

Addendum No. 1
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If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Division of Engineering Services - Office Engineer

Attachments

CONDUIT AND INNERDUCT SEALING PLUGS

Except as otherwise noted, all conduits and empty innerducts shall have their ends sealed with commercial preformed plugs which prevent the passage of gas, dust and water into these conduits and their included innerducts. Sealing plugs shall be installed within each manhole, pull box and cabinet.

Sealing plugs shall be removable and reusable. Plugs sealing innerducts, conductor or cable shall be the split type that permits installation or removal without removing conductors or cables.

Sealing plugs that seal between the Size 103 conduit and innerducts shall seal the conduit and all innerducts simultaneously with one self contained assembly having an adjustable resilient filler of neoprene or silicone rubber clamped between backing ends and compressed with stainless steel hardware.

Sealing plugs that seal the innerducts shall seal each innerduct individually with appropriate sizes and configuration to accommodate either empty ducts or those containing signal interconnect cable. To provide suitable sealing between the varying size cables and the plugs, split neoprene or silicone adapting sleeves, used singularly or in multiples, shall be inserted within the body of the plugs.

Sealing plugs used to seal Size 103 conduit and innerducts shall be capable of withstanding a pressure of 34.5 kPa.

A sealing plug that seals an empty conduit or innerduct shall have an eye or other type of capturing device (on the side of the plug that enters the conduit) to attach onto the pull tape, so the pull tape will be easily accessible when the plug is removed.

Full compensation for conduit and innerduct sealing plugs shall be considered as included in the lump sum price paid for Signal Interconnect System and no additional compensation will be allowed therefor.

10-3.04.5 HIGH DENSITY POLYETHYLENE INNERDUCT

GENERAL

High density polyethylene (HDPE) innerduct for communications applications shall conform to the details shown on the plans, these special provisions, and as directed by Engineer.

MATERIAL

High density polyethylene innerduct shall be manufactured from high density polyethylene virgin compounds.

High density polyethylene compounds used in the manufacture of innerduct shall conform to the following Cell Classifications specified in ASTM Designation: D 3350:

Property	Cell Classification
Density	3
Melt index	3 or 4
Flexural modulus	4 or 5
Tensile strength	4
Environmental stress crack resistance	3
Hydrostatic design basis	0, 1, 2, 3 or 4
Ultraviolet stabilizer	C ^b
b	HDPE resin shall contain not less than 2 ±0.5 percent carbon black ultraviolet stabilizer.

Innerduct high density polyethylene innerduct size (nominal trade inside diameter) and location shall be as shown on plans. Innerduct shall be the smooth interior wall type.

High density polyethylene innerduct shall be suitable for cable and conductor installation methods as described in Section 86 of the Standard Specifications, in these special provisions, and in "Air Blown Method" as described elsewhere in these special provisions.

Each high density polyethylene innerduct color shall be a different color and shall be consistent for the project. UL listing is not required.

Innerduct shall contain carbon black ultraviolet shielding suitable for the conduit to sustain unprotected outdoor exposure for at least one year.

Innerduct shall be continuously marked with clear, distinctive and permanent markings at intervals not greater than 2 meters. The marking shall be in a contrasting color to the conduit color. The height of the marking shall be approximately 2.5 mm or larger. Innerduct marking information shall include, as a minimum, the following information:

- A. Nominal Size
- B. Dimension Ratio (DR)
- C. Manufacturer Name and Product/Model Number
- D. Material Code
- E. Plant Identification
- F. Production Date
- G. Cell Classification

Coils and reels shall have sequential measurement markings every meter.

High density polyethylene innerduct shall be DR 11 per ASTM D3035 for controlled outside diameter.

High density polyethylene innerduct shall be IPS outside diameter controlled in accordance with the manufacturer's production tolerances. The wall thickness of DR or SDR sized innerduct shall be in accordance with the manufacturer's production tolerances.

High density polyethylene innerduct shall meet or exceed the following:

PROPERTY	TEST METHOD (ASTM unless shown otherwise)	UNIT	VALUE (Nominal)
Material Classification	D 3350		PE33 or PE34
Density	D 1505	g/cm ³	0.941
Flow Rate	D 1238	g/10 Min.	0.40
Flexural Modulus	D 790	MPa	552
Tensile Strength	D 638	MPa	20.6
Environmental Stress Crack Resistance	D1693	Hours	Meet Cell Classification 3
HDB @ 23°C	D 2837	MPa	Meet Cell Classification 0, 1, 2, 3 or 4
UV Stabilizer	D 1603	%C	not less than 2
Hardness	D 2240	Shore D	60-68
Elongation	D 638 (50.8 mm/Min)	%, minimum	750
Brittleness Temperature	D 746	°C	<-75
Vicat Softening Temperature	D 1525	°C	123

JOINING OF INNERDUCT

Innerduct shall be joined by heat fusion. Heat fusion (includes electrofusion) of high density polyethylene innerduct shall be by methods recommended by the innerduct manufacturer, and with equipment approved for the purpose. Equipment shall not expose innerduct to direct flame. Heat fusion shall be performed by conduit manufacturer certified or authorized personnel. A minimum of 2 test fusions, by each fusion operator, shall be demonstrated to the Engineer prior to performing fusion operations on any high density polyethylene innerduct to be installed.

INSTALLATION

High density polyethylene innerduct shall be installed at underground locations only.

Innerduct bends, except factory bends, shall have a radius of not less than the manufacturer's recommended minimum bend radius. Where factory bends are not used, innerduct shall be bent, without crimping or flattening, using the longest radius practicable.

Bending of high density polyethylene innerduct shall be by methods recommended by the innerduct manufacturer, and with equipment approved for the purpose. Equipment shall not expose innerduct to direct flame.

Attention is directed to "Conduit" in these special provisions regarding sealing conduit and innerduct.

The ends of high density polyethylene innerduct shall be capped until the installation of cable is started.

A pull tape, conforming to Section 86-2.05C, "Installation," of the Standard Specifications shall be installed in innerducts which are to receive future conductors.

CERTIFICATES OF COMPLIANCE, MATERIALS RECEIVING INSPECTION AND MANUFACTURER'S DATA

In conformance with the provisions in Section 6-1.07, "Certificates of Compliance," a Certificate of Compliance shall be furnished to the Engineer for each type of high density polyethylene innerduct furnished. The certificate shall also certify that the high density polyethylene innerduct complies with the requirements of these special provisions, and shall include the resin material Cell Classification, unit mass of pipe, average pipe stiffness and date of manufacture.

Innerduct, when delivered to the site, which exhibits damage in excess of 10 percent of the innerduct wall thickness may be rejected by the Engineer. Innerduct exhibiting damage which does not meet the manufacturer's recommendations for usable innerduct may also be rejected by the Engineer. Innerduct sections may be repaired if approved by the Engineer. Replacement or repair of rejected innerduct shall be at the Contractor's expense.

Two copies of the manufacturer's product technical specification information shall be furnished to the Engineer at least two weeks subsequent to the start of the scheduled delivery.

Two copies of the manufacturer's test data for the delivered shipment shall be furnished to the Engineer at the time of the delivery.

AIR BLOWN METHOD

At the Contractor's option, installation of innerduct into existing conduit may be performed using an "Air Blown Method".

The "Air Blown Method" shall be an installation method that uses a mechanical device combined with a high speed flow of compressed air to place cables or innerducts into conduits, ducts or subducts.

The "Air Blown Method" shall conform to the following:

- A. The method shall install cable or innerduct without exceeding the cable or innerduct manufacturers' tensile and compressive strength ratings.
- B. The mechanical device shall be used to provide a pushing force on the cable or innerduct into the conduit.
- C. The cable or innerduct installation equipment shall also have, at minimum, the following features:
 1. Controls to regulate the flow rate of compressed air entering the conduit, duct or subduct, and any hydraulic or pneumatic pressure applied to the cable or innerduct.
 2. Safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.
 3. Measuring device to determine the speed of the cable or innerduct during installation and the length of the cable or innerduct installed.

Information on the proposed "Air Blown method" shall be submitted to the Engineer. The submittal shall include, but not be limited to, the following items:

- A. Project description;
- B. List or plan sheet marked to identify the conduits, cables and innerducts involved;
- C. Equipment description and specifications;
- D. Manufacture's test data covering the performance of the equipment and cable or innerduct stress in a typical installation using cable or innerduct equivalent to cable or innerduct to be installed on this project; and
- E. User/Installer Manual for the equipment and installation procedures.

Within 30 days after the approval of the contract, the Contractor shall submit 2 copies of the proposed "Air Blown Method" to the Engineer. The Contractor shall allow 15 days for the Engineer to review the proposed "Air Blown Method". If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the proposed "Air Blown Method" within 5 days of receipt of the Engineer's comments and shall allow 5 days for the Engineer to review the revisions. Upon the Engineer's approval of the proposed "Air Blown Method", 2 additional copies of the proposed "Air Blown Method" incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the proposed "Air Blown Method". In order to allow construction activities to proceed, the Engineer may conditionally approve, in writing, the proposed "Air Blown Method" while minor revisions or amendments are being completed.

The submitted "Air Blown method" shall not be used until it has been approved in writing by the Engineer.

Three innerducts shall be installed in each Size 103 conduit as shown on the plans.

Innerduct within a conduit run shall be continuous without splices or joints.

The innerducts shall be shipped on reels marked with the manufacturer, the contract number, and the size and length of the innerduct. The product on reels shall be covered with aluminized material to protect colors from UV deterioration during shipment and storage.

Installation procedures shall conform to the procedures specified by the innerduct manufacturer.

Full compensation for installing three 25 mm innerducts into existing conduit, including pull tape shall be considered as included in the lump sum price paid for Signal Interconnect System and no additional compensation will be allowed therefor.