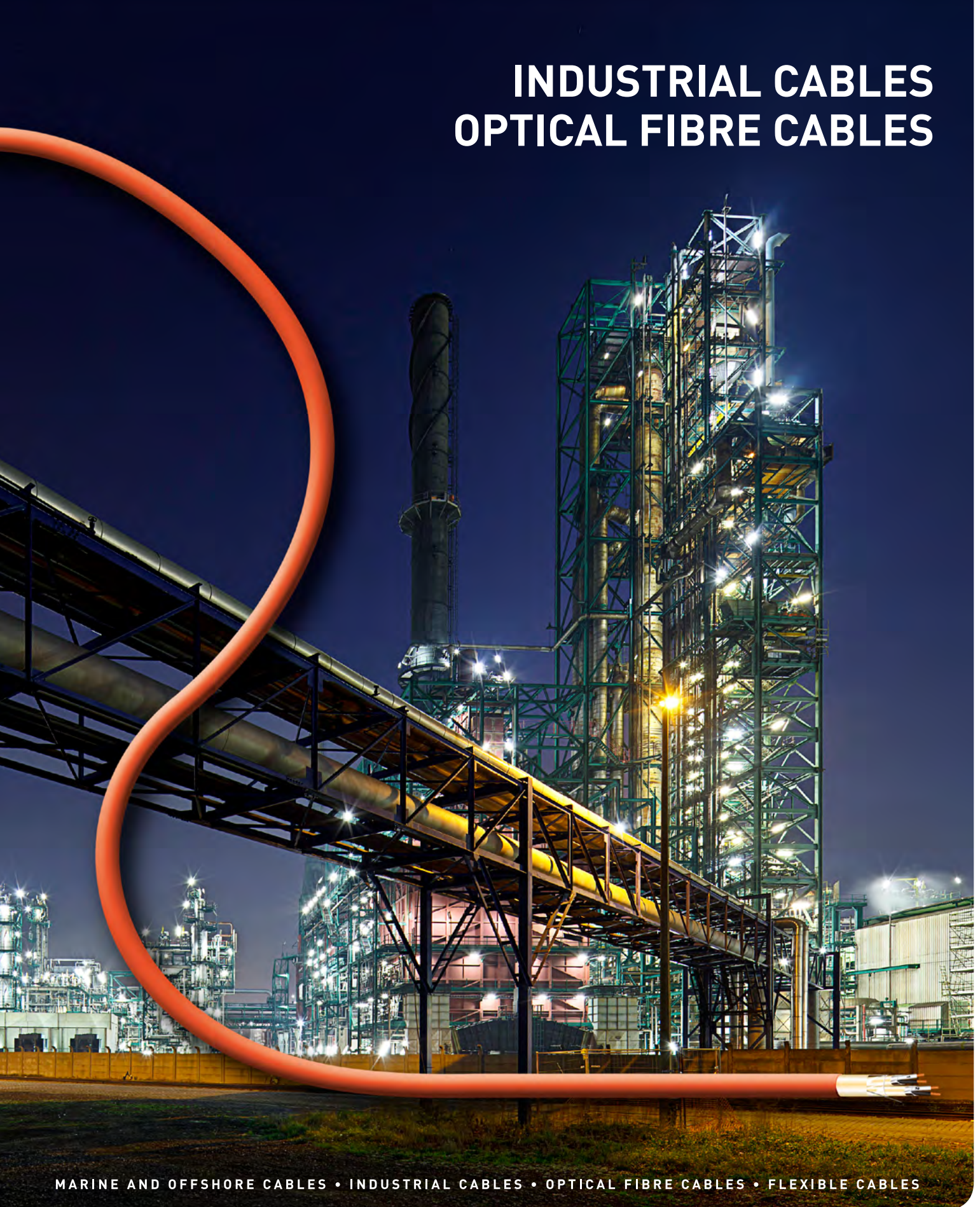


3/2017

HELKAMA

THE PERFECT CONNECTION

INDUSTRIAL CABLES OPTICAL FIBRE CABLES



MARINE AND OFFSHORE CABLES • INDUSTRIAL CABLES • OPTICAL FIBRE CABLES • FLEXIBLE CABLES

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Helkama cable factory in Hanko, Finland.





HELKAMA

**– your reliable partner
in cables**

Welcome to the world of cables!

This brochure introduces our instrumentation, fire resistant and fibre optical cables.

The cables are manufactured by Helkama Bica Oy, a family-owned company currently being run by the fourth generation. Cables have been produced for more than 50 years by the Helkama Group, which itself is over 110 years old.

The Helkama name stands for quality, flexibility and personal service. We focus on our customers' needs and short delivery times.

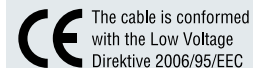
Since time is of essence in today's world, we keep stock of the most common instrumentation, fire resistant and fibre optical cables, which enables us to respond immediately to our customers' needs. Although a cable is not normally a major cost in a project, a missing cable can be extremely expensive. This is why our experienced personnel are trained to go that extra mile to satisfy the needs of our customers – your needs!

Our RE-instrumentation cables have the EAC (Certificate of Conformity to Technical Regulations of Customs union).

For more details, see the cable data sheets in this brochure. If you cannot find a cable matching your needs in this brochure, we are open to discussing the possibilities of manufacturing one to your requirements.

HELKAMA – today, tomorrow...and in the future!

RE-2X(St)H PiMF 1 – 24 pairs



Instrumentation cable according to EN 50288-7

General	Individually and collectively screened cable for instrumentation, control and communication applications. Suitable for direct burial use.
Conductor	Annealed stranded copper conductor
Insulation	Extruded XLPE. Nominal wall thickness 0,4 mm. Insulation colors white and black, white colors numbered 1, 2...n- according to number of pairs.
Twisting	Two insulated conductors white and black stranded together and covered with a polyester tape
Pair shielding	Solid ground conductor \varnothing 0,6 mm, al-polyester tape and a polyester tape applied on the pairs.
Stranding	Pairs twisted together. Polyester tape applied on the strand. 24 μ m al-polyester tape applied as a screen over the polyester tape. 7x0,30 tinned copper drain wire under the screen.
Sheath	Extruded flame retardant halogen free PE, (EN 50290-2-27) Nominal wall thickness cable \varnothing \leq 24 mm 1,8 mm cable \varnothing >24 mm 2,0 mm

Physical properties	Flame retardant	IEC 60332-1-2, IEC 60332-3-24 (Category C)
	Installation temperature	-5°C... +50°C
	Min. bending radius	7,5 x cable \varnothing
	Sunlight resistance	UL1581 section1200
	Oil resistance	ICEA S-82-552/NEMA WC 55
Identification	Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath	

Electrical properties

		Unit	0,5 mm ²	0,75 mm ²	1,3 mm ²	1,5 mm ²
Conductor size	nom.		0,5 mm ²	0,75 mm ²	1,3 mm ²	1,5 mm ²
Conductor resistance	max.	ohm/km	39,2	24,6	14,2	12,6
Insulation resistance	min.	Mohmxkm	5000	5000	5000	5000
Mutual capacitance (800Hz)						
	max.	nF/km	120	120	120	120
L/R ratio	max.	μ H/ohm	25	25	40	40
Inductance	max.	mH/km	0,57	0,60	0,59	0,60
Test voltage						
Conductor/conductor	min.	VDC 30s	4000	4000	4000	4000
Conductor/screen	min.	VDC 30s	2000	2000	2000	2000
Operating voltage (Ueff)	max.	V	300	300	300	300

Number of pairs	0,5 mm ²		0,75 mm ²		1,3 mm ²		1,5 mm ²	
	Outer \varnothing nom. mm	Weight nom. kg/km	Outer \varnothing nom. mm	Weight nom. kg/km	Outer \varnothing nom. mm	Weight nom. kg/km	Outer \varnothing nom. mm	Weight nom. kg/km
2	9,3	102	10,0	119	11,1	151	11,5	163
4	10,9	150	12,5	186	14,0	244	14,6	269
8	13,3	237	16,0	306	18,2	415	19,1	461
12	15,4	323	18,8	420	21,5	578	22,5	647
16	19,1	423	21,1	530	24,2	737	25,4	827
20	18,7	487	23,1	638	26,6	893	27,9	1005
24	20,1	556	24,9	746	28,7	1047	30,2	1180

Technical data of triples, other conductor dimensions and number of pairs will be stated on request.

RE-2X(St)H 1 – 24 pairs

CE The cable is conformed with the Low Voltage Directive 2014/35/EU



Instrumentation cable according to EN 50288-7

General	Collectively screened cable for instrumentation, control and communication applications. Suitable for direct burial use.
Conductor	Annealed copper solid or stranded
Insulation	Extruded XLPE. Nominal wall thickness 0,4 mm. Colors white and black, with numbers on white cores 1, 2...n- according to number of pairs.
Twisting	Two insulated conductors twisted together
Stranding	Pairs twisted together. Construction of two pairs is made as a quad or two pairs. Polyester tape applied on the strand. 24 µm Al-polyester tape applied as a screen over the polyester tape. 7x0,30 tinned copper drain wire under the screen.
Sheath	Extruded flame retardant halogen free PE, (EN 50290-2-27) Nominal wall thickness cable Ø ≤24 mm 1,8 mm cable Ø >24 mm 2,0 mm Colour of sheath: black or blue

Physical properties	Installation temperature	-15 °C to 50 °C
	During operation	-40 °C to 70 °C
	Min. bending radius	7,5 x cable Ø
	Flame propagation	IEC 60332-1-2 IEC 60332-3-22 (Cat. A)
	Sunlight resistance	UL1581 section1200
	Oil resistance	ICEA S-82-552/NEMA WC 55

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Electrical properties

		Unit					
Conductor size	nom.		0,5 mm ²	0,75 mm ²	1,0 mm ²	1,3 mm ²	1,5 mm ²
Conductor resistance	max.	ohm/km	39,2	24,6	18,1	14,2	12,6
Insulation resistance	min.	Mohm xkm	5000	5000	5000	5000	5000
Mutual capacitance (800Hz)							
cable of one pair	max.	nF/km	120	120	120	120	120
cable of 2 to 4 pairs	max.	nF/km	100	100	100	100	100
cables above 4 pairs	max.	nF/km	80	80	80	80	80
L/R ratio	max.	µH/ohm	25	25	25	40	40
Inductance	max.	mH/km	0,57	0,60	0,60	0,59	0,60
Test voltage							
Conductor/conductor	min.	VDC 30 s	4000	4000	4000	4000	4000
Conductor/screen	min.	VDC 30 s	2000	2000	2000	2000	2000
Operating voltage (Ueff)	max.	V	300	300	300	300	300

Number of pairs	Outer Ø	Weight	Outer Ø	Weight	Outer Ø	Weight	Outer Ø	Weight	Outer Ø	Weight
	nom. mm	nom. kg/km	nom. mm	nom. kg/km	nom. mm	nom. kg/km	nom. mm	nom. kg/km	nom. mm	nom. kg/km
	0,5 mm ²		0,75 mm ²		1,0 mm ²		1,3 mm ²		1,5 mm ²	
1	5,3	37	5,9	48	6,3	55	6,6	62	7,3	73
2	7,9	64	8,8	83	9,4	96	10,0	112	11,3	137
3	8,5	82	9,4	105	9,9	122	10,6	144	12,0	176
4	9,3	99	10,2	126	10,9	150	11,8	184	13,2	218
6	11,2	138	12,3	178	13,2	214	14,3	263	16,0	313
8	11,8	165	13,1	218	14,2	271	15,2	327	17,2	399
12	14,2	235	15,7	311	17,0	388	18,2	470	20,7	573
16	16,0	296	17,9	404	19,4	503	20,8	612	23,6	747
24	19,3	431	21,4	579	23,3	725	25,2	897	28,5	1094

NOVAK-HF



Cable for instrumentation, process control and computer systems, fixed installation

Electrical properties	Pair DC resistance (+20°C) max. 81 ohm/km Nominal pair capacitance (800 Hz) 80 nF/km Insulation resistance min. 100 Mohm x km
Conductor	Annealed, tinned copper 0,5 mm ² /7 x 0,3 mm
Insulation	PE, nominal wall thickness 0,3 mm
Twisting	Two conductors twisted together. Each pair has a different lay. Pair identification with a colour code and an identification number.
Pair colour codes	Orange/white
Pair numbers	Each pair has an identification number
Units	Units consisting of 4 pairs twisted together Unit identification with a numbered tape
Stranding	Groups cabled together and covered with a polyester tape
Shielding	Plastic coated aluminium tape over a ground conductor 7x0,3 mm
Sheath	Flame retardant, halogen-free polyolefine plastic, light grey.

Rated voltage 75 V

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Fire properties IEC 60332-1, IEC 60332-3-22

Physical properties Installation temperature -15 °C to 50 °C
During operation -40 °C to 70 °C

Type	Conductors	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
NOVAK-HF	2 x 2 x 0,5 + 0,5	6,5	48	1000
	4 x 2 x 0,5 + 0,5	7,5	75	1000
	8 x 2 x 0,5 + 0,5	9,8	131	1000
	12 x 2 x 0,5 + 0,5	11,6	186	1000
	24 x 2 x 0,5 + 0,5	17,5	346	1000

KJAAM-HF



Cable for instrumentation, process control, computer and sound reproduction systems. Designed for the transmission of digital and low-level analog signals, providing excellent protection against electromagnetic interference.

Electrical properties	Pair DC resistance (+20°C) max. 81 ohm/km Nominal pair capacitance (800 Hz) 100 nF/km Insulation resistance min. 2 Gohm x km
Conductor	Annealed, tinned copper 0,5 mm ² /7x0,3 mm
Insulation	Solid PE, nominal wall thickness 0,3 mm
Twisting	Two cores blue/red and a ground conductor 7x0,3 mm stranded together with a short lay
Pair shielding	Aluminium foil covered with a numbered tape and a polyester tape
Stranding	Pairs stranded together and covered with a polyester tape
Shielding	Plastic coated aluminium tape over a ground conductor 7x0,3 mm
Sheath	Flame retardant, halogen-free polyolefine plastic, light grey

Rated voltage	75 V
Identification	Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath
Fire properties	IEC 60332-1, IEC 60332-3-22
Physical properties	Installation temperature -15 °C to 50 °C During operation -40 °C to 70 °C

Type	Conductors	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
KJAAM-HF	1 x (2+1) x 0,5	4,8	33	1000
	2 x (2+1) x 0,5 + 0,5	8,0	70	1000
	4 x (2+1) x 0,5 + 0,5	10,0	120	1000
	8 x (2+1) x 0,5 + 0,5	12,6	205	1000
	12 x (2+1) x 0,5 + 0,5	15,1	286	1000
	24 x (2+1) x 0,5 + 0,5	20,2	522	1000

KJAAM-ECO



Halogen free and UV-protected cable for instrumentation, process control, computer and sound reproduction systems. Designed for the transmission of digital and low-level analog signals, providing excellent protection against electromagnetic interference.

Electrical properties	Pair DC resistance (+20°C) max. 81 ohm/km Nominal pair capacitance (800 Hz) 100 nF/km Insulation resistance min. 2 Gohm x km
Conductor	Annealed copper 0,5 mm ² /7x0,3 mm
Insulation	Solid PE, nominal wall thickness 0,3 mm
Twisting	Two cores blue/red and a ground conductor 7x0,3 mm stranded together with a short lay
Pair shielding	Aluminium foil covered with a numbered tape and a polyester tape
Stranding	Pairs stranded together and covered with a polyester tape
Shielding	Plastic coated aluminium tape over a ground conductor 7x0,3 mm
Sheath	Flame retardant, halogen-free polyolefine plastic, black

Rated voltage	75 V
Identification	Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath
Fire properties	IEC 60332-1, IEC 60332-3-22
Physical properties	Installation temperature -15 °C to 50 °C During operation -40 °C to 70 °C

Conductors	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
1 x (2+1) x 0,5	4,6	31	1000
2 x (2+1) x 0,5 + 0,5	6,8	64	1000
4 x (2+1) x 0,5 + 0,5	8,8	107	1000
8 x (2+1) x 0,5 + 0,5	12,2	201	1000
12 x (2+1) x 0,5 + 0,5	14,3	283	1000
24 x (2+1) x 0,5 + 0,5	20,4	534	1000

KJAAM-HF GM



Cable for instrumentation, process control, computer and sound reproduction systems. Designed for the transmission of digital and low-level analog signals, providing excellent protection against electromagnetic interference. Armouring with galvanized steel tapes.

Electrical properties	Pair DC resistance (+20°C) max. 81 ohm/km Nominal pair capacitance (800 Hz) 100 nF/km Insulation resistance min. 2 Gohm x km
Conductor	Annealed, tinned copper 0,5 mm ² /7x0,3 mm
Insulation	Solid PE, nominal wall thickness 0,3 mm
Twisting	Two cores blue/red and a ground conductor 7x0,3 mm stranded together with a short lay
Pair shielding	Aluminium foil covered with a numbered tape and a polyester tape
Stranding	Pairs stranded together and covered with a polyester tape
Shielding	Plastic coated aluminium tape over a ground conductor 7x0,3 mm
Inner sheath	Flame retardant, halogen-free polyolefine plastic, light grey
Armouring	Two 0,2 mm zinc-coated steel tapes
Sheath	Polyolefine plastic, SHF1, black

Rated voltage	75 V
Identification	Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath
Fire properties	IEC 60332-1, IEC 60332-3-22
Physical properties	Installation temperature -15 °C to 50 °C During operation -40 °C to 70 °C

Conductors	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
4 x (2+1) x 0,5 + 0,5	13,2	257	1000
8 x (2+1) x 0,5 + 0,5	16,3	380	1000
12 x (2+1) x 0,5 + 0,5	19,1	527	1000
24 x (2+1) x 0,5 + 0,5	25,2	868	1000

HEVAK-HF



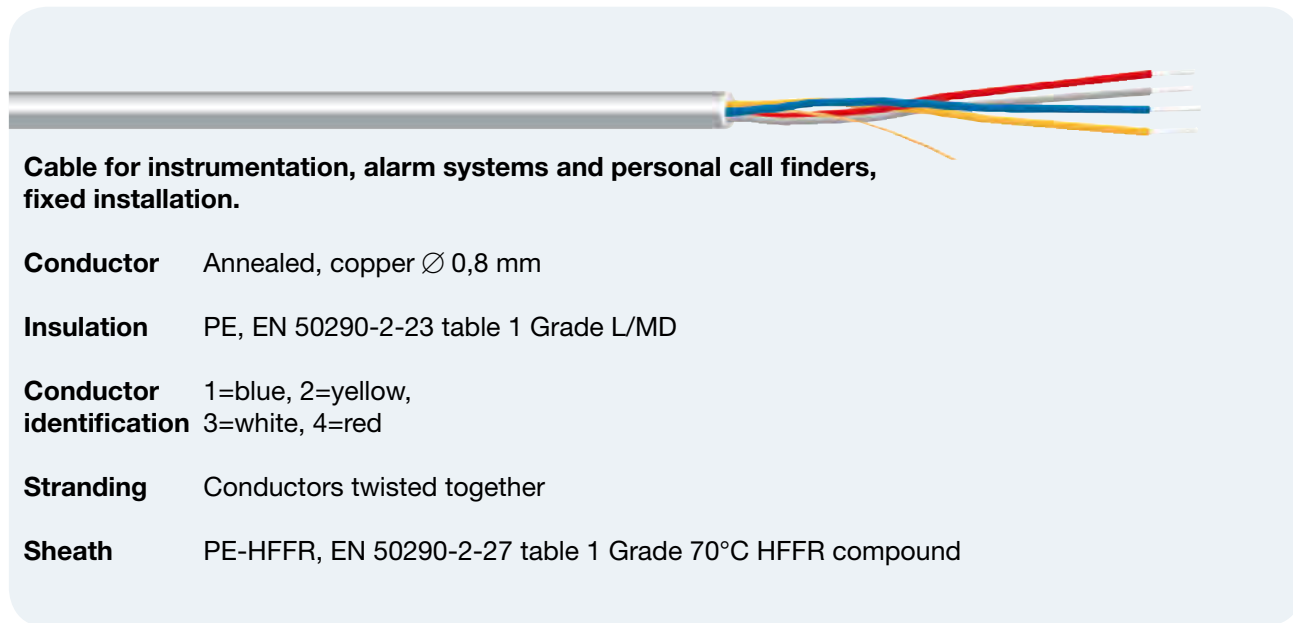
Cable for instrumentation, process control and computer systems, fixed installation.

Electrical properties	Pair DC resistance (+20°C) max. 81 ohm/km Nominal pair capacitance (800 Hz) 80 nF/km Insulation resistance min. 100 Mohm x km
Conductor	Annealed, tinned copper 0,5 mm ² /7x0,3 mm
Insulation	PE, nominal wall thickness 0,25 mm
Twisting	Two conductors twisted together. Each pair has a different lay. Pair identification with a colour code and an identification number.
Pair colour codes	Blue/red, grey/yellow, green/brown, white/black
Units	Units consisting of 4 pairs twisted together Unit identification with a numbered tape
Stranding	Groups cabled together and covered with a polyester tape
Shielding	Plastic coated aluminium tape over a ground conductor 7x0,3 mm
Sheath	Flame retardant, halogen-free polyolefine plastic, light grey

Rated voltage	75 V
Identification	Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath
Fire properties	IEC 60332-1, IEC 60332-3-22
Physical properties	Installation temperature -15 °C to 50 °C During operation -40 °C to 70 °C

Type	Conductors	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
HEVAK-HF	2 x 2 x 0,5 + 0,5	6,5	48	1000
	4 x 2 x 0,5 + 0,5	7,5	75	1000
	8 x 2 x 0,5 + 0,5	9,8	131	1000
	12 x 2 x 0,5 + 0,5	11,6	186	1000
	24 x 2 x 0,5 + 0,5	17,5	346	1000

KLM-LSZH



Cable for instrumentation, alarm systems and personal call finders, fixed installation.

- Conductor** Annealed, copper \varnothing 0,8 mm
- Insulation** PE, EN 50290-2-23 table 1 Grade L/MD
- Conductor identification** 1=blue, 2=yellow, 3=white, 4=red
- Stranding** Conductors twisted together
- Sheath** PE-HFFR, EN 50290-2-27 table 1 Grade 70°C HFFR compound

Rated voltage 75 V

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

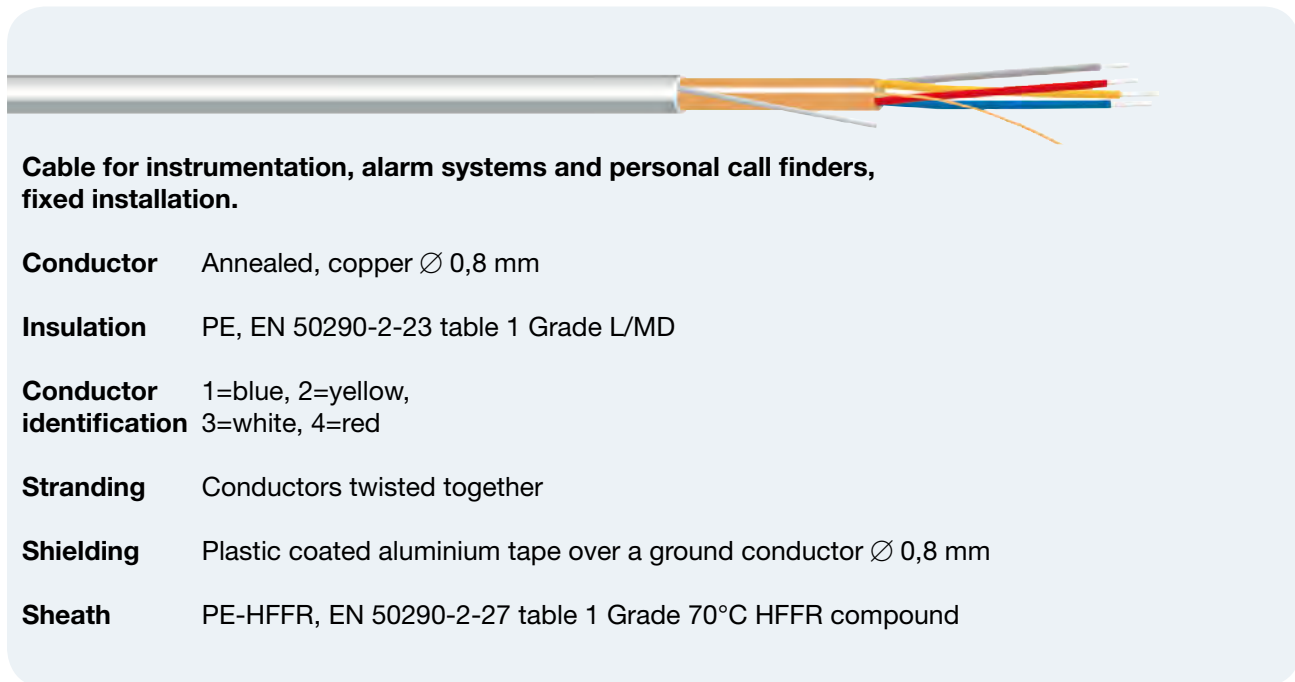
Fire test IEC 60332-1-2.

Physical properties Max. operating temperature +70°C
 Min. handling temperature -5°C
 Min. bending radius (D=overall diameter)
 - installation 15xD
 - final installation, only one bending 10xD

Electrical properties Loop resistance (max) 36,7 Ω /km
 Insulation resistance > 500 M Ω km
 Test voltage DC 60s
 conductor/conductor 2,25 kV
 Conductor/screen 1,5 kV

Type	Outer \varnothing mm	Weight kg/km	Length m	
			Drum	Coil
KLM-LSZH				
2 x 0,8	4,5	23	600	200
4 x 0,8	5,0	35	600	200

KLMA-LSZH



Cable for instrumentation, alarm systems and personal call finders, fixed installation.

- Conductor** Annealed, copper \varnothing 0,8 mm
- Insulation** PE, EN 50290-2-23 table 1 Grade L/MD
- Conductor identification** 1=blue, 2=yellow, 3=white, 4=red
- Stranding** Conductors twisted together
- Shielding** Plastic coated aluminium tape over a ground conductor \varnothing 0,8 mm
- Sheath** PE-HFFR, EN 50290-2-27 table 1 Grade 70°C HFFR compound

Rated voltage 75 V

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath


Fire test IEC 60332-1-2.

Physical properties Max. operating temperature +70°C
 Min. handling temperature -5°C
 Min. bending radius (D=overall diameter)
 - installation 15xD
 - final installation, only one bending 10xD

Electrical properties Loop resistance (max) 36,7 Ω /km
 Insulation resistance > 500 M Ω km
 Test voltage DC 60s
 conductor/conductor 2,25 kV
 Conductor/screen 1,5 kV

Type	Outer \varnothing mm	Weight kg/km	Length m	
			Drum	Coil
KLMA-LSZH				
2 x 0,8 + 0,8	4,5	28	600	200
4 x 0,8 + 0,8	5,1	42	600	200

FireLine 750



Fire-resistant collectively screened instrumentation and control cable for fixed installation. 500 V
EN 50288-7

Conductor Solid copper, nominal \varnothing 1,13 mm (1,0mm²)
 Solid copper, nominal \varnothing 1,38 mm (1,5mm²)
 Stranded copper, nominal \varnothing 7x0,67 mm (2,5mm²)
 Stranded copper, nominal \varnothing 7x0,85 mm (4,0mm²)

Insulation Mica tape and solid XLPE

Identification **2** cores blue and brown **3** cores brown, black and grey.
4 cores blue, brown, black and grey **7, 12, and 19** cores black numbers on white base

Twisting Two insulated conductors twisted helically to a pair

Screen Annealed, tinned copper, \varnothing 0,80 mm. A one side coated aluminium foil.

Sheath Sheath color is red. This material is UV-protected, halogen-free, highly flame-retardant and has low smoke emission. The polymer contains saturated polymers which are intrinsically resistant to the superficial ozone aggression.

- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Main characteristics	The rated voltage of the cable	500 V
	Flame-retardant	IEC 60332-1-2 IEC 60332-3-22 test for single insulated wire and cable test for bunched wires and cables, category A
	Fire-resistant	IEC 60331-21
	UV-protected	IEC 60068-2-5
	Halogen-free	IEC 60754 series
	Smoke emission	IEC 61034 series
	Minimum bending radius: during installation R= 6xD / fixed installation R=4xD	
	Min recommended installation temperature -15 °C	
	Operating temperature -40°C – +70°C	
	Maximum conductor temperature +90°C	

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Number of conductors & cross-section n x mm ²	Maximum conductor resistance at 20°C ohms/km	Capacitance nF/km	Loop inductance mH/km	Outer \varnothing (approx.)	kg / km (nominal)	Standard delivery length m
2x1,0	18,1	70	0,67	7,5	80	1000
3x1,0	18,1	70	0,67	7,9	90	1000
4x1,0	18,1	70	0,67	8,5	105	1000
7x1,0	18,1	70	0,67	10,0	150	1000
12x1,0	18,1	70	0,67	13,0	240	1000
19x1,0	18,1	70	0,67	15,5	340	1000
2x1,5	12,1	80	0,68	8,0	95	1000
3x1,5	12,1	80	0,68	8,5	110	1000
3x1,5 S*	12,1	80	0,68	8,5	110	1000
4x1,5	12,1	80	0,68	9,2	130	1000
7x1,5	12,1	80	0,68	11,0	195	1000
12x1,5	12,1	80	0,68	14,2	305	1000
19x1,5	12,1	80	0,68	16,5	450	1000
2x2,5	7,4	87	0,63	9,5	135	1000
3x2,5	7,4	87	0,63	9,8	155	1000
4x2,5	7,4	87	0,63	10,6	185	1000
7x2,5	7,4	87	0,63	12,6	280	1000
12x2,5	7,4	87	0,63	16,8	450	1000
19x2,5	7,4	87	0,63	20,0	680	1000

* Special colour code black, blue, green yellow

LKSM-EMC-FRHF



- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Fire-resistant armored power and control cable with improved EMC screening 0,6/1kV IEC 60092-353

Conductor	Stranded copper conductor 1,0-10mm ² IEC 60228, class 2
Insulation	Mica tape, XLPE plastic, IEC 60092-351
Bedding	Filler tape
Screen	Copper tape, coverage 100%
Armour	Copper wire braid, coverage > 90%, IEC 60092-350 tinned copper wire braid on request
Sheath	Polyolefine plastic, SHF1, IEC 60092-359, standard colour orange, other colours on request

Application For fixed installation. If the cable is exposed to direct sun light protective covering or cable with black outer sheath is recommended. Design to meet requirements for improved **EMC** screening properties.

Main characteristics Rated voltage AC 0,6/1kV (1,2kV)
DC 0,9/1,5kV (if voltage to earth does not exceed 0,9kV)

Max conductor temperature + 90 °C

Flame-retardant IEC 60332-1-2 -test for single insulated wire and cable
IEC 60332-3-22 -test for bunched wires and cables, category A

Fire -resistant IEC 60331-1 and IEC 600331-2

Halogen-free IEC 60754 series

Smoke emission IEC 61034 series

Transfer impedance IEC 61196-1

typical value 26dB over 1mΩ/m at 100MHz [20mΩ/m])

Minimum recommended installation temperature -15 °C

Lowest operation temperature -40 °C

Identification Lot number, cable type, cable size, production month, year,
manufacturer's name and meter marking printed on the sheath

Part number	Number of conductors & cross-section n x mm ²	Cross-section of armour mm ²	Nominal outer diameter mm	Approximate weight kg/km	Current Rating A at +45°C	Min. bending radius fixed installation mm
27872	2x1,5	4,1	10,5	165	20	65
27873	2x2,5	4,6	11,5	190	26	70
27875	2x6	5,6	14,0	390	44	85
27876	2x10	9,0	16,5	570	61	100
27882	3x1,5	4,4	11,5	210	16	70
27883	3x2,5	4,9	12,5	260	21	75
27885	3x6	11,3	15,5	505	36	90
27886	3x10	9,7	17,5	665	50	105
27914	5x1,5	5,4	13,5	290	13	80
27915	5x2,5	11,3	15,0	415	17	90
27917	5x6	11,4	18,5	685	30	110
27918	5x10	11,9	21,5	975	42	130
27921	7x1,5	14,1	15,0	400	12	90
27922	7x2,5	11,3	16,0	460	16	95
27925	12x1,5	11,0	19,0	535	10	115
27926	12x2,5	12,3	21,5	705	13	130
27931	19x1,5	13,1	22,5	750	9	135
27932	19x2,5	14,6	25,0	985	11	150
27935	27x1,5	15,9	27,0	1030	8	160
27936	27x2,5	17,9	30,0	1375	10	180

LifeCord (L) FRHF



- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Fire-resistant unarmoured power and control cable 0,6/1kV

Standards: IEC 60502-1

Conductor	1,5 mm ² solid copper conductor > 1,5 mm ² stranded copper conductor
Insulation	Mica tape, XLPE plastic
Bedding	Separator tape
Sheath	Polyolefine plastic, halogen free flame-retardant, standard colour orange, other colours on request

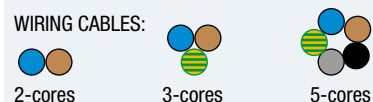
Application For fixed installation in places where the cable has to maintain its functionality during fire

Main characteristics Rated voltage AC 0,6/1kV (1,2kV)
DC 0,9/1,5kV (if voltage to earth does not exceed 0,9kV)
Max conductor temperature of +90°C
and in case of short circuit (max 5 s duration) +250°C
Minimum recommended installation temperature -15 °C
Lowest operation temperature -40 °C

Fire properties Fire-resistant IEC 60331-21 series
Flame-retardant IEC 60332-1-2 -test for single insulated wire and cable
IEC 60332-3-22 -test for bunched wires and cables, category A
Halogen-free IEC 60754 series
Smoke emission IEC 61034 series

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Core identification, HD308S2



CONTROL CABLES: 5–27 cores numbered 1, 2, 3...

LifeCord (L) FRHF 0,6/1 kV		conductor & cross-section n x mm ²	Number of Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m
Part number Normal	G-type				
75400		2X1.5	8,50	80	500
75401		2X2.5	10,00	120	500
75402		2X6	13,00	260	500
75403		2X10	15,00	385	500
75410	75411	3x1.5	9,00	105	500
75412	75413	3x2.5	10,50	150	500
75414	75415	3x6	14,00	330	500
75416	75417	3x10	16,00	485	500
75430	75431	5x1.5	11,00	165	500
75432	75433	5x2.5	12,50	225	500
75434	75435	5x6	16,70	496	500
75436	75437	5x10	19,50	736	500
75438		7X1.5	12,00	207	500
75439		7X2.5	14,00	295	500
75440		12X1.5	16,00	342	500
75441		12X2.5	18,30	480	500
75442		19X1.5	18,40	505	500
75443		19X2.5	21,60	718	500
75444		27X1.5	22,40	712	500
75445		27X2.5	26,50	1025	500

G-type is with yellow/green conductor and marking on sheath is, for example, 3G1,5

LifeCord-FRHF



**Fire-resistant screened instrumentation and communication cable 300 V
EN 50288-7**

Conductor	Stranded copper conductor, HD 383 S2
Insulation	Mica tape, XLPE plastic, EN 50290-2-29
Bedding	Separator tape
Screen	Drain wire tinned copper, aluminium polyester tape, coverage 100%
Sheath	Polyolefine plastic, EN 50290-2-27, standard colour orange, other colours on request

- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Application For fixed installation in places where the cable has to maintain its functionality during fire

Main characteristics	Rated voltage	300 V
	Max conductor temperature	+ 90 °C
	Min recommended installation temperature	- 15 °C
	Lowest recommended operation temperature	- 40 °C
	Recommended minimum bending radius, (R):	During installation R = 9 x outer Ø Fixed installation R = 6 x outer Ø

Fire properties	Fire-resistant	IEC 60331-21	-min. 90 min/750 °C
	Flame-retardant	IEC 60332-1-2 IEC 60332-3-22	-test for single insulated wire and cable -test for bunched wires and cables, category A
	Halogen-free	IEC 60754 series	
	Smoke emission	IEC 61034 series	

Electrical data		0,75 mm²	Unit
	Loop resistance of pair, max. / +20 °C	52	ohm/km
	Pair capacitance, nom. / 800 Hz	45	nF/km
	Loop inductance, nom.	0,6	mH/km
	Insulation resistance / +20 °C	≥1500	Mohm x km

Core identification	
	○ ●
	a b
Pair	Number of cores
1	1 2
2	3 4
3	5 6
4	7 8
5	9 10
6	11 12
	etc.

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Number of conductors & cross-section n x mm ²	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m	Drum
1 x 2x0,75	8,5	75	1000	K6
2 x 2x0,75	13,0	135	1000	K9
4 x 2x0,75	15,5	215	1000	K10
8 x 2x0,75	20,0	380	1000	K12
12 x 2x0,75	24,0	545	1000	K14
19 x 2x0,75	29,5	805	500	K14
24 x 2x0,75	33,5	1030	500	K18

LifeCord-FRHF (i)



**Fire-resistant collectively and pair screened instrumentation and communication cable 300 V
EN 50288-7**

Conductor	Stranded copper conductor, HD 383 S2
Insulation	Mica tape, XLPE plastic, EN 50290-2-29
Pair screen	Plastic coated aluminium tape and a tinned copper drain wire
Bedding	Separator tape
Collective screen	Drain wire tinned copper, aluminium polyester tape coverage 100 %
Sheath	Polyolefine plastic, EN 50290-2-27, standard colour orange, other colours on request

- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Application For fixed installation in places where the cable has to maintain its functionality during fire

Main characteristics	Rated voltage	300 V
	Max conductor temperature	+ 90 °C
	Min recommended installation temperature	- 15 °C
	Lowest recommended operation temperature	- 40 °C
	Recommended minimum bending radius, (R):	During installation R = 9 x outer Ø Fixed installation R = 6 x outer Ø

Fire properties	Fire-resistant	IEC 60331-21	-min. 90 min/750 °C
	Flame-retardant	IEC 60332-1-2 IEC 60332-3-22	-test for single insulated wire and cable -test for bunched wires and cables, category A
	Halogen-free	IEC 60754 series	
	Smoke emission	IEC 61034 series	

Electrical data

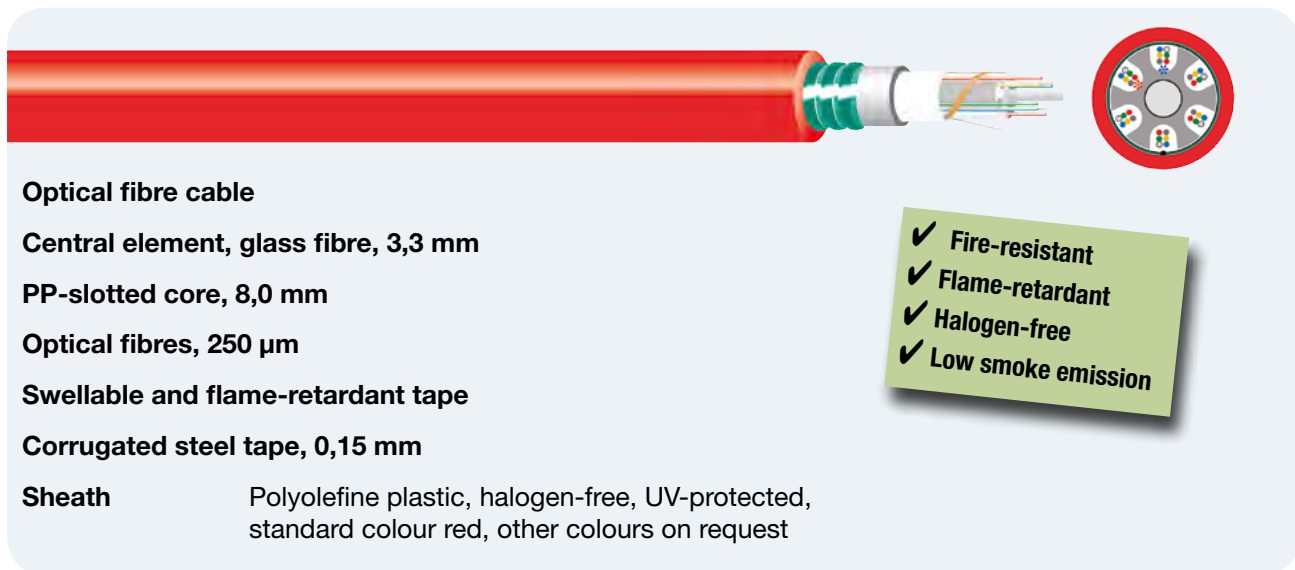
	0,75 mm ²	Unit
Loop resistance of pair, max. / +20 °C	52	ohm/km
Pair capacitance, nom. / 800 Hz	55	nF/km
Loop inductance, nom.	0,6	mH/km
Insulation resistance / +20 °C	≥1500	Mohm*km

Pair	Core identification		Number of cores
	a	b	
1	○	●	2
2	○	●	4
3	○	●	6
4	○	●	8
5	○	●	10
6	○	●	12
etc.			

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Number of conductors & cross-section n x mm ²	Nominal outer Ø mm	Nominal weight kg/km	Standard delivery length m	Drum
2 x 2x0,75	13,5	155	1000	K9
4 x 2x0,75	15,5	245	1000	K11
8 x 2x0,75	20,0	430	1000	K12
12 x 2x0,75	24,5	625	1000	K14
19 x 2x0,75	30,0	945	500	K14
24 x 2x0,75	34,0	1205	500	K18

LifeCord-FRHF



Optical fibre cable

Central element, glass fibre, 3,3 mm

PP-slotted core, 8,0 mm

Optical fibres, 250 µm

Swellable and flame-retardant tape

Corrugated steel tape, 0,15 mm

Sheath Polyolefine plastic, halogen-free, UV-protected, standard colour red, other colours on request

- ✓ Fire-resistant
- ✓ Flame-retardant
- ✓ Halogen-free
- ✓ Low smoke emission

Application Indoor cable for building cabling in places where the cable has to maintain its functionality during fire

Main characteristics	Max pulling force	2500 N	EN 187000 method 501
	Crush strength / 100 mm (plate)	7000 N	EN 187000 method 504
	Crush strength / 25 mm (mandrel)	1500 N	EN 187000 method 504
	Impact strength	50 J	EN 187000 method 505
	Min bending radius		270 mm during installation, 200 mm in fixed installation
	Nominal cable Ø	13.5 mm	
	Cable weight	196 kg/km	
	Min installation temperature	-15 °C	
	Operating temperature range	-30...+70 °C	

Fire properties	Fire-resistant	IEC 60331-25	-min. 180 min/750 °C
	Flame-retardant	IEC 60332-1-2	-test for single insulated wire and cable
		IEC 60332-3-22	-test for bunched wires and cables, category A
	Halogen-free	IEC 60754 series	
Smoke emission	IEC 61034 series		

Identification Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

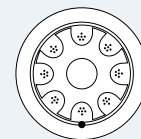
Standard fibre count			
1 x 6 SML	1 x 4 SML + 2 x 4 GKL	1 x 4 GKL	1 x 4 OM3L
2 x 6 SML	1 x 6 SML + 3 x 4 GKL	2 x 4 GKL	2 x 4 OM3L
4 x 6 SML	2 x 6 SML + 3 x 4 GKL	3 x 4 GKL	3 x 4 OM3L
		6 x 4 GKL	6 x 4 OM3L

Other types on request

FXMSU



Max
30 fibres



Max
48 fibres

Indoor/outdoor cable

Central element, glass fibre	∅ mm	1,5	3,3
PP slotted core	∅ mm	6,0	9,5
Optical fibres	∅ µm	250	250
Aramid binding yarn			
Swellable tape, rip cord			
UV-protected and halogen free sheath, colour orange			
Nominal thickness of sheath	mm	1,5	1,6

Cable characteristics

Tensile strength EN 187000 method 501	N	500	1750
Crush strength / 100 mm (plate) EN 187000 method 504	N	4000	4000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	650	1000
Impact strength EN 187000 method 505	J	25	30
Min bending radius = during installation/final bending	mm	140/100	260/190
Nominal cable ∅	mm	9,4	13,1
Cable weight	kg/km	75	146
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70
Longitudinal water tightness	EN 187000 method 605B		
Fire performance	Flame retardant/fire retardant		IEC 60332-1, IEC 60332-3A
	Halogenity	< 5 mg/g	IEC 60754-1
	Acidity of combustion gases	pH > 4,3	IEC 60754-2
	Conductivity of combustion gases < 10µS/mm		IEC 60754-2
	Smoke emission density		
	Light transmission	> 60 %	IEC 61034-1;2

Identification

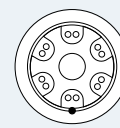
Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:				
FXMSU 1x6 SML	FXMSU 1x4 GKL	FXMSU 1x4 OM3L	FXMSU 1x4 SML + 2x4 GKL	FXMSU 1x4 SML + 2x4 OM3L
FXMSU 2x6 SML	FXMSU 2x4 GKL	FXMSU 2x4 OM3L	FXMSU 2x4 SML + 2x4 GKL	FXMSU 2x4 SML + 2x4 OM3L
FXMSU 4x6 SML	FXMSU 3x4 GKL	FXMSU 3x4 OM3L	FXMSU 1x6 SML + 3x4 GKL	FXMSU 1x6 SML + 3x4 OM3L
FXMSU 8x6 SML	FXMSU 4x6 GKL	FXMSU 4x6 OM3L	FXMSU 2x6 SML + 3x4 GKL	FXMSU 2x6 SML + 3x4 OM3L
	FXMSU 8x6 GKL	FXMSU 8x6 OM3L	FXMSU 4x6 SML + 4x6 GKL	FXMSU 4x6 SML + 4x6 OM3L

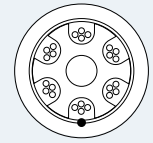
Other types on request.

FXMSU

Halogen free indoor/outdoor cable with 900 µm tight-buffered fibre



Max
12 fibres



Max
24 fibres

Indoor/outdoor cable

Central element, glass fibre	Ø mm	2,6	3,3
PP slotted core	Ø mm	9,0	11,0
Optical fibres	Ø µm	900	900
Aramid binding yarn			
Swellable tape, rip cord			
UV-protected and halogen free sheath, colour orange or black			
Nominal thickness of sheath	mm	1,5	1,5

Cable characteristics


Tensile strength EN 187000 method 501	N	1150	1750
Crush strength / 100 mm (plate) EN 187000 method 504	N	4000	4000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	1000	1000
Impact strength EN 187000 method 505	J	30	30
Min bending radius = during installation/final bending	mm	220/175	220/175
Nominal cable Ø	mm	12,4	14,4
Cable weight	kg/km	124	166
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70
Longitudinal water tightness	EN 187000 method 605B		
Fire performance	Flame retardant/fire retardant	IEC 60332-1, IEC 60332-3A	
	Halogenity	< 5 mg/g	IEC 60754-1
	Acidity of combustion gases	pH > 4,3	IEC 60754-2
	Conductivity of combustion gases	< 10µS/mm	IEC 60754-2
	Smoke emission density		
	Light transmission	> 60 %	IEC 61034-1;2

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:		
FXMSU 2x2 SMT	FXMSU 2x2 GKT	FXMSU 2x2 OM3T
FXMSU 3x2 SMT	FXMSU 3x2 GKT	FXMSU 3x2 OM3T
FXMSU 4x2 SMT	FXMSU 4x2 GKT	FXMSU 4x2 OM3T
FXMSU 5x2 SMT	FXMSU 5x2 GKT	FXMSU 5x2 OM3T
FXMSU 6x2 SMT	FXMSU 6x2 GKT	FXMSU 6x2 OM3T
FXMSU 6x4 SMT	FXMSU 6x4 GKT	FXMSU 6x4 OM3T

Other types on request.



		Max 36 fibres	Max 48 fibres
Non-metallic duct cable			
Central element, glass fibre	Ø mm	3,3	3,3
PP slotted core	Ø mm	8,0	9,5
Optical fibres	Ø µm	250	250
Aramid binding yarn, rip cord			
Water blocking by filling compound and waterswellable tape			
MDPE sheath nominal thickness	mm	1,6 mm	1,6 mm

Cable characteristics

Tensile strength EN 187000 method 501	N	1750	1750
Crush strength / 100 mm (plate) EN 187000 method 504	N	7000	7000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	1000	1000
Impact strength EN 187000 method 505	J	30	30
Min bending radius = during installation/final bending	mm	240/180	265/200
Nominal cable Ø	mm	11,7	13,2
Cable weight	kg/km	110	136
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70

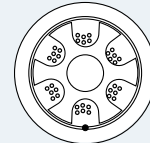
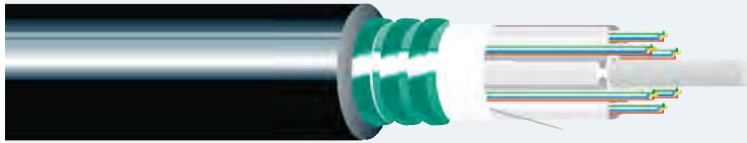
Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

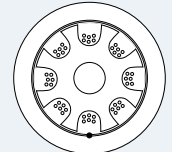
Standard cable types:				
FXOMU 1x6 SML	FXOMU 1x4 GKL	FXOMU 1x4 OM3L	FXOMU 1x4 SML + 2x4 GKL	FXOMU 1x4 SML + 2x4 OM3L
FXOMU 2x6 SML	FXOMU 2x4 GKL	FXOMU 2x4 OM3L	FXOMU 2x4 SML + 2x4 GKL	FXOMU 2x4 SML + 2x4 OM3L
FXOMU 4x6 SML	FXOMU 3x4 GKL	FXOMU 3x4 OM3L	FXOMU 1x6 SML + 3x4 GKL	FXOMU 1x6 SML + 3x4 OM3L
FXOMU 8x6 SML	FXOMU 4x6 GKL	FXOMU 4x6 OM3L	FXOMU 2x6 SML + 3x4 GKL	FXOMU 2x6 SML + 3x4 OM3L
	FXOMU 8x6 GKL	FXOMU 8x6 OM3L	FXOMU 4x6 SML + 4x6 GKL	FXOMU 4x6 SML + 4x6 OM3L

Other types on request.

FXOVDMU



Max
36 fibres



Max
48 fibres

Direct burial and duct cable

Central element, glass fibre	Ø mm	3,3	3,3
PP slotted core	Ø mm	8,0	9,5
Optical fibres	Ø µm	250	250
Aramid binding yarn, rip cord			
Water blocking by filling compound, waterswellable tape and corrugated steel tape as mechanical protection	mm	0,15	0,15
MDPE sheath nominal thickness	mm	1,4	1,4

Cable characteristics:

Tensile strength EN 187000 method 501	N	2500	2500
Crush strength / 100 mm (plate) EN 187000 method 504	N	7000	7000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	1500	1500
Impact strength EN 187000 method 505	J	50	50
Min bending radius = during installation/final bending	mm	260/200	300/225
Nominal cable Ø	mm	13,1	14,6
Cable weight	kg/km	175	215
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:

FXOVDMU 1x6 SML	FXOVDMU 1x4 GKL	FXOVDMU 1x4 OM3L	FXOVDMU 1x4 SML + 2x4 GKL	FXOVDMU 1x4 SML + 2x4 OM3L
FXOVDMU 2x6 SML	FXOVDMU 2x4 GKL	FXOVDMU 2x4 OM3L	FXOVDMU 2x4 SML + 2x4 GKL	FXOVDMU 2x4 SML + 2x4 OM3L
FXOVDMU 4x6 SML	FXOVDMU 3x4 GKL	FXOVDMU 3x4 OM3L	FXOVDMU 1x6 SML + 3x4 GKL	FXOVDMU 1x6 SML + 3x4 OM3L
FXOVDMU 8x6 SML	FXOVDMU 4x6 GKL	FXOVDMU 4x6 OM3L	FXOVDMU 2x6 SML + 3x4 GKL	FXOVDMU 2x6 SML + 3x4 OM3L
	FXOVDMU 8x6 GKL	FXOVDMU 8x6 OM3L	FXOVDMU 4x6 SML + 4x6 GKL	FXOVDMU 4x6 SML + 4x6 OM3L

Other types on request.



2 mm HF installation cable

Optical fibre SMT 10/125/900 µm
 GKT 62,5/125/900 µm
 OM3T 50/125/900 µm

Strength member

Halogen free sheath, nominal thickness 0,30 mm
 - yellow colour with SMT-fibres
 - green colour with GKT-fibres

Cable characteristics:

Tensile strength	100 N	EN 187000 method 501
Crush strength / 100 mm (plate)	1250 N	EN 187000 method 504
Crush strength / 25 mm (mandrel)	100 N	EN 187000 method 504
Impact strength, R=300 mm	15 J	EN 187000 method 505
Min bending radius	40 mm during installation 25 mm in final bending	
Nominal cable Ø	1,95 mm	
Cable weight	3,6 kg/km	
Min installation temperature	-15 °C	
Operating temperature range	-45...+70 °C	
Fire performance	Flame retardant/fire retardant	IEC 60332-1
	Halogenity	< 5 mg/g IEC 60754-1
	Acidity of combustion gases	pH > 4,3 IEC 60754-2
	Conductivity of combustion gases	< 10µS/mm IEC 60754-2
	Smoke emission density	
	Light transmission	> 60 % IEC 61034-1;2

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:

FMS 1 SMT (2 mm)	FMS 1 GKT (2 mm)	FMS 1 OM3T (2 mm)
------------------	------------------	-------------------

Other types on request.

FMS



2 mm HF installation cable

Optical fibre	SMT 10/125/900 μm
	GKT 62,5/125/900 μm
	OM3T 50/125/900 μm

Strength member

Separation neck

Halogen free sheath nominal thickness 0,30 mm

- yellow colour with SMT-fibres
- green colour with GKT and OM3T-fibres

Cable characteristics:

Tensile strength	200	N	EN 187000 method 501
Crush strength / 100 mm (plate)	1250	N	EN 187000 method 504
Crush strength / 25 mm (mandrel)	100	N	EN 187000 method 504
Impact strength, R=300 mm	15	J	EN 187000 method 505
Min bending radius	40 mm during installation, 25 mm in final bending		
Nominal cable \varnothing	1,95 x 4,0 mm mm		
Cable weight	7,2 kg/km		
Min installation temperature	-15 °C		
Operating temperature range	-45...+70 °C		
Fire performance	Flame retardant/fire retardant		IEC 60332-1
	Halogenity	< 5 mg/g	IEC 60754-1
	Acidity of combustion gases	pH > 4,3	IEC 60754-2
	Conductivity of combustion gases	< 10 $\mu\text{S}/\text{mm}$	IEC 60754-2
	Smoke emission density		
Light transmission	> 60 %		IEC 61034-1;2

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:

FMS 2 SMT (2 mm)

FMS 2 GKT (2 mm)

FMS 2 OM3T (2 mm)

Other types on request.



2 mm duplex installation cable

Optical fibre
SMT 10/125/900 μm
GKT 62,5/125/900 μm
OM3T 50/125/900 μm

Strength member

Installation cable FMS 1 (2mm)

Halogen free sheath, nominal thickness 0,30 mm

- yellow colour with SMT-fibres
- green colour with GKT and OM3T-fibres

Halogen free outer sheath, nominal thickness 0,70 mm

- yellow colour with SMT-fibres
- green colour with GKT and OM3T-fibres

Cable characteristics:

Tensile strength	200 N	EN 187000 method 501
Crush strength / 100 mm (plate)	1500 N	EN 187000 method 504
Crush strength / 25 mm (mandrel)	150 N	EN 187000 method 504
Impact strength, R=300 mm	20 J	EN 187000 method 505
Min bending radius	40 mm during installation 25 mm in final bending	
Nominal cable \varnothing	3,7 x 5,7 mm	
Cable weight	21 kg/km	
Min installation temperature	-15 °C	
Operating temperature range	-20...+60 °C	
Fire performance	Flame retardant/fire retardant	IEC 60332-1
	Halogenity	< 5 mg/g IEC 60754-1
	Acidity of combustion gases	pH > 4,3 IEC 60754-2
	Conductivity of combustion gases	< 10 $\mu\text{S}/\text{mm}$ IEC 60754-2
	Smoke emission density	
	Light transmission	> 60 % IEC 61034-1;2

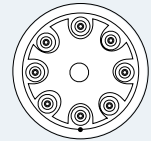
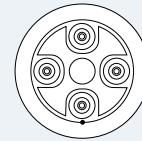
Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:		
FMMS 2 SMT (2 mm)	FMMS 2 GKT (2 mm)	FMMS 2 OM3T (2 mm)

Other types on request.

FXMMS



HF-installation cable

Central element, glass fibre

∅ mm

Max
4 fibres

2,0

Max
8 fibres

2,0

PP slotted core

∅ mm

7,5

9,7

Installation cable unit FMS 1 (2 mm)

Aramid binding yarn

Fire barrier tape

Rip cord

Halogen free sheath, nominal thickness

mm

1,4

1,5

- blue colour with SMT-fibres

- green colour with GKT and OM3T-fibres

Cable characteristics

Tensile strength EN 187000 method 501	N	1500	1750
Crush strength / 100 mm (plate) EN 187000 method 504	N	4000	7000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	750	1000
Impact strength EN 187000 method 505	J	30	30
Min bending radius = during installation/final bending	mm	195/130	265/200
Nominal cable ∅	mm	10,7	13,1
Cable weight	kg/km	102	142
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:

FXMMS 2 SMT (2 mm)

FXMMS 2 GKT (2 mm)

FXMMS 2 OM3T (2 mm)

FXMMS 4 SMT (2 mm)

FXMMS 4 GKT (2 mm)

FXMMS 4 OM3T (2 mm)

FXMMS 6 SMT (2 mm)

FXMMS 6 GKT (2 mm)

FXMMS 6 OM3T (2 mm)


FXMMS 8 SMT (2 mm)

FXMMS 8 GKT (2 mm)

FXMMS 8 OM3T (2 mm)

Other types on request.

FXMMSU



		Max 4 fibres	Max 8 fibres
HF-installation cable			
Central element, glass fibre	∅ mm	2,0	2,0
PP slotted core	∅ mm	7,5	9,7
Installation cable unit FMS 1 (2 mm)			
Aramid binding yarn			
Swellable tape, rip cord			
UV-protected and halogen free sheath, colour orange			
Halogen free sheath, nominal thickness	mm	1,4	1,5

Cable characteristics

Tensile strength EN 187000 method 501	N	1500	1750
Crush strength / 100 mm (plate) EN 187000 method 504	N	4000	7000
Crush strength / 25 mm (mandrel) EN 187000 method 504	N	750	1000
Impact strength EN 187000 method 505	J	30	30
Min bending radius = during installation/final bending	mm	195/130	265/200
Nominal cable ∅	mm	10,9	13,1
Cable weight	kg/km	115	150
Min installation temperature	°C	-15	-15
Operating temperature range	°C	-45...+70	-45...+70

Identification

Lot number, cable type, cable size, production month, year, manufacturer's name and meter marking printed on the sheath

Standard cable types:

FXMMSU 2 SMT (2 mm)	FXMMSU 2 GKT (2 mm)	FXMMSU 2 OM3T (2 mm)
FXMMSU 4 SMT (2 mm)	FXMMSU 4 GKT (2 mm)	FXMMSU 4 OM3T (2 mm)
FXMMSU 6 SMT (2 mm)	FXMMSU 6 GKT (2 mm)	FXMMSU 6 OM3T (2 mm)
FXMMSU 8 SMT (2 mm)	FXMMSU 8 GKT (2 mm)	FXMMSU 8 OM3T (2 mm)

Other types on request.

Characteristics of cabled optical fibres

Fibre coating:

L = 250 $\mu\text{m} \pm 10 \mu\text{m}$ T = 900 $\mu\text{m} \pm 50 \mu\text{m}$

Single mode fibre	10/125 μm	SM / OS2 (ITU-T G.652.D)
Mode field diameter (MFD)	1310 nm	9,3 +/- 0,5 μm
Mode field eccentricity		$\leq 1,0 \mu\text{m}$
- Installation cables		$\leq 0,5 \mu\text{m}$
Cladding diameter		125 +/- 2 μm
- Installation cables		125 +/- 1 μm
Cladding ellipticity		$\leq 2 \%$
Fibre attenuation	1310 nm	$\leq 0,40 \text{ dB/km}$
	1550 nm	$\leq 0,25 \text{ dB/km}$
Zero dispersion range		1300...1324 nm
Dispersion coefficient		$\leq 0,093 \text{ ps/nm}^2/\text{km}$
- Dispersion at	1550 nm	$\leq 18 \text{ ps/nm/km}$
Cut-off wavelength		$\leq 1260 \text{ nm}$
- Installation cables		1180...1250 nm
Polarization mode dispersion		$\leq 0,5 \text{ ps}/\sqrt{\text{km}}$
Proof test		1 % / 1 sec
Fibre identification		6 colour system according to SFS 5648

Multi mode fibre	50/125 μm	OM3
Core diameter		50 +/- 3 μm
Core ellipticity		$\leq 6 \%$
Core eccentricity		$\leq 3 \mu\text{m}$
Cladding diameter		125 +/- 2 μm
Cladding ellipticity		$\leq 2 \%$
Fibre attenuation	850 nm	$\leq 2,7 \text{ dB/km}$
	1300 nm	$\leq 0,8 \text{ dB/km}$
Bandwidth	850 nm	$\geq 1500 \text{ MHz} \times \text{km}$ (LED)
	1300 nm	$\geq 500 \text{ MHz} \times \text{km}$ (LED)
	850 nm	$\geq 2000 \text{ MHz} \times \text{km}$ (Laser)
Numerical aperture, NA		0,200 +/- 0,015
Fibre identification		6 colour system according to SFS 5648

Multi mode fibre	62,5/125 μm	GK / OM1
Core diameter		62,5 +/- 3 μm
Core ellipticity		$\leq 6 \%$
Core eccentricity		$\leq 3 \mu\text{m}$
Cladding diameter		125 +/- 2 μm
Cladding ellipticity		$\leq 2 \%$
Fibre attenuation	850 nm	$\leq 3,5 \text{ dB/km}$
	1300 nm	$\leq 1,0 \text{ dB/km}$
Bandwidth	850 nm	$\geq 200 \text{ MHz} \times \text{km}$
	1300 nm	$\geq 500 \text{ MHz} \times \text{km}$
Numerical aperture, NA		0,275 +/- 0,015
Fibre identification		6 colour system according to SFS 5648

GENERAL INFORMATION

Insulation material:

The following designations are used for insulation materials in this catalog.

XLPE stands for cross-linked polyethylene compound. It has excellent mechanical and electrical characteristics.

Sheathing material:

The designation SHF1 stands for thermoplastic compound. This material is halogen-free, highly flame-retardant and has low smoke emission.

Definition of terms:

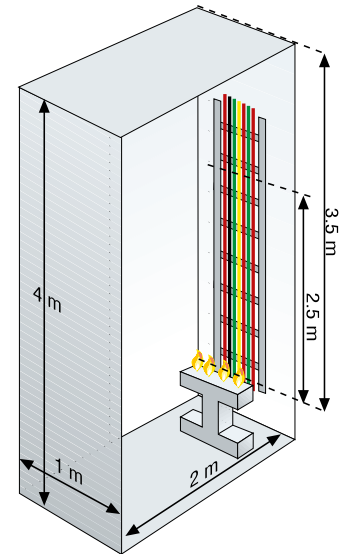
Flame-retardant

To be flame-retardant, the cables must withstand the test specified in IEC standard 60332-3 or IEC 60332-1. Flame-retardant cables do not propagate fire and are self-extinguishing.

IEC 60332-3 is the test for bunched wires and cables and has three categories - A, B and C - which are defined by different limits for flammable material and burning times. The burning time is the length of time the burner is directed towards the bunch of cables. For the cables to pass the test, they must extinguish themselves once the burner has been removed. Burning may not occur more than 2.5 m from the burner as shown in the figure.

All Helkama cables comply with the most severe requirements of category A.

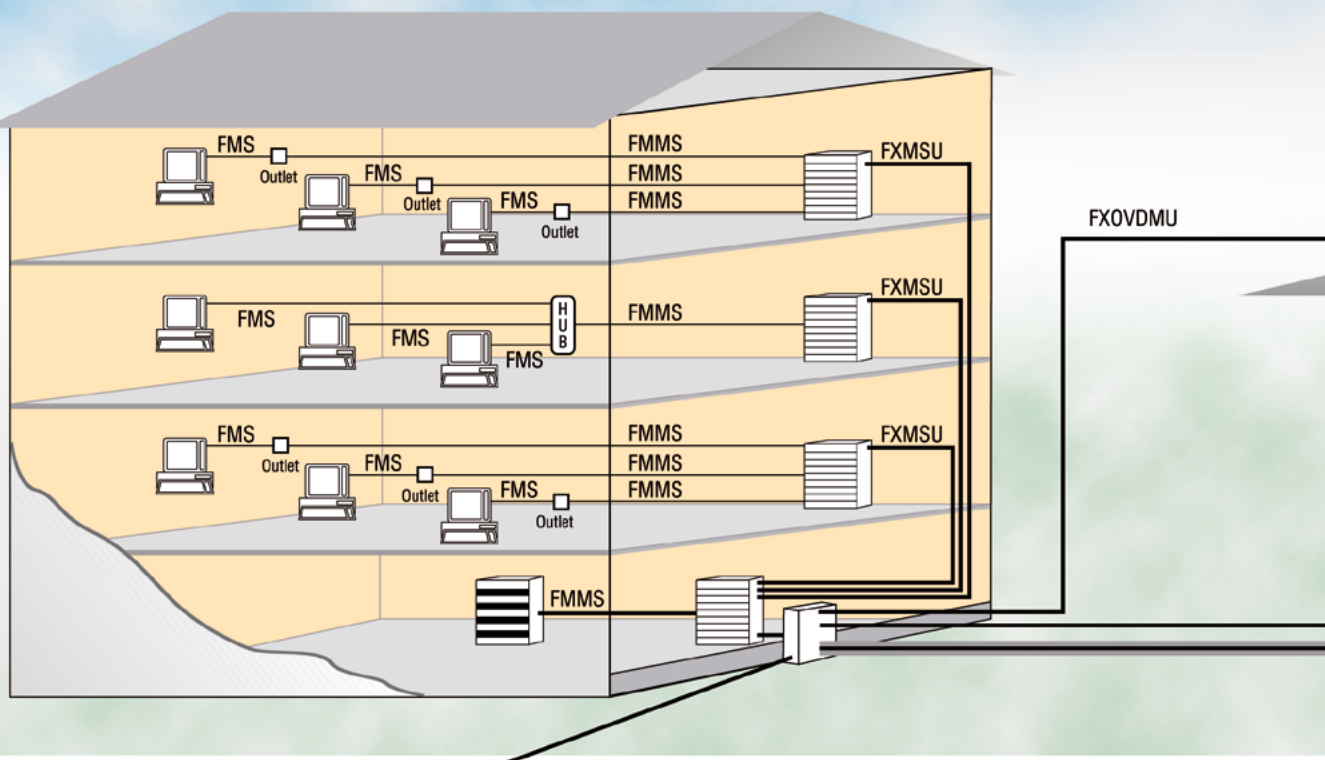
Test on bunched cables IEC 60332-3



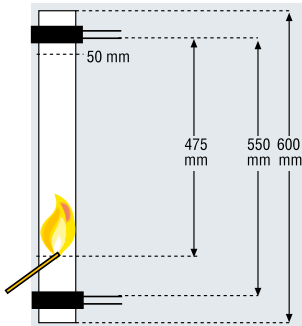
Burning is allowed up to max. 2.5 meters from the burner within a specified time.

Category	Amount of burning material	Burning time
A	7.0 litres/m	40 min
B	3.5 litres/m	40 min
C	1.5 litres/m	20 min

Optical fibre cable network



IEC 60332-1 is the test for a single insulated wire and cable. The test procedure and requirements are shown in the following diagram.



A min. 50 mm of the cable, measured from the upper support, must remain unburned after the specified time.

Fire-resistant

To be classified as fire-resistant, the cables must withstand the test specified in standard **IEC 60331-21**. The cables must operate for a minimum of 90 minutes while the burner is directed towards them as shown beside. Helkama fire-resistant cables are also flame-retardant.

Halogen-free

Halogen-free refers to the absence of halogens, such as chlorine and fluorine, and is determined on the basis of the halogen content and the acidity of cable's gases.

IEC 60754-1 determines the halogen content of the material. To meet the halogen-free requirements, the halogen content of the material may not exceed 0.5% or 5 mg/g.

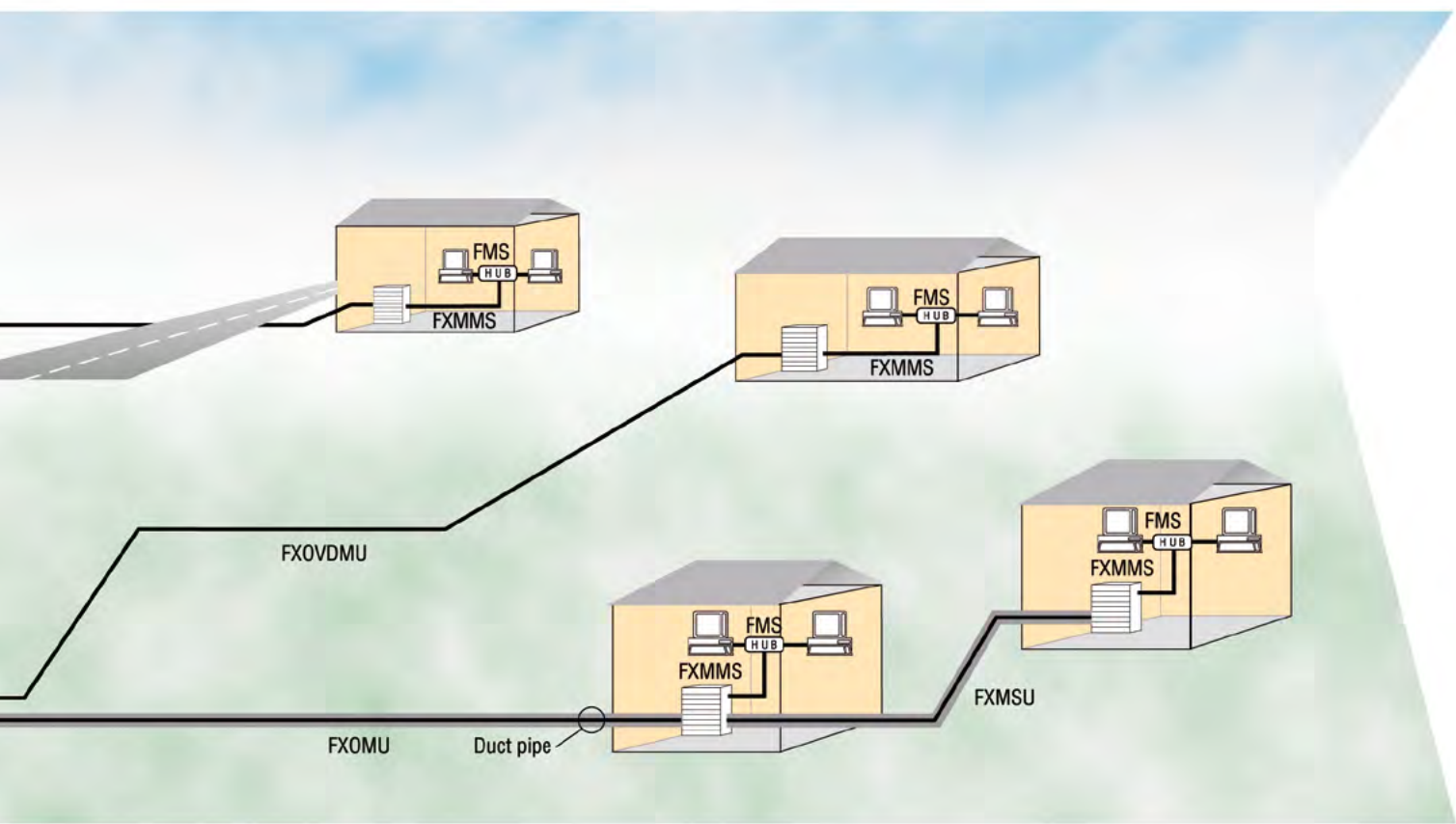
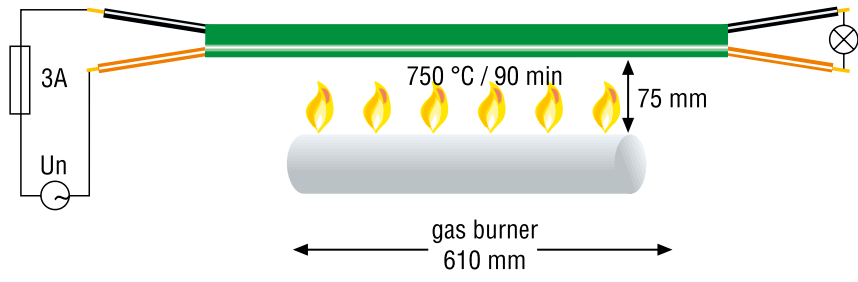
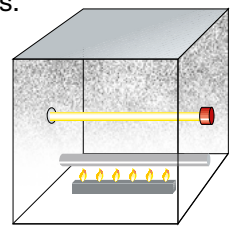
IEC 60754-2 determines the degree of acidity of gases evolved during combustion. The limit values are 4.3 for pH and 10 mikroS for conductivity.

Smoke emission

Smoke emission refers to visibility in a fire. The greater the light transmittance, the better the visibility. When tested in accordance with **IEC 61034-1** (test method) and **IEC 61034-2** (test requirements) the smoke emission of a cable during a fire must not exceed the following values.

27m³ cube smoke chamber

Requirements: 60% light transmittance



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