Elliott offers a complete line of precision tube tools, including:

tube expanders

- Boiler Expanders
- Heat Exchanger Expanders
- Condenser Expanders
- Refinery Expanders

tube rolling motors & torque controls

- Electric
- Pneumatic

tube cleaners

- Air & Water Driven Motors (Internal/External Drives)
- Jiffy Guns (“Shoot-Thru” Devices)
- Roto-Jet (Rotating Flex Shaft)

additional products

- Tube and Joint Testers
- Tube Plugs (High & Low Pressure)

retubing tools

- Tube Gauges
- Tube Cutters
- Manual Tools
- Spear Type Tube Pullers
- Collet-Type Tube Pullers
- CYCLGRIP Tube Extractors
- Grooving Tools
- End-Prep Tools

metal working products

- Back Chamfering Tools
- Carbide Roller Burnishing Tools
- Diamond Burnishing Tools
- Elliptical Deburring Tools
- Fine Boring Tools
- Internal Recessing Tools
- Magic Vise
- Mechanical Joining Tools
- Roller Burnishing Tools
- Single Blade Reamers

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5376 Series
Vacuum Joint Tester

For Tube Size Range 1/2” (12.70mm) O.D. X 8 Ga.
Thru 2-1/2” (63.50mm) O.D. X 24 Ga.

Safety and Operating Instructions

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TABLE 1

Seal & Washer Sets for 5376 Vacuum Joint Tester														
Wall Gauge (BWG)	Tube O.D. Inches [mm]													
	1/2 [12.7]	5/8 [15.88]	3/4 [19.05]	7/8 [22.2]	1 [25.4]	1-1/8 [28.58]	1-1/4 [31.75]	1-3/8 [34.9]	1-1/2 [38.1]	1-5/8 [41.28]	1-3/4 [44.45]	2 [50.8]	2-1/4 [57.15]	2-1/2 [63.5]
8-9	N/A	270	400	530	650	780	900	1030	1150	1280	1400	1650	1900	2150
10-11	N/A	340	440	590	690	840	940	1090	1190	1340	1440	1700	1950	2200
12-13	250	370	500	620	750	870	1000	1120	1250	1370	1500	1750	2000	2250
14-15	300	440	530	690	800	940	1070	1190	1310	1440	1550	1800	2050	2290
16-17	340	470	590	720	840	970	1090	1230	1340	1470	1590	1840	2090	2340
18-19	370	500	620	750	870	1000	1120	1250	1370	1500	1620	1870	2120	2370
20-24	400	530	650	780	900	1030	1150	1280	1400	1530	1650	1900	2150	2400

Notes:
1. Seal & Washer Set part number equals 5376-(chart size).
2. Standard material for seals is neoprene. For additional materials, consult the factory.
3. Seal & Washer Set includes one seal & two washers.

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing this Elliott product. The design and manufacture of this machine, represents the highest standard of quality, value and durability. Elliott tools have proven themselves in thousands of hours of trouble free field operation.

If this is your first Elliott purchase, welcome to our company; our products are our ambassadors. If this is a repeat purchase, you can rest assured that the same value you have received in the past will continue with all of your purchases, now and in the future.

The Elliott 5376 Series Vacuum Joint Tester is a lightweight, portable joint testing system designed to test for leaks between the tube and tube sheet in tube size range of 1/2" (12.70mm) O.D. x 12 Ga. thru 2-1/2" O.D.(63.50mm) x 24 Ga. With the Vacuum Joint Tester, you can pneumatically test from 3 to 10 tube joints per minute – all with significantly less operator fatigue and greater operator safety.

We at Elliott would like you to be completely satisfied with this tool and therefore recommend that this instruction manual be thoroughly read prior to use.

This machine has been designed and manufactured to the highest standards, using the latest in materials and technology. If the guidelines and maintenance schedules in this manual are followed, the Elliott Vacuum Joint Tester will provide many years of trouble free operation.

5376 VACUUM JOINT TESTING GUN DRAWING

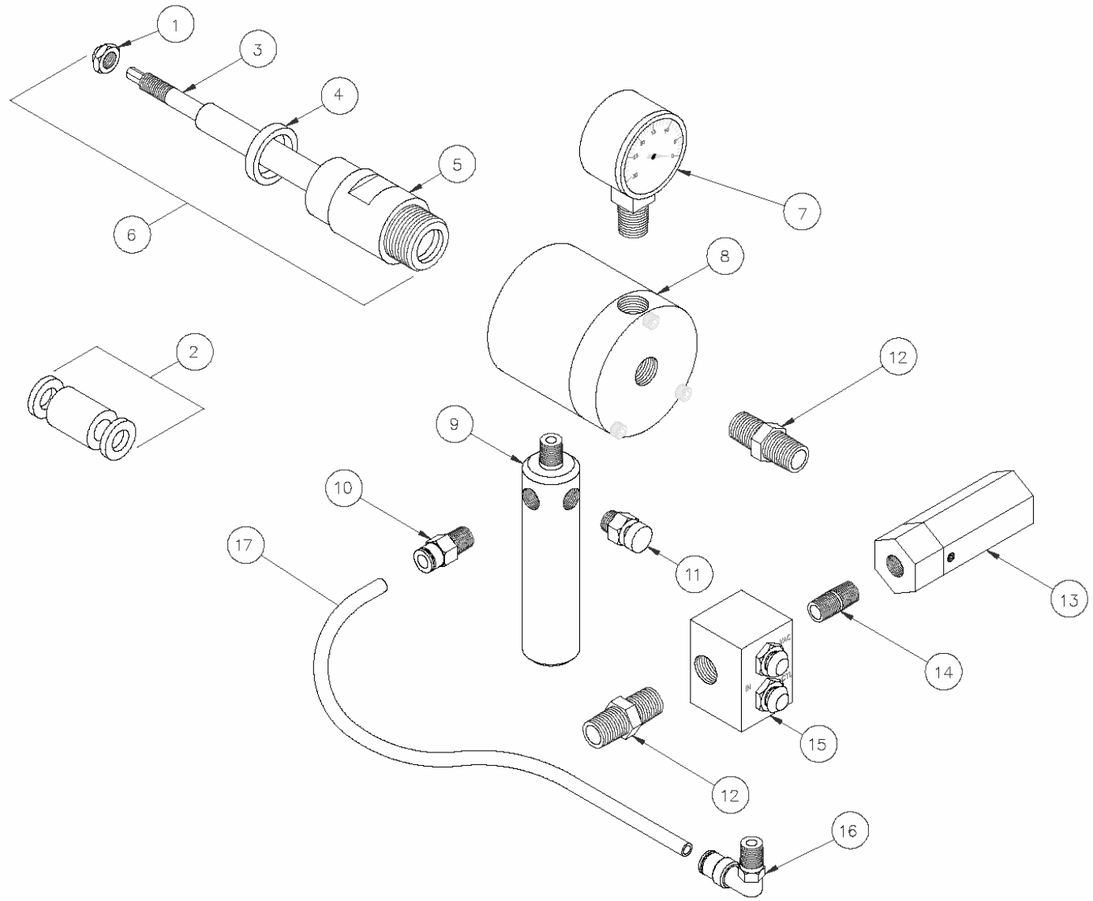

Figure 1

5376 VACUUM JOINT TESTING GUN SET PARTS LIST

Item No.	Qty.	Description	Part No.
1	1	Lock Nut	
		.28" - .48" [7.1mm - 12.2mm]	5373LN1
		.49" - .83" [12.4mm - 21.1mm]	5373LN2
		.84" - 2.53" [21.3mm - 64.3mm]	5373LN3
2	1	Replacement Seal and Washer Set	(See Chart)
3	1	Support Rod	
		.28" - .48" [7.1mm - 12.2mm]	See Item 6
		.49" - .83" [12.4mm - 21.1mm]	See Item 6
		.84" - 2.53" [21.3mm - 64.3mm]	See Item 6
4	1	Square Elastomer Ring	
		5/16” Manifold	5378-5
		3/8” Manifold	5378-6
		1/2” Manifold	5378-8
		5/8” Manifold	5378-10
		3/4” Manifold	5378-12
		7/8” Manifold	5378-14
		1” Manifold	5378-16
		1-1/8” Manifold	5378-18
		1-1/4” Manifold	5378-20
		1-1/2” Manifold	5378-24
		1-5/8” Manifold	5378-26
		1-3/4” Manifold	5378-28
		1-7/8” Manifold	5378-30
		2” Manifold	5378-32
		2-1/4” Manifold	5378-36
		2-3/8” Manifold	5378-38
		2-1/2” Manifold	5378-40
		2-7/8” Manifold	5378-46
		3” Manifold	5378-48
5	1	Manifold	See Item 6
6	1	Manifold Assembly (Includes Items 1, 3, 4 & 5)	
		5/16” Manifold	5377-5
		3/8” Manifold	5377-6
		1/2” Manifold	5377-8
		5/8” Manifold	5377-10
		3/4” Manifold	5377-12
		7/8” Manifold	5377-14
		1” Manifold	5377-16
		1-1/8” Manifold	5377-18
		1-1/4” Manifold	5377-20
		1-1/2” Manifold	5377-24
		1-5/8” Manifold	5377-26
		1-3/4” Manifold	5377-28
		1-7/8” Manifold	5377-30
		2” Manifold	5377-32
		2-1/4” Manifold	5377-36
		2-3/8” Manifold	5377-38
		2-1/2” Manifold	5377-40
		2-7/8” Manifold	5377-46
		3” Manifold	5377-48
7	1	Vacuum Gage	5376VG
8	1	Cylinder Body Complete	
		.28" - 1.23" [7.1mm - 31.2mm]	5376C
		1.24" - 2.53" [31.5mm - 64.3mm]	5376C1
9	1	Handle, Ported W/O Bleed Valve	5376H
10	1	Tube Fitting	5376TF
11	1	Bleed Valve	5373BV
12	2	Hex Nipple, 1/4 NPT	5373HN
13	1	Venturi Assembly	5376VA
14	1	Reducing Nipple, 1/8 NPT	5373RN
15	1	Valve Block	5376VB
16	1	Elbow Tube Fitting	5373ME
17	1	Tubing, Polyethylene	5376T

OPERATING PROCEDURES FOR 5376 VACUUM JOINT TESTER

NOTE: See pages 6 and 7 for part numbers and illustration of the 5376 Vacuum Joint Tester as indicated in instructions below.

PRIOR TO TESTING:

1. The tube ends being tested should be cleaned and any loose deposits or scale should be removed. Any scale present in the tube end may be drawn into the testing gun and clog the internal filter washer, causing the test gun to erroneously indicate a joint leak.

2. Visually inspect the tubesheet. Seriously eroded tubesheets may not be able to be tested using the 5376 Vacuum Joint Tester since the test gun must seal on the tubesheet face. In some cases use of silicone gasket sealant on the square elastomer ring may aid in making a leak tight seal.

3. Make sure the test gun has the correct size seal and manifold (items 2 and 6) for the tubes to be tested. 5376 series Seal and Washer sets should be sized using Table 1. The size of the manifold in inches will be stamped on the body of the manifold and should correspond with the tube O.D. of the tubes being tested. The correct seal size is considered to be when the seal O.D. is smaller than the actual tube I.D. by 0.02” to 0.06” (0.5mm to 1.5mm). If either the Manifold or the Seal and Washer Set are to be changed, please refer to the replacement procedure outlined on page 5.

OPERATING PROCEDURES FOR 5376 VACUUM JOINT TESTER

TESTING PROCEDURE:

Never actuate the test gun unless the seal assembly is installed within the proper I.D. tube as the washers could be forced into the seal I.D.

The 5376 Vacuum Joint Tester comes as a set. This set is comprised of an Air Injection Gun, a Manifold sized for one tube O.D. size, and a Seal and Washer Set for one tube I.D. size.

1. Attach air supply to the test gun. The 5376 Vacuum Joint Tester will be operational on air supplies from 40 to 125 psi (3 to 8.6 Bars) at a minimum of 5 cfm (2.3 lps).

2. Insert the test gun into the tube to be tested.

3. Apply light pressure to seat the square ring (item 4) firmly against the tubesheet.

4. Depress the air control valve button labeled “CYL” on the valve block assembly (item 15). Air will then fill the cylinder, expand the seal within the tube end and will draw the tubesheet seal firmly against the tubesheet. This operation should be accomplished in 1 to 2 seconds.

5. Depress the air control valve button labeled “VAC” on the valve block assembly (item 15). Hold the air control valve in this position until the maximum vacuum is obtained.

NOTE: The maximum vacuum obtained will vary in relation to the amount of air being supplied to the test gun.

6. At 100 psi (6.9 Bar) and 10 cfm (4.7 lps) the venturi is capable of producing a vacuum in excess of 16 in-hg vacuum in just a few seconds. Some experimentation should be performed to determine the vacuum that you will be capable of reaching. Steps 4 and 5 should take an experienced operator no more than about 5 seconds.

7. The test gun operator should observe the vacuum gauge (item 7). A loss of vacuum will indicate a tube joint leak.

NOTE: Always check possible leaking tubes more than once. Variations in the tubesheet, the technique of the operator, grit lodged in the check valve, or seal wear may cause erroneous joint leak indications. Proceed to step 8.

8. To release the air from the cylinder, press the bleed valve (item 11). Rock the test gun lightly to break the remaining vacuum. Remove the test gun from the tube and rotate the gun approximately 45 degrees. Repeat steps 2 thru 6. If the gun continues to indicate a joint leak, mark the tube for repair and continue on to the next tube.

9. If the test indicates the tube joint to be sound, press the bleed valve (item 11) to release the air in the cylinder. Rock the test gun lightly to break the remaining vacuum. Remove the test gun from the tube and continue to the next tube.

OPERATING PROCEDURES FOR 5376 VACUUM JOINT TESTER

REPLACING THE SEAL AND WASHER SET:

5376 replacement Seal and Washer Sets should be sized using Table 1. Replacement seals for the 5376 Vacuum Joint Tester are supplied with corresponding washers. Always replace the seal and washers at the same time.

1. Remove the locknut (item 1) from the end of the support tube (item 3) and set aside.

2. Remove the seal and washers (item 2). Discard if worn. Under optimum conditions you should be able to test between 100 and 500 tubes per replacement procedure listed below.

3. If you are replacing the seal and washers set with the same size set then reverse steps 1 and 2. If you are changing the seal and washers set to test different size tubes, please keep in mind that you may also have to change the support tube. To replace the support tube refer to the replacement procedure listed below.

4. When replacing the locknut (item 1) on the support tube (item 3), **DO NOT** use a wrench. Screw it on finger-tight only. A small space between the locknut, seal and washers set, and the manifold is normal.

REPLACING THE MANIFOLD:

1. Following the procedure outlined above, remove the seal and washers set.

2. Using an open-end wrench on the flats provided, gently unscrew the manifold assembly (item 6) from the front of the air cylinder (item 8).

3. Prior to installing the replacement manifold (item 5), visually inspect the o-ring on the threaded end of the manifold and the o-ring within the manifold to make sure they are in good condition. Lubricate the o-rings, if necessary. Screw the manifold (item 5) into the front of the air cylinder (item 8). The o-ring on the threaded end of the manifold should seat firmly against the face of the air cylinder (item 8) but should not bulge out. **DO NOT** over tighten when threading the manifold (item 5) and air cylinder (item 8) together.

REPLACING THE SUPPORT TUBE:

1. Following the procedure outlined above, remove the seal and washers set and manifold.

2. Using an open-end wrench on the flats provided on the piston and a pipe wrench on the support tube (item 3), gently unscrew the support tube (item 3) from the piston.

3. Reverse steps 1 and 2 above. **DO NOT** use excessive force in tightening the support tube.

4. Prior to replacing the seal and washers set (item 2), inspect the support tube for scars left from the replacement procedure. File smooth any burrs possibly caused by the pipe wrench.

OTHER REPLACEMENTS AND REPAIR:

UNDER NO CONDITIONS SHOULD YOU ATTEMPT TO SERVICE THE AIR CYLINDERS! Any attempt to perform service on the cylinders may void any and all remaining warranties, implied or otherwise. Please contact Elliott Tool Technologies to arrange for return and repair.