

TECHNICAL SPECIFICATION**PVC Rigid Conduit Fittings
Expansion Joints****SCOPE**

This specification covers the requirements for Rigid PVC (polyvinyl chloride) conduit expansion joints. This fitting is certified to the Canadian Standards Association (CSA) standard C22.2 No. 85 and 18 and Underwriters Laboratories (UL) Standard 651.

MATERIALS

The expansion joint is manufactured from virgin PVC compound.

PVC material used in the manufacture of expansion joints is UV and impact resistant.

MARKING

Expansion Joint markings are as specified in CSA C22.2 No. 85 and 18 and UL 651.

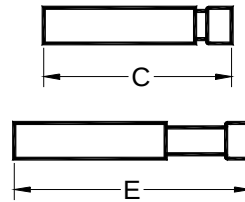
TEST REQUIREMENTS

Quality testing is as per Royal's Quality Assurance program and in accordance with CSA C22.2 No. 85 and 18 and UL 651.

FITTING DIMENSIONS

Fitting dimensions are as per drawing and table. Each expansion joint includes 2 molded sections (piston and barrel), assembled together. The annular space between the piston and barrel is sealed with an o-ring to prevent water from entering the fitting.

Nominal Size (in)	Part Number (US/CAN)	Contracted (C) (in)	Expanded (E) (in)	Travel (in)
¾	REJ15	8.000	12.000	4.000
1	REJ20	8.500	12.500	4.000
1-1/4	REJ25	9.000	13.000	4.000
1-1/2	REJ30	9.000	13.000	4.000
2	REJ35	9.250	13.250	4.000
2 ½, 3	REJ45/40	14.250	22.250	8.000
3 ½, 4	REJ55/50	14.250	22.250	8.000



DESIGN GUIDELINES

The following design guidelines will help to determine the amount of expected expansion, the number of expansion joints required and where to set the piston opening on the expansion joint. The coefficient of linear expansion for PVC conduit is 3.0×10^{-5} in/in/°F (5.4×10^{-5} mm/mm/°C).

Expected Expansion:

To determine the expected expansion, the following formulae should be used:

Total expansion (inches) = total expected temperature variation (°F) x length of run (feet) x coefficient of linear expansion of PVC (in/ft/°F)

Total expansion (mm) = total expected temperature variation (°C) x length of run (m) x coefficient of linear expansion of PVC (mm/m/°C)

If the conduit is being installed outside, add 30°F (17°C) to the total expected temperature variation to allow for the effects of radiant heating of the conduit.

Expansion/Contraction of PVC (in)										
	Length of Pipe Run (ft)									
Δ T (°F)	5	10	15	20	25	30	35	40	45	50
5	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.09
10	0.02	0.04	0.05	0.07	0.09	0.11	0.13	0.14	0.16	0.18
15	0.03	0.05	0.08	0.11	0.14	0.16	0.19	0.22	0.24	0.27
20	0.04	0.07	0.11	0.14	0.18	0.22	0.25	0.29	0.32	0.36
25	0.05	0.09	0.14	0.18	0.23	0.27	0.32	0.36	0.41	0.45
30	0.05	0.11	0.16	0.22	0.27	0.32	0.38	0.43	0.49	0.54
35	0.06	0.13	0.19	0.25	0.32	0.38	0.44	0.50	0.57	0.63
40	0.07	0.14	0.22	0.29	0.36	0.43	0.50	0.58	0.65	0.72
45	0.08	0.16	0.24	0.32	0.41	0.49	0.57	0.65	0.73	0.81
50	0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90

Expansion/Contraction of PVC (mm)										
ΔT (°C)	Length of Pipe Run (m)									
	2	4	6	8	10	12	14	16	18	20
5	0.54	1.08	1.62	2.16	2.70	3.24	3.78	4.32	4.86	5.40
10	1.08	2.16	3.24	4.32	5.40	6.48	7.56	8.64	9.72	10.80
15	1.62	3.24	4.86	6.48	8.10	9.72	11.34	12.96	14.58	16.20
20	2.16	4.32	6.48	8.64	10.80	12.96	15.12	17.28	19.44	21.60
25	2.70	5.40	8.10	10.80	13.50	16.20	18.90	21.60	24.30	27.00
30	3.24	6.48	9.72	12.96	16.20	19.44	22.68	25.92	29.16	32.40
35	3.78	7.56	11.34	15.12	18.90	22.68	26.46	30.24	34.02	37.80
40	4.32	8.64	12.96	17.28	21.60	25.92	30.24	34.56	38.88	43.20
45	4.86	9.72	14.58	19.44	24.30	29.16	34.02	38.88	43.74	48.60
50	5.40	10.80	16.20	21.60	27.00	32.40	37.80	43.20	48.60	54.00

Required Number of Expansion Joints

If the total expected expansion exceeds ½" (13mm), calculate the required number of expansion joints, rounding up to the nearest whole number:

$$\text{Number of Expansion Joints} = \frac{\text{Total Expected Expansion (inches or mm)}}{\text{Expansion Allowance of Expansion Joint (inches or mm)}}$$

The expansion allowance of the various sizes of expansion joints are shown above as "Travel".

Setting the Piston Opening

Expansion joints must allow for both expansion and contraction of the conduit. The piston of the expansion joint must be set at the correct position at the time and temperature of installation, to allow for linear movement. To determine the correct position for the piston:

$$\text{Piston Setting (inches)} = \frac{(\text{Max. Expected Temp., } ^\circ\text{F} - \text{Installation Temp., } ^\circ\text{F}) \times \text{Expansion Allowance of Expansion Joint, inches}}{\text{Total Expected Temperature Variation, } ^\circ\text{F}}$$

$$\text{Piston Setting (mm)} = \frac{(\text{Max. Expected Temp., } ^\circ\text{C} - \text{Installation Temp., } ^\circ\text{C}) \times \text{Expansion Allowance of Expansion Joint, mm}}{\text{Total Expected Temperature Variation, } ^\circ\text{C}}$$

INSTALLATION GUIDELINES

General

- For expansion joints to function correctly, they should be installed near a fixed point.
- Securely fasten the expansion joint barrel so that the expansion joint does not shift. Loosely fasten the conduit, so that it is free to move.
- It is prudent to install too many expansion joints than not enough. After wiring has been pulled through conduit, repairs to conduit are very difficult.
- Barrel and piston should be aligned and level.
- For vertical installations, ensure that the piston of the expansion joint is located at the bottom. This will prevent dirt and water from entering the expansion joint.

If One Expansion Joint is Required:

Securely fasten the barrel of the expansion joint close to one of the boxes. Support the conduit with straps so that free movement of the conduit for expansion and contraction can occur. See Figure 1 below.

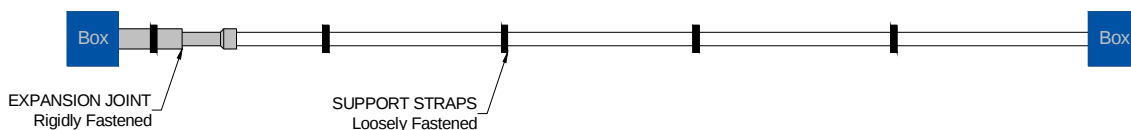


Figure 1

If Two Expansion Joints are Required:

Option 1: Firmly fasten one expansion joint near each end of the run and firmly fasten the conduit at the centre. Support the rest of the conduit with straps, allowing movement of the conduit. See Figure 2 below.

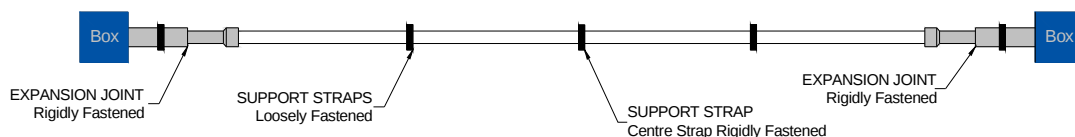


Figure 2

Option 2: Firmly fasten the expansion joints back to back at the centre of the run. The conduit should be supported with straps to allow free movement as it expands and contracts. See Figure 3 below.

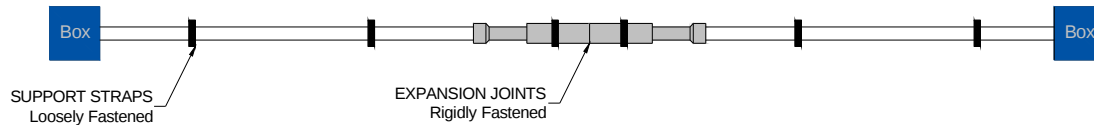


Figure 3

If Three or More Expansion Joints are Required:

Evenly space the expansion joints along the run of rigid PVC conduit. Tightly fasten each expansion joint and support the conduit with straps. Do not restrict the movement of the conduit. See Figure 4 below.

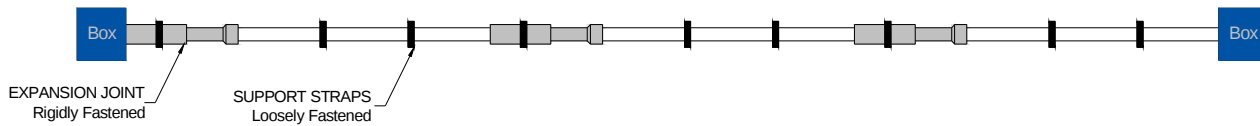


Figure 4