



Expansion Seal Technologies
EST Heat Exchanger LLC
EST Field Services

G-250 Vacuum Tube Testing Gun Set



G-250 Testing Guns



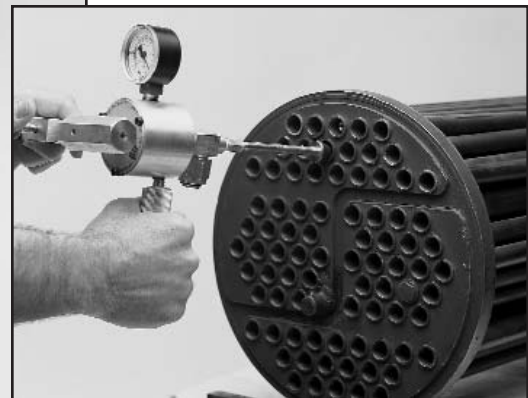
G-150 Testing Guns



G-450 Testing Guns



G-650 Testing Guns



A Fast & Effective Way To Test for Tube Leaks



Locating tube leaks is faster than ever using the G-250 Test Gun Set. Operating the G-250 Guns is simple. Connect shop air to the active vacuum gun. Insert the active and passive guns into the ends of the subject tube. Press a control valve and an integral vacuum generator quickly and efficiently evacuates the tube. Any loss of vacuum indicated on the gauge indicates a tube leak. The tapered seal design allows you to test a large range of tube ID's without changing out the seals, washers, or support rods.

Here's what the G-250 Tube Testing Gun Set has to offer:

- **Only Two Seal & Washer Sets:** Allows testing from 0.28" to 1.45" (7.1-36.8mm) with only two seal sizes.
- **Lightweight:** Gun and T-Handle weigh less than 2.1 lbs (1 kg)
- **Operates on plant air supply from 40 to 125 psi (2.7 to 8.6 bar)**
- **Standard Seal Materials:** Neoprene
- **Quality Assurance System:** Manufactured under QA program certified to ISO-9001. Can be supplied under ANSI N45.2, 10CFR50 Appendix B 10CFR21.



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SPECIALISTS IN TUBE TESTING, SLEEVING AND PLUGGING TECHNOLOGY

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G-250 Tube Testing Guns

Part No.	Description	Tube ID Range
GSV-2500	G-250 Test Gun Package (with support rods)	.28-1.45" (7.1 to 36.8 mm)

G-250 Neoprene Seal & Washer Sets

Part number: GSV-S-N for .28" thru .69" (7.1 to 17.5mm) ID tubes.
GSV-L-N for .64" thru 1.45" (15.5 to 36.8 mm) ID tubes.

Tube OD BWG	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"
8-9	GSV-S-N	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
10-11	GSV-S-N	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
12-13	GSV-S-N	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
14-15	GSV-S-N	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
16-17	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
18-19	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N
20-24	GSV-S-N	GSV-S-N	GSV-S-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N	GSV-L-N

Notes:

1. G-250 seal and washer set contain two seals and four washers.
2. For seal sizing and part numbers for applications in SWG, metric or other tube sizes, contact EST directly.
3. Optional seal material: fluoroelastomer.
4. Optional digital vacuum gage.

Other EST Tube Testing Products

- **G-150 Tube Testing Guns**-Leak test heat exchanger tubes by pressurizing individual tubes at working pressures to 125 psi (8.6 Bar).
- **G-450 Test Gun**-Test straight heat exchanger tubes without having to remove both heads. Perfect for hydrogen cooler and turbine oil coolers tube testing. Utilizes plant air supplies from 40 to 125 psi (2.7 to 8.6 Bar).
- **G-650 Test Gun**-Vacuum Test expanded tube-to-tubesheet joints for leakage at the joint. Ideal for heat exchangers manufacturers or when re-tubing. Available for 1/2" through 2 1/2" nominal tubes.
- **HJT-2500 Hydrostatic Tube Joint Tester**-Pressure test tube-to-tubesheet joints or boiler tube-to-drum joints for leakage at working pressures up to 2500 psi (172 Bar).

G-250 Rod & Tube Extensions

For easier testing when a channel head or water box is present.

Length	Tube ID Range	Vacuum Gun Part	T-Handle Part No.
Standard	.28" to .69" (7.1 to 17.5 mm)	GSV-2510	GSV-2510
	.64" to 1.45" (16.3 to 36.8mm)	GSV-2512	GSV-2612
1 ft (304.8mm)	.28" TO .69" (7.1 to 17.5mm)	GSV-2510-01	GSV-2510-01
	.64" to 1.45" (16.3 to 36.8mm)	GSV-2512-01	GSV-2512-01
2 ft (609.6 mm)	.28" to .69" (7.1 to 17.5mm)	GSV-2510-02	GSV-2510-02
	.64" to 1.45" (16.3 to 36.8mm)	GSV-2512-02	GSV-2512-02
3 ft (914.4 mm)	.28" to .69" (7.1 to 17.5mm)	GSV-2510-03	GSV-2510-03
	.64" to 1.45" (16.3 to 36.8mm)	GSV-2512-03	GSV-2512-03
4 ft (1,219.2mm)	.28" to .69" (7.1 to 17.5mm)	GSV-2510-04	GSV-2510-04
	.28" to .69" (16.3 to 36.8mm)	GSV-2512-04	GSV-2512-04

G-Series Guns now come with a durable tool box with internal compartments for the storage of seals and rod and tube extensions



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OPERATING PROCEDURES FOR G-250 VACUUM TUBE TESTING GUN SET

PRIOR TO TESTING

1. The tubes to be tested are to be cleaned and any loose deposits or scale are to 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 and a face shield when testing with the G-250 test gun.
3. If the tubes have been chemically cleaned, please check with EST regarding the compatibility of the test gun seals with the cleaning agent. Different types of elastomer seals are available as replacements.
4. Make sure the seal and support rod assembly are the correct size for the tubes being tested. The size range of the smaller seal and support rod assembly are for tube ID range of 0.28" to 0.69" (7.1mm to 17.5mm). The size range of the larger seal and support rod assembly are for tube ID range of 0.64" to 1.45" (16.3mm to 36.8mm). For tubes with IDs larger than 1.45" (36.8mm), please contact the factory.
5. Using seals that are too small may cause the following: premature seal wear, jamming of the test gun in the tube, or inability to pull a vacuum on tube end. Using seals that are too big may prevent the gun from creating a seal on the tube end.

TESTING PROCEDURE

1. **Configuring the Support Rod and Seal Assembly for 0.28" to 0.69" (7.1mm to 17.5mm) Tube ID:**
 - A. Confirm that the correct assembly is chosen. The OD of the small end washer is approximately 1/4" (6.4mm). Apply Teflon Tape to the NPT threads of both support rods. Firmly thread one support rod into the open NPT port of the filter on the G250 Test Gun. Tighten the lock nut on front of support rod to remove any slack in the assembly.
 - B. Firmly thread the 2nd support rod into the NPT port of the T-handle bar. Continue to step 3.
2. **Configuring the Support Rod and Seal Assembly for 0.64" to 1.45" (16.3mm to 36.8mm) Tube ID:**
 - A. Confirm that the correct assembly is chosen. The OD of the small end of washer is approximately 9/16" (14.2mm). Apply Teflon Tape to the NPT threads of both 3/8" OD support rods. Firmly thread the 3-3/8" long, 3/8" OD support rod into the open NPT port of the filter on the G250 Gun. Insert the following over the support rod in the order listed: 3/4" long comp tube, large washer (1.55" OD x 0.42" ID), large tapered seal, small washer (0.56" OD x 0.42" ID) over the support rod. Tighten the lock nut on front of support rod to remove any slack in the assembly.
 - B. Firmly thread the 5-5/16" long support rod into the NPT port of the T-handle bar. Insert the following over the support rod in the order listed: 2-7/8" long comp tube, large washer (1.55" OD x 0.42" ID), large tapered seal, small washer (0.56" OD x 0.42" ID) over the support rod. Tighten the lock nut on front of support rod to remove any slack in the assembly. Continue to step 3.
3. Attach air supply (40 to 130 psi; 2.7 to 8.9 Bar) to the air control valve of the G-250 test gun. The G-250 test gun will be operational on plant air supplies ranging from 40 to 130 psi (2.7 to 8.9 Bar) at a minimum of 5 cfm (2.4 lps).
4. Insert the tapered seal of the gun into one end of the tube for a snug fit to create a leak tight seal. The support rod of the G-250 should be in-line with the tube being tested at all times. Insert the tapered seal of the T-handle plug into the other end of tube for a snug fit to create a leak tight seal.



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6. Begin testing: Squeeze the handle of the air control valve on the G-250 test gun until the vacuum gage needle stops moving. Release the handle of the air control valve while maintaining a leak tight seal on the tube end. Gun operators should observe the vacuum gage on the gun. Any tube leaks will be identified by a reduction in vacuum reading on the gage.
7. If no leaks are detected, remove the G-250 test gun & T-Handle Plug from the tube ends by pulling the G-250 gun & T-Handle plug straight out of the tube and reinsert each into the next respective tube ends to be tested. Mark each leaking tube encountered for repair. The total operation should be completed in 15 to 30 seconds. Your actual testing time will depend on the amount of time you choose to hold the vacuum test and the length of the tubes.
8. Repeat steps 5 through 6 until testing is complete.

REPLACING THE AIR FILTER ELEMENT

Unscrew hex nut at the bottom of the filter body. Pull out the filter strainer element from filter body with needle nose pliers. Insert new element open end first, until snug. Screw hex nut back onto the filter body.

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

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On the Internet: www.expansionseal.com

Expansion Seal Technologies is part of the EST Group of companies. **EST Group** provides a complete range of repair products, services and replacement parts covering the life cycle of tubular heat exchangers and condensers; additionally EST provides products and services to facilitate pressure testing pipe, piping systems, pressure vessels and their components. Visit EST Group on the internet at www.estgrp.com.



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Table 1. G-250 Vacuum Tester Parts List

ITEM	QUANTITY	DESCRIPTION	PART NO.
1	1	COMPLETE G250 TEST GUN KIT (INCLUDES SEAL & WASHER SETS)	GSV-2500
2A	2	SUPPORT ROD ASSEMBLY 0.28" - 0.69" (7.1-17.5mm) (INCLUDES ITEMS 4A, 5A, 6)	GSV-2510
2B	1	0.64" - 1.45" (16.3-36.8mm) FOR GUN (INCLUDES ITEMS 4B, 5B, 7A)	GSV-2512
2C	1	0.64" - 1.45" (16.3-36.8mm) FOR T-HANDLE (INCLUDES 4B, 5C, 7B)	GSV-2612
3A	1	REPLACEMENT SEALS & WASHERS SET * 0.28" - 0.69" (7.1-17.5mm) (2 SEALS & 4 WASHERS)	GSV-S-N
3B	1	0.64" - 1.45" (16.3-36.8mm) (2 SEALS & 4 WASHERS)	GSV-L-N
4A	1	LOCK NUT 0.28" - 0.69" (7.1-17.5mm)	GSA1530
4B		0.64" - 1.45" (16.3-36.8mm)	GSA1532
5A	1	PORTED SUPPORT ROD 0.28" - 0.69" (7.1-17.5mm)	SEE ITEM 2
5B		0.64" - 1.45" (16.3-36.8mm) FOR GUN	SEE ITEM 2
5C		0.64" - 1.45" (16.3-36.8mm) FOR T-HANDLE	SEE ITEM 2
6	1	1/16F-1/8M NPT COUPLING 0.28" - 0.69" (7.1-17.5mm)	SEE ITEM 2
		0.64" - 1.45" (16.3-36.8mm)	N/A
7A	1	COMP TUBE SPACER 0.28" - 0.69" (7.1-17.5mm)	N/A
7B		0.64" - 1.45" (16.3-36.8mm) FOR GUN	SEE ITEM 2
		0.64" - 1.45" (16.3-36.8mm) FOR T-HANDLE	SEE ITEM 2
8	1	SMALL SUPPORT ROD EXTENSIONS ASSEMBLY 0.28" - 0.69" (7.1-17.5mm)	GSV-2510-01
		12" EXTENSION	GSV-2510-02
		24" EXTENSION	GSV-2510-03
		36" EXTENSION	GSV-2510-04
		48" EXTENSION	
9	1	LARGE SUPPORT ROD EXTENSIONS ASSEMBLY 0.64" - 1.45" (16.3-36.8mm)	GSV-2512-01
		12" EXTENSION	GSV-2512-02
		24" EXTENSION	GSV-2512-03
		36" EXTENSION	GSV-2512-04
		48" EXTENSION	
10	1	VACUUM GAGE, 0-30" HG VAC	GSC-6690
11A	1	AIR FILTER	GSV-FIL
11B		REPLACEMENT FILTER ELEMENT	GSV-FE
12	1	CYLINDER BODY ASSEMBLY	SEE ITEM 1
13	1	CHECK VALVE	GSC-6693
14	1	AIR CONTROL VALVE	GSA-1550
15	1	VENTURI	GSC-6692
16	1	REDUCING NIPPLE, 1/4 TO 1/8 NPT	GSA-1551
17	1	SHORT NIPPLE, 1/8 NPT	GSA-1552
18	1	GUN HANDLE	GSA-1572
19	1	T-HANDLE	GSV-HANDLE
20	1	HEX NIPPLE, 1/4 NPT	GSA-1553
21	1	PLASTIC TOOLBOX W/ INSERT	GSA-1670

*Replacement Seal and Washer Set part numbers are derived from the material used for the seal and the size tubes being tested. The default material is Neoprene. The part number GSV-X-M is defined as follows:

"X" = (S) for 0.28 to 0.69" (7.1 to 17.5mm) ID or (L) for 0.64 to 1.45" (16.3 to 36.8mm) ID

"M" = seal material designation

N - Neoprene is standard

B - Buna-N

S - Silicone

V - Fluoroelastomer (Viton® or equivalent)

Viton is a registered trademark of DuPont Dow Elastomers.



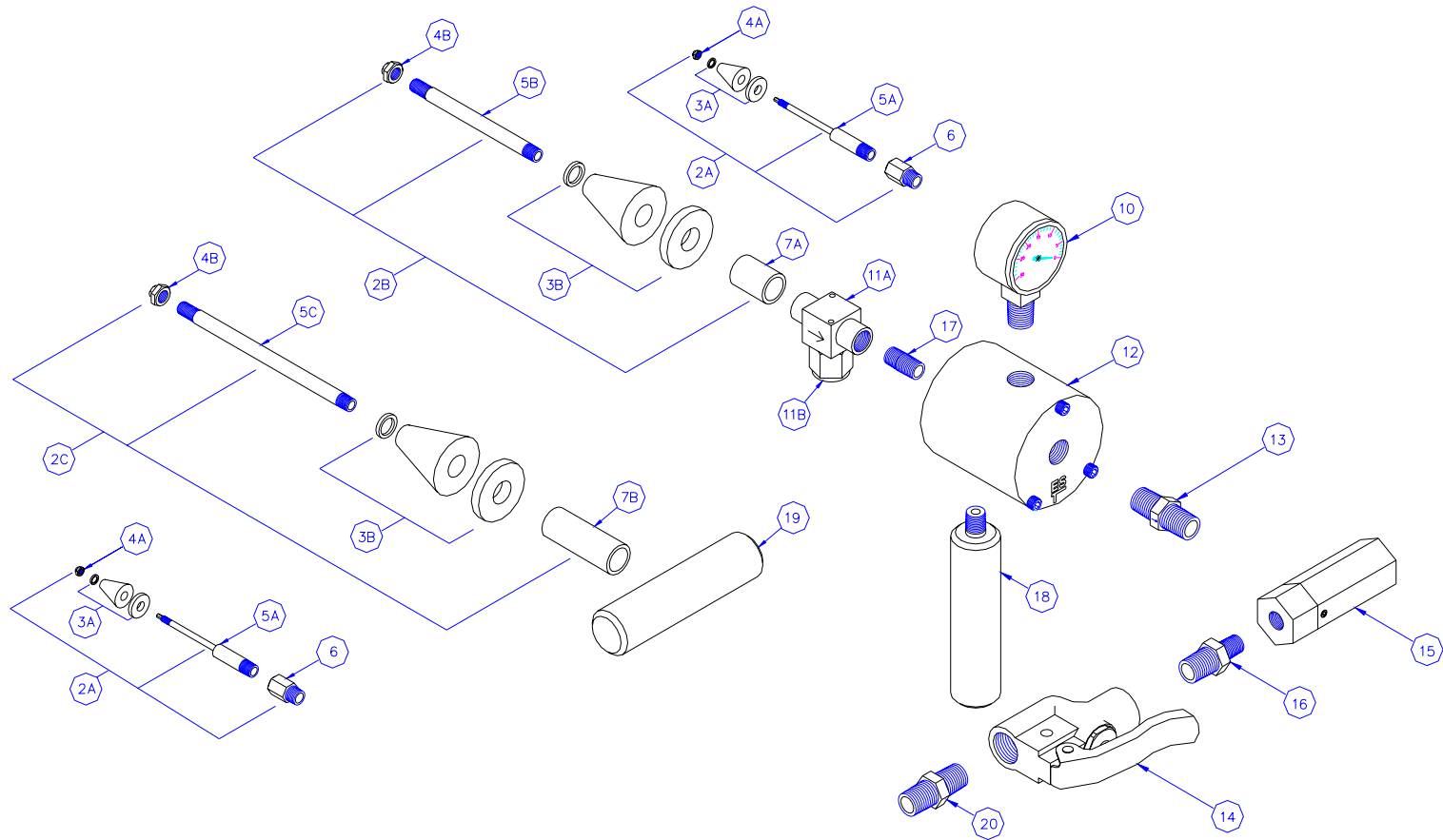
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Figure 2. G-250 Vacuum Tube Tester Parts List

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Exploded view diagram of a hydraulic pump assembly. The diagram shows the main pump body, a pressure gauge, a control valve, and a rod assembly. Dimensions are provided in inches and fractions of an inch.

Dimensions:

- Overall length: $9-7/16$ (.64-1.45 SEAL/ROD)
- Overall length: $9-9/16$ (.28-.69 SEAL/ROD)
- Overall length: $6-3/4$
- Overall length: $1-13/16$
- Overall length: 2
- Overall length: $1-3/4$
- Overall length: $82-1/2$
- Overall length: $6-3/4$
- Overall length: $9-1/4$
- Overall length: 6 (.64-1.45 SEAL/ROD)
- Overall length: $4-1/4$ (.28-.69 SEAL/ROD)

NOTES:

1. DIMENSIONS ARE REFERENCE ONLY
2. NOT DRAWN TO SCALE

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