

OPERATING PROCEDURES FOR G-150 TUBE TESTING GUNS

NOTE: See pages 4-8 for parts and drawings of the G-150 as indicated in instructions below.

PRIOR TO TESTING:

1. The tubes to be tested should be cleaned and any loose deposits or scale should be removed. If the tubes have not been cleaned, any foreign materials present may be ejected during the testing operation and may damage the test guns or injure the operators.
2. The operators should always wear safety glasses or a face shield when testing with the G-150 Tube Testing Gun or any type of pressure test guns.
3. If the tubes have been chemically cleaned please check with EST Customer Service regarding the compatibility of the G-150 Tube Testing Gun Seals with the cleaning agent. Alternate seal materials are available.
4. Make sure the G-150 Tube Testing Guns have the correct size replacement Seal and Washer Set (2) for the tubes being tested. The Seals and Washers are correctly sized if the OD of the Seals are between 0.02" to 0.06" (0.51 mm to 1.52 mm) smaller than the actual tube ID. Using Seals that are too small may cause any of the following: premature Seal wear, jamming of the G-150 Tube Testing Gun in the tube, or expulsion of the G-150 Tube Testing Gun from the tube end. Replacement Seals for the G-150 Tube Testing Guns can be manufactured for any tube I.D. from 0.28" to 1.23" (7.11 mm to 31.24 mm). For tube ID's larger than 1.23" (31.24 mm), contact EST for information on the G-150A Tube Testing Gun Package. The procedure for replacing the Seal and Washer sets is outlined below.

TESTING PROCEDURE:

WARNING: Never actuate the G-150 Tube Testing Injection Gun unless the Seal Assembly is installed within the proper ID tube as the Washers could be forced into the Seal ID. This could damage the Seals.

The G-150 Tube Testing Guns come as a set. This set is comprised of: an Injection Gun and a Plugging Gun. The Injection Gun can be differentiated from the Plugging Gun because it incorporates the Air Control Valve (9) and Bleed Valve (10). The Plugging Gun will not operate without the Injection Gun.

1. Attach air supply to the Injection Gun. The G-150 Tube Testing Guns will be operational on plant air supplies ranging from 40 to 125 PsiG (2.7 to 8.6 BarG) at a minimum of 5 cfm. If testing tube ID's from 0.28 to 0.48" (7.11 to 12.19 mm) the Regulator Assembly (part number GSA-REG) is required. Install Regulator Assembly (12) with arrow pointing towards the Injection Gun onto nipple leak tight and attach air supply to Regulator Assembly input. For tube ID's from 0.28" - 0.48" (7.11 mm – 12.19 mm) adjust regulator to 40 – 60 PsiG (2.7 to 4.1 BarG) by rotating adjustment knobs while viewing gauge.
2. Insert the Injection Gun into one end of the tube to be tested and the Plugging Gun into the other end. Apply enough pressure to seat the Back-up Washer (3) firmly against the end of the tube. Maintain this pressure throughout the test.
3. After making sure that the Plugging Gun operator is ready, push the Handle of the Air Control Valve (9) towards the Cylinder Body on the Injection Gun and hold until the reading on the Pressure Gauge (7) stabilizes.



<http://estgroup.cwfc.com>

North America / Central & South America
 Corporate Office
 2701 Township Line Rd
 Hatfield, PA 19440-1770 USA
 (P) +1 215.721.1100
 +1 800.355.7044
 (F) +1 215.721.1101
 est-info@curtisswright.com

Europe / Middle East / Africa
 EST Group B.V.
 Hoom 312a
 2404 HL, Alphen aan den Rijn
 The Netherlands
 (P) +31.172.418841
 (F) +31.172.418849
 est-emea@curtisswright.com

Asia Pacific
 EST Group Asia
 35 Tannery Rd, #11-10 Tannery Block
 Ruby Industrial Complex
 Singapore 347740
 (P) +65.6745.8560
 (F) +65.6742.8700
 est-asia@curtisswright.com

4. While maintaining control of the Injection Gun by holding on to the Handle (6), allow the Air Control Valve (9) to return to the closed position by letting go of the Air Control Valve Handle. The Air Control Valve will automatically return to the closed position and isolate the tube being tested. The tube is now under pressure.

NOTE: An initial pressure drop after closing the air control valve is normal. This is due to settling of the seals inside the tube and does not indicate a leak.

5. Both Injection Gun and Plugging Gun operators should observe the Pressure Gauge (7) on their respective G-150 Tube Testing Guns. Any decrease in the pressure indicated on the Pressure Gauge (7) will indicate a leaking tube. Generally, holding pressure for 5 to 10 seconds will be sufficient to determine whether a tube is leaking. If a leak is detected, follow site specific guidelines for identifying and repairing the tube leak.
6. After testing is complete, press the Bleed Valve (10) on the Injection Gun to bleed off the air pressure in the tube. Once the pressure is bled off, the Seals will relax.
7. Remove the G-150 Tube Testing Guns and move on to the next tube. If a leaking tube is encountered, follow site specific best practices for flagging and repairing the leaking tube(s).
8. Repeat steps 2 through 7.

INSTALLING REPLACEMENT SEALS:

Replacement Seals for the G-150 Tube Testing Guns are supplied with the corresponding size Washers. Always replace the Seals and Washers on both the Injection Gun and the Plugging Gun at the same time.

1. Remove the Lock Nut (1) from the end of the Support Tube (4) and set it aside.
2. Remove the Seal and Washer Set (2) from the Support Tube (4). Discard if worn. Under optimum testing conditions you should be able to test between 100 and 500 tubes per replacement Seal and Washer Set.
3. For replacement Seal and Washer sets of the same size, install on Existing Support tube (4). If you are changing the Seal and Washer set to a different size, keep in mind that the Support Tube Assembly (5) may also need to be changed. To replace the Support Tube Assembly, refer to the procedure outlined in the REPLACING THE SUPPORT TUBE ASSEMBLY section.
4. When replacing the Lock Nut (1) on the Support Tube (4), do not use a wrench. Screw it on finger tight only. A small space between the Lock Nut, Seal and Washer set, and Back-up Washers is normal.

REPLACING THE SUPPORT TUBE ASSEMBLY:

The G-150 Tube Testing Guns are originally shipped with three sets of Support Tube Assemblies (5). These Support Tube Assemblies will allow you to test tubes with ID's from 0.28" - 0.48", 0.49" to 0.83" and 0.84" to 1.23" (7.11 mm to 12.19 mm, 12.45 mm to 21.08 mm, and 21.34 mm to 31.24 mm respectively).

1. Remove the Seal and Washer Sets (2) as outlined above.
2. Using an open end wrench on the wrench flats provided on the Piston and a pipe wrench on the Support Tube (4) gently unscrew the Support Tube from the Piston.



<http://estgroup.cwfc.com>

North America / Central & South America
Corporate Office
2701 Township Line Rd
Hatfield, PA 19440-1770 USA
(P) +1 215.721.1100
+1 800.355.7044
(F) +1 215.721.1101
est-info@curtisswright.com

Europe / Middle East / Africa
EST Group B.V.
Hoom 312a
2404 HL, Alphen aan den Rijn
The Netherlands
(P) +31.172.418841
(F) +31.172.418849
est-emea@curtisswright.com

Asia Pacific
EST Group Asia
35 Tannery Rd, #11-10 Tannery Block
Ruby Industrial Complex
Singapore 347740
(P) +65.6745.8560
(F) +65.6742.8700
est-asia@curtisswright.com

3. Choose the correct size Support Tubes for the tube ID being tested. All three sizes of Support Tubes will fit into the Piston of the G-150 Tube Testing Gun. Use Never-seize or similar product to lubricate and seal the threads. Do not over tighten the Support Tube.
4. Repeat steps 1 thru 3 for the remaining G-150 Tube Testing Gun.
5. If testing tube ID's from 0.28" - 0.48" (7.11 mm to 12.19 mm), thread the Regulator Assembly with arrow pointing towards gun onto nipple leak tight.
6. Prior to replacing the Seal and Washer Set (2) and the Back-up Washer Set (3) inspect the Support Tube for marks or burrs left from the replacement procedure. File smooth if present.

OTHER REPLACEMENTS AND REPAIRS:

Under no conditions should you attempt to service the Air Cylinders contained in the Cylinder Bodies. Any attempt to perform service on the Cylinders may void any and all remaining warranties, implied or otherwise.

QUESTIONS? Contact EST Group Customer Service at any of the following locations with questions.

- In USA and Canada: tel: 800-355-7044, 215-721-1100; e-mail: est-info@curtisswright.com
- In Europe: tel: +31-172-418841; e-mail: est-emea@curtisswright.com
- In Asia: tel: +65-6745-8560; e-mail: est-asia@curtisswright.com
- On the Internet: <http://estgroup.cwfc.com>

EST Group provides a complete range of repair products, services, and replacement parts covering the life cycle of heat exchangers and condensers; additionally EST Group provides products and services to facilitate pressure testing pipe, piping systems, pressure vessels, and their components. Visit EST Group on the Internet at <http://estgroup.cwfc.com>.



<http://estgroup.cwfc.com>

North America / Central & South America

Corporate Office
2701 Township Line Rd
Hatfield, PA 19440-1770 USA
(P) +1 215.721.1100
+1 800.355.7044
(F) +1 215.721.1101
est-info@curtisswright.com

Europe / Middle East / Africa

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

Asia Pacific

EST Group Asia
35 Tannery Rd, #11-10 Tannery Block
Ruby Industrial Complex
Singapore 347740
(P) +65.6745.8560
(F) +65.6742.8700
est-asia@curtisswright.com

Table 1: Seal & Washer sets not included in the G-150 Tube Test Gun Package.

Seal & Washer sets are required for all applications. See Table 3 for XXXX sizing.

Item	Quantity	Description	Part Number for Tube ID's Listed in (mm)		
			0.28" - 0.48" (7.11-12.19 mm)	0.49" - 0.83" (12.45 – 21.08 mm)	0.84" - 1.23" (21.34 – 31.24 mm)
2	Minimum 1 set	Seal & Washer Set	GSA-XXXX-N (Neoprene)		

Table 2: Replacement Parts for G-150 Tube Testing Gun Set (Injection & Plugging Gun) Part # GSA-1500

Item	Quantity	Description	Part Number for Tube ID's Listed in (mm)		
			0.28 - 0.48 (7.11-12.19 mm)	0.49 - 0.83 (12.45 – 21.08 mm)	0.84 - 1.23 (21.34 – 31.24 mm)
1	1 each gun	Lock Nut	GSA-1530	GSA-1531	GSA-1532
3	1 each gun	Back-up Washer Set (includes elastomer & steel washer)	GSA-1520	GSA-1521	GSA-1522
4	1 each gun	Support Tube	Supplied as part of item 5		
5	1 each gun	Support Tube Assembly (includes items 1,3 &4)	GSA-1510	GSA-1511	GSA-1512
6	1	Handle, ported w/o bleed valve (Injection Gun only)	GSA-1571		
7	1 each gun	Pressure Gauge, 0-160 PsiG (0 – 11.03 BarG)	GSA-1540		
8	1 each gun	Cylinder Body Complete	GSA-1580		
9	1	Air Control Valve Assembly (includes Valve Handle Assembly and 1/8" to 1/4" NPT Hex Nipple Adapter)	GSA-1561		
10	1	Bleed Valve (Injection Gun Only)	GSA-1560		
11	2	Handle, w/o port (Plugging Gun Only)	GSA-1572		
12	1	Regulator Assembly	GSA-REG	Not required	
13	1 each gun (Optional)	Support rod Extension (Available in 1, 2, 3, & 4ft lengths)	GSA-1510-XX	GSA-1511-XX	GSA-1512-XX



<http://estgroup.cwfc.com>

North America / Central & South America
 Corporate Office
 2701 Township Line Rd
 Hatfield, PA 19440-1770 USA
 (P) +1 215.721.1100
 +1 800.355.7044
 (F) +1 215.721.1101
 est-info@curtisswright.com

Europe / Middle East / Africa
 EST Group B.V.
 Hoom 312a
 2404 HL, Alphen aan den Rijn
 The Netherlands
 (P) +31.172.418841
 (F) +31.172.418849
 est-emea@curtisswright.com

Asia Pacific
 EST Group Asia
 35 Tannery Rd, #11-10 Tannery Block
 Ruby Industrial Complex
 Singapore 347740
 (P) +65.6745.8560
 (F) +65.6742.8700
 est-asia@curtisswright.com

Table 3: Seal & Washer Set Part Numbers

Seal & Washer Set Part Numbers, GSA-XXXX-N, where XXXX is the number listed in the chart for the appropriate tube OD and BWG. Sets for the tube IDs 0.28"-0.48" (7.1-12.3 mm) contain (4) seals and (4) washers. All other Seal and Washer Sets contain (2) seals and (4) washers.

G-150 Seal & Washer Sets, Part Numbers (GSA-XXXX-N)									
BWG	½" (12.70 mm)	5/8 (15.88 mm)	¾ (19.05 mm)	7/8 (22.23 mm)	1 (25.40 mm)	1 1/8 (28.58 mm)	1 ¼ (31.75 mm)	1 3/8 (34.93 mm)	1 ½ (38.10 mm)
8-9	N/A	0030	0043	0056	0068	0081	0093	0106	0118
10-11	N/A	0037	0047	0062	0072	0087	0097	0112	0122
12-13	0028	0040	0053	0065	0078	0090	0103	0115	See G-150A
14-15	0033	0047	0056	0072	0083	0097	0110	0122	
16-17	0037	0050	0062	0075	0087	0100	0112	See	
18-19	0040	0053	0065	0078	0090	0103	0115	G-150A	
20-24	0043	0056	0068	0081	0093	0106	0118		

Table 4: G-150 Seal and Washer Sets for Specific Tube ID Ranges.

Part #	ID Range (mm)	ID Range (in)	Support Tube	Part #	ID Range (mm)	ID Range (in)	Support Tube
GSA-0028-N	6.73 - 7.87	0.265 - 0.310	GSA-1510-xx	GSA-0078-N	19.43-20.57	0.765 - 0.810	GSA-1511
GSA-0030-N	7.24 - 8.38	0.285 - 0.330	GSA-1510-xx	GSA-0081-N	20.19-21.34	0.795 - 0.840	GSA-1511
GSA-0033-N	8.00 - 9.14	0.315 - 0.360	GSA-1510-xx	GSA-0083-N	20.70-21.84	0.815 - 0.860	GSA-1511
GSA-0037-N	9.02 - 10.16	0.355 - 0.400	GSA-1510-xx	GSA-0087-N	21.72-22.86	0.855 - 0.900	GSA-1512
GSA-0040-N	9.78 - 10.92	0.385 - 0.430	GSA-1510-xx	GSA-0090-N	22.48-23.62	0.885 - 0.930	GSA-1512
GSA-0043-N	10.54 - 11.68	0.415 - 0.460	GSA-1510-xx	GSA-0093-N	23.24-24.38	0.915 - 0.960	GSA-1512
GSA-0047-N	11.56 - 12.70	0.455 - 0.500	GSA-1510-xx	GSA-0097-N	24.26-25.40	0.955 - 1.000	GSA-1512
GSA-0050-N	12.32 - 13.46	0.485 - 0.530	GSA-1511	GSA-0100-N	25.02-26.16	0.985 - 1.030	GSA-1512
GSA-0053-N	13.08 - 14.22	0.515 - 0.560	GSA-1511	GSA-0103-N	25.78-26.92	1.015 - 1.060	GSA-1512
GSA-0056-N	13.84 - 14.99	0.545 - 0.590	GSA-1511	GSA-0106-N	26.54-27.69	1.045 - 1.090	GSA-1512
GSA-0060-N	14.86 - 16.00	0.585 - 0.630	GSA-1511	GSA-0108-N	27.05-28.19	1.065 - 1.110	GSA-1512
GSA-0062-N	15.37 - 16.51	0.605 - 0.650	GSA-1511	GSA-0110-N	27.56-28.70	1.085 - 1.130	GSA-1512
GSA-0065-N	16.13 - 17.27	0.635 - 0.680	GSA-1511	GSA-0112-N	28.07-29.21	1.105 - 1.150	GSA-1512
GSA-0068-N	16.89 - 18.03	0.665 - 0.710	GSA-1511	GSA-0115-N	28.83-29.97	1.135 - 1.180	GSA-1512
GSA-0072-N	17.91 - 19.05	0.705 - 0.750	GSA-1511	GSA-0118-N	29.59-30.73	1.165 - 1.210	GSA-1512
GSA-0075-N	18.67-19.81	0.735 - 0.780	GSA-1511	GSA-0122-N	30.61-31.75	1.205 - 1.250	GSA-1512

Note: For GSA-0028 to 0047: Maximum pressure to be regulated to 40 to 60 PsiG (2.76 to 4.14 BarG)



<http://estgroup.cwfc.com>

North America / Central & South America
Corporate Office
2701 Township Line Rd
Hatfield, PA 19440-1770 USA
(P) +1 215.721.1100
+1 800.355.7044
(F) +1 215.721.1101
est-info@curtisswright.com

Europe / Middle East / Africa
EST Group B.V.
Hoom 312a
2404 HL, Alphen aan den Rijn
The Netherlands
(P) +31.172.418841
(F) +31.172.418849
est-emea@curtisswright.com

Asia Pacific
EST Group Asia
35 Tannery Rd, #11-10 Tannery Block
Ruby Industrial Complex
Singapore 347740
(P) +65.6745.8560
(F) +65.6742.8700
est-asia@curtisswright.com

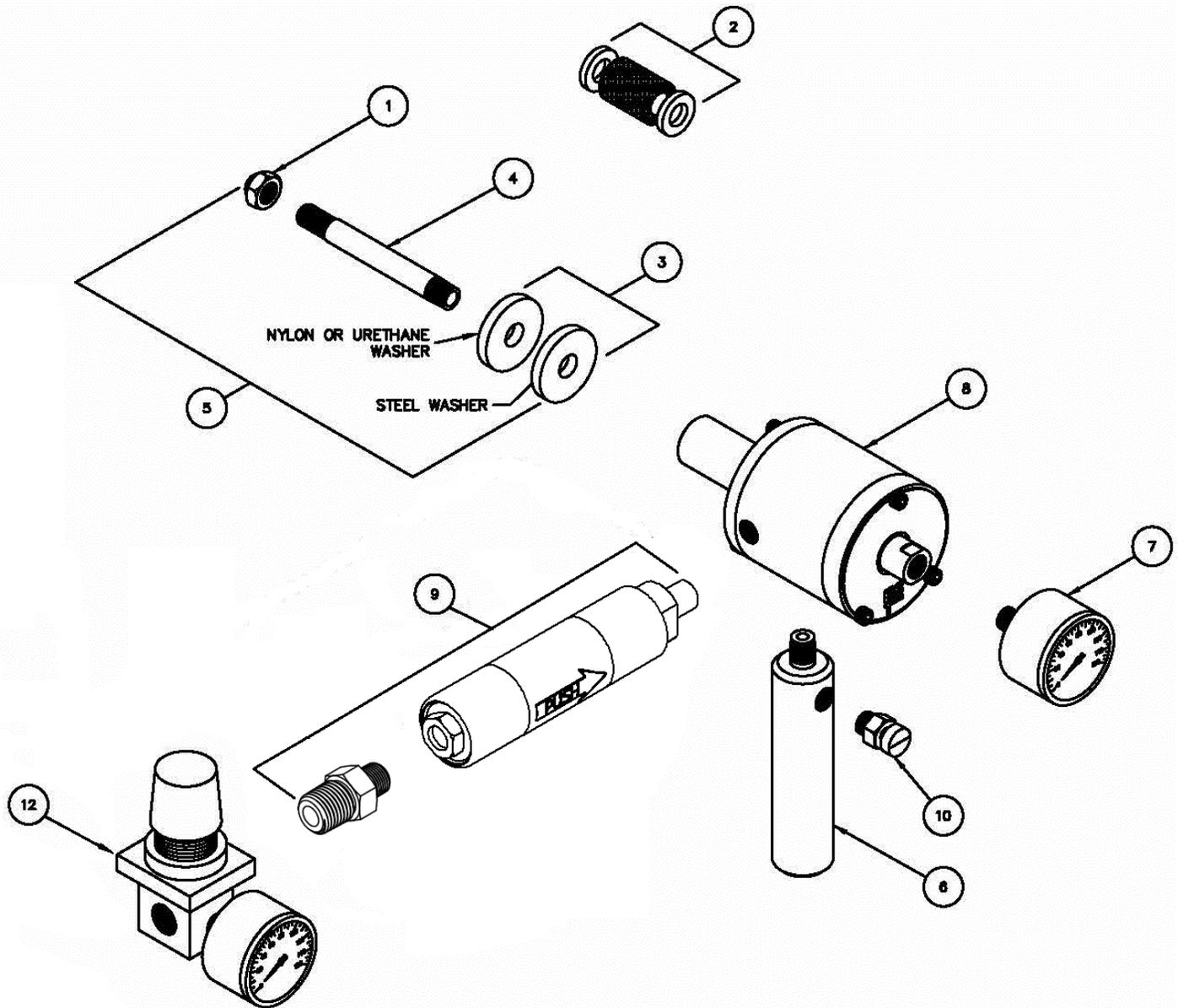


Figure 1: G-150 Injection Gun



<http://estgroup.cwfc.com>

North America / Central & South America
 Corporate Office
 2701 Township Line Rd
 Hatfield, PA 19440-1770 USA
 (P) +1 215.721.1100
 +1 800.355.7044
 (F) +1 215.721.1101
 est-info@curtisswright.com

Europe / Middle East / Africa
 EST Group B.V.
 Hoom 312a
 2404 HL, Alphen aan den Rijn
 The Netherlands
 (P) +31.172.418841
 (F) +31.172.418849
 est-emea@curtisswright.com

Asia Pacific
 EST Group Asia
 35 Tannery Rd, #11-10 Tannery Block
 Ruby Industrial Complex
 The Netherlands
 Singapore 347740
 (P) +65.6745.8560
 (F) +65.6742.8700
 est-asia@curtisswright.com

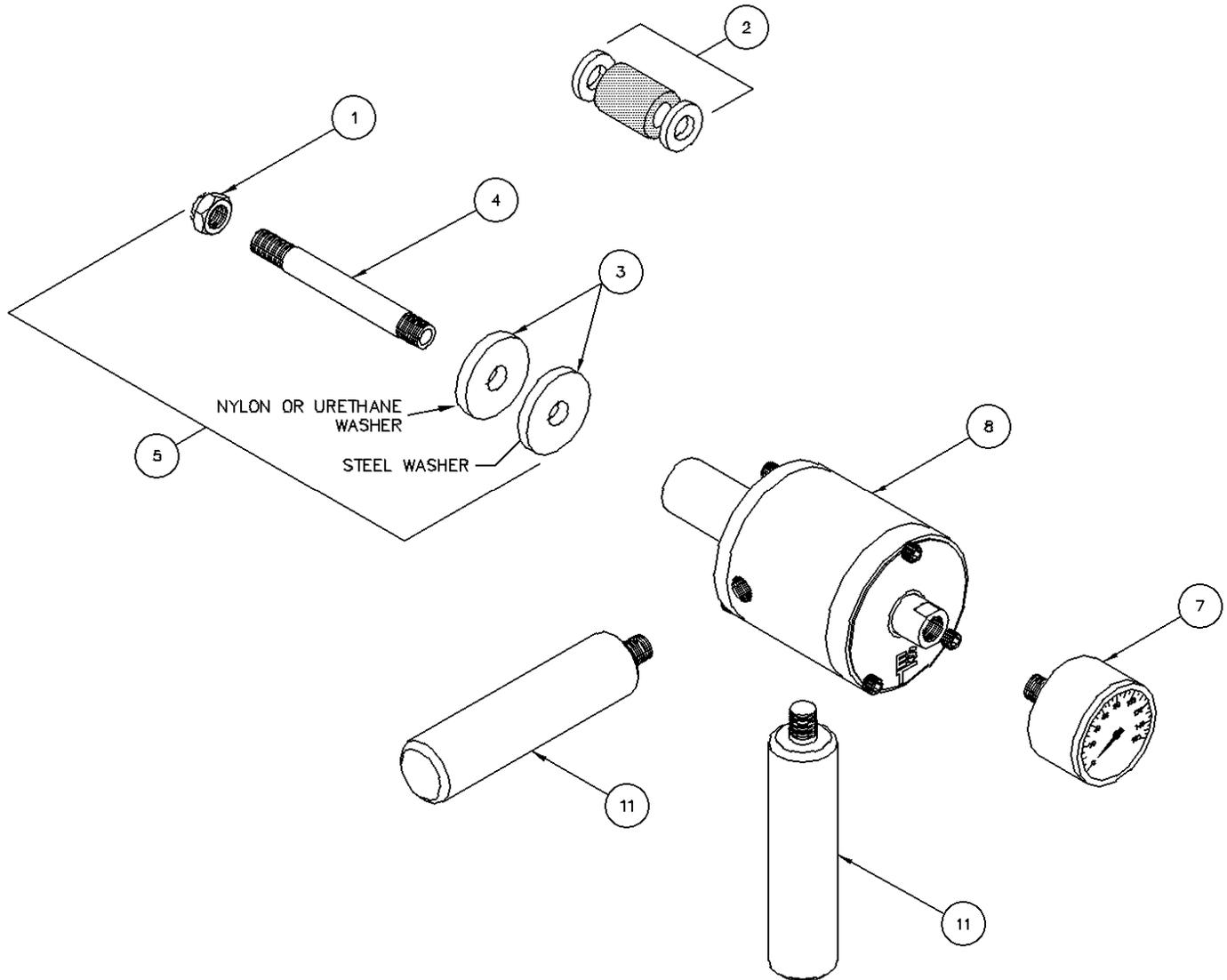


Figure 2: G-150 Plugging Gun



<http://estgroup.cwfc.com>

North America / Central & South America
Corporate Office
2701 Township Line Rd
Hatfield, PA 19440-1770 USA
(P) +1 215.721.1100
+1 800.355.7044
(F) +1 215.721.1101
est-info@curtisswright.com

Europe / Middle East / Africa
EST Group B.V.
Hoom 312a
2404 HL, Alphen aan den Rijn
The Netherlands
(P) +31.172.418841
(F) +31.172.418849
est-emea@curtisswright.com

Asia Pacific
EST Group Asia
35 Tannery Rd, #11-10 Tannery Block
Ruby Industrial Complex
Singapore 347740
(P) +65.6745.8560
(F) +65.6742.8700
est-asia@curtisswright.com

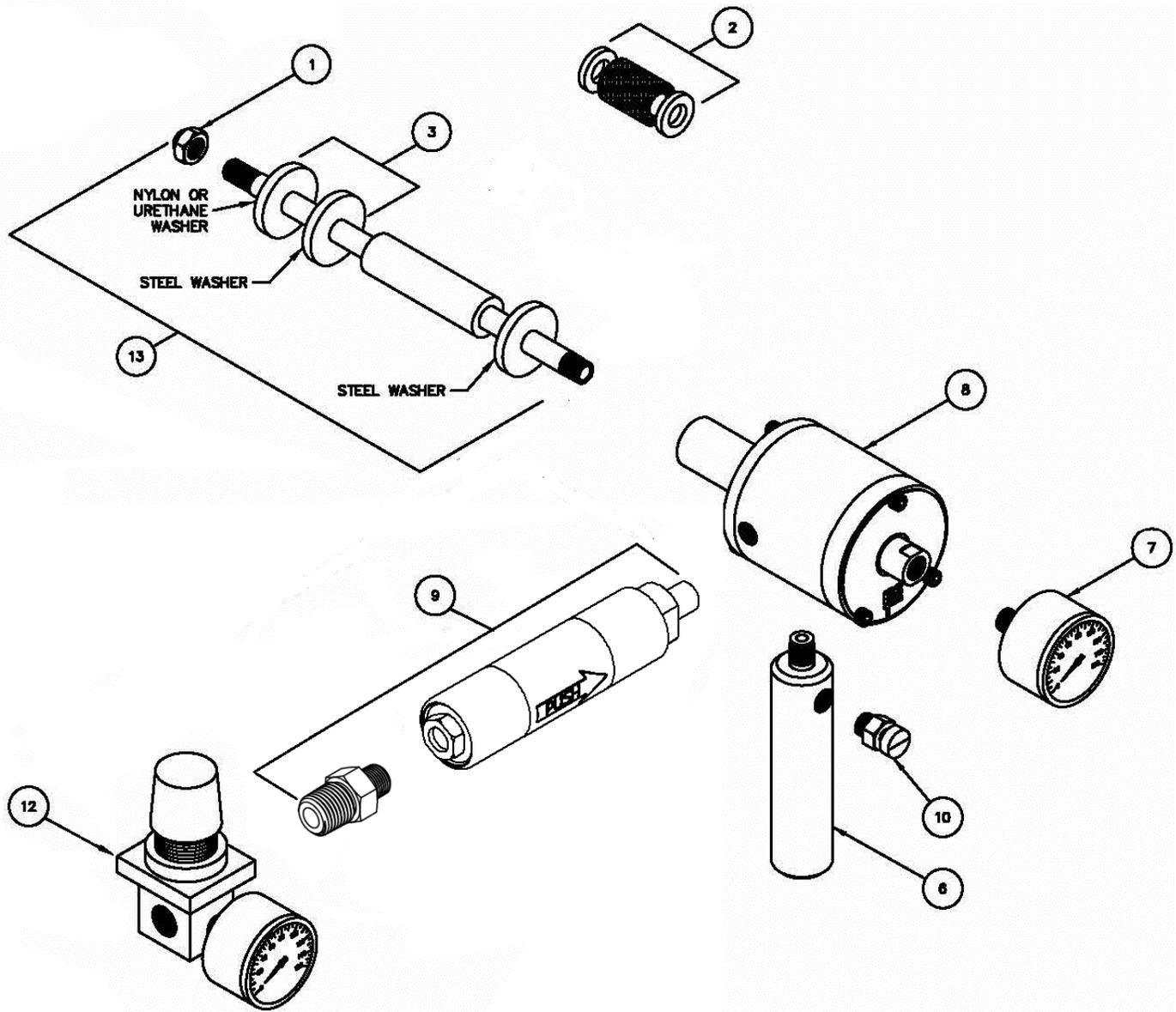


Figure 3: G-150 Injection Gun (Shown with Optional Support Rod Extension)



<http://estgroup.cwfc.com>

North America / Central & South America
 Corporate Office
 2701 Township Line Rd
 Hatfield, PA 19440-1770 USA
 (P) +1 215.721.1100
 +1 800.355.7044
 (F) +1 215.721.1101
 est-info@curtisswright.com

Europe / Middle East / Africa
 EST Group B.V.
 Hoom 312a
 2404 HL, Alphen aan den Rijn
 The Netherlands
 (P) +31.172.418841
 (F) +31.172.418849
 est-emea@curtisswright.com

Asia Pacific
 EST Group Asia
 35 Tannery Rd, #11-10 Tannery Block
 Ruby Industrial Complex
 Singapore 347740
 (P) +65.6745.8560
 (F) +65.6742.8700
 est-asia@curtisswright.com