

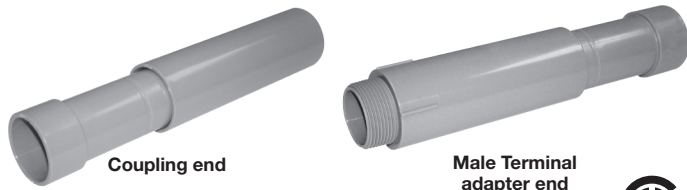
Fittings and Accessories

Expansion Fittings*

Standard Couplings

E945 Series expansion fittings are designed to compensate for length changes due to temperature variations in exposed conduit runs.

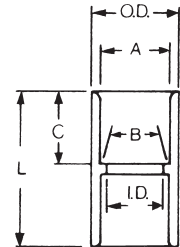
- Exclusive Molded in Mid-point indicator on the piston
- Exclusive 2 in. Expansion Fitting with an 8 in. travel distance
- Two-piece molded design with lubricated seals for easier movement for the life of the product
- Ridges on the fitting for easier installation (Sizes 2 in. through 6 in. only)
- Male terminal Adapter End design (1/2 in. – 2 in. NPT Threads and 2-1/2 in. – 6 in. NPSC Threads)
- Two O-Rings to prevent leakage
- Can be installed vertically or horizontally



All socket fittings should be attached using Carlton solvent cement. Using Carlton fittings with Carlton nonmetallic conduit insures system integrity.



Socket type for joining nonmetallic conduit.



Coupling End Cat. No.	Male Terminal Adapter End Cat. No.	Size (in.)	Std. Ctn. Qty.	Travel Length (in.)
E945D	E945DX	1/2	20	4
E945E	E945EX	3/4	15	4
E945F	E945FX	1	10	4
E945G	E945GX	1-1/4	5	4
E945H	E945HX	1-1/2	5	4
E945J	E945JX	2	15	8
E945K	E945KX	2-1/2	10	8
E945L	E945LX	3	10	8
E945M	E945MX	3-1/2	5	8
E945N	E945NX	4	5	8
E945P	E945PX	5	1	8
E945R	E945RX	6	1	8

* Please refer to page I21 for additional information.

Cat. No.	Size (in.)	Std. Ctn. Qty.	A	B	I.D. (in.)	O.D. (in.)	C		L
			Typical (in.)				Typical (in.)		
CE940DR-CTN	1/2	75	0.852	0.836	0.728	1-7/64	11-16	1-1/2	
CE940ER-CTN	3/4	45	1.064	1.046	0.840	1-5/16	3/4	1-5/8	
CE940F-UPC	1	50	1.330	1.310	1.210	1-5/8	15/16	2	
E940G	1-1/4	30	1.677	1.655	1.535	1-63/64	1	2-1/8	
E940H	1-1/2	25	1.918	1.894	1.755	2-15/64	1-1/8	2-3/8	
E940J	2	30	2.393	2.369	2.190	2-47/64	1-3/16	2-1/2	
E940K	2-1/2	20	2.890	2.868	2.688	3-5/16	1-33/64	3-3/16	
E940L	3	25	3.515	3.492	3.375	3-31/32	1-3/4	3-13/32	
E940M	3-1/2	20	4.015	3.992	3.780	4-9/16	1-3/4	3-5/8	
E940N	4	15	4.515	4.491	4.265	5-3/32	1-25/32	3-3/4	
E940P	5	8	5.593	5.553	5.097	6-1/4	1-5/16	4-1/16	
E940R	6	5	6.658	6.614	6.115	7-1/2	2-3/16	4-5/8	

Short Expansion Couplings*

(Expands to a maximum of 2 in.)



Cat. No.	Size (in.)	Std. Ctn. Qty.
E955D	1/2	40
E955E	3/4	40
E955F	1	25
E955G	1-1/4	15
E955H	1-1/2	10
E955J	2	6

* Please refer to page I21 for additional information.

General Information

Expansion and Contraction

Temperature Considerations for Rigid Nonmetallic Conduit Compensation for Linear Expansion

Like all construction materials, PVC will expand or contract with variations in temperatures. The coefficient of linear expansion in PVC conduit is 3.38×10^{-5} in./in./°C as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion fitting is needed whenever the change in length due to temperature variation will be 1/4 in. or greater.

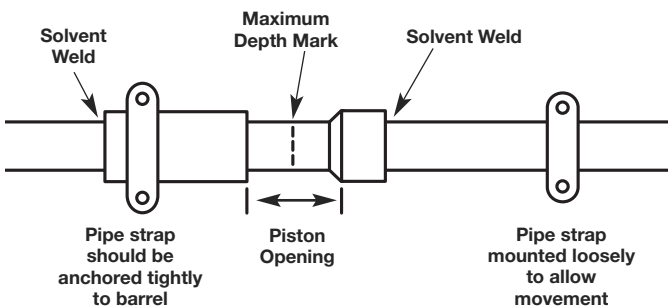
Add 1°C to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

An expansion fitting consists of two sections, one telescoping inside another. When installing expansion fittings, alignment of piston and barrel is important. Be sure to mount expansion fitting level for best performance.

For a vertical run, the expansion fitting must be installed close to the top of the run with the barrel jointing down, in order that rain water does not run into the opening. The lower end of the conduit run must be secured at the bottom so that any length change due to temperature variation will result in an upward movement.

Expansion Characteristics of PVC Rigid Nonmetallic Conduit Coefficient of Thermal Expansion = 3.38×10^{-5} in./in./°C

Temp. Change in Degrees F	Length Change in inches per 100 ft. of PVC Conduit	Temp. Change in Degrees C	Length Change in inches per 100 ft. of PVC Conduit	Temp. Change in Degrees C	Length Change in inches per 100 ft. of PVC Conduit	Temp. Change in Degrees C	Length Change in inches per 100 ft. of PVC Conduit
5	0.2	12.8	2.2	40.5	4.2	68.3	6.3
10	0.4	15.6	2.4	43.3	4.5	71.1	6.5
15	0.6	18.3	2.6	46.0	4.7	73.9	6.7
20	0.8	21.1	2.8	48.9	4.9	76.7	6.9
25	1.0	23.9	3.0	51.6	5.1	79.4	7.1
30	1.2	26.7	3.2	54.4	5.3	82.2	7.3
35	1.4	29.4	3.4	57.2	5.5	85.0	7.5
40	1.6	32.2	3.6	60.0	5.7	87.8	7.7
45	1.8	35.0	3.8	62.7	5.9	90.6	7.9
50	2.0	37.8	4.1	65.5	6.1	93.3	8.1



Determine the Piston Opening

The expansion joint must be installed to allow both expansion and contraction of the conduit run. The correct piston opening for any installation condition should use the following formula:

$$O = \left[\frac{T_{\text{max}} - T_{\text{installed}}}{\Delta T} \right] E$$

Where:

- O = Piston opening (in.)
- T max = Maximum anticipated temperature of conduit (°C)
- T inst. = Temperature of conduit at time of installation (°C)
- ΔT = Total change in temperature of conduit (°C)
- E = Expansion allowance built into each expansion fitting (in.)

Example

380 ft. of conduit is to be installed on the outside of a building exposed to the sun in a single straight run. It is expected that the conduit will vary in temperature from -17°C in the winter to 60°C in the summer (this includes the -1°C for radiant heating from the sun). The installation is to be made at a conduit temperature of 32°C. From the table, a 60°C temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is 5.7 in. x 3.8 = 21.67 in. which should be rounded to 22 in. The number of expansion fittings will be 22 in. x fitting range (4 in. for Carlton trade sizes 1/2 in. through 1-1/2 in. and 8 in. for sizes 2 in. through 6 in.). If the E945D fitting is used, the number will be 22 in. x 4 = 5.50 which should be rounded to 6. The fitting should be placed at 62 ft. intervals (380 x 6). The proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{60^\circ\text{C} - 32^\circ\text{C}}{60^\circ\text{C}} \right] 4.0 = 1.4 \text{ in.}$$

Insert the piston into the barrel to the maximum depth. Place a mark on the piston at the end of the barrel. To properly set the piston, pull the piston out of the barrel to correspond to the 2.1 in. calculated above. See drawing at lower left.

Summary

1. Anticipate expansion and contraction of PVC conduit in above ground, exposed installation.
2. Use an expansion fitting when length change due to temperature variation will be 1/4 in. or greater.
3. PVC conduit expands 4.1 in. for each 100 feet of run and a 37.8°C temperature change.
4. Align expansion fitting with the conduit run to prevent binding.
5. Follow the instructions to set the piston opening.
6. Rigidly fix the outer barrel of the expansion fitting so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.