TWIN CITY HOSE, LLC.

EXPANSION COMPENSATOR INSTALL INSTRUCTIONS

General Installation Instructions

INSTALLATION PROCEDURE

All compensators include labels identifying the rated pressure, temperature and specific installation instructions. It is recommended that all system designs include adequate anchors, guides and supports.

Female copper tube model "EXCS" is manufactured with high temperature brazed joints. Protect these models to ensure the temperature does not exceed 350°F during installation.

Be certain that the piping configuration or the installation method does not subject the bellows to twisting or torque for any model. Bellows can be damaged by excessive torsion.

Compensators are not flow-directional, however when installing in a vertical orientation, the traveling end should be installed below the fixed end to allow for proper drainage.

All Twin City Hose expansion compensators include anti-torque devices.

A shipping restraint is tack welded or soldered in place at the factory to ensure the rated measurement of travel. DO NOT remove this device until installation is complete (all anchors, guides and supports are adjusted).

Remove the restraint prior to pressure testing and remove the tack weld or solder flash after installation.

The restraint is not designed to react to pressure thrust.

ANCHORING AND GUIDING

Compensators used in risers and radiation lines require adequate anchoring and guiding. Main anchors are necessary at the end of each straight pipe run containing a compensator. With guides installed to prevent the line from bowing, buckling or becoming misaligned because of thermal expansion or internal pressures.

Pipe hangers and rollers are not considered to be adequate as guides. Anchors should be located per the Expansion Joint Manufacturers Association (EJMA) standards. The main anchors must restrain the ends of the pipe so that all expansion is directed into the compensator. The main anchors must also withstand the end thrust force of the internal pressure, plus all the other piping system loads.

Compensators should not be subjected to hydrostatic pressure beyond their rated working pressures. If a higher pressure test is required, the factory should be advised. The inside of all piping must be cleaned before installing and testing compensators. Before the pipe lines are hydro-statically tested, all anchors and pipe guides must be secured.

The contractor installing sweat end type compensators are advised to use a soft (Tin-Lead) solder. Excessive heat used to make the solder joint may have a detrimental effect on the compensator. The manufacturer's warranty is null and void if the installing temperature exceeds 350°F on the end fittings.

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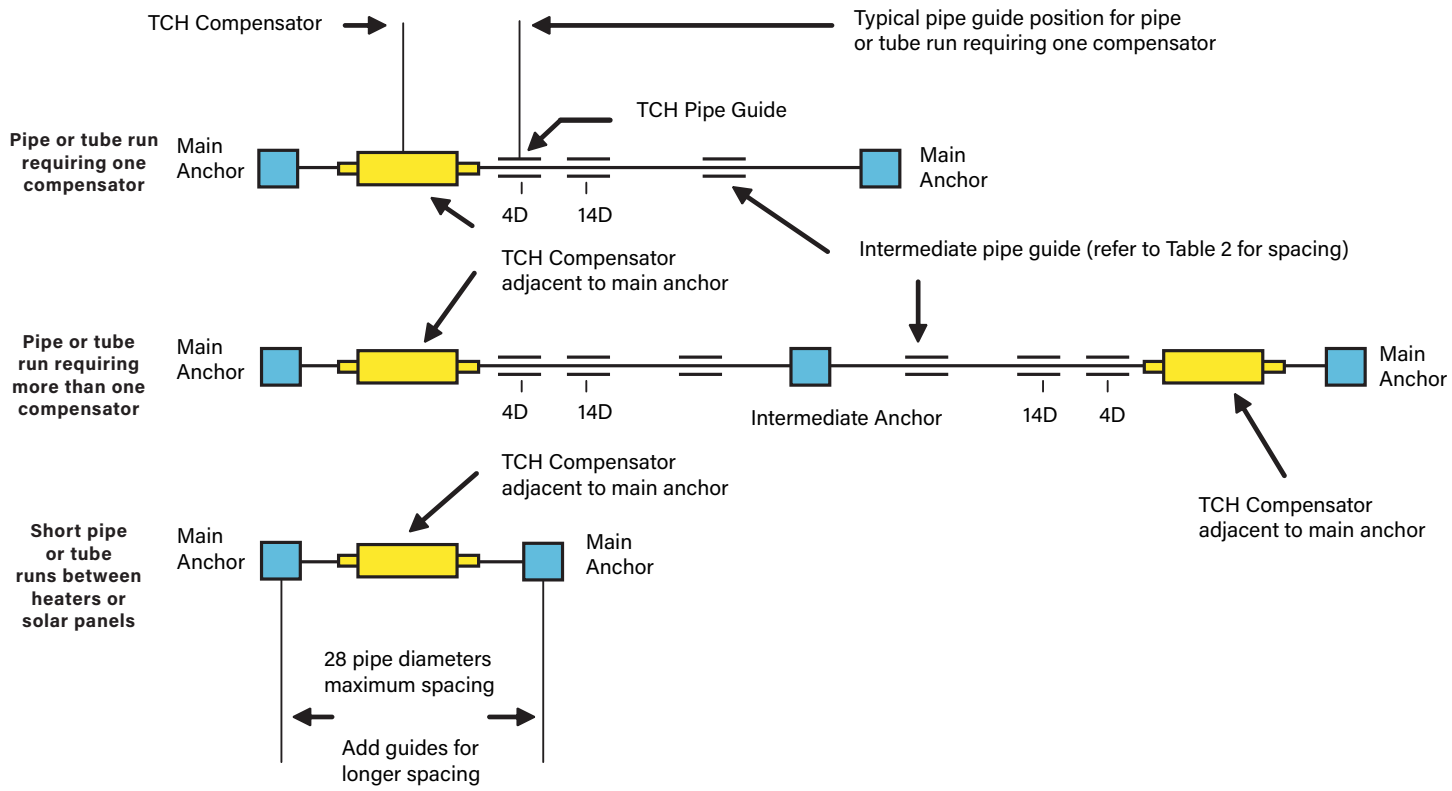
Compensators are not designed to absorb torsional movement or stress. Subjecting a compensator to torsion of any amount may drastically effect operating life and will void the warranty.

Note:
Drawings referenced from © 1985 Expansion Joint Manufacturers Association, Inc. (Fig. B-8.2)



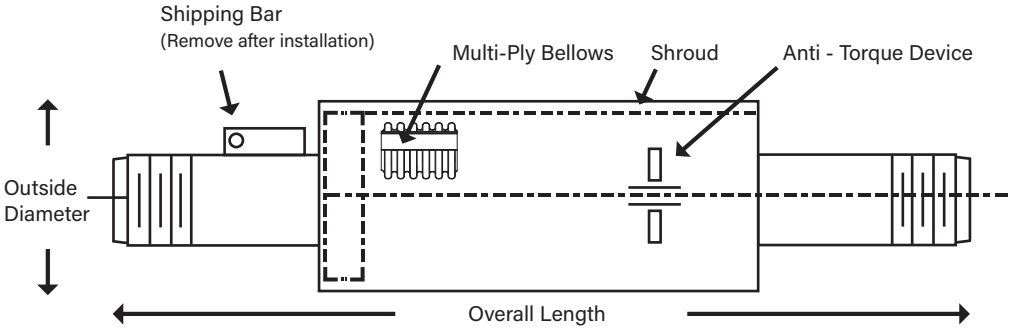


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TABLE 1 THERMAL EXPANSION

Linear thermal expansion of pipe and tube per 100 feet between 70°F and tabulated temperature.

Saturated Steam Pressure		Temperature DEG F	Temperature DEG C	Copper Tube	Carbon Steel Pipe
Vacuum (inches of mercury)		-200	-129	-2.85	
		-150	-101	-1.81	
		-100	-73	-1.81	
		-50	-46	-1.32	-0.84
		0	-18	-0.75	-0.49
		25	-4	-0.47	-0.32
	29.7	32	0	-0.39	-0.27
	29.6	50	10	-0.19	-0.14
	29.2	70	21	0	0
	28.0	100	38	0.38	0.23
	26.0	125	52	0.66	0.42
	22.4	150	66	0.94	0.61
	16.3	175	80	1.23	0.80
	6	200	93	1.51	0.99
	0	212	100	1.65	1.10
Pressure PSIG	4	225	107	1.80	1.21
	5	250	121	2.09	1.40
	31	275	135	2.38	1.61
	52	300	149	2.67	1.82
	82	325	163	2.97	2.04
	120	350	177	3.27	2.26
	150	358	181	3.37	2.33
	169	375	191	3.57	2.48
	232	400	205	3.88	2.70
	300	417	214	4.09	2.86
	311	425	219	4.18	2.93
	407	450	232	4.48	3.16
	525	475	246	4.79	3.39
	666	500	260	5.09	3.62

TABLE 2 INTERMEDIATE PIPE SPACING

(Center to Center, Feet)

Nominal Size		Pressure (PSIG) 50	75	100	150	200
Model EXC-M,W,G,F Sch. 40 Carbon Steel Pipe	¾"	7.7	7.3	6.9	6.3	5.8
	1	11.9	11.0	10.3	9.2	8.4
	1 ¼"	16.3	14.7	13.5	11.7	10.5
	1 ½"	19.4	17.2	15.6	13.4	11.9
	2"	26.8	23.2	20.7	17.5	15.4
	2 ½"	31.3	27.5	24.8	21.2	18.8
	3"	38.8	33.5	29.9	25.2	22.0
	4"	47.7	40.7	36.4	30.8	27.0
Model EXCS Copper Tubing	¾"	2.4	2.3	2.2	2.1	1.9
	1"	4.0	3.7	3.5	3.2	2.9
	1 ¼"	5.7	5.2	4.9	4.3	3.0
	1½"	7.5	6.8	6.2	5.4	4.9
	2"	10.0	9.0	8.3	7.2	6.5
	2 ½"	13.9	12.2	10.9	9.4	8.3
	3"	16.8	14.7	13.2	11.2	9.9