Underground Conduit Pipe Specification
(Series 68)

Description
Corrugated dual wall flexible conduit pipe identified by its red outer layer and a white emblem line with a smooth interior wall.

Manufactured from virgin high-density polyethylene (HDPE) compounds, in 6-m long sticks for underground electrical systems; meets the specifications, requirements and test methods of IEC 61386-24 and CFE DF110-23.

Scope
This specification describes 50 mm to 200 mm (2 inches to 8 inches) flexible profile conduit used in underground electrical wiring systems in low and medium voltage.

Characteristics
- The double-walled structure (smooth interior and corrugated exterior) optimizes the performance of the most important mechanical characteristics, such as impact, compression, etc.
- Resistant to moisture and to chemical and corrosive agents in the soil which ensures a long service life and durability.
- Low coefficient of friction, between 0.15 and 0.20, for easy wiring.

Applications
Used in underground electrical systems built by open trenching, backfilled with either excavated material backfill or concrete encasement.
- Low and medium voltage electrical systems in commercial and industrial facilities, public lighting, housing developments, logistics and industrial parks, hotels, etc.; the electrical installation standard NOM-001-SEDE-2012 (NFPA 70: National Electrical Code) allows the use of pipes from 50 to 150 mm.
- In low and medium voltage electrical distribution systems, the CFE DCCSSUBT 2015 underground system construction specification allows the use of pipes from 50 to 100 mm.
- High-voltage transmission electrical systems, the CFE DCDLTS01 design specification of underground transmission lines allow to use pipes from 150 to 300 mm.
- In aerial-underground transitions of electrical distribution and transmission systems. In low and medium voltage distribution, the CFE DCCSSUBT 2015 underground system construction specification allows the use of 50 to 100 mm pipes; in high-voltage transmission, the CFE DCDLTS01 design specification of underground transmission lines allows to use pipes from 150 to 300 mm.

Material Properties
The pipe is manufactured from virgin high-density polyethylene resin (HDPE) that complies with the following:
- The material for the exterior wall shall conform with the minimum requirements of cell classification 435420E (see table 1) and have a 12-month weather resistance warranty from the date of manufacture.

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Table 1. Raw material properties

Physical Property	Cell Class	Specification	Test Method
Absolute density	4	0.947 g/cm³ to 0.955 g/cm³	ASTM D1505-18
Melt index	3	0.4 to 0.15 g/10 min at 190 °C and 2.16 kg	ASTM D1238-23a
Flexural modulus	5	758 MPa to 1103 MPa	ASTM D0790-17
Tensile stress	4	21 MPa to 24 MPa	ASTM D0638-22
Resistance to environmental stress cracking	2	Condition B, 100% Igepal (24 h and 50% of failure)	ASTM D1693-21
Hydrostatic design base	0	Not applicable	-
Color and UV stabilizer	E	Red color with UV stabilizer with 1-year weather resistance	ASTM D3350-24

Dimensions

Table 2. Dimensional characteristics

Nominal Diameter		Minimum Inside Diameter	Average Outside Diameter	Minimum total area available	Compressive Strength	Bending Resistance	Useful length
mm	**inch**	**mm**	**mm**	**mm²**	**N**	**Pliable / Not pliable**	**m**
50	2	50.0	64.3	1 963	250 / 450	Pliable	6
75	3	75.0	93.5	4 417	250 / 450	Pliable	6
100	4	100.0	121.9	7 854	250 / 450	Pliable	6
150	6	150.1	176.4	17 671	450	Pliable	6
200	8	200.1	233.5	31 416	450	Not pliable	6

Specifications

The flexible conduit pipes manufactured by ADS Mexicana comply with the specifications, requirements and test methods of IEC 61386-24 (table 3 of this specification).

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Table 3. Conduit Compliance with Specifications

Specification	Classification, type or specification	Specification Requirements	Test Method
Impact resistance	Type N Normal	No cracks and the bullet passes freely when it is hit with an energy of: **Diameter (mm)** / **Energy (J)** 38 and 50 / 15 75 / 20 100 / 28 150 / 40	IEC 61386-24, Clause 10.3
Resistance to compression	Type 250 or 450 (2", 3", 4") Type 450 (6", 8")	No cracks when compressed to 5% deflection and the force is at least **250 N** No cracks when compressed to 5% deflection and the force is at least **450 N**	IEC 61386-24, Clause 10.2
Electrical properties	Insulation Features	Dielectric strength: the leakage current is less than 100 mA when a voltage of 2 000 Vac is applied for 15 min. Insulation resistance: greater than 100 M when a voltage of 500 Vdc is applied for 1 min.	IEC 61386-1, Clause 11.3
Resistance to bending	Pliable (2", 3", 4")	Ball travels through the conduit with 95% of the minimum inside diameter when the pipe is bent at 90°	IEC 61386-24, Clause 10.4
Flame Propagation Resistance	Flame propagating	No Requirement and/or Test	IEC 61386-1, Clause 13.1.3
External influences 1: Protection against ingress of foreign solid objects	Hermetically sealed to dust (IP68)	No dust ingress when exposed inside a chamber for 8 hours	IEC 61386-1, Clause 14.1.2 and IEC 60529, Clauses 13.4 and 13.6
External influences 2: Protection against ingress of water	Temporary immersion in water (IP68)	No water ingress when submerged inside a tank for 30 minutes	IEC 61386-1, Clause 14.1.3 and IEC 60529, Clause 14.2.7
External Influences 3: Corrosion resistance	High	No requirement and/or test for non-metallic tubes	IEC 61386-1, Clause 14.2
Low temperature	No requirement for buried pipes; however, it is considered -5 °C.	No Requirement and/or Test	No reference
High temperature	No requirement for buried pipes; however, 90 °C is considered.	Gauge step after heating the tube to 90 °C for 4 hours and then subjecting it to a load of about 2 kg for 24 hours, then allowed to cool to room temperature	IEC 61386-1, Clause 12

Installation

Installation must be performed in accordance with the provisions set forth in ASTM D2321-20 and the installation recommendations available in the ADS Mexicana Installation Manual. Download this manual from the ADS Mexicana website.

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