

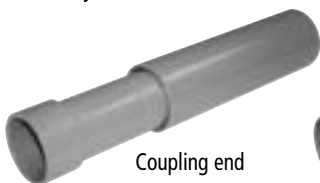
Rigid Nonmetallic Conduit – Couplings

Expansion Fittings

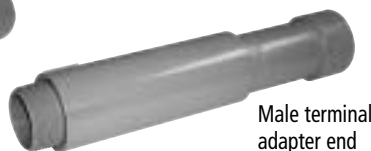
(For Use with Schedule 40 & 80 Conduit)

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" Expansion Fitting with an 8" 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" through 6" only).
- Male terminal Adapter End design (1/2" – 2" NPT Threads, and 2 1/2" – 6" NPSC Threads).
- Two O-Rings to prevent leakage.
- Can be installed vertically or horizontally.



Coupling end



Male terminal adapter end

Coupling End Part No.	Male Terminal Adapter End Part No.	Size	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"



Couplings

Standard Couplings

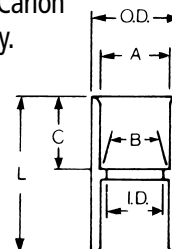


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All socket fittings should be attached Using Carlon solvent cement. Using Carlon fittings with Carlon nonmetallic conduit insures system integrity.



Socket type for joining nonmetallic conduit.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	I.D.	O.D.	C Typical	L Typical
E940D	1/2	150	.852	.836	.728	17/64	11/16	1 1/2
E940E	3/4	100	1.064	1.046	.840	15/16	3/4	1 5/8
E940F	1	50	1.330	1.310	1.210	15/8	15/16	2
E940G	1 1/4	30	1.677	1.655	1.535	163/64	1	2 1/8
E940H	1 1/2	25	1.918	1.894	1.755	215/64	1 1/8	2 3/8
E940J	2	30	2.393	2.369	2.190	247/64	1 3/16	2 1/2
E940K	2 1/2	20	2.890	2.868	2.688	35/16	133/64	3 3/16
E940K-CAR	2 1/2	4	2.890	2.868	2.688	35/16	133/64	3 3/16
E940L	3	25	3.515	3.492	3.375	331/32	1 3/4	3 13/32
E940L-CAR	3	5	3.515	3.492	3.375	331/32	1 3/4	3 13/32
E940M	3 1/2	20	4.015	3.992	3.780	49/16	1 3/4	3 5/8
E940N	4	15	4.515	4.491	4.265	53/32	125/32	3 3/4
E940N-CAR	4	5	4.515	4.491	4.265	53/32	125/32	3 3/4
E940P	5	8	5.593	5.553	5.097	61/4	15/16	4 1/16
E940R	6	5	6.658	6.614	6.115	71/2	23/16	4 5/8

Special Long Line Couplings



Long Line Couplings

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E941H	1 1/2	40	9
E941J	2	25	8
E941K	2 1/2	15	8
E941L	3	15	14
E941N	4	10	15
E941PF	5	4	12
► E941RF	6	5	21

Short Expansion Couplings

(Expands to a maximum of 2")



Part No.	Size	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



Fabricated Expansion Couplings



Part No.	Size	Std. Ctn. Qty.	Travel Length (in.)
E945KXL	2 1/2	10	12

Couplings

Special Long Line Couplings – Sleeve Couplings



Sleeve Coupling (For Repair Work)
No Internal Stop

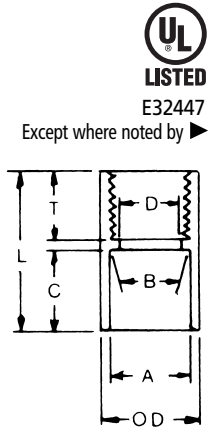
Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E948H	1½	25	6
► E948J	2	25	5
► E948K	2½	25	16
► E948L	3	25	13
► E948N	4	10	8
► E948P	5	14	33
► E948R	6	6	16
► E948JR	2" (6" long)	15	8
► E948JS	2" (Sch. 40 Split Duct)	25	6
► E948L12	3" (12" long)	1	1
► E948L6	3" (6" long)	15	15
► E948LS	3" (Sch. 40 Split Duct)	25	17
► E948N12	4" (12" long)	10	28
► E948N7	4" (7" long)	15	25
► E948NS	4" (Sch. 40 Split Duct)	10	15
► E948PS	5" (Sch. 40 Split Duct)	1	2
► E948R10	6" (10" long)	6	25
► E948R12	6" (12" long)	6	25
► E948RS	6" (Sch. 40 Split Duct)	1	2

Adapters

Female Adapters



For adapting nonmetallic conduits to threaded fittings, metallic systems. Female threads on one end, socket end on other.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C	T Typical	L
E942D	1/2	150	.852	.836	.620	17/64	11/16	3/4	19/16
E942E	3/4	100	1.064	1.046	.822	15/16	13/16	3/4	15/8
E942F	1	50	1.330	1.310	1.046	15/8	15/16	7/8	115/16
E942G	1¼	30	1.677	1.655	1.377	163/64	1	7/8	2
E942H	1½	25	1.918	1.894	1.607	25/32	11/8	7/8	27/32
E942J	2	30	2.393	2.369	2.064	247/64	13/16	1	25/16
E942K	2½	20	2.890	2.868	2.450	311/32	15/8	11/8	215/16
E942K-CAR	2½	4	2.890	2.868	2.450	311/32	15/8	11/8	215/16
E942L	3	25	3.515	3.492	3.000	331/32	13/4	11/8	31/16
E942L-CAR	3	3	3.515	3.492	3.000	331/32	13/4	11/8	31/16
E942M	3½	20	4.015	3.992	3.500	41/2	17/8	11/8	31/4
E942N	4	15	4.515	4.491	4.000	51/64	2	11/8	313/64
E942N-CAR	4	7	4.515	4.491	4.000	51/64	2	11/8	313/64
E942NX9*	4	15	(Call for information)						
E942P	5	8	5.593	5.553	5.047	61/4	115/16	11/16	33/16
E942R	6	6	6.658	6.614	6.055	71/4	21/8	11/16	33/8
E942RX*	6	6	(Call for information)						

* Long Line Adapter

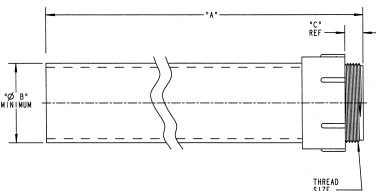
Special Schedule 40 Swedge Couplings

*Consult factory for additional sizes



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E442K	2½	20	13
► E442R	6	6	27
► E442T	8	2	17

Risers Schedule 40

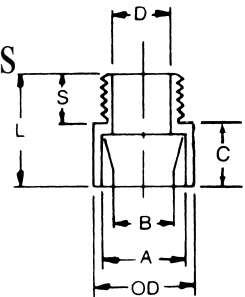


Part No.	Size	A (Length)	B (Min.)	C	Thread Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E954HX	1½	80.00	1.567	.950	1½" NPT	1	3.8
E954J	2	60.00	2.024	.825	2" NPT	1	3.7
E954JX	2	80.00	2.024	.825	2" NPT	1	5.0
E954K	2½	60.00	2.418	.812	2½" NPSC	1	6.0
E954KX	2½	80.00	2.418	.812	2½" NPSC	1	8.4
E954L	3	60.00	3.012	.798	3" NPSC	1	8.7
E954LX	3	80.00	3.012	.798	3" NPSC	1	11.0

Male Terminal Adapters



For adapting nonmetallic conduits to boxes, threaded fittings, metallic systems. Male threads on one end, socket end on other.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C	S Typical	L
E943D	1/2	150	.852	.836	.597	11/8	5/8	9/16	15/16
E943E	3/4	125	1.064	1.046	.800	111/32	3/4	9/16	13/8
E943F	1	50	1.330	1.310	1.018	15/8	1	11/16	125/32
E943G	1¼	50	1.677	1.655	1.332	21/32	1	3/4	115/16
E943H	1½	25	1.918	1.894	1.566	25/32	13/16	3/4	21/16
E943J	2	50	2.393	2.369	2.000	221/32	13/16	3/4	21/8
E943K	2½	25	2.890	2.868	2.376	35/16	13/4	7/8	27/8
E943K-CAR	2½	5	2.890	2.868	2.376	35/16	13/4	7/8	27/8
E943L	3	45	3.515	3.492	2.954	4	115/16	7/8	31/16
E943L-CAR	3	5	3.515	3.492	2.954	4	115/16	7/8	31/16
E943M	3½	30	4.015	3.992	3.440	41/2	27/16	17/8	37/16
E943N	4	20	4.515	4.491	3.940	53/32	23/8	7/8	31/2
E943N-CAR	4	20	4.515	4.491	3.940	53/32	23/8	7/8	31/2
E943P	5	5	5.593	5.553	4.815	61/4	21/3	1	315/16
E943R	6	10	6.658	6.614	5.860	71/2	23/8	1	33/8



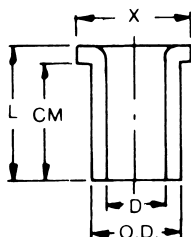
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Adapters

Box Adapters for Enclosures



Adapts nonmetallic conduit to all electrical enclosures by inserting adapter through knockout and cementing into Carlon couplings.



Part No.	Size	Std. Ctn. Qty.	Min D	OD Typical	Max X	CM Typical	L
E996D	1/2	100	.662	.840	17/64	23/32	27/32
E996E	3/4	100	.824	1.050	1 21/64	25/32	29/32
E996F	1	100	1.049	1.315	1 5/8	61/64	1 3/32
E996G	1 1/4	50	1.380	1.660	1 31/32	1 1/16	1 1/4
E996H	1 1/2	50	1.610	1.900	2 13/64	1 3/16	1 3/8
E996J	2	25	2.067	2.375	2 29/32	1 1/4	1 7/16
E996K-CAR	2 1/2	10	2.469	2.875	3 7/16	1 7/8	1 15/16
E996L	3	20	3.068	3.500	4 1/8	2	2 1/16
E996L-CAR	3	5	3.068	3.500	4 1/8	2	2 1/16
E996N	4	10	4.026	4.500	5 1/8	2 1/2	2 1/4

Threaded Adapters



Part No.	Size	Std. Ctn. Qty.
E9842D ¹	1/2	25
E9842E ²	3/4	25

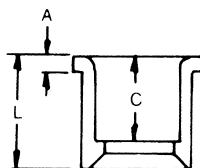
¹ Fits 3/4" sockets ² Fits 1" sockets

Reducers

Reducer Bushings



For connecting different sizes of conduit. Bell x Spigot.



Part No.	Size	Std. Ctn. Qty.	L Typical	A Typical	C Typical
E950ED	3/4" x 1/2"	100	15/32	13/64	11/32
E950FD-CAR	1" x 1/2"	25	1 11/32	3/16	57/64
E950FE	1" x 3/4"	100	1 11/32	3/16	11/64
E950GE-CAR	1 1/4" x 3/4"	10	1 15/32	3/16	11/64
E950GF	1 1/4" x 1"	50	1 15/32	3/16	19/64
E950HF-CAR	1 1/2" x 1"	10	1 19/32	3/16	19/64
E950HG-CAR	1 1/2" x 1 1/4"	10	1 19/32	3/16	117/64
E950JG-CAR	2" x 1 1/4"	10	1 3/4	7/32	117/64
E950JH-CAR	2" x 1 1/2"	10	1 3/4	7/32	125/64
E950KJ-CAR	2 1/2" x 2"	10	2 5/32	3/8	127/64
E950LJ-CAR	3" x 2"	10	2 1/8	1/4	17/8
► E950LK	3" x 2 1/2"	25	1 15/16	1/4	1 11/16
E950NL	4" x 3"	25	2 3/4	5/16	1 15/16

Reducers

Fabricated Reducers



Fabricated Reducers (Male x Male)

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E952KJ	2 1/2" x 2"	48	28
► E952LJ	3" x 2"	36	21
► E952LK	3" x 2 1/2"	36	31
► E952NL	4" x 3"	15	23
► E952NM	4" x 3 1/2"	15	25
► E952PN	5" x 4"	12	26
► E952RP	6" x 5"	10	31

Plugs

Reducer Plugs



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E971C	3/4" x 1/2"	100	2
► E971D	1" x 3/4"	100	3

Plugs (Polyethylene)



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► P258H	1 1/2"	50	2
► P258K	2 1/2"	25	1.5

Plugs with Pull Tabs (Polyethylene)



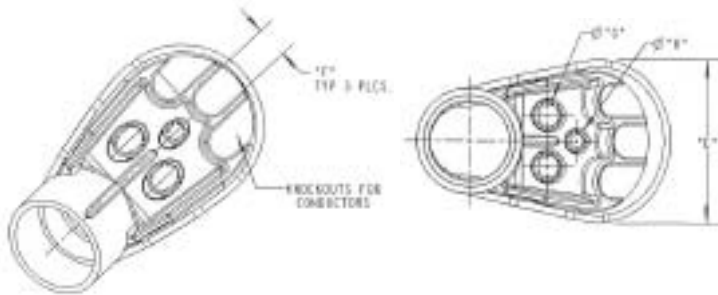
Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► P258JT	2	60	3
► P258LT	3	30	3
► P258NT	4	48	8
► P258PT	5	30	6
► P258RT	6	30	9

Caps

Service Entrance Caps



Part No.	Size	Std. Ctn. Qty.	Dimensions (in.)		
			F	G	H
E998D	1/2	5	.45	.45	—
E998E	3/4	20	.45	.45	—
E998E-CAR	3/4	5	.45	.45	—
E998F	1	15	.59	.58	—
E998F-CAR	1	5	.59	.58	—
E998G-CAR	1 1/4	5	.74	.71	.50
E998H-CAR	1 1/2	5	.74	.71	.50
E998J-CAR	2	5	.83	.78	.56
E998K-UPC	2 1/2	2	1.70	1.31	1.00
E998L	3	2	1.70	1.31	1.00
E998N	4	2	2.25	1.88	1.31



End Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E958D	1/2	100	3
► E958E	3/4	100	4
► E958F	1	75	5
► E958G	1 1/4	40	4
► E958H	1 1/2	30	4
► E958J	2	25	5
► E958K	2 1/2	10	4
► E958L	3	10	5
► E958N	4	5	17
► E958P	5	5	11
► E958R	6	5	13

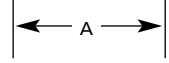
PVC Riser Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E935J	2	25	9
► E935L	3	25	18
► E935N	4	25	18
► E935P	5	25	35
► E935R	6	10	13

Offsets

Meter Offset



Part No.	Size	Std. Ctn. Qty.	Offset	A
► E995G	1 1/4	15	0.758	4.230
E995G-CTN	1 1/4	6	0.758	4.230
► E995J	2	8	0.684	4.270

Offset



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E994DR-CAR	1/2	25	3
► E994ER-CAR	3/4	15	2
► E994F	1	50	12

End Bells

End Bells



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
► E997F	1	50	1
► E997F-CAR	1	15	1
► E997G	1 1/4	35	1
► E997G-CAR	1 1/4	15	1
► E997H	1 1/2	30	1
► E997H-CAR	1 1/2	10	1
► E997J	2	40	1
► E997J-CAR	2	10	1
► E997K	2 1/2	30	2
► E997K-CAR	2 1/2	10	2
► E997L	3	50	2
► E997L-CAR	3	10	2
► E997M	3 1/2	40	10
► E997N	4	30	11
► E997P	5	15	10
► E997R	6	10	7.4
► E997T	8	3	14.55

Fabricated End Bells Schedule 40



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E949J5	2" x 5"	50	10
E949J6	2" x 6"	25	12
E949JN	2" x 4"	25	7
E949JX	2" x 8"	12	7
E949LR	3" x 6"	20	21
E949N5	4" x 5"	20	2
E949NR	4" x 6"	15	21
E949R5	6" x 5"	12	27
E949RX	6" x 8"	6	17

Washers

Flat Sealing Washer

Where a waterproof termination is required into any enclosure (metallic or nonmetallic), install the neoprene washer over the threads of a terminal adapter before inserting into the enclosure. Use a standard locknut or threaded bushing to secure the assembly.



Part No.	Size	Std. Ctn. Qty.
▶ E943DW	1/2	125
▶ E943EW	3/4	125
▶ E943FW	1	100
▶ E943GW	1 1/4	50
▶ E943HW	1 1/2	50
▶ E943JW	2	25

Lock Nuts



PVC Lock Nut



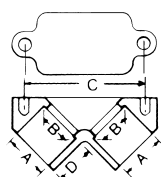
Part No.	Size	Std. Ctn. Qty.
▶ LT9LD	1/2	1200
▶ LT9LE	3/4	700
▶ LT9LF	1	600

Pull Elbows

Access Pull Elbows



Gasket included.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	C Typical	D Typical
E990D	1/2	75	.852	.836	2.187	.718
E990DR-CAR	1/2	25	.852	.836	2.187	.718
E990E	3/4	50	1.064	1.046	2.531	.781
E990ER-CAR	3/4	20	1.064	1.046	2.531	.781

Sleeves

HOLFORM™ Concrete Sleeves

HOLFORM nonmetallic concrete sleeve forms are the easy way to form holes in concrete. They install in seconds with nails, screws or staples and are easily removed. Concrete will not adhere to them. HOLFORMS are adjustable to any slab thickness.



E32447

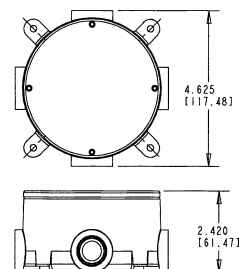
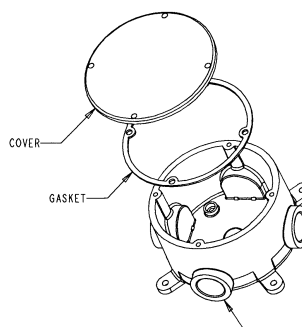
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Part No.	Min. O.D. A	B	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E92CSH	1 1/2	1 3/4	20	3
▶ E92CSJ	2	2 13/32	25	6
▶ E92CSL	3	3 13/32	25	8
▶ E92CSN	4	4 13/32	18	8
▶ E92CSP	5	5 13/32	15	8
▶ E92CSR	6	6 13/32	12	8

Conduit Bodies

Type X with Cover

Four knock-out type socket openings, 90° spacing. Available with 1/2" or 3/4" socket outlets. Includes cover and gasket.



Part No.	Size	Vol. Cu. In.	Std. Ctn. Qty.
E970CD	1/2	15.16	15
E970CE	3/4	15.16	15

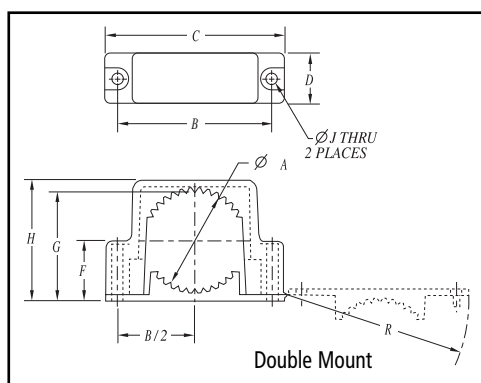
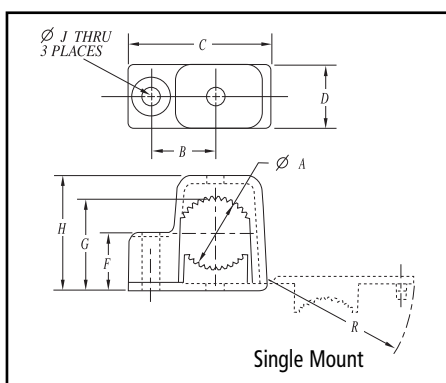
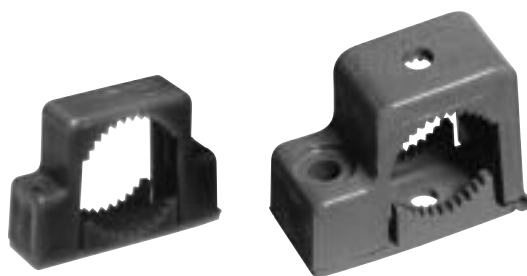
Supplied with 4 stainless steel cover screws. Diameter 4 1/8", Thickness 1/4".
*Not designed for use with wiring devices or light fixtures.

Snap Strap® Conduit Support Straps

Carlon's Snap Strap® offers a unique support strap designed especially for the installation of PVC conduit. Also usable for installations of rigid steel. This high strength, nonmetallic clamp allows conduit to expand and contract freely, eliminating the bowing commonly seen from the expansion and contraction of conduit caused by varying temperature changes. Finished installations have a neat, attractive appearance on exposed applications.

To be used in accordance with conduit spacing requirements per the NEC, Section 352.30. This part is not supplied with screws.

- UV inhibited for use in direct sunlight



Single Mount

Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	F	G	H	J	R
E978DC-CAR	1/2" (16)	40	1	0.80 (20.3)	.75 (1.90)	1.63 (41.4)	0.75 (19.1)	.59 (14.9)	.99 (25.1)	1.36 (34.5)	.21 (5.33)	1.67 (42.4)
E978EC-CAR	3/4" (21)	40	3	1.00 (25.4)	.88 (22.4)	1.92 (48.7)	0.75 (19.1)	.70 (17.8)	1.20 (30.4)	1.57 (39.9)	.21 (5.33)	1.96 (49.8)
E978FC-CAR	1" (27)	30	4	1.20 (30.5)	1.02 (25.9)	2.17 (55.1)	0.75 (19.1)	.83 (21.1)	1.43 (36.3)	1.84 (46.7)	.21 (5.33)	2.22 (56.3)

Double Mount

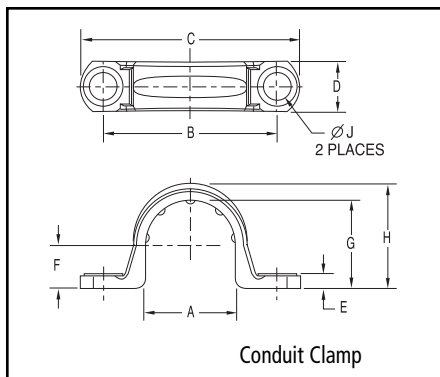
Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	F	G	H	J	R
E978GC-CAR	1 1/4" (35)	15	4	1.66 (42.16)	2.75 (69.9)	3.23 (82.0)	1.00 (25.4)	.95 (24.1)	1.78 (45.2)	2.15 (54.61)	.218 (5.54)	3.28 (83.3)
E978HC-CAR	1 1/2" (41)	15	5	1.92 (48.77)	3.05 (77.5)	3.53 (89.7)	1.00 (25.4)	1.08 (27.4)	2.04 (51.8)	2.40 (60.96)	.218 (5.54)	3.58 (90.9)
E978JC-CAR	2" (53)	10	5	2.34 (59.44)	3.50 (88.9)	4.00 (101.6)	1.00 (25.4)	1.31 (33.3)	2.48 (63.0)	2.86 (72.64)	.218 (5.54)	4.06 (103.1)

Nonmetallic Clamps

Nonmetallic clamps offer the same chemical resistance as Carlon nonmetallic conduits for a complete, corrosion resistant system.

To be used in accordance with conduit spacing requirements per the NEC, Section 352.30.

- UV inhibited for use in direct sunlight



Conduit Clamps

Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	E	F	G	H	J
E977DC	1/2" (16)	100	1.2	0.892 (22.6)	1.71 (43.4)	2.16 (54.8)	0.50 (12.7)	.14 (3.5)	.42 (10.6)	.866 (21.9)	1.04 (26.4)	.260 (6.6)
E977EC	3/4" (21)	100	1.4	1.102 (27.9)	1.97 (50.0)	2.40 (60.9)	0.50 (12.7)	.14 (3.5)	.525 (13.3)	1.076 (27.3)	1.255 (31.8)	.260 (6.6)
E977FC	1" (27)	100	2	1.39 (35.3)	2.25 (57.1)	2.81 (71.3)	0.594 (15.0)	.14 (3.5)	.658 (16.7)	1.342 (34.0)	1.574 (39.9)	.260 (6.6)
E977GC	1 1/4" (35)	50	5	1.714 (43.5)	2.68 (68.0)	3.28 (83.3)	.64 (16.2)	.15 (3.8)	.83 (21.0)	1.687 (42.8)	1.89 (48.0)	.320 (8.1)
E977HC	1 1/2" (41)	50	6	1.92 (48.7)	2.82 (71.6)	3.44 (87.3)	.70 (17.7)	.15 (3.8)	.97 (24.6)	1.93 (49.0)	2.12 (53.8)	.312 (7.9)
E977JC	2" (53)	25	4.5	2.54 (64.5)	3.54 (89.9)	4.18 (106.1)	.76 (19.3)	.16 (4.0)	1.05 (26.6)	2.29 (58.1)	2.49 (63.2)	.315 (8.0)
E977KC-CAR	2 1/2" (63)	25	1.4	2.86 (72.6)	4.50 (114.3)	5.46 (138.7)	1.00 (25.4)	.20 (5.08)	1.43 (36.3)	2.86 (72.6)	3.12 (79.2)	.36 (9.14)
E977LC-CAR	3" (78)	20	1.4	3.47 (88.2)	5.00 (127.0)	6.00 (152.4)	1.00 (25.4)	.20 (5.08)	1.74 (44.3)	3.48 (88.4)	3.70 (94.0)	.36 (9.14)
E977NC-CAR	4" (103)	15	12.2	4.366 (110.9)	6.15 (156.2)	7.20 (182.9)	1.00 (25.4)	.20 (5.08)	2.32 (58.8)	4.50 (114.3)	4.70 (119.4)	.36 (9.14)

*Note: Some clamp applications require 2 screws, 2 nuts and 2 washers.

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./°F as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion coupling is needed whenever the change in length due to temperature variation will exceed 1/2 in.

Add 30°F to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

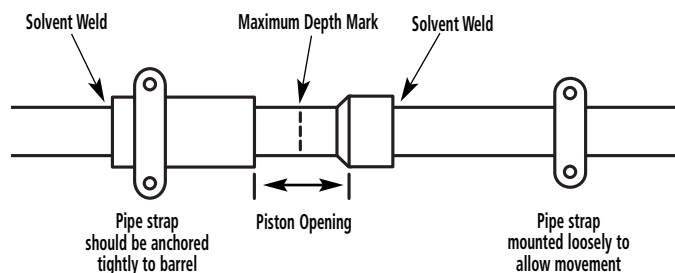
An expansion coupling consists of two sections of conduit, one telescoping inside another. When installing expansion couplings, alignment of piston and barrel is important. Be sure to mount expansion joint level for best performance.

For a vertical run, the expansion coupling 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./°F

Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit
5	0.2	55	2.2	105	4.2	155	6.3
10	0.4	60	2.4	110	4.5	160	6.5
15	0.6	65	2.6	115	4.7	165	6.7
20	0.8	70	2.8	120	4.9	170	6.9
25	1.0	75	3.0	125	5.1	175	7.1
30	1.2	80	3.2	130	5.3	180	7.3
35	1.4	85	3.4	135	5.5	185	7.5
40	1.6	90	3.6	140	5.7	190	7.7
45	1.8	95	3.8	145	5.9	195	7.9
50	2.0	100	4.1	150	6.1	200	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 (°F)
- T inst. = Temperature of conduit at time of installation (°F)
- Δ T = Total change in temperature of conduit (°F)
- E = Expansion allowance built into each expansion coupling (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 0°F in the winter to 140°F in the summer (this includes the 30°F for radiant heating from the sun.) The installation is to be made at a conduit temperature of 90°F. From the table, a 140°F temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is $5.7 \times 3.8 = 21.67$ which should be rounded to 22". The number of expansion couplings will be $22 \times$ coupling range (4" for Carlon trade sizes 1/2" through 1-1/2", and 8" for sizes 2" through 6"). If the E945D coupling is used, the number will be $22 \times 4 = 5.50$ which should be rounded to 6. The coupling should be placed at 62 ft. intervals ($380 \div 6$). the proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{140 - 90}{140} \right] 4.0 = 1.4 \text{ in.}$$

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 aboveground, exposed installation.
2. Use an expansion coupling when length change due to temperature variation will exceed 1/2".
3. PVC conduit expands 4.1" for each 100 feet of run and a 100°F temperature change.
4. Align expansion coupling 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 coupling so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.

Corrosion Resistance of Carlon Schedule 40 and Schedule 80 PVC Conduit and Fittings

Carlon Schedule 40 and Schedule 80 are generally acceptable for use in environments containing the chemicals below. These environmental resistance ratings are based upon tests where the specimens were placed in complete submergence in the reagent listed. Schedule 40 and Schedule 80 can be used in many process areas where

chemicals not on this list are manufactured or used because worker safety requirements dictate that any air presence or splashing be at a very low level.

If there are any questions for specific suitability in a given environment, prototype samples should be tested under actual conditions.

Acetic Acid 0-20%	Butyl Alcohol	Fluorine Gas – Wet	Mercurous Nitrate	Sodium Arsenite
Acetic Acid 20-30%	Butyl Phenol	Fluorine Gas – Dry	Mercury	Sodium Benzoate
Acetic Acid 30-60%	Butylene	Fluoroboric Acid	Methyl Sulfate	Sodium Bicarbonate
Acetic Acid 80%	Butyric Acid	Fluorosilicic Acid	Methylene Chloride	Sodium Bisulfate
Acetic Acid – Glacial	Calcium Bisulfite	Formaldehyde	Mineral Oils	Sodium Bisulfite
Acetic Acid Vapors	Calcium Carbonate	Formic Acid	Naphthalene	Sodium Bromide
Acetylene	Calcium Chlorate	Fructose	Nickel Chloride	Sodium Chlorate
Adipic Acid	Calcium Chloride	Gallic Acid	Nickel Nitrate	Sodium Chloride
Alum	Calcium Hydroxide	Gas – Coke Oven	Nitric Acid, Anhydrous	Sodium Cyanide
Aluminum Chloride	Calcium Hypochlorite	Gas – Natural (Dry)	Nitric Acid 20%	Sodium Dichromate
Aluminum Fluoride	Calcium Nitrate	Gas – Natural (Wet)	Nitric Acid 40%	Sodium Ferricyanide
Aluminum Hydroxide	Calcium Sulfate	Gasoline – Sour	Nitric Acid 60%	Sodium Ferrocyanide
Aluminum Oxychloride	Carbonic Acid	Gasoline – Refined	Nitrobenzene	Sodium Fluoride
Aluminum Nitrate	Carbon Dioxide Gas – Wet	Glucose	Nitrous Oxide	Sodium Hydroxide
Aluminum Sulfate	Carbon Dioxide – Aqueous Solution	Glycerine (Glycerol)	Oils and Fats	Sodium Hypochlorite
Ammonia-Dry Gas	Carbon Monoxide	Glycol	Oils – Petroleum – (See Type)	Sodium Nitrate
Ammonium Bifluoride	Caustic Potash	Glycolic Acid	Oleic Acid	Sodium Nitrite
Ammonium Carbonate	Caustic Soda	Green Liquor (Paper Industry)	Oxalic Acid	Sodium Sulfate
Ammonium Chloride	Chloracetic Acid	Heptane	Palmitic Acid 10%	Sodium Sulfide
Ammonium Hydroxide 28%	Chloral Hydrate	Hexanol, Tertiary	Perchloric Acid 10%	Sodium Sulfite
Ammonium Metaphosphate	Chlorine Gas (Dry)	Hydrobromic Acid 20%	Phenylhydrazine Hydrochloride	Sodium Thiosulfate (Hypo)
Ammonium Nitrate	Chlorine Gas (Moist)	Hydrochloric Acid 0% - 25%	Phosgene, Gas	Stannic Chloride
Ammonium Persulfate	Chlorine Water	Hydrochloric Acid 25% - 40%	Phosphoric Acid – 0-25%	Stannous Chloride
Ammonium Phosphate – Neutral	Chlorosulfonic Acid	Hydrocyanic Acid or	Phosphoric Acid – 25-50%	Stearic Acid
Ammonium Sulfate	Chrome Alum	Hydrogen Cyanide	Phosphoric Acid – 50-85%	Sulfur
Ammonium Sulfide	Chromic Acid 10%	Hydrofluoric Acid 10%	Photographic Chemicals	Sulfur Dioxide – Gas Dry
Ammonium Thiocyanate	Chromic Acid 30%	Hydrofluorosilicic Acid	Plating Solutions	Sulfur Trioxide
Amyl Alcohol	Chromic Acid 40%	Hydrogen Phosphide	Potassium Bicarbonate	Sulfuric Acid – 0-10%
Anthraquinone	Chromic Acid 50%	Hydrogen Sulfide – Dry	Potassium Bichromate	Sulfuric Acid – 10-75%
Anthraquinonesulfonic Acid	Citric Acid	Hydrogen Sulfide – Aqueous Solution	Potassium Borate	Sulfuric Acid – 75-90%
Antimony Trichloride	Copper Chloride	Hydroquinone	Potassium Bromide	Sulfurous Acid
Aqua Regia	Copper Cyanide	Hydroxylamine Sulfate	Potassium Carbonate	Tannic Acid
Arsenic Acid 80%	Copper Fluoride	Iodine	Potassium Chloride	Tanning Liquors
Arylsulfonic Acid	Copper Nitrate	Kerosene	Potassium Chromate	Tartaric Acid
Barium Carbonate	Copper Sulfate	Lactic Acid 28%	Potassium Cyanide	Titanium Tetrachloride
Barium Chloride	Cottonseed Oil	Lauric Acid	Potassium Dichromate	Triethanolamine
Barium Hydroxide	Cresylic Acid 50%	Lauryl Chloride	Potassium Ferricyanide	Trimethyl Propane
Barium Sulfate	Crude Oil – Sour	Lauryl Sulfate	Potassium Ferrocyanide	Trisodium Phosphate
Barium Sulfide	Crude Oil – Sweet	Lead Acetate	Potassium Fluoride	Turpentine
Beet – Sugar Liquor	Demineralized Water	Lime Sulfur	Potassium Hydroxide	Urea
Benzene Sulfonic Acid 10%	Dextrin	Linoleic Acid	Potassium Nitrate	Vinegar
Benzoic Acid	Dextrose	Linseed Oil	Potassium Perborate	Whiskey
Bismuth Carbonate	Diglycolic Acid	Lubricating Oils	Potassium Perchlorite	White Liquor (Paper Industry)
Black Liquor (Paper Industry)	Disodium Phosphate	Magnesium Carbonate	Potassium Permanganate 10%	Wines
Bleach – 12.5% Active CL ₂	Ethyl Alcohol	Magnesium Chloride	Potassium Persulfate	Zinc Chloride
Borax	Ethylene Glycol	Magnesium Hydroxide	Potassium Sulfate	Zinc Chromate
Boric Acid	Fatty Acids	Magnesium Nitrate	Propene	Zinc Cyanide
Brine	Ferric Chloride	Magnesium Sulfate	Propyl Alcohol	Zinc Nitrate
Breeder Pellets – Dane. Fish	Ferric Nitrate	Maleic Acid	Silicic Acid	Zinc Sulfate
Bromic Acid	Ferric Sulfate	Malic Acid	Silver Cyanide	
Bromine – Water	Ferrous Chloride	Mercuric Chloride	Silver Nitrate	
Butane	Ferrous Sulfate	Mercuric Cyanide	Silver Plating Solutions	
Butadiene			Sodium Acetate	

Suggested Format for Specifying Carlon Nonmetallic Conduit, Conduit Fittings and Junction Boxes

- A.** The Carlon rigid nonmetallic conduit system shall be installed as indicated on the drawings and as specified herein.
- B.** All wiring shall be installed in Carlon rigid nonmetallic conduit. All conduit shall be secured by means of proper fittings. All fittings shall be Carlon.
- C.** Carlon outlet boxes, fittings and junction boxes shall be used for all outlets, pull boxes and junction points. (Lighting fixtures shall not be supported or hung from PVC junction boxes but be supported in position by other means.)
- D.** Exposed conduits shall be mounted securely by suitable hangers or straps with the maximum spacing of points of supports not greater than indicated by Section 352.30 of the NEC.
- E.** Except where embedded in concrete or direct buried, Carlon conduit shall be supported to permit adequate lineal movement to allow for expansion and contraction of conduit due to temperature change.
- F.** For aboveground installations where temperature change in excess of 14°C (25°F) is anticipated, expansion joints shall be installed. See Table 352.44(A) NEC for expansion characteristics.
- G.** Proper care shall be taken when field bending is employed to maintain the internal diameter and wall thickness of the conduit.

