

# Carlton® Electrical Listed High Density Polyethylene (HDPE) Conduit

*Listed to  
UL 651 A&B Standard*

*Multiple Colors and  
Stripes*

*Straight Lengths, Coils  
and Reels*

*Trenching, Plowing,  
Directional Boring*

*Full Line of Couplings  
and HDPE to PVC  
Transition Adapters*

*Fusible Joint Assembly*

*Flexible and Lightweight*



**MEMBER**  
Plastics Pipe Institute (PPI)  
[www.plasticpipe.org](http://www.plasticpipe.org)

# Listed HDPE Conduit



ETL Listed to  
UL 651 A & B  
in compliance to  
the NEC

**ETL Listed HDPE** is a nonmetallic flexible raceway manufactured from High Density Polyethylene (HDPE), offering a protective pathway for cables and wires, and is used in underground or innerduct applications.

ETL Listed HDPE conduit is compliant with the NEC Articles 300 and 353, and is listed to UL 651 A & B. Its high tensile strength-to-weight ratio, superior crush resistance, and low coefficient of friction when installing cable makes it ideal for directional boring.

\*Refer to UL 651B standards/ specifications for dimensional requirements.

**Applications:** Underground (direct bury), or placed inside existing duct (innerduct). Ideal for use in parking lots, traffic lights, etc.

**Installation methods:** Plowing, open/continuous trench, directional boring or pulled through existing conduit.

## ETL Listed Options

- Wall type/sizes:
  - Schedule 40 1" – 4"
  - Schedule 80 2" – 6"
  - EPEC-B (SDR 13.5) 2" – 6"
- Multiple colors and stripes
- Sequentially marked footage
- Available in smoothwall only
- Conforms to NEMA TC-7 Smoothwall Coilable PE Electrical Plastic Conduit



**Directional Boring**



**Open Trench**

Reference *Plastics Pipe Institute PE Pipe Handbook* for installation and engineering recommendations. ([www.plasticpipe.org](http://www.plasticpipe.org))





## Specifications

### 1.0 General

**1.1** Carlon HDPE duct is manufactured to the following various industry standards and specifications for dimensional requirements.

**UL 651A** Type EB and A Rigid PVC Conduit and HDPE conduit.

**UL 651B** Continuous Length HDPE.

**ASTM F 2160** Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD).

**ASTM D 3035** Polyethylene (PE) Plastic Pipe (SDR) Based on Controlled Outside Diameter.

**NEMA TC-7** Smooth Wall Coilable Polyethylene Electrical Plastic Conduit.

### 2.0 Material

Carlon duct is manufactured from a suitable thermoplastic polymer conforming to the minimum standard of PE334420E/C as defined in ASTM D3350. (see table 1)

### Carlon® High Density Polyethylene

duct is manufactured in the following configurations:

**Smoothwall** – Smooth Interior and Smooth Exterior wall.

### 3.0 Product Description

Polyethylene conduit is an extruded coilable tubing for use as a single or multiple raceway.

The conduit may be direct buried, encased in concrete and used as innerducts.

Innerducts are used primarily to provide multiple raceways within an existing conduit system.

### 4.0 Ovality

Conduit 3" or larger supplied on reels needs to be re-rounded as outlined in ASTM F2160.

### Table 1 – Resin Properties

The resin properties shall meet or exceed the values listed below for HDPE.

ASTM Test	Description	Values HDPE
D-1505	Density g/CM <sup>3</sup>	.941 - .955
D-1238	Melt Index, g/10 min Condition E	.05 - .50
D-790	Flexural Modulus, MPa (PSI)	80,000 min.
D-638	Tensile strength at yield (psi)	3000 min.
D-1693	Environmental Stress Crack Resistance Condition B,F <sub>10</sub>	96 hrs. min.
D-746	Brittleness Temperature	-75°C

Requests for certifications must be requested at time of quote

## Specifications

Nom. Size	Nom. ID	Nom. OD	Min. Wall	Wt/ 100 Ft.	Pull Tensile Safe lbs.
<b>SCHEDULE 40 - ASTM D2447 / F2160 / NEMA TC-7 EPEC-40</b>					
1"	1.049	1.315	0.133	21.185	551
1-1/4"	1.380	1.660	0.140	28.677	747
1-1/2"	1.610	1.900	0.145	34.293	893
2"	2.067	2.375	0.154	46.093	1200
2-1/2"	2.469	2.875	0.203	73.096	1903
3"	3.068	3.500	0.216	95.591	2488
4"	4.026	4.500	0.237	136.152	3544

Nom. Size	Nom. ID	Nom. OD	Min. Wall	Wt/ 100 Ft.	Pull Tensile Safe lbs.
<b>SCHEDULE 80 - ASTM D2447 / F2160 / NEMA TC-7 EPEC-80</b>					
2"	1.939	2.375	0.218	63.368	1650
2-1/2"	2.323	2.875	0.276	96.667	2516
3"	2.900	3.500	0.300	129.370	3368
4"	3.826	4.500	0.337	189.059	4922
5"	4.812	5.562	0.375	262.125	6824
6"	5.761	6.625	0.432	360.534	9386

Nom. Size	Nom. ID	Nom. OD	Min. Wall	Wt/ 100 Ft.	Pull Tensile Safe lbs.
<b>SDR 13.5 - ASTM D3035 / F2160 / NEMA TC-7 EPEC-B</b>					
2"	2.023	2.375	0.176	52.155	1358
2-1/2"	2.449	2.875	0.213	76.410	1989
3"	2.982	3.500	0.259	113.120	2945
4"	3.834	4.500	0.333	186.994	4868
5"	4.738	5.562	0.412	285.934	7444
6"	5.643	6.625	0.491	405.869	10566

Pull Tensile Safe = Based on Plastic Pipe Institute tensile calculations and maximum tensile stress recommendations of 1/3 yield tensile for pulls of 30 to 60 minutes or less in directional drilling applications and pulling as innerduct into conduit.

# Listed HDPE Conduit



## Custom Orders

- \* Custom Orders are not returnable
- \* Custom lengths are available in minimum order quantities specified on quote request

### How to Build a Part Number:

Product	Size	Type	Wall	Options	Splits	Color	Stripes	Pull Tape	Length
U = Listed	5 = 1" 6 = 1-1/4" 9 = 1-1/2" 13 = 2" 14 = 2-1/2" 15 = 3" 16 = 4" 18 = 5" 22 = 6"	C = Smooth/Smooth	4 = SCH 40 1" - 4" 5 = SCH 80 2" - 6" 9 = SDR 13.5 2" - 6"	N = None D = Lube Duct	1 = 1 Way Single 5 = 2 Way 6 = 3 Way 7 = 4 Way Sizes 1" - 2"	A = Black E = Gray K = Red	NN = None 3A = Black Stripes 3K = Red Stripes	A = EMPTY B = 1130 lbs. C = 1250 lbs. E = 1800 lbs. J = 2500 lbs.	1500 (Equals 1500 Feet)

Size	HDPE SOLIDWALL	Type	Wall	Color	Pull Tape	Reel/Coil Length	Wt. per 100 Ft.	Reel Size* F x W x D
1"	U5C4N1A3KB500	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	500	21.36	Coil
	U5C4N1A3KB1000	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1000	21.36	48 x 32 x 24
	U5C4N1A3KB1800	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1800	21.36	48 x 32 x 24
	U5C4N1A3KB2500	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	2500	21.36	48 x 44 x 24
1 1/4"	U6C4N1A3KB500	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	500	28.91	Coil
	U6C4N1A3KB1000	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1000	28.91	48 x 44 x 30
	U6C4N1A3KB2500	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	2500	28.91	66 x 32 x 30
1 1/2"	U9C4N1A3KB1000	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1000	34.57	48 x 44 x 30
2"	U13C4N1A3KB1000	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1000	46.47	66 x 44 x 40
	U13C5N1A3KB1000	S/S	ETL Sch. 80	Black w/ Red Stripes	1130 lb. Polyester	1000	66.88	66 x 44 x 40
3"	U15C4N1A3KB500	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	500	96.37	82 x 44 x 64
	U15C5N1A3KB500	S/S	ETL Sch. 80	Black w/ Red Stripes	1130 lb. Polyester	500	130.42	82 x 44 x 64
	U15C4N1A3KB1000	S/S	ETL Sch. 40	Black w/ Red Stripes	1130 lb. Polyester	1000	96.37	96 x 44 x 64
	U15C5N1A3KB1000	S/S	ETL Sch. 80	Black w/ Red Stripes	1130 lb. Polyester	1000	130.42	96 x 44 x 64
4"	U16C5N1A3KB550	S/S	ETL Sch. 80	Black w/ Red Stripes	1130 lb. Polyester	550	190.60	96 x 44 x 64
	U16C9N1A3KA500	S/S	ETL SDR 13.5	Black w/ Red Stripes	Empty	500	188.52	96 x 44 x 64
5"	U18C9N1A3KA550	S/S	ETL SDR 13.5	Black w/ Red Stripes	Empty	550	288.31	120 x 48 x 85
6"	U22C9N1A3KA450	S/S	ETL SDR 13.5	Black w/ Red Stripes	Empty	450	409.16	120 x 48 x 85

\*Outside dimensions

## Truckload Quantities

### Reels

#### Flatbed (48 ft.)

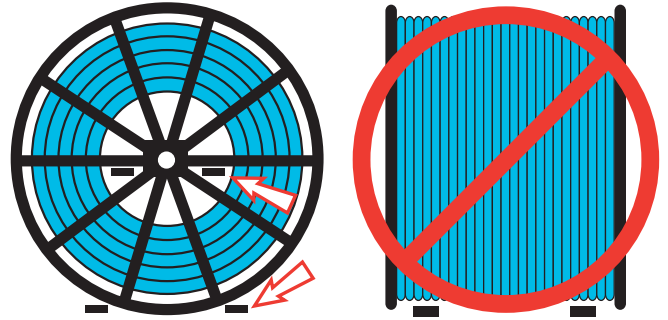
Reel Size	Number of Reels per Truckload
48"	24
66"	18
72"	16
82"	14
84"	14
96"	12
102"	12

#### Step Deck Flatbed

Reel Size	Number of Reels per Truckload
114"	8
120"	8

NOTE: Two additional reels, 102" or smaller, can fit on the upper deck.

### Loading Reels



Reels must be lifted from the side with lift truck forks inserted through the spokes of the reel, or at the bottom with entry from the side of the reel. Reels should NEVER be lifted from the front of the reel or contact innerduct.

### Bundles 40 ft Lengths

Size	# of Lengths per Bundle	Ft. per Bundle 40 ft. Lengths	Bundles per Truck	Total Feet per Truck 40 ft. Lengths
2"	98	3920	12	47040
3"	50	2000	14	28000
4"	29	1160	14	16240
6"	26	1040	8	8320



### Coils 500 ft

Size	Pallet Size	No. Coils coils per Pallet 500 ft.	Coils per Truck	Total ft. per Truck 500 ft.
1"	48"	8	22	88000
1 1/4"	84"	8	56	28000

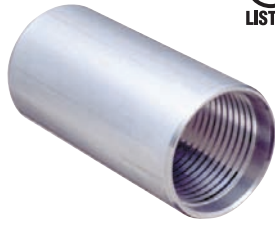


Standard length and custom coils available 1" - 6".  
Call for quantity and dimensions available.

# HDPE Conduit Accessories

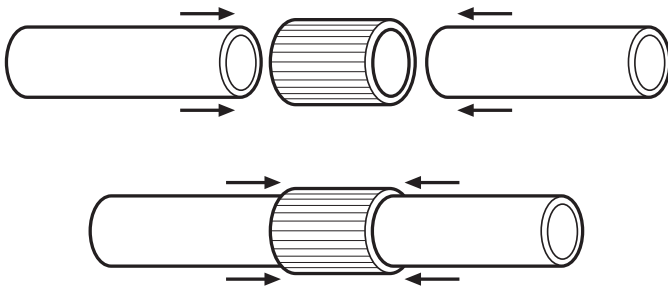
## Universal Aluminum Couplings

Self-threading, which draws each end of the conduit into the center of the coupler.



Part No.	Size	Nom. O.D. (Duct Range)	Std. Ctn. Qty.	Std. Ctn. Wt.
LS100	1"	1.21 – 1.41	100	25
LS125	1 1/4"	1.44 – 1.68	100	28
LS150	1 1/2"	1.80 – 2.02	50	15
LS200	2"	2.31 – 2.48	50	19
LS300	3"	3.495 – 3.505	12	10
LS400	4"	4.41 – 4.65	12	12

### Installation Instructions:



1. Square cut and de-burr edges of both Polyethylene ducts.
2. Insert end of each Polyethylene duct into the coupler.
3. While securely holding each duct, rotate coupler by hand to begin threading and continue rotating until ducts become secured in coupler.
4. Continue tightening with strap wrench or coupler tool until ducts are completely seated in coupler.

*Note: To ensure proper installation, measure inside of coupler to center rib and mark this distance on both ducts as a visual aid to ensure both ducts are fully seated in coupler.*

## HDPE to PVC Transition Couplings

Self-threading tapered threads on one side allows coupling on to HDPE. Other side threaded to PVC thread dimensions.



Part No.	Size	Nom. O.D. (of Duct)	Std. Ctn. Qty.	Std. Ctn. Wt.
LSTC100	1"	1.315"	100	25
LSTC125	1 1/4"	1.66"	100	28
LSTC150	1 1/2"	1.90"	50	15
LSTC200	2"	2.375"	50	19
LSTC300*	3"	3.50"	12	10
LSTC400*	4"	4.50"	12	12

\*UL Listing pending

### Installation Instructions:



1. Square cut end of Polyethylene duct and de-burr edge.
2. Insert end of Polyethylene duct into one end of the transition adapter.
3. While securely holding duct, rotate adapter by hand to begin threading and continue rotating until duct becomes secured in adapter.
4. Continue tightening with strap wrench or coupler tool until duct is completely seated in adapter.
5. Thread PVC Male Adapter into opposite end of transition adapter and rotate until the male adapter is completely seated in the transition adapter.
6. Apply PVC Solvent Cement onto the PVC Male Adapter and then insert spigot/plain end of the PVC conduit or elbow.

*Note: To ensure proper installation, measure inside of transition adapter to center rib and mark this distance on duct as a visual aid to ensure polyethylene duct is fully seated.*

## Butt Fusion

Butt Fusion joining process is an approved method of joining HDPE when joint fused appropriately. The following guidelines are provided in appendix A to provide a properly fused joint:

### Butt Fusion Time Cycles For Carlon HDPE Smoothwall Conduit Appendix A

Pipe Inches IPS	Heat Time @ 500 Deg. F (Seconds)	Heat Time @ 425 Deg. F (Seconds)	Heat Time Cool Time (Seconds)	Approx Melt Bead Width (inches)	Approx Finished Bead Width (inches)
1	16 – 20	27 – 32	90	1/16	1/16 – 1/8
1-1/4	20 – 24	35 – 40	90	1/16	1/16 – 1/8
2	28 – 32	52 – 57	90	1/8	1/8
3	32 – 38	59 – 66	180	1/8	1/8
4	38 – 44	68 – 75	210	3/16	3/16
5	44 – 56	77 – 82	225	3/16	3/16
6	56 – 66	80 – 90	240	3/16	3/16

Note: The information given above is an estimate and may vary depending upon prevailing weather and jobsite conditions. Recommended interface pressure on these sizes is 75 psi.

### BUTT FUSION

The most widely used method for joining individual lengths of large diameter polyethylene pipe is by heat fusion of the pipe butt ends. This technique, which precludes the need for specially modified pipe ends or couplings, produces a permanent, and economical connection. Field-site butt fusions may be made readily by trained operators using specially developed butt fusion machines that secure and precisely align the pipe ends for the fusion process.

#### The six steps involved in making a butt fusion joint are:

1. Securely fasten the components to be joined
2. Face the pipe ends
3. Align the pipe profile
4. Melt the pipe interfaces
5. Join the two profiles together
6. Hold under pressure

#### Secure

Each component that is to be fused must be held in position so that it will not move unless it is moved by the clamping device.

#### Face

The pipe ends must be faced to establish clean, parallel mating surfaces. Most, if not all, equipment manufacturers have incorporated the rotating planer block design in their facers to accomplish this goal. Facing is continued until a minimal distance exists between the fixed and movable jaws of the machine and the facer is locked firmly and squarely between the jaws. This operation provides for a perfectly square face, perpendicular to the pipe centerline on each pipe end and with no detectable gap.

#### Align

The pipe profiles must be rounded and aligned with each other to minimize mismatch (high-low) of the pipe walls. This can be accomplished by adjusting the clamping jaws until the outside diameters of the pipe ends match. The jaws must not be loosened or the pipe may slip during fusion. The minimal distance requirement between fixed- and moveable-jaws mentioned above allows the pipe to be rounded as close as possible to the joint area. The closer to the joint area that the pipe can be clamped, the better control the operator has in properly aligning the pipe.

#### Melt

Heat the ends of the pipe to the pipe manufacturer's recommended temperature, interface pressure, and time duration. By doing so, the heat will penetrate into the pipe ends and a molten "bead" of material will form at the pipe ends. Heating tools which simultaneously heat both pipe ends are used to accomplish this operation. These heating tools are normally furnished with thermometers to measure internal heater temperature so the operator can monitor the temperature before each joint is made. However, they can be used only as a general indicator because there is some heat loss from internal to external surfaces, depending on factors such as ambient temperatures and wind conditions. A pyrometer or other surface temperature measuring device should be used periodically to insure proper temperature of the heating tool. If temperature indicating crayons are used, do not use them on a surface which will come in contact with the pipe or fitting. Additionally, heating tools are usually equipped with suspension and alignment guides which center them on the pipe ends. The heater faces which come into contact with the pipe should be coated by the manufacturer to prevent molten plastic from sticking to the heater faces. Remaining molten plastic can interfere with fusion quality and must be removed according to the tool manufacturer's instructions.

#### Join

After the pipe ends have been heated for the proper time and to the proper temperature, the heater tool is removed and the molten pipe ends are brought together with sufficient pressure to properly mix the pipe materials and form a homogeneous joint. Use interface pressure and outer bead size of molten material as a guide for a proper joint. Machines for 4-inch diameter and smaller sizes are normally lever-operated. Many of these smaller machines can be fitted with torque wrenches to obtain a theoretical value which allows the operator to consistently apply the approximate force required to properly fuse a joint. Larger machines employ hydraulics with various types of control systems such as:

1. Manual with hydraulic hand pump.
2. Semi-automatic with motorized hydraulics including pressure reducing, selector, and directional control valves.
3. Fully automatic with computer- or microprocessor-control of the heat and fusion cycles and pressures.

#### Hold

The molten joint must be held immobile under pressure until cooled adequately to develop strength. The designs of the machines vary from a lever-arm-assist to manual or automatic locking devices that assist the operator to accomplish this step. The proper cooling times for the joint are material-, pipe-diameter-, and wall-thickness-dependent and are established by the pipe manufacturer. Allowing proper times under pressure for cooling prior to removal from the clamps of the machine is important in achieving joint integrity.

# Carlton® HDPE Quote Request

Date: \_\_\_\_\_ Needed By: \_\_\_\_\_ Destination: \_\_\_\_\_  
 Customer: \_\_\_\_\_ Account Number: \_\_\_\_\_ Application: \_\_\_\_\_  
 Rep Agency: \_\_\_\_\_ Market: \_\_\_\_\_ Power \_\_\_\_\_ Electrical

<b>1. PRODUCT TYPE</b> <input type="checkbox"/> U Listed HDPE <input type="checkbox"/> Certification Required _____ Specification <input type="checkbox"/> Custom Printline _____	<b>4. WALL TYPE</b> <input type="checkbox"/> 4 SCH 40 1" - 4" <input type="checkbox"/> 5 SCH 80 2" - 6" <input type="checkbox"/> 9 SDR 13.5 2" - 6"  4" Sch. 40 HDPE available in straight lengths only.	<b>7. COLOR</b> <input type="checkbox"/> A Black <input type="checkbox"/> E Grey	<b>10. QUANTITY</b> <table border="1" style="width: 100%;"> <tr> <td style="width: 80%; height: 20px;"></td> <td>Total Length Feet</td> </tr> <tr> <td style="width: 80%; height: 20px;"></td> <td>Max Reel Size</td> </tr> </table>		Total Length Feet		Max Reel Size								
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<b>2. SIZE</b> <input type="checkbox"/> 5 1" <input type="checkbox"/> 6 1-1/4" <input type="checkbox"/> 9 1-1/2" <input type="checkbox"/> 13 2" <input type="checkbox"/> 14 2-1/2" <input type="checkbox"/> 15 3" <input type="checkbox"/> 16 4" <input type="checkbox"/> 18 5" <input type="checkbox"/> 22 6"	<b>5. OPTIONS</b> <input type="checkbox"/> N Standard/No Options <input type="checkbox"/> D Lube Duct	<b>8. STRIPE</b> <input type="checkbox"/> NN NONE <input type="checkbox"/> 3E 3 Grey Stripes <input type="checkbox"/> 3K 3 Red Stripes	<b>Target Price:</b> _____ <b>Project Stage Bid/Buy:</b> _____ <b>Competitors:</b> _____ <b>Carlton Quote #:</b> _____ <b>Pricing Specialist:</b> _____												
<b>3. CONFIGURATION</b> <input type="checkbox"/> C Smooth Out/Smooth In	<b>6. REEL SPLITS</b> <input type="checkbox"/> 1 1- Way Single <input type="checkbox"/> 5 2- Way Parallel <input type="checkbox"/> 6 3- Way Parallel <input type="checkbox"/> 7 4- Way Parallel	<b>9. PULL LINE</b> <input type="checkbox"/> A Empty <input type="checkbox"/> B 1130 lbs. Polyester Tape <input type="checkbox"/> C 1250 lbs. Polyester Tape <input type="checkbox"/> E 1800 lbs. Polyester Tape <input type="checkbox"/> J 2500 lbs. Polyester Tape	<b>Minimum Custom Run Quantities:</b> <table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>Reels</th> <th>Straight Lengths</th> </tr> </thead> <tbody> <tr> <td>1"</td> <td>5000 ft.</td> <td></td> </tr> <tr> <td>1 1/4" - 2"</td> <td>2500 ft.</td> <td>5000 ft.</td> </tr> <tr> <td>2 1/2" - 6"</td> <td>1000 ft.</td> <td>2500 ft.</td> </tr> </tbody> </table>		Reels	Straight Lengths	1"	5000 ft.		1 1/4" - 2"	2500 ft.	5000 ft.	2 1/2" - 6"	1000 ft.	2500 ft.
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1"	5000 ft.														
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2 1/2" - 6"	1000 ft.	2500 ft.													

**Fax completed Quote Request to your Local Carlton Representative  
 Visit [www.carlton.com](http://www.carlton.com) to locate a Carlton Representative**

- Freight quoted F.O.B., origin (freight additional) from plant specified.
- Custom product non-cancelable 24 hours after order acknowledgement or production has started.

