

Operating Procedures for 3/4" to 3" GripTight® Isolation Plugs

WARNING

- ⚠ Pressure testing is inherently dangerous. Strict adherence to these operating instructions and industry safety practices could prevent injury to personnel.
- ⚠ All personnel must be clear of test plug during pressure testing.
- ⚠ Pressures must never exceed the maximum pressure rating of the weakest component in a system.
- ⚠ An incompressible liquid such as water should be used as the test medium. Residual air or gas must be evacuated from the pipe prior to testing.
- ⚠ Remove metal shipping band or tape securing gripper assembly prior to testing.
- ⚠ Do not use this plug in pipes with ID coatings. Contact EST Group Customer Service before using in any type of coated pipe and/or tube.
- ⚠ Failure to apply specified installation torque (see Table 1) may result in unsafe operation or leakage. Installation equipment and tool must be adequately sized to handle installation torque.
- ⚠ Constant monitoring of upstream pressure is required. Immediately discontinue work if an unplanned or unanticipated increase in upstream pressure occurs.
- ⚠ Failure to replace worn or damaged components may affect the ability of the plug to hold pressure and may cause injury or damage to persons or property within the test area.

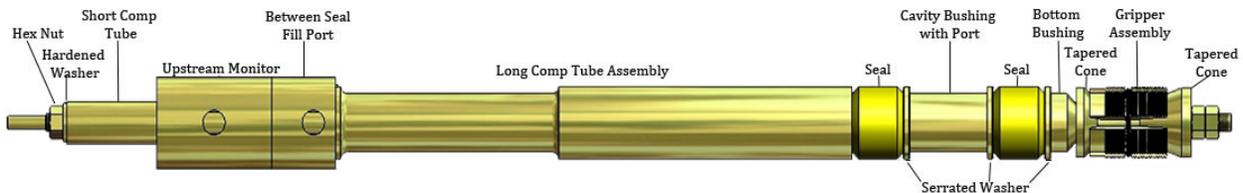


Figure 1: Single Shaft GripTight Isolation Plug

MAXIMUM TEST PRESSURE BETWEEN SEALS: 2250 PSIG (155 BARG)

MAXIMUM UPSTREAM PRESSURE: 1500 PSIG (103 BARG)

Questions? Contact EST Group Customer Service at any of the following locations.

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1. Test Preparation

Perform the steps outlined below prior to performing your pressure test.

Step/Action	Additional Action/Information/Result
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- 1.1. Visually inspect the plug for worn or damaged components including any cuts, scores and deformations. Replace as needed.

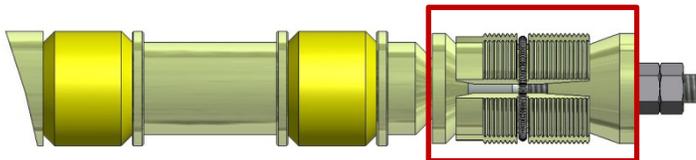


Figure 2: Gripper Assembly

- The surface between the cone and grippers must be free of friction producing dirt or corrosion.

- 1.2. Liberally spread antiseize over both sides of the Hardened Washer and threads of the shaft.



Figure 3: Hardened Washer Location

Doing this ensures that installation torque is transmitted to the Seals and grippers.

CAUTION

Special caution must be taken when applying lubricant and handling the test plug. The lubricant must not come in contact with the Seals or tube ID. Failure to properly use antiseize on the Shaft threads and Hardened Washer may cause an incomplete torque transmittal resulting in a decrease in pressure holding capability.

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Step/Action	Additional Action/Information/Result
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- 1.3. Tighten the Hex Nut so the Gripper Assembly moves freely to the end of the Tapered Cone surface.

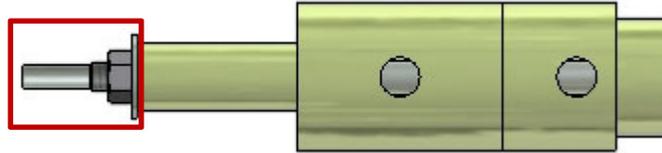


Figure 4: Hex Nut Location

<i>If</i>	<i>then</i>
grippers move freely to end of the Tapered Cone surfaces,	loosen the Hex Nut back to its original position and go to the next step.
grippers do not fully retract,	apply a light lubricant such as Molykote® DX or SAE 10W motor oil to the tapered surface of the cones and wipe away any excess. Repeat §1.3 verification.
you cannot easily tighten the Hex Nut to allow full gripper expansion,	DO NOT USE THIS PLUG FOR TESTING. Contact EST Group Customer Service for assistance.

- 1.4. Verify that the pipe size and schedule stamped on the plug is equivalent to pipe size you are testing.

NOTE:
The stamp **2P80** indicates that the plug is suitable for use in 2" SCH 80 pipe size. See Table 1 for pipe size and schedule of plugs. The seal OD must correlate with the Plug OD listed in Table 1 for the corresponding pipe size.

- 1.5. Clean and dry the pipe ID.

All moisture, debris, and excessive scale must be removed from the pipe ID to ensure a proper seal is established during the pressure test.

- 1.6. Complete Site Safety Check List, as applicable.

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2. Installing Plug as an Isolation Barrier

Perform the steps outlined below when using the plugs as isolation barriers.

Step/Action	Additional Action/Information/Result
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- 2.1. Attach hoses to the Fill Port and Upstream Monitor connections. (1/4 NPT ports)

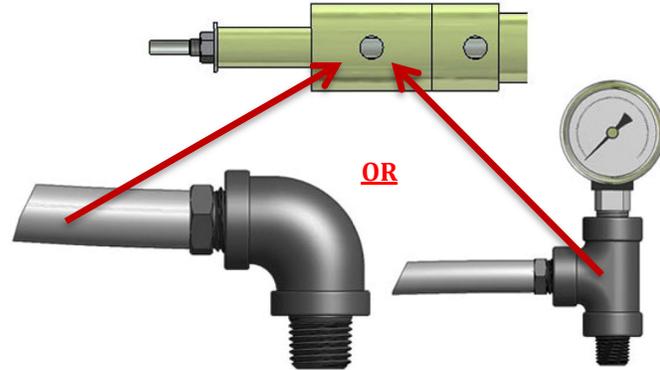


Figure 5: Upstream Monitor Location

- Upstream Monitor Connection: Upstream vapors may be vented by attaching approximately 50 ft. of hose to the port and locating the open end of the hose well downwind from the hot work area. If upstream vapors are to be vented, a tee fitting should be used such that the hose and the pressure gauge are both connected to the Upstream Monitor Connection.
- Pressure Connection: Connect pressure source to pressurize between seals for isolation and/or testing purposes.

- 2.2. If desired, wrap the heat resistant tape, provided with plugs up to 1 1/4" pipe size, onto the shaft to protect the plug from weld splatter.

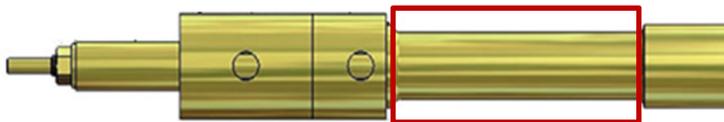


Figure 6: Heat Tape Location

Note Additional heat resistant tape may be purchased by contacting an EST Group Customer Representative.

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Step/Action	Additional Action/Information/Result
<p>2.3. Place plug inside the pipe so the Seals are away from any Hot Work zone.</p> <p>Typically, installing the plug so the Seals are 8" (20 cm) deep is sufficient. Larger plugs may require a deeper installation.</p>	<p>NOTE: The maximum temperature exposure for urethane seals is 180°F (82°C). It may be necessary to monitor pipe temperatures during hot work to ensure seals are not damaged. Contact EST Group Customer Service if high temperature seal materials are needed.</p>
<p>2.4. Remove residual air between the seals, if required.</p>	<ul style="list-style-type: none"> • Ensure the Port between the Seals is in the six o'clock position. • Tighten the Hex Nut on the plug until the plug is barely able to slide within the pipe. • Apply slight pressure of the isolation medium until a small amount of the medium escapes past the seals. At this point, the majority of residual air has been displaced from between the seals.
<p>2.5. Hand tighten the Hex Nut until the test plugs grip the pipe ID. Slight wiggling of the plug may allow for further hand tightening of the Hex Nut.</p>	<ul style="list-style-type: none"> • The normal torque values listed in Table 1 should be adequate for most installations, however due to variations within internal pipe finishes, the torque may need to be increased up to the maximum torque values listed in Table 1. If at the maximum torque the plug still leaks, verify the correct seal and washers are being used, correct if necessary, reinstall and torque the plug in increasing increments starting at the normal installation torque.
<p>2.6. Using a calibrated torque wrench, tighten the Hex Nut to the normal installation torque (see Table 1).</p>	<ul style="list-style-type: none"> • If shaft spins while Hex Nut is being tightened, a crowfoot wrench and a pipe wrench/opened end wrench must be used (see Table 1 for crowfoot wrench sizes). After initial tightening, it may be possible to use a deep socket as the friction created when the seals contact the pipe ID will prevent the shaft from spinning during further tightening of the Hex Nut.
<p>2.7. Slowly introduce the isolation pressure.</p> <p>2.8. By maintaining a positive pressure between the seals greater than the potential upstream pressure, you are ensuring that the hot work zone is isolated from any upstream vapors or contaminants.</p>	<p>NOTE: During pressurization, some settling of the plug may occur. If the plug moves more than a total of 0.125" (3 mm) during pressurization or testing, then halt your procedure immediately. If there is no upstream pressure, release the pressure between the seals. Inspect the test plug and pipe ID for damage and review installation steps taken prior to reinstalling the plug and retesting.</p>

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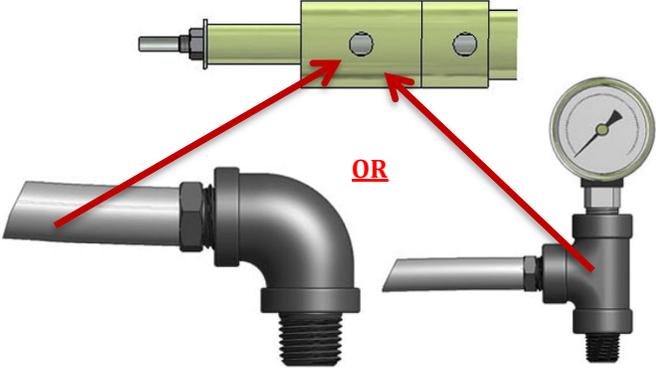
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Step/Action	Additional Action/Information/Result
2.9. After application is complete, release/vent all pressure from between the seals. Verify there is no upstream pressure.	<p>CAUTION</p> <p>⚠ Never remove a plug if upstream pressure is present.</p>
2.10. Loosen the Hex Nut.	<ul style="list-style-type: none"> Permanent seal deformation may occur if the seal is left partially compressed.

2.11. Remove the plug from the tube end.

3. Performing the Pressure Test

Perform the steps outlined below when conducting a pressure test.

Step/Action	Additional Action/Information/Result
3.1. Attach hoses to the Fill Port and Upstream Monitor connections. (¼ NPT ports)	
<p style="text-align: center;">Figure 7: Upstream Monitor Location</p> <ul style="list-style-type: none"> Upstream Monitor Connection: Upstream vapors may be vented by attaching approximately 50 ft. of hose to the port and locating the open end of the hose well downwind from the hot work area. If upstream vapors are to be vented, a tee fitting should be used such that the hose and the pressure gauge are both connected to the Upstream Monitor Connection. Pressure Connection: Connect pressure source to pressurize between seals for isolation and/or testing purposes. 	

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Step/Action**Additional Action/Information/Result**

- 3.2. Place plug so both Seals are inside the pipe you are testing. Position the plug so that the seals straddle the weld or area you are testing.

NOTE:

The maximum temperature exposure for urethane seals is 180°F (82°C). It may be necessary to monitor pipe temperatures during hot work to ensure seals are not damaged. Contact EST Group Customer Service if high temperature seal materials are needed.

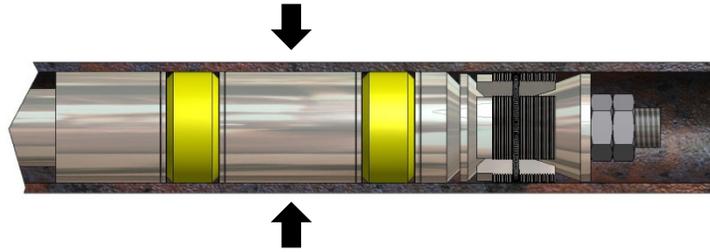


Figure 8: Arrows Signify Weld Location

- 3.3. Remove residual air between the seals, if necessary.

- Ensure the Port between the seals is in the six o'clock position.
- Tighten the Hex Nut on the plug until the plug is barely able to slide within the pipe.
- Apply slight pressure of the test medium until a small amount of the medium escapes past the seals. At this point, the majority of residual air is removed between the seals.

- 3.4. Hand tighten the Hex Nut until the test plugs grip the pipe ID. Slight wiggling of the plug may allow for further hand tightening of the Hex Nut.

- The normal torque values listed in Table 1 should be adequate for most installations, however due to variations within internal pipe finishes, the torque may need to be increased up to the maximum torque values listed in Table 1. If at the maximum torque the plug still leaks, verify the correct seal and washers are being used, correct if necessary, reinstall and torque the plug in increasing increments starting at the normal installation torque.

- 3.5. Using a calibrated torque wrench, tighten the Hex Nut to the normal installation torque (see Table 1).

- If shaft spins while Hex Nut is being tightened, a crowfoot wrench and a pipe wrench/opened end wrench must be used (see Table 1 for crowfoot wrench sizes). After initial tightening, it may be possible to use a deep socket as the friction created when the seals contact the pipe ID will prevent the shaft from spinning during further tightening of the Hex Nut.

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Step/Action**Additional Action/Information/Result**

3.6. Slowly introduce the test pressure.

If performing a pressure drop test, hold the desired pressure with pump for a minimum of 5 minutes to allow parts to settle prior to closing the isolation valve.

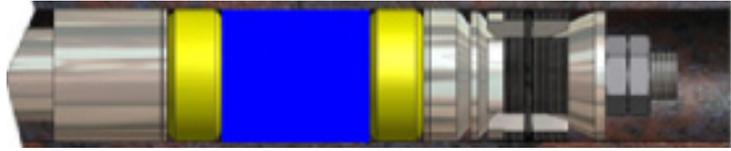


Figure 9: Between Seals Test Area

NOTE:

During pressurization, some settling of the plug may occur. If the plug moves more than a total of 0.125" (3 mm) during pressurization or testing, then halt your procedure immediately. If there is no upstream pressure, release the pressure between the seals. Inspect the test plug and pipe ID for damage and review installation steps taken prior to reinstalling the plug and retesting.

If situation continues, contact EST Group Customer Service for technical assistance.

3.7. After isolation or testing application is complete, release all pressure from the pipe.

**Caution**

Never remove a plug if upstream pressure is present.

3.8. Loosen the Hex Nut until the top of the nut is at the top of the threads.

- Permanent seal deformation may occur if the Seal is left partially compressed.

3.9. Remove the plug from the tube end.

3.10. Inspect the plug for wear and replace any worn components.

- Visually inspect Seals for damage including cuts, scores and deformations.
- Visually inspect O-rings (internal) for damage including cuts, scores and deformations if leakage or a pressure drop occurred during the pressure test.
- Verify proper operation of grippers by tightening the Hex Nut to expand the gripper assembly. Apply a light lubricant if necessary. Wipe away excess.
- Liberally spread antiseize over both sides of the Hardened Washer and threads of the shaft. Wipe away any excess.
- Contact EST Group Customer Service for replacement of worn or damaged parts identified.

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4. Part Replacement – Disassembly

When performing the steps outlined below, be sure to keep track of the assembly order of component parts. Occasionally a tool may be needed to pry seals away from washer face to facilitate removal. If this is the case, be sure not to damage any components while using the tool.

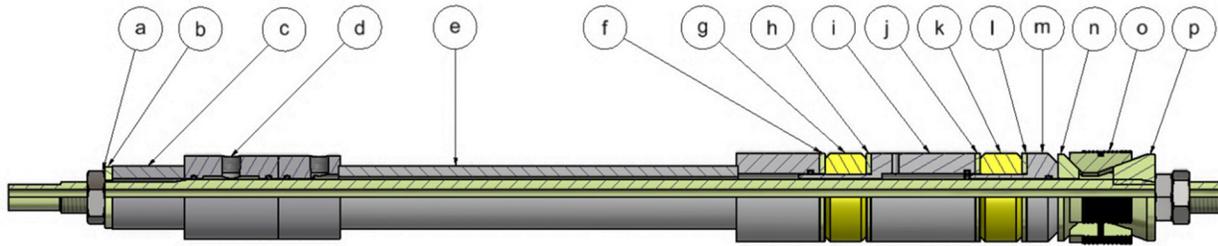


Figure 10: GripTight Isolation Plug Component Parts

Step/Action	Additional Action/Information/Result	
4.1. Visually inspect component parts for damages.	<i>If</i> damaged components are identified,	<i>then</i> contact EST Group Customer Service for replacement parts.
	no damaged components are identified,	reassemble the plug (see Figure 10) and prep for storage.

4.2. Disassemble the plug in assembly order.

Component parts of the plug must be removed in the following order:

- a. Hex Nut
- b. Hardened Washer
- c. Short Comp Tube
- d. Upstream Monitor
- e. Between Seal Fill Port/Long Comp Tube Assembly
- f. Serrated Washer (Type 2 only)
- g. Seal
- h. Serrated Washer
- i. Cavity Bushing with port
- j. Serrated Washer
- k. Seal
- l. Serrated Washer
- m. Bottom Bushing
- n. Tapered Cone
- o. Gripper Assembly
- p. Tapered Cone

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5. Storage

Prior to storing, clean and dry the plug. Re-lubricate the shaft threads and between the Hex Nut and mating surface as previously described. Store plug in an area out of direct exposure to sun, UV light, or temperature extremes. Excessive heat or UV light will damage and prematurely degrade the seal elements.

Store these instructions with the plug.

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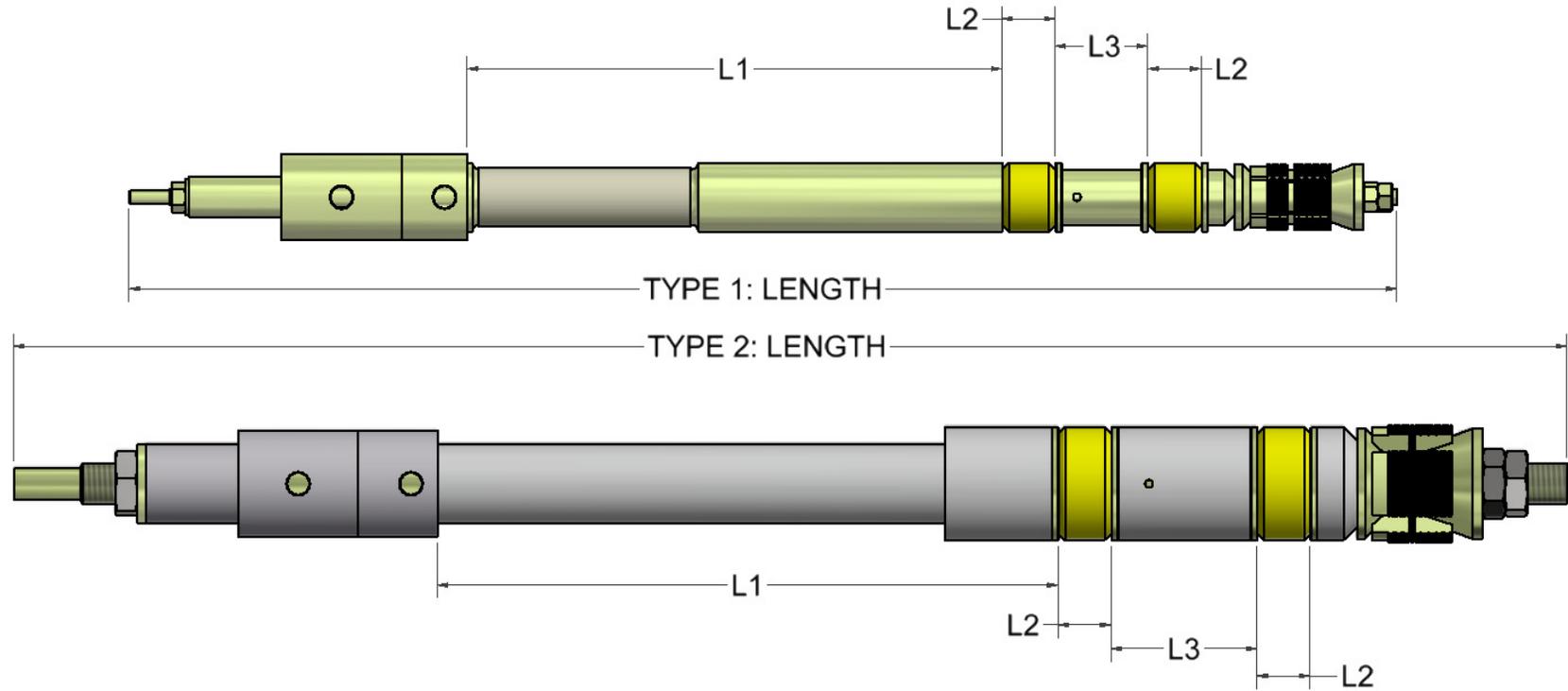


Figure 11: Type 1/2 Spacing

UPSTREAM MONITORING AND FILL PORTS ARE ¼ NPT

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Table 1: GripTight Isolation Plug (Single Shaft) Installation and Torque Specifications

PART NUMBER	PIPE SIZE	SCH	TYPE	PLUG OD		CLEARANCE BETWEEN PLUG AND PIPE		LENGTH		L1 DISTANCE TO SEAL		L2 SEAL THICKNESS		L3 DISTANCE BETWEEN SEALS		NORMAL INSTALLATION TORQUE		MAXIMUM INSTALLATION TORQUE		CROWFOOT WRENCH SIZE (IN)
				(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	FT-LBS	N-m	FT-LBS	N-m	
GTDBB-75P160	3/4"	160	1	0.54	13.7	0.07	1.8	21 1/4	540	10.75	273.1	0.25	6.4	1.50	38.1	1.5	2.0	3	4.1	7/16
GTDBB-75P80	3/4"	80/XS	1	0.65	16.5	0.09	2.3	22 5/8	575	11.13	282.7	0.50	12.7	1.75	44.5	2.5	3.4	5	6.8	7/16
GTDBB-75P40	3/4"	40/STD	1	0.72	18.3	0.10	2.6	22 5/8	575	11.25	285.8	0.50	12.7	1.75	44.5	3.5	4.7	6.5	8.8	7/16
GTDBB-75P10	3/4"	10	1	0.78	19.8	0.10	2.6	22 5/8	575	11.25	285.8	0.50	12.7	1.75	44.5	4	5.4	7	9.5	7/16
GTDBB-1PXXS	1"	XXS	1	0.54	13.7	0.06	1.5	21 1/4	540	10.75	273.1	0.50	12.7	1.75	44.5	1.5	2.0	3	4.1	7/16
GTDBB-1P160	1"	160	1	0.72	18.3	0.10	2.4	22 5/8	575	11.25	285.8	0.50	12.7	1.75	44.5	3.5	4.7	6.5	8.8	7/16
GTDBB-1P80	1"	80/XS	1	0.84	21.3	0.12	3.0	22 5/8	575	10.06	255.5	0.50	12.7	1.75	44.5	5	6.8	7.5	10.2	7/16
GTDBB-1P40	1"	40/STD	1	0.93	23.6	0.12	3.0	22 5/8	575	10.06	255.5	0.50	12.7	1.75	44.5	5	6.8	7.5	10.2	7/16
GTDBB-1P10	1"	10	1	0.98	24.9	0.12	3.0	22 5/8	575	10.00	254.0	0.50	12.7	1.75	44.5	5	6.8	7.5	10.2	7/16
GTDBB-125PXXS	1 1/4"	XXS	1	0.80	20.3	0.10	2.4	22 5/8	575	11.25	285.8	0.50	12.7	1.75	44.5	4	5.4	7	9.5	7/16
GTDBB-125P160	1 1/4"	160	1	1.04	26.4	0.12	3.0	23 7/8	606	10.13	257.3	1.00	25.4	1.75	44.5	8	10.8	12	16.3	1/2
GTDBB-125P80	1 1/4"	80/XS	1	1.13	28.7	0.15	3.8	23 7/8	606	10.13	257.3	1.00	25.4	1.75	44.5	10	13.6	13	17.6	1/2
GTDBB-125P40	1 1/4"	40/STD	1	1.23	31.2	0.15	3.8	23 7/8	606	10.10	256.5	1.00	25.4	1.75	44.5	11	14.9	14	19.0	1/2
GTDBB-125P10	1 1/4"	10	1	1.29	32.8	0.15	3.9	23 7/8	606	10.10	256.5	1.00	25.4	1.75	44.5	12	16.3	14	19.0	1/2
GTDBB-15PXXS	1 1/2"	XXS	1	0.98	24.9	0.12	3.0	22 5/8	575	10.00	254.0	0.50	12.7	1.75	44.5	5	6.8	7.5	10.2	7/16
GTDBB-15P160	1 1/2"	160	2	1.19	30.2	0.15	3.8	26 3/4	679	10.71	272.0	1.00	25.4	2.75	69.9	15	20.3	20	27.1	3/4
GTDBB-15P80	1 1/2"	80/XS	2	1.35	34.3	0.15	3.8	26 3/4	679	10.62	269.7	1.00	25.4	2.75	69.9	15	20.3	20	27.1	3/4
GTDBB-15P40	1 1/2"	40/STD	2	1.46	37.1	0.15	3.8	26 3/4	679	10.62	269.7	1.00	25.4	2.75	69.9	15	20.3	20	27.1	3/4
GTDBB-15P10	1 1/2"	10	2	1.53	38.9	0.15	3.9	26 3/4	679	10.62	269.7	1.00	25.4	2.75	69.9	20	27.1	30	40.7	3/4

Questions? Contact EST Group Customer Service at any of the following locations.

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PART NUMBER	PIPE SIZE	SCH	TYPE	PLUG OD		CLEARANCE BETWEEN PLUG AND PIPE		LENGTH		L1 DISTANCE TO SEAL		L2 SEAL THICKNESS		L3 DISTANCE BETWEEN SEALS		NORMAL INSTALLATION TORQUE		MAXIMUM INSTALLATION TORQUE		CROWFOOT WRENCH SIZE
				(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	(IN)	(mm)	FT-LBS	N-m	FT-LBS	N-m	(IN)
GTDBB-2PXXS	2"	XXS	2	1.35	34.3	0.15	3.9	26 3/4	679	10.62	269.7	1.00	25.4	2.75	69.9	15	20.3	20	27.1	3/4
GTDBB-2P160	2"	160	2	1.53	38.9	0.16	4.0	26 3/4	679	10.62	269.7	1.00	25.4	2.75	69.9	20	27.1	30	40.7	3/4
GTDBB-2P80	2"	80/XS	2	1.76	44.7	0.18	4.5	28 1/2	724	11.62	295.1	1.00	25.4	2.75	69.9	30	40.7	50	67.8	7/8
GTDBB-2P40	2"	40/STD	2	1.89	48.0	0.18	4.5	28 1/2	724	11.62	295.1	1.00	25.4	2.75	69.9	30	40.7	50	67.8	7/8
GTDBB-2P10	2"	10	2	1.98	50.3	0.18	4.5	28 1/2	724	10.44	265.2	1.00	25.4	2.75	69.9	35	47.5	60	81.3	7/8
GTDBB-25PXXS	2 1/2"	XXS	2	1.61	40.9	0.16	4.1	26 3/4	679	10.69	271.5	1.00	25.4	2.75	69.9	20	27.1	30	40.7	3/4
GTDBB-25P160	2 1/2"	160	2	1.95	49.5	0.18	4.4	28 1/2	724	10.44	265.2	1.00	25.4	2.75	69.9	35	47.5	60	81.3	7/8
GTDBB-25P80	2 1/2"	80/XS	2	2.13	54.1	0.19	4.9	29 1/4	743	11.63	295.4	1.00	25.4	2.75	69.9	60	81.3	90	122.0	1 1/4
GTDBB-25P40	2 1/2"	40/STD	2	2.29	58.2	0.18	4.5	29 1/4	743	11.63	295.4	1.00	25.4	2.75	69.9	60	81.3	90	122.0	1 1/4
GTDBB-25P10	2 1/2"	10	2	2.46	62.5	0.18	4.4	34 1/4	870	14.25	362.0	1.00	25.4	2.75	69.9	100	135.6	150	203.4	1 13/16
GTDBB-3PXXS	3"	XXS	2	2.13	54.1	0.17	4.3	29 1/4	743	11.63	295.4	1.00	25.4	2.75	69.9	60	81.3	90	122.0	1 1/4
GTDBB-3P160	3"	160	2	2.46	62.5	0.17	4.2	34 1/4	870	14.25	362.0	1.00	25.4	2.75	69.9	100	135.6	150	203.4	1 13/16
GTDBB-3P80	3"	80/XS	2	2.69	68.3	0.21	5.3	34 1/4	870	13.75	349.3	1.00	25.4	2.75	69.9	150	203.4	200	271.2	1 13/16
GTDBB-3P40	3"	40/STD	2	2.86	72.6	0.21	5.3	34 1/4	870	13.75	349.3	1.00	25.4	2.75	69.9	150	203.4	200	271.2	1 13/16
GTDBB-3P10	3"	10	2	3.04	77.2	0.22	5.6	34 1/4	870	13.75	349.3	1.00	25.4	2.75	69.9	175	237.3	250	339.0	1 13/16

NOTE: A high strength crowfoot may be required when using plugs that require an installation torque greater than 91 ft-lbs. Contact EST Group Customer Service to purchase high strength crowfoot wrenches.

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