

## Operating Procedures for 10” through 24” GripTight® High Pressure Test Plug

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Thank you for choosing to use a GripTight (GT®) Test Plug. **Please note that the following procedures apply to testing metallic pipes or tubes. If you are testing non-metallic pipes or tubes, please contact EST Group Customer Service prior to usage. Failure to follow the correct procedures for testing non-metallic pipes or tubes may result in injury to personnel and damage to equipment.**

In order to carry out safe testing with your GripTight Test Plug, the following equipment is required:

1. A calibrated torque wrench that is capable of producing the required torque
2. A deep socket or crowfoot wrench (1-5/8 inch for all plugs)
3. Pipe cap(s) or couplings with working pressure greater than or equal to the test pressure being used (see Table 1 for size).

All required test equipment is available through EST Group. All equipment and components required to maintain and refurbish GT Test Plugs is available through EST Group. Contact EST Group Customer Service for information.

### WARNING

- ⚠ Pressure testing is inherently dangerous. Strict adherence to these operating procedures and industry standard safety practices could prevent injury to personnel and damage to equipment.
- ⚠ GripTight Test Plugs are for use in all Carbon Steel with a hardness up to HRC 20. Contact EST Customer Service if pipes to be tested have a hardness greater than HRC 20.
- ⚠ Contact EST Group Customer Service if the test pressure required exceeds the maximum plug rating or is in excess of 80% of specified minimum yield stress for host pipe, tube, or equipment.
- ⚠ All personnel must be clear of the GripTight Test Plug during pressure testing. Never stand in the potential path of a GripTight Test Plug during testing. Always understand and observe industry standard safe practices for distance between personnel and equipment being tested.
- ⚠ Pressures must never exceed the maximum pressure rating of any component in a system or the maximum pressure rating of the GripTight Test Plug being used.
- ⚠ For safety, an incompressible liquid such as water should be used as the test medium. Residual air or gas should be displaced from the pipe prior to testing.
- ⚠ If testing pneumatically, every attempt to limit potential damage to equipment or injury to personnel must be made. The suggested test medium for pneumatic testing is nitrogen since it cannot support combustion. Testing procedures and protocol should adhere to the provisions for pneumatic testing set forth in the current ASME PCC-2 Repair of Pressure Equipment and Piping.
- ⚠ GripTight Test Plugs are designed to withstand test pressure in the direction shown below. Do not use these plugs in applications that would subject the plugs to pressure in a manner that differs from the image below.

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

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[www.cw-estgroup.com](http://www.cw-estgroup.com)

**North, Central & South America**

EST Group Corporate Office  
2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

+1.800.355.7044

F: +1.215.721.1101

[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

**Europe / Middle East / Africa**

EST Group B.V.  
Hoor 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
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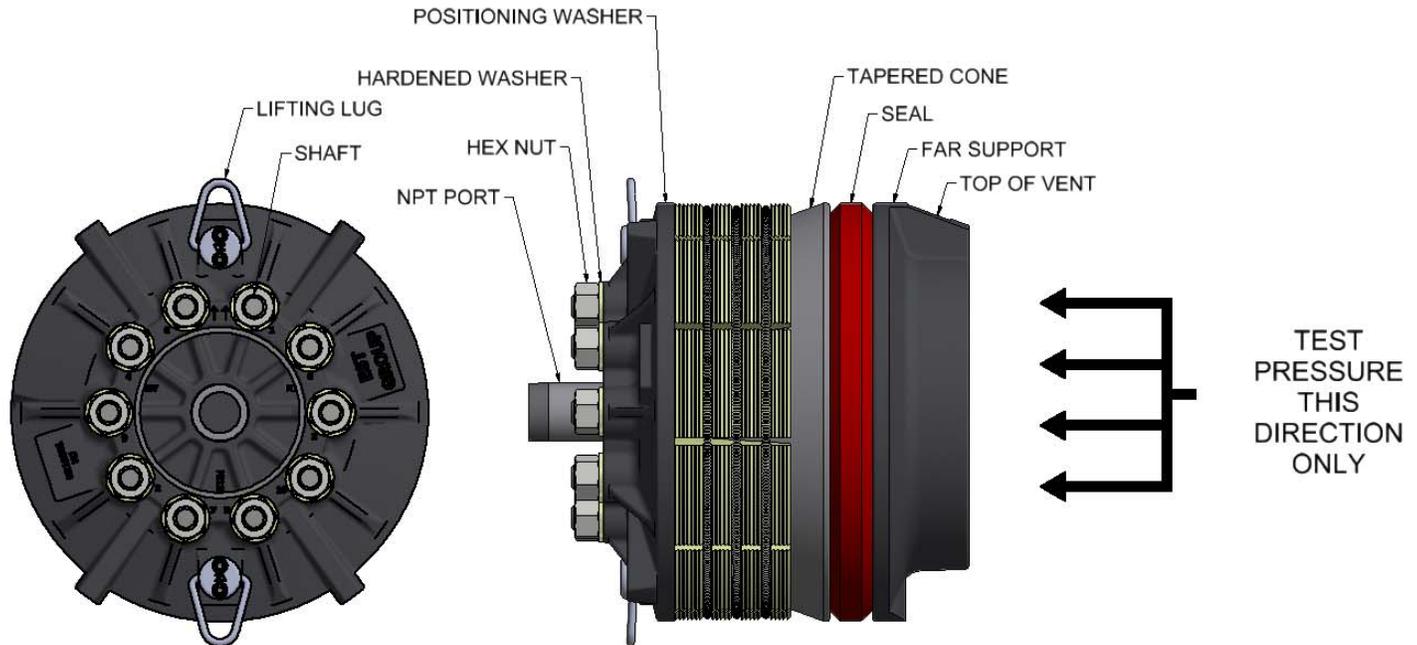
P +86.400.636.5077

[est-china@curtisswright.cn](mailto:est-china@curtisswright.cn)

**Singapore**

P +65.3158.5052

[est-asia@curtisswright.com](mailto:est-asia@curtisswright.com)



**GripTight High Pressure Test Plug**

## 1. Test Preparation

- 1.1. Fully read and understand these operating procedures. Pressure testing is inherently dangerous and must be performed as safely as possible. If any instruction contained in this document is unclear, STOP and contact EST Group Customer Service.
- 1.2. Following these procedures and industry standard safe practices may prevent injury to personnel and damage to property.
- 1.3. Read these instructions prior to every test. Be familiar with and use applicable Human Performance Tools before, during, and after every test.
- 1.4. Hydrostatic testing is preferred over pneumatic testing due to safety concerns. Displace as much air or gas as possible prior to conducting a hydrostatic test.
- 1.5. If any instruction contained in these operating procedures contradicts a site specific guideline or procedure: STOP and contact EST Group Customer Service for guidance.

Test pressure **MUST NOT** exceed the maximum pressure rating of the lowest rated component under test.

The test pressure **MUST NOT** exceed the rated pressure of the plug.

Test pressure **MUST NOT** exceed 80% of specified minimum yield stress for host pipe, tube, or equipment.

### Examples of Human Performance Tools

- Pre-Job Briefing
- Two-Minute Drill
- Three-Way Communication
- Phonetic Alphabet
- S.T.A.R. (Stop-Think-Act-Review)
- Procedure Use and Adherence
- Place Keeping (Circle Slash)
- Flagging / Operational Barriers
- Self-Checking
- Independent Verification
- Concurrent Verification
- First Check
- STOP When Unsure
- Peer Checking
- Post-Job Review

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EST Group Corporate Office  
2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

+1.800.355.7044

F: +1.215.721.1101

[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

#### Europe / Middle East / Africa

EST Group B.V.  
Horn 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
[est-emea@curtisswright.com](mailto:est-emea@curtisswright.com)

#### China

P +86.400.636.5077

[est-china@curtisswright.com](mailto:est-china@curtisswright.com)

#### Singapore

P +65.3158.5052

[est-asia@curtisswright.com](mailto:est-asia@curtisswright.com)

**WARNING**

**⚠ Contact EST Group Customer Service if the test pressure required exceeds the maximum plug rating or is in excess of 80% of specified minimum yield stress for host pipe, tube, or equipment.**

## 2. Equipment Inspection and Preparation

Perform the following steps prior to performing your pressure test.

Step/Action	Additional Action/Information/Result								
2.1. Visually inspect the plug for worn or damaged components. Replace as needed.	<ul style="list-style-type: none"> <li>The tapered surface between the Cone and Grippers must be free of friction producing dirt or corrosion.</li> </ul>								
2.2. Lubricate surface of the Tapered Cone.	<ul style="list-style-type: none"> <li>Apply a lubricant such as Molykote® DX or SAE 10W motor oil to the tapered surface of the Cone. Wipe away any excess lubricant from components making sure to leave an ample amount on tapered cone face and mating surface of gripper back. Lubricant <u>must not</u> be on seal.</li> </ul>								
2.3. Inspect or lubricate the underside of the positioning washer where the grippers slide.	<ul style="list-style-type: none"> <li>The Seal must not have excessive deformations, cuts or scores.</li> </ul>								
2.4. Liberally spread antiseize over both sides of the Hardened Washers and on the threads of the Shaft.	<div style="border: 1px solid red; padding: 5px; text-align: center;"> <p><b>CAUTION</b></p> <p>⚠ Failure to properly lubricate Shaft thread and Washer surfaces may result in unsafe operating conditions or plug leakage.</p> </div>								
2.5. Verify there is no debris in the gripper teeth; clean as needed.									
2.6. Tighten the Hex Nuts so the Grippers move freely to the end of the Tapered Cone surface.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white; text-align: center;"><i>If</i></th> <th style="background-color: #4F81BD; color: white; text-align: center;"><i>then</i></th> </tr> </thead> <tbody> <tr> <td>Grippers move freely to end of the tapered Cone surfaces,</td> <td>Loosen the Hex Nuts back to its/their original position and go to the next step.</td> </tr> <tr> <td>Grippers do not fully retract,</td> <td>If required, remove any light rust, residue or corrosion on the cone face, gripper backs and tops and underside of positioning washer using a Scotch Brite Pad or pad of equivalent quality. Re-lubricate gripper backs, tops and tapered cone surface using a lubricant such as Molykote® DX or SAE 10W motor oil. Wipe away any excess lubricant from components making sure to leave an ample amount on Tapered Cone face and mating surface of gripper back. If grippers still do not fully retract and nuts cannot be easily advanced, do not use this plug for testing. Contact EST Group Customer Service for assistance.</td> </tr> <tr> <td>The Hex Nuts cannot easily be tightened to allow full gripper expansion</td> <td>Do not use this plug for testing. Contact EST Group Customer Service for assistance.</td> </tr> </tbody> </table>	<i>If</i>	<i>then</i>	Grippers move freely to end of the tapered Cone surfaces,	Loosen the Hex Nuts back to its/their original position and go to the next step.	Grippers do not fully retract,	If required, remove any light rust, residue or corrosion on the cone face, gripper backs and tops and underside of positioning washer using a Scotch Brite Pad or pad of equivalent quality. Re-lubricate gripper backs, tops and tapered cone surface using a lubricant such as Molykote® DX or SAE 10W motor oil. Wipe away any excess lubricant from components making sure to leave an ample amount on Tapered Cone face and mating surface of gripper back. If grippers still do not fully retract and nuts cannot be easily advanced, do not use this plug for testing. Contact EST Group Customer Service for assistance.	The Hex Nuts cannot easily be tightened to allow full gripper expansion	Do not use this plug for testing. Contact EST Group Customer Service for assistance.
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The Hex Nuts cannot easily be tightened to allow full gripper expansion	Do not use this plug for testing. Contact EST Group Customer Service for assistance.								
2.7. Clean and dry the inside of the pipe.	<ul style="list-style-type: none"> <li>All moisture, debris, and excessive scale must be removed from the pipe ID to ensure a proper seal is established during the pressure test.</li> </ul>								

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2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

+1.800.355.7044

F: +1.215.721.1101

[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

**Europe / Middle East / Africa**

EST Group B.V.  
Hoon 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
[est-emea@curtisswright.com](mailto:est-emea@curtisswright.com)

**China**

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[est-china@curtisswright.cn](mailto:est-china@curtisswright.cn)

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

2.8. Verify that the pipe size and schedule stamped on the GripTight Test Plug is equivalent to the size of the pipe you are testing, or that the inside diameter (ID) of the equipment being tested is within the ID operating range for the GripTight Test Plug being used.

**NOTE:**

Schedule 5 wall thickness pipe, or tubes with a wall thickness less than equivalent Schedule 10/10S pipe, must have an OD restraint. Contact EST Customer Service for information.

- See Table 1 for the Functional ID Operating Range for GripTight Test Plugs.

2.9. Verify that the equipment to be tested is prepared before performing the test. Make sure all applicable safety procedures are observed and followed, e.g. Lock-Out Tag-Out, work permits, correct components is being tested, etc.

**CAUTION**

⚠ Special caution must be taken when applying lubricant and handling the GripTight Test Plug. The lubricant must not come in contact with the Seal, the Gripper Teeth, or the inside of the pipe or tube.

### 3. Installing and Using the Safety Gag or Pipe Restraint

Safety Gags are strongly recommended for every application as they enhance the safety of the test system configuration. Perform the following steps if you are using a Safety Gag.

A Pipe Restraint is recommended for thin walled pipes or tubes (wall thickness equivalent to Schedule 10/10S) and required on pipes or tubes with walls thinner than Schedule 10/10S.

If a Safety Gag or Pipe Restraint is not being used, skip to Section 4: Performing the Pressure Test.

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

3.1. Install Safety Gag Pipe Clamps or Pipe Restraints onto pipe being tested. If required, the safety chains may be placed between the Pipe Clamps or the Pipe Restraints. This configuration is acceptable as long as the placement of the chains does not prevent the Safety Gag or Pipe Restraint from tightening securely on to the outside of the pipe or tube.

**If****Then**

Using a Safety Gag

Install the Safety Gag pipe clamps onto the pipe.

Using a Pipe Restraint with or without Safety Chains

Position the Pipe Restraint over the area where the GripTight Test Plug is installed.

**CAUTION**

⚠ GripTight Test Plug Seals and Grippers are energized by test pressure. During pressurization, the Shaft(s) may move slightly. This is normal and expected. A small amount of slack in the Safety Chain(s) is required for this movement and energization to occur.

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

- 3.2. Tighten the bolts enough to prevent the Safety Gag or Pipe Restraint from moving. The Safety Gag or Pipe Clamp should not be able to rotate, slide, or move when pushed or pulled.
- 3.3. Insert GripTight Test Plug into the equipment to be tested.
- 3.4. Follow remaining GripTight Test Plug installation procedure as per the steps in Section 4: Performing the Pressure Test.
- 3.5. Slip the Link(s) over the Shaft(s) before introducing test medium or test pressure. Do not place the Link(s) under the GripTight Test Plug Hex Nut(s) or over the center port.



Note: In some cases to make the clamp tight, the chain or chains need to be outside the tangs



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EST Group Corporate Office  
2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

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F: +1.215.721.1101  
[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

**Europe / Middle East / Africa**

EST Group B.V.  
Hoorn 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
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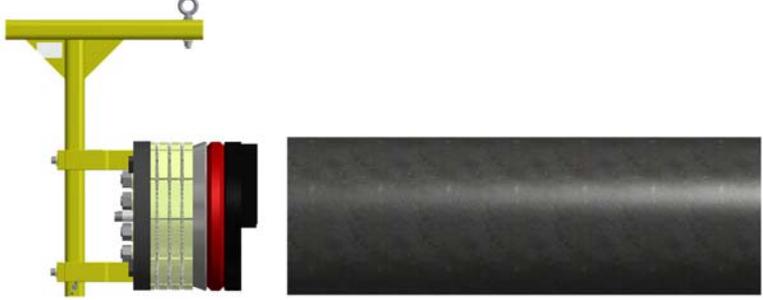
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## 4. Performing the Pressure Test

Perform the following steps to perform a pressure test with the GripTight Test Plug.

Step/Action	Additional Action/Information/Result
<p>4.1. Place the GripTight Test Plug inside the pipe. The GripTight Test Plug must be able to fit with the full length of the Grippers inside the pipe. Ideally, the plug should be inserted until the positioning washer contacts the face of the equipment being tested.</p>	
<p>4.2. If testing in seam-welded pipe, position the Grippers so that the weld seam is between two Gripper segments.</p>	<p>For added safety, use an approved installation device such as TPLIFT-1024 to install the test plug (reference instructions, DC2590)</p>
	<div style="border: 1px solid red; padding: 5px;"> <p style="text-align: center;"><b>Warning</b></p> <p>⚠ It is sometimes necessary to remove the weld seam in the area where the GripTight Test Plug is being installed. Carefully machine or grind the weld bead in the area of the test plug.</p> </div> <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p><b>Note:</b> The inside of the tube or pipe must be clean, dry, and free of rust, scale, or debris.</p> </div>

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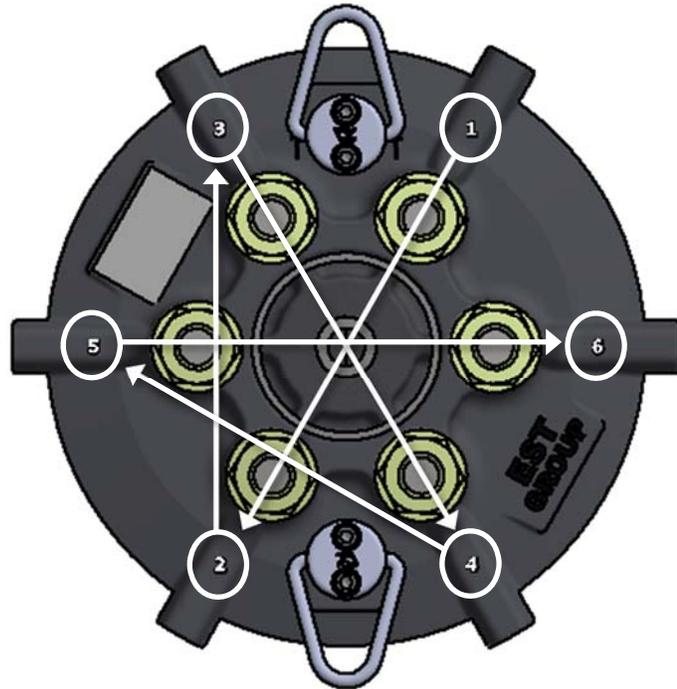
Step/Action	Additional Action/Information/Result
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- 4.3. Center the GripTight Test Plug within the pipe and hand tighten the Hex Nuts until the test plug has gripped the pipe ID.

**Note:** Slight wiggling of the plug may allow for further hand tightening of the Hex Nut(s).

- 4.4. Use a star pattern to incrementally tighten the Hex Nuts. Numbers on the positioning washer provide a suggested tightening sequence. Repeat torque sequence until desired torque has been applied.

If	Then
Using GripTight Test Plugs horizontally,	Tighten the bottom Hex Nuts first to help center the GripTight Test Plug within the pipe.



- 4.5. Tighten the Hex Nut(s) with a calibrated torque wrench and an appropriately sized crowfoot wrench or deep socket. Deep Sockets are recommended for Multi-Shaft GripTight Test Plugs. See Table 1 for nominal and maximum installation torques.

#### CAUTION

- ⚠ The torque wrench being used must be calibrated to ensure that the correct amount of torque is being applied. An un-calibrated torque wrench may cause the operator to tighten the Hex Nut(s) either too much or too little. This may result in unsafe operating conditions or damage to the test plug.
- ⚠ Some crowfoot wrenches may not be able to apply the required amount of torque for some GripTight Test Plugs. Before attempting to install, make sure the equipment being used is of adequate strength for the application. Using an insufficiently strong crowfoot wrench may cause injury to personnel or damage to the GripTight Test Plug.
- ⚠ Failure to apply at least the nominal installation torque from Table 1 may result in unsafe operation of the plug.
- ⚠ If a crowfoot wrench is used, ensure wrench is used at a 90° angle relative to the handle of the torque wrench. Failure to do so can result in significant and dangerous over-torque.

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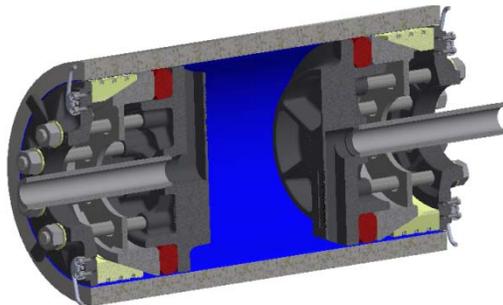
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Hoon 312a  
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The Netherlands  
P: +31.172.418841  
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Step/Action	Additional Action/Information/Result
<p>4.6. If a Safety Gag or Pipe Restraint is being used, slip the Link(s) over the Shaft(s) before proceeding. The Link(s) should not be placed under the Hex Nut(s) or over the center port.</p>	
<p>4.7. Install the pressure source leak tight. Use of a hose whip restraint is very strongly recommended. Inspect all connections to ensure they are leak tight.</p>	<ul style="list-style-type: none"> <li>For GripTight Test Plugs not being used to pressurize or vent the system, install a pipe cap with a pressure rating that is greater than or equal to the maximum test pressure being used.</li> </ul> <div style="border: 2px solid red; padding: 5px;"> <p style="text-align: center;"><b>CAUTION</b></p> <p>⚠ Before proceeding, inspect the unit / component under test to ensure every component is in the correct configuration. This includes checking to make sure all GripTight Test Plugs being used have been properly installed.</p> </div>
<p>4.8. Fill the pipe with test medium.</p>	 <p style="text-align: center;"><b>Position A</b>                      <b>Position B</b></p> <ul style="list-style-type: none"> <li>Check for any leaks while filling.</li> <li>If using a multiple GT test plugs, fill the pipe or tube being tested through GT Test Plug in position B (the Fill position) until test medium flows steadily out of GT Test Plug in position A (the Vent position).</li> <li>If not using fill and vent plugs, displace residual gases from the test system by opening the system at its highest point.</li> </ul>
<p>4.9. Perform the pressure test.</p>	<ul style="list-style-type: none"> <li>Slowly introduce the test pressure. <b>TEST PRESSURE MUST NEVER EXCEED THE MAXIMUM PRESSURE RATING OF ANY COMPONENT IN THE SYSTEM UNDER TEST. TEST PRESSURE MUST NEVER EXCEED THE MAXIMUM PRESSURE RATING OF THE GRIPTIGHT MAX TEST PLUG BEING USED.</b></li> <li>Imperfections within the pipe being tested may cause small leaks.</li> <li>Seam welded pipes occasionally require some weld bead to be removed. If the pipe is seam-welded and leaking persists after additional tightening, remove the weld bead in the area where the GripTight Test Plug seal is installed.</li> </ul>
<p>4.10. Check for leaks. A drop in pressure may not necessarily indicate a leak, as the GripTight Test Plugs require some time to “settle” while pressure is applied and the testing is being performed.</p>	<ul style="list-style-type: none"> <li>If leaks persist, additional tightening of the Hex Nuts may be required. <b>RELEASE ALL TEST PRESSURE</b> before adjusting the GT Test Plug.</li> <li>Do not exceed the maximum torque for the GripTight Test Plug. See Table 1 for torque values.</li> </ul>

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Step/Action	Additional Action/Information/Result
<p>4.11. Verify that GripTight Test Plug movement is within specified limits.</p> <div data-bbox="107 260 672 457" style="border: 1px solid red; padding: 5px;"> <p style="text-align: center;"><b>Warning</b></p> <p>⚠ Never re-torque the hex nut(s) while the plug is pressurized. This is unsafe and can cause damage to the GripTight Test Plug.</p> <p>⚠ Release all pressure prior to adjusting GripTight Test Plug torque.</p> </div>	<ul style="list-style-type: none"> <li>• For Multi-Shaft GripTight Test Plugs, movement up to 0.50” (13 mm) is acceptable. If plug movement exceeds the acceptable amount, immediately release all pressure and remove the GripTight Test Plug.</li> <li>• Examine the GripTight Test Plug components for wear. Pay particular attention to the condition of the Grippers. Replace parts as necessary.</li> <li>• Reinstall the GripTight Test Plug, following all instructions provided. Increase the installation torque used. Do not exceed the maximum torque rating for the plug.</li> </ul>
<p>4.12. Gradually release all pressure from the system once the test is completed.</p> <div data-bbox="107 663 672 892" style="border: 1px solid red; padding: 5px;"> <p style="text-align: center;"><b>Warning</b></p> <p>⚠ Incrementally loosen Hex Nuts, ½ turn, on multi-shaft plugs using the same star pattern as installation until torque is less than nominal installation torque. Failure to do so may over stress the shafts and nuts and cause deformation or damage.</p> </div>	<div data-bbox="701 499 1523 590" style="border: 1px solid black; padding: 5px;"> <p><b>Note:</b> If excessive Shaft movement persists after using the maximum GripTight installation torque, <b>stop the test, release all test pressure, and contact EST Group customer Service for technical assistance.</b></p> </div> <ul style="list-style-type: none"> <li>• If using a GripTight plugs in the Vent/Fill positions, to recover test medium, apply low pressure air to plug in Position A (see Section 4.8 reference).</li> <li>• Loosen the Hex Nut(s), remove the GripTight Test Plug from the pipe and then inspect the GripTight Test Plug for any deformation or damage.</li> <li>• If the plug is difficult to remove, wait for the seal to relax (up to 2-3 minutes) and a gentle wiggle of the shafts or tap on the positioning washer, will help.</li> </ul>
<p style="text-align: center;"><b>Warning</b></p> <p>⚠ Some test medium may remain inside the pipe after a hydrostatic test has been conducted. Caution must be taken when loosening Hex Nuts and removing GripTight Test Plugs to prevent unsafe conditions from occurring during removal, e.g. water spills onto a catwalk creating slippery conditions.</p>	

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EST Group

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**North, Central & South America**

EST Group Corporate Office  
2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

+1.800.355.7044

F: +1.215.721.1101

[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

**Europe / Middle East / Africa**

EST Group B.V.  
Hoorn 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
[est-emea@curtisswright.com](mailto:est-emea@curtisswright.com)

**China**

P +86.400.636.5077  
[est-china@curtisswright.cn](mailto:est-china@curtisswright.cn)

**Singapore**

P +65.3158.5052  
[est-asia@curtisswright.com](mailto:est-asia@curtisswright.com)

## 5. Storage

- Prior to storing, clean and dry the GripTight Test Plug. Do not allow the Seal to come in contact with any cleaning chemicals or solvents. Exposure to these chemicals may damage the Seal.
- Ensure the gripper teeth are free of dirt and debris. Clean as needed.
- Re-lubricate the Shaft threads and between the Hex Nuts and mating surface as previously described in Section 2: Equipment Inspection and Preparation.
- Store the GripTight Test Plug in an area out of direct exposure to sun or ultraviolet (UV) light. Do not store in an area where it will be subjected to heat in excess of 180°F (82°C). Excessive heat or UV light exposure will damage and prematurely degrade the Seal(s).
- For additional protection, the GT should be stored in a plastic bag or wrap.
- Store these instructions with each GripTight Test Plug.

**Table 1: GripTight Test Plug Information**

Part Number	Pipe Size	Pipe Schedule	Plug OD		Functional I.D. Range				Maximum Test Pressure		Installation Torque				NPT Size
					(in)		(mm)				FT-LBS		N-m		
			(in)	(mm)	Min	Max	Min	Max	(PsiG)	(BarG)	Nominal	Max	Nominal	Max	
GT-10P5	10	5	10.32	262.1	10.45	10.61	265.4	269.5	707	49	180	325	244	441	1" M
GT-10P10	10	10S	10.24	260.1	10.39	10.56	263.9	268.2	873	60	180	325	244	441	1" M
GT-10P20	10	20	10.07	255.8	10.22	10.41	259.6	264.4	1333	92	180	325	244	441	1" M
GT-10P30	10	30	9.96	253.0	10.10	10.31	256.5	261.9	1645	113	180	325	244	441	1" M
GT-10P40	10	40/STD	9.84	249.9	9.99	10.21	253.7	259.3	1966	136	180	325	244	441	1" M
GT-10PXS	10	XS/60	9.57	243.1	9.72	9.97	246.9	253.2	2725	188	180	325	244	441	1" M
GT-10P80	10	80	9.38	238.3	9.48	9.94	240.8	252.5	3264	225	180	325	244	441	1" M
GT-10P100	10	100	9.13	231.9	9.23	9.69	234.4	246.1	3993	275	180	325	244	441	1" M
GT-12P10	12	10S/5	12.20	309.9	12.36	12.57	313.9	319.3	802	55	180	325	244	441	1" M
GT-12P20	12	20	12.07	306.6	12.22	12.41	310.4	315.2	1120	77	180	325	244	441	1" M
GT-12P30	12	30	11.91	302.5	12.06	12.27	306.3	311.7	1487	103	180	325	244	441	1" M
GT-12P40	12	40/STD	11.82	300.2	11.91	12.19	302.5	309.6	1840	127	180	325	244	441	1" M
GT-12PXS	12	XS	11.57	293.9	11.72	11.97	297.7	304.0	2282	157	180	325	244	441	1" M
GT-12P60	12	60	11.45	290.8	11.59	11.86	294.4	301.2	2577	178	180	325	244	441	1" M
GT-12P80	12	80	11.19	284.2	11.34	11.64	288.0	295.7	3814	263	180	325	244	441	1" M
GT-12P100	12	100	10.88	276.4	11.03	11.37	280.2	288.8	3950	272	180	325	244	441	1" M
GT-12P120	12	120/XXS	10.57	268.5	10.72	11.09	272.3	281.7	4732	326	180	325	244	441	1" M
GT-12P140	12	140	10.32	262.1	10.47	10.88	265.9	276.4	5369	370	180	325	244	441	1" M
GT-12P160	12	160	9.96	253.0	10.06	10.52	255.5	267.2	6340	437	180	325	244	441	1" M

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EST Group Corporate Office  
2701 Township Line Road  
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EST Group B.V.  
Hoon 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
[est-emea@curtisswright.com](mailto:est-emea@curtisswright.com)

**China**

P +86.400.636.5077

[est-china@curtisswright.com](mailto:est-china@curtisswright.com)

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P +65.3158.5052

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Part Number	Pipe Size	Pipe Schedule	Plug OD		Functional I.D. Range				Maximum Test Pressure		Installation Torque				NPT Size
					(in)		(mm)				FT-LBS		N-m		
			(in)	(mm)	Min	Max	Min	Max	Nominal	Max	Nominal	Max			
									(PsiG)	(BarG)					
GT-14P10	14	10	13.31	338.1	13.47	13.82	342.1	351.0	1018	70	180	325	244	441	1" M
GT-14P20	14	20	13.20	335.3	13.34	13.55	338.8	344.2	1276	88	180	325	244	441	1" M
GT-14PSTD	14	STD/ 30	13.07	332.0	13.22	13.44	335.8	341.4	1540	106	180	325	244	441	1" M
GT-14P40	14	40	12.94	328.7	13.09	13.33	332.5	338.6	1807	125	180	325	244	441	1" M
GT-14PXS	14	XS	12.82	325.6	12.97	13.22	329.4	335.8	2071	143	180	325	244	441	1" M
GT-14P60	14	60	12.63	320.8	12.78	13.05	324.6	331.5	2476	171	180	325	244	441	1" M
GT-14P80	14	80	12.32	312.9	12.47	12.78	316.7	324.6	3160	218	180	325	244	441	1" M
GT-14P100	14	100	11.94	303.3	12.09	12.45	307.1	316.2	4001	276	180	325	244	441	1" M
GT-14P120	14	120	11.63	295.4	11.78	12.18	299.2	309.4	4713	325	180	325	244	441	1" M
GT-14P140	14	140	11.32	287.5	11.47	11.91	291.3	302.5	5438	375	180	325	244	441	1" M
GT-14P160	14	160	11.00	279.4	11.10	11.56	281.9	293.6	6175	426	180	325	244	441	1" M
GT-16P10	16	10	15.32	389.1	15.47	15.81	392.9	401.6	889	61	180	325	244	441	2" M
GT-16P20	16	20	15.20	386.1	15.34	15.55	389.6	395.0	1113	77	180	325	244	441	2" M
GT-16PSTD	16	STD/30	15.07	382.8	15.22	15.44	386.6	392.2	1343	93	180	325	244	441	2" M
GT-16P40	16	40/XS	14.82	376.4	14.97	15.22	380.2	386.6	1805	124	180	325	244	441	2" M
GT-16P60	16	60	14.51	368.6	14.66	14.95	372.4	379.7	2390	165	180	325	244	441	2" M
GT-16P80	16	80	14.13	358.9	14.28	14.62	362.7	371.3	3109	214	180	325	244	441	1" M
GT-16P100	16	100	13.76	349.5	13.91	14.29	353.3	363.0	3839	265	180	325	244	441	1" M
GT-16P120	16	120	13.38	339.9	13.53	13.96	343.7	354.6	4587	316	180	325	244	441	1" M
GT-16P140	16	140	12.94	328.7	13.09	13.58	332.5	344.9	5477	378	180	325	244	441	1" M
GT-16P160	16	160	12.63	320.8	12.78	13.30	324.6	337.8	6121	422	180	325	244	441	1" M
GT-18P10	18	10	17.32	439.9	17.46	17.81	443.5	452.4	789	54	180	325	244	441	2" M
GT-18P20	18	20	17.20	436.9	17.34	17.55	440.4	445.8	987	68	180	325	244	441	2" M
GT-18PSTD	18	STD	17.07	433.6	17.22	17.44	437.4	443.0	1191	82	180	325	244	441	2" M
GT-18P30	18	30	16.94	430.3	17.09	17.33	434.1	440.2	1396	96	180	325	244	441	2" M
GT-18PXS	18	XS	16.82	427.2	16.97	17.22	431.0	437.4	1599	110	180	325	244	441	2" M
GT-18P40	18	40	16.70	424.2	16.84	17.11	427.7	434.6	1803	124	180	325	244	441	2" M
GT-18P60	18	60	16.32	414.5	16.47	16.78	418.3	426.2	2430	168	180	325	244	441	2" M
GT-18P80	18	80	15.94	404.9	16.09	16.45	408.7	417.8	3069	212	180	325	244	441	2" M
GT-18P100	18	100	15.51	394.0	15.66	16.07	397.8	408.2	3825	264	180	325	244	441	2" M
GT-18P120	18	120	15.07	382.8	15.22	15.69	386.6	398.5	4600	317	180	325	244	441	2" M
GT-18P140	18	140	14.69	373.1	14.84	15.36	376.9	390.1	5274	364	180	325	244	441	2" M
GT-18P160	18	160	14.25	362.0	14.41	14.98	366.0	380.5	6076	419	180	325	244	441	2" M

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EST Group

[www.cw-estgroup.com](http://www.cw-estgroup.com)

**North, Central & South America**

EST Group Corporate Office  
2701 Township Line Road  
Hatfield, PA 19440-1770 USA

P: +1.215.721.1100

+1.800.355.7044

F: +1.215.721.1101

[est-info@curtisswright.com](mailto:est-info@curtisswright.com)

**Europe / Middle East / Africa**

EST Group B.V.  
Hoon 312a  
2404 HL Alphen aan den Rijn  
The Netherlands  
P: +31.172.418841  
F: +31.172.418849  
[est-emea@curtisswright.com](mailto:est-emea@curtisswright.com)

**China**

P +86.400.636.5077  
[est-china@curtisswright.com](mailto:est-china@curtisswright.com)

**Singapore**

P +65.3158.5052  
[est-asia@curtisswright.com](mailto:est-asia@curtisswright.com)

Part Number	Pipe Size	Pipe Schedule	Plug OD		Functional I.D. Range				Maximum Test Pressure		Installation Torque				NPT Size
					(in)		(mm)				FT-LBS		N-m		
			(in)	(mm)	Min	Max	Min	Max	Nominal	Max	Nominal	Max			
									(PsiG)	(BarG)					
GT-20P10	20	10/10S/5	19.38	492.3	19.47	19.80	494.5	502.9	709	49	180	325	244	441	2" M
GT-20PSTD	20	STD/20	19.07	484.4	19.22	19.47	488.2	494.5	1070	74	180	325	244	441	2" M
GT-20PXS	20	XS/30	18.82	478.0	18.97	19.25	481.8	489.0	1435	99	180	325	244	441	2" M
GT-20P40	20	40	18.63	473.2	18.78	19.09	477.0	484.9	1713	118	180	325	244	441	2" M
GT-20P60	20	60	18.20	462.3	18.34	18.70	465.8	475.0	2366	163	180	325	244	441	2" M
GT-20P80	20	80	17.76	451.1	17.91	18.32	454.9	465.3	3035	209	180	325	244	441	2" M
GT-20P100	20	100	17.26	438.4	17.41	17.88	442.2	454.2	3814	263	180	325	244	441	2" M
GT-20P120	20	120	16.82	427.2	16.97	17.50	431.0	444.5	4511	311	180	325	244	441	2" M
GT-20P140	20	140	16.32	414.5	16.47	17.06	418.3	433.3	5321	367	180	325	244	441	2" M
GT-20P160	20	160	15.87	403.1	16.03	16.68	407.2	423.7	6043	417	180	325	244	441	2" M
GT-22P10	22	10/10S/5	21.25	539.8	21.47	21.80	545.3	553.7	644	44	180	325	244	441	2" M
GT-22PSTD	22	STD/20	21.00	533.4	21.22	21.47	539.0	545.3	971	67	180	325	244	441	2" M
GT-22PXS	22	XS	20.75	527.1	20.97	21.25	532.6	539.8	1302	90	180	325	244	441	2" M
GT-22P60	22	60	20.03	508.8	20.22	20.59	513.6	523.0	2316	160	180	325	244	441	2" M
GT-22P80	22	80	19.53	496.1	19.72	20.16	500.9	512.1	3009	208	180	325	244	441	2" M
GT-22P100	22	100	19.07	484.4	19.22	19.72	488.2	500.9	3814	263	180	325	244	441	2" M
GT-22P120	22	120	18.58	471.9	18.72	19.28	475.5	489.7	4438	306	180	325	244	441	2" M
GT-22P140	22	140	18.06	458.7	18.22	18.48	462.8	469.4	5172	357	180	325	244	441	2" M
GT-22P160	22	160	17.55	445.8	17.72	18.41	450.1	467.6	5920	408	180	325	244	441	2" M
GT-24P10	24	10/10S/5	23.31	592.1	23.47	23.74	596.1	603.0	589	41	180	325	244	441	2" M
GT-24PSTD	24	STD/20	23.00	584.2	23.22	23.47	589.8	596.1	889	61	180	325	244	441	2" M
GT-24PXS	24	XS	22.75	577.9	22.97	23.25	583.4	590.6	1191	82	180	325	244	441	2" M
GT-24P30	24	30	22.63	574.8	22.84	23.14	580.1	587.8	1342	93	180	325	244	441	2" M
GT-24P40	24	40	22.37	568.2	22.59	22.92	573.8	582.2	1651	114	180	325	244	441	2" M
GT-24P60	24	60	21.81	554.0	22.03	22.43	559.6	569.7	2352	162	180	325	244	441	2" M
GT-24P80	24	80	21.31	541.3	21.53	21.99	546.9	558.5	2985	206	180	325	244	441	2" M
GT-24P100	24	100	20.72	526.3	20.91	21.45	531.1	544.8	3798	262	180	325	244	441	2" M
GT-24P120	24	120	20.16	512.1	20.34	20.95	516.6	532.1	4543	313	180	325	244	441	2" M
GT-24P140	24	140	19.66	499.4	19.84	20.52	503.9	521.2	5217	360	180	325	244	441	2" M
GT-24P160	24	160	19.13	485.9	19.28	20.02	489.7	508.5	5991	413	180	325	244	441	2" M

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EST Group B.V.  
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