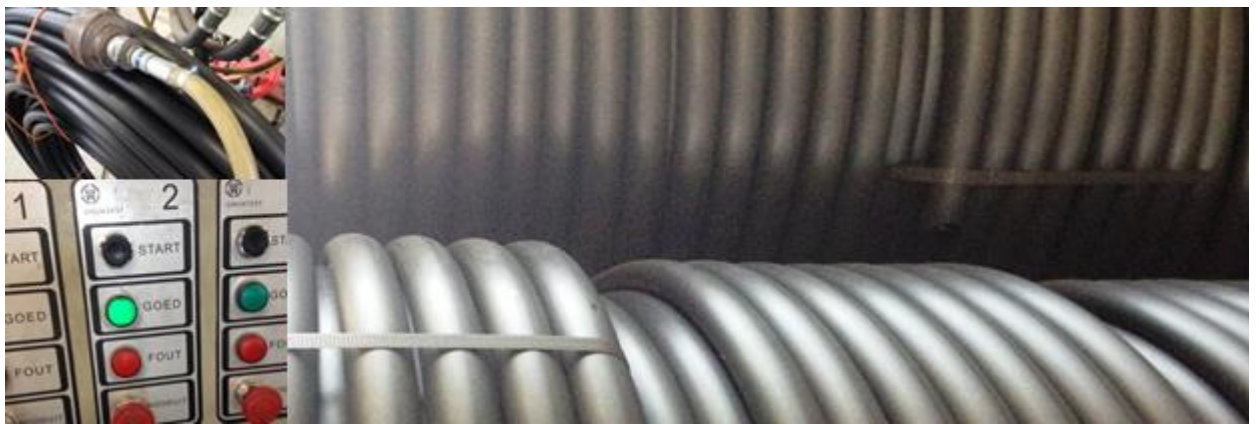


PRODUCTSPECIFICATION



TUBES | PE / PP TUBE

Product group : Tubes
Product : PE / PP Tube
Date : August 2014

PE / PP Tube

Introduction	<p>The requirements set out in this specification are used by H. Weterings Plastics B.V. in 's-Gravenzande in the production and delivery of polyethylene (LDPE and HDPE) and polypropylene (PP) tubes.</p> <p>Depending on the combination of materials and dimensions these products can be used as pressure or conveyance tubes for fluids, as floor heating or cooling tubes, as CO₂ tubes, or as part of drip irrigation systems, among others.</p>
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Supply programme

Size	Ø 5 to Ø 50 mm (see page 6 for common PE/PP tubes)				
Colour	Black.				
Length	Tube lengths up to 2500 metres (subject to size and packaging).				
Finishing		Mat.	Outside diameter	Wall thickness	Other
	Perforate	LDPE	Ø 6 – 40 mm	Up to 3.0 mm	Hole: 1 / 1.5 / 2 mm
	Cut open	LDPE	Ø 6 – 32 mm	Up to 3.0 mm	Axial cut
Packaging	Drums, rolls and bundles.				

Technical specifications

Material	All tubes are made of LDPE, HDPE or PP, to which only materials required for the fabrication and application were added, such as: pigment, UV stabilisers and antioxidants.				
	Property	LDPE	HDPE	PP	Unit
	Density	915 – 940	≥ 940	900 – 915	kg/m ³
	Melt index	0.15 – 0.90 (2.16 kg - 190°C)	0.30 – 1.30 (5.00 kg - 190°C)	1.00 – 1.80 (2.16 kg - 230°C)	g/10min
Appearance	Smooth, sound, clean and uniformly coloured on the outside and inside, as well as free of blisters, scratches, cavities, holes, impurities and other defects. The tube ends are smooth and finished at right angles.				

Dimensions	<i>Sizes in mm</i>	Tolerance						
		Outside diameter ¹⁾		Wall thickness		Inside diameter ¹⁾	Length ²⁾	
	Tube	Min	Max	Min	Max	Min	Min	Max
	Ø 5 to Ø 15	+0.1	+0.3	-0.0	+0.3	-0.5	-0.0	+10
Ø 15 to Ø 50	+0.1	+0.4	-0.0	+0.4	-0.7	-0.0	+20	
	1) Average							
	2) Length tolerances not applicable to tubes on roll or drum.							
Resistance to stress-cracking	To provide sufficient resistance to environmental stress-cracking under normal operating conditions, the tubes are made to endure tests as described in ISO 8796.							
Resistance to chemicals	<p>PE and PP are not resistant to aromatic and chlorinated hydrocarbons or solvents.</p> <p>In particular, you should <u>avoid</u> contact with benzene, benzole, bromine, chlorine, chloroform, dichloroethylene, ether, fluorine, aqua regia, oleum, ozone, propane, nitric acid, turpentine, tetrachloroethylene, trichloroethylene, vaseline, xylene, sulphuric acid, soap and soapy solutions.</p>							
Marking	<p>Tubes from Ø 16 mm on roll or drum, with an interval of 1 metre:</p> <p>Production code (ID and tracing), Size and Length indication (length).</p>							
Identification	Packages are provided with a label or sticker stating at least the material, dimension, and length of the tube.							
Packaging	Drum:							
	Tube	Drum flange		Drum core		Drum width		Tube length
	Ø 25 mm	Ø 180 cm		Ø 90 cm		108 cm		2500 mtr
	Ø 32 mm	Ø 180 cm		Ø 90 cm		108 cm		1400 mtr
	Ø 40 mm	Ø 180 cm		Ø 90 cm		108 cm		1000 mtr
	Ø 50 mm	Ø 180 cm		Ø 90 cm		108 cm		550 mtr
	Roll:							

Tube	Roll diameter	Roll core	Roll width	Tube length
Ø 5 mm	Ø 65 cm	Ø 45 cm	15 cm	500 mtr
Ø 6 mm	Ø 70 cm	Ø 45 cm	15 cm	500 mtr
Ø 8 mm	Ø 70 cm	Ø 45 cm	15 cm	250 mtr
Ø 10 mm	Ø 80 cm	Ø 45 cm	15 cm	250 mtr
Ø 12 mm	Ø 85 cm	Ø 45 cm	15 cm	250 mtr
Ø 16 mm	Ø 100 cm	Ø 60 cm	30 cm	500 mtr
Ø 20 mm	Ø 100 cm	Ø 60 cm	40 cm	500 mtr
Ø 25 mm	Ø 120 cm	Ø 60 cm	40 cm	500 mtr
Ø 32 mm	Ø 120 cm	Ø 60 cm	40 cm	300 mtr
Ø 40 mm	Ø 120 cm	Ø 60 cm	40 cm	250 mtr
Ø 50 mm	Ø 150 cm	Ø 80 cm	40 cm	200 mtr
Bundle:				
Tube	Bundle content		Tube length	
Ø 5 mm	250 pcs.		50 to 100 cm	
Ø 6 mm	200 pcs.		50 to 100 cm	

Operating instructions

Storage	<p>Keep the tubes in a dry and cool place.</p> <p>Do not expose the tubes to extreme temperatures or temperature fluctuations.</p>
Installation	<p>Those working with tubes made by H. Weterings Plastics B.V. should be familiar with the installation process of this type of product. Applicable national and/or local precautions should always be observed.</p> <p>Make sure a tube is suited for its intended purpose prior to installation. Conduct a visual inspection to check for flaws.</p> <p>The tubes should be warmed up to a temperature of 15 °C to 25 °C at least 24 hours before installation/assembly, and this temperature should be maintained during installation.</p> <p>Safeguard the tubes against damage, defects, or permanent deformations during installation.</p> <p>While connecting tube ends using fittings you should <u>never</u> use soapy</p>

	lubricants to facilitate the work. Soapy solutions will make the stressed material brittle in the long run, causing cracks. This phenomenon is also known as “Environmental Stress-Cracking”.																																					
Operation	<p>The tubes are designed to have an operational lifetime of at least 5 years under normal operating conditions. Normal operating conditions are among others:</p> <ul style="list-style-type: none"> - Environmental and water temperatures between 0 °C and +35 °C; - Maximum working pressure according to the table below. Multiply the nominal pressure (PN) with a reduction factor to find out a tube's temperature zone: <table border="1"> <thead> <tr> <th rowspan="2">Material</th> <th colspan="4">Reduction factors for the environmental and/or water temperature</th> </tr> <tr> <th>≤ 20 °C</th> <th>21 – 25 °C</th> <th>26 – 30 °C</th> <th>31 – 35 °C</th> </tr> </thead> <tbody> <tr> <td>LDPE</td> <td>1.00</td> <td>0.75</td> <td>0.56</td> <td>0.44</td> </tr> <tr> <td>HDPE</td> <td>1.00</td> <td>0.90</td> <td>0.81</td> <td>0.72</td> </tr> <tr> <td>PP</td> <td>1.00</td> <td>0.90</td> <td>0.81</td> <td>0.72</td> </tr> <tr> <td><i>Example:</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>LDPE 25 x 2.5 mm PN 6</i></td> <td><i>6 bar</i></td> <td><i>4.5 bar</i></td> <td><i>3.4 bar</i></td> <td><i>2.6 bar</i></td> </tr> </tbody> </table> <p>See page 6 for common PE/PP tubes and their nom. pressure.</p> <p>Additionally, take into account that the lifetime of a tube can be shortened due to increases in external pressures and/or chemical influences to which the tube is exposed.</p>				Material	Reduction factors for the environmental and/or water temperature				≤ 20 °C	21 – 25 °C	26 – 30 °C	31 – 35 °C	LDPE	1.00	0.75	0.56	0.44	HDPE	1.00	0.90	0.81	0.72	PP	1.00	0.90	0.81	0.72	<i>Example:</i>					<i>LDPE 25 x 2.5 mm PN 6</i>	<i>6 bar</i>	<i>4.5 bar</i>	<i>3.4 bar</i>	<i>2.6 bar</i>
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Quality

Tests and trials	<p>Product quality is monitored throughout the production process. Our machine operators and process computers conduct both visual and metrological checks after the start up release. Our Quality management team inspects these quality checks at random and also test materials. To this end they take raw material and product samples out of production and analyse and test these, respectively.</p> <p>This is done according to standards and guidelines set by (inter)national organisations and Weterings Plastics. The frequency and performance of the tests and trials are described in internal quality documents.</p>
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Common PE / PP Tubes

Specifications	Diameter		Wall thickness mm	Nominal Pressure (PN) ¹⁾			Classification (SDR)
	outside mm	x inside mm		LDPE bar	HDPE bar	PP bar	
	5	x 2.8	1.1	4.5			
	5	x 3.2	0.9	4.0			
	5	x 3.4	0.8	4.0			
	6	x 4.0	1.0	4.0			
	8	x 6.0	1.0	7.0			
	9	x 6.0	1.5	10.0			6
	10	x 8.0	1.0	5.0			11
	12	x 9.0	1.5	6.3			9
	12	x 10.0	1.0	4.5			13.6
	16	x 12.0	2.0	7.0			
	16	x 12.8	1.6	6.0			
	16	x 13.0	1.5	5.0			11
	16	x 14.0	1.0	3.5			21
	20	x 13.0	3.5	11.0			
	20	x 13.2	3.4	10.0			6
	20	x 15.6	2.2	6.3			9
	20	x 16.0	2.0	6.0	11.0		
	20	x 16.4	1.8	5.0			11
	20	x 16.8	1.6	4.5		10.0	
	20	x 17.0	1.5	4.0			13.6
	25	x 19.6	2.7	6.3		16.0	9
	25	x 20.0	2.5	6.0	11.0		
	25	x 20.4	2.3	5.0	10.0		11
	25	x 21.0	2.0	4.5			
	25	x 21.2	1.9	4.0		10.0	13.6
	25	x 21.4	1.8	3.8			
	25	x 21.8	1.6	3.5			
	32	x 25.0	3.5	6.3			9
	32	x 25.3	3.35	6.0	11.0		
	32	x 26.0	3.0	5.0			11
	32	x 28.0	2.0	3.5			
	40	x 32.0	4.0	6.0			
	40	x 32.8	3.6	5.0	10.0		11
	40	x 34.0	3.0	4.0	8.0		13.6
	50	x 39.0	5.5	6.3			9
	50	x 40.8	4.6	5.0	10.0		11
	50	x 41.0	4.5	4.9			
	50	x 43.8	3.1	3.5			
1) Allowable wall pressure at 20 ⁰ C (MPa)				2.5	5.0	6.3	
Nominal pressure is given for common tubes only							

Normative references

Standards and guidelines		
	BRL-K533/03	Kiwa beoordelingsrichtlijn - Buizen van PE voor het transport van drinkwater
	DIN 8072	Rohre aus PE weich (LDPE) - maße
	DIN 8073	Rohre aus PE weich (LDPE) – Allgemeine Güteanforderungen – Prüfung
	DIN 8074	Rohre aus Polyethylen (HDPE) – maße
	DIN 8075	Rohre aus Polyethylen (HDPE) – Allgemeine Güteanforderungen – Prüfung
	ISO 1133	Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics
	ISO 3126	Plastics pipes - measurement of dimensions
	ISO 8796	Polyethylene (PE) pipes for irrigation laterals – Susceptibility to environmental stress-cracking induced by insert type fittings – Test method and specification
	NEN 7105	Plastics pipelines for floor heating – LDPE pipes – requirements en test methods
	NEN-EN 12201-2	Plastics piping systems for water supply – polyethylene (PE) – part 2: pipes
	ISO 9001: 2000	Quality management systems – requirements
	-	Internal quality documents Weterings Plastics