

FIBER OPTIC CABLES

AND FTTX PRODUCTS CATALOG



TECHNICAL DATA SHEETS

Table of content

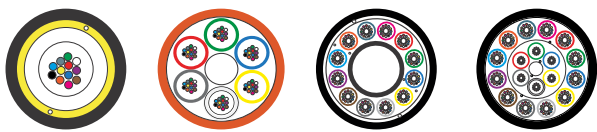
<i>Introduction</i>	<i>4 - 5</i>
<i>Product Overview</i>	<i>6 - 14</i>
<i>EPFU micro cable</i>	<i>17 - 18</i>
<i>SINGLE TUBE micro cable PE / PA</i>	<i>19 - 21</i>
<i>MULTI TUBE micro cable PE</i> <i>Loose Tube size - 1,40 & 1,55 mm</i>	<i>22 - 29</i>
<i>MULTI TUBE micro cable PA</i> <i>Loose Tube size - 1,40 & 1,55 mm</i>	<i>30 - 40</i>
<i>MULTI TUBE micro cable 200 µm PE / PA</i>	<i>41 - 46</i>
<i>MULTI TUBE duct cable PE</i>	<i>48 - 52</i>
<i>ARMOURED MULTI TUBE micro cable PE</i>	<i>53</i>
<i>SINGLE TUBE micro cable LSZH</i>	<i>54</i>
<i>MULTI TUBE micro cable LSZH</i>	<i>55 - 57</i>
<i>ACCESSORIES</i>	<i>58 - 67</i>
<i>BLOWING MACHINES</i>	<i>68 - 75</i>

Introduction

Optical Fiber Cables come in all sorts of lengths, sizes and configurations. In this catalogue you'll find a wide variety of cables that will fit into many different application areas.

OPTICAL FIBER CABLES

An optical fiber cable contains one or more optical fibers. The fiber elements are individually coated with plastic layers and contained in protective tubes suitable for the environment where the cable will be deployed. Fiber bundles vary in number according to cable types. (Single & Multi Tube)



Different types of cable are used for different applications, for example long distance telecommunication, or providing a high-speed data connection between different parts of a building or between buildings.



In this catalogue we showcase Single & Multi Loose Tube Micro Fiber Optic Cables with Single Mode Optical Fiber G-657A and G-652D.

The offered cables are fully compliant with the relevant IEC specifications.

All provided cables are completely dielectric / non metallic - immune to electromagnetic interferences.

Application types :

- Indoor use (LSZH)
- Outdoor use
- Blowing into Micro- and HDPE Pipes
- Backbone Networks
- FTTH / House connections



ACCESSORIES

CABLE77 provides a broad range of accessories for fiber cable installation, maintenance and handling. Ranging from machines for installation of fiber cable to duct scissors and connectors.

We've spent a lot of time and energy finding out which tools get the job done flawlessly, every time.



DUCTS

We provide a virtually endless selection of different Multiduct, Flatliner, Cable Duct and DB Microduct products.

All of our Optical Fiber Cables are tested and ensured to work optimally and with as little friction as possible when used in conjunction with duct products.

BLOWING TESTS

CABLE77 has been conducting blowing tests to provide clients with most accurate numbers regarding different fiber optical cable types. We have been testing our products in different circumstances to find the best solutions which can then be used on site. Our KNOW-HOW is the sum of years of constant tests and developments. We are able to assure that the products we offer are the best available products on the market.



OUR EXPERIENCE

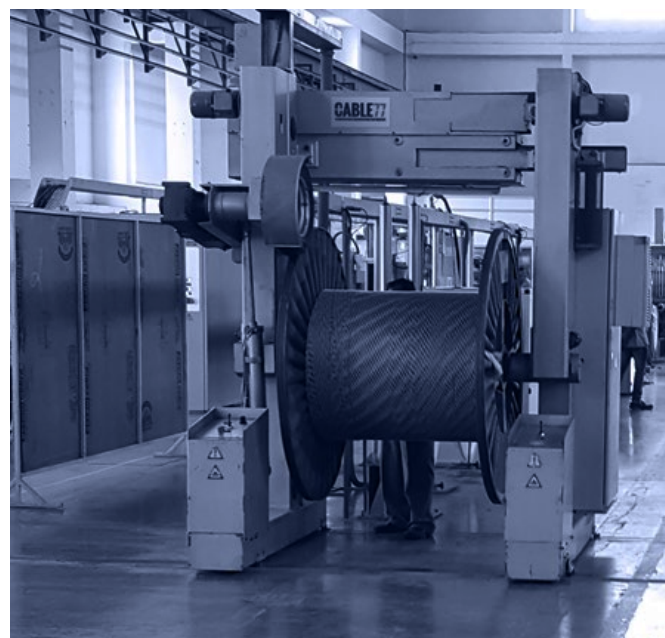
Associated company GM Plast has been producing ducts for cable installation since 1975. Since 1998 the minds behind CABLE77 have been developing a perfect match between the cable and the duct.



As world leaders in this subject we have been pushing, dragging, blowing and floating in pretty much everything imaginable. CABLE77 did a lot of pioneering and a lot of teaching, on how to install cable with air and water. We made the mistakes and we learned from them.

We produced the first micro blowing machine in 2000 and our first MultiSub Duct blowing machine in 2003.

To get good blowing results CABLE77 worked with several of the leading cable producers, to change the oversheet and memory effect of the standard duct cable (1996-1998).



Since 2001 CABLE77 has been constantly developing micro cables.

In this catalogue we are summing up many years of our experience. With us as a partner in your project you are sure to work with the best.

Ask us for any suggestions to get the job done, and if you like our ideas we would be glad to offer you the right material for the job that you want to have done.

PRODUCT OVERVIEW

EPFU micro cable

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
EPFU Single Tube IU - PAGES 17 - 18						
	2	1x2	G657A1	245µm	1,2mm	6km
	4	1x4	G657A1	245µm	1,2mm	6km
	6	1x6	G657A1	245µm	1,5mm	6km
	8	1x8	G657A1	245µm	1,8mm	6km
	12	1x12	G657A1	245µm	1,8mm	6km

SINGLE LOOSE TUBE micro cable (PE)

		Fiber Number Singlemode 9µm	Fiber Type	Fiber Ø	Cable Ø	Drum Length
Single Loose Tube HDPE IU - PAGE 19						
	4	1x4	G657A/G652D	245µm	3,5mm	4 km
	6	1x6	G657A/G652D	245µm	3,5mm	4 km
	8	1x8	G657A/G652D	245µm	3,5mm	4 km
	12	1x12	G657A/G652D	245µm	3,5mm	4 km
	24	1x24	G657A/G652D	245µm	4,0mm	4 km

SINGLE LOOSE TUBE micro cable (PA)

		Fiber Number Singlemode 9µm	Fiber Type	Fiber Ø	Cable Ø	Drum Length
Single Loose Tube PA IU - PAGES 20 - 21						
	2	1x2	G657A/G652D	245µm	1,9mm	4 km
	4	1x4	G657A/G652D	245µm	2,5mm / 3,5mm	4 km
	6	1x6	G657A/G652D	245µm	2,5mm / 3,5mm	4 km
	8	1x8	G657A/G652D	245µm	2,5mm / 3,5mm	4 km
	12	1x12	G657A/G652D	245µm	2,5mm / 3,5mm	4 km
	24	1x24	G657A/G652D	245µm	4,0mm	4 km

PRODUCT OVERVIEW

MULTI TUBE micro cable (PE) Loose Tube size - 1,40mm

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube PE IU - PAGES 22 - 25						
	24	2x12	G657A/G652D	245µm	5,3mm	4km
	48	4x12	G657A/G652D	245µm	5,3mm	4km
	72	6x12	G657A/G652D	245µm	5,3mm	4km
	96	8x12	G657A/G652D	245µm	6,1mm	4km
	144	12x12	G657A/G652D	245µm	7,9mm	4km
	192	16x12	G657A/G652D	245µm	8,3mm	4km
	288	24x12	G657A/G652D	245µm	9,5mm	4km
	432	24x24	G657A/G652D	245µm	11,0mm	4km

MULTI TUBE micro cable (PE) Loose Tube size - 1,55mm

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube PE IU - PAGES 26 - 29						
	24	2x12	G657A/G652D	245µm	5,7mm	4km
	48	4x12	G657A/G652D	245µm	5,7mm	4km
	72	6x12	G657A/G652D	245µm	5,7mm	4km
	96	8x12	G657A/G652D	245µm	6,5mm	4km
	144	12x12	G657A/G652D	245µm	8,5mm	4km
	144	6x24	G657A/G652D	245µm	8,2mm	4km
	192	8x24	G657A/G652D	245µm	9,7mm	4km
	288	12x24	G657A/G652D	245µm	10,5mm	4km

OUTER SHEATH*

HDPE

Micro cable

PA Micro cable

* Outer sheath colour can be customized

PRODUCT OVERVIEW

MULTI TUBE micro cable (PA) Loose Tube size - 1,40mm

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube PA IU - PAGES 30 - 34						
	24	2x12	G657A/G652D	245µm	5,3mm	4 km
	48	4x12	G657A/G652D	245µm	5,3mm	4 km
	72	6x12	G657A/G652D	245µm	5,3mm	4 km
	96	8x12	G657A/G652D	245µm	6,1mm	4 km
	144	12x12	G657A/G652D	245µm	7,9mm	4 km
	192	16x12	G657A/G652D	245µm	8,3mm	4 km
	288	24x12	G657A/G652D	245µm	9,5mm	4 km
	432	24x24	G657A/G652D	245µm	10,4mm	4 km

MULTI TUBE micro cable (PA) Loose Tube size - 1,55mm

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube PA IU - PAGES 35 - 40						
	24	2x12	G657A/G652D	245µm	5,7mm	4km
	48	4x12	G657A/G652D	245µm	5,7mm	4km
	72	6x12	G657A/G652D	245µm	5,7mm	4km
	96	8x12	G657A/G652D	245µm	6,3mm	4km
	144	12x12	G657A/G652D	245µm	8,5mm	4km
	144	6x24	G657A/G652D	245µm	8,2mm	4km
	192	8x24	G657A/G652D	245µm	9,7mm	4km
	288	12x24	G657A/G652D	245µm	10,5mm	4km

OUTER SHEATH*

HDPE

Micro cable

PA Micro cable

* Outer sheath colour can be customized

PRODUCT OVERVIEW

MULTI LOOSE TUBE micro cable 200 microns (PA/HDPE)

	Fiber Number		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube 200 microns PA/HDPE IU - PAGES 41 - 46						
	72	3x24	G657A1	200µm	5,7mm	2km/ 4km
	96	4x24	G657A1	200µm	5,7mm	2km/ 4km
	144	6x24	G657A1	200µm	5,7mm	2km/ 4km
	192	8x24	G657A1	200µm	6,7mm	2km/ 4km
	288	12x24	G657A1	200µm	8,7mm	2km/ 4km
	432	18x24	G657A1	200µm	9,0mm	2km/ 4km
	576	24x24	G657A1	200µm	10,5mm	2km/ 4km

MULTI LOOSE TUBE duct cable (PE)

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi LooseTube duct cable PE IU - PAGES 48 - 52						
	12	1x12	G652D	245µm	10,6mm	4km
	24	2x12	G652D	245µm	10,6mm	4km
	48	4x12	G652D	245µm	10,6mm	4km
	72	6x12	G652D	245µm	10,6mm	4km
	96	8x12	G652D	245µm	12,0mm	4km
	144	12x12	G652D	245µm	14,6mm	4km
	192	8x24	G652D	245µm	14,2mm	4km
	288	12x24	G652D	245µm	17,3mm	4km
	432	18x24	G652D	245µm	18,0mm	4km

ARMOURED MULTI LOOSE TUBE micro cable (PE)

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Armoured Multi Loose Tube PE IU - PAGE 53						
	12	1x12	G652D	245µm	11,9mm	4km
	24	2x12	G652D	245µm	11,9mm	4km
	48	4x12	G652D	245µm	11,9mm	4km
	72	6x12	G652D	245µm	11,9mm	4km
	96	8x12	G652D	245µm	13,1mm	4km

PRODUCT OVERVIEW

SINGLE LOOSE TUBE micro cable (LSZH)

			Fiber Number Singlemode 9µm	Fiber Type	Fiber Ø	Cable Ø	Drum Length
Single Loose Tube LSZH IU - PAGE 54							
	4	1x4	G657A/G652D	245µm	3,5mm	4km	
	6	1x6	G657A/G652D	245µm	3,5mm	4km	
	8	1x8	G657A/G652D	245µm	3,5mm	4km	
	12	1x12	G657A/G652D	245µm	3,5mm	4km	

MULTI LOOSE TUBE micro cable (LSZH)

	Fiber Number Singlemode 9µm		Fiber Type	Fiber Ø	Cable Ø	Drum Length
Multi Loose Tube LSZH IU - PAGES 55 - 57						
	24	6x4	G652D	245µm	7,2mm	4km
	48	6x8	G652D	245µm	7,2mm	4km
	72	6x12	G652D	245µm	7,2mm	4km
	96	8x12	G652D	245µm	8,2mm	4km
	120	10x12	G652D	245µm	10,4mm	4km
	144	12x12	G652D	245µm	10,4mm	4km
	168	7x24	G652D	245µm	11,4mm	4km
	192	8x24	G652D	245µm	11,4mm	4km
	216	9x24	G652D	245µm	14,4mm	4km
	240	10x24	G652D	245µm	14,4mm	4km
	264	11x24	G652D	245µm	14,4mm	4km
	288	12x24	G652D	245µm	14,4mm	4km

OUTER SHEATH

HDPE

Micro cable



OUTER SHEATH

LSZH

Micro cable



* Outer sheath colour can be customized

PRODUCT OVERVIEW

LC Connectors and Adapters

	Properties
LC Connectors & Adapters SN - PAGES 58 - 59	
	Comply with IEC standard 61754-20
	Simplex and duplex styles
	RoHS compliant
	Single-mode (PC/blue, APC/green) and multi-mode (grey)
	Assembled with cables of 0.9 mm, 1.4 mm, 1.7-2.1 mm, 2.4 mm, 2.8 mm and other contracted diameters

SC Connectors and Adapters

	Properties
SC Connectors & Adapters SN - PAGES 60 - 61	
	Comply with IEC standard 61754-20
	Simplex and duplex styles
	RoHS compliant
	Single-mode (PC/blue, APC/green) and multi-mode (grey)
	Can be assembled with cables of 0.9 mm, 1.4 mm, 1.7-2.1 mm, 2.4 mm, 2.8 mm and other contracted diameters

E2000 Connectors and Adapters

	Properties
E2000 Connectors & Adapters TC - PAGE 62	
	Comply with IEC standard 61754-20
	Simplex and duplex styles
	One-piece design
	Single-mode (PC/blue, APC/green) and multi-mode (grey)
	Can be assembled with cables of 0.6 mm - 3,5mm diameter

PRODUCT OVERVIEW

Pre-assembled Fan-Outs

	Properties
Pre-assembled Fan-outs SN - PAGE 63	
	Indoor , Outdoor Installations
	Fiber numbers: 4, 6, 8, 12, 24, 48
	RoHS compliant
	Single-mode - G.652.D, G.657.A1/A2/B3
	Multi-mode - OM1-4
	Connectors: LC, SC, FC, ST etc., PC/APC

Simplex, Duplex Cables

	Properties
LC Connectors & Adapters SN - PAGES 64 - 65	
	Comply with IEC standard
	Simplex and duplex styles
	RoHS compliant
	Single-mode (PC/blue, APC/green)
	Assembled with cables of 0.9 m
	mm, 1.7-2.1 mm, 2.4 mm

Pigtails - LC, SC, E2000

	Properties
Pigtails LC, SC - PAGE 66	
	Single-mode - G.652.D
	Single-mode - G.657.A1
	Multi-mode - OM1-4
	RoHS compliant
	Single-mode (PC/blue,
	mm, 1.7-2.1 mm, 2.

Pigtails Sets - LC, SC, E2000

	Properties
Pigtails Sets LC, SC - PAGE 67	
	12 colour Sets
	Single-mode - G.652.D, G.657.A2
	Multi-mode - OM3-4
	Colours yellow, magenta, turquoise
	2m. length

PRODUCT OVERVIEW

Fiber Optic Cable Blowing machine

	Properties
Blowing Machine Micro Kat - PAGE 68	
	Fiber/Cable Diameter 3-8 mm
	Tube Size (OD) 7-20 mm
	Maximal pushing force 180 N
	Distance up to 2500 m
	Use with Air, Air driven, Light weight, Flexible Adaptability, Great resistance, Distance speed measurment, Ease of Use

Fiber Optic Cable Blowing machine

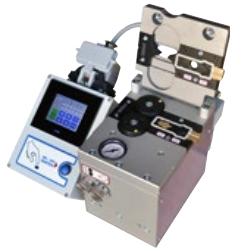
	Properties
Blowing Machine Mini Kat - PAGE 69	
	Fiber/Cable Diameter 3-12 mm
	Tube Size (OD) 10-50 mm
	Maximal pushing force 400 N
	Distance up to 3500 m
	Use with Air, Air driven, Light weight, Flexible Adaptability, Great resistance, Distance speed measurment, Ease of Use

Fiber Optic Cable Blowing machine

	Properties
Blowing Machine Mini Kat Log Box - PAGE 70	
	Fiber/Cable Diameter 3-12 mm
	Tube Size (OD) 10-50 mm
	Maximal pushing force 400 N
	Distance up to 3500 m
	Blowing Data Log, Air driven, Light weight, Flexible Adaptability, Great resistance, Distance speed measurment, Ease of Use

PRODUCT OVERVIEW

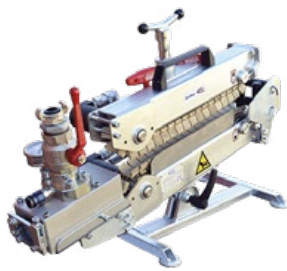
Fiber Optic Cable Blowing machine

	Properties
Blowing Machine MicroFlow - PAGE 71	
	Fiber/Cable Diameter 0,8-5,5 mm
	Tube Size (OD) 5-16 mm
	Install speed to 100m/min
	Distance up to 2500 m
	Automatic Buckle Detection, Adjustable Speed Control,
	Great resistance, Air pressure/flow regulation, Ease to Operate

Fiber Optic Cable Blowing machine

	Properties
Blowing Machine MiniFlow - PAGE 72	
	Fiber/Cable Diameter 4-12 mm
	Tube Size (OD) 7-20 mm
	Install speed to 110m/min
	Distance up to 3500 m
	Use with Air or Water, Hydraulic driven, Flexible Adaptability,
	Great resistance, Distance/Speed measurement, Ease of Use

Fiber Optic Cable Blowing machine

	Properties
Blowing Machine MultiFlow - PAGE 73	
	Fiber/Cable Diameter 8-32 mm
	Tube Size (OD) 20-70 mm
	Install speed to 80m/min
	Distance up to 10000 m
	Use with Air or Water, Tubes or Cables, Flexible Adaptability,
	Great resistance, Distance/Speed measurement, Ease of Use

TECHNICAL INFORMATION

Size chart for blowing (cable- microduct)

Cable size OD	Recomended microduct size OD/ID	Under careful conditions short length
1,1 - 2,5 mm	5/3,5 - 7/4 mm	1,1 - 3,0 mm
2,5 - 4,0 mm	10/6 mm	1,8 - 4,4 mm
3,9 - 5,7 mm	12/8 mm	3,0 - 6,3 mm
6,0 - 7,9 mm	14/10 mm	5,0 - 8,2 mm
6,0 - 8,3 mm	16/12 mm	5,7 - 10,5 mm
6,0 - 10,5 mm	20/15 mm	5,7 - 12,5 mm
6,0 - 11,5 mm	20/16 mm	5,7 - 12,5 mm

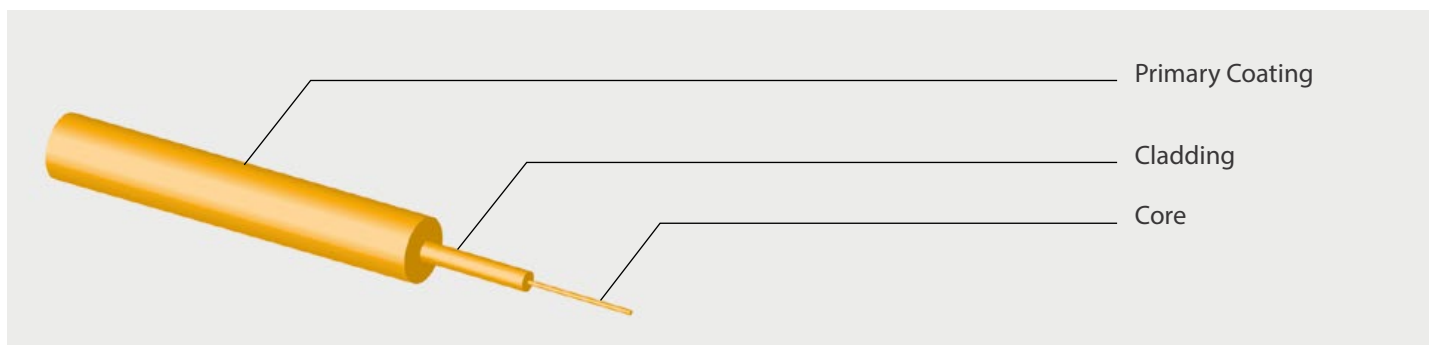
To get the best fiber-blowing length, always follow the duct producer layering infromations.

Colourcode norms micro cable

Colourcode norms			
Fiber numbers	DIN	ISO	TIA/EIA-598
Nr.1	red	blue	blue
Nr.2	green	orange	orange
Nr.3	blue	green	green
Nr.4	yellow	red	brown
Nr.5	white	grey	grey
Nr.6	grey	yellow	white
Nr.7	brown	brown	red
Nr.8	violet	violet	black
Nr.9	turquoise	white	yellow
Nr.10	black	black	violet
Nr.11	orange	rosa	rosa
Nr.12	rosa	turquoise	turquoise

Colourcode Fiber - colours in bundle (13 -24 with rings)

Singlemode-Fiber G.657 A & G.652D specification



OPTICAL PROPERTIES

Fiber type	Wave length	G.657. A 9/125 μm	G.652.D 9/125 μm
Attenuation [db/km]	1310 nm	≤ 0.36	≤ 0.34
Attenuation [db/km]	1550 nm	≤ 0.23	≤ 0.21
Attenuation [db/km]	1625 nm	≤ 0.27	≤ 0.23
Point discontinuity [db]	-	≤ 0.05	≤ 0.05
Zero dispersion wavelength	-	1302 to 1322 nm	1302 to 1322 nm
Zero dispersion slope	-	0.092 nm ² km	0.090 nm ² km
Mode field diameter range	1310 nm	9.2 ± 0.4 μm	9,2 ± 0.3 μm

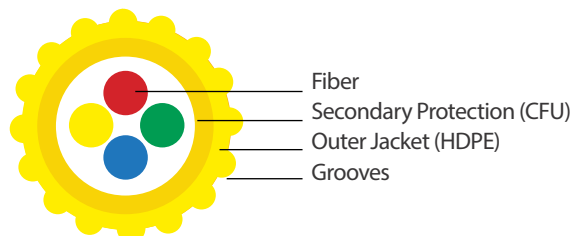
GEOMETRICAL PROPERTIES

Fiber type	G.652. D 9/125 μm	G.657.A 9/125 μm
Cladding Diameter	125 ± 0.7 μm	125 ± 0.7 μm
Primary Coating Diameter	245 ± 5 μm	245 ± 5 μm
Cladding noncircularity	≤ 0,70%	≤ 0,70%
Core/Clad concentricity error	≤ 0.5 μm	≤ 0.5 μm
Coating / Cladding Concentricity error	< 10 μm	< 10 μm

MECHANICAL PROPERTIES

Fiber type	G.657. A 9/125 μm	G.652.D 9/125 μm
Dynamic tensile strength (Unaged)	>550 kpsi	>550 kpsi
Dynamic tensile strength (Aged)	>440 kpsi	>440 kpsi
Dynamic Fatigue	>20	>20
Fiber Curl	> 4m	> 4m
Coating Strip Force	1.3N ≤ F ≤ 8.9N	1.3N ≤ F ≤ 8.9N

EPFU MICRO CABLE DRY/ WITH JELLY (G657A1) 2, 4 fibers 1,20 mm



Properties

- Small Diameter & Light in Weight
- Completely non metallic cable suitable for installation near high voltage lines
- For Air blown installation inside Duct
- Grooves to improve blowing distance

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation :	-10° to +50°C
Operation :	-20° to +60°C
Storage and Transport :	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

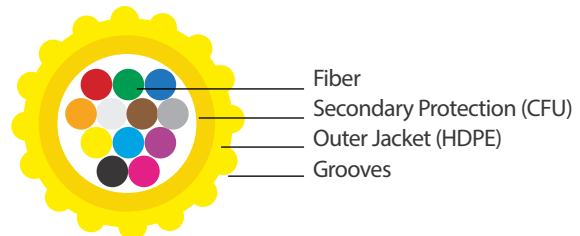
Cable Diameter : 1.20 ± 0.05 mm
 Cable Weight : 1,2kg/km
 Tensile (N) : $1 \cdot W \cdot 9.81$ N, W=Mass of 1Km Cable
 Crush(N/100mm) : 100N for 60sec
 Impact : Energy=5Nm
 Min. Bending Radius : 20D, D=Cable Diameter
 Transport : Drum
 Outer Sheath colour: yellow
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Pan Length
EPFU 1,20mm1x2+2x1dummies	2	G657A1	1,20 mm	3,5 - 4,5 mm	6 km
EPFU 1,20mm1x4	4	G657A1	1,20 mm	3,5 - 4,5 mm	6 km

EPFU MICRO CABLE DRY/ WITH JELLY (G657A1) 6-12 fibers 1,50mm, 1,80 mm



Properties

- Small Diameter & Light in Weight
- Completely non metallic cable suitable for installation near high voltage lines
- For Air blown installation inside Duct
- Grooves to improve blowing distance

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation :	-10° to +50°C
Operation :	-20° to +60°C
Storage and Transport :	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

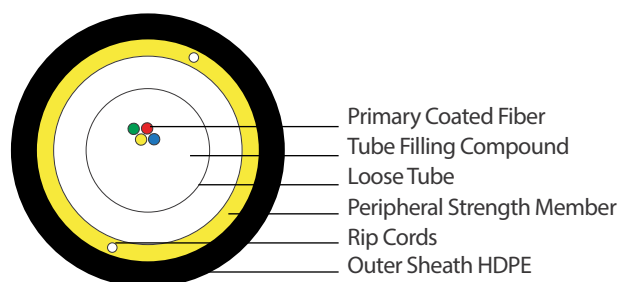
Cable Diameter : 1.50 ± 0.05 mm for 6F / 1.80 ± 0.05 mm for 8F and 12F
 Cable Weight : 1,8kg/km for 6F 2,3kg/km for 8F 2,5kg/km for 12F
 Tensile (N) : $1 \cdot W \cdot 9.81$ N, W=Mass of 1Km Cable
 Crush(N/100mm) : 100N for 60sec
 Impact : Energy=5Nm
 Min. Bending Radius : 20D, D=Cable Diameter
 Transport : Drum
 Outer Sheath colour: yellow
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Pan Length
EPFU 1,50mm1x6	6	G657A1	1,50 mm	3,5 - 4,5 mm	6 km
EPFU 1,80mm1x8	8	G657A1	1,80 mm	3,5 - 4,5 mm	6 km
EPFU 1,80mm1x12	12	G657A1	1,80 mm	3,5 - 4,5 mm	6 km

(G657A/G652D) 4 -12 fibers 3,5 mm, 24 fibers 4,0 mm



- Single Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Rip cords to open Outer Sheath
- Suitable for Indoor use
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D
	IEC/ITU standards

Cable Diameter : 3,5 mm and 4,0 mm

Cable Weight : 9 kg/km

Transport : Wooden Drum

Bending radius (installed) : 15 x Cable Diameter

Tensile Force : During Installation 150 N
Installed 75 N

Crush Resistance: 50 N (100 x 100 mm) for 60 sec.

Outer Sheath colour: black

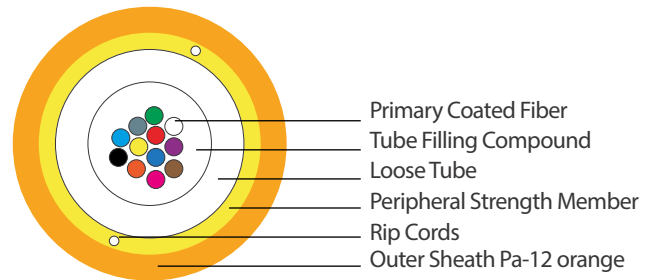
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
SL Tube HDPE 3,5mm 1x4	4	G657A/G652D	3,5mm	6 - 10 mm	4 km
SL Tube HDPE 3,5mm 1x6	6	G657A/G652D	3,5mm	6 - 10 mm	4 km
SL Tube HDPE 3,5mm 1x8	8	G657A/G652D	3,5mm	6 - 10 mm	4 km
SL Tube HDPE 3,5mm 1x12	12	G657A/G652D	3,5mm	6 - 10 mm	4 km
SL Tube HDPE 4,0mm 1x24	24	G657A/G652D	4,0mm	6 - 10 mm	4 km

SINGLE TUBE MICRO CABLE PA IU

(G657A/G652D) 2 fibers 1,9 mm, 4 - 12 fibers 2,5 mm/ 3,5 mm



Properties

- Single Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

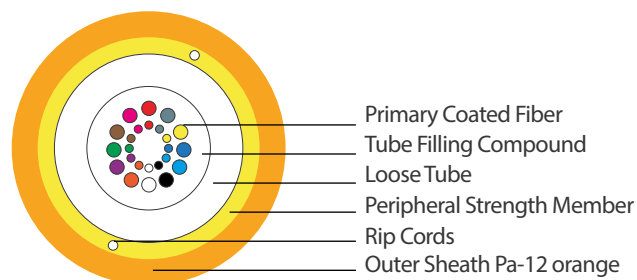
Cable Diameter : 2.5 mm / 3,5mm
 Cable Weight : 6 kg/km / 10kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 150 N
 Installed 75 N
 Crush Resistance: 50 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
SL Tube PA 1,9mm 1x2	2	G657A/G652D	1,9mm	4 - 6 mm	4 km
SL Tube PA 2,5/3,5mm 1x4	4	G657A/G652D	2,5mm/3,5mm	4 - 10 mm	4 km
SL Tube PA 2,5/3,5mm 1x6	6	G657A/G652D	2,5mm/3,5mm	4 - 10 mm	4 km
SL Tube PA 2,5/3,5mm 1x8	8	G657A/G652D	2,5mm/3,5mm	4 - 10 mm	4 km
SL Tube PA 2,5/3,5mm 1x12	12	G657A/G652D	2,5mm/3,5mm	4 - 10 mm	4 km

SINGLE TUBE MICRO CABLE PA IU (G657A/G652D) 24 fibers 4,0 mm



Properties

- Single Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Loose tube colour :	white
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

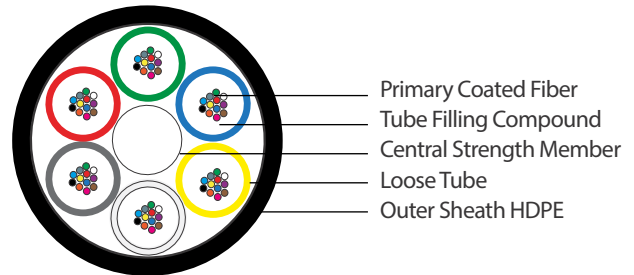
Cable Diameter : 4.0 mm
 Cable Weight : 12 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 200 N
 Installed 100 N
 Crush Resistance: 100 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
SL Tube PA 4,0mm 1x24	24	G657A/G652D	4,0mm	6 - 10 mm	4 km

MULTI TUBE MICRO CABLE PE IU (G657A/G652D) 12 - 72 fibers 5,3 mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation

Characteristics

Cable Diameter : 5.3 mm (+/-0,3) mm
Cable Weight : 22 kg/km
Transport : Wooden Drum
Bending radius (installed) : 15 x Cable Diameter
Tensile Force : During Installation 500N
Installed 350 N
Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
Outer Sheath colour: black
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

Standard: IEC 60794
Temperature Range Norms : IEC 60794-1-2-F1
Laying and Installation -20° to +70°C
Operation -20° to +70°C
Fiber colour : acc. to DIN
Fiber type : Singlemode G657 A or G652 D
IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

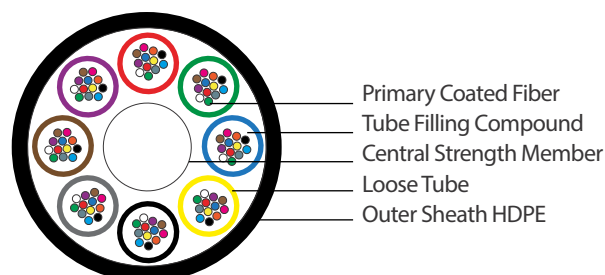
1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 5,3mm 1x12	12	G657A/G652D	5,3mm	8 - 16 mm	4 km
ML Tube HDPE 5,3mm 2x12	24	G657A/G652D	5,3mm	8 - 16 mm	4 km
ML Tube HDPE 5,3mm 4x12	48	G657A/G652D	5,3mm	8 - 16 mm	4 km
ML Tube HDPE 5,3mm 6x12	72	G657A/G652D	5,3mm	8 - 16 mm	4 km

MULTI TUBE MICRO CABLE PE IU

(G657A/G652D) 96 fibers 6,1 mm , 144 fibers 7,9 mm

Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation

Characteristics

Cable Diameter : 6,1 mm for 96F / 7,9 mm for 144F (+/-0,3) mm

Cable Weight : 33 kg/km 96F / 52 kg/km 144F

Transport : Wooden Drum

Bending radius (installed) : 15 x Cable Diameter

Tensile Force : During Installation 1000N
Installed 850 N

Crush Resistance: 500 N (100 x 100 mm) for 60 sec.

Outer Sheath colour: black

Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

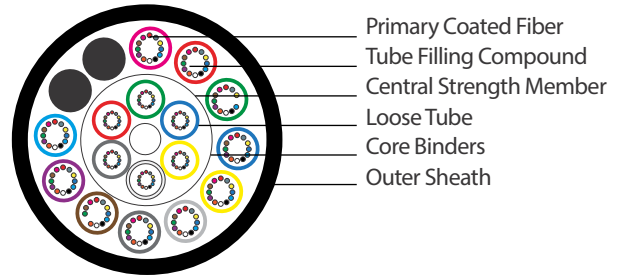
Standard:	IEC 60794
Temperature Range Norms:	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 6,1mm 8x12	96	G657A/G652D	6,1mm	10 - 16 mm	4 km
ML Tube HDPE 7,9mm 12x12	144	G657A/G652D	7,9mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PE IU
(G657A/G652D) 192 fibers 8,3 mm
Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- UV Resistant Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652D IEC/ITU standards

Characteristics

Cable Diameter : 8,3 (+/-0,3) mm
 Cable Weight : 50 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During installation 800 N
 Installed 650 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

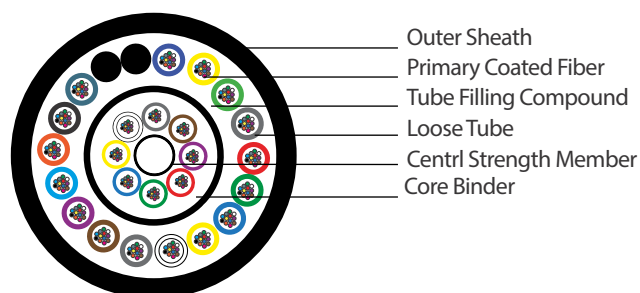
1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 8,3mm 16x12	192	G657A/G652D	8,3 mm	16 - 20 mm	4 km

MULTI TUBE MICRO CABLE PE IU

(G657A/G652D) 288 fibers 9,5 mm, 432 fibers 11,0 mm

Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

Cable Diameter : 9,5 mm for 288F / 11,0 mm for 432F (+/-0,4) mm

Cable Weight : 73 kg/km 288f / 95 kg/km 432F

Transport : Wooden Drum

Bending radius (installed) : 15 x Cable Diameter

Tensile Force : During Installation 1500N
Installed 1250 N

Crush Resistance: 500 N (100 x 100 mm) for 60 sec.

Outer Sheath colour: black

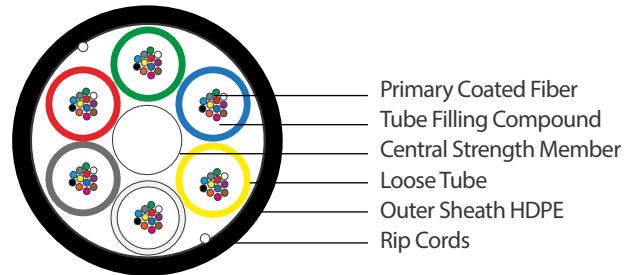
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 9,5mm 24x12	288	G657A/G652D	9,5mm	16 - 20 mm	4 km
ML Tube HDPE 11,0mm 18x24	432	G657A/G652D	11,0mm	16 - 20 mm	4 km

MULTI TUBE MICRO CABLE PE IU (G657A/G652D) 24 - 72 fibers 5,7mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Characteristics

Cable Diameter : 5.7 mm
Cable Weight : 24 kg/km
Transport : Wooden Drum
Bending radius (installed) : 15 x Cable Diameter
Tensile Force : During Installation 650N
Installed 500 N
Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
Outer Sheath colour: black
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

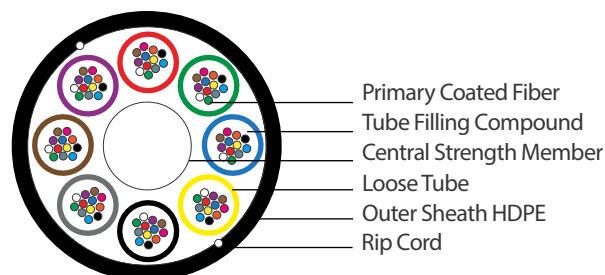
1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 5,7mm 2x12	24	G657A/G652D	5,7mm	8 - 16 mm	4 km
ML Tube HDPE 5,7mm 4x12	48	G657A/G652D	5,7mm	8 - 16 mm	4 km
ML Tube HDPE 5,7mm 6x12	72	G657A/G652D	5,7mm	8 - 16 mm	4 km

MULTI TUBE MICRO CABLE PE IU

(G657A/G652D) 96 fibers 6,5 mm , 144 fibers 8,7 mm

Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Characteristics

Cable Diameter : 6,5 mm for 96F / 8,7 mm for 144F

Cable Weight : 37 kg/km 96F / 60 kg/km 144F

Transport : Wooden Drum

Bending radius (installed) : 15 x Cable Diameter

Tensile Force : During Installation 1500N
Installed 1000 N

Crush Resistance: 500 N (100 x 100 mm) for 60 sec.

Outer Sheath colour: black

Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

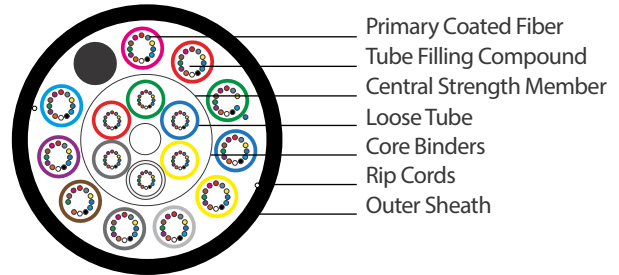
Standard:	IEC 60794
Temperature Range Norms:	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 6,5mm 8x12	96	G657A/G652D	6,5mm	10 - 16 mm	4 km
ML Tube HDPE 8,7mm 12x12	144	G657A/G652D	8,7mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PE IU (G652D) 192 fibers 9,5 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- UV Resistant Outer Sheath
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652D IEC/ITU standards

Characteristics

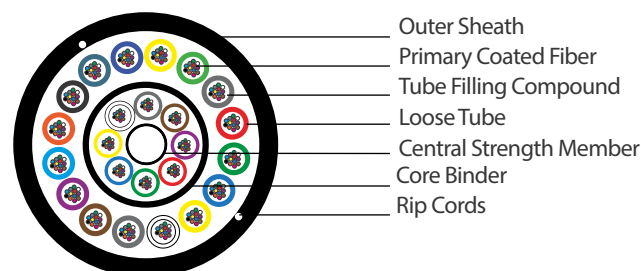
Cable Diameter : 9,5 (+/-0,5) mm
 Cable Weight : 65 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force: During installation 1450 N
 Installed 850 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 9,5mm 16x12	192	G652D	9,5 mm	16 - 20 mm	4 km

MULTI TUBE MICRO CABLE PE IU (G657A/G652D) 288 fibers 10,4 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Suitable for Blowing
- UV Resistant Outer Sheath
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

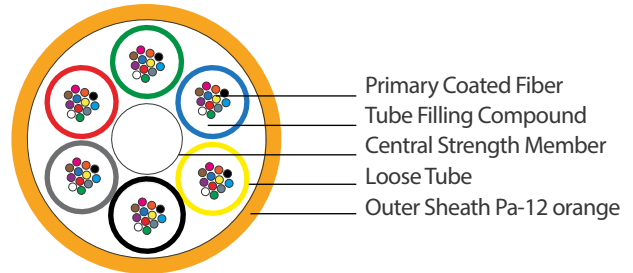
Cable Diameter : 10,4 mm f
Cable Weight : 85 kg/km
Transport : Wooden Drum
Bending radius (installed) : 15 x Cable Diameter
Tensile Force : During Installation 1500N
Installed 1000 N
Crush Resistance: 700 N (100 x 100 mm) for 60 sec.
Outer Sheath colour: black
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 10,4mm 24x12	288	G657A/G652D	10,4mm	16 - 20 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 24 - 72 fibers 5,3mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation

Characteristics

Cable Diameter : 5,3 mm (+/-0,3) mm
Cable Weight : 23 kg/km
Transport : Wooden Drum
Bending radius (installed) : 15 x Cable Diameter
Max. Tension: During Installation 500 N
Installed 350 N
Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
Outer Sheath colour: orange
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

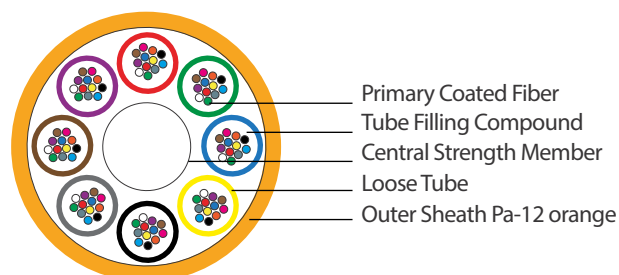
Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 5,3mm 2x12	24	G657A/G652D	5,3mm	8 - 16 mm	4 km
ML Tube PA 5,3mm 4x12	48	G657A/G652D	5,3mm	8 - 16 mm	4 km
ML Tube PA 5,3mm 6x12	72	G657A/G652D	5,3mm	8 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 96 fibers 6,1mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

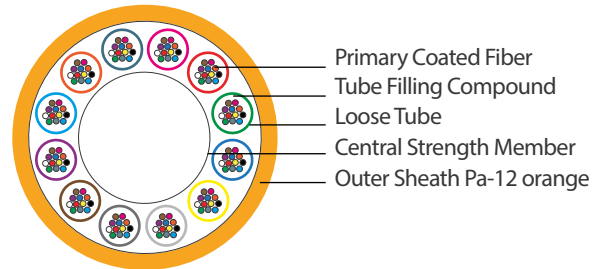
Cable Diameter : 6,1 mm (+/-0,3) mm
 Cable Weight : 34 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1000 N
 Installed 850 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 6,1mm 8x12	96	G657A/G652D	6,1mm	10 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 144 fibers 7,9 mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation

Characteristics

Cable Diameter : 7,9 mm (+/-0,3) mm
 Cable Weight : 53kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1000 N
 Installed 850 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

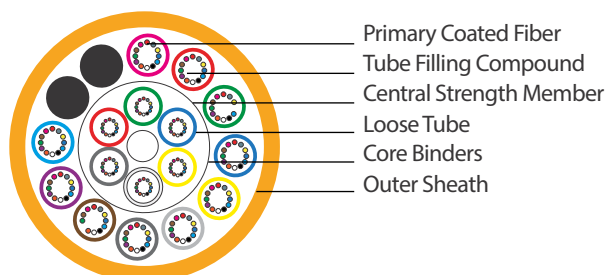
Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 7,9mm 12x12	144	G657A/G652D	7,9mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 192 fibers 8,3 mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

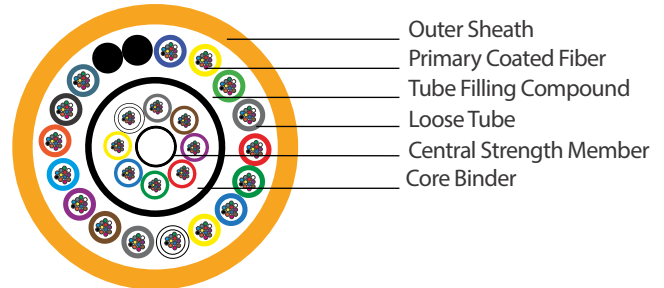
Cable Diameter : 8,3 mm (+/-0,3) mm
 Cable Weight : 51kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 800 N
 Installed 650 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 8,3mm 16x12	192	G657A/G652D	8,3mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 288 fibers 9,5 mm, 432 11,0 mm Loose Tube size - 1,40mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation

Characteristics

Cable Diameter : 9,5 mm for 288F / 11,0 mm for 432F (+/-0,3) mm
 Cable Weight : 74 kg/km 288F / 96 kg/km 432F
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1250 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

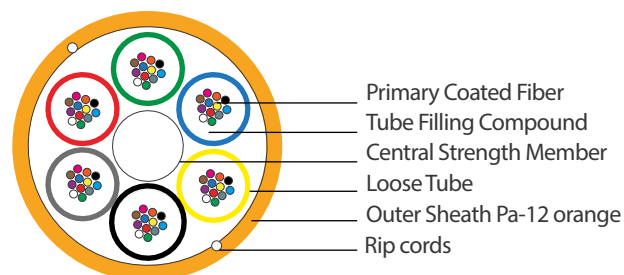
Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-20° to +70°C
Operation	-20° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 9,5mm 24x12	288	G657A/G652D	9,5mm	16 - 20 mm	4 km
ML Tube PA 11,0mm 18x24	432	G657A/G652D	11,0mm	16 - 20 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 24 - 72 fibers 5,7 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

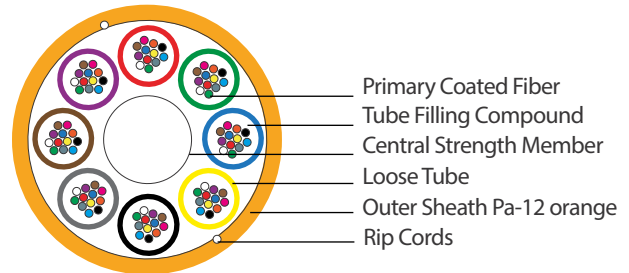
Cable Diameter : 5,7 mm
 Cable Weight : 24 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Max. Tension: During Installation 650 N
 Installed 500 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 5,7mm 2x12	24	G657A/G652D	5,7mm	8 - 16 mm	4 km
ML Tube PA 5,7mm 4x12	48	G657A/G652D	5,7mm	8 - 16 mm	4 km
ML Tube PA 5,7mm 6x12	72	G657A/G652D	5,7mm	8 - 16 mm	4 km

**MULTI TUBE MICRO CABLE PA IU
(G657A/G652D) 96 fibers 6,3 mm
Loose Tube size - 1,55mm**



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

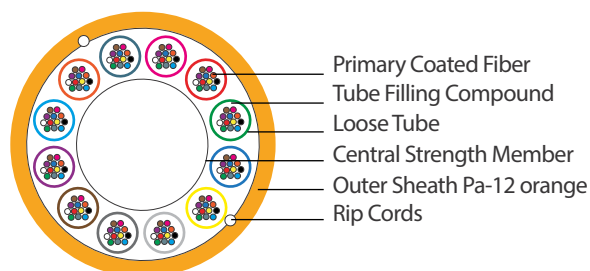
Cable Diameter : 6,3 mm
 Cable Weight : 35 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 6,3mm 8x12	96	G657A/G652D	6,3mm	10 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 144fibers 8,5 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

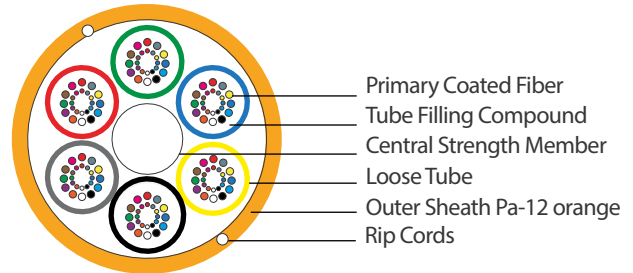
Cable Diameter : 8,5 mm
 Cable Weight : 58kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 8,5mm 12x12	144	G657A/G652D	8,5mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 144 fibers 8,2 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Indoor use
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

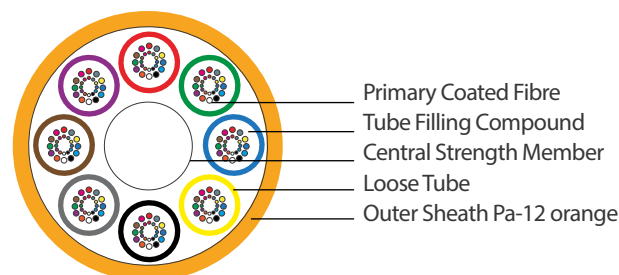
Cable Diameter : 8,2 mm
 Cable Weight : 60 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 8,2mm 6x24	144	G657A/G652D	8,2 mm	12 - 16 mm	4 km

MULTI TUBE MICRO CABLE PA IU (G657A/G652D) 192 fibers 9,7 mm Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

Characteristics

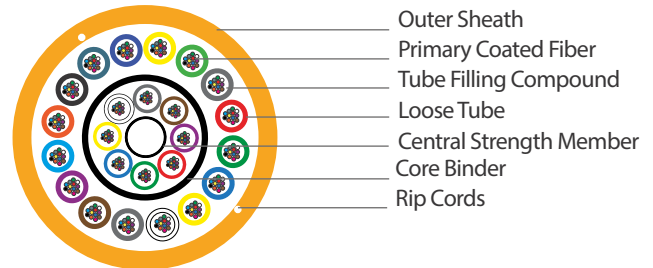
Cable Diameter : 9.7 mm
 Cable Weight : 80 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 500 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 9,7mm 8x24	192	G657A/G652D	9,7mm	16 mm - 20mm	4 km

MULTI TUBE MICRO CABLE PA IU
(G657A/G652D) 288 fibers 10,5 mm
Loose Tube size - 1,55mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath Nylon (PA-12) for optimal blowing length (Insect and Termite resistant)
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657 A or G652 D IEC/ITU standards

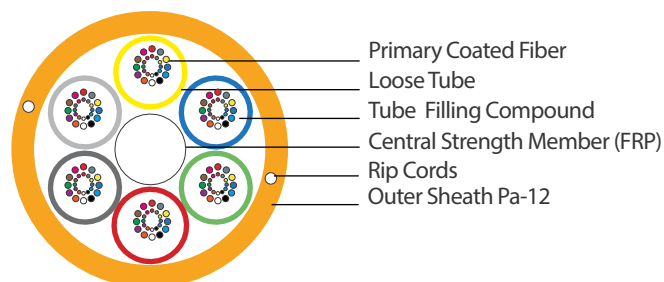
Characteristics

Cable Diameter : 10,5 mm
 Cable Weight : 80 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 700 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: orange
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 10,5mm 24x12	288	G657A/G652D	10,5 mm	16 mm - 20mm	4 km



- Multi Loose Tube Unarmoured
- Outer Sheath PA-12 for optimal blowing length
- Completely dielectric / non metallic cable immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1
	IEC/ITU standards

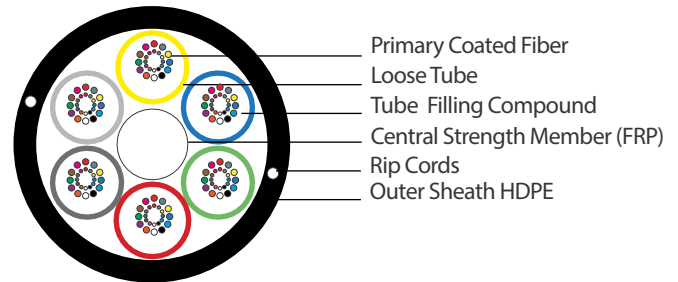
Cable Diameter : 5,7mm (+/- 0,3mm)
Cable Weight : 28 kg/km
Min. Bending Radius : static 12 x Cable Diameter
dynamic 20 x Cable Diameter
Crush Resistance : 300N/100mm
Tensile Strength : During Installation 500N
Installed 450N

Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 5,7mm 3x24	72	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km
ML Tube PA 5,7mm 4x24	96	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km
ML Tube PA 5,7mm 6x24	144	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km

MULTI TUBE MICRO CABLE HDPE IU 200µm (G657A1) 72 - 144 fibers 5,7 mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

Cable Diameter : 5,7mm (+/- 0,3mm)
 Cable Weight : 28 kg/km
 Min. Bending Radius : static 12 x Cable Diameter
 dynamic 20 x Cable Diameter
 Crush Resistance : 300N/100mm
 Tensile Strength : During Installation 500N
 Installed 450N
 Outer Sheath colour: Black - HDPE

The Outer Sheath is marked in 1 meter intervals as follows:

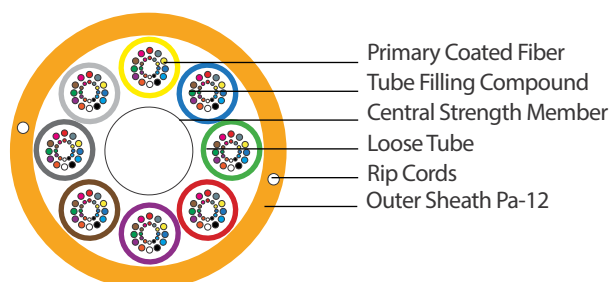
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 5,7mm 3x24	72	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km
ML Tube HDPE 5,7mm 4x24	96	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km
ML Tube HDPE 5,7mm 6x24	144	G657A1	5,7 mm	8 - 14 mm	2 km / 4 km

MULTI TUBE MICRO CABLE PA IU 200µm (G657A1) 192 fibers 6,7 mm, 288 fibers 8,7 mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath PA-12 for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

Cable Diameter : for 192F - 6,7 mm/ for 288F - 8,7 mm (+/- 0,3mm)

Cable Weight : for 192F - 40 kg/km/ for 288F - 66 kg/km

Min. Bending Radius : static 12 x Cable Diameter

dynamic 20 x Cable Diameter

Crush Resistance : 300 N /100 mm

Tensile Strength : During Installation 1250N

Installed 1000N

Outer Sheath colour: Orange - PA12

The Outer Sheath is marked in 1 meter intervals as follows:

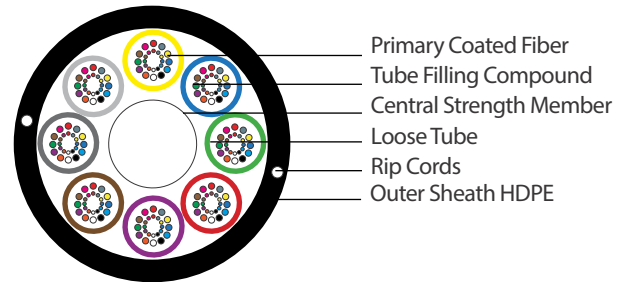
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 6,7mm 8x24	192	G657A1	6,7 mm	10 - 14 mm	2 km / 4 km
ML Tube PA 8,7mm 12x24	288	G657A1	8,7 mm	12 - 16 mm	2 km / 4 km

MULTI TUBE MICRO CABLE HDPE IU 200µm (G657A1) 192 fibers 6,7 mm, 288 fibers 8,7 mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

Cable Diameter : for 192F - 6,7 mm/ for 288F - 8,7 mm (+/- 0,3mm)

Cable Weight : for 192F - 40 kg/km/ for 288F - 66 kg/km

Min. Bending Radius : static 12 x Cable Diameter

dynamic 20 x Cable Diameter

Crush Resistance : 300 N /100 mm

Tensile Strength : During Installation 1250N

Installed 1000N

Outer Sheath colour: Black - HDPE

The Outer Sheath is marked in 1 meter intervals as follows:

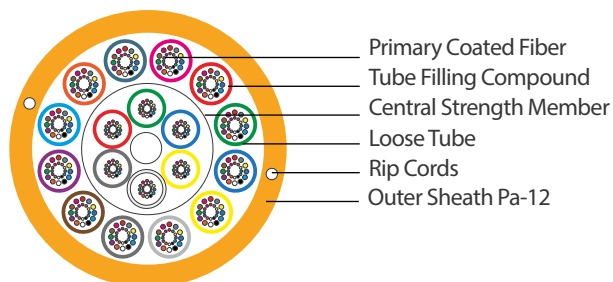
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 6,7mm 8x24	192	G657A1	6,7 mm	10 - 14 mm	2 km / 4 km
ML Tube HDPE 8,7mm 12x24	288	G657A1	8,7 mm	12 - 16 mm	2 km / 4 km

MULTI TUBE MICRO CABLE PA IU 200µm (G657A1) 432 fibers 9,0 mm, 576 fibers 10,5 mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath PA-12 for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

Cable Diameter : for 432F - 9,0 mm (+/- 0,3mm)
for 576F - 10,5 mm (+/- 0,3mm)

Cable Weight : for 432F - 64 kg/km
for 576F - 88 kg/km

Min. Bending Radius : static 12 x Cable Diameter
dynamic 20 x Cable Diameter

Crush Resistance : 300 N /100 mm

Tensile Strength : During Installation for 432F 650N
Installed for 432F 450N
During Installation for 576F 1000N
Installed for 576F 850N

Outer Sheath colour: Orange - PA12

The Outer Sheath is marked in 1 meter intervals as follows:

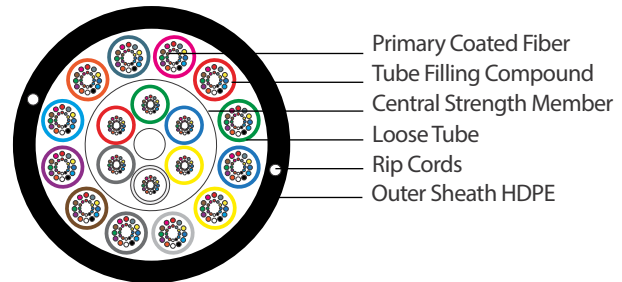
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube PA 9,0mm 18x24	432	G657A1	9,0 mm	14 - 18 mm	2 km / 4 km
ML Tube PA 10,5mm 24x24	576	G657A1	10,5 mm	14 - 18 mm	2 km / 4 km

MULTI TUBE MICRO CABLE HDPE IU 200µm (G657A1) 432 fibers 9,0 mm, 576 fibers 10,5 mm



Properties

- Multi Loose Tube Unarmoured
- Outer Sheath HDPE for optimal blowing length
- Completely dielectric / non metallic cable
immune to electromagnetic interferences
- Optimal cable structure
- High fiber density
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Storage	-30° to + 70°C
Installation	-30° to + 70°C
Operation	-30° to + 70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A1 IEC/ITU standards

Characteristics

Cable Diameter : for 432F - 9,0 mm (+/- 0,3mm)
for 576F - 10,5 mm (+/- 0,3mm)

Cable Weight : for 432F - 64 kg/km
for 576F - 88 kg/km

Min. Bending Radius : static 12 x Cable Diameter
dynamic 20 x Cable Diameter

Crush Resistance : 300 N /100 mm

Tensile Strength : During Installation for 432F 650N
Installed for 432F 450N
During Installation for 576F 1000N
Installed for 576F 850N

Outer Sheath colour: Black - HDPE

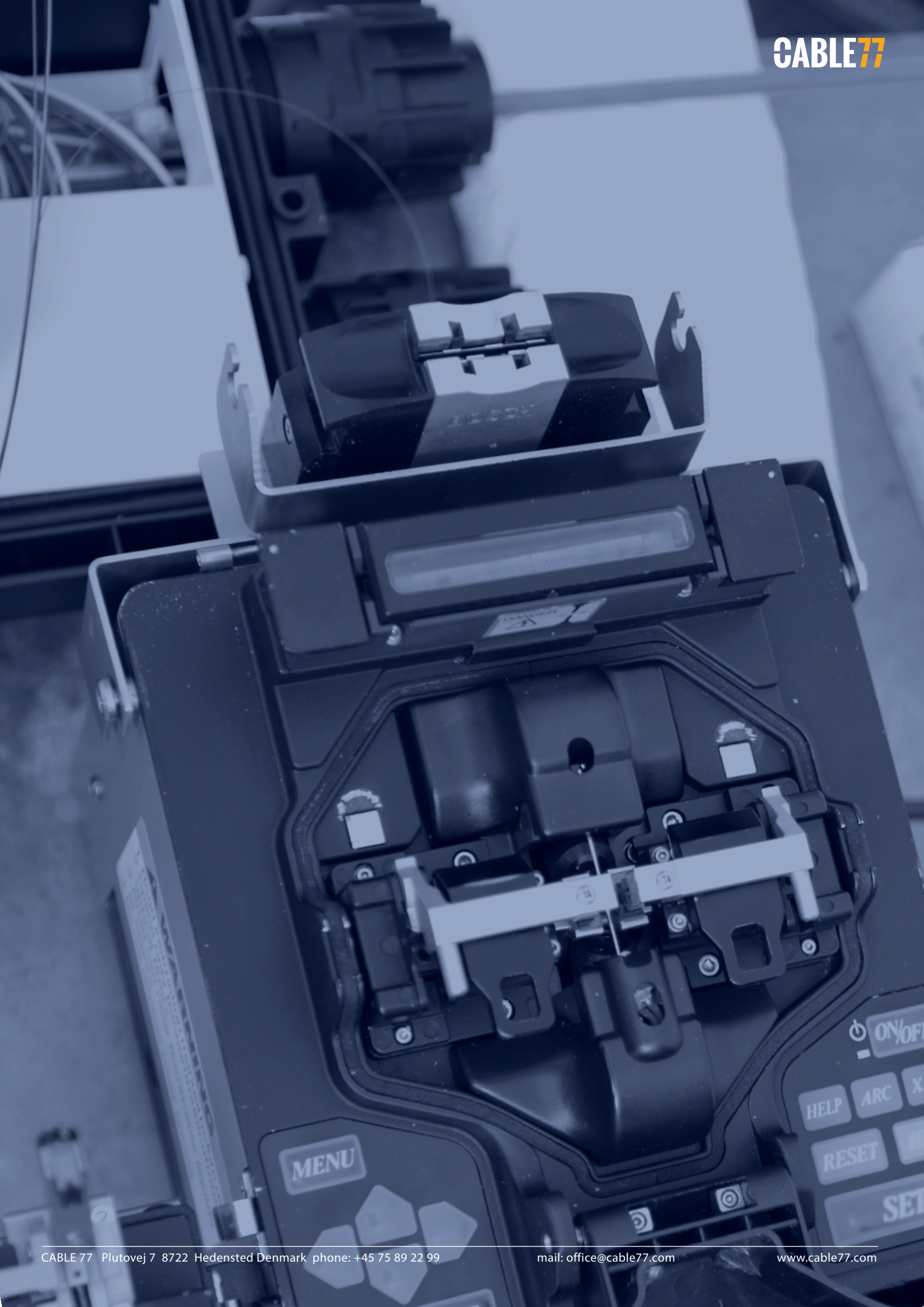
The Outer Sheath is marked in 1 meter intervals as follows:

Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

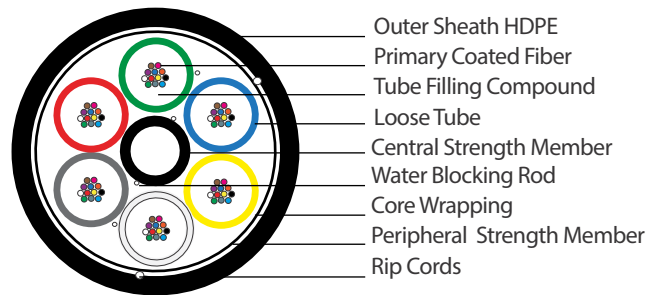
Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 9,0mm 18x24	432	G657A1	9,0 mm	14 - 18 mm	2 km / 4 km
ML Tube HDPE 10,5mm 24x24	576	G657A1	10,5 mm	14 - 18 mm	2 km / 4 km



MULTI TUBE DUCT CABLE HDPE IU (G652D) 12 - 72 fibers 10,6 mm



Properties

- Multi Loose Tube Unarmoured
- Water Swellable Elements
- Outer Sheath UV Stabilized HDPE for optimal blowing length
- Glass Yarn Elements
- Non metallic Rod
- Suitable for Blowing
- Easy Fiber routing inside closure
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

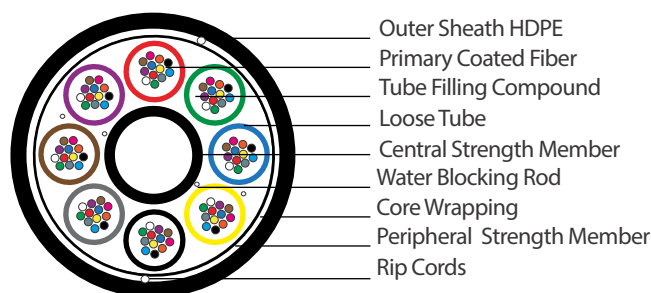
Cable Diameter : 10,6 mm
 Cable Weight : 84 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force : 1500N
 Crush Resistance: 2000N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 10,6mm 1x12	12	G652D	10,6mm	16 mm	4 km
ML Tube HDPE 10,6mm 2x12	24	G652D	10,6mm	16 mm	4 km
ML Tube HDPE 10,6mm 4x12	48	G652D	10,6mm	16 mm	4 km
ML Tube HDPE 10,6mm 6x12	72	G652D	10,6mm	16 mm	4 km

MULTI TUBE DUCT CABLE HDPE IU (G652D) 96 fibers 12,0 mm



Properties

- Multi Loose Tube Unarmoured
- Water Swellable Elements
- Outer Sheath UV Stabilized HDPE for optimal blowing length
- Glass Yarn Elements
- Non metallic Rod
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

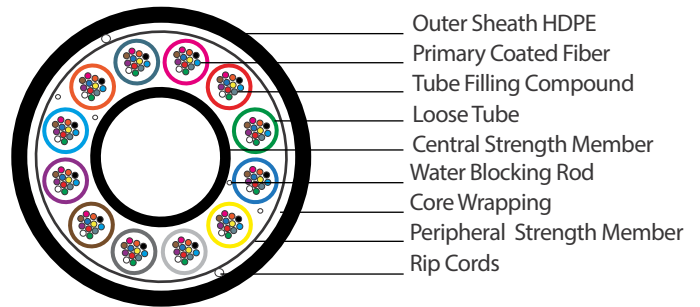
Cable Diameter : 12,0 mm
 Cable Weight : 113,0 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force : 2000N
 Crush Resistance: 2000N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 12,0mm 8x12	96	G652D	12,0mm	18 mm	4 km

MULTI TUBE DUCT CABLE HDPE IU (G652D) 144 fibers 14,6 mm



Properties

- Multi Loose Tube Unarmoured
- Water Swellable Elements
- Outer Sheath UV Stabilized HDPE for optimal blowing length
- Glass Yarn Elements
- Non metallic Rod
- Suitable for Blowing
- Suitable for Micro duct Installation
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

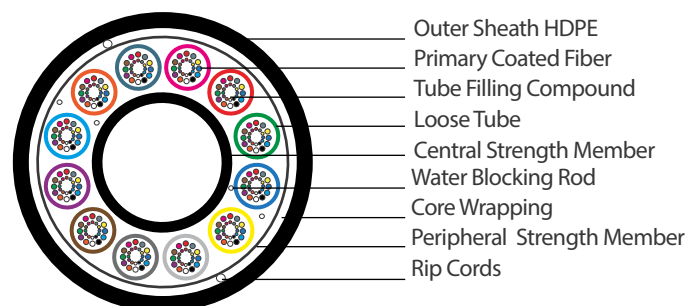
Cable Diameter : 14,6 mm
Cable Weight : 167,0 kg/km
Transport : Wooden Drum
Bending radius (installed) : 10 x Cable Diameter
Tensile Force : 2000N
Crush Resistance: 2000N (100 x 100 mm) for 60 sec.
Outer Sheath colour: black
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 14,6mm 12x12	144	G652D	14,6mm	20 mm	4 km

MULTI TUBE DUCT CABLE HDPE IU (G652D) 192, 288 fibers 14,2 mm , 17,3 mm



Properties

- Multi Loose Tube Unarmoured
- Water Swellable Elements
- Outer Sheath UV Stabilized HDPE for optimal blowing length
- Glass Yarn Elements
- Non metallic Rod
- Suitable for Blowing
- Easy Fiber routing inside closure
- Rip cords to open Outer Sheath

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

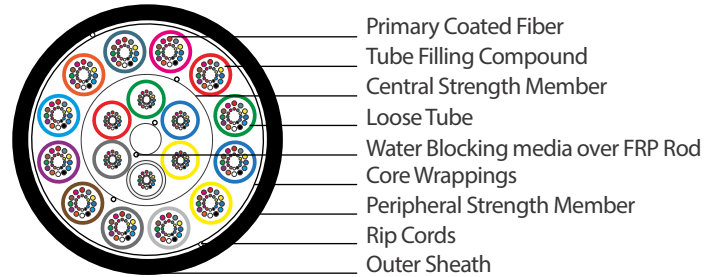
Cable Diameter : 14,2 mm for 192F / 17,3 mm for 288F
 Cable Weight : 157,0 kg/km 192F / 230,0 kg/km 288F
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force : 2000N
 Crush Resistance: 2000N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube HDPE 14,2mm 8x24	192	G652D	14,2mm	20 mm	4 km
ML Tube HDPE 17,3mm 12x24	288	G652D	17,3mm	26-40mm	4 km

MULTI TUBE DRY CORE DUCT CABLE HDPE IU (G652D) 432 fibers 18,0 mm



Properties

- Multi Loose Tube Unarmoured
- Enhance low water peak single mode fibers in full compliance with ITU-T-G 652D
- Double layer stranded construction
- Water swellable yarns
- Non metallic Rod
- Cable core is wrapped with Water Swellable Tape
- UV Stabilized HDPE outer sheath, black
- Rip cords to open Outer Sheath

Characteristics

Cable Diameter : 18,0 mm
 Cable Weight : 230 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 10 x Cable Diameter
 Tensile Force : 2000N
 Crush Resistance: 2000N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE, PRODUCTION CODE, DRUM NUMBER

Specifications/Norms

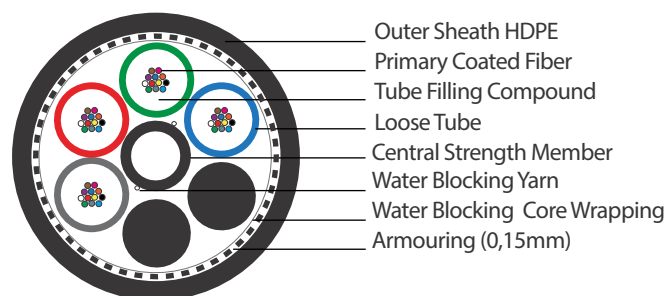
Standard: IEC 60794
 Temperature Range Norms : IEC 60794-1-2-F1
 Laying and Installation -40° to +70°C
 Operation -40° to +70°C
 Fiber colour : acc. to DIN
 Fiber type : Singlemode G652 D
 IEC/ITU standards

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
MLTube HDPE 18,0mm 18 x 24	432	G652D	18,0m	26-40mm	4 km

ARMOURED MULTI TUBE MICRO CABLE HDPE IU (G652D) 12 - 96 fibers 11,9 mm - 13,1 mm



Properties

- Corrugated Steel Tape armouring
- Outer Sheath HDPE- Black
- Water Swellable Elements
- Loose Tube Construction
- Inside duct - pulled or blown
- Suitable for direct burial
- PE Fillers

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms:	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

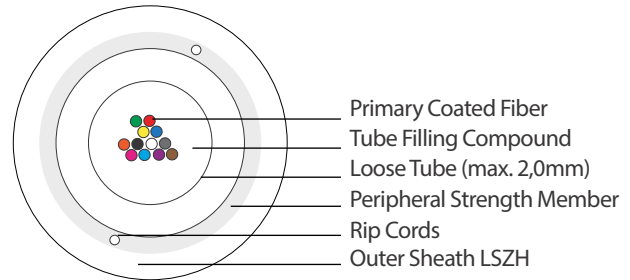
Cable Diameter : 11,9 mm up to 72F / 13,1 mm up to 96F
 Cable Weight : 130 kg/km up to 72F / 150 kg/km up to 96F
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: 2000 N
 Crush Resistance: 2000 N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube AR 11,9mm 1x12	12	G652D	11,9 mm	26-40mm	4 km
ML Tube AR 11,9mm 2x12	24	G652D	11,9 mm	26-40mm	4 km
ML Tube AR 11,9mm 4x12	48	G652D	11,9mm	26-40mm	4 km
ML Tube AR 11,9mm 6x12	72	G652D	11,9mm	26-40mm	4 km
ML Tube AR 13,1mm 8x12	96	G652D	13,1mm	26-40mm	4 km

SINGLE TUBE LSZH IU (G657A & G652D) 4-12 fibers 3,5 mm



Properties

- Single Loose Tube Unarmoured
- LSZH Low Smoke Zero Halogen Outer Sheath
- UV Resistant Outer Sheath
- Aramid yarns as flexible peripheral strength member
- Non metallic cable / immune to electromagnetic interferences
- Suitable for Indoor use
- Suitable for Microduct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Transport and Storage	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G657A & G652 D IEC/ITU standards

Characteristics

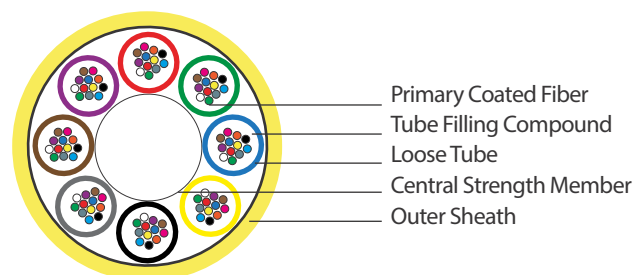
Cable Diameter : 3,5 mm
 Cable Weight : 9 kg/km
 Transport : Wooden Drum
 Bending radius (installation) : 20 x Cable Diameter
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 150 N
 Installed 75 N
 Crush Resistance: 50N (100 x 100 mm) for 60 sec.
 Outer Sheath colour : white
 Inkjet-Print : MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
SL Tube LSZH 3,5mm 1x4	4	G657A & G652D	3,5mm	6 - 10 mm	4 km
SL Tube LSZH 3,5mm 1x8	8	G657A & G652D	3,5mm	6 - 10 mm	4 km
SL Tube LSZH 3,5mm 1x12	12	G657A & G652D	3,5mm	6 - 10 mm	4 km

MULTI TUBE LSZH IU (G652D) 24 - 72 fibers 7,2 mm, 96 fibers 8,2 mm



Properties

- Multi Loose Tube Unarmoured
- LSZH Low Smoke Zero Halogen Outer Sheath
- Non metallic cable
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms:	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

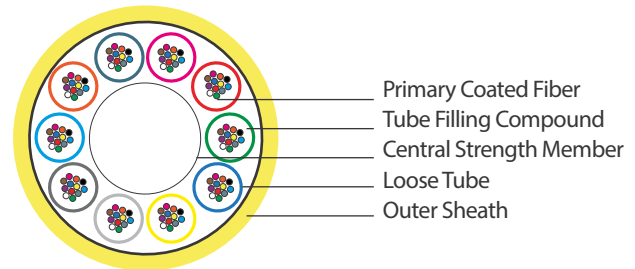
Cable Diameter : 7,2mm for 24-72F and 8,2 mm for 96F
 Cable Weight : 50kg/km for 24-72F and 65 kg/km for 96F
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 650N (24-72F) 1500N (96F)
 Installed 500N (24-72F) 1000N (96F)
 Crush Resistance: 500N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube LSZH 7,2mm 6x4	24	G652D	7,2mm	10 - 16 mm	4 km
ML Tube LSZH 7,2mm 6x8	48	G652D	7,2mm	10 - 16 mm	4 km
ML Tube LSZH 7,2mm 6x12	72	G652D	7,2mm	10 - 16 mm	4 km
ML Tube LSZH 7,2mm 6x12	96	G652D	8,2mm	12 - 16 mm	4 km

MULTI TUBE LSZH IU (G652D) 120 - 144 fibers 10,4 mm



Properties

- Multi Loose Tube Unarmoured
- LSZH Low Smoke Zero Halogen Outer Sheath
- Non metallic cable
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

Cable Diameter : 10,4 mm
 Cable Weight : 100 kg/km
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N

Crush Resistance: 500N (100 x 100 mm) for 60 sec.

Outer Sheath colour: black

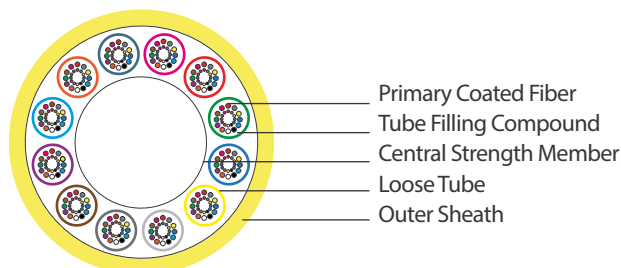
Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube LSZH 10,4mm 10x12	120	G652D	10,4mm	16 mm	4 km
ML Tube LSZH 10,4mm 12x12	144	G652D	10,4mm	16 mm	4 km

MULTI TUBE LSZH IU (G652D) 168 - 288 fibers 11,4 mm - 14,4 mm



Properties

- Multi Loose Tube Unarmoured
- LSZH Low Smoke Zero Halogen Outer Sheath
- Non metallic cable
- Suitable for Indoor use
- Suitable for Micro duct Installation

Specifications/Norms

Standard:	IEC 60794
Temperature Range Norms :	IEC 60794-1-2-F1
Laying and Installation	-30° to +70°C
Operation	-30° to +70°C
Fiber colour :	acc. to DIN
Fiber type :	Singlemode G652 D IEC/ITU standards

Characteristics

Cable Diameter : 11,4 mm up to 192F / 14,4 mm up to 288F
 Cable Weight : 115 kg/km up to 192F / 185 kg/km up to 288F
 Transport : Wooden Drum
 Bending radius (installed) : 15 x Cable Diameter
 Tensile Force: During Installation 1500 N
 Installed 1000 N
 Crush Resistance: 500N (100 x 100 mm) for 60 sec.
 Outer Sheath colour: black
 Inkjet-Print: MICRO CABLE, FIBER COUNT, FIBER TYPE,
 PRODUCTION CODE, DRUM NUMBER

Colourcode Fiber - colours in bundle (13 -24 with rings)
 Tube colours

1	2	3	4	5	6	7
red	green	blue	yellow	white	grey	brown
8	9	10	11	12		
violet	cyan	black	orange	rosa		

Cable type	Fiber Number	Fiber Type	Cable Ø	Recommended microduct inside Ø	Drum Length
ML Tube LSZH 11,4mm 7x24	168	G652D	11,4 mm	16 mm	4 km
ML Tube LSZH 11,4mm 8x24	192	G652D	11,4 mm	16 mm	4 km
ML Tube LSZH 14,4mm 9x24	216	G652D	14,4mm	20 mm	4 km
ML Tube LSZH 14,4mm 10x24	240	G652D	14,4mm	20 mm	4 km
ML Tube LSZH 14,4mm 11x24	264	G652D	14,4mm	20 mm	4 km
ML Tube LSZH 14,4mm 12x24	288	G652D	14,4mm	20 mm	4 km

LC - Connectors SN



Properties

- Comply with IEC standard 61754-20
- Simplex and duplex styles
- RoHS compliant
- Single-mode (PC/blue, APC/green) and multi-mode (grey)
- Can be assembled with cables of 0.9 mm, 1.4 mm, 1.7-2.1 mm, 2.4 mm, 2.8 mm and other contracted diameters
- One-piece design as well as multi-piece design

Specifications

Ferrule (zirconia) diameter :	D: 1.25 mm; d: 125.3-126.3 µm (SM & MM)
Concentricity :	≤ 1.0 µm (SM); ≤ 4.0 µm (MM)
Tuning :	In 45 °steps
Operating temperature °C :	-40 to +80
Flammability :	UL 94 V-0
Humidity :	95 %
Tensile load	70 N

Single-mode Assembly Specifications

Product Performance Class	High End	Premium
Insertion loss maximum (dB)	0.35	0.15
Insertion loss typical (dB)	0.12	0.06
Return loss (dB) PC	≥ 45	≥ 45
Return loss (dB) UPC	≥ 55	≥ 55
Return loss (dB) APC	≥ 85	≥ 85
Fiber Height (nm) PC	-30 to +100	-30 to +50
Fiber Height (nm) APC	-100 to +100	-50 to +50
Apex Offset (µm)	≤ 50	≤ 50
Radius (mm) PC	5 to 25	5 to 25
Radius (mm) APC	5 to 12	5 to 12
Angle (°) of APC	8 ± 0.4	8 ± 0.4
Tensile Strength (N)	> 100	> 100
Operating Temperature (°C)	-25 to +70	-25 to +70
Flammability	UL 94 V-0	UL 94 V-0
Humidity	95 %	95 %

Multi-mode Assembly Specifications

Insertion loss maximum (dB)	0.35
Insertion loss typical (dB)	0.20
Return loss (dB)	≥ 27
Fiber Height (nm)	-50 to +100
Apex Offset (µm)	≤ 70
Radius (mm)	5 to 25
Tensile Strength (N)	> 100
Operating Temperature (°C)	-25 to +70
Flammability	UL 94 V-0
Humidity	95 %

All assemblies comply with IEC 61753 and IEC 61755 standards

LC - Adapters SN



Properties

- Comply with IEC standard 61754-20
- RoHS compliant
- Single-mode (PC/blue, APC/green) and multi-mode (grey)
- Zirconia sleeves
- Available with SC Footprint as well
- Available in high density quad design

Specifications

Attenuation (dB) :	< 0.2
Repeatability 1000 cycles (dB) :	< 0.2
Service life :	> 1000
Operating temperature °C :	-40 to +80
Storage temperature °C :	-40 to +85
Flammability :	UL 94 V-0
Humidity :	95 %

Single-mode Assembly Specifications

Product Performance Class	High End	Premium
Insertion loss maximum (dB)	0.35	0.15
Insertion loss typical (dB)	0.12	0.06
Return loss (dB) PC	≥ 45	≥ 45
Return loss (dB) UPC	≥ 55	≥ 55
Return loss (dB) APC	≥ 85	≥ 85
Fiber Height (nm) PC	-30 to +100	-30 to +50
Fiber Height (nm) APC	-100 to +100	-50 to +50
Apex Offset (μm)	≤ 50	≤ 50
Radius (mm) PC	5 to 25	5 to 25
Radius (mm) APC	5 to 12	5 to 12
Angle (°) of APC	8 ± 0.4	8 ± 0.4
Tensile Strength (N)	> 100	> 100
Operating Temperature (°C)	-25 to +70	-25 to +70
Flammability	UL 94 V-0	UL 94 V-0
Humidity	95 %	95 %

Multi-mode Assembly Specifications

Insertion loss maximum (dB)	0.35
Insertion loss typical (dB)	0.20
Return loss (dB)	≥ 27
Fiber Height (nm)	-50 to +100
Apex Offset (μm)	≤ 70
Radius (mm)	5 to 25
Tensile Strength (N)	> 100
Operating Temperature (°C)	-25 to +70
Flammability	UL 94 V-0
Humidity	95 %

All assemblies comply with IEC 61753 and IEC 61755 standards

SC - Connectors SN



Properties

- Comply with IEC standard 61754-4
- Simplex and duplex styles
- RoHS compliant
- Single-mode (PC/blue, APC/green) and multi-mode (grey)
- Can be assembled with cables of 0.9 mm, 1.4 mm, 1.7-2.1 mm, 2.4 mm, 2.8 mm and other contracted diameters
- One-piece design as well as multi-piece design

Specifications

Ferrule (zirconia) diameter :	D: 2.5 mm; d: 125.3-126.3 μ m (SM & MM)
Concentricity :	$\leq 1.0 \mu$ m (SM PC); $\leq 0.8 \mu$ m (SM APC); $\leq 4.0 \mu$ m (MM)
Tuning :	In 45 °steps
Operating temperature °C :	-40 to +80
Storage temperature °C :	-40 to +85
Flammability :	UL 94 V-0
Humidity :	95 %
Tensile load	100 N

Single-mode Assembly Specifications

Product Performance Class	High End	Premium
Insertion loss maximum (dB)	0.35	0.15
Insertion loss typical (dB)	0.12	0.06
Return loss (dB) PC	≥ 45	≥ 45
Return loss (dB) UPC	≥ 50	≥ 50
Return loss (dB) APC	≥ 85	≥ 85
Fiber Height (nm) PC	-30 to +100	-30 to +50
Fiber Height (nm) APC	-100 to +100	-50 to +50
Apex Offset (μ m)	≤ 50	≤ 50
Radius (mm) PC	5 to 25	5 to 25
Radius (mm) APC	5 to 12	5 to 12
Angle (°) of APC	8 ± 0.4	8 ± 0.4
Tensile Strength (N)	> 100	> 100
Operating Temperature (°C)	-25 to +70	-25 to +70
Flammability	UL 94 V-0	UL 94 V-0
Humidity	95 %	95 %

Multi-mode Assembly Specifications

Insertion loss maximum (dB)	0.35
Insertion loss typical (dB)	0.20
Return loss (dB)	≥ 27
Fiber Height (nm)	-50 to +100
Apex Offset (μ m)	≤ 70
Radius (mm)	5 to 25
Tensile Strength (N)	> 100
Operating Temperature (°C)	-25 to +70
Flammability	UL 94 V-0
Humidity	95 %

All assemblies comply with IEC 61753 and IEC 61755 standards

SC - Adapters SN



Properties

- Comply with IEC standard 61754-4
- Simplex and duplex styles
- RoHS compliant
- Single-mode (PC/blue, APC/green) and multi-mode (grey)
- Zirconia sleeves
- Available with and without flange

Specifications

Attenuation (dB) :	< 0.2
Repeatability 1000 cycles (dB) :	< 0.2
Service life :	> 1000
Operating temperature °C :	-40 to +80
Storage temperature °C :	-40 to +85
Flammability :	UL 94 V-0
Humidity :	95 %

Single-mode Assembly Specifications

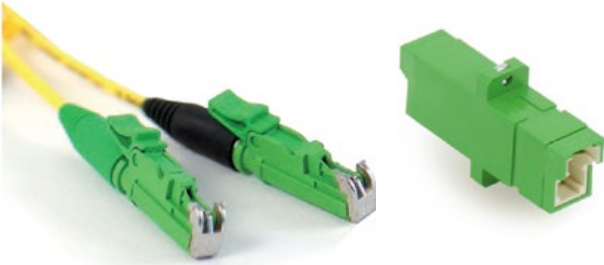
Product Performance Class	High End	Premium
Insertion loss maximum (dB)	0.35	0.15
Insertion loss typical (dB)	0.12	0.06
Return loss (dB) PC	≥ 45	≥ 45
Return loss (dB) UPC	≥ 50	≥ 50
Return loss (dB) APC	≥ 85	≥ 85
Fiber Height (nm) PC	-30 to +100	-30 to +50
Fiber Height (nm) APC	-100 to +100	-50 to +50
Apex Offset (μm)	≤ 50	≤ 50
Radius (mm) PC	5 to 25	5 to 25
Radius (mm) APC	5 to 12	5 to 12
Angle (°) of APC	8 ± 0.4	8 ± 0.4
Tensile Strength (N)	> 100	> 100
Operating Temperature (°C)	-25 to +70	-25 to +70
Flammability	UL 94 V-0	UL 94 V-0
Humidity	95 %	95 %

Multi-mode Assembly Specifications

Insertion loss maximum (dB)	0.35
Insertion loss typical (dB)	0.20
Return loss (dB)	≥ 27
Fiber Height (nm)	-50 to +100
Apex Offset (μm)	≤ 70
Radius (mm)	5 to 25
Tensile Strength (N)	> 100
Operating Temperature (°C)	-25 to +70
Flammability	UL 94 V-0
Humidity	95 %

All assemblies comply with IEC 61753 and IEC 61755 standards

E2000 - Connectors and Adapters TC



Properties

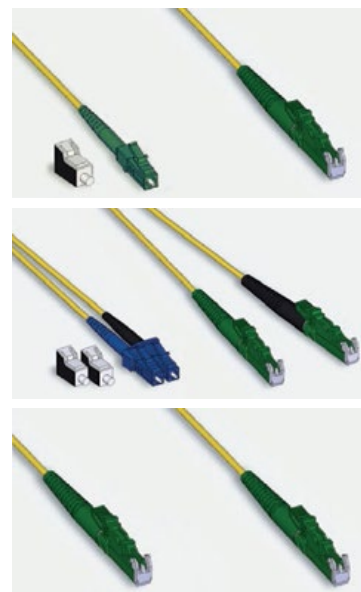
- Comply with IEC standard IEC 61754-15
- Simplex and duplex styles
- Single-mode (PC/blue, APC/green) and multi-mode (grey)
- Can be assembled with cables of 0,6mm - 3,5 mm diameter
- One-piece design

Specifications

Tuning :	In 60 °steps
Operating temperature °C :	-40 to +85
Flammability :	UL 94 V-0
Lifetime :	1000 connections
Tensile load	100 N

Singlemode simplex/ duplex 9/125

LCAPC-E2000APC
LC-E2000APC
E2000APC-E2000APC



Single & Multi-mode Assembly Specifications

Return loss (dB) MM	≥ 35
Return loss (dB) SM PC	≥ 50
Return loss (dB) SM APC	≥ 85
Return loss (dB) SM APC HE	≥ 85
Insertion loss MM typ. ≤ / 97% ≤	0.20 / 0.50
Insertion loss SM PC typ. ≤ / 97% ≤	0.20 / 0.45
Insertion loss SM APC typ. ≤ / 97% ≤	0.20 / 0.45
Insertion loss SM APC HE typ. ≤ / 97% ≤	0.12 / 0.25

Pre-assembled FAN-OUTS SN



Description

Pre-assembled cable systems are actually furcation systems, furcating, for example, from a multi-fiber cable into individual single-fiber cables. Single-fiber connectors are pre-terminated on one or both ends of the individual fan-out cables, allowing for an easy and fast installation on site.

Applications

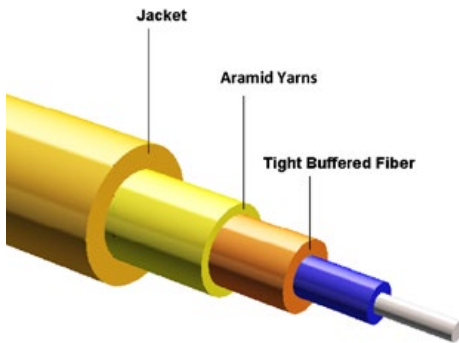
- The cable systems are suited for both indoor and outdoor installation.

Features

- Cables: ODF, indoor, Outdoor
- Fiber number: 4/6/8/12/16/24 fibers (ODF & indoor), 4/6/8/12/16/24/48 fibers (outdoor)
- Fiber type: single-mode (G.652.D, G.657.A1/A2/B3) or multi-mode (OM1-4)
- Connectors: LC, SC, FC, ST etc., PC/APC
- Individual fan-out cables: 0.9 mm or 1.7 mm in diameter, same or staggered cable length
- Connectors: LC, SC, FC, ST etc., PC/APC
- Cable length: any desired length
- Protection of the individual fan-out cables: choice between (1) tube protection and (2) tube protection + pulling aid and (3) plastic protection
- Packaging: choice between (1) carton drum + plastic bag and (2) carton drum + carton box and (3) carton box

Cable type	Fiber Type	Cable Ø	Drum Length
PRE-ASSEMBLED FAN-OUTS	G.652.D, G.657.A1/A2/B3, OM1-4	0.9mm 1.7mm	-

Simplex Cable SN



Description

Tight buffered tubes with 0.6 mm or 0.9 mm diameter are often used for indoor simplex cables. The simplex cable is composed of an optical fiber (with primary coating) in a tight buffered tube, aramid yarns, and a cable outer jacket.

Applications

- Used in optical communication equipment room and optical distribution frames
- Used as connections in data processing equipment and optical telecommunication equipment
- Used as pigtails and patch cords
- Installation in indoor area

Features

- Soft, flexible and easy to strip
- Flame retardant, self-extinguishing
- Non-toxic and halogen free
- Excellent mechanical and thermal properties
- High capacity in data transmission

Characteristics

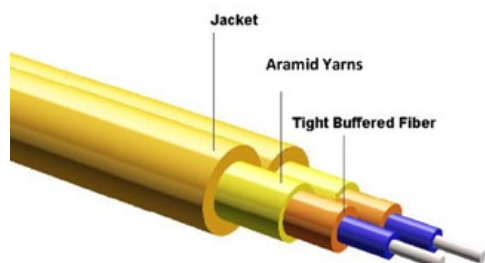
Cable Diameter :	1.4-1.9mm	2.1mm	2.4mm	2.8mm
Cable Weight :	2.1-3.2kg/km	3.8kg/km	5,3kg/km	7,85kg/km
Long Term Tensile Strength :	100N	100N	150N	200N
ShortTerm Tensile Strength :	100N	200N	300N	400N
Long Term Crush Resistance :	100-300 N/100mm		300 N/100mm	
Short Term Crush Resistance :	200-500 N/100mm		700 N/100mm	
Min. Bend. Radius :	dynamic 50mm / static 25mm			
Temperature Range :	-10 °C to +50 °C		Installation	
	-20 °C to +70 °C		In service	
	-25 °C to +70 °C		Storage	

Options

Optical fiber :	Single-mode (G.652.D, G.655.C, G.657.A1, G.657.A2, G.657.B) or Multi-mode (OM1-4)
Fiber Type :	LSZH, PVC, PUR or any other contracted material
Jacket color :	24 different colors possible
Cable Ø :	Standard diameters: 1.4 mm, 1.7 mm, 2.0 mm, 2.4 mm, 2.7 mm, or any other contracted diameter

Cable type	Fiber Type	Cable Ø				Drum Length
SIMPLEX CABLE	G.652.D, G.655.C, G.657.A1, G.657.A2, G.657.B	1.4-1.9mm	2.1mm	2.4mm	2.8mm	2 km

Duplex Cable SN



Description

A duplex cable consists of 2 simplex cables. Semi-tight buffered or tight buffered tubes with 0.9 mm or 0.6 mm diameter are often used. Each fiber is strain relieved with aramid yarns and protected by a cable outer jacket.

Applications

- Used as indoor cables
- Used in telecommunication equipment rooms and optical distribution frames
- Used as connections in data processing equipment and optical telecommunication equipment
- Used as jumper cables and pigtails

Features

- Tight bending radius (flat side)
- Easily separated into two simplex cables
- Soft, flexible and easy to strip
- Excellent mechanical and thermal properties
- High capacity in data transmission

Characteristics

Cable Diameter :	2.0x4.1 mm	2.7x5.5 mm
Cable Weight :	7.9kg/km	13.6kg/km
Long Term Tensile Strength :	2x100N	2x100N
ShortTerm Tensile Strength :	400N	400N
Long Term Crush Resistance :	200 N/100mm	200 N/100mm
Short Term Crush Resistance :	500 N/100mm	1000 N/100mm
Min. Bend. Radius :	dynamic 50mm / static 25-30mm	
Temperature Range :	-10 °C to +50 °C Installation -20 °C to +70 °C In service -25 °C to +70 °C Storage	

Options

Optical fiber :	Single-mode (G.652.D, G.655.C, G.657.A1, G.657.A2, G.657.B) or Multi-mode (OM1-4)
Fiber Type :	LSZH, PVC, PUR or any other contracted material
Jacket color :	12 different colors possible
Cable Ø :	Standard simplex cable diameters: 1.7 mm, 2.0 mm and 2.7 mm or any other contracted diameter

Cable type	Fiber Type	Cable Ø		Drum Length
DUPLEX CABLE	G.652.D, G.655.C, G.657.A1, G.657.A2, G.657.B	2.0x4.1mm	2.7x5.5mm	2 km

Pigtails - E2000, LC, SC



E2000 Pigtails

- Single-mode 9 μm G.652.D, PC (0°), 2m, yellow
- Single-mode 9 μm G.652.D, APC (8°), 2m, yellow
- Multimode 50 μm OM4, 2 m, magenta
- Multimode 50 μm OM3, 2 m, turkuse
- Multimode 50 μm OM2, 2 m, orange
- Multimode 50 μm OM1, 2 m, blue

LC Pigtails

- Single-mode 9 μm G.652.D, PC (0°), 2m, yellow
- Single-mode 9 μm G.652.D, APC (8°), 2m, yellow
- Single-mode 9 μm G.657.A1, APC (8°), 2m, yellow
- Multimode 50 μm OM4, 2 m, magenta
- Multimode 50 μm OM3, 2 m, turkuse
- Multimode 50 μm OM2, 2 m, orange
- Multimode 50 μm OM1, 2 m, blue

SC Pigtails

- Single-mode 9 μm G.652.D, PC (0°), 2m, yellow
- Single-mode 9 μm G.652.D, APC (8°), 2m, yellow
- Single-mode 9 μm G.657.A1, APC (8°), 2m, yellow
- Multimode 50 μm OM4, 2 m, magenta
- Multimode 50 μm OM3, 2 m, turkuse
- Multimode 50 μm OM2, 2 m, orange
- Multimode 50 μm OM1, 2 m, blue

Pigtails Sets - E2000, LC, SC



E2000 12 colours Sets

- Single-mode 9 µm G.652.D, APC (8°), 2m
- Multimode 50 µm OM4, 2 m
- Multimode 50 µm OM3, 2 m

LC 12 colours Sets

- Single-mode 9 µm G.652.D, PC (0°), 2m, yellow
- Single-mode 9 µm G.652.D, APC (8°) 2m, yellow
- Single-mode 9 µm G.657.A2, APC (8°) 2m, yellow
- Multimode 50 µm OM4, 2 m, magenta
- Multimode 50 µm OM3, 2 m, turkuiise

SC 12 colours Sets

- Single-mode 9 µm G.652.D, PC (0°), 2m, yellow
- Single-mode 9 µm G.652.D, APC (8°), 2m, yellow
- Single-mode 9 µm G.657.A2, APC (8°), 2m, yellow
- Multimode 50 µm OM4, 2 m, magenta
- Multimode 50 µm OM3, 2 m, turkuiise

Pigtail 2.0 mm Easy Strip

- E2000APC
9 µm G.652.D, APC (8°), 6m



- LCAPC
9 µm G.652.D, APC (8°), 6m



- SCAPC
9 µm G.652.D, APC (8°), 6m



Blowing Machine - Fiber Kat Micro

High Performance

The cable blowing machine type KAT Micro may be used for the installation of sensitive micro-cables into micro-duct in just one procedure using compressed air.

During the blow-in operation the micro-cable is passing the cabling caterpillar. The integrated compressed-air connector consists of a two-piece aluminium casing.

Split sealing washers hermetically surround the cable to be blown-in.

The cable is driven forward by the air supplied from a suitable compressor. Air regulation is done by a valve which is integrated into the machine.

Two drive belts guarantee an excellent closed linkage to the cable. The upper belt can manually be moved up and down.

The aluminium-frame construction of the caterpillar guarantees stability, long operating life and light weight.



Accessories

- All of our machines are delivered with aluminium carrying case
- Sealing kit for cable diameters of 3-8mm and external duct diameters of 10mm
- Compressed air hose 10m

Model	Fiber Kat Micro
Fiber/Cable Diameter	3 -8 mm OD
Tube Size (OD)	7 -20,0 mm OD
Max. pushing force	180N
Install Speed to	100 m/min.
Distance	2.5 km
Recommended Airflow Motor Air Pressure	- 7 bar
Length: Width: Height: Weight:	330 mm 220 mm 280 mm 7 kg.

Blowing Machine - Fiber Kat Mini



High Performance

The cable blowing machine type KAT Mini may be used for the installation of sensitive micro-cables into micro-duct in just one procedure using compressed air.

During the blow-in operation the micro-cable is passing the cabling caterpillar. The integrated compressed-air connector consists of a two-piece aluminium casing.

Split sealing washers hermetically surround the cable to be blown-in.

The cable is driven forward by the air supplied from a suitable compressor. Air regulation is done by a valve which is integrated into the machine.

Two drive belts guarantee an excellent closed linkage to the cable. The upper belt can manually be moved up and down.

The electronic measuring device displays the blown-in cable length as well as the cable speed during blowing work.

The aluminium-frame construction of the caterpillar guarantees stability, long operating life and light weight.

Accessories

- All of our machines are delivered with aluminium carrying case
- Electronic speed/meter counter
- Adapter for cable OD 3-12mm
- Adapter for pipe OD 10-12-14-16-20 mm
- 2 sets. rubber band
- Gaskets set for fibercable 3-12mm
- 10 meter 3/4" airhose with couplers

Model	Fiber Kat Mini
Fiber/Cable Diameter	3 -12 mm OD
Tube Size (OD)	7 -20,0 mm OD
Max. pushing force	400N
Install Speed to	120 m/min.
Distance	3.5 km
Recommended Airflow Motor Air Pressure	- 7 bar
Length: Width: Height: Weight:	540 mm 240 mm 290 mm 12 kg.

Blowing Machine - Fiber Kat Mini Log Box

High Performance

Through the electronic measure system is the KAT MINI Innovation on the fiber blowing equipment market and is listed as approved by Deutsche Telekom. All relevant data are automatically recorded and output as PDF in the USB port for data transfer.

Features

1. Blowing data logging
 - Blowing length, cable speed
 - Engine pressure
 - Push force on the cable
 - Air pressure in the duct
 - Environmental data (GPS, temperature, etc.)
2. Frame parameter preselection
 - Pipe, cable information
 - Construction project, section
 - Compressor, etc.
3. Diagram Live View
4. Internal memory for re-selection

Accessories

- All of our machines are delivered with aluminium carrying case
- Electronic speed/meters counter
- Adapter for cable OD 3-12mm•
- Adapter for pipe OD 10-12-14-16-20 mm
- 2 sets Rubber band
- Gaskets set for fibercable 3-12mm
- 10 meter 3/4" airhose with couplers



Model	Fiber Kat Mini Log Box
Fiber/Cable Diameter	3 -8 mm OD
Tube Size (OD)	7 -20,0 mm OD
Max. pushing force	180N
Install Speed to	120 m/min.
Distance	3.5 km
Recommended Airflow Motor Air Pressure	- 7 bar
Length: Width: Height: Weight:	540 mm 240 mm 290 mm 12 kg.

Blowing Machine - MicroFlow



Control unit

Microflow's control unit has a user friendly touch display, which can be used to make a number of different adjustments:

- Adjustment of maximum motor torque
- Adjustment of maximum speed
- Presetting of counter with automatic stop after a certain blowing distance
- Acceleration - from start to maximum speed
- Deceleration - from maximum speed to stop
- The display shows different information during blowing, for instance: Meter count, Actual speed and Actual torque

Protection technology

- Unique protection technology that stops the machine if the fiber cable meets an obstacle.
- Unique protection technology that stops the machine if the motor exceeds the preset maximum torque level.

In both cases the machine stops immediately so the fiber cable does not get damaged. After the protection technology has stopped the machine, it will automatically start up again. It will try 3 times total to get through the obstacle, if it still has not succeeded it will come to a full stop.

The blowing process

- The machine is placed on a stable surface and the fiber cable is placed in the machine.
- The duct, in which the fiber cable is to be blown, is placed in the machine .
- The pulling wheels are adjusted.
- With the control unit the torque level, speed and blowing distance can be adjusted.
- Press the start button to start the machine, and after 10-20 m the air is turned on.
- The cable blowing is now automatic and can be stopped either manually by pressing the stop button or automatically when the preset blowing distance has been reached.

Model	MicroFlow	
Fiber/Cable Diameter	0,8-5,5 mm	
Tube Size (OD)	5-16 mm	
Max. Pushing Force	-	
Install Speed to	100 m/min	
Distance	Up to 2,5 km	
Recommended Airflow Recommended Pressure	200-500 l/per min 8-16 bar air	
Length:	Machine:	Control Box:
Width:	25 cm	25 cm
Height:	15 cm	16 cm
Weight:	22 cm	13 cm
	9,7 kg	1,9 kg

Blowing Machine - MiniFlow

User friendly design

MiniFlow has a user friendly design, that makes for easy operation. The machine is designed with the main focus on functionality that includes:

- Rugged Stainless construction
- Safety chain guard
- Large easy to use adjustable knobs
- Push force indicator

Efficient cable blowing

MiniFlow is a compact and efficient cable blowing machine. The machine is capable of installing fiber cable at a speed up to 100 m/min. and up to a distance of 3,5 km.

Built-in meter counter

MiniFlow has a built-in mechanical meter counter. The counter is easy to read and is robust and simple to operate. OPTIONAL: available with electronic counter and tachometer.

Flexibility

MiniFlow is very flexible, the machine can quickly be adapted to accommodate different cable and duct sizes.

Cable damage safety

MiniFlow has a unique monitoring system, which continuously monitors the pushing force, applied on the fiber cable. This makes it possible to stop the drive wheels before the cable is damaged.

The following equipment is needed to run:

- Hydraulic pump + control valve.
- High pressure compressor + hoses.

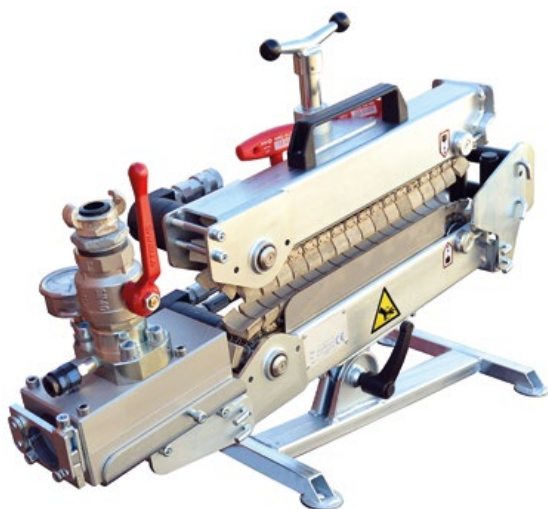
We offer all accessories on request.

Full training - theory and practice - is always provided.



Model	MiniFlow
Fiber/Cable Diameter	4-12,0 mm
Tube Size (OD)	7-20,0 mm
Max. Pushing Force	-
Install Speed to	100 m/min.
Distance	Up to 3.5 km
Recommended Airflow Recommended Pressure	1.000 l/pr. min. 8-16 bar air
Length: Width: Height: Weight:	650 mm 220 mm 225 mm 24kg.

Blowing Machine - MultiFlow



User friendly design

MultiFlow has a user friendly design, which makes the machine easy to operate. The machine is designed with main focus on functionality that makes cable blowing is easy.

Efficient cable blowing

MultiFlow is a very efficient cable blowing machine. It can blow cables with a speed up to 80 m/min. It is possible to blow distances up to 10 km.

Cable blowing using either air or water

With MultiFlow it is possible to install fiber optic cables using either air or water. With water assisted cable blowing you can achieve optimal results, especially when installing larger cables or blowing long distances.

Robust

MultiFlow is constructed in a way that it is robust and can withstand being used as the special conditions there sometimes are at a cable blowing location are taken into account.

Flexibility

MultiFlow is very flexible as the machine can be quickly changed to blow different sizes and numbers of micro ducts. There are many different sizes and combinations available to fit the different dimensions needed in a specific situation.

The following equipment is needed to run:

- Hydraulic pump + control valve.
- High pressure compressor + hoses.

We offer all accessories on request.

Full training - theory and practice - is always provided.

Model		MultiFlow	
Fiber/Cable Diameter		8-32,0 mm	
Tube Size (OD)		18-70 mm	
Max. Pushing Force		-	
Install Speed to		80 m/min.	
Distance		Up to 10 km*	
Recommended Airflow Recommended Pressure		8.000-12.000 l/pr. min. 8-12 bar air	
Length: Width: Height: Weight:		700 mm 230 mm 350 mm 40 kg.	
 32mm	 40mm	 50mm	 MICRODUCT RELINER
5x	8x	12x	7 / 5,5 mm
3x	5x	7x	10 / 8 mm
-	3x	5x	12 / 8 mm
-	-	4x	14 / 11,5 mm

FIBER OPTIC CABLE BLOWING MACHINES

PRODUCT OVERVIEW



Model	FPT Micro Kat	FPT Mini Kat	FPT Mini Kat Log Box
Usage	Outside Plant	Outside Plant	Outside Plant
Fiber/Cable Diameter	3-8 mm	3-12 mm	3-12 mm
Tube Size (OD)	7-20 mm	10-50 mm	10-50 mm
Max. pushing force	180N	400N	400N
Install Speed to	100 m/min.	120 m/min.	120 m/min.
Distance Up to	2.5 km	3.5 km	3.5 km
Recommended Airflow Recommended Pressure	- max 7 bar	- max 15 bar	- max 15 bar
Length: Width: Height: Weight:	330 mm 220 mm 280 mm 7 kg.	540 mm 240 mm 290 mm 12 kg.	540 mm 240 mm 290 mm 17 kg
Unique Features	Use with Air Air driven Compact Light weight Flexible Adaptability Great resistance Distance and Speed measurment Ease of Use Simple Maintenance	Use with Air Air driven Compact Light weight Flexible Adaptability Great resistance Distance and Speed measurment Ease of Use Simple Maintenance	Blowing data logging - Blowing Length - Cable speed - Engine pressure - Push force on the cable - Air pressure on the duct Diagram Live View Internal Memory Frame Parameter selection



Model	MicroFlow (MF)	MiniFlow (MF)	MultiFlow (MF)
Usage	Inside Plant	Outside Plant	Outside Plant
Fiber/Cable Diameter	0,8-5,5 mm	4-12 mm	8-32 mm
Tube Size (OD)	5-16 mm	7-20 mm	20-70 mm
Max. pushing force	-	-	-
Install Speed to	100 m/min.	110 m/min.	80 m/min.
Distance Up to	2.5 km	3.5 km	10 km
Recommended Airflow Recommended Pressure	200-500 l/pr. min. 8-16 bar air	1.000 l/pr. min. 8-16 bar air	8.000-12.000 l/pr. min. 8-12 bar
Length: Width: Height: Weight:	Machine: 25 cm Control Box: 25 cm 15 cm 16 cm 22 cm 13 cm 9,7 kg. 1,9 kg.	650 mm 225 mm 210 mm 24 kg.	700 mm 230 mm 350 mm 40 kg.
Unique Features	Automatic Buckle Detection Adjustable Torque Preset Automatic Stop Adjustable Speed Control Speed, Torque & Count Display Air Pressure & Flow Regulation Easy to Operate Simple Maintenance	Use with Air or Water Hydraulic driven Push Force Monitor Rugged Construction Flexible Adaptability Adjustable Torque Distance and Speed measurment Ease of Use Simple Maintenance	Use with Air or Water Jets Tubes or Cable Rugged Construction Flexible Adaptability Adjustable Torque Distance and Speed measurment Ease of Use Simple Maintenance

