BENCH TEST PROCEDURE
FOR DETERMINING HOW MUCH TORQUE IS NEEDED
FOR SEATING SECO 7 SEALS

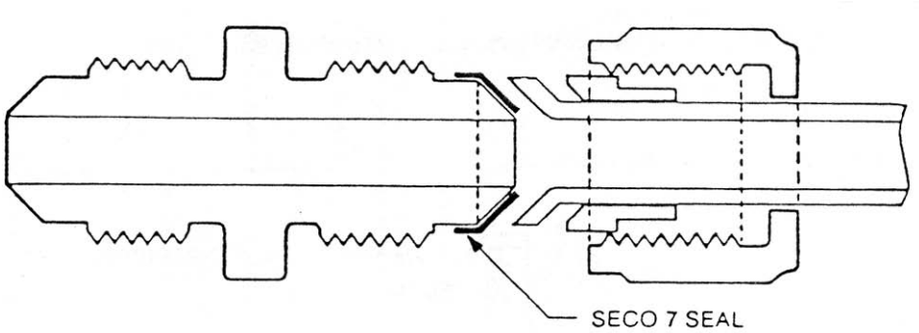

Illustration 1

PAGE

Object #1 To place a soft malleable gasket seal material between two hard fitting and tube bearing surfaces.

Object #2 To teach the fitting assembly installer how to torque Seco 7 seals through the hex point indexing method.

Object #3 To teach the fitting installer what to look for in a properly torqued seal.

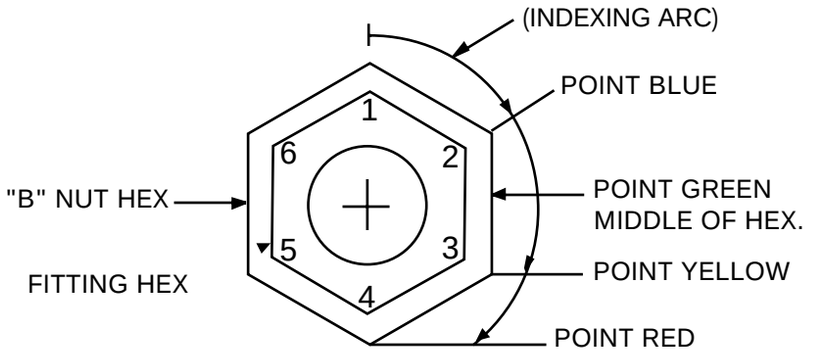

Illustration #2
End view of fitting assembly mounted in vise

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PLEASE SEE FOLLOWING PAGES FOR FURTHER DETAILS

Step #1 Place 3 Seco 7 seals on bench next to fitting assembly in vice, see illustration #1.

Step #2 Place first seal in fitting assembly and tighten nut to Point of Sharp Torque Rise (POSTR-finger tight), see illustration #2. This provides the same starting point in every fitting installation.

Step #3 Tighten "B" nut clockwise to point blue. (Note hex points will not align, as illustrated, every time. Illustration used to demonstrate indexing arc only.) Installer note hex point travel blue with crayon. Installer note difference of torque feel with Seco 7 seal in place. Remove seal and observe for yielding at Seco 7 sealing periphery. See illustration #3.

P A G E

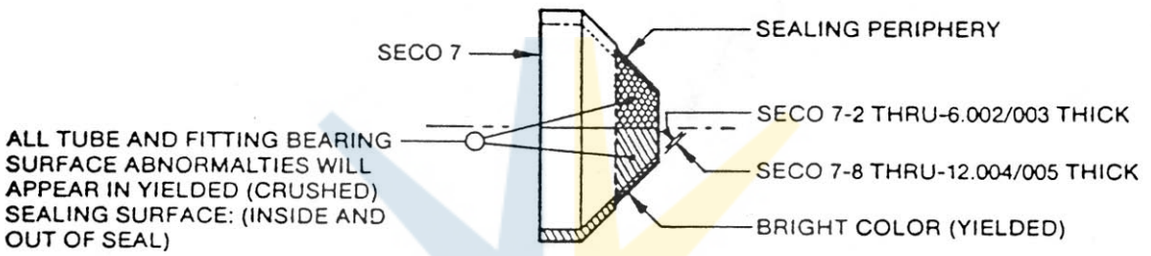

Illustration #3
Compression yield of Seco 7 seal

Step #4 Place Seco 7 seal (Exhibit #2) into illustration #1 assembly and torque from POSTR to point green. Mark index arc and remove yielded seal. Note yielded seal periphery and point green torque pull-up feel.

Step #5 Place Seco 7 seal (Exhibit #3) into illustration #1 and torque "B" nut from POSTR to point yellow. Mark index arc and remove yielded seal. Note yielded sealing periphery and point yellow torque pull-up feel.

Step #6 Observe 3 exhibit seals under an inspection magnifying glass. Note yielding of each seal's bearing surfaces. Yielding of the seals begins at POSTR. The best torque, in accordance with hex point travel, will be located close to point green (90º from POSTR).

SUMMARY What we are looking for is a continuous, bright coloured sealing periphery on seal's bearing surface. See illustration #3.

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SECO 7 MATERIAL SELECTION CHART

SECO 7 Seals Selection is Based Upon:

(1) Fluid compatibility with Seal material.
(2) Temperature of fluid inside tube.
(3) Ambient temperature. (Sustained)
(4) Tubing and Fitting materials compability with Seal.
(5) Pressure of vacuum inside Tube and Fitting.
(6) Prudent Selection - Use Steel Seals only on select applications. Steel Seal in annealed condition still very hard. (6,000 to 8,000 PSI less in compression yield than Steel Tube Flare and Fitting 37º Cone Surface.)
(7) Torque - In accordance with values on Torque Values Chart.

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SEAL MATERIAL	TUBING AND FITTING MATERIAL	ASSEMBLY TEMPERATURE RANGE	FLUID TO BE SEALED
ALUMINIUM (1100 (2S) per QQ-A-250/IE or AMS 4001E	ALUMINIUM	-420°F to +275°F	Helium Hydraulic Oil Hydrogen Peroxide Hydrozine Liquid Hydrogen Liquid Nitrogen Nitric Acid Oxygen Pneumatics UDMH Water
COPPER Oxygen Free per QQ-C-576 or AMS 6500	STEEL	-420°F to +800°F	Helium Hydraulic Oil (Non Sulphur Base) Hydrogen Nitrogen Oxygen Pneumatics
NICKEL Low Carbon per ASTM-B-162 or AMS 5553	STEEL	-420°F to +1500°F	Hydraulic Oil JP-4 JP-5 Liquid Hydrogen Liquid Nitrogen Nitric Acid Oxygen Pneumatics Water
STEEL Corrosion Resistant per AISI 305	STEEL	-420°F to +1500°F	Hydrazine-Anhydrous Hydrazine (50%) -+ Aerozine 50 (50%) Monomethylhydrazine (MMH) Undimethylhydrazine (UDMH) Diethylenthriamine + UDMH UDMH (40%) + JP-4 (60%) - (JP-X) (See Note 6)

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SEAL INSTALLATION PROCEDURE

(WITH TORQUE WRENCH)

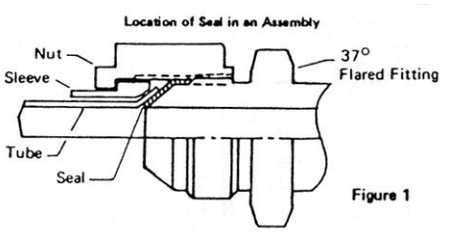

Figure 1

OBJECT: To place a soft malleable material between the sealing surfaces of the tube and fitting. The soft material makes up for the minute imperfections in the sealing surfaces when placed in compression yield. See Figure 1.

(1) Select correct Fittings, Sleeves, Nuts and Seals for job.

(2) Prepare tube assembly for flaring.

(3) Place Seco 7 Seal on Fitting's 37º Flare Cone.

(4) Mate tube assembly in non-torqued position. Check interface area of each connection for squareness of sealing surfaces so as to minimize strain in final torque-up.

(5) Torque Fittings in accordance with following chart.

P A G E

SEAL TORQUE VALUES

(IN INCH POUNDS)

Dash Size	All Aluminium Systems Aluminium Seal		All Steel Systems Copper Seal		All Steel Systems Nickel Seal	
	Min.	Max.	Min.	Max.	Min.	Max.
-2	20	30	75	85	90	100
-3	25	35	95	105	110	125
-4	50	65	135	150	165	190
-5	70	90	170	200	225	250
-6	110	130	270	300	335	375
-8	230	260	450	500	575	625
-10	330	360	650	700	810	875
-12	460	500	900	1000	1125	1250
-16	500	700	1200	1400	1500	1750
-20	800	900	1520	1680	1875	2250
-24	800	900	1900	2100	2500	2850
-28	950	1150	2300	2500	3250	3600
-32	1800	2000	2660	2940	4000	4500

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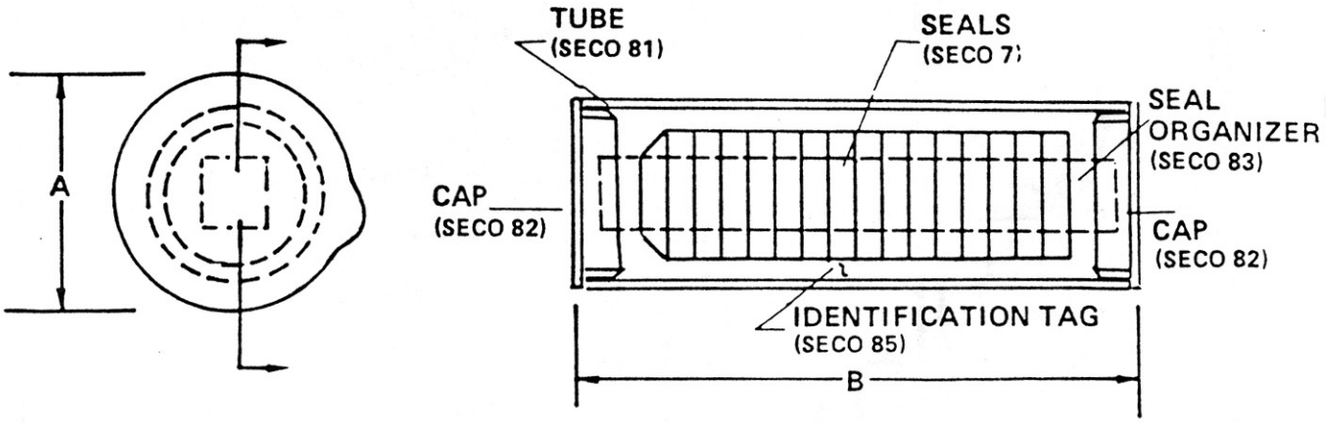

DASH NO.	A REF.	B REF.	NUMBER OF SECO 7 SEALS PER TUBE ASSEMBLY	DASH NO.	A REF.	B REF.	NUMBER OF SECO 7 SEALS PER TUBE ASSEMBLY
-2	.710	6.125	50	-12	1.400	6.125	50
-3	.710	6.125	50	-14	1.400	6.125	50
-4	.710	6.125	50	-16	1.400	6.125	50
-5	.710	6.125	50	-18	2.125	6.125	25
-6	.710	6.125	50	-20	2.125	6.125	25
-7	.710	6.125	50	-24	2.125	6.125	25
-8	1.400	6.125	50	-28	3.546	6.125	25
-9	1.400	6.125	50	-32	3.546	6.125	25
-10	1.400	6.125	50	-40	3.546	6.125	25
-11	1.400	6.125	50	-48	3.546	6.125	25

PAGE

(A) SEAL MATERIALS - A-ALUMINIUM
C-COPPER
N-NICKEL

NOTES: 1. PARTS VAPOR DEGREASE CLEANED, 100% INSPECTED AND ORGANISED INTO NESTED STACK OF 50 OR 25 PIECES.

2. SEE SECO TECHNICAL BROCHURE #SS1177 FOR SEAL SELECTION OF MATERIALS, SYSTEM USAGE, AND INSTALLATION PROCEDURE.

EXAMPLE - PART NUMBER

SECO 80 - 7A2

- 7A2 → 50 PIECES OF ALUMINIUM SECO 7 SEALS PACKAGED IN .710 x 6.125 INCH TUBE ASSEMBLY AS SHOWN IN FIELD OF DRAWING
- SECO 80 → BASIC PART NUMBER

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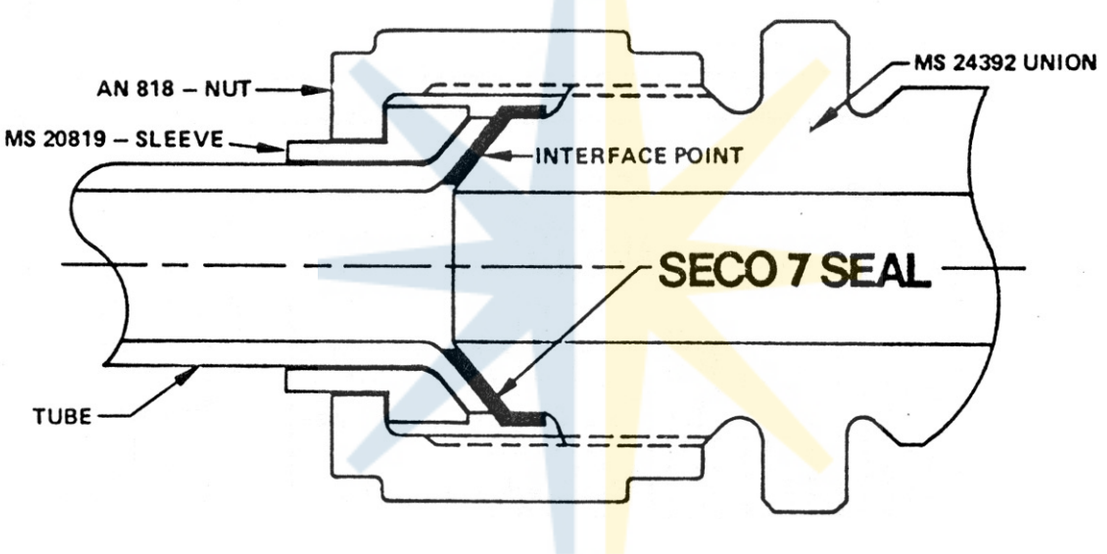
THE USE OF
SECO 7 SEALS
IN 37º FLARED FITTING
ASSEMBLIES



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SECO SEALS COMPANY

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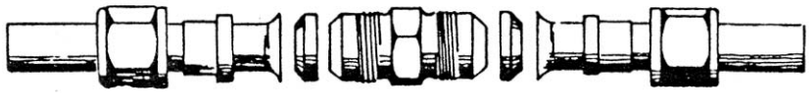

SECO presents
the 37º Flared Fitting Seal

The Seal Is:

• A soft, malleable crush water designed for MS, AN, and JIC standard 37º flared fitting assemblies.

The Seals Purpose Is:

• To provide a lower yield gasket material to the interface periphery at time of torque-up. It is designed to make-up for the minute imperfections that will occur to the fitting and tubes mating surfaces during manufacture and installation processing.

The Seal Will:

• Reduce stress in the individual piece parts of the flared fitting assembly (fitting-tube-sleeve-"B" nut).
• Prevent dishing or crushing of the 37º flared fittings and tubes sealing surfaces.
• Allow the installer to re-use the original equipment hardware repeatedly, in maintenance and overhaul applications.
• Will reduce the amount of torque required to affect the "yield to seal" principle.
• Will greatly reduce the high cost of replacement parts.
• Will cut down on operational equipment "down time".
• Require no assembly part number change.

The Seals Materials Are:

• Aluminium • Copper • Nickel

The Seals Sizes Are:

• 1/8" thru 3" (-2 thru -48)

The Seals Are:

• Stock items.

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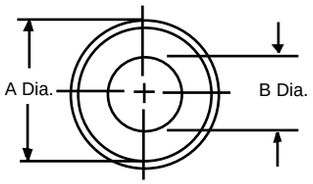

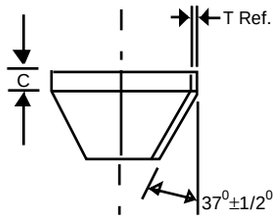

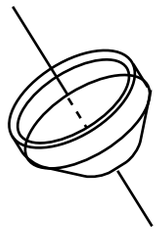

Dash No.	Tube Size O.D.	A ±.005	B +.005 -.000	C +.005 -.015	T Ref.	Dash No.	Tube Size O.D.	A ±.005	B +.005 -.000	C +.005 -.015	T Ref.
2	1/8	.245	.103	.060	.005	12	3/4	.938	.687	.105	.010
3	3/16	.307	.166	.060	.005	14	7/8	1.070	.826	.105	.010
4	1/4	.359	.213	.075	.005	16	1	1.188	.936	.125	.010
5	5/16	.421	.275	.075	.005	18	1 1/8	1.375	1.046	.075	.010
6	3/8	.476	.338	.075	.005	20	1 1/4	1.501	1.175	.125	.010
7	7/16	.539	.401	.075	.005	24	1 1/2	1.750	1.410	.125	.010
8	1/2	.654	.446	.095	.010	28	1 3/4	2.125	1.680	.125	.010
9	9/16	.722	.529	.095	.010	32	2	2.375	1.913	.125	.010
10	5/8	.767	.562	.105	.010	40	2 1/2	2.882	2.500	.055	.015
11	1 1/16	.882	.625	.105	.010	48	3	3.382	2.990	.055	.015

NOTES:

1. Remove all burrs and sharp edges.
2. These parts are soft and easily deformed, therefore dimensions “A” and “B” should be verified by installing the seal on a standard fitting per MS24385 or MS33656 of appropriate size. An out of round condition which does not prevent installation shall not be cause for rejection unless the seal material is creased or nicked.

MATERIAL & FINISH:

C Oxygen free copper strip, soft-annealed per QQ-C-576.
A Aluminium Alloy 1100 (2S) sheet, cond. “O” per QQ-A-250/1.
N Low-carbon nickel strip, annealed per ASTM-B-162.
S Corrosion resistant steel per AISI 305.

HEAT TREAT: All materials, dead soft annealed after forming.

(A) CLEANING & PACKAGING

1. No code indicates parts to be organized and packaged per SECO 80.
2. Code letter “V” - Vial indicates part to be non-lox clean, organized in lots of 10 pcs. per SECO 90.
3. Code letter “X” indicates parts to be non-lox-cleaned and individual packaged per SECO 60.
4. Code letter “L” indicates parts to be lox cleaned and packaged per customer lox clean spec.

EXAMPLE OF PART NUMBER:

SECO 7 N 12

- 12 — Cleaning & Packaging Code
- N — Dash No. (Tube O.D. in 16ths)
- 7 — Material & Finish Code
- SECO — Basic Part Number

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