

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 If the exhaust nozzle isn't withdrawn properly, the back pressure will rapidly build and equal the line pressure.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%.

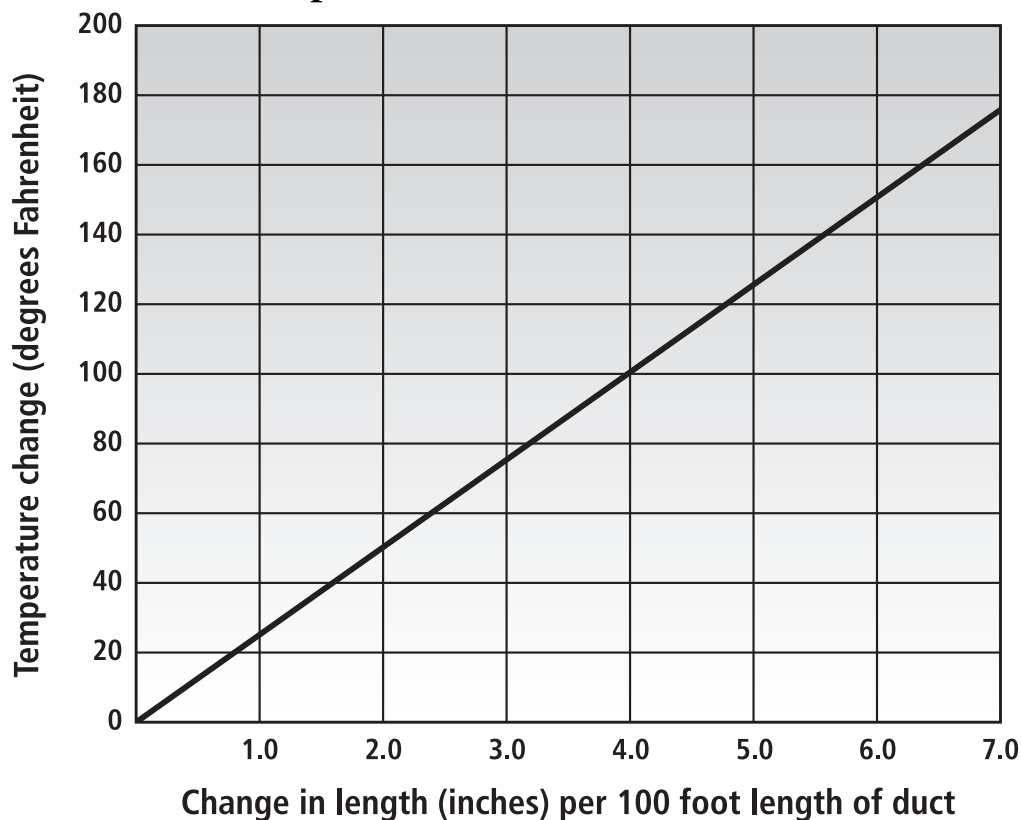
Expansion & Contraction

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.

Expansion/Contraction Chart



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.