

Telephone Duct – Type B, C & D

Telephone Duct Type B

Carlton® Telephone Duct Type B is designed for use in concrete encased installations. Type B duct meets the requirements of NEMA TC-10 and conforms to Bellcore CA08546.



RUS Listed

Telephone Duct Type B

Nom. Size	Part Number	Std. Crate Qty.	Approx. Wt. per 100 ft.	O.D.	*Min. Wall
4"	68315-020 (Grey)	1260	100	4.350	.090
4"	68315W-020 (White)	1260	100	4.350	.095

Telephone Duct Type B Heavy Wall

Nom. Size	Part Number	Std. Crate Qty.	Approx. Wt. per 100 ft.	O.D.	*Min. Wall
4"	68415-020 (Grey)	1260	100	4.350	.100
4"	68415W-020 (White)	1260	100	4.350	.100

* Estimated min. wall to meet performance criteria (500,000 modulus compound)

NOTE: One Belled End per 20' length (for concrete encasement only)

Telephone Duct Type C

Carlton® Telephone Duct Type C is designed for direct burial or concrete encased applications. Type C duct complies with NEMA Standard TC-10 and Bellcore CA08546.



RUS Listed

Telephone Duct Type C

One belled end per 20' length

Nom. Size	Part Number	Std. Crate Qty.	Approx. Wt. per 100 ft.	O.D.	*Min. Wall
4"	68515-020 (Grey)	1260	151	4.350	.150
4"	68515W-020 (White)	1260	151	4.350	.150

* Estimated min. wall to meet performance criteria

Telephone Duct Type D

White Only (Carlton® Telephone Duct Type D is designed to be used in exposed applications.)



RUS Listed

Telephone Duct Type D

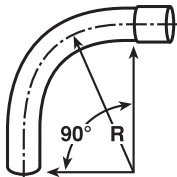
Nom. Size	Part Number	Std. Crate Qty.	Approx. Wt. per 100 ft.	O.D.	*Min. Wall
4"	68615-020 (White)	1260	150	4.350	.160

* Estimated min. wall to meet performance criteria

Telephone Duct Sweeps Manufactured from Heavy Wall "C" Duct

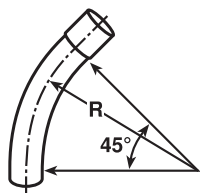
- Size: 4 inches.
- Each sweep is furnished with a belled end.
- Straight end length 3".

90° Sweep



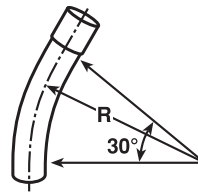
Part No. (Gray)	Bend Radius	Std. Ctn. Qty.
TP9CN	1' 6"	1
TP9DN	2'	1
TP9FN	3'	1
TP9HN	4'	1
TP9IN	5'	1
TP9JN	6'	1
TP9MN	9'	1
TP9NN	10'	1
TP9SN	12' 6"	1
TP9TN	15'	1
TP9UN	20'	1
(White):		
TW9DN	2'	1
TW9FN	3'	1
TW9HN	4'	1
TW9IN	5'	1
TW9JN	6'	1
TW9MN	9'	1
TW9NN	10'	1
TW9SN	12' 6"	1
TW9TN	15'	1

45° Sweep



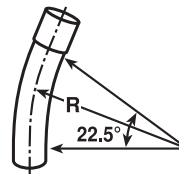
Part No. (Gray)	Bend Radius	Std. Ctn. Qty.
TP7DN	2'	1
TP7FN	3'	1
TP7HN	4'	1
TP7ON	4' 6"	1
TP7IN	5'	1
TP7JN	6'	1
TP7MN	9'	1
TP7NN	10'	1
TP7RN	12'	1
TP7SN	12' 6"	1
TP7TN	15'	1
TP7UN	20'	1
(White):		
TW7DN	2'	1
TW7FN	3'	1
TW7HN	4'	1
TW7ON	4' 6"	1
TW7IN	5'	1
TW7JN	6'	1
TW7MN	9'	1
TW7NN	10'	1
TW7RN	12'	1
TW7SN	12' 6"	1
TW7TN	15'	1

30° Sweep



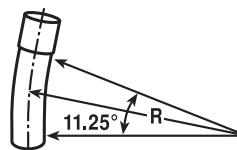
Part No. Gray	Bend Radius	Std. Ctn. Qty.
TP6FN	3'	1
TP6HN	4'	1
TP6JN	6'	1
TP6NN	10'	1
TP6RN	12'	1
TP6SN	12' 6"	1
TP6TN	15'	1
(White):		
TW6FN	3'	1
TW6HN	4'	1
TW6JN	6'	1
TW6MN	9'	1
TW6NN	10'	1
TW6RN	12'	1
TW6SN	12' 6"	1
TW6TN	15'	1

22 1/2° Sweep



Part No. (Gray)	Bend Radius	Std. Ctn. Qty.
TP5DN	2'	1
TP5FN	3'	1
TP5HN	4'	1
TP5IN	5'	1
TP5JN	6'	1
TP5MN	9'	1
TP5RN	12'	1
TP5SN	12' 6"	1
TP5TN	15'	1
TP5UN	20'	1
TP5VN	25'	1
(White):		
TW5DN	2'	1
TW5FN	3'	1
TW5HN	4'	1
TW5JN	6'	1
TW5MN	9'	1
TW5SN	12' 6"	1

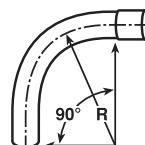
11 1/4° Sweep



Part No. (Gray)	Bend Radius	Std. Ctn. Qty.
TP3DN	2'	1
TP3FN	3'	1
TP3HN	4'	1
TP3IN	5'	1
TP3JN	6'	1
TP3SN	12' 6"	1
(White):		
TW3DN	2'	1
TW3FN	3'	1
TW3HN	4'	1

E-Bends – Riser Ells

90° Sweep



Part No. (Gray Only)	Bend Radius	Std. Ctn. Qty.
TA9ENT (Belled End)	2' 6"	1
TA9FN (Plain End)	3'	1
TA9FNT (Belled End)	3'	1
TA9FNTL (Belled End-Long)	3'	1

Couplings

Sleeve Coupling



No internal stop

Part No.	Size	Std. Ctn. Qty.
For Repair Work:		
E900N	4" x 6"	25
E900NU	4" x 12"	10
E900NW (White)	4" x 6"	25
Split Sleeve Couplings:		
E900NS	4"	25
E900NS8 (White)	4" x 8"	15
E900NSW (White)	4"	25
E900PS	5"	15
For Type D Duct Applications Only:		
E900DN (White)	4"	25

Plugs

Plug with Pull Tab



Part No.	Size	Std. Ctn. Qty.
P258 NTB	4"	50

End Bells

Square to Round



Part No.	Size	Std. Ctn. Qty.
E903N	4" Sq.	4

Molded Coupling



Internal Stop

Part No.	Size	Std. Ctn. Qty.
E908N	4"	25

Molded End Bell



Part No.	Size	Std. Ctn. Qty.
E917N	4"	10

5° Angle Coupling



Part No.	Size	Std. Ctn. Qty.
E914N	4"	15

Straight End Bell



Part No.	Size	Std. Ctn. Qty.
E907N	4" (5" long, 5.5" flare)	10
E907NY	4" (9" long, 5.75" flare)	1

(Designed for use with a coupling.)

Split End Bell (PVC)



Part No.	Size	Std. Ctn. Qty.
E9098NS	4"	1
E9098PS	5"	1

Adapters

Internal Adapter



Adapts Telephone Duct to Fiber
Transite MCD

Part No.	Size	Std. Ctn. Qty.
E901N	4"	24
Split:		
E901NS	4"	24

Female Adapter



Adapts threaded metal pipe to
Telephone Duct

Part No.	Size	Std. Ctn. Qty.
E902N	4"	10

Square Clay Tile Adapter



Part No.	Size	Std. Ctn. Qty.
Adapts Clay to Telephone Duct:		
E904M	3 1/4" to 4" x 18"	10
E904M12	3 1/4" to 4" x 12"	10
E904M8	3 1/4" to 4" x 8 1/2"	12
E904MM	3 1/2" to 3 1/2" x 18"	12
E904MX	3" to 4" x 18"	10
E904N	3 1/2" to 4" x 18"	10
E904N12	3 1/2" to 4" x 12"	12
E904N24	3 1/2" to 4" x 24"	10
E904N8	3 1/2" to 4" x 8"	10
Split Square Adapter:		
E904MS	3 1/4" x 4"	10
E904NS	3 1/2" to 4" x 18"	10

Cast Iron Adapter



Adapts Telephone Duct to Cast Iron
Bends

Part No.	Size	Std. Ctn. Qty.
E906N	4"	1

Round Clay Tile Adapter



Part No.	Size	Std. Ctn. Qty.
E923NM	4" to 3 1/4"	10

P&C Duct® Adapter



Adapts Telephone Duct to
P&C Duct (IPS)

Part No.	Size	Std. Ctn. Qty.
E913N	4"	15
E913NF	4"	15

Reducers

P&C Duct® Reducer



Adapts Telephone Duct to
P&C Duct (IPS)

Part No.	Size	Std. Ctn. Qty.
E908NM	4" to 3 1/2"	15



Wye Branch



For starting lateral runs:

Part No.	Size	Std. Ctn. Qty.
E916N	4"	1
E916NW (White)	4"	1
Split:		
E916NS	4"	1
E916NSW (White)	4"	5

Expansion Joints

Expansion Joint - Type D



Part No.	Size	Std. Ctn. Qty.
E905N	4"	5
E905NL (Long)	4"	1

P&C® Duct and Telephone Duct – Specification

Physical Properties of P&C® Duct by ASTM Test Methods

Property	ASTM No.	Typical Values	
		P&C® Duct	Telephone Duct
Tensile strength, psi	D638	4,800	4,800
Modulus of elasticity in tension, psi	D638	500,000	500,000
Flexural strength, psi	D790	11,000	11,000
Deflection temp under load at 265 psi deg. C	D648	72°C	72°C
Coefficient of thermal expansion in/in/°F	D696	3.30×10^{-5}	3.30×10^{-5}
Coefficient of static friction		.20	.20

Collapse Pressure of P&C Duct Materials (PSI)

2" EB-20 – 11.2	5" EB-20 – 5.9
2" EB-35 – 11.2	5" EB-35 – 10.3
2" DB-60 – 11.2	5" DB-60 – 18.9
2" DB-120 – 26.6	5" DB-120 – 38.2
3" EB-20 – 6.6	
3" EB-35 – 8.2	6" EB-20 – 6.1
3" DB-60 – 15.2	6" EB-35 – 11.2
3" DB-120 – 34.0	6" DB-60 – 19.6
4" EB-20 – 6.7	6" DB-120 – 38.0
4" EB-35 – 9.2	
4" DB-60 – 17.0	
4" DB-120 – 36.6	

Collapse Pressure of Telephone Duct Materials (PSI)

Type B Duct –	9.2
Type C Duct –	36.6
Type D Duct –	36.6

Performance Properties of P&C Duct as Indicated per NEMA Standard TC-6 & 8 and ASTM F-512

Pipe Stiffness lb/in/in

Conduit Series	Minimum Pipe Stiffness (F/Δy), all sizes
EB-20	20
EB-35	35
DB-60	60
DB-100	100
DB-120	120

Minimum Impact Resistance at 0°C (32°F) ft • lbf

Nominal Size	Conduit Series				
	EB-20	EB-35	DB-60	DB-100	DB-120
1	–	–	–	–	10
1½	–	–	10	–	15
2	20	20	20	–	25
3	20	30	40	45	50
3½	20	35	50	60	65
4	25	40	60	70	80
5	30	55	85	100	110
6	40	75	120	135	150

Performance Properties of Telephone Duct as Indicated per NEMA Standard TC-10

Pipe Stiffness F/Δy lb/in/in

Nominal Size	B-Duct	HWB	C-Duct	D-Duct
All	30	40	120	120

Minimum Impact Resistance at 32°C

B-Duct ft. lb.	C-Duct ft. lb.	D-Duct ft. lb.
25	50	50

Typical Installation Practices for P&C® Duct Type EB and Telephone Duct Type B

RUS Listed

Trenching:

Whenever possible the walls of the trench for P&C Duct should act as forms for concrete encasement. The trench should be made no wider than necessary to provide the nominal size concrete thickness.

Duct Spacing:

Duct spacing, both vertical and horizontal, is accomplished with the use of Carlon PVC Snap-Loc® Spacers. Recommended interval between spacer assemblies is 8 to 10 feet.

Terminating:

For smooth cable pulling and properly engineered terminations into manholes, Carlon P&C Duct end bells should be used.

Concrete:

The concrete used with P&C Duct should be 3/8" aggregate with a nominal compressive strength of 2,500 lbs. per square inch. The slump should be at the upper end of the range, preferably 7 to 8 inches. It should have just enough slump to flow to the bottom of the formation and yet not be so wet as to cause the ducts to float. In placing concrete around P&C Duct, adjust the delivery chute so the fall of the concrete into the trench is minimal. Use a splash board to divert the flow of concrete away from the trench sides and avoid dislodging soil and stones.



Pressure Grouting:

This technique is used for ducts in a casing or bored construction. Hydraulic pressure exceeding 25 psi is common and thus dictates the use of a P&C Duct Type DB-120 or a Schedule 40® product. (See collapse pressure chart). Hydraulic pressure from grouting is a function of the line pressure at the nozzle and back pressure created by pumping. If the exhaust nozzle isn't withdrawn properly, the back pressure will rapidly build and equal the line pressure. Depending on the type casing and pumping distance, line pressures will go up to 90 psi.

Hydraulic Pressure:

The primary consideration for duct selection is the height of the duct bank. Since concrete exerts a force of 1.03 psi per foot of height, to determine the correct duct selection, consider the following examples:

1. 16 way duct bank, 5" conduit, 4 x 4 configuration with 3" separation, and 3" concrete cover

$$\text{Concrete Height} - 4 \times 5.563" + 4 \times 3 = 22.5 + 12" = 34.2"$$

$$\text{Hydraulic Pressure} - (34.2"/12) \times 1.03 = 2.9 \text{ psi}$$

In this instance the maximum force on the bottom ducts would be 2.9 psi, therefore, 5" EB-20 would be a satisfactory choice.

2. 16 way duct bank, 5" conduit, 8 x 2 configuration with 3" separation, and 3" concrete cover.

$$\text{Concrete Height} - 8 \times 5.563" + 8 \times 3 = 44.5 + 24" = 68.5"$$

$$\text{Hydraulic Pressure} - (68.5"/12) \times 1.03 = 5.9 \text{ psi}$$

In this instance the hydraulic force is equal to the theoretical collapse pressure of 5" EB-20, therefore, the use of 5" EB-35 or DB-60 would be a satisfactory choice.

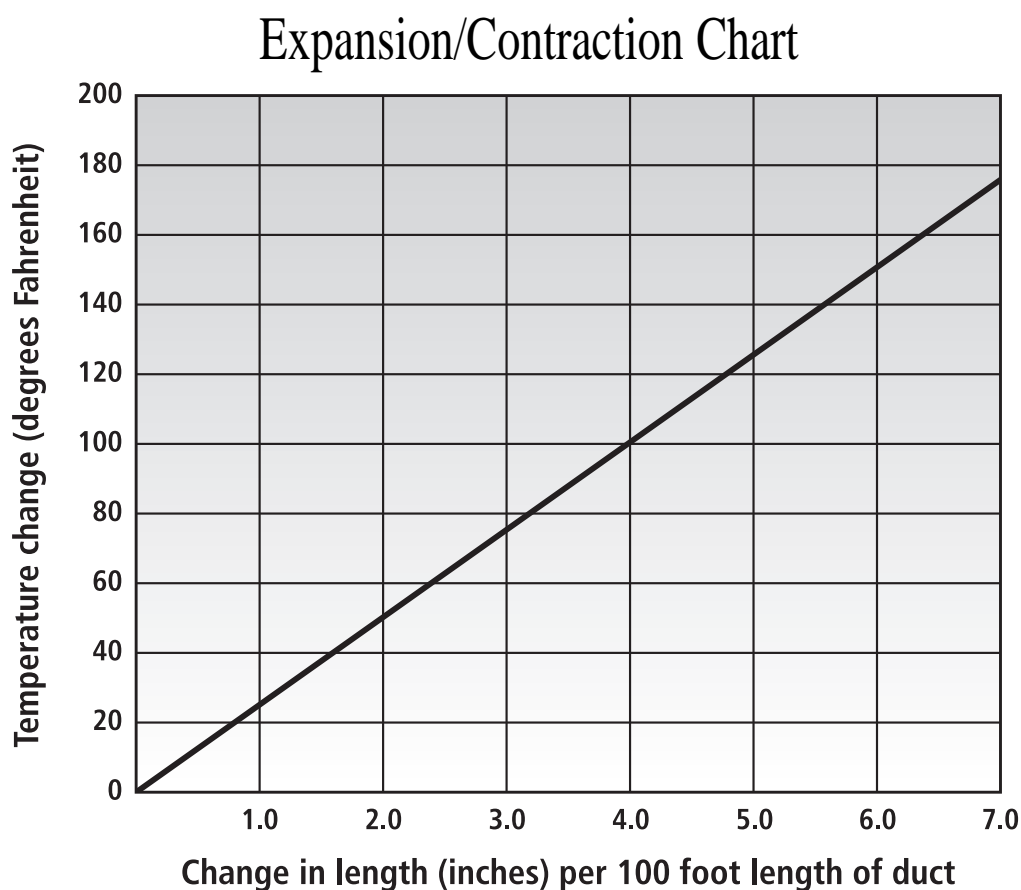
Another alternative would be to use a sequential pour technique. Pour approximately 1/2 the height, allow the concrete to set-up, and then pour the remaining distance. Using this method, 5" EB-20 would be satisfactory, since the hydraulic pressure has been reduced by 50%.

Expansion & Contraction

When duct temperature variations are anticipated during the installation of Carlon P&C® Duct and Telephone Duct, allow extra duct footage at each tie-in for contraction. Terminated duct runs should be covered with backfill from tie-in point toward the end of the duct run. If the trench must be left open, don't terminate the run. All plastic duct may expand or contract as concrete is poured and cured. When placing concrete encasement, always encase from one end of the duct

section toward the other end of the section, to allow the free end to move. Never encase from each end of the section toward the center.

The coefficient of thermal expansion of Carlon P&C Duct and Telephone Duct is 3.30×10^{-5} in/in/°F. The following chart indicates what expansion or contraction can be expected at various temperature changes.



Bridge Crossings and Exposed Applications

Type D Telephone Duct is designated specifically for use in bridge crossings and exposed applications. Using the expansion/contraction chart, calculate the number of expansion joints required. Expansion joints provide a 6" allowance for expansion/contraction. Utilize one expansion

joint for each 100 feet of exposed length for most installations. The duct should be free to move during expansion/contraction; the barrel should be securely clamped and the piston should be aligned properly with the barrel for easy movement.