

Engineering Manual and Buyers Guide

Experience Counts

GPT

an EnPro Industries company

THE INDUSTRIES WIDEST SELECTION OF HIGH QUALITY CASING SPACERS

» CASING SPACERS

» END SEALS



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NOTE: More specifications are available online at www.gptindustries.com

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METALLIC CASING SPACERS



Coated



Stainless Steel

NON-METALLIC CASING SPACERS



Model PE



Model HT

CASING END SEALS



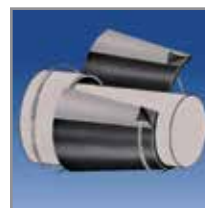
Model C



Model S



Ranger II® all non-metallic casing spacers



Model W



Model FW



Model R

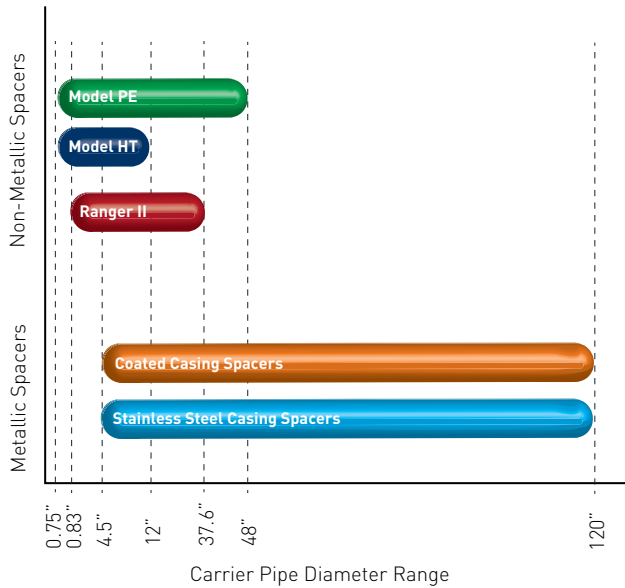
CASING SPACER CLARIFICATION

Casing Spacer and a Casing Isolator are the same product and serve the same application needs. Casing Isolator was the description that originated in the Energy Market, dating back to the late 1960's. In the following manual, Casing Spacer will be the description used. The Market or Industry has also used the following descriptions below referring to a Casing Spacer:

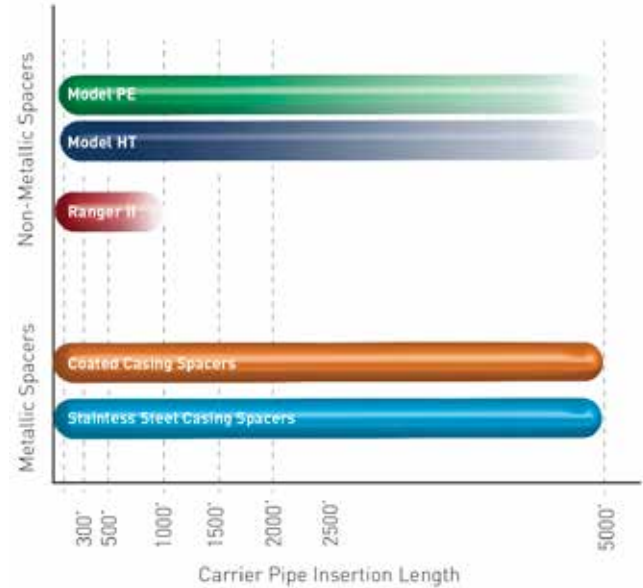
- » Chalks
- » Skids
- » Spiders
- » Pipe Isolators
- » Pipe Supports
- » Clusters

Casing Spacer General Ordering Guidelines

CARRIER PIPE INSERTION RANGE OPTIONS



CARRIER PIPE INSERTION LENGTH



Contact GPT if longer insertions are needed.

CARRIER PIPE COMPATIBILITY WITH SPACER MODEL GUIDELINES

	Non-Metallic Casing Spacers			Metallic Casing Spacers	
	Model PE	Model HT	Ranger II®	Models C & C with 8" Band	Models C & C with 12" Band
Steel	E	E	E	E	E
Steel (Motor Coated)	U	U	U	NR	E
Ductile Iron	U	U	G	G	E
Cement	U	U	U	E	E
Profile Pipe	U	U	S	E	E
Clay	NR	NR	U	E	E
HDPE	NR	NR	E	E	E
PVC Water Pipe	NR	NR	E	E	E
PVC Sewer Pipe	NR	NR	E	E	E

E = Excellent
 NR - Not Recommended
 G = Good
 F = Fair
 S = Satisfactory
 U = Unsatisfactory

General Notes: The foregoing performance data are intended as guidelines only. Performance suitability for specific applications should be determined by the user. Variation in carrier pipe type, carrier pipe diameter, casing length, casing condition, and position may preclude suggested service use. Casing Spacer selection is at the sole risk of the user. Consult with a specialist or GPT for specific applications. GPT's responsibilities will be limited to those listed in the GPT standard warranties. Consult with a specialist or GPT for specific applications.

STANDARD MATERIAL PROPERTY COMPARISON - GPT CASING SPACERS

For detailed information and higher/lower metallic temp. range please view specific Model pages.

	Non-Metallic Casing Spacers			Metallic Casing Spacers		
	Model PE	Model HT	Ranger II®	Models C8 - C12	Models S8 - S12	Model SL8
Band Material	Polyethylene	Polycarbonate	Polypropylene	14 Gauge PVC Coated Steel	14 Gauge 304 Coated Steel	16 Gauge 304 Coated Steel
Runner Material	Polyethylene	Polycarbonate	Polypropylene	Glass Reinforced Nylon	Glass Reinforced Nylon	Glass Reinforced Nylon
Riser Material	None	None	None	10 Gauge Coated Steel	10 Gauge Coated Steel	12 Gauge Coated Steel
Liner Material	None	T.P.E Liner (some sizes)	None	Polyvinyl Chloride	Polyvinyl Chloride	Polyvinyl Chloride
Hardware	Plated Steel	Plated Steel	None	Plated or 304 Stainless Steel	304 Stainless Steel	304 Stainless Steel
Compressive Strength	3,200 psi	12,500 psi	3,000 psi	18,000 psi	18,000 psi	18,000 psi
Temperature Range	180°F (82°C)	280°F (138°C)	-22°F (-30°C) to 212°F (100°C)	-40°F (-40°C) to 170°F (77°C)	-40°F (-40°C) to 170°F (77°C)	-40°F (-40°C) to 170°F (77°C)

Casing Spacer General Ordering Guidelines

GENERAL RUNNER HEIGHT OPTIONS

MODEL PE NON-METALLIC CASING SPACERS

- » Model PE runners are molded as an integral part of each segment.
- » Runner heights range from 5/16" (7.94mm) to 1-1/2" (38.1mm) depending on model dimensions.
- » Runner height is symmetrical around spacer.
- » Runner/Band width for PE spacers is 3.0" (76.19mm) through 6.25" (158.75mm).
- » Refer to pages 8 - 9 for detailed information on PE Casing Spacers.

MODEL HT (HIGH TEMP) NON-METALLIC CASING SPACERS

- » Model HT runners are molded as an integral part of each segment.
- » Runner height range from 5/16" (8.0mm) to 7/8" (48.5mm) depending on model dimensions.
- » Runner height is symmetrical around spacer.
- » Runner/Band width for HT spacers is 3.0" (7.94mm) through 5.0" (127.0mm).
- » Refer to pages 10 - 11 for detailed information on HT Casing Spacers.

RANGER II® NON-METALLIC CASING SPACERS

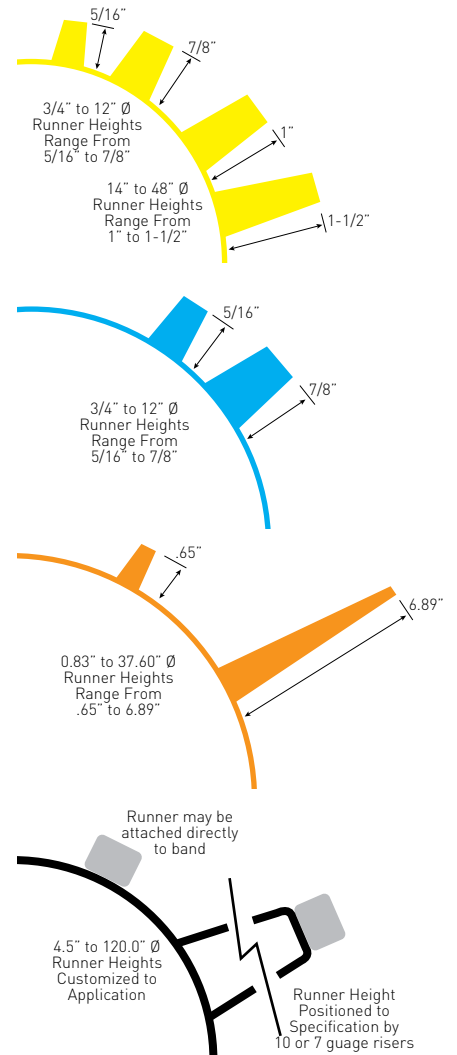
- » Ranger II runners are molded as an integral part of each segment.
- » Runner height range from .65" (16.5mm) to 6.89" (175.0mm).
- » Runners may be placed asymmetrically around spacer.
- » Runner/Segment widths for Ranger II spacers is 2.13" (54.1mm) through 8.86" (225.04mm).
- » Refer to pages 12 - 15 for detailed information on Ranger II Casing Spacers.

METALLIC CASING SPACERS COATED (C) & STAINLESS STEEL (S)

- » 2" (50.8mm) wide nylon or polyester glass reinforced runners.
- » Effective runner height = 1.07" (27.2mm) or 1.70" (43.2mm).
- » Runners may be attached directly to spacer band.
- » Runners may be attached on top of 10 or 7 gauge risers to accommodate any runner height configuration.
- » Metallic spacers available in 8.0" (203.2mm) or 12.0" (304.79mm) wide bands.
- » Refer to page 16 - 21 for detailed information on coated or stainless steel casing spacers.

*Caution Note

If casing pipe has offsets or weld beads in excess of 1/8", consider using a metallic casing spacer.



Casing Spacer General Ordering Guidelines

POSITION WITHIN CASING OPTIONS

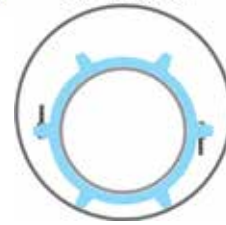
MODEL PE NON-METALLIC CASING SPACERS

- » Standard position within casing.
- » Runner height must be symmetrical around spacer.
- » Refer to pages 8 - 9 for detailed information on PE Casing Spacers.

Standard Position



Standard Position



MODEL HT (HIGH TEMP) NON-METALLIC CASING SPACERS

- » Standard position within casing.
- » Runner height must be symmetrical around spacer.
- » Refer to pages 10 - 11 for detailed information on HT Casing Spacers.

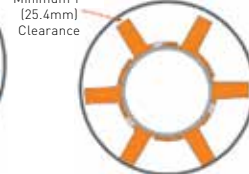
RANGER II® NON-METALLIC CASING SPACERS

- » Multiple positions within casing possible.
- » Different height runner segments may be mixed around carrier pipe.
- » Runner height may be asymmetrical around carrier pipe.
- » Positioning options include: standard (clear bell), centered, centered-restrained and non-centered-restrained
- » Refer to page 12 - 15 for detailed information on Ranger II® Casing Spacers.

Standard Position



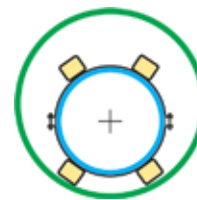
Centered/Restrained Position



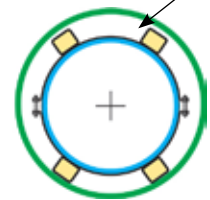
METALLIC CASING SPACERS COATED (C) & STAINLESS STEEL (S)

- » Multiple positions within casing possible.
- » Runner height may be asymmetrical around carrier pipe.
- » Positioning options include: standard (clear bell), centered, centered/restrained and non-centered/restrained
- » Refer to pages 16-21 for detailed information on Metallic Casing Spacers.

Typical Energy Market

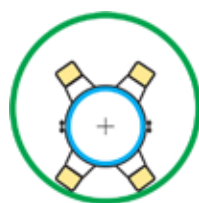


Standard

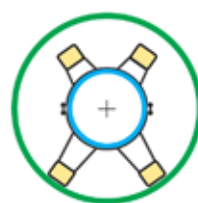


Centered/Restrained

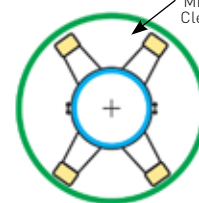
Typical Water Market



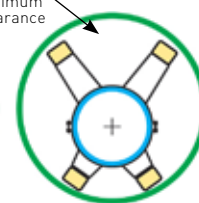
Standard



Centered

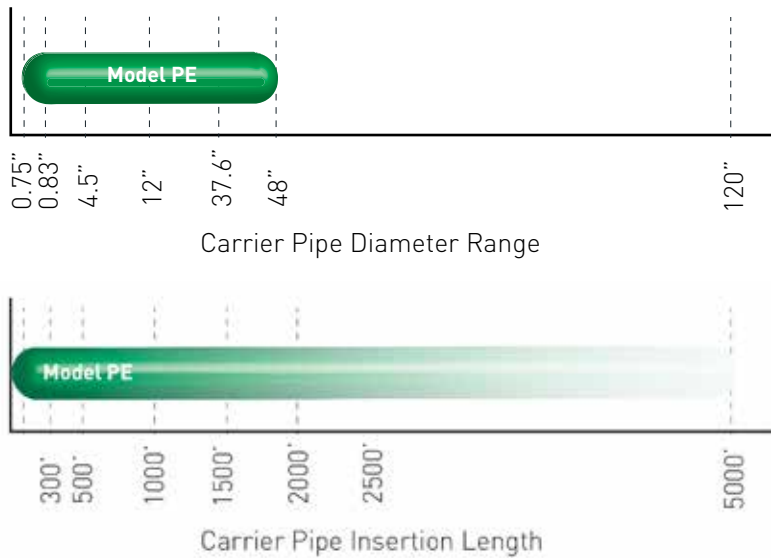


Centered/Restrained



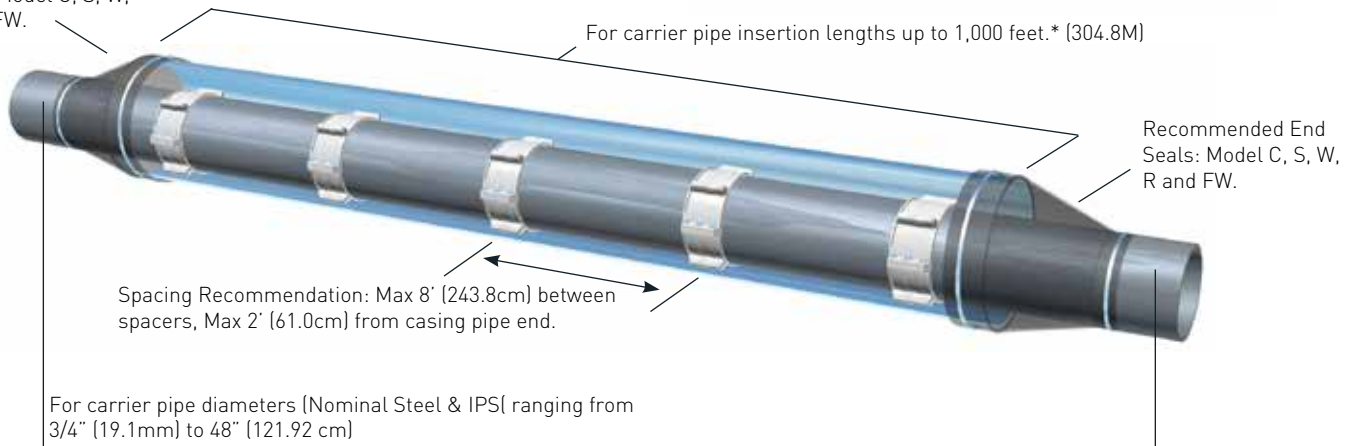
Non-Centered/Restrained

Contact GPT for use with Link-Seal® modular seals.



Contact GPT if longer insertions over 1000 ft.

Recommended End Seals: Model C, S, W, R and FW.



For carrier pipe diameters (Nominal Steel & IPS) ranging from 3/4" (19.1mm) to 48" (121.92 cm)

FEATURES/BENEFITS

- » Ribbed inner surface prevents slippage & guards against coating damage.
- » Molded from virgin polyethylene material.
- » Lightweight for ease of handling and installation.
- » Screwdriver is only tool needed for installation.
- » Eliminates the need for grout, blown sand or pea gravel.

TARGETED USE - ENERGY

Model PE Casing Spacers are designed for smaller diameter steel or polyethylene carrier pipes (ANSI O.D. pipe without a bell mechanical joint). We do not recommend that they be used on any carrier pipe over 24" (61.0cm) in diameter or for installations over 400 feet (121.9M) long without consulting with GPT. PE Isolators should not be used on concrete carrier pipe.

High density (linear), injection molded virgin Polyethylene casing isolators/spacers provide positive electrical isolation, high abrasion resistance and low coefficient of friction for a wide variety of double containment carrier/casing pipe applications. They are extremely light in weight and easy to handle during installation.

A ribbed inner surface prevents slippage and guards against carrier pipe coating damage while the outer surface may include any one of several molded runners to accommodate 2" (50.8mm) x 4" (101.6mm) or larger carrier/casing differentials. One piece solid molded segments provide for maximum load bearing. Hardware includes cadmium plated steel bolts and nuts. A screwdriver is the only tool needed for installation.

Casing Spacer Models - Non-Metallic, Model PE

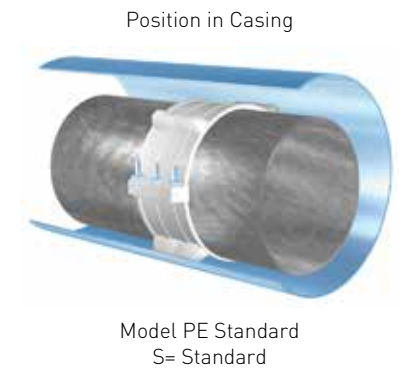
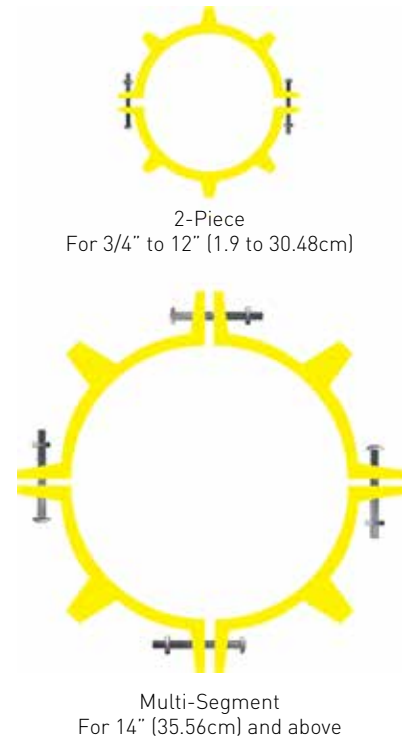
MATERIAL SPECIFICATIONS

Specification	ASTM Test	Value
Band/Runner Segments		Injection Molding Virgin Polyethylene
Tensile Strength	D638, D651	3,100 - 5,500 psi [218 - 387 kg/cm ²]
Compressive Strength	D693	3,200 psi [225kg/cm ²]
Water Absorption	D570	0.1%
Temperature		180°F. Max. [82°C]
Impact Strength	D256	1.5-2.0 ft lb/in. [0.8-1.07 newton-meters/cm]
Dielectric Strength	D149	450 Volts/Mil.
Color		White
Liner - None		
Runners - Size and Configurations		3/4" [19mm] through 12" [305mm] = 2-piece with molded-in runners 14" [356mm] and larger = Multiple segments with molded-in runners.
Hardware		Metallic - Bolts and Square Nuts = Plated Steel

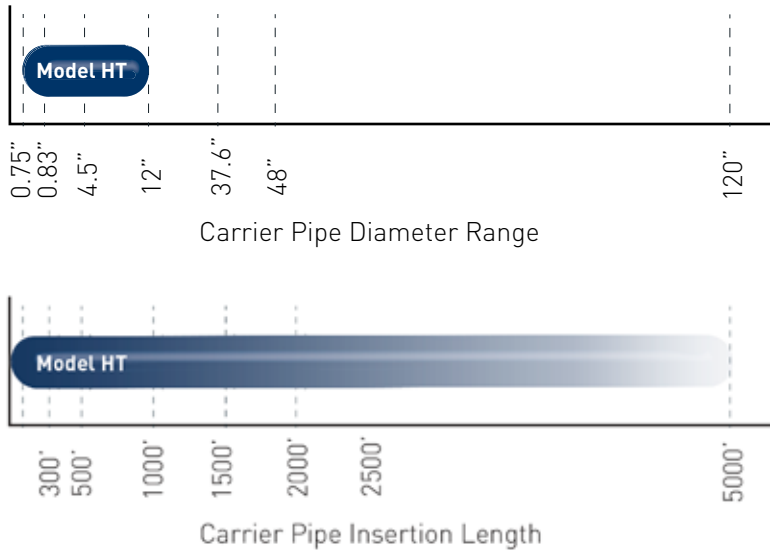
BAND WIDTH AND RUNNER HEIGHT

Model Size	Band Width	Runner Height
3/4 x 2	3.0" [76.19mm]	5/16" [7.94mm]
1 x 3	3.0" [76.19mm]	1/2" [12.7mm]
1-1/4 x 3	3.0" [76.19mm]	1/2" [12.7mm]
1-1/2 x 3	3.0" [76.19mm]	1/2" [12.7mm]
2 x 4	4.0" [101.6mm]	5/8" [15.88mm]
2-1/2 x 5	4.0" [101.6mm]	5/8" [15.88mm]
3 x 6	4.0" [101.6mm]	5/8" [15.88mm]
4 x 6	4.0" [101.6mm]	9/16" [14.29mm]
4 x 8	4.0" [101.6mm]	1" [25.4mm]
6 x 8	4.0" [101.6mm]	9/16" [14.29mm]
6 x 10	4.0" [101.6mm]	1" [25.4mm]
8 x 10	4.0" [101.6mm]	9/16" [14.29mm]
8 x 12	5.0" [127.0mm]	1" [25.4mm]
10 x 14	5.0" [127.0mm]	7/8" [22.23mm]
12 x 16	5.0" [127.0mm]	7/8" [22.23mm]
All multiple segments* [4" differential]	6.25" [158.75mm]	1" [25.4mm]
All multiple segments* [6" differential]	6.25" [158.75mm]	1-1/2" [38.1mm]

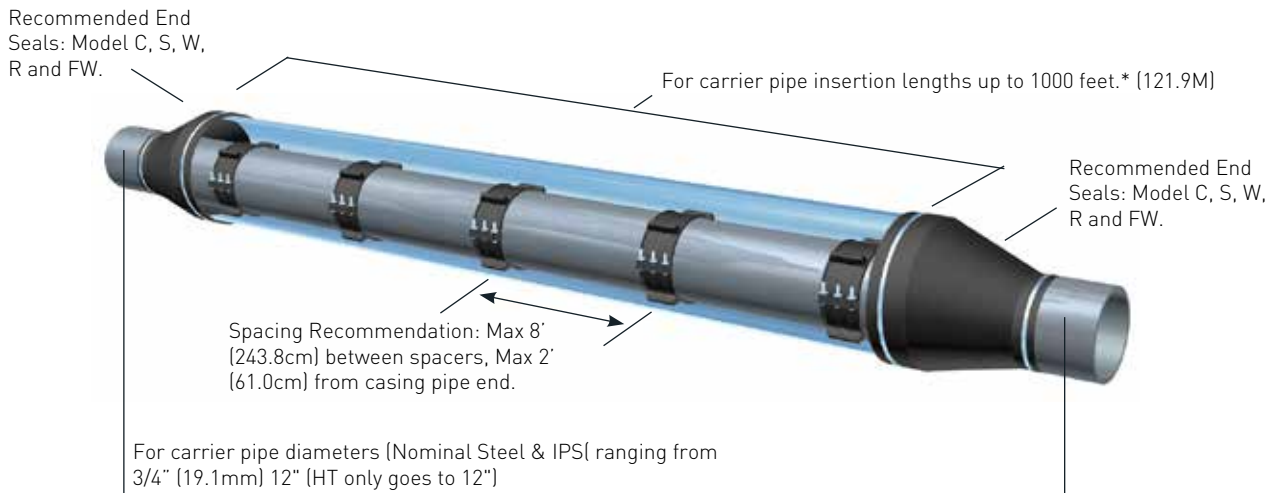
Note: Model PE sized for nominal steel and IPS pipe
 * Download model size information from www.gptindustries.com



Casing Spacer Models - Non-Metallic, Model HT



Contact GPT if longer insertions over 1000 ft.



FEATURES/BENEFITS

- » May be used for high-temperature applications.
- » Unique formulation of polymers allows isolator/spacer to be used in applications where temperatures may reach 280°F. (138°C)
- » Ribbed inner surface prevents slippage and guards against coating damage.
- » Lightweight for ease of handling and installation.
- » Screwdriver is only tool needed for installation.
- » Eliminates the need for grout, blown sand or pea gravel.

TARGETED USE - ENERGY

Model HT Casing Isolators are designed primarily for smaller diameter steel or polyethylene carrier pipes (ANSI O.D. pipe without a bell or mechanical joint). We do not recommend that they be used on any carrier pipe over 12" (30.5cm) in diameter or for installations over 400 feet (121.9M) long without consulting with PSI. HT Isolators should not be used on concrete carrier pipe.

Polycarbonate is used in the manufacturing of the Hi-Temp isolators/spacers giving them the ability to be used for applications that may reach 280°F (138°C). In addition to heat resistance, they also offer excellent electrical isolation, high abrasion resistance and low coefficient of friction for a wide variety of double containment carrier/casing pipe applications. Light in weight and easy to handle during installation, Model HT casing isolators also feature ribbed inner surface that prevents slippage and guards against carrier pipe coating damage. The outer surface may include any one of several molded runners to accommodate 2" (50.8mm) x 4" (101.6mm) or larger carrier/casing differentials.

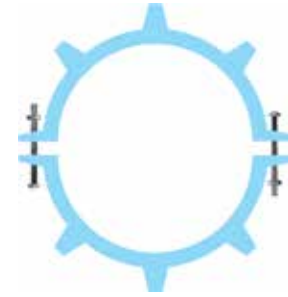
Casing Spacer Models - Non-Metallic, Model HT

MATERIAL SPECIFICATIONS

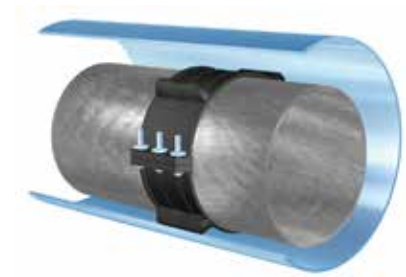
Specification	ASTM Test	Value
Band/Runner Segments		Injected Molded Virgin Polycarbonate
Tensile Strength	D790	8,100 - 9,000 psi (569 - 633 kg/cm ²)
Compressive Strength	D695	12,500 psi (879kg/cm ²)
Water Absorption	D570	0.1%
Temperature		266°F. Max. (130°C)
Impact Strength	D256	1.5-2.0 ft lb/in. (0.8-1.07 newton-meters/cm)
Dielectric Strength	D149	450 Volts/Mil.
Color		Black
T.P.E. 6 x 10 & larger		
Runners - Size and Configurations 3/4" (19mm) through 12" (305mm) = 2-piece with molded-in runners 14" (356mm) and larger = Multiple segments with molded-in runners.		
Hardware Metallic - Bolts and Square Nuts = Plated Steel		

Liner - T.P.E. Liner (HT Models 6x10 through 12x16)

Thickness	0.118" (3.0mm)
Hardness	Shore "A" 73
Dielectric Strength 1/8" (3.18mm) Surge Test Step-by-step test	60,000 V min. 58,000 V min.
Water Absorption	1% max.
Runners - Sizes and Configurations 3/4" (19mm) through 12" (305mm) = 2-piece with molded-in runners	
Hardware Metallic - Bolts and Square Nuts = Plated Steel	



2-piece
For 3/4" to 12" (1.9 to 30.48cm)



Model HT Standard
S = Standard

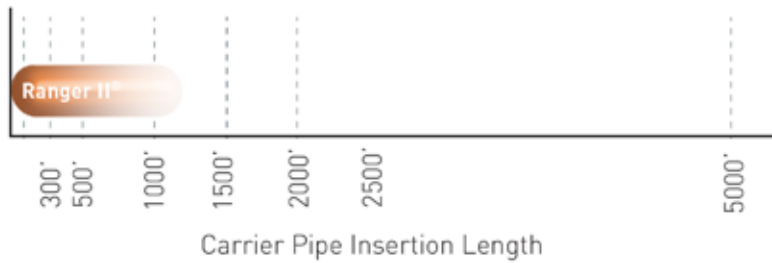
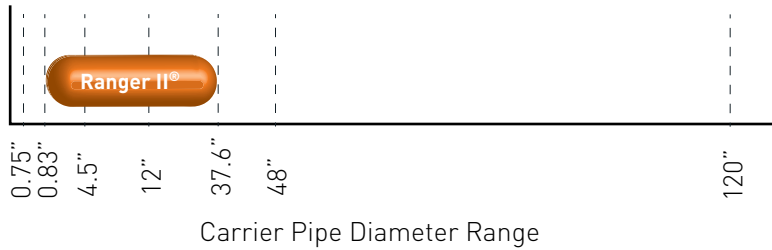
BAND WIDTH AND RUNNER HEIGHT

Model Size	Band Width	Runner Height
3/4 x 2	3.0" (76.19mm)	5/16" (7.94mm)
1 x 3	3.0" (76.19mm)	1/2" (12.7mm)
1-1/4 x 3	3.0" (76.19mm)	1/2" (12.7mm)
1-1/2 x 3	3.0" (76.19mm)	1/2" (12.7mm)
2 x 4	4.0" (101.6mm)	5/8" (15.88mm)
3 x 6	4.0" (101.6mm)	5/8" (15.88mm)
4 x 8	4.0" (101.6mm)	1" (25.4mm)
6 x 10*	4.0" (101.6mm)	1" (25.4mm)
8 x 12*	5.0" (127.0mm)	1" (25.4mm)
10 x 14*	5.0" (127.0mm)	7/8" (22.23mm)
12 x 16*	5.0" (127.0mm)	7/8" (22.23mm)

* = Sold with liner

Note: Model HT sized for nominal steel and IPS pipe

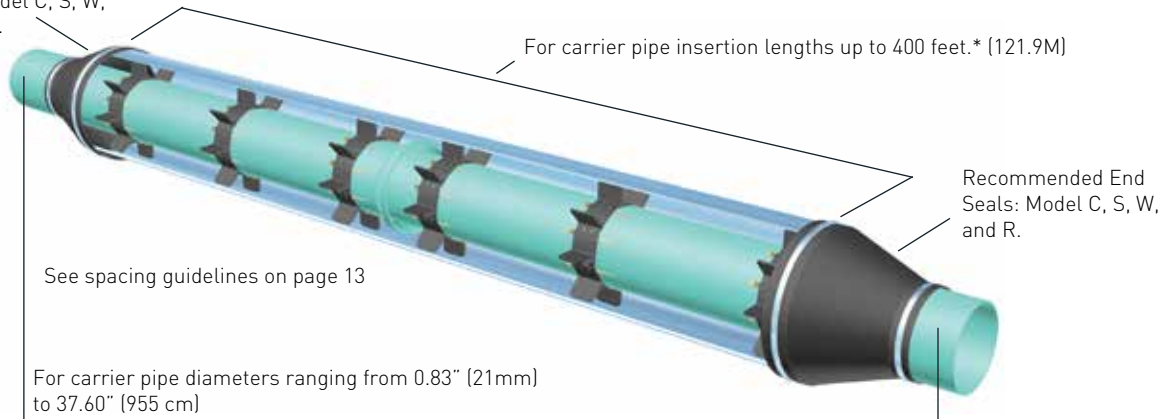
Ranger II® Non-metallic Casing Spacers



The Ranger II® is an all non-metallic casing isolator/spacer system that uses molded segments to encircle the carrier pipe. Each segment includes at least one molded-in runner and one slide lock. Customer's may choose from any one of five different size bands to allow correct sizing for carrier pipe O.D. ranges from 0.83" (21.1mm) up to 37.60" (95.5cm) in diameter. Once sized, the segments are placed around the carrier pipe and cinched together via non-metallic slide-locks. Installation is quick and easy while only a small inventory of segments may be used to accommodate a large variety of pipe styles, types and diameters.

Contact GPT if longer insertions over 400 ft.

Recommended End Seals: Model C, S, W, R and FW.



Separate segments are connected by inserting the buckles into slots on the adjacent segment. Slot accepts Slide-Lock. Arrow molded on segment indicates correct insertion direction.

Slide-Lock is used to tension the segments together after installation on pipe. Channels face up during insertion while the correct size Slide-Lock (micro, mini, midi, maxi) is molded on the flat (bottom) side.



Buckle with angled locking nubs.

Runners are available in a variety of heights to allow for desired carrier pipe placement in casing.



Slide-Lock is inserted into channel to close and lock the segments together. Slide-Lock removal and re-insertion will cinch the segments together for final tightening against carrier pipe.

Ranger II® Non-metallic Casing Spacers

MATERIAL SPECIFICATIONS

Specification	ASTM Test	Value
Band/Runner Segments		Injected Molded Virgin Polypropylene
Tensile Strength	D790	8,100 - 9,000 psi [569 - 633 kg/cm ²]
Compressive Strength	D695	3,000 psi [211 kg/cm ²]
Water Absorption	D570	0.1%
Temperature		-22°F to 212°F [-30°C to +100°C]
Impact Strength	D256	1.5 ft lb/in. [0.8 newton-meters/cm]
Dielectric Strength	D149	800 Volts/Mil.
Color		Black
Liner - None		
Runners - Size and Configurations		.65" [16.5 mm] through 6.89" [175 mm] = 2-piece with molded-in runners
Hardware		Non-metallic - Slide-Locks = No metallic parts

FEATURES/BENEFITS

- » All non-metallic. No nuts, bolts, washers or any other metal parts to corrode or degrade over time.
- » Designed for carrier pipe diameters from 0.83" [21mm] to 37.60" [955mm] in diameter.
- » Segmented pieces - small inventory may be used to accommodate a large variety of pipe styles, types and diameters. No extra trips from job site to warehouse for additional parts.
- » Easy assembly. Simply slide the segments together and cinch tight with the patented Slide-Lock connecting system.
- » Wide variety of runner heights to allow numerous options for pipe positioning within the casing.
- » Runner variations may be used to adjust for grade.
- » Will accommodate small conduit attachment for communications or electrical cable.
- » Medi and Maxi segments, 2 molded runners per segment.
- » Segment band and runners molded as one piece.

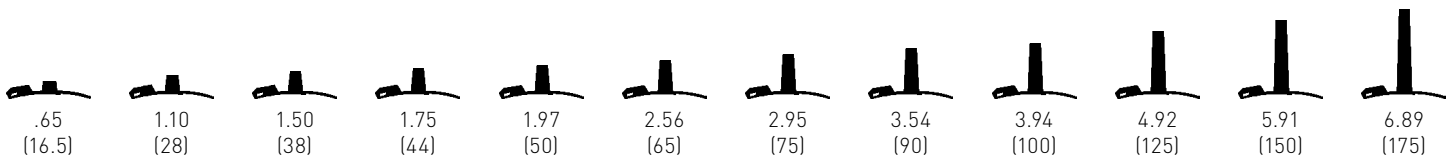
WEIGHT AND SPACING GUIDELINES

Ranger II® Casing Spacers Skid Height Spacing: (Maximum Distance Between Casing Spacer.)

Skid Height .65" [16.5mm] to 1.97" [50mm]	8' (Feet)
Skid Height 2.56" [65mm] to 3.54" [90mm]	6' (Feet)
Skid Height 3.94" [100mm] and up	5' (Feet)

Ranger II Casing Spacers Skid Height Max Load Per Spacer:

	MICRO	MINI	MIDI	MEDI	MAXI
Skid Height .65" [16.5mm] to 1.97" [50mm]	175 lb.	500 lb.	1,250 lb.	3,300 lb.	5,000 lb.
Skid Height 2.56" [65mm] to 2.95" [75mm]	135 lb.	400 lb.	1,000 lb.	2,600 lb.	4,000 lb.
Skid Height 3.54" [90mm] to 3.94" [100mm]	120 lb.	350 lb.	875 lb.	2,300 lb.	3,500 lb.
Skid Height 4.92" [125mm] to 5.91" [150mm]		250 lb.	625 lb.	1,650 lb.	2,500 lb.
Skid Height 6.89" [175mm]			550 lb.	1,400 lb.	2,300 lb.



TARGETED USE - WATER

Ranger II® spacers should not be used on concrete carrier pipe. Engineered equal to 304 Stainless Steel Metallic Casing Spacers. Excellent for the Stocking Distributor.

- » Manufactured from UV resistant polypropylene.
- » High impact strength, 1.5 ft. lbs./inch [0.8 joules/cm]
- » Excellent compressive strength, 3,000 psi [211 kg/square cm]
- » 800 Volts/Mil. Dielectric Strength.
- » Wide temperature range, -22° to +212° F. [-30° to +100° C.]
- » Eliminates sand or grout fill.
- » No special tools required for installation.
- » Low coefficient of friction for ease of installation.

Weight Comparison 9.05" x 17.25" CR Application

Ranger II Non-metallic 2.79lbs	Model S8GN2 Stainless Steel 15lbs.
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INSTALLED ON VARIOUS PIPE TYPES

- » PVC Water
- » PVC Sewer
- » HDPE Steel
- » Ductile Iron
- » Steel

Ranger II® Non-metallic Casing Spacers


RANGER II - MICRO FOR 0.83 - 3.07" (21 - 78MM) DIAMETER CARRIER PIPE BAND WIDTH = 2.13" (54MM)

Carrier Pipe O.D. Range Inches (mm)	Number of Segments	Runner Height Options Inches (mm)
0.83 - 1.14 (21 - 29)	3	Verify that Slide-Locks match segment size: Make sure (Mini) matches name molded on the bottom of the Slide-Lock. Note: Micro & Mini segments both use the Mini Slide-Lock.
1.14 - 1.54 (29 - 39)	4	
1.54 - 1.85 (39 - 47)	5	
1.85 - 2.24 (47 - 57)	6	
2.24 - 2.48 (57 - 63)	7	
2.48 - 3.07 (63 - 78)	8	




RANGER II - MINI FOR 2.48 - 5.51" (63 - 140MM) DIAMETER CARRIER PIPE BAND WIDTH = 3.15" (80MM)

Carrier Pipe O.D. Range Inches (mm)	Number of Segments	Runner Height Options Inches (mm)
2.48 - 3.07 (63 - 78)	4	Verify that Slide-Locks match segment size by checking to ensure the segment name (Mini) matches the name molded on bottom of the Slide-Lock. Note: Micro & Mini segments both use the Mini Slide-Lock.
3.07 - 3.86 (78 - 98)	5	
3.86 - 4.49 (98 - 114)	6	
4.49 - 5.51 (114 - 140)	7	



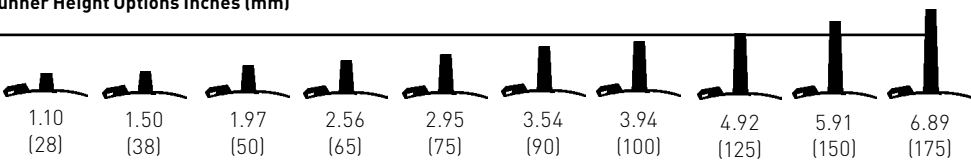
RANGER II - MIdI FOR 5.51 - 16.65" (140 - 423MM) DIAMETER CARRIER PIPE BAND WIDTH = 5.12" (130MM)

Carrier Pipe O.D. Range Inches (mm)	Number of Segments	Runner Height Options Inches (mm)
5.51 - 6.89 (140 - 175)	4	Verify that Slide-Locks match segment size by checking to ensure the segment name (Midi) matches the name molded on bottom of the Slide-Lock.
6.89 - 8.70 (175 - 221)	5	
8.70 - 10.31 (221 - 262)	6	
10.31 - 12.87 (262 - 327)	7	
12.87 - 14.41 (327 - 366)	8	
14.41 - 16.65 (366 - 423)	10	



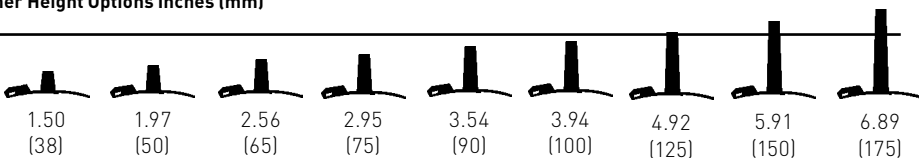
RANGER II - MEDI FOR 16.77 - 25.98" (426 - 660MM) DIAMETER CARRIER PIPE BAND WIDTH = 6.87" (174MM)

Carrier Pipe O.D. Range Inches (mm)	Number of Segments	Runner Height Options Inches (mm)
16.77 - 21.22 (426 - 539)	4	Verify that Slide-Locks match segment size by checking to ensure the segment name (Maxi) matches the name molded on bottom of the Slide-Lock. Note: Medi & Maxi segments both use the Maxi Slide-Lock.
21.22 - 25.98 (539 - 660)	5	



RANGER II - MAXI FOR 25.98 - 37.60" (660 - 995MM) DIAMETER CARRIER PIPE BAND WIDTH = 8.86" (225MM)

Carrier Pipe O.D. Range Inches (mm)	Number of Segments	Runner Height Options Inches (mm)
25.98 - 30.79 (660 - 782)	6	Verify that Slide-Locks match segment size by checking to ensure the segment name (Maxi) matches the name molded on bottom of the Slide-Lock. Note: Medi & Maxi segments both use the Maxi Slide-Lock.
30.79 - 37.60 (782 - 955)	7	



Ranger II® Non-metallic Casing Spacers

SIZE YOUR INSTALLATION APPLICATION

All Ranger II® Casing Spacers require more than one segment to complete a spacer. In addition, all Ranger II Casing Spacers are available with a number of different runner height options which are used to guarantee clearance of the mechanical joint, provide for options in carrier pipe positioning within the casing or to compensate for grade elevation adjustments. Following are examples on how to size Ranger II Casing Spacers for various applications. **Detailed Ranger II casing spacers weight & spacing guidelines on page 11. For exact centering and adjusting for grade elevation changes contact GPT.**

EXAMPLE - CENTERED & RESTRAINED WITH EQUAL LENGTH RUNNERS

20" Ductile Iron pipe (21.60" O.D. barrel & 28.63" O.D. bell) inside a 36" casing with a 0.375" wall thickness.

A. Find carrier pipe O.D. (21.60") from adjacent chart and choose the proper size and number of segments. One spacer would require 5 - Medi segments.

B. Determine maximum runner height with equal length runners.

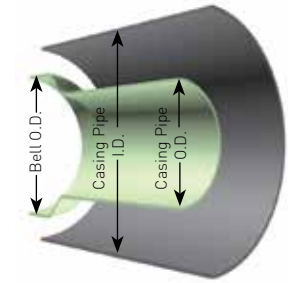
Casing I.D.	35.25"
Less Carrier Pipe O.D.	<u>-21.60"</u>
	13.65"
Less Space Allowance	<u>-1.00"</u>
	12.65"

Divide this number (12.65") by 2 to obtain the total maximum runner height = 6.325"

C. Choose a runner height of this value or less.

Solution: Use 5 - Medi (150) segments with runner heights of 5.91".

NOTE: This combination will restrain the pipe from flotation within the casing pipe by allowing only about 1.8" of clearance between the top runners and the casing I.D. This will center the carrier pipe within approximately 0.9" of exact center.



EXAMPLE - TO CLEAR THE BELL

(suggested minimum clearance is at least 0.8" (0.4" on both sides))

20" Ductile Iron pipe (21.60" O.D. barrel & 28.63" O.D. bell) inside a 36" casing with a 0.375" wall thickness.

Determine runner height. **(Clear Bell)**

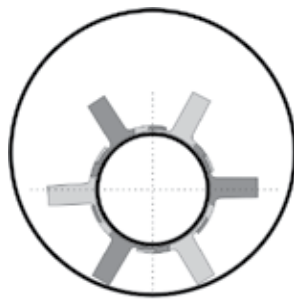
Bell O.D.	28.63"
Add 0.8" Clearance	<u>-0.08"</u>
	29.43"
Less Barrel O.D.	<u>-21.60"</u>
	7.83"

Divide this number (7.83") by 2 to obtain the minimum runner height to clear the bell = 3.92"

Choose a runner height between 3.92" and the maximum allowable runner height (6.32") determined in the above example.

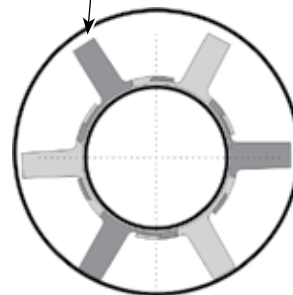
Solution: Use 5 - Medi (100) segments with runner heights of 3.94".

Ordering Codes: See Back Page for Ordering Code Sequence.



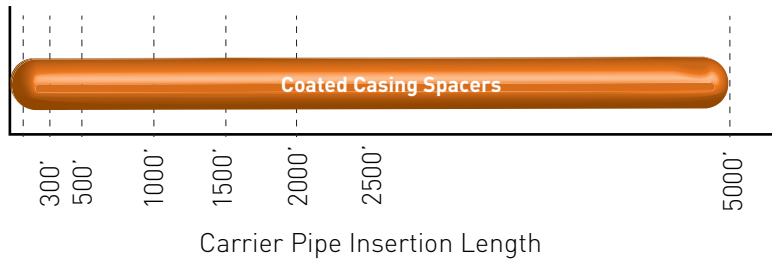
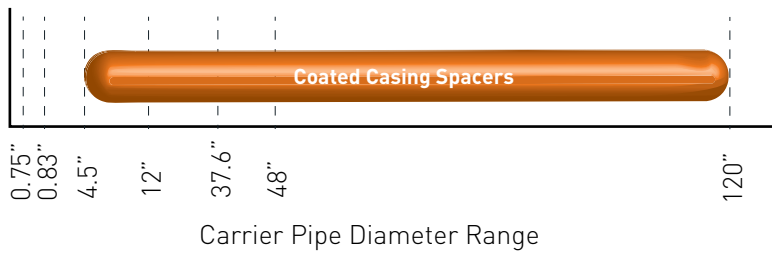
Standard To Clear Bell

Min. 1" (25.4mm) clearance typical

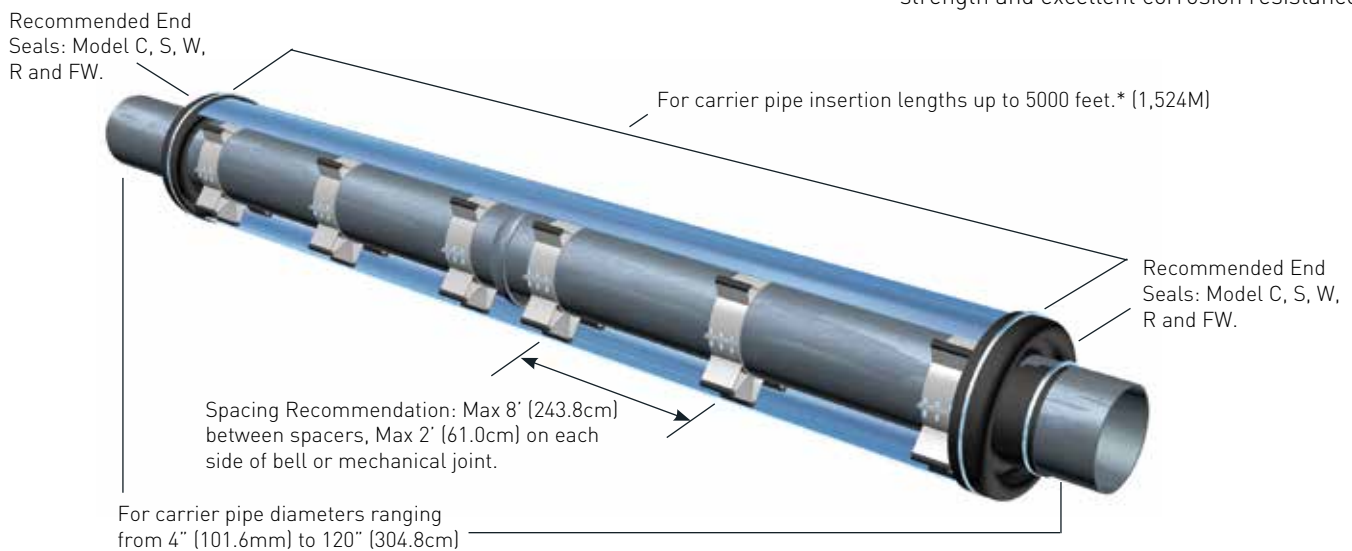


Centered / Restrained

Casing Spacer Models - Coated Metallic, Model C



GPT cross-linked polymer coated casing spacers/isolators are often selected due to their strength and excellent corrosion resistance.



MODEL OPTIONS

Model C8G2 or C8GN2

Coated Steel casing isolator with an 8" (203mm) wide steel band and 2" (50.8mm) wide glass reinforced polymer runners.

Model C12G2 or C12GN2

Coated Steel casing isolator with a 12" (305mm) wide steel band and 2" (50.8mm) wide glass reinforced polymer runners.

TARGETED USE - ENERGY, WATER & FILLED CASINGS

Pipe insertion lengths may vary depending on type of casing pipe, condition of casing pipe, misaligned casing joint or other factors that may cause excessive abrasion to runner materials.

An extremely tough and durable heat fused fluid bed thermo set cross-linked polymer coating is offered on steel casing spacers/isolators 4" and larger, with 8" and 12" band widths. The cold formed steel casing spacer/isolator band (risers where applicable) and studs for runner mounting are grit blasted, heated and fusion coated with a cross-linked epoxy polymer formulation, providing a minimum 0.010 (0.254mm) thick coating over the entire metallic surface. A post cured cycle strengthens the bond and provides an even more uniform coating. Other heat fused formulations are also available for custom orders and applications.

The runners are attached with 3/8" diameter studs, which are fusion welded to the band before it is powder coated. They are recessed far below the wearing surface of the runner. After the runner is anchored to the riser band, the stud counter-bore is filled with specially formulated caulk to assure a water tight seal for the stud and the locking fastener.

Casing Spacer Models - Coated Metallic, Model C

MATERIAL SPECIFICATIONS

Band

14 Gauge [0.074" [1.88mm)] hot rolled and pickled mild steel

12 Gauge [0.105" [2.66mm)] hot rolled and pickled mild steel (40" Ø and up)

Flanges of the spacer are deep embossed and the corners are chamfered

Configurations - Band

4" [101.6mm) through 36" [914mm) = 2 Piece

36" [914mm) through 48" [1,219mm) = 3 Piece

48" [1,219mm) and over = Consult Factory

Finish - 10 to 16 mil. fusion bonded PVC coating

Durometer - shore D2 (10 sec.) (ASTM D2240-74)	86
Max. Operating Temp. (constant)	225°F (107°C)
Aging Properties	Excellent
Electrical Properties (ASTM D149-61) (short time .010")	1,500 V/mil.
Resistance:	
Salt Spray (ASTM B117)	Excellent
Acids	Good
Alkalies	Good

Liner - Polyvinyl Chloride Liner (Standard)

Thickness	0.090" (2.29mm) minimum
Hardness	Durometer "A" 85-90
Dielectric Strength	
1/8" [3.18mm) Surge Test	60,000 V min.
Step-by-Step Test	58,000 V min.
Water Absorption	1% max.
Temperature	-40 to 170°F (-40 to 76°C)

Liner - T.P.E Liner (Temperature Extremes) Model C12 Only

Thickness	0.118" [3.0mm)
Hardness	Shore "A" 73
Dielectric Strength	
1/8" [3.18mm) Surge Test	60,000 V min.
Step-by-Step Test	58,000 V min.
Water Absorption	1% max.
Temperature	-50 to 270°F (-45 to 132°C)

Risers

10 gauge [0.135" [3.43mm)] steel MIG welded to band (Standard)

7 gauge [0.179" [4.55mm)] steel MIG welded to band (Contact GPT)

Configurations - Threaded Studs, Nuts and Washers

8" [203.2mm) Band = 6 studs, 12 nuts and washers

12" [305mm) Band = 8 studs, 16 nuts and washers

APPLICATIONS

Rugged, heavy duty steel casing spacers with tough glass reinforced polymer insulating runners are designed for ease of installation:

- » Concrete pipe
- » Ductile Iron pipe
- » Plastic pipe
- » Steel pipe

Model GN



Model G



Effective Runner Heights and Lengths - G and GN

Sizing carrier pipe O.D. and casing I.D. can be misleading at times due to a difference between nominal and effective dimensions. When sizing, make sure to consider effective runner height. Two heights are available/used; custom positioning in the casing can be achieved with riser heights.

Heights - Nominal versus Effective

2" Wide Glass Reinforced Nylon or Polyester Runners

Nominal 1.0" [25.4mm) - 1.5" [38.1mm)

Effective 1.07" [27.2mm) - 1.70" [43.2mm)

Lengths - Effective

2" Wide Glass Reinforced Nylon or Polyester Runners

7.0" [177.8mm) - 11.0" [279.4mm)

Glass reinforced polymer runners are standard in 2" [50.8mm) widths for Model C (coated).

GPT GN glass reinforced nylon runners have 5 times the compressive strength of polyethylene runners. Our Model G polyester 2" wide runners are particularly designed for heavier pipes and longer pulls.

Runners (G and GN) Note: GN Material is the GPT Standard Material

Sizes and Configurations

2" [51mm) Wide Glass Reinforced

Polyester (G) or Nylon Runners (GN)

4" [101.6mm) - 12" [305mm) = 2 top & 2 bottom

14" [356mm) - 36" [914mm) = 2 top & 4 bottom

38" [965.2mm) and over = Consult Factory

Runners Specifications (G and GN)

Tensile Strength, (ASTM D638)	17,600 psi (1,237 kg/cm ²)
Flexural Strength, (ASTM D790)	25,300 psi (1,779 kg/cm ²)
Compression Strength, (ASTM D695)	18,000 psi (1,266 kg/cm ²) (10% Deformation)
Deflection Temp. @ 264 psi, (ASTM D648)	405°F (205°C)

Hardware (Threaded Studs, Nuts and Washers)

Threaded Studs = 5/16" - 18 x 2 1/2" 304 Stainless Steel or plated

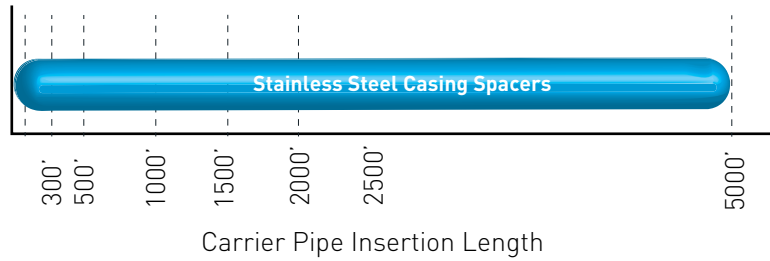
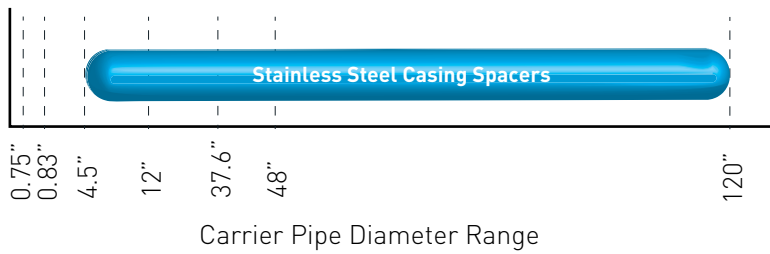
Hex Nuts = 5/16"

Washers = 5/16" SAE 2330

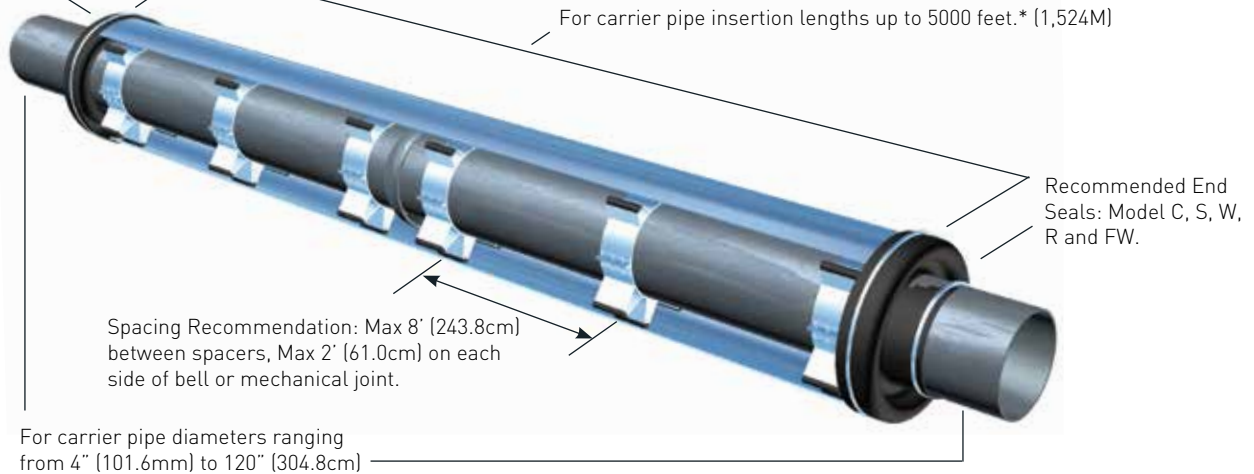
SPACER ACCOMMODATE

- » Mechanical Joints
- » Push-on
- » Restrained
- » Welded Joint Pipe
- » Small or large carrier/casing differentials
- » Electrical isolation of carrier pipe from casing for corrosion protection

Casing Spacer Models - Stainless Metallic, Model S



Recommended End Seals: Model C, S, W, R and FW.



MODEL OPTIONS

Model S8G2 or S8GN2

Stainless Steel casing isolator with an 8" (203mm) wide steel band and 2" (50.8mm) wide glass reinforced polymer runners.

Model S12G2 or S12GN2

Stainless Steel casing isolator with a 12" (305mm) wide steel band and 2" (50.8mm) wide glass reinforced polymer runners.

Model SL8GN2 (Cost Effective Stainless Option.)

Stainless Steel casing isolator with a 8" (203mm) wide steel band and 2" (50.8mm) wide glass reinforced polymer runners.

Designed for carrier pipe O.D's under 13.8" (35.0cm), targeting PVC pipe types for water market.

Tough, heavy duty 14 gauge (0.74"/1.88mm) 304 stainless steel isolators/spacers are available for use in highly corrosive environments. They offer maximum corrosion resistance while providing support for large diameter pipe, unusually heavy pipe or for long casing pulls. The flanges of the spacer are deep embossed and the corners are chamfered.

The runners are attached with 3/8" (9.5mm) diameter studs, which are fusion welded to the band. The studs are recessed far below the wearing surface of the runner and, after the runner is anchored to the band or riser, the stud counter-bore is filled to insure a water tight seal for the stud and the lock fastener.

Casing Spacer Models - Stainless Metallic, Model S

MATERIAL SPECIFICATIONS

Band

14 Gauge [0.074" [1.88mm]] 304 stainless steel (S8 and S12)

12 Gauge [0.105" [2.66mm]] 304 stainless steel (S12 - 40" - Ø & up)
Engineer/Contractor must specify

16 Gauge [0.061" [1.56mm]] 304 stainless steel (Model SL8)

Flanges of the spacer are deep embossed and the corners are chamfered

Configurations - Band

4" [101.6mm] through 36" [914mm] = 2 Piece

36" [914mm] through 48" [1,219mm] = 3 Piece

48" [1,219mm] and over = Consult Factory

Finish

None

Liner - Polyvinyl Chloride Liner (Standard)

Thickness 0.090" [2.29mm] minimum

Hardness Durometer "A" 85-90

Dielectric Strength

1/8" [3.18mm] Surge Test 60,000 V min.

Step-by-Step Test 58,000 V min.

Water Absorption 1% max.

Temperature -40 to 170°F [-40 to 76°C]

Liner - T.P.E Liner (Temperature Extremes) Model S12 Only

Thickness 0.118" [3.0mm]

Hardness Shore "A" 73

Dielectric Strength

1/8" [3.18mm] Surge Test 60,000 V min.

Step-by-Step Test 58,000 V min.

Water Absorption 1% max.

Temperature -50 to 270°F [-45 to 132°C]

Risers

10 gauge [0.135" [3.43mm]] 304 stainless steel MIG welded to band (Standard S8 and S12)

7 gauge [0.179" [4.55mm]] steel MIG welded to band (Contact GPT)

12 gauge [0.105" [2.667mm]] steel IMIG welded to band (Model SL8)

Configurations - Threaded Studs, Nuts and Washers

8" [203.2mm] Band = 6 studs, 12 nuts and washers

12" [305mm] Band = 8 studs, 16 nuts and washers

Model GN



Model G



Effective Runner Heights and Lengths - G and GN

Sizing carrier pipe O.D. and casing I.D. can be misleading at times due to a difference between nominal and effective dimensions. When sizing, make sure to consider effective runner height. Two heights are available/used; custom positioning in the casing can be achieved with riser heights.

Heights - Nominal versus Effective

2" Wide Glass Reinforced Nylon or Polyester Runners

Nominal 1.0" [25.4mm] - 1.5" [38.1mm]

Effective 1.07" [27.2mm] - 1.70" [43.2mm]

Lengths - Effective

2" Wide Glass Reinforced Nylon or Polyester Runners

7.0" [177.8mm] - 11.0" [279.4mm]

Glass reinforced polymer runners are standard in 2" [50.8mm] widths for Model S (stainless).

GPT GN glass reinforced nylon runners have 5 times the compressive strength of polyethylene runners. Our Model G polyester 2" wide runners are particularly designed for heavier pipes and longer pulls.

Runners (G and GN) Note: GN Material is the GPT Standard Material

Sizes and Configurations

2" [51mm] Wide Glass Reinforced

Polyester (G) or Nylon Runners (GN)

4" [101.6mm] - 12" [305mm] = 2 top & 2 bottom

14" [356mm] - 36" [914mm] = 2 top & 4 bottom

38" [965.2mm] and over = Consult Factory

Runners Specifications (G and GN)

Tensile Strength, (ASTM D638) 17,600 psi (1,237 kg/cm²)

Flexural Strength, (ASTM D790) 25,300 psi (1,779 kg/cm²)

Compression Strength, (ASTM D695) 18,000 psi (1,266 kg/cm²)
(10% Deformation)

Deflection Temp. @ 264 psi, (ASTM D648) 405°F (205°C)

Hardware (Threaded Studs, Nuts and Washers)

Threaded Studs = 5/16" - 18 x 2 1/2" 304 Stainless Steel or plated

Hex Nuts = 5/16"

Washers = 5/16" SAE 2330

SPACER ACCOMMODATE

- » Mechanical Joints
- » Push-on
- » Restrained
- » Welded Joint Pipe
- » Small or large carrier/casing differentials
- » Electrical isolation of carrier pipe from casing for corrosion protection

APPLICATIONS

Rugged, heavy duty steel casing spacers with tough glass reinforced polymer insulating runners are designed for ease of installation:

- » Concrete pipe
- » Ductile Iron pipe
- » Plastic pipe
- » Steel pipe

Multiple Carrier Pipe - Metallic

ENGINEERED CUSTOM FABRICATION

MULTIPLE CASING SPACERS - ENGINEERED

GPT is the industry leader in the design and fabrication of multiple carrier spacers used for inserting different size pipes, conduits and wires into casings. Projects have ranged from simple dual pipe configurations to complex pipe/conduit arrangements, designed for maximum strength and efficiency within all pipe specifications.

Customized spacers are also available with electrically isolated rollers to ease installation of unusually heavy carrier pipes or for extremely long casing pipe runs.

GPT Models C (coated) and S (stainless steel) may be designed and fabricated to meet the needs of your custom project.

All custom multiple carrier spacers share the same features as our single carrier spacers described throughout this brochure. However, the multiple carrier spacers are considerably more complex and therefore require more detailed design considerations.

Please contact GPT during your design phase. We have over forty years experience with custom casing spacers and can provide you with insights into design criteria based on "real world" applications in all industries.



BENEFITS/FEATURES

- » Customized To Customer Specifications
- » Design Assistance If Needed
- » Same High Quality As Standard Isolators
- » May be Specified with Heavy Duty PVC Inner Liner Provides Protection For Pipe and/or Coating
- » Rollers may be used for long pulls and/or heavy pipe installations
- » Designed to last for the life of the piping system
- » Eliminates the Need for Grout, Blown Sand or Pea Gravel



Ordering Procedure - Metallic Casing Spacers

MULTIPLE CASING SPACERS - ENGINEERED

1. Quantity
2. Type Finish
3. Band Width
4. Runner Width
5. Carrier Pipe O.D. (Type and coating thickness if applicable)
6. Casing Pipe I.D. (Type and coating thickness if applicable)
7. Carrier Pipe Joint O.D. (If applicable)
8. Carrier pipe position within casing
9. Length of crossing
10. Contact your local distributor or GPT

Example

Coated 12" (305mm) wide steel band casing spacer with 2" (50.8mm) wide glass reinforced nylon runners for a 16" (400mm) ductile iron pipe with a 17.40" (400mm) outside diameter within a casing pipe with a 23.25" (590mm) inside diameter, carrier pipe joint O.D. 20.00" (508mm), standard position.

C 12 GN2 17.40 X 23.25 - 20.00" - CB

Type Finish

- C = Coated
- S = 304 Stainless Steel
- SL8 = Light Gauge 304 Stainless Steel

Band Width

- 8 = 8" Band
- 12 = 12" Band

Runner Width

- G2 = 2" Wide Glass Reinforced Polyester Runners
- GN2 = 2" Wide Glass Reinforced Nylon Runners

Carrier Pipe O.D.

Indicate actual O.D. including coating.

Casing Pipe I.D.

Indicate actual I.D. including coating.

Carrier Pipe Joint/Bell O.D. (if applicable)

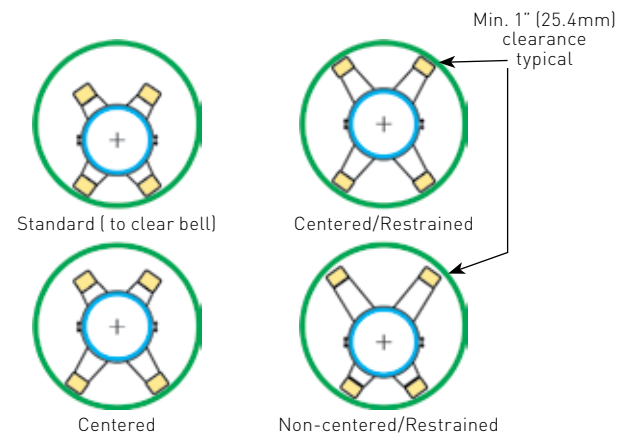
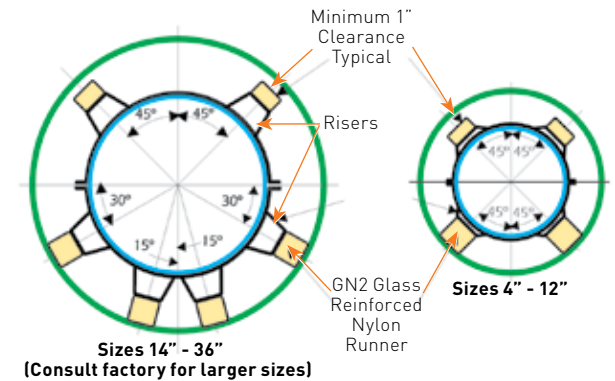
Indicate actual O.D. including coating.

Position within Casing

- S = Standard
- C = Centered
- CR = Centered/Restrained
- NCR = Non-centered/Restrained

NOTE: GN Runner material is standard

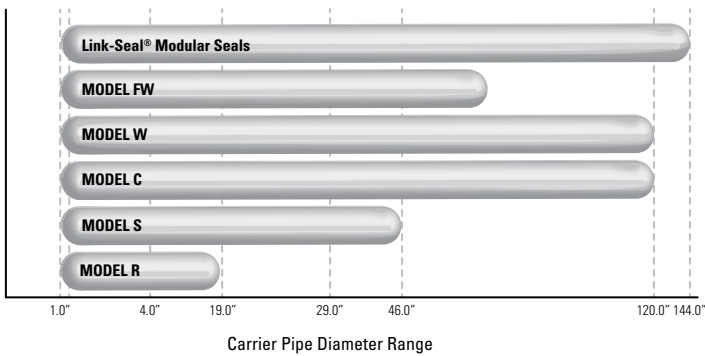
TYPICAL CONFIGURATION EXAMPLES



MULTIPLE CASING SPACERS - ENGINEERED

Contact GPT during design stage

Casing End Seals - Models C & R



MODEL C END SEALS | WATER/ENERGY MARKET

(For New Installations)

Model C Custom Pull-on End Seals are designed to accommodate custom carrier/casing diameter combinations. They are made to customer supplied specifications so they may be used for any size casing/carrier differential. Manufactured from 1/8" thick specially compounded synthetic rubber, GPT Model C end seals are extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

BENEFITS/FEATURES

- » Custom Made to Order
- » Quick and Easy Installation
- » Carrier Pipe Does Not Need To Be Centered Within Casing
- » Screwdriver Is Only Tool Required for Installation
- » Designed To Last for the Life of the Piping System
- » Heavy Duty Stainless Steel Hose Clamps Supplied

MODEL R END SEALS AND NIGHT CAPS | WATER/ENERGY MARKET

(For New Installations)

Model R End Seals are available in five (5) different sizes to accommodate a wide range of carrier/casing diameter combinations. A unique "cone" design, with molded-in dimensions, are easily cut to size for a correct fit on the carrier pipe.

BENEFITS/FEATURES

- » Low storage costs, only five end seal sizes to accommodate casings from 4" (10.2cm) to 24" (61.0cm) in diameter with all applicable carrier pipe sizes
- » May be easily stocked in 5 model sizes
- » Quick and Easy Installation
- » Manufactured from 1/8" (3.18mm) thick high quality EPDM rubber
- » Casing night cap prevents entry of debris and animals during install
- » Sizes are clearly printed on sleeve to simplify cutting to the correct size
- » Designed to last for the life of the piping system
- » Stainless steel bands for clamping both ends of end seal provided
May be used for new installations

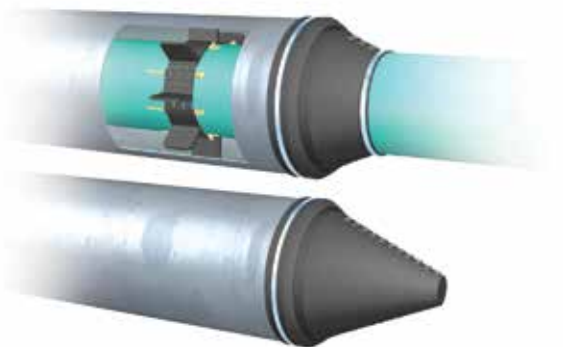
Material	Endseal Model						Material Specifications
	C	R	S	W	FW	LS	
EPDM 60	X	X	X	X	*		Thickness = 1/8" (3.18mm) Color = Black Temperature = 250°F (121°C)
BUNA-N ¹	X			X	*		Thickness = 1/8" (3.18mm) Color = Black Temperature = 212°F (100°C)
NEOPRENE	X			X	*		Thickness = 1/8" (3.18mm) Color = Black Temperature = 170°F (77°C)
NITRILE						X	Color = Green Temperature = 210°F (99°C)
SILICONE						X	Color = Grey Temperature = 400°F (204°C)
EPDM						X	Color = Black Temperature = 250°F (121°C)

Note:

Standard casing end seals are designed for below grade applications. For above grade applications please contact GPT. LS=Link-Seal® Modular Seals

* = Contact GPT for Material Specifications

1. High grade Buna-N material available for oil/gas run off.



For Model R End Seal sizing, download Model R literature.
www.gptindustries.com

Casing End Seals

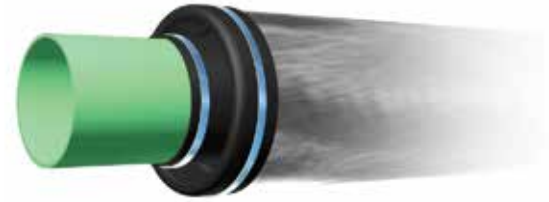
MODEL S STANDARD PULL-ON END SEALS | ENERGY MARKET

(For New Installations)

Model S Standard Pull-on End Seals are flexible and easily installed on Nominal Steel & IPS casing/carrier pipe combinations. GPT Model S end seals are extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

BENEFITS/FEATURES

- » Quick and Easy Installation
- » May be stocked
- » Screwdriver Is Only Tool Required for Installation
- » Designed To Last for the Life of the Piping System
- » Heavy Duty Stainless Steel Hose Clamps Supplied



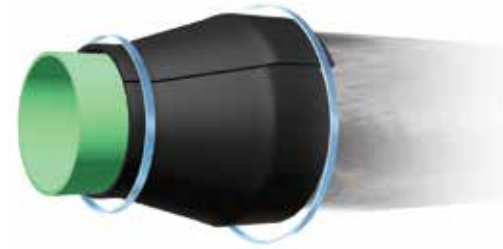
MODEL W WRAP AROUND END SEALS | WATER/ENERGY MARKET

(For New and Existing Installations)

Model W Wrap Around End Seals are designed to accommodate customer supplied specifications so they may be used for any size casing/carrier differential. GPT Model W end seals are extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

BENEFITS/FEATURES

- » Custom Made to Order
- » Quick and Easy Installation
- » Carrier Pipe Does Not Need To Be Centered Within Casing
- » Can Be Installed on Existing Casing Installations
- » Screwdriver Is Only Tool Required for Installation
- » Designed To Last for the Life of the Piping System
- » Heavy Duty Stainless Steel Hose Clamps Supplied
- » Self-Curing Seam - Simply Remove Plastic Backing and Press Together



MODEL FW FIRE RESISTANT END SEALS | ENERGY MARKET

(For New and Existing Installations)

Model FW Fire Resistant End Seals have been developed for applications identified as fire prone areas such as tank farms or pipes passing through fire walls. They are ordered to customer supplied specifications so they may be used for any size casing/carrier differential. These seals are excellent for eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

BENEFITS/FEATURES

- » Custom Made to Order
- » Quick and Easy Installation
- » Carrier Pipe Does Not Need To Be Centered Within Casing
- » Screwdriver Is Only Tool Required for Installation
- » Designed To Last for the Life of the Piping System
- » Heavy Duty Hose Clamps Supplied



**Standard casing end seals are designed for below grade applications.
For above grade applications please contact GPT.**

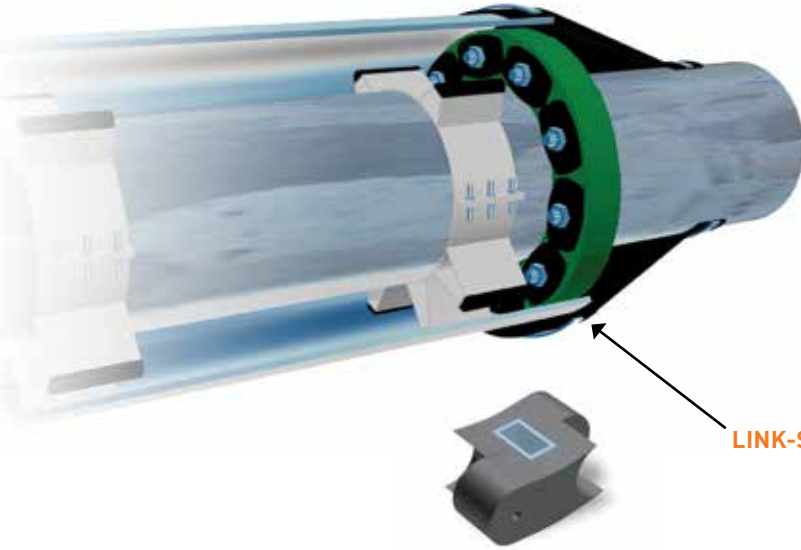
Casing End Seals - Link-Seal® Modular Seals

FOR DOUBLE SEALING PIPELINE CASING ENDS WHEN CARRIER PIPE IS CENTERED IN CASING



LINK-SEAL® MODULAR SEALS WITH REINFORCED CENTERING BLOCKS

A Link-Seal® modular seal assembly installed at each end of pipeline casings provides positive, hydrostatic protection against the entry of water, soil or other backfill materials and reduces corrosion and ice damage. If casing isolators are not used, starting with 14" diameter assemblies, we suggest Link-Seal® modular seals with "centering blocks" in 25% of the links. These centering blocks fit into molded openings in the Link-Seal® modular seals and are positioned in the lower 90° of each assembly. GPT centered casing isolators should also be placed within two feet of casing ends.



LINK-SEAL® MODULAR SEALS WITH CENTERING BLOCKS

400 SERIES

For Casings Two Pipe Sizes Larger than Carrier Pipe

CARRIER X CASING PIPE IPS NOMINAL	COMPLETE CASING SEAL ASSEMBLY CONSISTS OF:			BASIC LINK-SEAL® SIZE USED	COMPLETE ASSEMBLY ORDER NO.
	PLAIN LINKS	LINKS WITH CENTERING BLOCKS	TOTAL LINKS		
2" X 6"	5	0	5	LS-410	26*
3" X 6"	7	0	7	LS-360	36*
4" X 8"	7	0	7	LS-475	48*
6" X 10"	10	0	10	LS-475	610*
8" X 12"	12	0	12	LS-475	812*
10" X 14"	10	0	10	LS-425	1014*
12" X 16"	12	0	12	LS-425	1216*
14" X 18"	9	4	13	LS-400	1418
16" X 20"	11	4	15	LS-400	1620
18" X 22"	13	4	17	LS-400	1822
20" X 24"	13	5	18	LS-400	2024
22" X 26"	16	5	20	LS-400	2226
24" X 28"	17	5	22	LS-400	2428
26" X 30"	17	6	23	LS-400	2630
28" X 32"	18	7	25	LS-400	2832
30" X 34"	20	7	27	LS-400	3034
32" X 36"	21	8	29	LS-400	3236
34" X 38"	22	8	30	LS-400	3438
36" X 40"	24	8	32	LS-400	3640

* = Centering Blocks are not required and not available for these models. (Maximum coating 3/16" thick - Casing pipe walls should not exceed 0.500" except for casing sizes 12", 14" and 16", which should not have a wall thickness greater than 0.312")

500 SERIES

For Casings Three Pipe Sizes Larger than Carrier Pipe

CARRIER X CASING PIPE IPS NOMINAL	COMPLETE CASING SEAL ASSEMBLY CONSISTS OF:			BASIC LINK-SEAL® SIZE USED	COMPLETE ASSEMBLY ORDER NO.
	PLAIN LINKS	LINKS WITH CENTERING BLOCKS	TOTAL LINKS		
4" X 10"	6	0	6	LS-500	410**
6" X 12"	7	0	7	LS-500	612**
8" X 14"	11	0	11	LS-575	814**
10" X 16"	7	3	10	LS-525	1016
12" X 18"	9	3	12	LS-525	1218
14" X 20"	9	4	13	LS-500	1420
16" X 22"	11	4	15	LS-500	1622
18" X 24"	12	4	16	LS-500	1824
20" X 26"	13	5	18	LS-500	2026
22" X 28"	14	6	20	LS-500	2228
24" X 30"	15	6	21	LS-500	2430
26" X 32"	17	6	23	LS-500	2632
28" X 34"	18	6	24	LS-500	2834
30" X 36"	19	7	26	LS-500	3036
32" X 38"	21	7	28	LS-500	3238
34" X 40"	21	8	29	LS-500	3440
36" X 42"	23	8	31	LS-500	3642
42" X 48"	27	9	36	LS-500	4248
48" X 54"	30	11	41	LS-500	4854
54" X 60"	34	12	46	LS-500	5460

** = Centering Blocks are not required for these applications. (Maximum coating 3/16" thick - Casing pipe walls should not exceed 0.500" except for casing sizes 16" and 18" which should not have a wall thickness greater than 0.312")

Link-Seal® Modular Seals - Installation Techniques



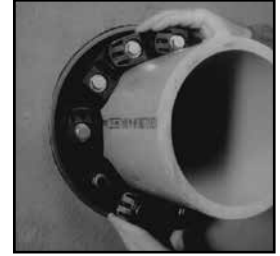
1. Center the pipe, cable or conduit in wall opening or casing. Make sure the pipe will be adequately supported on both ends. Link-Seal® modular seals are not intended to support the weight of the pipe.



2. Loosen rear pressure plate with nut just enough so links move freely. Connect both ends of belt around the pipe.



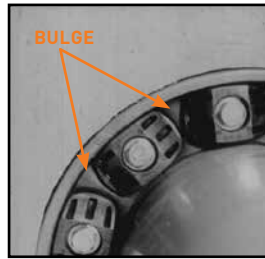
3. Check to be sure all bolt heads are facing the installer. Extra slack or sag is normal. Do not remove links if extra slack exists. Note: On smaller diameter pipe, links may need to be stretched.



4. Slide belt assembly into annular space. For larger size belts, start inserting Link-Seal® modular seal assembly at the 6 o'clock position and work both sides up toward the 12 o'clock position in the annular space.



5. Using a hand socket or offset wrench ONLY, start at 12 o'clock. Do not tighten any bolt more than 4 turns at a time. Continue in a clockwise manner until links have been uniformly compressed. [Approx. 2 or 3 rotations]



6. Make 2 or 3 more passes at 4 turns per bolt MAXIMUM, tightening all bolts clockwise until all sealing elements "bulge" around all pressure plates. On type 316 stainless steel bolts, hand tighten ONLY without power tool.



7. If the seal doesn't appear to be correct using the instructions provided, Call GPT at 800-423-2410.

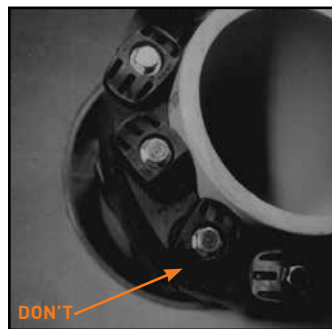
Installation Notes: The Link-Seal® modular seal bolt heads are usually recessed below the wall opening or the edge of casing pipe and therefore a socket or offset wrench must be used. Hand Tools: Use 5/16" hex or #6 screwdriver for LS-200. 1/2" hex requires 3/8" drive socket wrench. 9/16" and 3/4" hex requires 1/2" drive socket wrench. (Tools not provided.)

LINK-SEAL® MODULAR SEAL - DO'S



1. Make sure pipe is centered.
2. Install the belt with the pressure plates evenly spaced.
3. Install the exact number of links indicated in sizing charts.
4. Check to make sure pipe is supported properly during backfill operations. Note: Link-Seal® modular seals are not intended to support the weight of the pipe.
5. Make sure seal assembly and pipe surfaces are free from dirt.
6. For tight fits, use non-polluting liquid detergent to assist with installation.

LINK-SEAL® MODULAR SEAL - DON'TS



1. Don't Install the belt with the pressure plates aimed in irregular directions. (Staggered)
2. Don't Install Link-Seal® modular seals where weld-beads or other irregular surfaces exist without consideration of the sealing requirements.
3. Don't torque each bolt completely before moving on to the next.
4. Don't use high speed power tools (450 rpm or more)
5. Do not use power tools on Link-Seal® modular seal 316 stainless steel bolts.
6. Don't use grease installing Link-Seal® modular seals.

Ranger II® Casing Spacer Installation Techniques

IMPORTANT PRE-INSTALLATION FACTORS:

- A. Always wear protective safety glasses, especially in low temperatures.
- B. Installation in Cold Climates: Keep Ranger II® segments and Slide-Locks in a warm environment while awaiting installation in colder climates.
- C. Installation in Warm Climates: Under hot installation conditions, allow the product to age a couple of hours at ambient temperature prior to assembly.
- D. Review Steps 1-3 on page 27.



1. Size the Ranger II to make sure you have all the segments and Slide-Locks. Refer to the sizing chart on page 12.



2. Take the segments and align the buckles. Insert the buckles 1/4 of the way into the slots. This will vary after your first installation.



3. Locate the directional arrows on the segment and insert Slide-Lock until the tip exits the end of the segment.



4. Continue the process from the previous step until all segments are put together. You're now ready to wrap the Ranger II around the pipe.



5. Align the buckles and lock into place. Take the final Slide-Lock and slide into place.

Note: In tight installation areas you might need to break the belt into two parts and then wrap the R-II around the pipe.



6. Insert all Slide-Locks as far as possible by hand. Complete tightening by tapping each Slide-Lock with a hammer, while holding the Slide-Lock against the pipe.



7A. To tighten Ranger II securely to carrier pipe, back Slide-Lock completely out of the slot. If needed, push segments together by hand.

Note: You may have to release tension by loosening other Slide-Locks.



7B. Re-insert Slide-Locks into segments or until tight by driving Slide-Lock back into position while holding the Slide-Lock against the pipe.



7C. Repeat steps 7A and 7B until Ranger II is secure against the carrier pipe and unable to move.

Note: In tight installation areas you might need to break the belt into two parts and then wrap the R-II around the pipe.



Note: Properly installed slide-locks will rarely be driven all the way in. To secure a tight fit drive as far as possible, but if all are driven completely, [bottomed out] it may not be tight enough. Verify Ranger II casing spacer cannot slide on carrier pipe.

TROUBLE SHOOTING INSTALLATION PROCEDURE: STEPS A - D



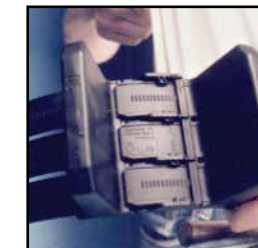
A) If a Slide-Lock should break during installation, remove and replace with a new Slide-Lock.



B) Remove Slide-Lock by backing it out, do not pull it through to remove broken piece. Tap broken piece back out.



C) Take a Slide-Lock and insert the opposite direction of the arrows. Push until you can grab the broken piece and remove.



D) If the Slide-Lock does not completely lock into place the following may have occurred. Two or more segments may have engaged completely. To rectify back Slide-Lock out and readjust segments by pulling them apart by hand. Re-insert Slide-Lock and adjust tightness of the spacer with another segment.

Slide-Lock will NOT insert completely.



Installation Techniques for Metallic Casing Spacers

INSTALLATION TECHNIQUES FOR METALLIC CASING SPACERS (MODELS C AND S)

In general, the actual physical insertion method is left to the expertise of the installation contractor and beyond the scope of GPT.

The following are suggested installation techniques and guidelines that should be taken into consideration when installing the casing spacers to the carrier pipe and handling prior to insertion.

1. It is absolutely critical that when installing the casing spacer that the spacers are lined up perfectly straight on the carrier pipe. All runners should line up straight like the sight through a gun barrel, making sure all segments of the spacer correspond to the drawing.
2. When handling the pipe it is also critical that the load is uniformly applied to all casing spacers on each joint of pipe and not just one. Furthermore, caution should be taken so they do not set the carrier pipe down with the casing spacers attached unless it is on a cut-a-way section of the casing pipe so the runners are bearing the weight uniformly.
3. The weight should be uniformly distributed to all bottom runners at one time. Better yet, until the pipe is being installed, have the contractor place sand bags or similar material under the pipe to bear the weight.
4. Metallic casing spacers are labeled TOP and BOTTOM; install accordingly.
5. The casing spacers should be uniformly tightened so that approximately 1/2" space (by design) exists at each flange of the casing spacer. The studs at each flange should be tightened uniformly which should result in a torque reading of 60 inch-pounds (5 foot-pounds)*.
6. Spacing between casing spacers is as detailed on the project or in accordance with the latest GPT literature.
7. It is desirable to restrict or minimize rotation or rifling of the carrier pipe within the casing unless the spacers are designed with equal length runners and specifically intended to allow for rotation.
8. Spacers are manufactured with requested clearance design. If weld beads are excessive (more than 1/4"), bore of casing beyond quality tolerances, bend or sags exist in the casing, these tolerances could be diminished. Call GPT @ 800-423-2410 if any of these conditions exist.

*In most installations, torque wrenches are not used. The nuts are tightened on the studs sufficiently, but not so much as to bend the flanges of the casing spacers.

INSTALLATION TECHNIQUES FOR MODEL PE AND HT CASING SPACERS

Steps 1 - 3 listed above should be followed for all GPT Casing Spacers



1. Size the casing spacers using charts on appropriate product pages. When opening packaging, make sure you have the correct amount of segments, bolts and nuts for your application.



2. Pre-assemble segments by inserting bolts through spacer segments and hand tightening nuts. Leave one segment open so you can position the "belt of segments" around the pipe.



3. Position belt around pipe and secure all segments by tightening all bolts with standard screw driver or allen head (Model AZ).

Installation Techniques for GPT Casing End Seals

INSTALLATION TECHNIQUES - MODEL C AND S END SEALS (NEW INSTALLATION ONLY)

Prior to installing the final carrier pipe section into casing, slide end seal loosely onto carrier pipe making sure large opening of end seal is facing toward casing pipe. Position end seal on carrier pipe so it will be near the casing opening after the insertion of the carrier pipe is complete.



1. Prepare outside surfaces by removing dirt from casing and carrier pipes.
2. After carrier pipe is completely inserted into casing and end seal is correctly positioned relative to both casing and carrier pipes, secure large end (casing end) with stainless steel hose/banding clamp. Hose/banding clamp should be positioned at least 1" (25.4cm) from the end of the casing pipe. Tighten screw with a standard screwdriver to secure end seal to casing pipe.
3. Fold end seal into an "S" shape so it will protrude into the casing. This is done to relieve stress during backfilling and allow for expansion and contraction both during and after installation is complete. The small end of the end seal will slide toward the casing as the "S" is constructed.
4. Position banding clamp approximately 1" from the small end of the end seal (on the carrier pipe) and tighten with a standard screwdriver to secure end seal to carrier pipe.



INSTALLATION TECHNIQUES - MODEL R END SEALS (NEW INSTALLATION ONLY)

Cut the seals at the closed end of the end seal to the measured external diameter of the carrier pipe. Prior to installing the final carrier pipe section into casing, slide end seal loosely onto carrier pipe making sure large opening of end seal is facing toward casing pipe. Position end seal on carrier pipe so it will be near the casing opening after the insertion of the carrier pipe is complete.

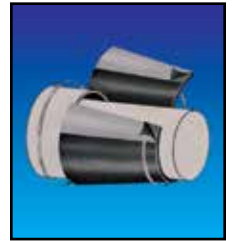


Follow steps 1 through 4 as shown for Model "C" and "S" End Seals.

Note: The printed sizes are marked or embossed on each end seal.

INSTALLATION TECHNIQUES - MODEL W END SEALS (NEW OR RETROFIT APPLICATIONS)

1. Prepare outside surfaces by removing dirt from casing and carrier pipe.
2. Wrap end seal around both carrier and casing pipes, making sure the widest portion of the end seal is wrapped around the casing pipe.
3. Overlap the edges of the end seal with the release papers facing each other.
4. Remove release papers and firmly press together along the entire edge of the sealing area. Repeat the pressing process to make sure seam is tight.
5. Secure large end (casing end) with stainless steel hose/banding clamp. Hose/banding clamp should be positioned at least 1" (25.4cm) from the end of the casing pipe. Tighten screw with a standard screwdriver to secure end seal to casing pipe.
6. Fold end seal into an S shape so it will protrude into the casing. This is done to relieve stress during backfilling and allow for expansion and contraction both during and after installation is complete. The small end of the end seal will slide toward the casing as the S is constructed.
7. Position banding clamp approximately 1" from the small end of the end seal (on the carrier pipe) and tighten with a standard screwdriver to secure end seal to carrier pipe.



INSTALLATION TECHNIQUES - MODEL FW END SEALS (NEW OR RETROFIT APPLICATIONS)

Please contact GPT for Model FW installation techniques.



Typical Specification - Non-Metallic for Energy Market

GPT has noted specific standard industry specifications for your convenience. Please review the following pages, and incorporate the specification that best meets your application needs. For more suggested specifications, not included in this engineering manual, and for ease of editing please visit our website www.gptindustries.com.

Please incorporate the following disclaimer below with any of the standard specifications that have been suggested in the engineering manual.

Disclaimer

The foregoing performance data is intended as guideline material only and is based on assumptions of general and reasonable use. Performance suitability for any specific application should be determined by the user.

MODEL PE NON-METALLIC CASING SPACERS/ISOLATORS

1. Energy Market
2. Nominal Steel & IPS Pipe
3. Suggested Max. Casing Length = 1,000 ft.
4. Max. Carrier Pipe O.D. = 48.0" Ø
5. Position Within Casing = Standard

Casing spacers/isolators must be GPT Model PE molded from high density virgin polyethylene plastic in two segments for applications on carrier pipe diameters of 12" and under. Model PE isolator/spacers will be provided in multiple segments for applications on carrier pipe diameters of over 12". Each spacer segment shall be a solid, non-welded molded piece designed for accommodating a specific size carrier pipe O.D.

The casing spacers must be the GPT Model PE as manufactured by GPT, or engineered approved equal.

Alternate considerations shall be submitted to Engineer 10 days prior to bid opening.

Considerations:

The above specification is considered sufficient for most nominal pipe sizes and types up to 36-inches and casing lengths up to 1,000 feet. For larger size pipes, exact pipe O.D.'s, longer or unusual casings, consider Metallic Casing spacers/isolators or please contact Pipeline Seal and Insulator, Inc.

End Seal Specification for Application:

After insertion of the carrier pipe in the casing, the ends of the casing shall be closed by installing a GPT Model C, Model S, Model R or Model FW casing end seal as manufactured by GPT.

Quality Assurance:

Each casing spacer and end seal shall be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. A copy of the current ISO 9001:2008 registration shall be provided with material submittal.

MODEL HT NON-METALLIC CASING SPACERS/ISOLATORS

1. Energy Market (Hi Temp)
2. Nominal Steel & IPS Pipe
3. Suggested Max. Casing Length = 1,000 ft.
4. Max. Carrier Pipe O.D. = 12.0" Ø
5. Position Within Casing = Standard

Casing spacers/isolators for applications that may reach 280° F must be GPT Model HT molded from virgin polycarbonate in two segments for applications on carrier pipe diameters of 12" and under. Each spacer segment must be a solid, non-welded molded piece designed for accommodating a specific size carrier pipe O.D.

The casing spacers must be the GPT Model HT as manufactured by GPT or engineered approved equal.

Alternate considerations shall be submitted to Engineer 10 days prior to bid opening.

Considerations:

The above specification is considered sufficient for most nominal pipe sizes and types up to 12 inches and casing lengths up to 1,000 feet. For larger size pipes, exact pipe O.D.'s, longer or unusual casings, consider Metallic Casing spacers/isolators with T.P.E liners or please contact GPT.

End Seal Specification for Application:

After insertion of the carrier pipe in the casing, the ends of the casing shall be closed by installing a GPT Model C, Model S, Model R or Model FW casing end seal as manufactured by GPT.

Quality Assurance:

Each casing spacer and end seal shall be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. A copy of the current ISO 9001:2008 registration shall be provided with material submittal.

Typical Specifications - Non-Metallic for Water Market

GPT has noted specific standard industry specifications for your convenience. Please review the following pages, and incorporate the specification that best meets your application needs. For more suggested specifications, not included in this engineering manual, and for ease of editing please visit our website www.gptindustries.com. Please incorporate the following disclaimer below with any of the standard specifications that have been suggested in the engineering manual.

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MODEL RANGER II® NON-METALLIC CASING SPACERS

1. Water Market
2. Pressure and Gravity Pipe
3. Suggested Max. Casing Length = 400 ft.
4. Max. Carrier Pipe O.D. = 37.60" Ø
5. Position Within Casing = Standard, Centered, Centered/Restrained

A. Casing Spacers

Upon installation completion of the steel pipe encasement, the contractor shall furnish and install a Ranger II® boltless casing spacer on the carrier pipe as described below. Casing spacers shall be spaced a maximum of eight (8) feet apart along the length of the carrier pipe with one casing spacer within two (2) feet of each side of a pipe joint and the rest evenly spaced. Wood skids are not an acceptable method of supporting the carrier pipe.

1. Casing spacers shall be all non-metallic virgin polypropylene, molded in segments for field assembly without any special tools. Spacer segments shall be secured around carrier pipe by insertion of a Slide-Lock. The casing spacer polymer shall contain ultraviolet inhibitors and shall have a minimum compressive strength of 3,000 psi, an 800 Volts/mil dielectric strength and impact strength of 1.5 ft-lbs./inch. Each casing spacer shall have full length, integrally molded skids extending beyond the bell or mechanical joint of the carrier pipe.
2. The casing spacers shall be the GPT Ranger II® Casing Spacers as manufactured by GPT or engineered approved equal.

Alternate considerations shall be submitted to Engineer 10 days prior to bid opening

3. Spacers shall be at least as wide as listed below.

CARRIER PIPE DIAMETER INCHES (MM)	RANGER II® MODEL	WIDTH INCHES (MM)
0.83 to 3.07" (21 to 78)	Micro	2.13" (54)
2.48 to 5.51" (63 to 140)	Mini	3.15" (80)
5.51 to 16.65" (140 to 423)	Midi	5.12" (130)
16.77 to 25.98" (426 to 660)	Medi	6.87" (174)
25.98 to 37.60" (660 to 955)	Maxi	8.86" (225)

B. End Seals

After insertion of the carrier pipe into the casing, the ends of the casing shall be closed by installing 1/8" thick synthetic rubber end seals equal to the GPT Model C or Model R end seal as manufactured by GPT.

Considerations:

The above specification is considered sufficient for most pipe sizes and types up to 36-inches and casing lengths up to 400 feet. For larger size pipes, heavy pipe types, and longer or unusual casings, use metallic casing spacers or please contact GPT.

Quality Assurance:

Each casing spacer and end seal shall be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. Copy of current ISO 9001:2008 Registration shall be provided with material submittal.

Typical Specification - Non-Metallic for Energy Market

GPT has noted specific standard industry specifications for your convenience. Please review the following pages, and incorporate the specification that best meets your application needs. For more suggested specifications, not included in this engineering manual, and for ease of editing please visit our website www.gptindustries.com.

Please incorporate the following disclaimer below with any of the standard specifications that have been suggested in the engineering manual.

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METALLIC CASING SPACERS

1. Energy/Water Markets
2. All Pipe Types
3. Suggested Max. Casing Length = 5,000 ft.
4. Suggested Max. Carrier Pipe O.D. = 120.0" Ø
5. Position Within Casing = Standard, Centered, Centered/Restrained, Non-centered/Restrained and More
6. Model C Metallic Casing Spacers/Isolators

Factory made casing spacers/isolators of the following description shall be installed on any carrier pipe passing through a pipe casing. They are designed to protect the carrier pipe corrosion coating and electrically isolate the carrier pipe from the casing.

Casing spacers/isolators must be GPT Model C8GN-2 for carrier pipes up to 24-inch diameters and Model C12GN2 for larger pipe sizes as manufactured by GPT. Casing spacers/isolators shall have a minimum 14 gauge steel band and where required, 10 gauge risers. The band, risers and connecting studs shall be welded and grit blasted at the factory before the application of a heat fused fluidized bed thermo set cross-linked Epoxy coating of between 10-16 mils thickness. The cross-linked Epoxy coating shall provide good resistance to acids and alkalies and excellent resistance under ASTM B117 salt spray tests.

The spacers/isolators must have a flexible PVC inner liner of 0.09 inch thickness with a durometer A 85-90 hardness and a minimum 58,000 volt dielectric strength. The runners shall be high pressure molded glass reinforced nylon with a minimum compressive strength of 18,000 psi per ASTM D638. The runners shall be 2.0 inch in width and a minimum of 7.0 inches long for C8GN2 models and 11" for C12GN2 models (polyethylene runners are not an acceptable alternative). The runners shall be attached to the band or riser by 3/8" welded steel studs and lock nuts which shall be recessed far below the wearing surface on the runner. The recess shall be filled with a corrosion inhibiting filler. The band section shall be bolted together with cadmium plated threaded studs, nuts and washers.

The casing spacers must be GPT Model C Metallic Casing Spacers as manufactured by GPT or engineered approved equal. Alternate considerations shall be submitted to Engineer 10 days prior to bid opening.

Considerations:

The above specification is considered sufficient for most pipe sizes and types up to 36-inches and casing lengths up to 1,000 feet. For larger size pipes or longer or unusual casings, please contact Pipeline Seal and Insulator, Inc. Heavy Gauge Steel Bands and Steel Risers may be required.

End Seal Specification:

After insertion of the carrier pipe in the casing, the ends of the casing must be closed by installing a GPT Model C, Model S, Model W or Model R casing end seal as manufactured by GPT.

Energy Market Note: For Tank Farm Applications and Fire Resistant applications, specify Model "FW" casing end seal as manufactured by GPT.

Link-Seal® End Seal Specification (Carrier Pipe Must Be Centered Within Casing):

After insertion of the carrier pipe in the casing, the ends of the casing must be closed by installing the Link-Seal® end seals and 1/8" thick synthetic rubber end seals equal to the GPT Model C or Model W end seal. Both as manufactured by GPT.

Quality Assurance:

Each spacer/isolator and end seal must be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. Copy of current ISO 9001:2008 registration shall be provided with material submittal.

Specification 60" Ø & Up - Metallic for Water Market

GPT has noted specific standard industry specifications for your convenience. Please review the following pages, and incorporate the specification that best meets your application needs. For more suggested specifications, not included in this engineering manual, and for ease of editing please visit our website www.gptindustries.com.

Please incorporate the following disclaimer below with any of the standard specifications that have been suggested in the engineering manual.

Disclaimer

The foregoing performance data is intended as guideline material only and is based on assumptions of general and reasonable use. Performance suitability for any specific application should be determined by the user.

METALLIC CASING SPACERS

1. Water Market - Large Diameter, 60" Ø +
2. All Pipe Types
3. Suggested Max. Casing Length = 1,000 ft.
4. Suggested Max. Carrier Pipe O.D. = 84.0" Ø
5. Position Within Casing = Standard, Centered, Centered/Restrained, Non-centered/Restrained and More
6. Model C Metallic Casing Spacers/Isolators

Factory made casing spacers/isolators of the following description must be installed on any carrier pipe passing through a pipe casing. They are designed to protect the carrier pipe corrosion coating and electrically isolate the carrier pipe from the casing.

Casing spacers/isolators shall be GPT Model C12GN2 for carrier pipes 60-inch diameters and up as manufactured by GPT. Casing spacers/isolators shall have a minimum 12 gauge steel band and where required, 7 gauge risers. The band, risers and connecting studs shall be welded and grit blasted at the factory before the application of a heat fused fluidized bed thermo set cross-linked Epoxy coating of between 10-16 mils thickness. The cross-linked Epoxy coating shall provide good resistance to acids and alkalis and excellent resistance under ASTM B117 salt spray tests.

The spacers/isolators shall have a flexible PVC inner liner of 0.09 inch thickness with a durometer "A" 85-90 hardness and a minimum 58,000 volt dielectric strength. The runners shall be high pressure molded glass reinforced nylon with a minimum compressive strength of 18,000 psi per ASTM D638. The runners shall be 2.0 inch in width and a minimum 11" long for C12GN2 models (polyethylene runners are not an acceptable alternative).

The runners shall be attached to the band or riser by 3/8" welded steel studs and lock nuts which shall be recessed far below the wearing surface on the runner. The recess shall be filled with a corrosion inhibiting filler. The band section shall be bolted together with cadmium plated threaded studs, nuts and washers. The casing spacers shall be GPT Model C Metallic Casing Spacers as manufactured by GPT or engineered approved equal. Alternate considerations shall be submitted to Engineer 10 days prior to bid opening

Considerations:

The above specification is considered sufficient for most pipe sizes and types 60 to 84-inches and casing lengths up to 300 feet. For lengths 300 to 1,000 feet, a symmetrical runner design should be considered. For larger size pipes or longer or unusual casings, please contact GPT.

End Seal Specification:

After insertion of the carrier pipe in the casing, the ends of the casing shall be closed by installing a GPT Model C or Model W casing end seal as manufactured by GPT.

Link-Seal® End Seal Specification (Carrier Pipe Must Be Centered Within Casing):

After insertion of the carrier pipe in the casing, the ends of the casing shall be closed by installing the Link-Seal® end seals and 1/8" thick synthetic rubber end seals equal to the GPT Model C or Model W end seal. Both as manufactured by GPT.

Quality Assurance:

Each spacer/isolator and end seal must be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. Copy of current ISO 9001:2008 registration shall be provided with material submittal.

Specification Wax Filled Casing - Metallic for Energy Market

GPT has noted specific standard industry specifications for your convenience. Please review the following pages, and incorporate the specification that best meets your application needs. For more suggested specifications, not included in this engineering manual, and for ease of editing please visit our website www.gptindustries.com.

Please incorporate the following disclaimer below with any of the standard specifications that have been suggested in the engineering manual.

Disclaimer

The foregoing performance data is intended as guideline material only and is based on assumptions of general and reasonable use. Performance suitability for any specific application should be determined by the user.

METALLIC CASING SPACERS

1. Energy Market - Wax Filled Casings
2. All Pipe types
3. Suggested Max. Casing Length = 1,000 ft.
4. Suggested Max. Carrier Pipe O.D. = 48" Ø
5. Position Within Casing = Centered/Restrained
6. Model C Metallic Casing Spacers/Isolators

Factory made casing spacers/isolators of the following description must be installed on any carrier pipe passing through a pipe casing. They are designed to protect the carrier pipe corrosion coating and electrically isolate the carrier pipe from the casing.

Casing spacers/isolators must be GPT Model C12GN2 for all diameter carrier pipes as manufactured by GPT. Casing spacers/isolators must have a minimum 14 gauge steel band and where required, 10 gauge risers. The band, risers and connecting studs shall be welded and grit blasted at the factory before the application of a heat fused fluidized bed thermo set cross-linked Epoxy coating of between 10-16 mils thickness. The cross-linked Epoxy coating shall provide good resistance to acids and alkalis and excellent resistance under ASTM B117 salt spray tests.

The spacers/isolators must have a flexible T.P.E Hi-Temp inner liner of 0.118" inch thickness, a durometer "A" 73 hardness, a temperature range of -50 to 270° F and a minimum 58,000 volt dielectric strength. The runners shall be high pressure molded glass reinforced nylon with a minimum compressive strength of 18,000 psi per ASTM D638. The runners shall be 2.0 inch in width and a minimum of 11" long for C12GN2 models (polyethylene runners are not an acceptable alternative). The runners shall be attached to the band or riser by 3/8" welded steel studs and lock nuts which shall be recessed far below the wearing surface on the runner. The recess must be filled with a corrosion inhibiting filler. The band section must be bolted together with cadmium plated threaded studs, nuts and washers.

The casing spacers must be GPT Model C Metallic Casing Spacers as manufactured by GPT or engineered approved equal. Alternate considerations must be submitted to Engineer 10 days prior to bid opening.

Considerations:

The above specification is considered sufficient for most pipe sizes and types up to 48-inches and casing lengths up to 1,000 feet. Casing Spacer Runner Configuration should be symmetrical - Near C/R position for the body and the Runner Configuration for the ends of the casing should be a 2 Top/4 Bottom - C/R for use with Link-Seal® modular seals; 2 casing spacers on each end of the casing are needed for a total of 4. (Consult GPT for spacing.) For larger size pipes or longer or unusual casings, please contact GPT.

End Seal Specification:

After insertion of the carrier pipe in the casing, the ends of the casing must be closed by installing GPT Link-Seal® modular seals (Model C) and Model W EPDM casing end seal as manufactured by GPT or engineered approved equal. Alternate considerations must be submitted to Engineer 10 days prior to bid opening.

Wax Note: Both end seal types must be installed, wax can reach temperatures of 250° F during filling process.

Quality Assurance:

Each spacer/isolator and end seal must be manufactured at a facility that has a Registered ISO 9001:2008 Quality Management System. Copy of current ISO 9001:2008 registration shall be provided with material submittal.

Casing Spacer Field Terminology

CASING FILL:

Casing fill materials may include sand, gravel, cement or wax. Under normal circumstances Model C coated Spacers are provide excellent support and durability for these applications, therefore it is not necessary to use stainless steel casing spacers for filled applications. Casing fill material encapsulates the spacers and carrier pipe, supports both, and provides an additional non-conductive barrier between casing and carrier pipes.

For wax filling application, please specify the TPE Liner and use Link-Seal® Modular Seals in combination with Model W end seals.

RIFLING:

Rifling occurs when the carrier pipe rotates or turns, as much as 360-degrees, inside the casing as the push or pull progresses. Casing spacers with a symmetrical design are used to allow for rotation. Runner/Riser configurations are made to equal heights and uniform position to allow for uniform loading and equal carrier pipe support to accommodate rifling. The chance your carrier pipe will rifle during the push or pull will depend on a number of factors. Best engineering practice is to order casing spacers with a symmetrical runner configuration to accommodate the possibility of rifling in the first place.

CONDITION OF CASING

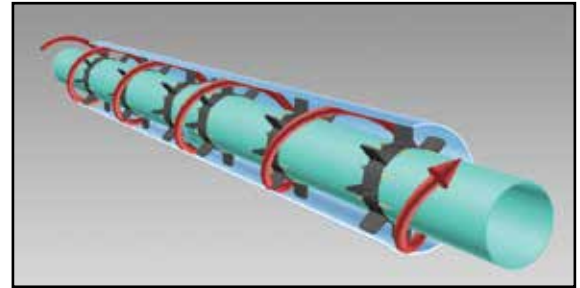
It's important to determine the condition of the inside surface of the casing pipe prior to installation. Rough, corroded and/or uneven surfaces - "high and low" weld beads and other anomalies on the interior pipe surface can drastically reduce the effectiveness of any casing spacer. GPT metallic casing spacers are suggested, when surface conditions are marginal, because runners on metallic casing spacers are much more resistant to abrasion than runners on plastic spacers. If you are unsure of the casing condition, pipe inspection services using cameras to analyze the interior of a pipe may be used or you may also simply pull a 20 ft section of pipe through the casing as a test or field trial .

7-GAUGE VS. 10-GAUGE RISER MATERIAL

An increase in applications requiring heavier, larger diameter pipes has initiated the need for more robust casing spacers. To meet this need, GPT offers 7-gauge riser material as a substitute for 10-gauge risers. 7-gauge risers provide additional strength and stability when supporting large diameter Steel ML&C (Mortar Lined and Coated) or Concrete pipe that may be carrying heavier, higher density fluids.

WOOD SKIDS VS. CASING SPACERS

Wood skids are a poor substitute for casing spacers. A casing spacer is an engineered product that has been used for decades to ease carrier pipe insertion, protect both casing and carrier pipes and maintain physical and electrical separation to preserve the corrosion mitigation (protection) program designed for the piping system.



WOOD LAGGING CORROSION ISSUE:

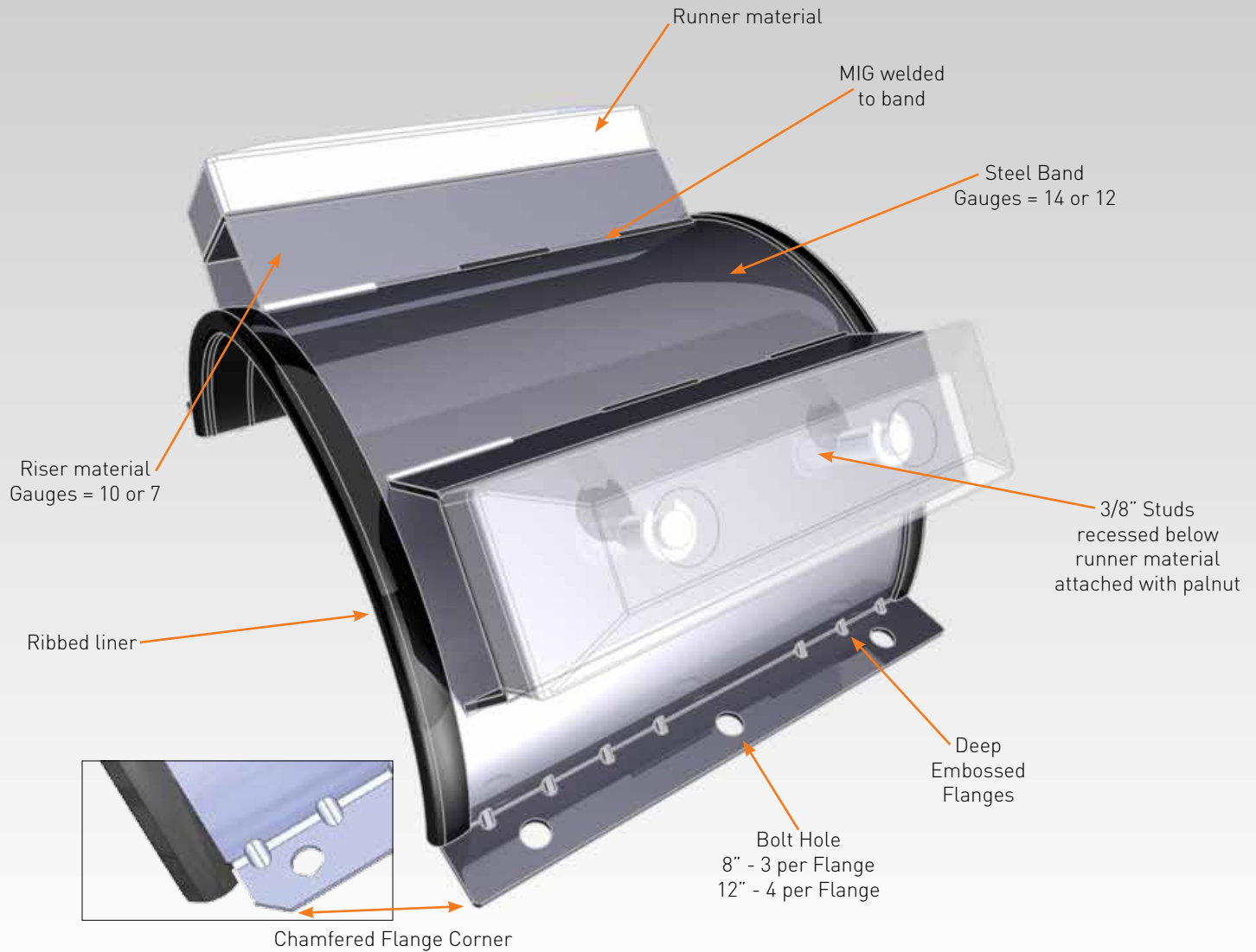
Wood should not be used in a cased crossing. It has the potential to accelerate corrosion concerns. When dry, wood has good dielectric resistance. When wet (as is likely in a buried casing) it has a dielectric resistance that can be magnitudes lower; allowing corrosion on metallic (Steel, D.I) carrier pipes. This presents concerns if wood were used in a casing to isolate or support the carrier pipe within the casing. Furthermore, when wood rots, the bacteria will attack metallic pipe in form of Microbiological Influenced Corrosion.

A COMPARISON...GPT CASING SPACERS VS. BANDED WOOD SKIDS

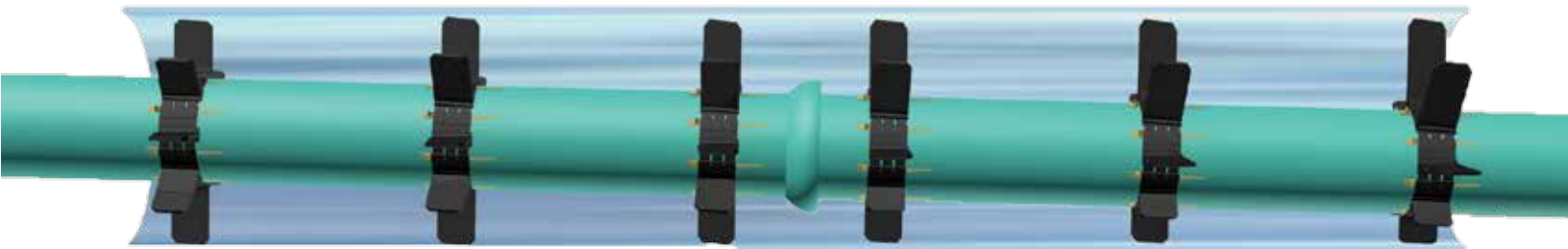
GPT Casing Spacer	Banded Wood Skids
Low Labor Cost - Installed by one person	Labor Intensive - High labor costs
Easily secured in place	Easily dislodged
Quick installation	Hard to field construct
Supports pipe and protects coating	Rots and allows settlement
Assured electrical insulation	Non-insulating - Allows corrosion
Resists weight of pipe and product	Uneven load on pipe
Long term corrosion protection	Allows bacteria & differential oxygen concentration corrosion
Eliminates grout, blown sand or pea gravel	Requires annulus space filler
Engineered for the project	At discretion of job site laborer

Casing Spacer Field Terminology

MAKE-UP OF AN 8" - 12" METALLIC CASING SPACER



USING CASING SPACERS FOR GRAVITY FEED PIPE OR TO ADJUST FOR GRADE



Both metallic and non-metallic casing spacers may be used to create a sloped carrier pipe (i.e. gravity feed sewer pipe) within a level casing or to compensate for a non-level casing pipe by using spacers with varying height runners to level the carrier pipe.

Please contact GPT for more information on how to order casing spacers for these types of applications.

Casing - Steel Pipe Reference Schedules

The following wall thickness chart has been provided to help size C/R casing spacers in steel pipe sleeves of various wall thicknesses. To determine the Inside Diameter (I.D.) of the proposed steel wall sleeve subtract 2 times the selected Wall Thickness (W.T.) from the actual Outside Diameter (O.D.) of the pipe.

Example: Find the I.D. for a 24" (INCH) Schedule 40 Pipe.

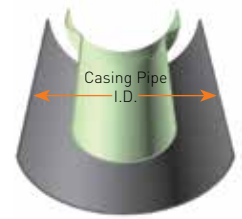
Use Chart Below:

O.D. of a 24" Schedule 40 Pipe = **24.00" (INCHES)**

Wall Thickness of 5" Schedule 40 Pipe = **.688"**

Wall Thickness multiplied by 2 (.688 x 2) = **1.376"**

I.D. of 24" Schedule 40 Pipe (24.00 - 1.376) = **"22.624**



Non Bold = Wall Thickness (Inches)

STD = Standard

E.H. = Extra Heavy

PIPE SIZE	O.D. INCHES	SCHEDULE					SCHEDULE					SCHEDULE				DBLE. E.H.
		5	10	20	30	40	STD	60	80	E.H.	100	120	140	160		
4"	4.500	.083	.120	--	--	.237	.237	.281	.337	.337	--	.438	--	.531	.674	
4 1/2"	5.000	--	--	--	--	.247	.247	--	.355	.355	--	--	--	--	.710	
5"	5.563	.109	.134	--	--	.258	.258	--	.375	.375	--	.500	--	.625	.750	
6"	6.625	.109	.134	--	--	.280	.280	--	.432	.432	--	.562	--	.719	.864	
7"	7.625	--	--	--	--	--	.301	--	--	.500	--	--	--	--	.875	
8"	8.625	.109	.148	.250	.277	.322	.322	.406	.500	.500	.594	.719	.812	.906	.875	
9"	9.625	--	--	--	--	--	.342	--	--	.500	--	--	--	--	--	
10"	10.750	.134	.165	.250	.307	.365	.365	.500	.594	.500	.719	.844	1.000	1.125	1.000	
11"	11.750	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
12"	12.750	.165	.180	.250	.330	.406	.375	.562	.688	.500	.844	1.000	1.125	1.312	1.000	
14"	14.000	--	.250	.312	.375	.438	.375	.594	.750	.500	.938	1.094	1.250	1.406	--	
16"	16.000	--	.250	.312	.375	.500	.375	.656	.844	.500	1.031	1.219	1.438	1.594	--	
18"	18.000	--	.250	.312	.438	.562	.375	.750	.938	.500	1.156	1.375	1.562	1.781	--	
20"	20.000	--	.250	.375	.500	.594	.375	.812	1.031	.500	1.281	1.500	1.750	1.969	--	
22"	22.000	--	.250	.375	.500	--	.375	.875	1.125	.500	1.375	1.625	1.875	2.125	--	
24"	24.000	--	.250	.375	.562	.688	.375	.969	1.219	.500	1.531	1.812	2.062	2.344	--	
26"	26.000	--	.312	.500	--	--	.375	--	--	.500	--	--	--	--	--	
28"	28.000	--	.312	.500	.625	--	.375	--	--	.500	--	--	--	--	--	
30"	30.000	--	.312	.500	.625	--	.375	--	--	.500	--	--	--	--	--	
32"	32.000	--	.312	.500	.625	.688	.375	--	--	.500	--	--	--	--	--	
34"	34.000	--	.312	.500	.625	.688	.375	--	--	.500	--	--	--	--	--	
36"	36.000	--	.312	.500	.625	.750	.375	--	--	.500	--	--	--	--	--	
38"	38.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
40"	40.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
42"	42.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
48"	48.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
54"	54.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	
60"	60.000	--	--	--	--	--	.375	--	--	.500	--	--	--	--	--	

DISCLAIMER NOTE:

The above steel pipe O.D.'s are generic, GPT is not a pipe manufacturer. Please always refer to the pipe manufacturer's published/actual values.

WALL THICKNESS NOTE:

It's suggested casings be installed with standard (STD) wall thickness.

GPT Casing Spacer/Isolator RFQ Worksheet



CONTACT NAME: DATE:

COMPANY: TELEPHONE:

PROJECT INFORMATION

PROJECT NAME:

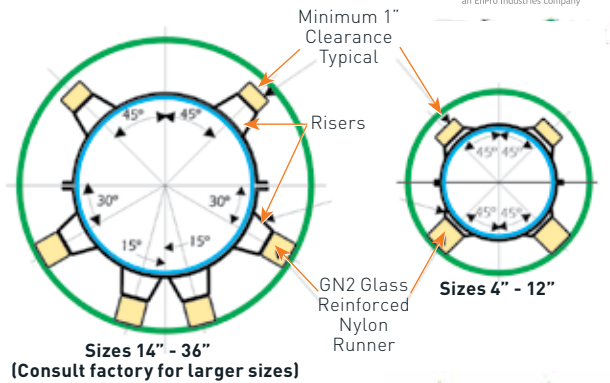
LOCATION:

CITY/STATE/ZIP:

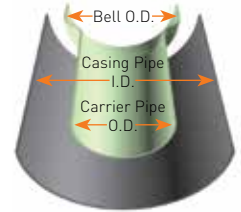
ENGINEER:

BID DATE:

AWARD DATE:



Attn:



METALLIC CASING SPACERS/ISOLATORS

Quantity or Length of Run	Number of Insertions	Spacer Type	Band Width	Runner Width	Actual Carrier Pipe O.D.	Actual Casing Pipe I.D.	Actual Bell or Joint O.D.	Position in Casing	Price
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

End Seals

Filled Casing?

Comments:

S C CR NCR
Note: S position = clear bell only if applicable

NON-METALLIC CASING SPACERS/ISOLATORS

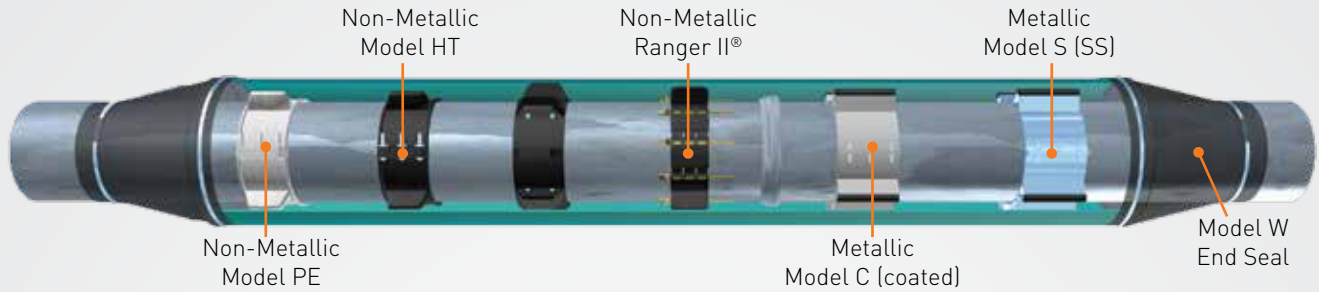
Quantity or Length of Run	Number of Insertions	Spacer Type	Band Width	Runner Width	Actual Carrier Pipe O.D.	Actual Casing Pipe I.D.	Actual Bell or Joint O.D.	Position in Casing	Price
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Qty <input type="checkbox"/> Length	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

End Seals

Filled Casing?

Comments:

Multiple Segment 2-piece CR Standard to clear Bell
Model PE Ranger II® Spacers



WARRANTY AND CONDITIONS OF SALE

The seller warrants that all goods furnished under this order will be free from defects in material and workmanship and will conform to GPT's published specifications.

The limit of GPT's liability for failure of any of our products to meet the foregoing warranty, or for breach of any other warranty, express, implied or statutory, shall be to supply an equivalent amount of product for any materials returned to us within 12 months of shipment and found to be defective by GPT.

Due to the widely varying conditions under which our products are used or installed, GPT offers no warranty as to their merchantability, length of service or suitability for any particular purpose, express or implied, other than described above.

The Purchaser accepts full responsibility for installation of all goods furnished under this order and for any defects or damage suffered as a result of defective installation of such goods. No instructions, advice, or aid relative to installation given by the Seller to the Purchaser shall be construed as a warranty as to the accuracy or utility of such instructions, advice, or aid, but only as an accommodation to the Purchaser and an opinion of the Seller.

The foregoing conditions of sale shall not be modified or affected in any way whatsoever by reason of Seller's receipt or acknowledgement of Buyer's purchase order or any other related instrument of paper containing additional or different conditions and, to the extent there may be any terms or provisions in such a purchase order, etc. which may be in conflict with or modification of the foregoing, such terms and provisions of such purchase order, etc. shall be deemed to have no force or effect.



All metallic casing spacers are packaged on skids, banded and properly shrink wrapped.



"Buy America"/A.R.R.A Compliant



Certificate No. 10125