

HOW TO SELECT AND SPECIFY AN ISOTECH EXPANSION JOINT

1. Determine from the piping system specifications

- a) Pipe sizes involved
- b) Maximum working pressure
- c) Maximum working temperature

2. Calculate axial traverse between anchor points. (Refer to thermal expansion table located in the application guide)

3. Select the proper type and quantity of ISOTECH expansion compensators or expansion joints to provide the amount of movement required within the rated working pressure and temperature .
(See the pressure derating table for elevated temperatures.)

4. Select the appropriate end fittings and check the physical specifications for the overall length and other dimensional

GUIDE SPECIFICATION-EXPANSION JOINTS

SCOPE:

1. All heating and/or cooling system piping shall contain expansion joints to compensate for expansion and/or contraction resulting from temperature variations.

These lines shall have adequate guides and anchors as defined by the expansion joint manufacturers association (EJMA) standards.

CONSTRUCTION:

Bellows construction shall be multi-ply laminated corrugated bellows of type 300 stainless steel.

2. All joints shall have a square telescoping shroud to prevent torsional stress and/or external damage.

3. End fittings shall be (male pipe thread, female pipe thread, female copper tube, weld end, 150# flange) suitable for mating piping.

4. Expansion joints for heating system piping shall be designed for 2" total travel (1 1/2" compression, 1/2" extension) for single units, 4" total travel (3" compression, 1" extension) for dual units. Expansion joints for chilled water systems shall be designed for 1" extension and 1" compression (single units) and 2" extension and 2" compression (dual units) respectively.

5. Units shall be modeled "IEJ" as manufactured by "ISOTECH".

FEATURES

- Compact overall length and outside diameter
- Four-Sided shroud for Anti-Torque and protection
- Multi-Ply-T-300 stainless steel bellows
- Long cycle life
- Force to actuate usually less than 100 lbs.
- 2" Traverse (1-1/2" compression, 1/2" extension) for single units
- Chilled water systems: 1" extension and 1" compression
- 4" Traverse (3" compression, 1" extension) for dual units
- Brass case construction
- Variety of endings
 - Female thread ends
 - Copper sweat ends
 - Male thread ends
 - Steel weld ends

Ratings

The ISOTECH Expansion Pressure joints are designed for a maximum of 200 or 300 psi working at ambient (70oF) temperature depending on model. When operating at elevated temperatures it is necessary to derate the maximum pressure capability of the units. The table indicates the recommended maximum pressures for various temperature levels. Joints should not be subjected to line tests beyond their rated working pressure. If higher pressure is required, please consult the factory.

The maximum temperature of an ISOTECH Compensator is limited by the internal construction. The compensator is limited to a maximum of 600°F.

| DERATED PRESSURE FOR ELEVATED TEMPERATURES | | | |
|--|-----------|------------------|-----|
| DEGREES F | DEGREES C | PRESSURE (Psi) | |
| 70 | 21 | 200 | 300 |
| 150 | 66 | 195 | 290 |
| 200 | 93 | 190 | 285 |
| 250 | 121 | 185 | 275 |
| 300 | 149 | 175 | 260 |
| 350 | 177 | 170 | 255 |
| 400 | 204 | 165 | 245 |
| 450 | 232 | 160 | 240 |
| 500 | 260 | 155 | 230 |

- 150# Drilling flanges
- 300# Drilling flanges
(upon application)

CANADA LOCATION

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Tool free : 1-888-831-3311

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THRUST FORCE DATA

| EXPANSION JOINT NOMINAL PIPE SIZE (in) | ¾ | 1 | 1 ¼ | 1 ½ | 2 | 2 ½ | 3 | 4 |
|--|---|------|------|------|------|------|------|-------|
| NOMINAL I.D. BELLWS ELEMENT (in) | 1 ¼ | 1 ¼ | 1 ¼ | 1 ½ | 2 | 2 ½ | 3 | 4 |
| EFFECTIVE AREA (in) ² | 1.75 | 1.76 | 1.76 | 2.76 | 4.55 | 6.50 | 9.61 | 14.50 |
| PRESSURE PSI | THRUST FORCE IN POUNDS @ SPECIFIED PRESSURE | | | | | | | |
| 10 | 18 | 18 | 18 | 28 | 46 | 65 | 96 | 145 |
| 20 | 35 | 35 | 35 | 55 | 91 | 130 | 192 | 290 |
| 30 | 53 | 53 | 53 | 83 | 137 | 195 | 288 | 435 |
| 40 | 70 | 70 | 70 | 110 | 182 | 260 | 384 | 580 |
| 50 | 88 | 88 | 88 | 138 | 228 | 260 | 384 | 725 |
| 60 | 106 | 106 | 106 | 166 | 273 | 390 | 57 | 870 |
| 75 | 132 | 132 | 132 | 207 | 341 | 488 | 721 | 1088 |
| 100 | 176 | 176 | 176 | 276 | 455 | 650 | 961 | 1450 |
| 125 | 220 | 220 | 220 | 345 | 569 | 813 | 1201 | 1813 |
| 150 | 264 | 264 | 264 | 414 | 683 | 975 | 1442 | 2175 |
| 175 | 308 | 308 | 308 | 483 | 796 | 1138 | 1682 | 2538 |
| 200 | 352 | 352 | 352 | 552 | 910 | 1300 | 1922 | 2900 |

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ANCHORING & GUIDE ISOTECH EXPANSION JOINTS

Expansion joints 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, as noted on the reverse side of this sheet. 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 other piping system loads. Expansion joints should not be subjected to hydrostatic pressure tests beyond their rated working pressures. If a higher pressure test is required, the factory should be advised. The inside of all piping must be clean before installing and testing expansion joints. Before the pipe lines are hydro statically tested, all anchors and pipe guides must be secured, and the **Screws** must be removed.

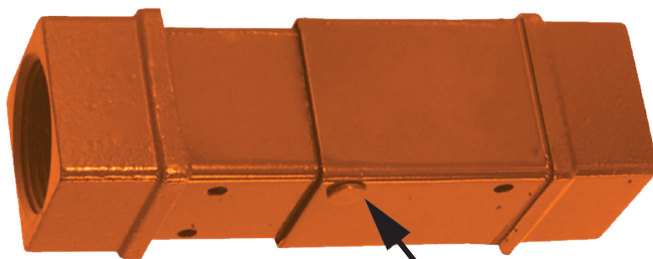
THE CONTRACTOR INSTALLING SWEAT END TYPE EXPANSION JOINTS IS ADVISED TO USE A SOFT (TIN-LEAD) ^{*1} SOLDER. EXCESSIVE HEAT USED TO MAKE THE SOLDER JOINT MAY HAVE A DETRIMENTAL EFFECT ON THE COMPENSATOR. THE MANUFACTURERS WARRANTY IS NULL AND VOID IF THE INSTALLING TEMPERATURE EXCEEDS 950° ON THE END FITTINGS.

The single type expansion compensator is fitted with two (2) **Screws** that holds the bellows at an optimum installation length during ship-ment. The dual type expansion joints has four fasteners—two for each bellows. After the unit has been attached to the pipes and the system properly anchored and guided, the **Screws** must be removed, allowing the bellows to automatically make proper allowance for expansion of the line during service (see diagram). Expansion Joints must be leak checked subsequent to installation.

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

1. Leave **Screws** in place DURING installation to provide proper compression and extension movements in response to pipe thermal expansion and contraction, respectively.

2. Remove **Screws** AFTER installation is complete, but PRIOR to hydro testing.



Screw
(2 Per Unit on opposite side compensator)

COPPER TUBE GUIDE SPACING

(Data per Heating and Air Condition magazine , Sep. 1961)

| Pipe diameter (D) (in) | 4 D (in) | 14 D (in) | Maximum Spacing for Intermediate Guides for Copper Type-M"Water Tube (Feet)* | | |
|-------------------------------|---------------|----------------|---|--------|--------|
| | | | 25 PSI | 50 PSI | 70 PSI |
| 3/4 | 3 | 10 ½ | 7 | 6 | 5 |
| 1 | 4 | 14 | 9 | 8 | 6 |
| 1 ¼ | 5 | 17 ½ | 14 | 11 | 9 |
| 1 ½ | 6 | 21 | 14 | 11 | 9 |
| 2 | 8 | 28 | 19 | 14 | 12 |
| 2 ½ | 10 | 35 | 23 | 17 | 15 |
| 3 | 12 | 42 | 27 | 20 | 18 |
| 4 | 16 | 56 | 31 | 23 | 21 |

*FOR COPPER TYPE "L" TUBING, SPACING MAY BE INCREASED BY 10%.

*FOR COPPER TYPE- "K" TUBING, SPACING MAY BE INCREASED BY 20%

Note :

*1 - For Potable / Domestic Water Application, use Lead Free solder .

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COPPER PIPE, ANCHOR AND GUIDES (CTA)

1. Anchors should be located per the Expansion Joint Manufacturers Association (EJMA) standards:

- A. At a change in direction of flow.
- B. Between two expansion joints of different sizes.
- C. At the entrance of a side branch into a main line.
- D. Where a valve is installed in a pipe run between two expansion joints.
- E. At the blind end of a pipe.

2. The anchor bracket must be mounted and secured to a solid and non-moving surface.

3. The copper anchor should be soldered to the copper tube for best results.

Notes:

- System design must not create torque on expansion joints. See diagram below for typical installation practices.
- Piping centerlines should be precisely aligned.
- All set pins must be removed after installation.

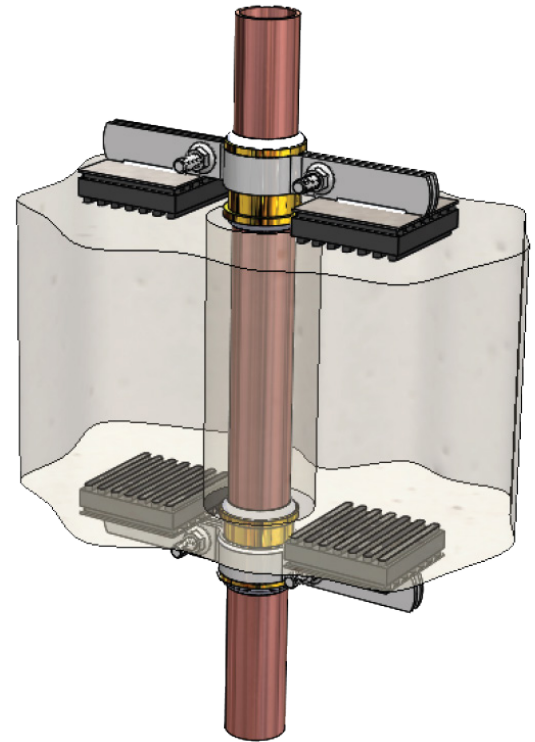
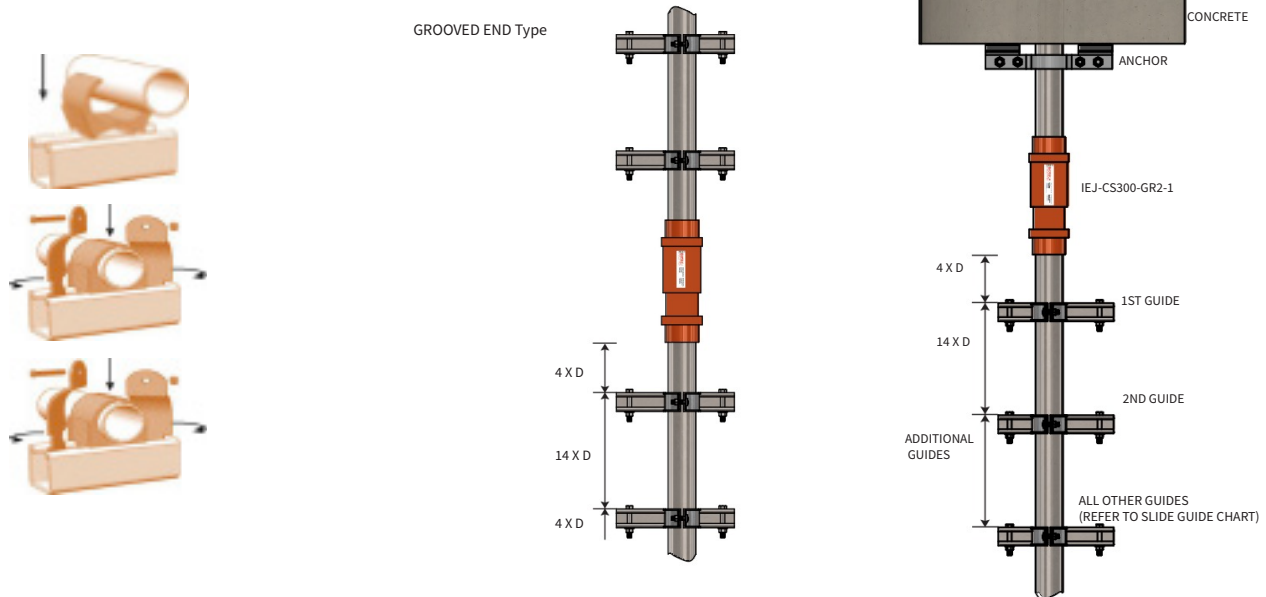


ILLUSTRATION SHOWS ANCHORS IN USE WITH COPPER PIPES



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ISOTECH EXPANSION JOINT

The industry standard in Expansion Compensator's for the control of Pipe Expansion & Contraction in water/stream systems. ISOTECH is one of the few manufacturers utilizing this superior square design that eliminates issues that can occur with round joints.

KEY SPECIFICATIONS:

- Sizes-3/4" To 4"
- Single bellows-316L SS
2" Total Movement
1½" Compression
1/2" Extension
- Pressure 200 or 300 PSIG
- Max. Temperature 600°F

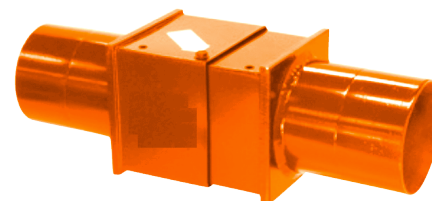


IEJ-CP300-FTH

- Brass Case
- Female Brass Thread Ends

MAX. WORKING PRESSURE 300 PSIG @ 70°F

| NOMINAL I.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-------------------|-------------|-----------|
| 3/4 | 2 | 6 ½ | 2.25 |
| 1 | 2 | 6 ½ | 2.25 |
| 1 ¼ | 2 | 6 ½ | 2.50 |
| 1 ½ | 2 ½ | 6 ½ | 4.00 |
| 2 | 3 | 6 ½ | 5.75 |
| 2 ½ | 3 ½ | 7 | 7.75 |
| 3 | 4 ½ | 7 ¾ | 11.00 |
| 4 | 5 ½ | 8 | 12.00 |



IEJ-CP-SW

- Brass Case
- Female Copper Tube Ends

MAX. WORKING PRESSURE 200 & 300 PSIG @ 70°F

| NOMINAL I.D. (in) | FIT TUBE O.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-----------------------|-------------------|-------------|-----------|
| 3/4 | 7/8 | 2 | 6 ½ | 1.50 |
| 1 | 1 ⅛ | 2 | 6 ½ | 1.50 |
| 1 ¼ | 1 ¾ | 2 | 6 ½ | 1.75 |
| 1 ½ | 1 ⅝ | 2 ½ | 6 ½ | 2.75 |
| 2 | 2 ⅛ | 3 | 10 | 3.50 |
| *2 ½ | 2 ⅝ | 3 ½ | 10 ¾ | 5.00 |
| *3 | 3 ¾ | 4 ½ | 11 ½ | 6.25 |
| *4 | 4 ⅛ | 5 ½ | 13 ½ | 7.00 |

* From 2 ½ , 3 and 4 inch Rated to 200 PSI @ 70 ° F

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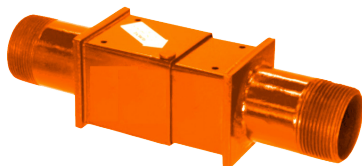
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IEJ-CS300-MTH

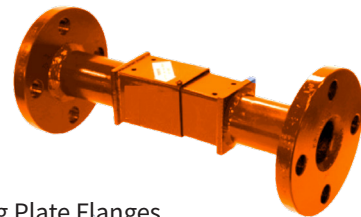


- Brass Case
- Female Copper Tube Ends

MAX. WORKING PRESSURE 300 PSIG @ 70°F

| NOMINAL I.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-------------------|-------------|-----------|
| 3/4 | 2 | 9 1/2 | 2.25 |
| 1 | 2 | 9 1/2 | 2.25 |
| 1 1/4 | 2 | 9 1/2 | 2.50 |
| 1 1/2 | 2 1/2 | 9 1/2 | 4.00 |
| 2 | 3 | 9 1/2 | 5.75 |
| 2 1/2 | 3 1/2 | 9 1/2 | 7.75 |
| 3 | 4 1/2 | 9 1/2 | 11.00 |
| 4 | 5 1/2 | 9 1/2 | 12.00 |

IEJ-CS300-FL

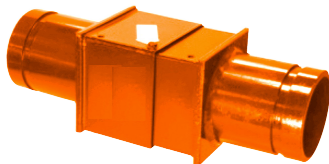


- Brass Case
- Steel #150 Drilling Plate Flanges

MAX. WORKING PRESSURE 300 PSIG @ 70°F

| NOMINAL I.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-------------------|-------------|-----------|
| 3/4 | 2 | 11 | 5.75 |
| 1 | 2 | 11 | 5.75 |
| 1 1/4 | 2 | 11 | 8.25 |
| 1 1/2 | 2 1/2 | 11 | 8.75 |
| 2 | 3 | 11 | 10.75 |
| 2 1/2 | 3 1/2 | 11 | 16.00 |
| 3 | 4 1/2 | 11 | 19.00 |
| 4 | 5 1/2 | 11 | 20.00 |

IEJ-CS300-GR



- Brass Case
- Sch 40 Carbon Steel Victaulic Groove Ends

MAX. WORKING PRESSURE 300 PSIG @ 70°F

| NOMINAL I.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-------------------|-------------|-----------|
| 3/4 | 2 | 10 1/2 | 2.50 |
| 1 | 2 | 10 1/2 | 2.75 |
| 1 1/4 | 2 | 10 1/2 | 3.25 |
| 1 1/2 | 2 1/2 | 10 1/2 | 4.00 |
| 2 | 3 | 10 1/2 | 5.25 |
| 2 1/2 | 3 1/2 | 10 1/2 | 7.50 |
| 3 | 4 1/2 | 10 1/2 | 9.50 |
| 4 | 5 1/2 | 10 1/2 | 10.50 |

IEJ-CS300-W



- Brass Case
- Sch 40 Carbon Steel Weld Ends

MAX. WORKING PRESSURE 300 PSIG @ 70°F

| NOMINAL I.D. (in) | MAX. O.D. (in) | OAL (in) | Wt. (Lbs) |
|----------------------|-------------------|-------------|-----------|
| 3/4 | 2 | 10 1/2 | 2.50 |
| 1 | 2 | 10 1/2 | 2.75 |
| 1 1/4 | 2 | 10 1/2 | 3.25 |
| 1 1/2 | 2 1/2 | 10 1/2 | 4.00 |
| 2 | 3 | 10 1/2 | 5.25 |
| 2 1/2 | 3 1/2 | 10 1/2 | 7.50 |
| 3 | 4 1/2 | 10 1/2 | 9.50 |
| 4 | 5 1/2 | 10 1/2 | 10.50 |

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