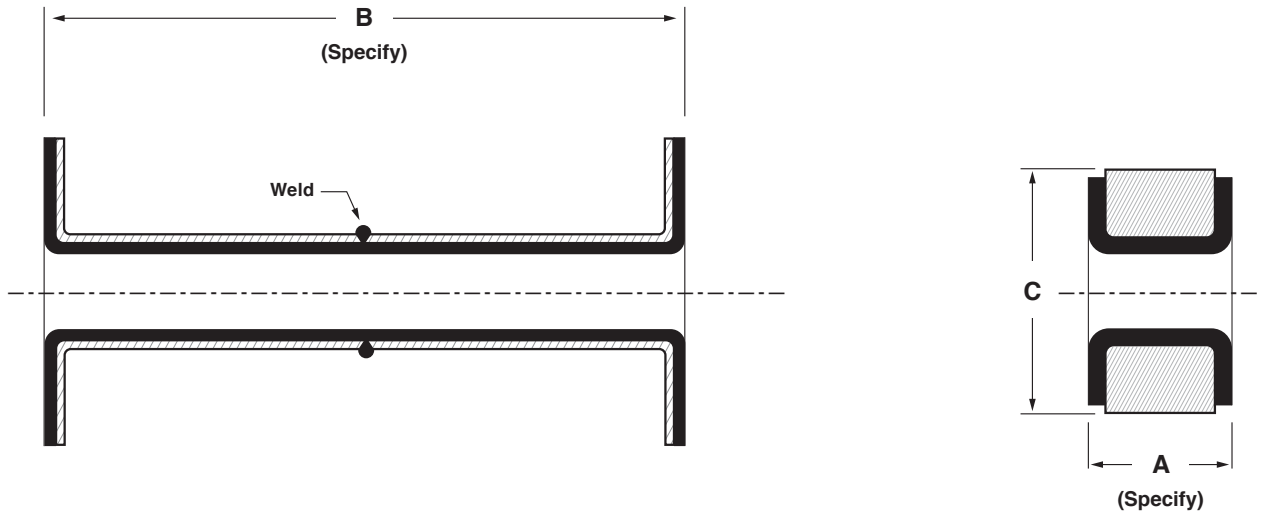
NPS (inches)	Weight (pounds)		A – Minimum Spool Length (inches)	
	1st Foot	Each Additional Foot	With Weld	Without Weld
1	6	2	3 1/4	5 1/4
1 1/2	9	3	3 1/2	6 1/2
2	15	4	3 3/4	7 1/2
3	26	8	4	10 1/2
4	39	11	4 1/2	10 3/4
6	62	21	5 1/2	16 1/2
8	98	31	6 1/2	17
10	129	40	9	27
12	179	53	9	27

## Notes

- 1" – 8" pipe spools: Maximum length is 20'.
- 10" and 12" pipe spools: Maximum length is 10'.
- For lengths shorter than the minimum listed, see Spacers (pp. 13 – 14).
- Round custom lengths to the nearest 1/16".
- Lap joint standard/fixd when specified.
- Vent hole extensions are available for pipe and fittings.

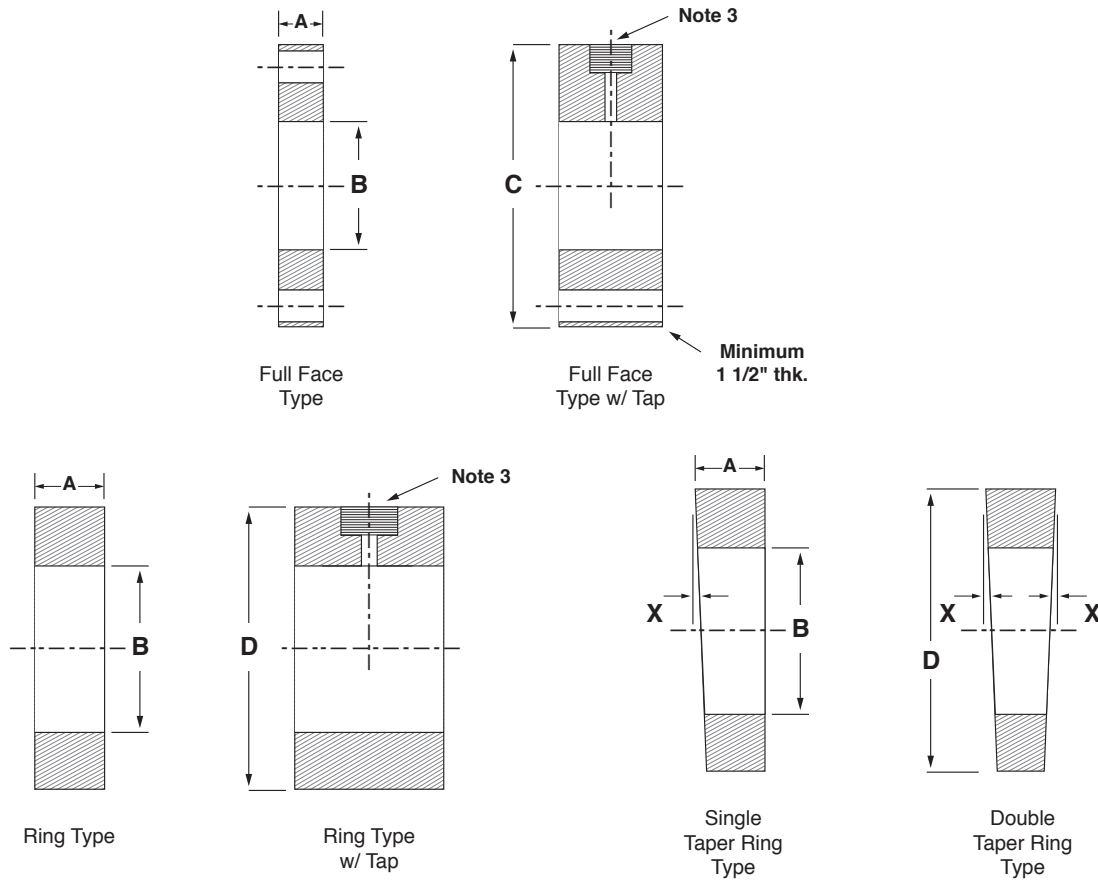
# Reinforced Spacers

DISTANCE PIECE/ARMORED SPACER



NPS (inches)	A – Specify Length (inches)	B – Specify Length (inches)	C (inches)
1	1/2 through 3	3 through 3 1/4	2 1/2
1 1/2	1/2 through 3	3 through 3 1/2	3 1/4
2	1/2 through 3	3 through 3 3/4	4
3	1/2 through 3	3 through 4	5 1/4
4	1/2 through 3	3 through 4 1/2	6 3/4
6	1/2 through 3	3 through 5 1/2	8 5/8
8	1/2 through 3	3 through 6 1/2	10 5/8
10	1/2 through 3	3 through 9	12 7/8
12	1/2 through 3	3 through 9	15 5/8

# Solid Spacers



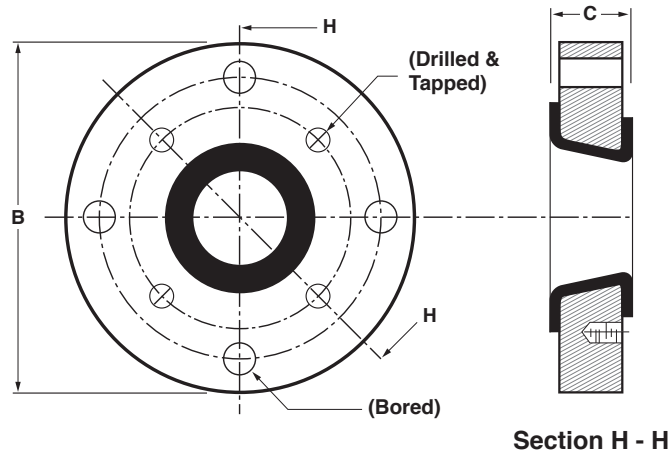
NPS (inches)	B (inches)	C (inches)	D (inches)
1	1	4 1/4	2 1/2
1 1/2	1 1/2	5	3 1/4
2	2	6	4
3	3	7 1/2	5 1/4
4	4	9	6 1/4
6	6	11	8 5/8
8	8	13 1/2	10 5/8
10	10	16	12 7/8
12	12	19	15 5/8

## Notes

1. Dimension A: 1/4" through 3" to be specified in increments of 1/16".
2. Angle X to be specified.
3. Orifice tap: 1/2" or 3/4" NPT to be specified.
4. Dimensions for ANSI Class 150.
5. Spacers can be tapered on the ID for lined butterfly valve requirements.
6. Materials available: PTFE, PFA, PVDF, PP.



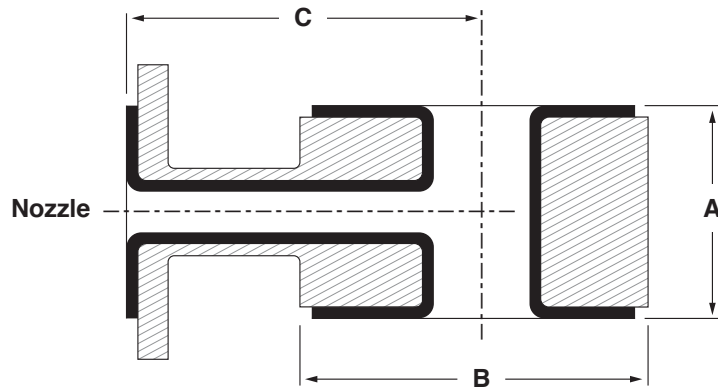
# Reducing Flange



NPS (inches)	B (inches)	C (inches)	Weight (pounds)
1 x 1/2	4 1/2	1 3/8	6
1 x 3/4	4 1/2	1 3/8	6
1 1/2 x 1	5	1 3/8	6
2 x 1	6	1 3/8	8
2 x 1 1/2	6	1 3/8	8
3 x 1	7 1/2	1 3/8	15
3 x 1 1/2	7 1/2	1 3/8	14
3 x 2	7 1/2	1 3/8	13
4 x 1	9	1 7/8	28
4 x 1 1/2	9	1 7/8	27
4 x 2	9	1 7/8	22
4 x 3	9	1 7/8	20
6 x 1	11	1 7/8	37
6 x 1 1/2	11	1 7/8	35
6 x 2	11	1 7/8	31
6 x 3	11	1 7/8	29
6 x 4	11	1 7/8	26
8 x 2	13 1/2	2 1/8	61
8 x 3	13 1/2	2 1/8	58
8 x 4	13 1/2	2 1/8	50
8 x 6	13 1/2	2 1/8	40
10 x 4	16	2 1/8	85
10 x 6	16	2 1/8	76
10 x 8	16	2 1/8	75
12 x 6	19	2 1/8	114
12 x 8	19	2 1/8	100
12 x 10	19	2 1/8	96

**Note**  
Depending on the reduction, some IDs may not be tapered as shown. Contact RMB Products for details.

# Instrument Tee

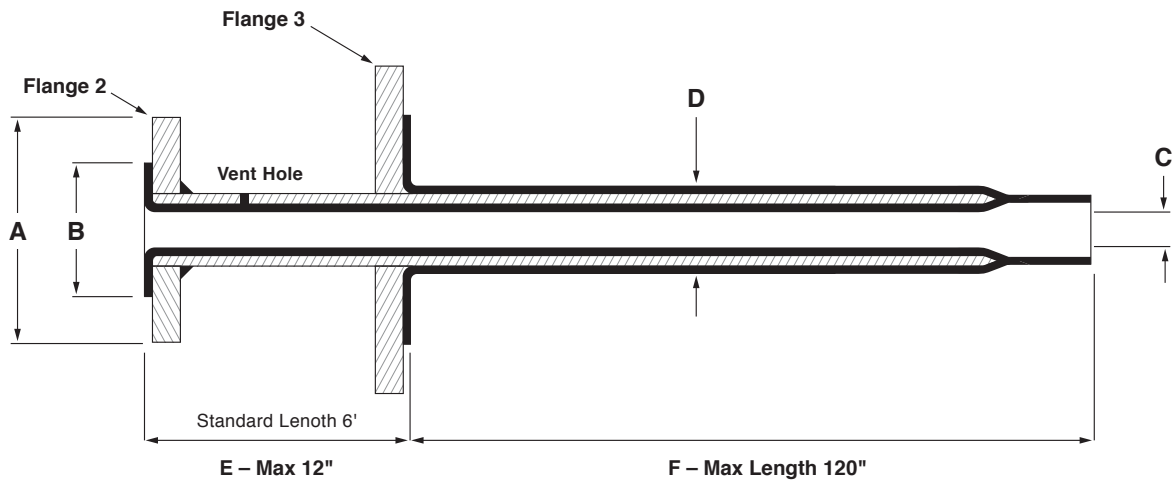


NPS (inches)	Nozzle Size (inches)	A (inches)	B (inches)	C (inches)	Weight (pounds)
1	1	2	2 1/2	3 1/2	5
1 1/2	1	2	3 1/4	4	7
1 1/2	1 1/2	4	3 1/4	4	11
2	1	2	4	4 1/2	11
2	1 1/2	4	4	4 1/2	13
2	2	4	4	4 1/2	13
3	1	2	5 1/4	5 1/2	13
3	1 1/2	4	5 1/4	5 1/2	26
3	2	4	5 1/4	5 1/2	26
4	1	2	6 3/4	6 1/2	17
4	1 1/2	4	6 3/4	6 1/2	30
4	2	4	6 3/4	6 1/2	30
6	1	2	8	8	22
6	1 1/2	4	8	8	41
6	2	4	8	8	41
8	1	2	10 5/8	9	65
8	1 1/2	4	10 5/8	9	84
8	2	4	10 5/8	9	84
10	1	2	12 7/8	11	89
10	1 1/2	4	12 7/8	11	109
10	2	4	12 7/8	11	109
12	1	2	15 5/8	12	102
12	1 1/2	4	15 5/8	12	139
12	2	4	15 5/8	12	139

## Note

Lining material: PFA.

# Double Flange Dip Pipe

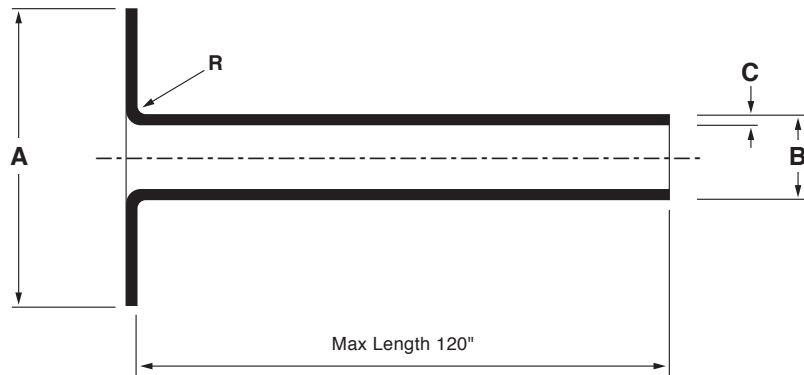


NPS (inches)	A (inches)	B (inches)	C (inches)	D (inches)	Flange 2 (inches)	Flange 3 (inches)
1	4 1/4	2	1 1/16	1 11/16	1	2, 3
1 1/2	5	2 7/8	1 3/16	2 5/16	1 1/2	3, 4
2	6	3 5/8	1 5/8	2 3/4	2	3, 4
3	7 1/2	5	2 9/16	3 15/16	3	4, 6
4	9	6 1/8	3 7/16	4 15/16	4	6, 8
6	11	8 3/8	5 3/8	7 1/16	6	8, 10
8	13 1/2	10 1/2	7 9/16	9 1/4	8	10, 12

## Notes

1. Check nozzle ID of equipment before ordering to assure proper fit.
2. Distance between flanges to be specified.
3. The use of reinforced dip tubes recommended for agitation service.
4. Single flange dip tubes are available. The nozzle flange will always be one size larger than the pipe size. The flare diameter will be standard for the pipe size.
5. Lining material: PFA.

# Solid Nozzle Liner



NPS (inches)	A (inches)	B (inches)	C (inches)	R (inches)	Maximum Length (inches)
1	2	1.030	0.130	1/8	120
1 1/2	2 7/8	1.600	0.150	1/4	120
2	3 5/8	2.045	0.160	1/4	120
3	5	3.000	0.160	3/8	120
4	6 1/8	4.000	0.160	3/8	120
6	8 3/8	6.030	0.197	3/8	120
8	10 1/2	7.950	0.217	3/8	120

## Notes

1. The nozzle liner is designed for equipment nozzles that have a radius equal to the R dimension.
2. Nozzle liners are not designed for agitation.
3. Material: PTFE.

# Rotational Lining Solutions

To protect unconventionally sized or shaped parts, rotational lining is the best solution. Using specialized materials and technology, we can bond a uniform, seamless polymer layer to the interior of virtually any metallic structure, regardless of shape or complexity.

## Rotational Lining Process

Granular polymer resin is placed inside the structure to be lined and all openings are covered. The structure is heated while simultaneously being rotated about two axes. The resin melts and flows evenly over the entire inner surface of the structure, bonding to the metal substrate. Once cooled, the result is a monolithic, corrosion- and chemical-resistant lining that conforms to complex shapes and is virtually free of stresses. Wall thickness can range from 0.090" to 0.400". Typical linings range from 0.100" to 0.250", depending on part size and service requirements. Flanges are integrated into the lining, eliminating the need for welding or flaring operations.

## Standard and Custom Sizes

We line a wide range of equipment, including some of the largest pipes and vessels in the industry. Our manufacturing capabilities can accommodate most size requirements.

Maximum dimensions for lined structures:

- 8' diameter × 20' length
- 10' diameter × 12' length

Typical lined structures include

- Tanks, pressure vessels, scrubbers, pipe spool and fittings
- Caissons and other equipment used underwater
- Pumps, valves, flowmeters, heat exchangers, filter housings and other process equipment

## Part Geometries

Rotational lining is well-suited to lining simple or complex structures, including parts with diameter changes, multiple outlets, nozzles or other unique requirements. The process provides unlimited design flexibility without compromising the integrity of the lining.

## Lining Materials

Polymer selection and liner thickness are based on the chemical resistance properties the final structure requires. We work with technically engineered fluoropolymers (PFA, ETFE, PVDF, and ECTFE), nylons (nylon 12) and olefins (HDPE) to meet the specific requirements of each application.

## Turnkey Solutions

We offer a full range of vertically integrated manufacturing services at our Fountain, Colorado facility:

- Design and engineering
- Material compounding
- Fabrication of metal substrates
- High-tolerance machining
- Welding and assembly
- Custom finishing

## Testing, Inspection and Quality Control

RMB Products adheres to a rigorous quality assurance program for its rotational lining solutions. We carry the following certifications:

- AS9100 Revision C
- ISO 9001:2008
- ASME U stamp
- NBBI R stamp

Our testing capabilities include spark testing per NACE SP0274 for all our linings. We use ultrasonic and magnetic thickness gauges to confirm lining thickness at the point of manufacture.

We perform mechanical, thermal, chemical, rheological, morphological and flammability testing as needed to ensure products meet dimensional and performance specifications.

To learn more about our rotational lining capabilities, contact one of our sales offices or visit our website at **[rmbproducts.com](http://rmbproducts.com)**.

# Chemical Resistance

RMB Products offers the following table as a general guide in selecting products for appropriate chemical compatibility. For more detailed information about resistance for specific chemicals, contact one of our sales offices.

Changes in chemical composition or special working conditions may lead to deviations from the information contained in the table. If you have any doubt about the behavior of a product under specific conditions, perform a test installation. The data shown in the table is based on information available at time of publication.

## Process Considerations

Consider the following factors in the selection and specification of lined piping:

- Process chemical to include primary and trace concentrations, contaminants, solids and particle size
- Normal and design operating pressures, including minimum and maximum
- Vacuum conditions
- Normal and design operating temperatures, including minimum and maximum
- Ambient temperature for the use region
- Cleaning methods
- Insulation or heat tracing
- Maximum flow rate and fluid velocity
- Possible upset conditions

Lining Material	Trade Name	Maximum Service Temperature	Characteristics
<i>Fluoropolymers</i>			
PFA	Teflon®	260°C/500°F	Resistant to nearly all chemicals
PTFE	Teflon®	232°C/450°F	Resistant to nearly all chemicals
ETFE	Tefzel®	150°C/302°F	High impact strength and chemical resistance over a wide temperature range
ECTFE	Halar®	150°C/302°F	High impact strength, chemical and corrosion resistance over a wide temperature range
PVDF	Kynar®	125°C/260°F	High impact strength and resistance to solvents, acids, bases and heat
<i>Nylons</i>			
Nylon 12	RMB 421E2	104°C/220°F	High chemical and impact resistance; low moisture absorption
<i>Olefins</i>			
HDPE	High-density polyethylene	80°C/180°F	High strength-to-density ratio and chemical resistance

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To learn more about RMB Products and our PTFE lined pipe and rotational lining solutions, visit our website at **[rmbproducts.com](http://rmbproducts.com)**.

To discuss solutions and options or to receive pricing information, contact our chemical processing sales staff directly at either office location.

To place an order, call for pricing and submit a purchase order to our regional office.

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