

# Rubber Lined Grooved Pipe and Fittings for Abrasive Services

## ABRASION RESISTANT RUBBER LINED PIPE AND FITTINGS

Abrasion resistant rubber lined pipe and fittings, connected with Victaulic couplings, have been used for over fifty years and have proven to be a most practical, common and economical method for conveying abrasive fluids and slurries, showing savings in maintenance cost over unlined metal pipe in such services. The use of rubber-lined metal pipe and fittings combine the abrasion resistant properties of natural or synthetic rubber with the rigidity and strength of metal.

Standard "Off the Shelf" Victaulic cast ductile iron grooved fittings may be directly rubber lined for abrasion resistance without any special machining or end preparation. Lined pipe and fittings are available with Victaulic grooved ends from leading industry lining applicators with different types of lining material for handling a wide range of abrasive materials.

## PIPE PREPARATION

The most widely used and preferred method is cut grooved pipe for "Abrasion Resistance". When using this method, the pipe is cut grooved and rubber lined in accordance with the dimensions published in Victaulic Submittal 25.03.

Pipe end preparation is fast and easy either in the shop or on the job site using portable Victaulic cut grooving tools equipped for cut grooving pipe to abrasion resistant groove dimensions. These tools may be power driven by a Victaulic Power Mule II or a Victaulic Power Drive, VPD752, using a universal drive shaft attachment.

Refer to Victaulic Submittal 24.01 for details of various tools and accessories.

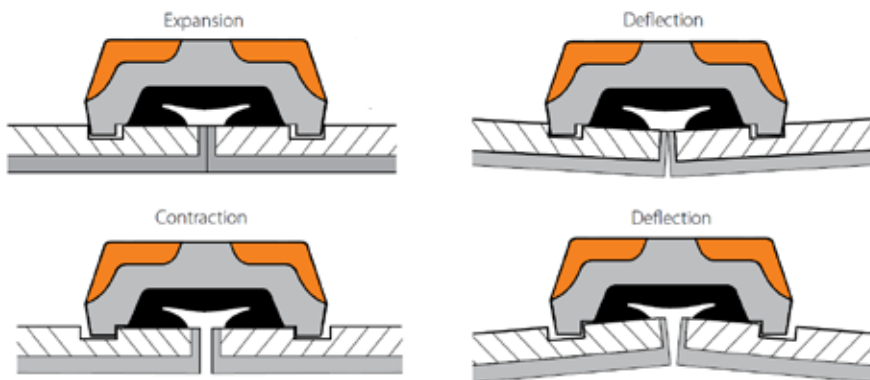
When necessary pipe may also be cut grooved in a standard engine lathe to the dimensions published in Victaulic Submittal 25.03. Contact Victaulic for details and specific considerations when cut grooving pipe in an engine lathe.

## COUPLINGS

Rubber lined grooved pipe and fittings are easily joined using Victaulic Style 77 flexible couplings, which is the preferred coupling for rubber lined pipe and fittings.

In addition to speed and ease of assembly provided by Victaulic couplings, Victaulic flexible couplings offer varied mechanical benefits to the designer, installer and owner. Victaulic flexible couplings can be used to accommodate expansion or contraction of the piping caused by changes in temperature and can permit limited angular deflection at the joints. It should be noted that these benefits are only available at "pipe-to-pipe" and "pipe-to-fitting" joints as further detailed in the Joint Performance Section of this submittal.

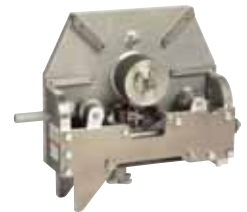
Refer to Victaulic Submittal 06.04 for coupling details and pages 3 & 4 for joint performance.



**IMPORTANT: "Fitting-to-fitting" joints do not permit linear movement or angular deflection.**



VG28GD-ABR



VG824-ABR



VPD752



POWER MULE II



2 - 12"/50 - 300MM SIZES  
STYLE 77 FLEXIBLE COUPLING



14 - 24"/350 - 600MM SIZES  
STYLE 77 FLEXIBLE COUPLING

<b>JOB/OWNER</b>	<b>CONTRACTOR</b>	<b>ENGINEER</b>
System No. _____	Submitted By _____	Spec Sect _____ Para _____
Location _____	Date _____	Approved _____
		Date _____

## Rubber Lined Grooved Pipe and Fittings for Abrasive Services

In some areas rigid joints may be preferred as they can simplify installation. Rigid couplings simplify pipe support by reducing the number of pipe hangers required. The Victaulic Zero-Flex® rigid couplings may be installed at “pipe-to-pipe” joints and “pipe-to-fitting” joints to take advantage of these benefits.

Refer to Victaulic publication 06.02 for coupling details.

### IMPORTANT:

**Victaulic Style 07 Zero-Flex® rigid couplings must not be installed at “fitting-to-fitting” joints as there is insufficient pipe end separation or gap to allow proper installation.**

**Victaulic Style 107H and Style 177 “installation ready” couplings should not be installed with rubber lined pipe and fittings.**



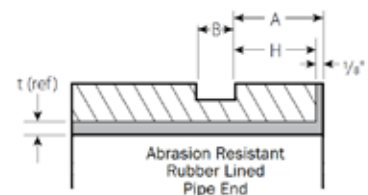
STYLE 07 RIGID COUPLING

### ABRASION RESISTANT RUBBER LINED PIPE DETAILS

A typical abrasion resistant rubber lined pipe end is illustrated to the right. For most applications,  $\frac{1}{4}$ "/6.4 mm of rubber is applied to the inside diameter of the pipe and  $\frac{1}{8}$ "/3.2 mm to the end of the pipe.

The pipe is first cut grooved using a special Victaulic adjustable cut grooving tool to provide the abrasion resistant groove dimensions listed in Victaulic publication 25.03. The tool operates in the same manner and requires the same grooving time as a standard cut grooving tool. These tool models include special geometry to provide the required 'A', 'B' and 'H' dimensions illustrated in the diagram to the right.

The rubber lining applied to the end of the pipe can be the lining material applied to the interior of the pipe, extending beyond and turned up the end of the pipe. It can then be cut, ground or buffed to the required thickness. Alternately, a separate piece of rubber of the required thickness may be applied to the end of the pipe. The actual method used is up to the discretion of the applicator and their normal lining practices providing it satisfies the dimensions published in Victaulic publication 25.03.



### ABRASION RESISTANT RUBBER LINED FITTINGS

Standard "Off the Shelf" Victaulic cast ductile iron grooved fittings may be directly rubber lined for abrasion resistance without any special machining or end preparation.

A typical abrasion resistant rubber lined cast ductile iron grooved fitting is illustrated to the right. In the same manner as the pipe, for most applications  $\frac{1}{4}$ "/6.4 mm of rubber is applied to the inside diameter of the fitting and  $\frac{1}{8}$ "/3.2 mm to the end of the pipe.

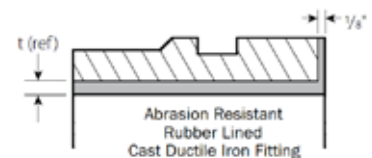
The rubber lining applied to the end of the fitting can be the lining material applied to the interior of the fitting, extending beyond and turned up the end of the fitting. It can then be cut, ground or buffed to the required thickness. Alternately, a separate piece of rubber of the required thickness may be applied to the end of the fitting. Again, the actual method is up to the discretion of the applicator and their normal application practices, providing it satisfies the dimensions listed in the appendix at the end of this document.

Refer to the pipe end dimensional requirements on page 5 for lining and fitting dimensions.

### IMPORTANT:

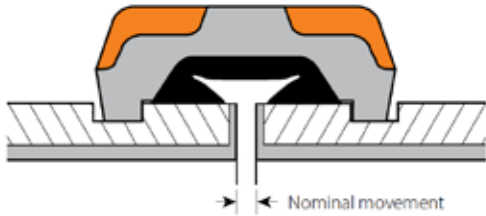
**The Center-to-End dimensions published for Victaulic ductile iron fittings in publication 07.01, such as elbows and tees, will increase by  $\frac{1}{8}$ "/3.2 mm when rubber lined. The End-to-End dimensions published for Victaulic ductile iron fittings in publication 07.01, such as cast ductile iron reducers, will increase by  $\frac{1}{4}$ "/6.4 mm when rubber lined.**

**Some fittings are not available in cast ductile iron construction. In these instances Victaulic will provide optional fabricated steel fittings grooved for abrasion resistant rubber lining in accordance with publication 25.03. The fittings will provide the same joint performance as listed for “pipe-to-pipe” joints. Refer to Victaulic publication 07.04 for available fittings.**



## Rubber Lined Grooved Pipe and Fittings for Abrasive Services

### JOINT PERFORMANCE



"PIPE-TO-PIPE" JOINT

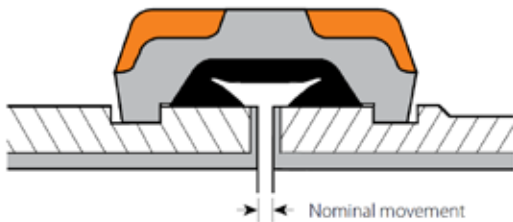
Refer to the table on the following page for the range of movement available

Abrasion resistant rubber lined "pipe-to-pipe" joints provide similar joint performance to Style 77 couplings installed on standard cut grooved pipe that has been grooved in accordance with Victaulic publication 25.01.

Refer to the table on the following page for the allowable range of pipe end separation or "end gap" available at the coupling joints.

Where rigid joints are desired, Victaulic Style 07, Zero-Flex® rigid couplings may be used at pipe-to-pipe joints.

Style 07, Zero-Flex® rigid couplings will not allow for linear (axial) movement or angular deflection.



"PIPE-TO-FITTING" JOINT

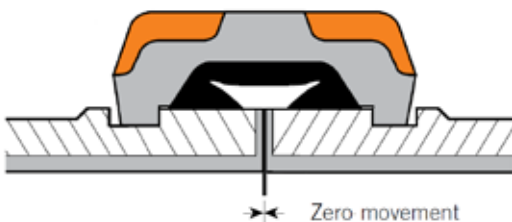
Refer to the table on the following page for the range of movement available

Abrasion resistant rubber lined "pipe-to-fitting" joints provide similar or slightly less linear movement and angular deflection capabilities compared to "pipe-to-pipe" joints described above.

Refer to the table on the following page for the allowable range of pipe end separation or "end gap" available at the coupling joints.

Where rigid joints are desired, Victaulic Style 07, Zero-Flex® rigid couplings may be used at pipe-to-fitting joints.

Style 07, Zero-Flex® rigid couplings will not allow for linear (axial) movement or angular deflection.



"FITTING-TO-FITTING" JOINT

Fitting-to-Fitting joints do not include any separation or gap between the pipe ends and will not permit angular deflection or linear movement

Abrasion resistant rubber lined "fitting-to-fitting" joints will provide zero pipe end separation when installed using Victaulic Style 77 flexible couplings.

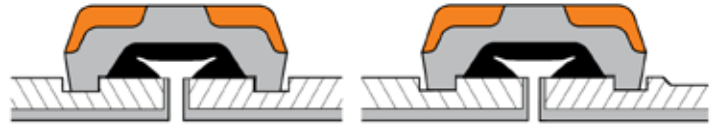
If the rubber lining thickness tolerances result in any interference at "fitting-to-fitting" joints, the rubber lining on the end of the fitting may be ground or buffed to reduce the thickness. Consult the rubber lining applicator for instructions.

#### IMPORTANT:

**Victaulic Style 07, Zero-Flex® rigid couplings must not be installed at "fitting-to-fitting" joints as there is insufficient pipe end separation or gap to allow proper installation. Victaulic recommends the use of Style 77 flexible couplings for fitting-to-fitting joints.**

# Rubber Lined Grooved Pipe and Fittings for Abrasive Services

## JOINT PERFORMANCE



Size		Max. Work Pressure *	Max. End Load *	"PIPE-TO-PIPE" JOINT			"PIPE-TO-FITTING" JOINT		
				Allow. Pipe End Sep. †	Deflect. Fr. C <sub>1</sub> †		Allow. Pipe End Sep. †	Deflect. Fr. C <sub>1</sub> †	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	psi kPa	Lbs. N	Inches mm	Per Cplg. Deg.	Pipe In./Ft. mm/m	Inches mm	Per Cplg. Deg.	Pipe In./Ft. mm/m
2 50	2.375 60.3	1.000 6900	4430 19715	Ductile iron fittings in sizes less than 4"/100mm must not be directly rubber lined as there is insufficient pipe end separation at the joints to accommodate the rubber lining. In these sizes, ductile iron fittings should be ordered as MRL (Machined for Rubber Lining). Alternately, Victaulic can provide fabricated steel fittings suitable for rubber lining.					
2½ 65	2.875 73.0	1.000 6900	6490 28880						
3 80	3.500 88.9	1.000 6900	9620 46810						
3½ 90	4.000 101.6	1.000 6900	12565 55915						
4 100	4.500 114.3	1.000 6900	15900 70755	0.19 – 0.38 4.8 – 9.7	2° – 25'	0.50 41.7	0 – 0.19 0.0 – 4.8	2° – 25'	0.50 41.7
5 125	5.563 141.3	1.000 6900	24300 108135	0.19 – 0.38 4.8 – 9.7	1° – 58'	0.41 34.2	0 – 0.19 0.0 – 4.8	1° – 58'	0.41 34.2
6 150	6.625 168.3	1.000 6900	34470 153390	0.19 – 0.38 4.8 – 9.7	1° – 37'	0.35 29.2	0 – 0.19 0.0 – 4.8	1° – 37'	0.35 29.2
8 § 200	8.625 219.1	800 5500	46740 207995	0.19 – 0.50 4.8 – 12.7	2° – 5'	0.44 36.7	0 – 0.25 0.0 – 6.4	1° – 40'	0.35 29.2
10 § 250	10.750 273.0	800 5500	73280 326100	0.31 – 0.50 7.9 – 12.7	1° – 0'	0.21 17.5	0.03 – 0.25 0.8 – 6.4	1° – 10'	0.25 20.8
12 § 300	12.750 323.9	800 5500	102000 453900	0.31 – 0.50 7.9 – 12.7	0° – 51'	0.18 15.0	0.03 – 0.25 0.8 – 6.4	0° – 59'	0.21 17.5
14 ‡ 350	14.000 355.6	300 2065	46180 205500	0 – 0.25 0 – 6.4	1° – 1'	0.21 17.5	0 – 0.13 0 – 3.3	0° – 32'	0.11 9.2
16 ‡ 400	16.000 406.4	300 2065	60320 268425	0 – 0.25 0 – 6.4	0° – 53'	0.19 15.8	0 – 0.13 0 – 3.3	0° – 28'	0.09 7.5
18 ‡ 450	18.000 457.2	300 2065	76340 339710	0 – 0.25 0 – 6.4	0° – 48'	0.17 14.2	0 – 0.13 0 – 3.3	0° – 25'	0.08 6.7
20 ‡ 500	20.000 508.0	300 2065	94000 418300	0 – 0.25 0 – 6.4	0° – 43'	0.15 12.5	0 – 0.13 0 – 3.3	0° – 22'	0.08 6.7
22 ‡ 550	22.000 558.8	250 1725	95000 425220	0 – 0.25 0 – 6.4	0° – 39'	0.14 11.7	Not Available		
24 ‡ 600	24.000 609.6	250 1725	113000 502850	0.06 – 0.25 1.5 – 6.4	0° – 27'	0.09 7.5	0 – 0.13 0 – 3.3	0° – 19'	0.06 5.0

NOTE: Cast ductile iron fittings are not available in the 22" size. Where 22" fittings are required Victaulic will provide optional fabricated steel fittings grooved for abrasion resistant rubber lining in accordance with Submittal 25.03. Refer to Victaulic Submittal 07.04 for available fittings.

Some fittings are not available in cast ductile iron construction. In these instances Victaulic will provide optional fabricated steel fittings grooved for abrasion resistant rubber lining in accordance with Submittal 25.03. The fittings will provide the same joint performance as listed for "pipe-to-pipe" joints. Refer to Victaulic Submittal 07.04 for available fittings.

### OPTION FOR CORROSION RESISTANCE

Where corrosion protection for steel pipe is necessary other methods of rubber lining are available. Contact Victaulic for details.

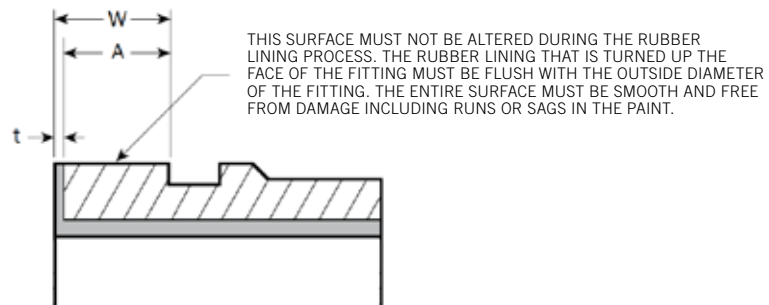
# Rubber Lined Grooved Pipe and Fittings for Abrasive Services

## DIMENSIONAL REQUIREMENTS - STANDARD CAST DUCTILE IRON FITTINGS

### Rubber Lined Cast Ductile Iron Grooved Fittings

#### No Special Machining or End Preparation

Victaulic cast ductile iron grooved fittings shall be rubber lined for abrasion resistance in accordance with the dimensions below.



Abrasion resistant rubber lined “fitting-to-fitting” joints will provide NO pipe end separation when installed using Victaulic Style 77 flexible couplings.

Nominal Size	Dimensions- In./ mm			
	Inches mm	W	Tol. On W +0	A Nominal
4	0.750	-0.031	0.625	0.125
100	19.05	0.79	15.88	3.18
5	0.750	-0.031	0.625	0.125
125	19.05	0.79	15.88	3.18
6	0.750	-0.031	0.625	0.125
150	19.05	0.79	15.88	3.18
8	0.875	-0.031	0.750	0.125
200	22.23	0.79	19.05	3.18
10	0.875	-0.031	0.750	0.125
250	22.23	0.79	19.05	3.18
12	0.875	-0.031	0.750	0.125
300	22.23	0.79	19.05	3.18
14	1.062	-0.031	0.938	0.125
350	26.98	0.79	23.83	3.18
16	1.062	-0.031	0.938	0.125
400	26.98	0.79	23.83	3.18
18	1.125	-0.031	1.000	0.125
450	28.58	0.79	25.40	3.18
20	1.125	-0.031	1.000	0.125
500	28.58	0.79	25.40	3.18
24	1.125	-0.031	1.000	0.125
600	28.58	0.79	25.40	3.18

**IMPORTANT:**

Victaulic Style 07, Zero-Flex® rigid couplings must not be installed at “fitting-to-fitting” joints as there is insufficient pipe end separation or gap to allow proper installation. Victaulic recommends the use of Style 77 couplings for fitting-to-fitting joints.

If the rubber lining thickness tolerances result in any interference at “fitting-to-fitting” joints, the rubber lining on the end of the fitting may be ground or buffed to reduce the thickness. Consult the rubber lining applicator for instructions.

## Rubber Lined Grooved Pipe and Fittings for Abrasive Services

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**INSTALLATION**

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at [www.victaulic.com](http://www.victaulic.com).

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**WARRANTY**

Refer to the Warranty section of the current Price List or contact Victaulic for details.

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**NOTE**

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

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For complete contact information, visit [www.victaulic.com](http://www.victaulic.com)

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