# Carlon® P&C® Duct

Carlon P&C (Power & Communications) Duct and fittings are designed and formulated specifically for concrete encased and direct burial applications of power utility primaries, secondaries, street lighting and distribution systems. Carlon P&C Duct complies with NEMA Standard TC-6 & 8, and ASTM F-512 for utility duct. Both EB and DB duct are rated for use with 90°C conductors. P&C Duct fittings comply with NEMA TC-9 Standard.

Carlon Telephone Duct complies with NEMA TC-10. Bellcore CAO 8546, GT8343, and other applicable telephone standards.

## Advantages:

- Manufactured for high modulus C-250 compound
- High impact strength
- Excellent structural strength
- Superior load bearing
- Multiple duct banks can be pre-assembled and lowered into trench
- No special cutting or tapering devices required
- Provides easy bending around obstructions minimizing the need for special angle couplings and sweeps
- Superior aging and weathering characteristics

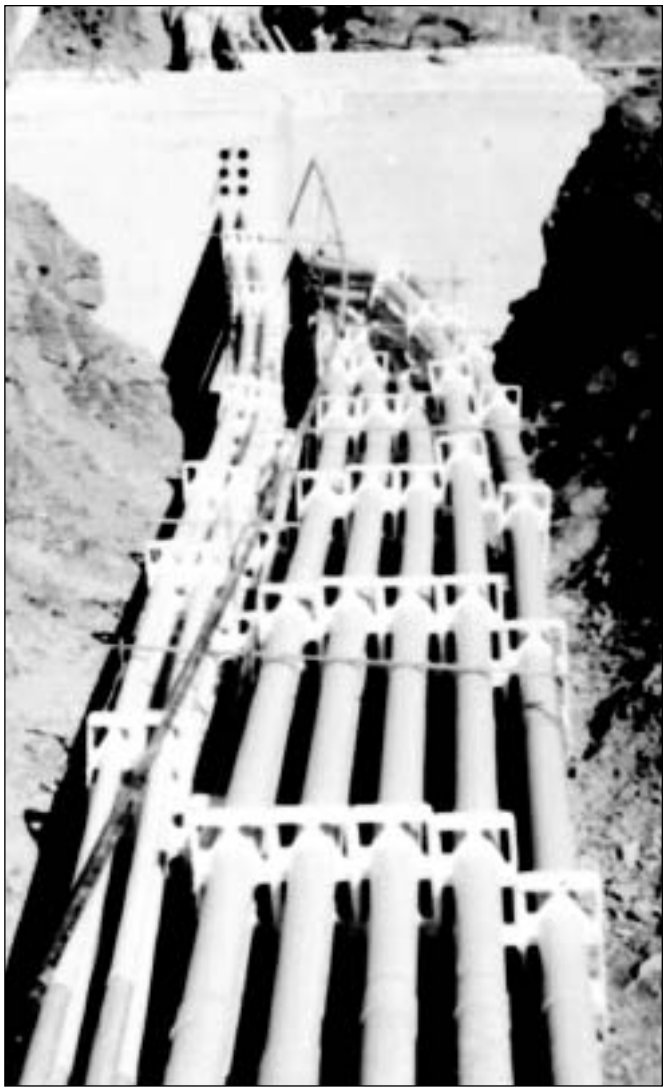
## Features:

- Heat resistant
- Fire resistant
- Conforms to NEMA Standard TC-6 & 8 and ASTM Standard F-512 for utility duct*
- Carlon P&C Duct Type EB-20 is ETL Listed
- Low coefficient of expansion
- Continuous rigid control
- Smooth inner wall and smooth transition between joints

## Engineering Features:

**Chemical Inertness** resists water absorption and is totally immune to galvanic or electrolytic attacks.

**Solvent Cemented Joints** provide leakproof duct runs tested at 25 psi. This type of joint eliminates the need for costly mechanical rodding procedure. Carlon P&C Duct can be rodded pneumatically.



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# Carlon® P&C® Duct Type EB

Carlon nonmetallic P&C Duct Type EB is manufactured from Carlon's exclusive high modulus C-600 compound, developed especially for power and communications applications, and is designed for use in concrete encased installations. Type EB is rated for 90°C Cable.

RUS Listed

ETL Listed to UL 651A in compliance to the NEC

## P&C Duct Type EB-20

**Meets NEMA Standard TC-6 & 8**
**EB-20/ASTM F-512**

| Nom. Size | Part Number 10' | Part Number 20' | Std. Crate Qty. 10' | Std. Crate Qty. 20' | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|---|---|
| 2 | – | 48711-020 | – | 2,800 | 36 | 2.375 | .060 |
| 3 | – | 48713-020 | – | 2,000 | 59 | 3.500 | .061 |
| 4 | 48715-010 | 48715-020 | 570 | 1,140 | 98 | 4.500 | .082 |
| 5 | 48716-010 | 48716-020 | 380 | 760 | 148 | 5.563 | .103 |
| 6 | 48717-010 | 48717-020 | 260 | 520 | 212 | 6.625 | .125 |

*Min. wall thickness relates to 500,000 modulus
Note: One belled end per 20' length

## P&C Duct Type EB-35 Heavy Wall

**Meets NEMA Standard TC-6 & 8**
**EB-35/ASTM F-512**

| Nom. Size | Part Number 10' | Part Number 20' | Std. Crate Qty. 10' | Std. Crate Qty. 20' | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|---|---|
| 2 | – | 68711-020 | – | 2,800 | 39 | 2.375 | .060 |
| 3 | – | 68713-020 | – | 2,000 | 72 | 3.500 | .076 |
| 4 | – | 68715-020 | – | 1,140 | 116 | 4.500 | .100 |
| 5 | 68716-010 | 68716-020 | 380 | 760 | 177 | 5.563 | .126 |
| 6 | – | 68717-020** | – | 520 | 251 | 6.625 | .152 |

*Min. wall thickness relates to 500,000 modulus
**Special order item
Note: One belled end per 20' length

**Use DB Sweeps with EB Duct.**

# Carlon® P&C® Duct Type DB

RUS Listed

Carlon nonmetallic P&C Duct Type DB is manufactured from Carlon's exclusive high modulus C-600 compound, developed especially for power and communications applications, and is designed for use in direct burial or concrete encased installations. Type DB is rated for 90°C Cable.

## Trenching:

Trench should be graded true and free from stones and soft spots. Backfill should also be free of stones and be firmly tamped around the sides of the conduit, to develop maximum supporting strength. Tamping on top of the conduit is not recommended.

## Backfill:

In rocky soil where it is impossible to have an even trench bottom, a selected backfill should be put in before laying the conduit. Selected backfill (not tamped) at least 6" over the top of the conduit is recommended. After final backfill is placed, tamping may be used to finish the grade.

The method of direct burial varies with soil condition, load conditions, and engineering preferences. A common practice is to lay one tier at a time, backfill, and repeat with the desired spacing of ducts being made as ducts are layered.

Many companies have used the heavier wall Type DB-120 in a duct-to-duct formation. Where limited loads occur, this type of installation has proven satisfactory.

## P&C Duct Type DB-60

**Meets NEMA Standard TC-6 & 8**
**DB-60/ASTM F-512**

| Nom. Size | Part Number | Std. Crate Qty. | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|
| 2 | 48811-020 | 2,800 | 38 | 2.375 | .060 |
| 3 | 48813-020 | 2,000 | 81 | 3.500 | .092 |
| 3 1/2 | 48814-020 | 2,000 | 108 | 4.000 | .107 |
| 4 | 48815-020 | 1,140 | 133 | 4.500 | .121 |
| 5 | 48816-020 | 760 | 202 | 5.563 | .152 |
| 6 | 48817-020 | 520 | 288 | 6.625 | .182 |

*Min. wall thickness relates to 500,000 modulus
Note: One belled end per 20' length

## P&C Duct Type DB-120 Heavy Wall

**Meets NEMA Standard TC-6 & 8**
**DB-120/ASTM F-512**

| Nom. Size | Part Number 10' | Part Number 20' | Std. Crate Qty. 10' | Std. Crate Qty. 20' | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|---|---|
| 1 | – | 48808-020 | – | 8,000 | 18 | 1.315 | .060 |
| 1 1/2 | – | 48810-020 | – | 4,500 | 28 | 1.900 | .060 |
| 2 | – | 68811-020 | – | 2,800 | 47 | 2.375 | .077 |
| 3 | – | 68813-020 | – | 2,000 | 99 | 3.500 | .118 |
| 4 | – | 68815-020 | – | 1,140 | 165 | 4.500 | .154 |
| 5 | – | 68816-020 | – | 760 | 251 | 5.563 | .191 |
| 6 | 68817-010 | 68817-020 | 260 | 520 | 356 | 6.625 | .227 |

*Min. wall thickness relates to 500,000 modulus
Note: One belled end per 20' length

# Carlon Special California Rigid Nonmetallic DB-100 P&C® Duct & Sweeps

RUS Listed

Carlon DB-100 nonmetallic P&C Duct Type DB is manufactured to NEMA Standard TC-6 & 8 and to specifications that exist within the State of California, and is designed for use in direct burial or concrete encased installations. Rated for use with 90°C cable.

## P&C Duct Type DB-100

**Meets NEMA Standard TC-6 & 8 and ASTM F-512**

| Nom. Size | Part Number | Std. Crate Qty. | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|
| 4 | 68915-020 | 1,140 | 154 | 4.500 | .155 |
| 5 | 68916-020 | 760 | 237 | 5.563 | .192 |
| 6 | 68917-020 | 520 | 337 | 6.625 | .229 |

*Min. wall thickness relates to 500,000 modulus
Note: One belled end per 20' length

## P&C Duct Type DB-100 DWP Approved

**Meets NEMA Standard TC-6 & 8 and ASTM F-512**

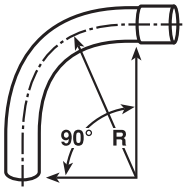
| Nom. Size | Part Number | Std. Crate Qty. | Approx. Wt. per 100 ft. | O.D. | *Min. Wall |
|---|---|---|---|---|---|
| 3 | 68913D-020 | 2,000 | 95 | 4.500 | .155 |
| 4 | 68915D-020 | 1,140 | 156 | 5.563 | .192 |
| 5 | 68916D-020 | 760 | 237 | 6.625 | .229 |

*Min. wall thickness relates to 500,000 modulus

# DB-100 Sweeps – Belled

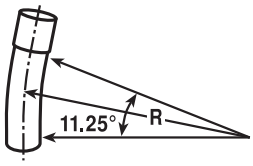
*Consult factory for additional sizes

## 90° Sweep – 48" Radius



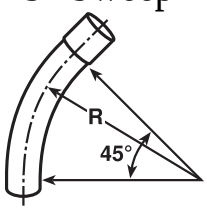

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| PE9HN | 4" | 1 |
| PE9HP | 5" | 1 |

## 11¼° Sweep – 150" Radius




| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| PE3SP | 5" | 1 |

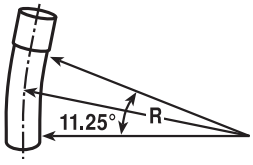
## 45° Sweep – 150" Radius




| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| PE7SP | 5" | 1 |

## 11¼° Sweep – 150" Radius

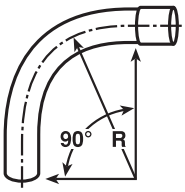
(Segmented sweeps)

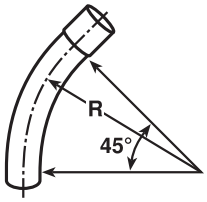



| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| PE3SNS | 4" | 1 |
| PE3SPS | 5" | 1 |
| PE3SRS | 6" | 1 |

# DB-60 Sweeps

*Consult factory for additional sizes/configurations

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **90° Sweep**   | PF9CH | 1 1/2" | 18" | 1 |
| | PF9CJ | 2" | 18" | 1 |
| | PF9CL | 3" | 18" | 1 |
| | PF9CN | 4" | 18" | 1 |
| | PF9DF | 1" | 24" | 1 |
| | PF9DH | 1 1/2" | 24" | 1 |
| | PF9DJ | 2" | 24" | 1 |
| | PF9DL | 3" | 24" | 1 |
| | PF9DN | 4" | 24" | 1 |
| | PF9DP | 5" | 24" | 1 |
| | PF9FF | 1" | 36" | 1 |
| | PF9FJ | 2" | 36" | 1 |
| | PF9FL | 3" | 36" | 1 |
| | PF9FN | 4" | 36" | 1 |
| | PF9FP | 5" | 36" | 1 |
| | PF9FR | 6" | 36" | 1 |
| | PF9HL | 3" | 48" | 1 |
| | PF9HN | 4" | 48" | 1 |
| | PF9HP | 5" | 48" | 1 |
| | PF9HR | 6" | 48" | 1 |
| | PF9IL | 3" | 60" | 1 |
| | PF9IN | 4" | 60" | 1 |
| | PF9IP | 5" | 60" | 1 |
| | PF9IR | 6" | 60" | 1 |
| | PF9SH | 1 1/2" | 150" | 1 |
| | PF9SJ | 2" | 150" | 1 |
| | PF9SL | 3" | 150" | 1 |
| | PF9SR | 6" | 150" | 1 |
| | PF9VL | 3" | 300" | 1 |
| | PF9VN | 4" | 300" | 1 |
| | PF9VP | 5" | 300" | 1 |

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **45° Sweep**   | PF7CF | 1" | 18" | 1 |
| | PF7CH | 1 1/2" | 18" | 1 |
| | PF7CJ | 2" | 18" | 1 |
| | PF7CL | 3" | 18" | 1 |
| | PF7DF | 1" | 24" | 1 |
| | PF7DH | 1 1/2" | 24" | 1 |
| | PF7DJ | 2" | 24" | 1 |
| | PF7DL | 3" | 24" | 1 |
| | PF7DN | 4" | 24" | 1 |
| | PF7FF | 1" | 36" | 1 |
| | PF7FH | 1 1/2" | 36" | 1 |
| | PF7FJ | 2" | 36" | 1 |
| | PF7FL | 3" | 36" | 1 |
| | PF7FN | 4" | 36" | 1 |
| | PF7FP | 5" | 36" | 1 |
| | PF7FR | 6" | 36" | 1 |
| | PF7HJ | 2" | 48" | 1 |
| | PF7HL | 3" | 48" | 1 |
| | PF7HN | 4" | 48" | 1 |
| | PF7HP | 5" | 48" | 1 |
| | PF7HR | 6" | 48" | 1 |
| | PF7IL | 3" | 60" | 1 |
| | PF7IP | 5" | 60" | 1 |
| | PF7NN | 4" | 120" | 1 |
| | PF7SH | 1 1/2" | 150" | 1 |
| | PF7SJ | 2" | 150" | 1 |
| | PF7SL | 3" | 150" | 1 |
| | PF7SN | 4" | 150" | 1 |
| | PF7SP | 5" | 150" | 1 |
| | PF7SR | 6" | 150" | 1 |
| | PF7VN | 4" | 300" | 1 |
| | PF7VP | 5" | 300" | 1 |
| | PF7VR | 6" | 300" | 1 |



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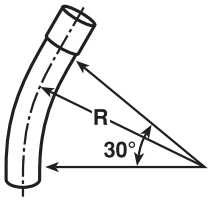
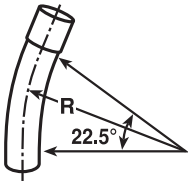
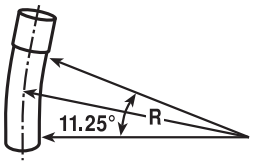
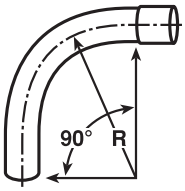
# DB-60 Sweeps *Consult factory for additional sizes/configurations

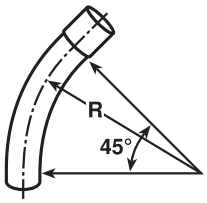
| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **30° Sweep** | PF6CJ | 2" | 18" | 1 |
|  | PF6CL | 3" | 18" | 1 |
| | PF6DL | 3" | 24" | 1 |
| | PF6DN | 4" | 24" | 1 |
| | PF6DP | 5" | 24" | 1 |
| | PF6CH | 1 1/2" | 30" | 1 |
| | PF6FJ | 2" | 36" | 1 |
| | PF6FL | 3" | 36" | 1 |
| | PF6FN | 4" | 36" | 1 |
| | PF6FR | 6" | 36" | 1 |
| | PF6HJ | 2" | 48" | 1 |
| | PF6HN | 4" | 48" | 1 |
| | PF6HP | 5" | 48" | 1 |
| | PF6HR | 6" | 48" | 1 |
| | PF6IN | 4" | 60" | 1 |
| | PF6IP | 5" | 60" | 1 |
| | PF6SJ | 2" | 150" | 1 |
| | PF6SN | 4" | 150" | 1 |
| | PF6SP | 5" | 150" | 1 |
| | PF6VJ | 2" | 300" | 1 |
| | PF6VN | 4" | 300" | 1 |
| | PF6VR | 6" | 300" | 1 |
| **22 1/2° Sweep** | PH5DL | 3" | 24" | 1 |
|  | PF5DN | 4" | 24" | 1 |
| | PF5DP | 5" | 24" | 1 |
| | PF5FF | 1" | 36" | 1 |
| | PF5FL | 3" | 36" | 1 |
| | PF5FN | 4" | 36" | 1 |
| | PF5FP | 5" | 36" | 1 |
| | PF5FR | 6" | 36" | 1 |
| | PF5HL | 3" | 48" | 1 |
| | PF5HN | 4" | 48" | 1 |
| | PF5HR | 6" | 48" | 1 |
| | PF5IJ | 2" | 60" | 1 |
| | PF5IL | 3" | 60" | 1 |
| | PF5IP | 5" | 60" | 1 |
| | PF5IR | 6" | 60" | 1 |
| | PF5SL | 3" | 150" | 1 |
| | PF5SN | 4" | 150" | 1 |
| | PF5SP | 5" | 150" | 1 |
| | PF5SR | 6" | 150" | 1 |
| | PF5VN | 4" | 300" | 1 |
| | PF5VP | 5" | 300" | 1 |
| | PF5VR | 6" | 300" | 1 |

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **11 1/4° Sweep** | PF3CJ | 2" | 18" | 1 |
|  | PF3CL | 3" | 18" | 1 |
| | PF3DF | 1" | 24" | 1 |
| | PF3DH | 1 1/2" | 24" | 1 |
| | PF3DP | 5" | 24" | 1 |
| | PF3FJ | 2" | 36" | 1 |
| | PF3FL | 3" | 36" | 1 |
| | PF3FN | 4" | 36" | 1 |
| | PF3FP | 5" | 36" | 1 |
| | PF3FR | 6" | 36" | 1 |
| | PF3HL | 3" | 48" | 1 |
| | PF3HN | 4" | 48" | 1 |
| | PF3HP | 5" | 48" | 1 |
| | PF3HR | 6" | 48" | 1 |
| | PF3IJ | 2" | 60" | 1 |
| | PF3IR | 6" | 60" | 1 |
| | PF3SJ | 2" | 150" | 1 |
| | PF3SN | 4" | 150" | 1 |
| | PF3SP | 5" | 150" | 1 |
| | PF3SR | 6" | 150" | 1 |
| | PF3VJ | 2" | 300" | 1 |
| | PF3VL | 3" | 300" | 1 |
| | PF3VN | 4" | 300" | 1 |
| | PF3VP | 5" | 300" | 1 |

# DB-120 Sweeps

*Consult factory for additional sizes/configurations

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **90° Sweep**   | PH9CJ | 2" | 18" | 1 |
| | PH9CL | 3" | 18" | 1 |
| | PH9CN | 4" | 18" | 1 |
| | PH9DJ | 2" | 24" | 1 |
| | PH9DL | 3" | 24" | 1 |
| | PH9DN | 4" | 24" | 1 |
| | PH9DP | 5" | 24" | 1 |
| | PH9FJ | 2" | 36" | 1 |
| | PH9FL | 3" | 36" | 1 |
| | PH9FN | 4" | 36" | 1 |
| | PH9FP | 5" | 36" | 1 |
| | PH9FR | 6" | 36" | 1 |
| | PH9HJ | 2" | 48" | 1 |
| | PH9HL | 3" | 48" | 1 |
| | PH9HN | 4" | 48" | 1 |
| | PH9HP | 5" | 48" | 1 |
| | PH9HR | 6" | 48" | 1 |
| | PH9IJ | 2" | 60" | 1 |
| | PH9IL | 3" | 60" | 1 |
| | PH9IN | 4" | 60" | 1 |
| | PH9IR | 6" | 60" | 1 |
| | PH9OJ | 2" | 66" | 1 |
| | PH9SJ | 2" | 150" | 1 |
| | PH9SL | 3" | 150" | 1 |
| | PH9SN | 4" | 150" | 1 |
| | PH9SP | 5" | 150" | 1 |
| | PH9SR | 6" | 150" | 1 |
| | PH9VN | 4" | 300" | 1 |
| | PH9VP | 5" | 300" | 1 |
| | PH9VR | 6" | 300" | 1 |

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **45° Sweep**   | PH7CJ | 2" | 18" | 1 |
| | PH7CL | 3" | 18" | 1 |
| | PH7CN | 4" | 18" | 1 |
| | PH7DJ | 2" | 24" | 1 |
| | PH7DL | 3" | 24" | 1 |
| | PH7DN | 4" | 24" | 1 |
| | PH7DP | 5" | 24" | 1 |
| | PH7FJ | 2" | 36" | 1 |
| | PH7FL | 3" | 36" | 1 |
| | PH7FN | 4" | 36" | 1 |
| | PH7FP | 5" | 36" | 1 |
| | PH7FR | 6" | 36" | 1 |
| | PH7HJ | 2" | 48" | 1 |
| | PH7HL | 3" | 48" | 1 |
| | PH7HN | 4" | 48" | 1 |
| | PH7HP | 5" | 48" | 1 |
| | PH7HR | 6" | 48" | 1 |
| | PH7IJ | 2" | 60" | 1 |
| | PH7IL | 3" | 60" | 1 |
| | PH7IP | 5" | 60" | 1 |
| | PH7IR | 6" | 60" | 1 |
| | PH7SJ | 2" | 150" | 1 |
| | PH7SN | 4" | 150" | 1 |
| | PH7SP | 5" | 150" | 1 |
| | PH7SR | 6" | 150" | 1 |



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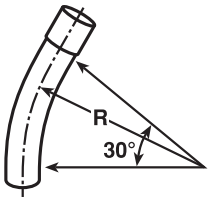
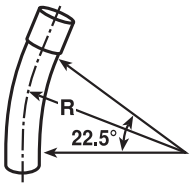
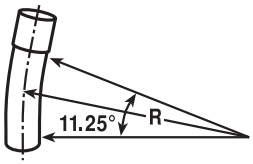
# DB-120 Sweeps

Note: For Nom. Diameter of 1": use 1" DB-60 Sweeps
For Nom. Diameter of 1 1/2": use 1 1/2" DB-60 Sweeps

*Consult factory for additional sizes/configurations

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **30° Sweep** | PH6CJ | 2" | 18" | 1 |
|  | PH6CL | 3" | 18" | 1 |
| | PH6CN | 4" | 18" | 1 |
| | PH6DJ | 2" | 24" | 1 |
| | PH6DN | 4" | 24" | 1 |
| | PH6DP | 5" | 24" | 1 |
| | PH6FJ | 2" | 36" | 1 |
| | PH6FL | 3" | 36" | 1 |
| | PH6FN | 4" | 36" | 1 |
| | PH6FP | 5" | 36" | 1 |
| | PH6FR | 6" | 36" | 1 |
| | PH6HN | 4" | 48" | 1 |
| | PH6HR | 6" | 48" | 1 |
| | PH6IN | 4" | 60" | 1 |
| | PH6SL | 3" | 150" | 1 |
| **22 1/2° Sweep** | PH5CJ | 2" | 18" | 1 |
|  | PH5CL | 3" | 18" | 1 |
| | PH5CN | 4" | 18" | 1 |
| | PH5DJ | 2" | 24" | 1 |
| | PH5DL | 3" | 24" | 1 |
| | PH5DP | 5" | 24" | 1 |
| | PH5FJ | 2" | 36" | 1 |
| | PH5FL | 3" | 36" | 1 |
| | PH5FN | 4" | 36" | 1 |
| | PH5FP | 5" | 36" | 1 |
| | PH5HL | 3" | 48" | 1 |
| | PH5HN | 4" | 48" | 1 |
| | PH5HP | 5" | 48" | 1 |
| | PH5HR | 6" | 48" | 1 |
| | PH5IJ | 2" | 60" | 1 |
| | PH5IL | 3" | 60" | 1 |
| | PH5IR | 6" | 60" | 1 |
| | PH5SN | 4" | 150" | 1 |
| | PH5SP | 5" | 150" | 1 |
| | PH5SR | 6" | 150" | 1 |
| | PH5VJ | 2" | 300" | 1 |
| | PH5VN | 4" | 300" | 1 |

| Segment | Part No. | Size | Radius (in.) | Std. Ctn. Qty. |
|---|---|---|---|---|
| **11 1/4° Sweep** | PH3CJ | 2" | 18" | 1 |
|  | PH3CN | 4" | 18" | 1 |
| | PH3DJ | 2" | 24" | 1 |
| | PH3DN | 4" | 24" | 1 |
| | PH3DP | 5" | 24" | 1 |
| | PH3FJ | 2" | 36" | 1 |
| | PH3FL | 3" | 36" | 1 |
| | PH3FN | 4" | 36" | 1 |
| | PH3FP | 5" | 36" | 1 |
| | PH3FR | 6" | 36" | 1 |
| | PH3HN | 4" | 48" | 1 |
| | PH3IN | 4" | 60" | 1 |
| | PH3IP | 5" | 60" | 1 |
| | PH3IR | 6" | 60" | 1 |
| | PH3SJ | 2" | 150" | 1 |
| | PH3SL | 3" | 150" | 1 |
| | PH3SN | 4" | 150" | 1 |
| | PH3SP | 5" | 150" | 1 |
| | PH3SR | 6" | 150" | 1 |
| | PH3VR | 6" | 300" | 1 |

# Couplings

**(Use same type fittings for Type EB and DB)**

## Sleeve Coupling (for repair work)

No internal stop

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E200J | 2" | 30 |
| E200L | 3" | 25 |
| E200M | 3 1/2" | 20 |
| E200N | 4" | 15 |
| E200P | 5" | 8 |
| E200R | 6" | 5 |

## Coupling

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E940H | 1 1/2" | 25 |
| E940J | 2" | 30 |
| E940K | 2 1/2" | 20 |
| E240L | 3" | 30 |
| E240N | 4" | 15 |
| E240P | 5" | 20 |
| E240RF | 6" | 5 |

*Sizes 1 1/2" - 2 1/2" order part numbers E940_

## Long Line Coupling

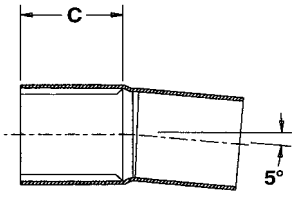
*Consult factory for additional sizes

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E941H | 1 1/2" | 40 |
| E941J | 2" | 25 |
| E941K | 2 1/2" | 15 |
| E241L | 3" | 15 |
| E241N | 4" | 10 |

*Sizes 1 1/2" - 2 1/2" order part numbers E941_

## 5° Angle Coupling BxS (Bell x Spigot)

| Part No. | Size | C | Std. Ctn. Qty. |
|---|---|---|---|
| E244J | 2" | 2.13 | 15 |
| E244L | 3" | 3.25 | 5 |
| E244NF | 4" | 3.50 | 15 |
| E244NF5 (short) | 4" | 1.87 | 25 |
| E244PF | 5" | 4.13 | 10 |
| E244PF5 (short) | 5" | 2.00 | 20 |
| E244RF | 6" | 5.13 | 5 |
| E244RF5 (short) | 6" | 2.25 | 10 |




## 5° Angle Coupling BxB (Bell x Bell)

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E2440NF | 4" | 15 |
| E2440PF | 5" | 10 |
| E2440RF | 6" | 5 |

## 5° Angle Coupling BxB (Swedged)

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E245J | 2" | 20 |
| E245N | 4" | 10 |
| E245P | 5" | 10 |
| E245R | 6" | 5 |

# Plugs

## Plug

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| P258H | 1 1/2" | 50 |
| P258K | 2 1/2" | 50 |

## Plug with Pull Tab

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| P258JT | 2" | 60 |
| P258LT | 3" | 30 |
| P258NT | 4" | 48 |
| P258PT | 5" | 30 |
| P258RT | 6" | 30 |

## Swedge Coupling

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E242J | 2" | 48 |

## 5° Angle Coupling S x S

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E2440N5 | 4" | 15 |
| E2440P5 | 5" | 20 |

# Adapters

## Male Adapter

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E943F | 1" | 50 |
| E943H | 1 1/2" | 25 |
| E943J | 2" | 50 |
| E943L-CAR | 3" | 5 |
| E943N-CAR | 4" | 5 |
| E943P | 5" | 5 |
| E943R | 6" | 10 |

## Female Adapter

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E942F | 1" | 50 |
| E942H | 1 1/2" | 25 |
| E942J | 2" | 30 |
| E942L-CAR | 3" | 3 |
| E942N-CAR | 4" | 7 |
| E942P | 5" | 8 |
| E942R | 6" | 6 |

# Reducers

## Swedge Reducer (Male x Male)

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E252LJ | 3" x 2" | 50 |
| E252NJS | 4" x 2" | 25 |
| E252NL | 4" x 3" | 25 |
| E252PN | 5" x 4" | 20 |
| E252RNS | 6" x 4" | 6 |
| E252RP | 6" x 5" | 10 |

# Markers

## Cable Marker

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E299JM | 2" x 42" | 1 |
| E299JP | 2" x 56" | 1 |
| E299JR | 2" x 78" | 1 |
| E299LF | 3" x 36" | 1 |
| E299LR | 3" x 60" | 1 |
| E299NX7 | 4" x 84" | 1 |

# End Bells

## End Bell

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E997F-CAR | 1" | 15 |
| E997H-CAR | 1 1/2" | 10 |
| E997J-CAR | 2" | 10 |
| E997L-CAR | 3" | 10 |
| E997N | 4" | 30 |
| E997P | 5" | 15 |
| E997R | 6" | 10 |

## Molded End Bell

(For use with P&C Duct only)

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E297J | 2" | 40 |
| E297L | 3" | 50 |
| E297N | 4" | 30 |
| E297P | 5" | 15 |

## Fabricated End Bell

(For use with P&C Duct only)

*Consult factory for additional sizes

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E297JN | 2" x 4" | 25 |
| E297LR | 3" x 6" | 20 |
| E297NT | 4" x 10" | 15 |
| E297PS | 5" x 8" | 10 |
| E297PT | 5" x 10" | 10 |
| E297RF | 6" x 5" | 10 |
| E297RT | 6" x 10" | 6 |

## Long Length End Bell P&C Duct

| Part No. | Size | Std. Ctn. Qty. |
|---|---|---|
| E297RR | 6"(6" long) | 10 |

Note: for manhole terminations



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# 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 | $3.30 \times 10^{-5}$ | $3.30 \times 10^{-5}$ |
| 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 |
| 1 1/2 | – | – | 10 | – | 15 |
| 2 | 20 | 20 | 20 | – | 25 |
| 3 | 20 | 30 | 40 | 45 | 50 |
| 3 1/2 | 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

Concrete Height – 4 x 5.563" + 4 x 3 =
22.5 + 12" = 34.2"

Hydraulic Pressure – (34.2"/12) x 1.03 = 2.9 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.

Concrete Height – 8 x 5.563" + 8 x 3 =
44.5 + 24" = 68.5"

Hydraulic Pressure — (68.5"/12) x 1.03 = 5.9 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%.


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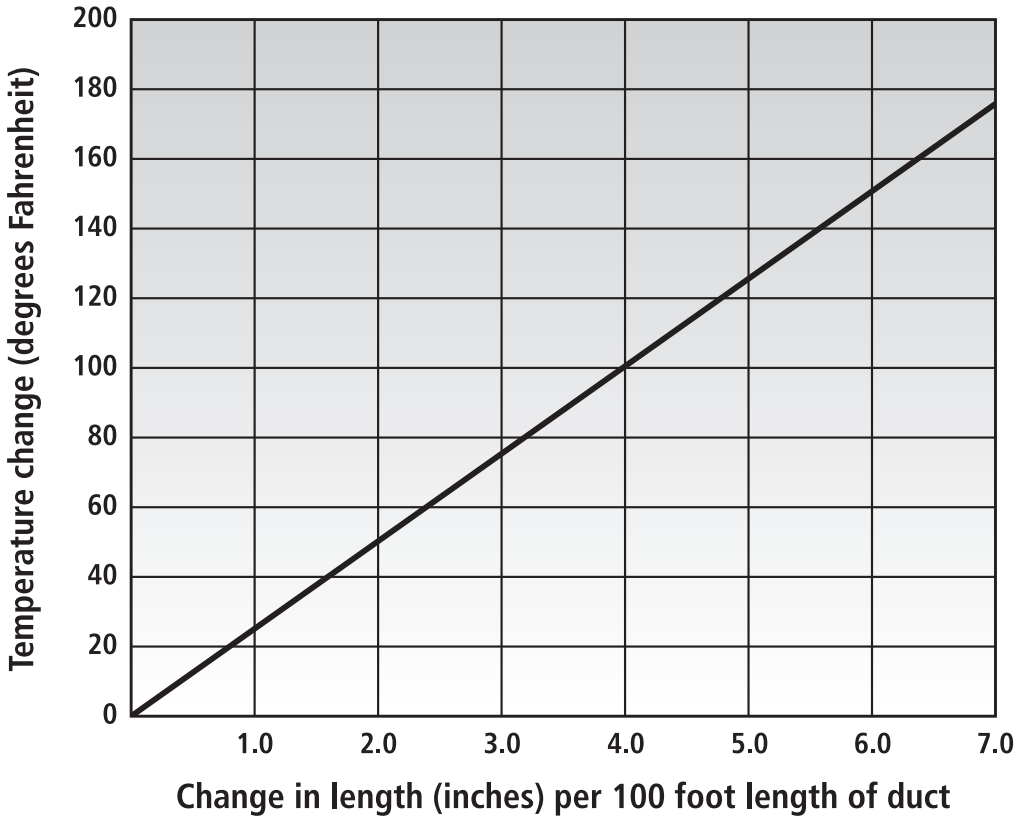
# Expansion & Contraction

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 x $10^{-5}$ 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.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WM TAO & ASSOCIATES
CONSULTING ENGINEERS

# Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: June 29, 2016

Attention: **stl-cac@cannondesign.com**

Contact Person / WTA Field Inspector: Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Bill Shaw

Project No. WT 14127.01

☐ UPS ☐ Courier ☒ **Email**

| Copies | No. | Description |
|---|---|---|
| 1 PDF | 261300E03 | (Submittal No. 261300-003) – Raceways & Boxes |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Remarks:

c: **Kelvin Patel**
**Kpatel@cannondesign.com**

☒ **Furnish as Submitted** ☐ Furnish as Noted

☐ Rejected ☐ Revise & Resubmit

☐ Reviewed ☐

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for review of general conformance with the design concept of project and general compliance with information given in contract documents. Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

**WTASHOP - Webster ISB - 26 1300-003**

---

**From:** STL-CAC <STL-CAC@CANNONDESIGN.COM>
**To:** 'Patrick Garner' <pgarner@wmtao.com>, WTASHOP <wtashop@wmtao.com>
**Date:** 6/20/2016 5:06 PM
**Subject:** Webster ISB - 26 1300-003
**Cc:** "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>, "Grossman, Lynn" <lgrossman@C...
**Attachments:** 261300-003 Raceways and Boxes.pdf

---

Attached for review.

**Melissa Pirtle**
Construction Admin
CANNONDESIGN
1100 Clark Ave
St. Louis, Missouri 63102
T 314.425.8797 • M
cannondesign.com

CANNONDESIGN

# SUBMITTAL IDENTIFICATION SHEET

**To be completed by Contractor/CM**

WEBSTER UNIVERSITY ISB
PROJECT NAME

8274 BIG BEND BLVD
ADDRESS

NUMBER

WEBSTER UNIVERSITY
OWNER

CANNON DESIGN
ARCHITECT / ENGINEER

Joe Voypick
SUBMITTED BY

261300-003
CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

261300
SPECIFICATION SECTION / PARAGRAPH

Guarantee Electrical
MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

◯ CRITICAL

ITEM BEING SUBMITTED (check only one)

- ◉ Shop Drawings
- ◯ Samples ( _____ copies)
- ◯ LEED Submittal
- ◯ Certification / Qualifications
- ◯ Record Documents
- ◯ Product Data
- ◯ Coordination Drawing
- ◯ Calculations
- ◯ Schedules
- ◯ O&M Manuals
- ◯ Other _____

ITEM BEING SUBMITTED FOR (check only one)

◉ Action ◯ Information Only ◯ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:
Devin D. Gates

Joe Voypick
REVIEWED BY

6/20/16
DATE

**To be completed by Reviewer**

26 1300-003
CANNON DESIGN SUBMITTAL NUMBER

6/21/16
RECEIVED DATE

- ◯ A. No Exceptions Taken
  No further review of submittal is required.
- ◯ B. Make Corrections Noted
  Incorporate corrections in work; resubmission is not required.
- ◯ C. Revise and Resubmit
  Revise as noted, and resubmit for review.
- ◯ D. Rejected
  Submittal is not in compliance with Contract Documents; provide new submittal.
- ◯ E. For Record / Information Only
  Submittal was reviewed for Record / Information purposes only.
- ◯ F. Not Required for Review
  Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

A/E COMMENTS ◯ See attached sheet(s) for additional comments

REVIEWED BY

DATE

77 Westport Plaza
Suite 250
St. Louis, MO 63146

# TRANSMITTAL

**No. 15051-0097**

*Paric Corporation*

**PROJECT:** 15051-Webster University Interdisciplinary Science Building

**DATE:** 06/20/2016

**TO:** Cannon Design
1100 Clark Ave
St Louis MO 63102

**RE:** Raceways and Boxes

**ATTN:** Kelvin Patel

**JOB: 15051**

| WE ARE SENDING: | SUBMITTED FOR: | ACTION TAKEN: |
|---|---|---|
| ☐ Shop Drawings | ☑ Approval | ☐ Approved as Submitted |
| ☐ Letter | ☐ Your Use | ☐ Approved as Noted |
| ☐ Prints | ☐ As Requested | ☐ Returned After Loan |
| ☐ Change Order | ☐ Review and Comment | ☐ Resubmit |
| ☐ Plans | | ☐ Submit |
| ☐ Samples | **SENT VIA:** | ☐ Returned |
| ☐ Specifications | ☐ Attached | ☐ Returned for Corrections |
| ☑ Other: Product Data | ☐ Separate Cover Via: | ☐ Due Date: |

| *Item* | *Package* | *Code* | *Rev.* | *Copies* | *Date* | *Description* | *Status* |
|---|---|---|---|---|---|---|---|
| Submittal | | 261300-003 | 1 | | 06/20/2016 | Raceways and Boxes | Submitted |

**NOTES:**

**CC:** Paric Corporation, Kathy Bathe

**Project Coordinator:** Paric Corporation, Kathy Bathe

**Signed:** _____
Devin Gates

GUARANTEE
ELECTRICAL CONSTRUCTION

3415 Bent Avenue
St. Louis, MO 63116
Phone: (314) 772-5400
Fax: (314) 772-2526

# Transmittal

To Paric Corporation

Date 6/16/16

Job Number 11317

Job Name Webster Univ. ISB Building

Attention Devin Gates

Transmittal Number 11317-003

We are sending you:

- X Attached
- ___ Under separate cover, the following:
- ___ Preliminary Drawings
- ___ Samples
- ___ Construction Drawings
- ___ Copy of Letter
- ___ Specifications
- ___ Other

| Quantity | Drawing # | Date/Revision | Description |
|---|---|---|---|
| 1 | | | Submittal for Raceways & Boxes - Spec |
| | | | Section 26 13 00 |
| | | | |
| | | | |
| | | | |

These are transmitted as checked:

- X For Your Review & Comment
- X For Approval
- ___ For Your File
- ___ As Requested
- ___ Approved As Noted
- ___ Returned For Corrections
- ___ Approved As Submitted
- ___

Copy: Transmittal Enclosure

___ ___

___ ___

___ ___

*Rick Branstetter*

Signed: Rick Branstetter, Project Manager