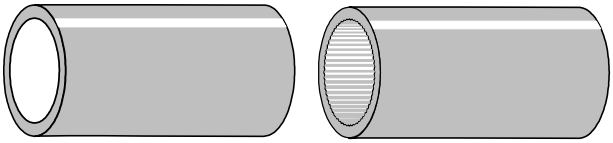
HDPE CABLE DUCT (or 'Sub-Duct')



1 GENERAL

1.1 This document defines single continuous duct made from HDPE, according to paragraph 2.1.

1.2 It features a co-extruded, permanent low friction dry liner, to enable easy installation of fibre optic and power cables of suitable construction and design using commercially available cabling techniques and equipment for blowing, pulling and pushing.

1.3 HDPE duct is supplied in coils or on drums on request (wood or metal)

1.4 The finished product shall be free from cracks, holes, foreign inclusions or other defects that would impair its performance. It shall be smooth walled inside and out and conform to the requirements of this document. A ribbed internal surface is available on request.

1.5 The finished product shall be capped after manufacturing and during storage, transport, construction and installation to ensure that the ends are watertight and to prevent the ingress of contamination or foreign bodies likely to cause problems during cable installation.

1.6 Duct is also available with a pull-rope pre-installed (3kN or 8kN) on customer request. This is called 'rope-in-duct'.

2 RAW MATERIALS

2.1 The tensile strength of the polyethylene stated by the supplier shall be no less than 18MPa.

2.2 The derived density of the polyethylene shall be not less than 0.935 g/ml when determined in accordance with Appendix B of BS 3412 Method B5.

2.3 The melt flow rate of the polyethylene compound shall be less than 1.1g/600s when measured in accordance with ISO 1133 Method 720 Test condition 4.

2.4 The polyethylene shall be free from foreign matter.

2.5 Both the polyethylene compound and the dry lubricant shall be protected against thermal degradation so that adequate stabilisation is imparted for manufacturing processing of the material.

2.6 The polyethylene compound shall be adequately protected against ultraviolet degradation in accordance with ISO 877: Method 550B, normal daylight. Performance is based on maximum 6 months storage outdoors.

3 DIMENSIONS

3.1 The duct shall have dimensions (mm) as per the table below.

3.2 Ovality is the amount the greatest diameter exceeds the diameter at 90° to it, (at one position) divided by the average diameter. It is expressed as a percentage.

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a) On the extrusion line (before the drumming/coiling operation): The ovality shall not exceed 3% (ducts up to OD 40mm). For ducts over nominal 40mm, the ovality shall not exceed 5%.
b) Coming off the drum or coil: The ovality shall not exceed 7% (ducts up to OD 40mm). For ducts over nominal 40mm, the ovality shall not exceed 10%.

3.3 The weight (mass) of the duct shall be nominally as stated in the table.

'SIZE' OD/ID	SDR	Mean Outside Diameter			I.D.	Wall Thickness			Mass nom	Max install tension	
		min	NOM	max	nom	min	NOM	max	g/m	kN	kg
16 / 12	8.0	15.8	16	16.2	12	1.8	**2.0**	2.2	85	0.85	85
20 / 16	10.0	19.7	20	20.3	16	1.7	**2.0**	2.3	111	1.1	110
25 / 20	10.0	24.7	25	25.3	20	2.2	**2.5**	2.8	170	1.7	170
32 / 26	10.7	31.7	32	32.3	26	2.7	**3.0**	3.3	255	2.6	260
40 / 33	11.4	39.7	40	40.3	33	3.2	**3.5**	3.8	383	3.7	370
40 / 35	16.0	39.7	40	40.3	35	2.2	**2.5**	2.8	280	2.7	270
50 / 42	13.5	49.5	50	50.5	42.6	3.4	**3.7**	4.0	544	5.4	540
63 / 50	9.7	62.7	63	63.3	50	6.2	**6.5**	6.8	1105	11	1100

↳'SDR' is the standard dimension ratio (OD / wall). Lower SDRs indicate heavy-duty sizes.

4 PERFORMANCE

4.1 TENSILE: The duct shall withstand the stated axial load when applied at 100mm/min to a 500mm gauge length. The elongation due to this load shall not exceed 5%.

NB: The expected tensile 'yield' load causes total failure of the duct. 'Yield' load is not a safe working load. At this load, the duct has normally elongated by around 10%, and then continues to elongate to failure.

4.2 a) INSTALLATION of DUCT: We recommend that installation tension does not exceed that specified maximum installation tension in the previous table, and that correct installation procedures and equipment are followed by trained and competent installers. Pulling duct causes temporary elongation, which reduces when the tensile load is released. After pulling and before cutting or connecting the duct, allow suitable relaxation time, ideally 24 hours or more. Duct to duct jointing should always use suitable connectors as specified by Emtelle and with a grab ring retention system and O Ring sealing system.
b) INSTALLATION of Cable into DUCT: Use Emtelle recommended methods, equipment and procedures only. Do not exceed the installation air pressure listed below.

4.3 STIFFNESS of each duct at 5% deflection shall exceed that stated below. (Test to ASTM 2412)

4.4 COMPRESSION: The load expected to give 15% deflection on a 200mm length is given. (to EN 50086-2-4)

4.5 IMPACT: All duct shall withstand (ie no cracks) a 15J impact at -5°C when tested to EN 50086-2-4.

4.6 COIL SET: When 100m of duct is laid out and allowed to relax, the central part, excluding ends, shall lie substantially straight.

4.7 FRICTION: The frictional force (horizontal) on a standard, specified 8kN pull-rope shall be less than 390N when lifting a 25kg mass (vertical) at a speed of 0.5m/min. The duct sample containing the rope shall be 5m long, and include a 450° loop of diameter 0.75m. .

4.8 BENDING: Minimum recommended bend radius is as stated. If temp is below 5°C, MBR is greater, as stated. Do not install the cable duct below the specified MBR. Remember that the **greater** the installed bend radius, the less stress will be induced in the duct, and the easier that cables will blow or pull

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around the curve.

OD / ID	4.1 Tensile test load (N)	4.1 Expected tensile yield load (N) #	4.2 Max recommend blow pressure bar	4.3 Min stiffness ASTM 2412 kPa	4.4 Expected load at 15% compression on 200mm length		4.8 Min bend radius** for installation, handling and use	
					Newtons	kg	over 5°C	under 5°C
16 / 12	1000	2020	15				0.16m	0.22m
20 / 16	1300	2600	15				0.22m	0.3m
25 / 20	2000	4060	15	3000	1900	190	0.3m	0.4m
32 / 26	3000	6280	15	2100	1600	160	0.4m	0.55m
40 / 33	4500	9230	15	1800	1700	170	0.5m	0.7m
40 / 35	3200	6700	15				0.7m	1.0m
50 / 42	6400	13290	15	1200	1600	160	0.75m	1.05m
63 / 50	13000	26500	15				0.7m	1.0m

NOTE: Emtelle can supply a wide range of additional sizes. Please enquire.

4.9 MARKING**:** Unless otherwise requested, the duct shall be marked as below at one metre intervals:

Incremental metre-mark
Manufacturer's product code
Production date
Size of duct
Customer name and / or other special designations
(Colours and / or stripes are also available on request)

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