

TORQ N' SEAL®

U.S. Pat. No. 5,289,851 others pending

High Pressure Heat Exchanger Tube Plug with Patented Hex Drive Capture System

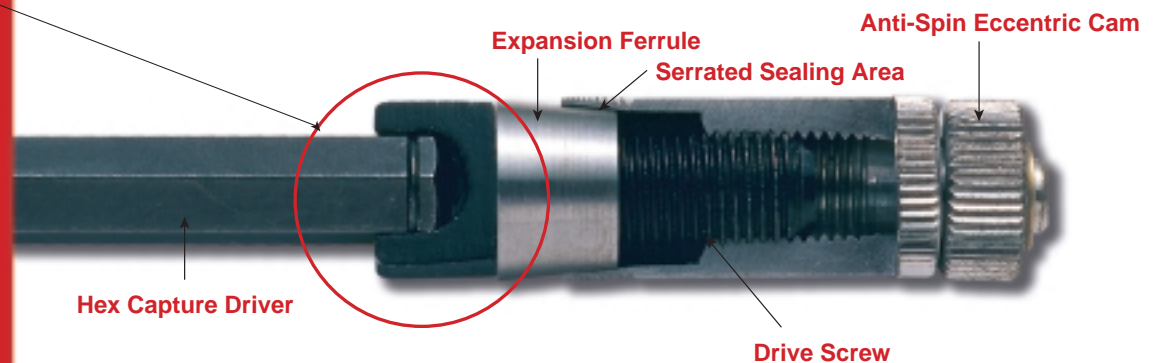
**Now
There is
a New,
Easy Way
to Seal
Leaking
Tubes!**

The TORQ N' SEAL® Heat Exchanger Tube Sheet Plug is a solid one piece plug that can be inserted into the tube sheet of a leaking tube and expanded with a standard 3/8" drive torque wrench. The plug will expand approximately 30 mills (.030") to provide a positive mechanical contact seal. The TORQ N' SEAL® Heat Exchanger Plug can be used in high or low pressure applications such as feedwater heaters, moisture separator reheaters, preheaters, condensers, coolers, fin-fan coolers or any other tubed heat exchanger.

- Positive sealing in excess of 6500 PSI is achieved without special tooling or personnel training.
- Plug can be inserted to any depth of the tube sheet in order to avoid severely corroded areas on the tube sheet face.
- Design enables rapid implantation and fit into tight areas adjacent to the tube sheet/shell joint interface, baffle plates and internal dividers.
- One piece design enhances sealing characteristics by eliminating second potential leak path common to design found in two piece plugs.
- Wide sealing area contact zone ensures a positive seal while the gradual and symmetrical torque expansion eliminates thermal and mechanical shock to the tube sheet, commonly found with welding, impact due to hammering of tapered pins, and explosive insertion methods.
- Exclusive design allows installation of plugs at the face and back side of the tube sheet in order to prevent intrusion of shellside corrosives. With single plugging techniques accomplished on the face of the tube sheet, corrosives can enter the void created in the tube sheet, thereby exacerbating erosion and corrosion of the tube sheet ligaments.
- TORQ N' SEAL® Plugs are available to meet Nuclear ASME Sec. III or ISO 9002 QA specifications.

Patented Hex Drive Capture System

New hex drivers have a spring loaded tang that captures the TORQ N' SEAL® Plug onto the end of the drive preventing it from falling off into the heat exchanger tube.



TORQ N' SEAL® ...how it works!

The TORQ N' SEAL® Plug is snapped onto the hex capture driver and inserted into the tube ID, ensuring that the serrated sealing area is within the tube sheet. Applying the initial torque to the driver engages the anti-spin eccentric cam, locking the plug into the tube ID, thereby providing a torsional resistive force. As additional torque (in. lb.) is exerted, the drive screw threads into the plug body, pressing the tapered expansion ferrule into the reverse taper of the plug. These tapered surfaces combine to generate an enormous radial expansion force, swaging the serrated sealing area into the tube wall. A positive mechanical contact seal in excess of 6,500 psi is created.

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torq-n-seal.com

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High Pressure Heat Exchanger Tube Plug Installation Instructions

**Fast
Reliable
Dependable**

ALLOYS

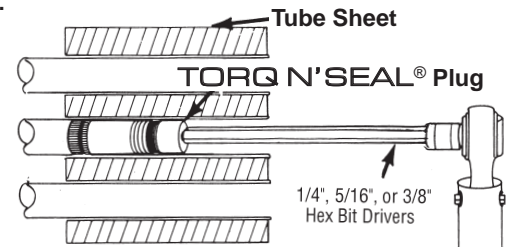
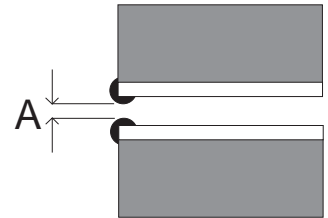
Carbon Steel
Stainless Steel
Brass
Cupra Nickel
Titanium
Monel

(Other alloys available.)

- 1) A careful measurement of the tube I.D. should be taken with an inside tube micrometer or a gauging block to determine the actual bore diameter. Select a TORQ N' SEAL® Plug that is sized within the range of the measured tube ID: i.e., for a .518" ID tube: use a TNS/.510-.530 TORQ N' SEAL® Plug.
- 2) Clean tube of any loose scale or corrosive oxide formation. If the tube is out of round, extremely eccentric or cracked, a straight spiral drill reamer should be used to resize the bore of the tube or remove the tube completely.
- 3) After the correct size TORQ N' SEAL® Plug is chosen, affix the plug onto the capture hex driver and insert it into the tube in the tube sheet area of the heat exchanger.
- 4) Using a ratcheting (in. lb.) torque wrench, begin slowly tightening to the right until you feel the anti-spin eccentric cam lock in place. If the cam does not lock, then the plug is too small for the ID of tube and cannot expand enough for this particular application. After the cam locks it will feel as if there is an even resistance of about 100 in. lbs. Continue applying torque to expand the plug body until you reach the desired torque listed in the chart below.

BE CAREFUL TO AVOID THE FOLLOWING:

- A) DO NOT MEASURE TUBE AT ROLL JOINT SEAL WELD (Not true tube I.D.).
- B) DO NOT USE IN A TUBE THAT IS MORE THAN .020" LARGER IN DIAMETER THAN THE TORQ N' SEAL PLUG.
- C) DO NOT PUSH THE DRIVE ADAPTER AGAINST THE TUBE SHEET FACE. The expanding screw threads into the plug body and may slip off the drive prior to sealing.
- D) DO NOT place plug in an internal tube area near a step roll transition or a tube with severe pitting, corrosion or crack.



TORQ N' SEAL® Plug Drive & Torque Selection Chart

Carbon Steel		Stainless Steel/Monel		Brass/Cupra Nickel	
Plug Size	Torque (in lbs)	Plug Size	Torque (in lbs)	Plug Size	Torque (in lbs)
.410" - .560"	250	.410" - .560"	300	.410" - .560"	200
.570" - .710"	350	.570" - .710"	500	.570" - .710"	250
.720" - 1.00"	450	.720" - 1.00"	600	.720" - 1.00"	350

TORQ N' SEAL® Plug Selection Chart (Special sizes available upon request)

5/8" Tube Ga. (ID)	Torq N' Seal Part Number	3/4" Tube Ga. (ID)	Torq N' Seal Part Number	7/8" Tube Ga. (ID)	Torq N' Seal Part Number	1" Tube Ga. (ID)	Torq N' Seal Part Number
12 (.407)	TNS\410-430 (*)	12 (.532)	TNS\530-550 (*)	12 (.657)	TNS\650-670 (*)	12 (.782)	TNS\780-800 (*)
13 (.435)	TNS\430-450 (*)	13 (.560)	TNS\550-570 (*)	13 (.685)	TNS\690-710 (*)	13 (.810)	TNS\800-820 (*)
14 (.459)	TNS\450-470 (*)	14 (.584)	TNS\570-590 (*)	14 (.709)	TNS\710-730 (*)	14 (.834)	TNS\840-860 (*)
15 (.481)	TNS\470-490 (*)	15 (.606)	TNS\610-630 (*)	15 (.731)	TNS\730-750 (*)	15 (.856)	TNS\860-880 (*)
16 (.495)	TNS\490-510 (*)	16 (.620)	TNS\610-630 (*)	16 (.745)	TNS\750-770 (*)	16 (.870)	TNS\860-880 (*)
17 (.509)	TNS\510-530 (*)	17 (.634)	TNS\630-650 (*)	17 (.759)	TNS\750-770 (*)	17 (.884)	TNS\880-900 (*)
18 (.527)	TNS\530-550 (*)	18 (.652)	TNS\650-670 (*)	18 (.777)	TNS\780-800 (*)	18 (.902)	TNS\900-920 (*)
19 (.541)	TNS\550-570 (*)	19 (.666)	TNS\670-690 (*)	19 (.791)	TNS\780-800 (*)	19 (.916)	TNS\920-940 (*)
20 (.555)	TNS\550-570 (*)	20 (.680)	TNS\670-690 (*)	20 (.805)	TNS\800-820 (*)	20 (.930)	TNS\920-940 (*)
21 (.561)	TNS\570-590 (*)	21 (.686)	TNS\690-710 (*)	21 (.811)	TNS\820-840 (*)	21 (.936)	TNS\940-960 (*)
22 (.569)	TNS\570-590 (*)	22 (.694)	TNS\690-710 (*)	22 (.819)	TNS\820-840 (*)	22 (.944)	TNS\940-960 (*)

*Insert alloy designation: (BR) Brass, (CS) Carbon Steel, (SS) Stainless Steel, (CN) Cupra Nickel
Tube I.D. is nominal. Add 8 to 12 mils to account for tube rolling.

Inch Standard to Metric Conversion Chart

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.460	11.7	.600	15.2	.740	18.8	.880	22.4
.470	11.9	.610	15.5	.750	19.1	.890	22.6
.480	12.2	.620	15.8	.760	19.3	.900	22.9
.490	12.5	.630	16.0	.770	19.6	.910	23.1
.500	12.7	.640	16.3	.780	19.8	.920	23.3
.510	13.0	.650	16.5	.790	20.1	.930	23.6
.520	13.2	.660	16.8	.800	20.3	.940	23.8
.530	13.5	.670	17.0	.810	20.6	.950	24.1
.540	13.7	.680	17.3	.820	20.8	.960	24.3
.550	14.0	.690	17.5	.830	21.1	.970	24.6
.560	14.2	.700	17.8	.840	21.3	.980	24.8
.570	14.5	.710	18.0	.850	21.6	.990	25.1
.580	14.7	.720	18.3	.860	21.8	1.000	25.4
.590	15.0	.730	18.5	.870	22.1	1.010	25.6

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