

TITFLEX INDUSTRIAL ASSEMBLY PROCEDURE

TITLE: INDUSTRIAL PTFE CONVOLUTED HOSE ASSEMBLY

**AP-09
Rev. M**

Total No. of Pages: 7

SPECIFICATION CHANGE HISTORY

REV LTR	EFFECTIVE DATE	DESCRIPTION-CHANGE	APPROVALS		
			ENG	QA	
G	04/16/99	Revisions to Tables I, III, and IV to include size -10 hose. Put into latest format.			
H	04/28/00	Revisions to Tables I and IV to add -40 information. Added new section 4.6, remaining renumbered accordingly.	REQ	ENG	QA
			RNK 5/1/00	RNK 5/1/00	SAF 5/1/00
J	1/16/03	Revisions to para. 3.0 and 4.7.3 to remove reference to obsolete SOP: QA-203. Added Form AP-01.	HBG 1/13/03	RNK 1/15/03	HBG 1/16/03
K	10/12/04	Removed reference to R267 hose and replaced with 109365.	RNK 10/04/04	RNK 10/04/04	HBG 10/04/04
L	2/17/05	Revisions made to Table 1 'Swage Dia.'	RNK 2/16/05	RNK 2/16/05	HBG 2/16/05
M	8/13/09	Removed references to-48, -64, 110051-8, R272-8NPT, 109365, Sugarlines, and Dry Pressure Test	TMS 7/14/09	AJB 8/12/09	JJM 8/12/09

NOTE: This specification shall be modified from time to time, as required, by modifications to the products herein, or as required by addition of new products, or deletion of old products. Holders of this specification outside of the normal Titeflex change distribution list will not be kept up to date.

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1.0 PURPOSE

To establish assembly instructions and inspection procedures for Titeflex Industrial Convoluted PTFE Hose Assemblies. This procedure covers assembly of R272, R276, R285, R287, R270 and R273 hose.

2.0 DEFINITIONS

N/A

3.0 ASSOCIATED DOCUMENTS

CQP-830 Nonconforming Material Report and Control

4.0 PROCEDURE

4.1 Preparation of Hose

Calculate the cut off length by subtracting the fitting deduct length. The fitting deduct length can be determined from the catalog data or from measuring the face of the fitting to the back of the “dog lock” ring on each fitting. Measure length with a tape measure or other suitable device and wrap cutting area with appropriate masking tape. Then using abrasive cut off wheel or another suitable device, cut hose to desired length. Trim end of hose innercore to remove rough edges. Ends must be cut clean and approximately square

NOTE Because of the Pressure Test process the -24 & -32 braid is sometimes a little loose and needs to be milked down. The best way to handle this is to tape one end of the hose with masking tape and, with rope tied in a slip knot, attach the rope to the end of the hose and with leather palm gloves milk the braid down. Then gather the extra braid together tightly, put masking tape on the hose end, and then cut off the excess braid

**** This is best done in long lengths before cutting hose for assemblies.****

NOTE When measuring hose length at this operation or at 4.6 it is permissible to measure from the 1” mark on the tape to minimize wear on the tab.

Overall length and dimensional tolerances are as follows:

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Up to 18"	+ ¼" - 1/8"
18" to 36"	+ ½" - ¼"
36" to 50"	+ 1" - ½"
Over 50"	+ 2" - 1"

Inspect ID and OD of cut hose for obvious flaws.

4.2 Fitting Preparation

When taping the barbs, it is important that the PTFE tape, P/N 97452, adheres to the insert. This usually requires a "rough-up" of the barb area with a file prior to applying the tape. Use care in taping so that all barbs are covered, but no tape extends into the collar lock area. This "rough-up" operation shall not include the doglock barb.

Wrap PTFE Teflon tape (97452) firmly around fitting end 3-1/2 ±1/2 overlapping turns wrapping in a clockwise direction. The one exception to this is the 2" Tefzel coated stub ends which require only 1 -0+1 wrap. Remove masking tape from hose end and slide collar on the hose.

4.3 Fitting Assembly

Thread fitting into hose with a smooth and firm clockwise motion to avoid distortion of the PTFE tape on the O.D. of the insert. A power threading tool or a vise to hold the insert while this is done may be helpful on the larger sizes. While threading take care not to push the innercore out through the other end of the hose. If necessary, holding the hose securely at a 90° bend will hold the innercore firmly in place. A properly taped insert will act as a screw. It will engage the helix of the hose and draw the hose onto the insert. **CAUTION:** Do not "over-insert so the innercore is loaded into the collar lock area. Stop inserting just as the collar is completely bottomed-out on the end fitting." Back off the innercore 1/8" from the insert before swaging.

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It is necessary in the case of R285/R287 hose to remove approximately two turns of the inner support spring wire before sliding the collar onto the hose. Cut this spring off with a wire cutter and tuck it back under the braid. When all the wire is left under the collar, there is a possibility that it will work out of the convolutions during the insertion and swage operation and may cut through the innercore.

4.4 Prepare Swager

- 4.4.1 Select proper pusher, see Table I, and install with 97302P3A master pusher into crossbar. Set base ring and proper size die (See Table I). Fit die halves around hose and place fitting into pusher. Lubricate fitting collar with aerosol spray of McLube 1700L and allow drying before repeating. After second spray, allow to dry and lubricate collar and I.D. of die with high viscosity oil.

**Table I
Swaging Tools**

HOSE SIZE	DIES R272, R276, 109365, R270, R273	SWAGE DIAM.	DIES R285, R287	PUSHER: JIC (All conv. hoses)	PUSHER: MPT (All conv. hoses)
-08	1 st pass 106539-12 2 ND pass 97954-08	.800 ±.003 .781 ± .010	-	97302-A-08	97302-C-08
-10	97954-10	.884 ± .005	-	97302-10	97302-C-10
-12	97954-12	1.063 ± .005		97302-A-12	97302-C-12
-16	97954-16	1.295 ± .005		97302-A-16	97302-C-16
-20	97954-20	1.547 ± .005	-	97302-A-20	97302P3A
-24	97954-24	1.810 ± .005	-	97302-A-24	97302P3A
-24	-	1.875 ± .005	97954-24HV	97302-A-24	97302P3A
-32	97954-32	2.375 ± .010	-	97302-A-32	97302P3A
-32		2.445 ± .010	97954-32HV	97302-A-32	97302P3A
-40	T165602-40	2.842 ± .005	-	N/A	N/A

NOTE: FOR FLANGE RETAINING INSERT ASSEMBLIES. USE 97302P3A ONLY.

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NOTE: FOR -32 HALAR ENCAPSULATED FLANGE RETAINERS IT IS RECOMMENDED THAT YOU USE A TWO PASS SWAGE, FOR THE 1ST PASS USE 97954-32HV DIES AND FOR THE 2ND PASS USE THE 97954-32 DIES

4.4.2 Swaging Operation

Activate swager and lower ram until collar nests concentrically with die opening. Activate swager ram and continue swaging, smoothly and without jogging, until top of collar is flush with top face of die. Return ram immediately upon attaining fully swaged position. Remove dies, and repeat process for other end of hose assembly. **CAUTION:** Always be certain that proper pusher is in place for each fitting used.

NOTE: On open throat swagers, always close gate prior to swaging.

4.4.3 Alternate tooling and equipment for size 40.

- a. Rigid #300 power drive and/or assembly machine.
- b. Strap wrench

4.5 Special Crimp Instructions for R272-40

4.5.1 Install crimp fingers T165602-40 in sequence into the FP150 or equivalent crimper.

4.5.2 Using a set-up piece or a piece of 3" tubing, set closed crimp finger die set to $2.910 \pm .010$. Use a vernier dial caliper, Pi tape or equivalent to measure actual crimp diameter.

4.5.3 Starting at the end of the collar closest to the fitting, crimp one half of the collar length to $2.910 \pm .010$ ". Index position of fitting relative to the crimp finger die set and crimp the other half of the collar, thus creating a continuous diameter across the collar. Repeat for the other end fitting.

4.5.4 Using a set-up piece or a piece of 3" tubing, set closed crimp finger die set to $2.842 \pm .005$. Use a vernier dial caliper, Pi tape or equivalent to measure actual crimp diameter.

4.5.5 Starting at the end of the collar closest to the fitting, crimp one half of the collar length to $2.842 \pm .005$ ". Index position of fitting relative to the crimp finger die set and crimp the other half of the collar, thus creating a continuous diameter across the collar. Repeat for the other end fitting.

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4.6 Inspect and Test Procedure

4.6.1 Perform a visual/dimensional inspection of the assembly per the following:

- | | | | |
|----|------------------|---|----------------------------------|
| A. | Swage Diameter - | } | Measure first piece and visually |
| B. | Overall Length - | } | compare to remainder of order. |

Overall length tolerances per paragraph 4.1, swage diameter per Table I. Measure swage diameter in center of collar approximately 90° from longitudinal marks caused by die parting line.

Use a vernier, Pi tape or equivalent to measure swage diameter and a tape measure to measure overall length. The tape measure does not require calibration.

4.6.2 Pressure test each assembly with water per proof pressure values in Table IV.

For flanged assemblies, pressure test per drawing requirements or double the primary service rating of 150 lb flange and one and half the primary service rating of 300 lb flange:

- 150 lb flange test at 300 psi
- 300 lb flange test at 450 psi.

Perform water pressure test according to the following:

- a. Connect assemblies to pressure manifold.
- b. Run water through assemblies to remove air. Leave water on.
- c. Place caps on assemblies.
- d. Adjust pressure to test value specified in Table IV of this document or above.
- e. With air hose, blow water from outside of hose assemblies.
- f. Set timer for three minutes minimum or four minutes maximum, except as noted in Table IV.
- g. Examine lines. Any evidence of leakage constitutes failure.
- h. Complete Pressure Test Log (Form AP01-1) and Initial Factory Order or Router as required.

4.7.3 Sampling of pressure test is permitted in accordance with Table V on all products except “heavywall” R285 and R287. These products are not to be sampled at pressure test. If

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any part is rejected, the entire lot is to be tested. Acceptable parts shall be routed to packing/stores and shipping. Rejectable parts shall be processed per CQP-830.

TABLE IV

Note: Test pressures apply to JIC and male pipe fittings only.

R272/ R276	Test Pressure	Length of Test
-8	1500 PSI	3 MIN
-10	1500 PSI	3 MIN
-12	1500 PSI	3 MIN
-16	1500 PSI	3 MIN
-20	1500 PSI	3 MIN
-24	1125 PSI	3 MIN
-32	750 PSI	3 MIN
-40	200 PSI	3 MIN
R285/R287	Test Pressure	Length of Test
-24	1125 PSI	3 MIN
-32	750 PSI	3 MIN
R270/R273	Test Pressure	Length of Test
-8	300 PSI	3 MIN
-12	260 PSI	3 MIN
-16	260 PSI	3 MIN
-20	225 PSI	3 MIN
-24	225 PSI	3 MIN

TABLE V

LOT SIZE*	SAMPLE SIZE
2 to 8	All
9 to 150	13
151 to 500	50

* For lot size above 500 contact Quality Engineering for sample size.

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