

Fireflif

Fire Resistant Instrumentation & Data Cables

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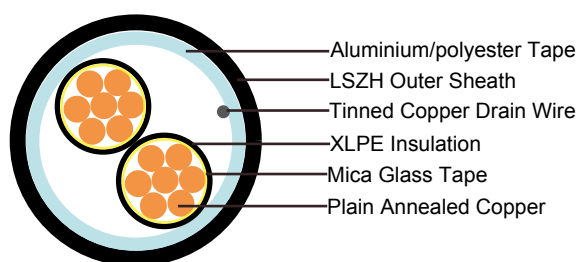
TYPE CODES

Technical Information for Fire Properties



Fire Resistant Overall Screened Instrumentation Cables (Multicore)

RE-2X(St)H...CI. FE 180 PH30/PH60



Aluminium/polyester Tape
LSZH Outer Sheath
Tinned Copper Drain Wire
XLPE Insulation
Mica Glass Tape
Plain Annealed Copper

APPLICATION

The LSZH sheathed cables are generally use for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Overall Screen: Aluminium/polyester tape is applied over the laid up cores with metallic side down in contact with tinned copper drain wire, 0.5mm².

Outer Sheath: Halogen free flame retardant compound to EN 50290-2-27.



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Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 160°C

Minimum bending radius: 7.5 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	μH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				
Maximum Mutual Capacitance	nf/km	250				
Capacitance Unbalance	pf/500m	500				
Maximum L/R (ratio)	μH/Ω	25	25	25	40	60
Operating Voltage	V	500				

Dielectric Strength for 1 minute	AC	V	≥2000
	DC	V	≥3000

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²		mm	mm	mm	kg/km
0.5mm ²					
2x0.5	2	0.4	0.9	7.4	65
3x0.5	2	0.4	0.9	7.8	79
4x0.5	2	0.4	0.9	8.5	95
5x0.5	2	0.4	0.9	9.3	112
8x0.5	2	0.4	1.0	11.1	164
10x0.5	2	0.4	1.0	13.0	200
12x0.5	2	0.4	1.0	13.4	226
14x0.5	2	0.4	1.0	14.1	254
16x0.5	2	0.4	1.0	14.8	283
20x0.5	2	0.4	1.1	16.3	348
24x0.5	2	0.4	1.1	18.5	412
27x0.5	2	0.4	1.1	19.0	450
30x0.5	2	0.4	1.2	19.9	503
37x0.5	2	0.4	1.2	21.4	598
40x0.5	2	0.4	1.2	22.2	639
0.75mm ²					
2x0.75	2	0.4	0.9	7.7	73
3x0.75	2	0.4	0.9	8.2	91
4x0.75	2	0.4	0.9	8.9	110
5x0.75	2	0.4	1.0	9.9	136
8x0.75	2	0.4	1.0	11.7	192
10x0.75	2	0.4	1.1	13.9	244
12x0.75	2	0.4	1.1	14.3	276
14x0.75	2	0.4	1.1	15.1	311
16x0.75	2	0.4	1.1	15.9	347
20x0.75	2	0.4	1.2	17.4	426
24x0.75	2	0.4	1.3	20.0	517
27x0.75	2	0.4	1.3	20.5	565
30x0.75	2	0.4	1.3	21.2	616
37x0.75	2	0.4	1.3	22.9	733
40x0.75	2	0.4	1.4	24.0	800
1.0mm ²					
2x1.0	2	0.4	0.9	8.2	84
3x1.0	2	0.4	0.9	8.6	106
4x1.0	2	0.4	0.9	9.4	129
5x1.0	2	0.4	0.9	10.3	154
8x1.0	2	0.4	1.0	12.4	229



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Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²		mm	mm	mm	kg/km
10x1.0	2	0.4	1.0	14.5	281
12x1.0	2	0.4	1.0	15.0	322
14x1.0	2	0.4	1.0	15.8	365
16x1.0	2	0.4	1.1	16.9	419
20x1.0	2	0.4	1.2	18.5	516
24x1.0	2	0.4	1.2	21.1	612
27x1.0	2	0.4	1.2	21.6	672
30x1.0	2	0.4	1.2	22.4	735
37x1.0	2	0.4	1.3	24.4	896
40x1.0	2	0.4	1.3	25.3	960
1.5mm ²					
2x1.5	2	0.5	0.9	9.1	104
3x1.5	2	0.5	0.9	9.6	134
4x1.5	2	0.5	1.0	10.8	172
5x1.5	2	0.5	1.0	11.8	205
8x1.5	2	0.5	1.1	14.1	306
10x1.5	2	0.5	1.1	16.6	377
12x1.5	2	0.5	1.1	17.1	433
14x1.5	2	0.5	1.2	18.3	503
16x1.5	2	0.5	1.2	19.3	564
20x1.5	2	0.5	1.3	21.1	694
24x1.5	2	0.5	1.3	24.1	824
27x1.5	2	0.5	1.4	24.8	922
30x1.5	2	0.5	1.4	25.8	1009
37x1.5	2	0.5	1.4	27.9	1211
40x1.5	2	0.5	1.5	29.1	1317

500V

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²		mm	mm	mm	kg/km
0.5mm ²					
2x0.5	2	0.6	0.9	8.2	74
3x0.5	2	0.6	0.9	8.7	91
4x0.5	2	0.6	0.9	9.5	109
5x0.5	2	0.6	0.9	10.3	129
8x0.5	2	0.6	1.0	12.4	189
10x0.5	2	0.6	1.0	14.6	231
12x0.5	2	0.6	1.1	15.2	272
14x0.5	2	0.6	1.1	16.0	305
16x0.5	2	0.6	1.1	16.9	339
20x0.5	2	0.6	1.2	18.5	416

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²		mm	mm	mm	kg/km
24x0.5	2	0.6	1.2	21.1	492
27x0.5	2	0.6	1.2	21.6	537
30x0.5	2	0.6	1.3	22.6	599
37x0.5	2	0.6	1.3	24.4	711
40x0.5	2	0.6	1.3	25.4	760
0.75mm ²					
2x0.75	2	0.6	0.9	8.5	82
3x0.75	2	0.6	0.9	9.0	102
4x0.75	2	0.6	0.9	9.9	125
5x0.75	2	0.6	1.0	11.0	154
8x0.75	2	0.6	1.0	13.0	218
10x0.75	2	0.6	1.0	15.3	268
12x0.75	2	0.6	1.0	15.8	305
14x0.75	2	0.6	1.1	16.8	355
16x0.75	2	0.6	1.1	17.8	396
20x0.75	2	0.6	1.2	19.5	486
24x0.75	2	0.6	1.3	22.4	590
27x0.75	2	0.6	1.3	22.9	645
30x0.75	2	0.6	1.3	23.8	703
37x0.75	2	0.6	1.4	25.9	854
40x0.75	2	0.6	1.4	26.9	914
1.0mm ²					
2x1.0	2	0.6	0.9	9.0	93
3x1.0	2	0.6	0.9	9.5	118
4x1.0	2	0.6	1.0	10.6	151
5x1.0	2	0.6	1.0	11.6	179
8x1.0	2	0.6	1.0	13.7	257
10x1.0	2	0.6	1.1	16.3	325
12x1.0	2	0.6	1.1	16.9	372
14x1.0	2	0.6	1.1	17.8	421
16x1.0	2	0.6	1.2	19.0	482
20x1.0	2	0.6	1.2	20.5	579
24x1.0	2	0.6	1.3	23.7	702
27x1.0	2	0.6	1.3	24.2	770
30x1.0	2	0.6	1.3	25.1	841
37x1.0	2	0.6	1.4	27.4	1023
40x1.0	2	0.6	1.4	28.4	1096
1.5mm ²					
2x1.5	2	0.6	0.9	9.5	109
3x1.5	2	0.6	1.0	10.3	146
4x1.5	2	0.6	1.0	11.3	180
5x1.5	2	0.6	1.0	12.3	215
8x1.5	2	0.6	1.1	14.8	322
10x1.5	2	0.6	1.2	17.6	407



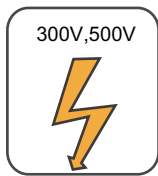
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Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²		mm	mm	mm	kg/km
12x1.5	2	0.6	1.2	18.2	466
14x1.5	2	0.6	1.2	19.2	529
16x1.5	2	0.6	1.2	20.2	592
20x1.5	2	0.6	1.3	22.1	729
24x1.5	2	0.6	1.4	25.5	881
27x1.5	2	0.6	1.4	26.1	969
30x1.5	2	0.6	1.4	27.1	1060
37x1.5	2	0.6	1.5	29.5	1290
40x1.5	2	0.6	1.5	30.6	1383
2.5mm ²					
2x2.5	2	0.7	1.0	10.9	150
3x2.5	2	0.7	1.0	11.6	195
4x2.5	2	0.7	1.0	12.7	243
5x2.5	2	0.7	1.1	14.2	301
8x2.5	2	0.7	1.2	17.0	452
10x2.5	2	0.7	1.3	20.3	570
12x2.5	2	0.7	1.3	21.0	657
14x2.5	2	0.7	1.3	22.1	748
16x2.5	2	0.7	1.4	23.5	854
20x2.5	2	0.7	1.4	25.5	1034
24x2.5	2	0.7	1.5	29.4	1248
27x2.5	2	0.7	1.6	30.3	1395
30x2.5	2	0.7	1.6	31.4	1528
37x2.5	2	0.7	1.7	34.2	1859
40x2.5	2	0.7	1.7	35.5	1995

Note: Other conductor sizes & core configurations are available upon request.



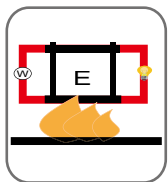
300V,500V

Rated Voltage



EN 50288-7
formerly BS 5308

Standard



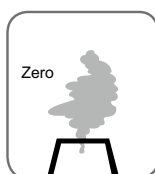
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



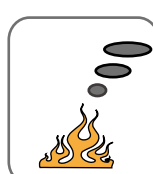
Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



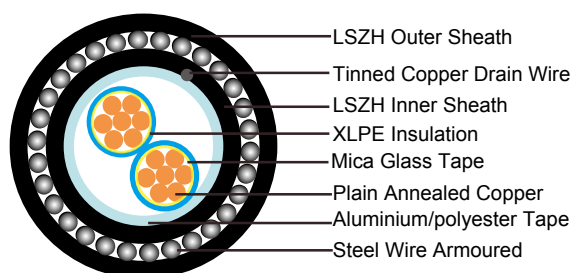
Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Fire Resistant Overall Screened, Armoured Instrumentation Cables (Multicore)

RE-2X(St)HSAWAH...CI. FE 180 PH30/PH60



APPLICATION

The LSZH sheathed cables are generally used for indoor installation and suitable for wet and damp areas. The galvanized steel wire armour provides excellent protection. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Overall Screen: Aluminium/polyester tape is applied over the laid up cores with metallic side down in contact with tinned copper drain wire, 0.5mm².



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Inner Sheath: LSZH compound.

Armouring: Galvanised steel wire.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 160°C

Minimum bending radius: 10 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	µH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				

Maximum Mutual Capacitance		nf/km	250				
Capacitance Unbalance		pf/500m	500				
Maximum L/R (ratio)		$\mu\text{H}/\Omega$	25	25	25	40	60
Operating Voltage		V	500				
Dielectric Strength for 1 minute	AC	V	≥ 2000				
	DC	V	≥ 3000				

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x0.5	2	0.4	0.9	0.9	1.3	11.8	287
3x0.5	2	0.4	0.9	0.9	1.3	12.2	312
4x0.5	2	0.4	0.9	0.9	1.3	12.9	346
5x0.5	2	0.4	0.9	0.9	1.3	13.7	383
8x0.5	2	0.4	1.0	0.9	1.4	15.7	491
10x0.5	2	0.4	1.0	0.9	1.4	17.6	579
12x0.5	2	0.4	1.0	0.9	1.4	18.0	616
14x0.5	2	0.4	1.0	0.9	1.4	18.7	663
16x0.5	2	0.4	1.0	0.9	1.4	19.4	713
20x0.5	2	0.4	1.1	0.9	1.5	21.1	828
24x0.5	2	0.4	1.1	0.9	1.5	23.3	955
27x0.5	2	0.4	1.1	0.9	1.5	23.8	1004
30x0.5	2	0.4	1.2	0.9	1.5	24.7	1082
37x0.5	2	0.4	1.2	0.9	1.6	26.4	1235
40x0.5	2	0.4	1.2	1.25	1.6	27.9	1474
0.75mm ²							
2x0.75	2	0.4	0.9	0.9	1.3	12.1	304
3x0.75	2	0.4	0.9	0.9	1.3	12.6	333
4x0.75	2	0.4	0.9	0.9	1.4	13.5	380
5x0.75	2	0.4	1.0	0.9	1.4	14.5	433
8x0.75	2	0.4	1.0	0.9	1.4	16.3	536
10x0.75	2	0.4	1.1	0.9	1.5	18.7	657
12x0.75	2	0.4	1.1	0.9	1.5	19.1	702
14x0.75	2	0.4	1.1	0.9	1.5	19.9	758
16x0.75	2	0.4	1.1	0.9	1.5	20.7	816
20x0.75	2	0.4	1.2	0.9	1.6	22.4	950
24x0.75	2	0.4	1.3	0.9	1.6	25.0	1115
27x0.75	2	0.4	1.3	0.9	1.6	25.5	1175
30x0.75	2	0.4	1.3	0.9	1.6	26.2	1247
37x0.75	2	0.4	1.3	1.25	1.7	28.8	1607



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Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
40x0.75	2	0.4	1.4	1.25	1.7	29.9	1712
1.0mm ²							
2x1.0	2	0.4	0.9	0.9	1.3	12.6	326
3x1.0	2	0.4	0.9	0.9	1.3	13.0	360
4x1.0	2	0.4	0.9	0.9	1.4	14.0	413
5x1.0	2	0.4	0.9	0.9	1.4	15.0	461
8x1.0	2	0.4	1.0	0.9	1.4	17.0	591
10x1.0	2	0.4	1.0	0.9	1.5	19.3	713
12x1.0	2	0.4	1.0	0.9	1.5	19.8	767
14x1.0	2	0.4	1.0	0.9	1.5	20.6	832
16x1.0	2	0.4	1.1	0.9	1.5	21.7	916
20x1.0	2	0.4	1.2	0.9	1.5	23.3	1057
24x1.0	2	0.4	1.2	0.9	1.6	26.1	1240
27x1.0	2	0.4	1.2	1.25	1.6	27.3	1483
30x1.0	2	0.4	1.2	1.25	1.6	28.1	1574
37x1.0	2	0.4	1.3	1.25	1.7	30.3	1823
40x1.0	2	0.4	1.3	1.25	1.7	31.2	1920
1.5mm ²							
2x1.5	2	0.5	0.9	0.9	1.4	13.7	379
3x1.5	2	0.5	0.9	0.9	1.4	14.2	423
4x1.5	2	0.5	1.0	0.9	1.4	15.4	491
5x1.5	2	0.5	1.0	0.9	1.4	16.4	552
8x1.5	2	0.5	1.1	0.9	1.5	18.9	727
10x1.5	2	0.5	1.1	0.9	1.5	21.4	866
12x1.5	2	0.5	1.1	0.9	1.5	21.9	937
14x1.5	2	0.5	1.2	0.9	1.5	23.1	1038
16x1.5	2	0.5	1.2	0.9	1.6	24.3	1141
20x1.5	2	0.5	1.3	1.25	1.6	26.8	1488
24x1.5	2	0.5	1.3	1.25	1.7	30.0	1741
27x1.5	2	0.5	1.4	1.25	1.7	30.7	1866
30x1.5	2	0.5	1.4	1.25	1.7	31.7	1986
37x1.5	2	0.5	1.4	1.25	1.8	34.0	2282
40x1.5	2	0.5	1.5	1.25	1.8	35.2	2435

500V

Conductor		RE-2X(St)HSWAH...Cl. FE 180 PH30/PH60					
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x0.5	2	0.6	0.9	0.9	1.3	12.6	317
3x0.5	2	0.6	0.9	0.9	1.3	13.1	346
4x0.5	2	0.6	0.9	0.9	1.4	14.1	393
5x0.5	2	0.6	0.9	0.9	1.4	14.9	437
8x0.5	2	0.6	1.0	0.9	1.4	17.0	553
10x0.5	2	0.6	1.0	0.9	1.5	19.4	664
12x0.5	2	0.6	1.1	0.9	1.5	20.0	723
14x0.5	2	0.6	1.1	0.9	1.5	20.8	779
16x0.5	2	0.6	1.1	0.9	1.5	21.7	837
20x0.5	2	0.6	1.2	0.9	1.5	23.3	958
24x0.5	2	0.6	1.2	0.9	1.6	26.1	1122
27x0.5	2	0.6	1.2	0.9	1.6	26.6	1180
30x0.5	2	0.6	1.3	0.9	1.6	27.6	1270
37x0.5	2	0.6	1.3	0.9	1.6	29.4	1433
40x0.5	2	0.6	1.3	1.25	1.7	31.3	1723
0.75mm ²							
2x0.75	2	0.6	0.9	0.9	1.3	12.9	335
3x0.75	2	0.6	0.9	0.9	1.3	13.4	368
4x0.75	2	0.6	0.9	0.9	1.4	14.5	420
5x0.75	2	0.6	1.0	0.9	1.4	15.6	481
8x0.75	2	0.6	1.0	0.9	1.4	17.6	598
10x0.75	2	0.6	1.0	0.9	1.5	20.1	720
12x0.75	2	0.6	1.0	0.9	1.5	20.6	771
14x0.75	2	0.6	1.1	0.9	1.5	21.6	850
16x0.75	2	0.6	1.1	0.9	1.5	22.6	917
20x0.75	2	0.6	1.2	0.9	1.6	24.5	1068
24x0.75	2	0.6	1.3	0.9	1.6	27.4	1256
27x0.75	2	0.6	1.3	0.9	1.6	27.9	1325
30x0.75	2	0.6	1.3	0.9	1.6	28.8	1407
37x0.75	2	0.6	1.4	1.25	1.7	31.8	1836
40x0.75	2	0.6	1.4	1.25	1.7	32.8	1931



Caledonian

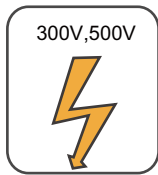
FIREFLIX Fire Resistant Instrumentation & Data Cables

www.caledonian-cables.co.uk www.addison-cables.com

Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
1.0mm²							
2x1.0	2	0.6	0.9	0.9	1.3	13.4	357
3x1.0	2	0.6	0.9	0.9	1.4	14.1	403
4x1.0	2	0.6	1.0	0.9	1.4	15.2	466
5x1.0	2	0.6	1.0	0.9	1.4	16.2	521
8x1.0	2	0.6	1.0	0.9	1.4	18.3	655
10x1.0	2	0.6	1.1	0.9	1.5	21.1	807
12x1.0	2	0.6	1.1	0.9	1.5	21.7	868
14x1.0	2	0.6	1.1	0.9	1.5	22.6	942
16x1.0	2	0.6	1.2	0.9	1.6	24.0	1049
20x1.0	2	0.6	1.2	0.9	1.6	25.5	1191
24x1.0	2	0.6	1.3	0.9	1.6	28.7	1403
27x1.0	2	0.6	1.3	1.25	1.7	30.1	1691
30x1.0	2	0.6	1.3	1.25	1.7	31.0	1795
37x1.0	2	0.6	1.4	1.25	1.7	33.3	2058
40x1.0	2	0.6	1.4	1.25	1.8	34.5	2188
1.5mm²							
2x1.5	2	0.6	0.9	0.9	1.3	14.1	394
3x1.5	2	0.6	1.0	0.9	1.4	14.9	453
4x1.5	2	0.6	1.0	0.9	1.4	15.9	513
5x1.5	2	0.6	1.0	0.9	1.4	17.0	577
8x1.5	2	0.6	1.1	0.9	1.5	19.6	760
10x1.5	2	0.6	1.2	0.9	1.5	22.4	923
12x1.5	2	0.6	1.2	0.9	1.6	23.2	1012
14x1.5	2	0.6	1.2	0.9	1.6	24.2	1102
16x1.5	2	0.6	1.2	0.9	1.6	25.2	1195
20x1.5	2	0.6	1.3	1.25	1.7	28.0	1575
24x1.5	2	0.6	1.4	1.25	1.7	31.4	1849
27x1.5	2	0.6	1.4	1.25	1.7	32.0	1957
30x1.5	2	0.6	1.4	1.25	1.8	33.2	2102
37x1.5	2	0.6	1.5	1.25	1.8	35.6	2420
40x1.5	2	0.6	1.5	1.25	1.8	36.7	2554
2.5mm²							
2x2.5	2	0.7	1.0	0.9	1.4	15.5	474
3x2.5	2	0.7	1.0	0.9	1.4	16.2	537
4x2.5	2	0.7	1.0	0.9	1.4	17.3	616
5x2.5	2	0.7	1.1	0.9	1.5	19.0	723
8x2.5	2	0.7	1.2	0.9	1.5	21.8	953
10x2.5	2	0.7	1.3	0.9	1.6	25.3	1175
12x2.5	2	0.7	1.3	0.9	1.6	26.0	1281
14x2.5	2	0.7	1.3	1.25	1.7	28.0	1593
16x2.5	2	0.7	1.4	1.25	1.7	29.4	1751
20x2.5	2	0.7	1.4	1.25	1.8	31.6	2021

Conductor		RE-2X(St)HSAWAH...CI. FE 180 PH30/PH60					
No. of Core X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
24x2.5	2	0.7	1.5	1.25	1.8	35.5	2378
27x2.5	2	0.7	1.6	1.25	1.9	36.6	2577
30x2.5	2	0.7	1.6	1.25	1.9	37.7	2752
37x2.5	2	0.7	1.7	1.25	1.9	40.5	3187
40x2.5	2	0.7	1.7	1.25	2.0	42.0	3396

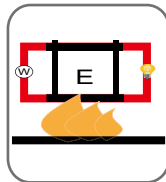
Note: Other conductor sizes & core configurations are available upon request.



Rated Voltage



Standard



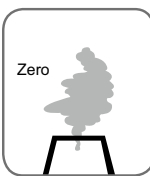
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2



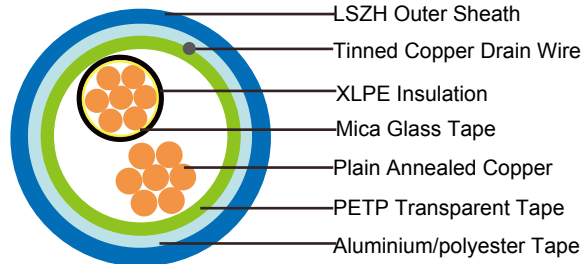
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FIREFLIX Fire Resistant Instrumentation & Data Cables

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Fire Resistant Overall Screened Instrumentation Cables (Single Pair)

RE-2X(St)H...CI. FE 180 PH30/PH60



APPLICATION

The unarmoured LSZH sheathed cables are generally used for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm (for 2.5mm^2).

Binder tape: PETP transparent tape.

Overall Screen: Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 160°C

Minimum bending radius: 7.5 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	μH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				
Maximum Mutual Capacitance	nf/km	250				



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Capacitance Unbalance		pf/500m	500				
Maximum L/R (ratio)		$\mu\text{H}/\Omega$	25	25	25	40	60
Operating Voltage		V	500				
Dielectric Strength for 1 minute	AC	V	≥ 2000				
	DC	V	≥ 3000				

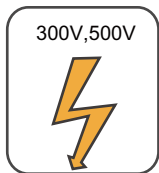
CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm^2	No./mm	mm	mm	mm	kg/km
1x2x0.5	2	0.4	0.9	6.4	58
1x2x0.75	2	0.4	0.9	6.7	66
1x2x1.0	2	0.4	0.9	7.1	76
1x2x1.5	2	0.5	0.9	7.8	95

500V

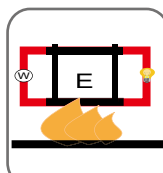
Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm^2	No./mm	mm	mm	mm	kg/km
1x2x0.5	2	0.6	0.9	7.1	64
1x2x0.75	2	0.6	0.9	7.4	72
1x2x1.0	2	0.6	0.9	7.7	83
1x2x1.5	2	0.6	0.9	8.2	98
1x2x2.5	2	0.7	1.0	9.4	137



Rated Voltage



Standard



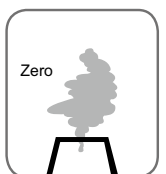
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



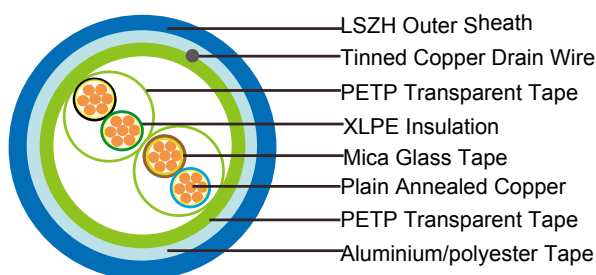
Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Fire Resistant Overall Screened Instrumentation Cables (Multipair)

RE-2X(St)H...CI. FE 180 PH30/PH60



APPLICATION

The unarmoured LSZH sheathed cables are generally used for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm (for 2.5mm^2).



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Binder tape: PETP transparent tape.

Overall Screen: Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 160°C

Minimum bending radius: 7.5 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	µH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				

Maximum Mutual Capacitance		nf/km	250				
Capacitance Unbalance		pf/500m	500				
Maximum L/R (ratio)		$\mu\text{H}/\Omega$	25	25	25	40	60
Operating Voltage		V	500				
Dielectric Strength for 1 minute	AC	V	≥ 2000				
	DC	V	≥ 3000				

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60				
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight	
mm^2	No./mm	mm	mm	mm	kg/km	
0.5mm ²						
2x2x0.5	2	0.4	0.9	10.8	110	
3x2x0.5	2	0.4	1.0	11.7	146	
4x2x0.5	2	0.4	1.0	12.9	177	
5x2x0.5	2	0.4	1.1	14.3	218	
8x2x0.5	2	0.4	1.1	17.0	310	
10x2x0.5	2	0.4	1.1	20.0	380	
12x2x0.5	2	0.4	1.2	20.9	446	
16x2x0.5	2	0.4	1.2	23.3	560	
20x2x0.5	2	0.4	1.3	25.5	687	
24x2x0.5	2	0.4	1.3	29.3	815	
0.75mm ²						
2x2x0.75	2	0.4	1.0	11.6	133	
3x2x0.75	2	0.4	1.0	12.3	168	
4x2x0.75	2	0.4	1.1	13.8	215	
5x2x0.75	2	0.4	1.1	15.1	255	
8x2x0.75	2	0.4	1.1	17.9	366	
10x2x0.75	2	0.4	1.2	21.4	463	
12x2x0.75	2	0.4	1.2	22.2	529	
16x2x0.75	2	0.4	1.3	24.9	685	
20x2x0.75	2	0.4	1.4	27.3	840	
24x2x0.75	2	0.4	1.4	31.2	997	
1.0mm ²						
2x2x1.0	2	0.4	1.0	12.3	155	
3x2x1.0	2	0.4	1.1	13.3	206	
4x2x1.0	2	0.4	1.1	14.6	254	
5x2x1.0	2	0.4	1.1	16.0	303	
8x2x1.0	2	0.4	1.2	19.3	452	
10x2x1.0	2	0.4	1.2	22.8	557	
12x2x1.0	2	0.4	1.3	23.8	654	
16x2x1.0	2	0.4	1.4	26.7	847	
20x2x1.0	2	0.4	1.4	29.0	1021	



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FIREFLIX Fire Resistant Instrumentation & Data Cables

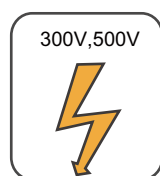
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Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
24x2x1.0	2	0.4	1.5	33.5	1234
1.5mm ²					
2x2x1.5	2	0.5	1.1	14.0	203
3x2x1.5	2	0.5	1.1	14.9	263
4x2x1.5	2	0.5	1.2	16.7	338
5x2x1.5	2	0.5	1.2	18.3	404
8x2x1.5	2	0.5	1.3	22.0	605
10x2x1.5	2	0.5	1.4	26.3	762
12x2x1.5	2	0.5	1.4	27.2	876
16x2x1.5	2	0.5	1.5	30.6	1137
20x2x1.5	2	0.5	1.6	33.4	1395
24x2x1.5	2	0.5	1.7	38.5	1683

500V

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
0.5mm ²					
2x2x0.5	2	0.6	1.0	12.3	134
3x2x0.5	2	0.6	1.0	13.1	168
4x2x0.5	2	0.6	1.1	14.6	214
5x2x0.5	2	0.6	1.1	16.1	253
8x2x0.5	2	0.6	1.2	19.3	371
10x2x0.5	2	0.6	1.2	22.9	456
12x2x0.5	2	0.6	1.3	23.9	532
16x2x0.5	2	0.6	1.4	26.8	685
20x2x0.5	2	0.6	1.4	29.1	818
24x2x0.5	2	0.6	1.5	33.6	991
0.75mm ²					
2x2x0.75	2	0.6	1.0	12.9	151
3x2x0.75	2	0.6	1.1	14.0	200
4x2x0.75	2	0.6	1.1	15.3	245
5x2x0.75	2	0.6	1.2	17.1	301
8x2x0.75	2	0.6	1.2	20.3	430
10x2x0.75	2	0.6	1.3	24.3	544
12x2x0.75	2	0.6	1.3	25.1	620
16x2x0.75	2	0.6	1.4	28.2	800
20x2x0.75	2	0.6	1.5	30.8	979
24x2x0.75	2	0.6	1.6	35.6	1183
1.0mm ²					
2x2x1.0	2	0.6	1.0	13.6	173
3x2x1.0	2	0.6	1.1	14.7	231

Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
4x2x1.0	2	0.6	1.2	16.4	295
5x2x1.0	2	0.6	1.2	18.0	351
8x2x1.0	2	0.6	1.2	21.4	507
10x2x1.0	2	0.6	1.3	25.6	641
12x2x1.0	2	0.6	1.4	26.7	751
16x2x1.0	2	0.6	1.5	30.0	970
20x2x1.0	2	0.6	1.5	32.6	1167
24x2x1.0	2	0.6	1.6	37.6	1410
1.5mm ²					
2x2x1.5	2	0.6	1.1	14.7	214
3x2x1.5	2	0.6	1.2	15.8	286
4x2x1.5	2	0.6	1.2	17.4	354
5x2x1.5	2	0.6	1.3	19.4	436
8x2x1.5	2	0.6	1.3	23.1	635
10x2x1.5	2	0.6	1.4	27.6	801
12x2x1.5	2	0.6	1.5	28.7	938
16x2x1.5	2	0.6	1.6	32.3	1214
20x2x1.5	2	0.6	1.7	35.3	1487
24x2x1.5	2	0.6	1.8	40.7	1793
2.5mm ²					
2x2x2.5	2	0.7	1.2	16.9	293
3x2x2.5	2	0.7	1.2	18.0	384
4x2x2.5	2	0.7	1.3	20.1	493
5x2x2.5	2	0.7	1.4	22.4	607
8x2x2.5	2	0.7	1.4	26.7	894
10x2x2.5	2	0.7	1.6	32.1	1145
12x2x2.5	2	0.7	1.6	33.2	1321
16x2x2.5	2	0.7	1.7	37.3	1714
20x2x2.5	2	0.7	1.9	40.9	2130
24x2x2.5	2	0.7	2.0	47.2	2564

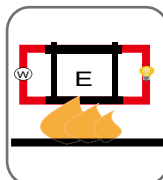
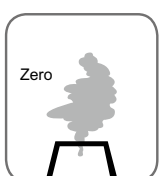


300V,500V

Rated Voltage

EN 50288-7
formerly BS 5308

Standard

Circuit Integrity
IEC 60331-21/BS 6387Flame Retardancy
BS EN 60332-1-2Reduced Fire Propagation
EN 60332-3-24

Zero

Halogen Free
IEC 60754-1Low Corrosivity
IEC 60754-2Low Smoke Emission
IEC 61034-2



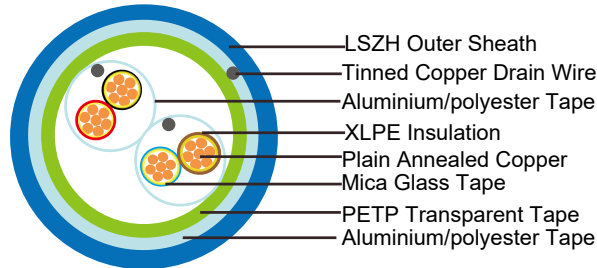
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FIREFLIX Fire Resistant Instrumentation & Data Cables

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Fire Resistant Individual and Overall Screened Instrumentation Cables (Multipair)

RE-2X(St)H PIMF...CI. FE 180 PH30/PH60



APPLICATION

The unarmoured LSZH sheathed cables are generally used for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm (for 2.5mm^2).

Individual Screen: Aluminium/polyester tape is applied over each pair with metallic side down in contact with tinned copper drain wire, 0.5mm^2 .

Binder tape: PETP transparent tape.

Overall Screen: Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 250°C

Minimum bending radius: 7.5 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	μH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				



Maximum Mutual Capacitance		nf/km	250				
Capacitance Unbalance		pf/500m	500				
Maximum L/R (ratio)		μH/Ω	25	25	25	40	60
Operating Voltage		V	500				
Dielectric Strength for 1 minute	AC	V	≥2000				
	DC	V	≥3000				

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)H PiMF...CI. FE 180 PH30/PH60				
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight	
mm ²	No./mm	mm	mm	mm	kg/km	
0.5mm ²						
2x2x0.5	2	0.4	1.0	12.0	138	
3x2x0.5	2	0.4	1.0	12.7	173	
4x2x0.5	2	0.4	1.1	14.2	222	
5x2x0.5	2	0.4	1.1	15.6	263	
8x2x0.5	2	0.4	1.1	18.5	377	
10x2x0.5	2	0.4	1.2	22.2	478	
12x2x0.5	2	0.4	1.2	23.0	545	
16x2x0.5	2	0.4	1.3	25.8	705	
20x2x0.5	2	0.4	1.4	28.2	865	
24x2x0.5	2	0.4	1.5	32.5	1046	
0.75mm ²						
2x2x0.75	2	0.4	1.0	12.6	155	
3x2x0.75	2	0.4	1.1	13.6	206	
4x2x0.75	2	0.4	1.1	15.0	253	
5x2x0.75	2	0.4	1.2	16.7	312	
8x2x0.75	2	0.4	1.2	19.8	449	
10x2x0.75	2	0.4	1.3	23.6	567	
12x2x0.75	2	0.4	1.3	24.4	648	
16x2x0.75	2	0.4	1.4	27.5	839	
20x2x0.75	2	0.4	1.5	30.0	1028	
24x2x0.75	2	0.4	1.5	34.5	1221	
1.0mm ²						
2x2x1.0	2	0.4	1.0	13.4	177	
3x2x1.0	2	0.4	1.1	14.4	238	
4x2x1.0	2	0.4	1.2	16.1	304	
5x2x1.0	2	0.4	1.2	17.7	363	
8x2x1.0	2	0.4	1.2	21.0	528	
10x2x1.0	2	0.4	1.3	25.1	667	
12x2x1.0	2	0.4	1.4	26.2	782	
16x2x1.0	2	0.4	1.5	29.4	1012	
20x2x1.0	2	0.4	1.5	32.0	1220	

Conductor		RE-2X(St)H PiMF...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
24x2x1.0	2	0.4	1.6	36.9	1473
1.5mm ²					
2x2x1.5	2	0.5	1.1	15.2	230
3x2x1.5	2	0.5	1.2	16.4	309
4x2x1.5	2	0.5	1.2	18.1	384
5x2x1.5	2	0.5	1.3	20.1	472
8x2x1.5	2	0.5	1.3	24.0	690
10x2x1.5	2	0.5	1.4	28.7	870
12x2x1.5	2	0.5	1.5	29.9	1021
16x2x1.5	2	0.5	1.6	33.6	1323
20x2x1.5	2	0.5	1.7	36.7	1622
24x2x1.5	2	0.5	1.8	42.3	1955

500V

Conductor		RE-2X(St)H PiMF...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
0.5mm ²					
2x2x0.5	2	0.6	1.0	13.4	157
3x2x0.5	2	0.6	1.1	14.5	208
4x2x0.5	2	0.6	1.1	15.9	254
5x2x0.5	2	0.6	1.2	17.7	313
8x2x0.5	2	0.6	1.2	21.1	447
10x2x0.5	2	0.6	1.3	25.2	565
12x2x0.5	2	0.6	1.4	26.3	660
16x2x0.5	2	0.6	1.5	29.5	850
20x2x0.5	2	0.6	1.5	32.1	1018
24x2x0.5	2	0.6	1.6	37.0	1230
0.75mm ²					
2x2x0.75	2	0.6	1.1	14.2	184
3x2x0.75	2	0.6	1.1	15.2	233
4x2x0.75	2	0.6	1.2	16.9	297
5x2x0.75	2	0.6	1.2	18.6	353
8x2x0.75	2	0.6	1.3	22.3	523
10x2x0.75	2	0.6	1.4	26.7	660
12x2x0.75	2	0.6	1.4	27.6	754
16x2x0.75	2	0.6	1.5	31.0	972
20x2x0.75	2	0.6	1.6	33.9	1190
24x2x0.75	2	0.6	1.7	39.1	1436
1.0mm ²					
2x2x1.0	2	0.6	1.1	15.0	207
3x2x1.0	2	0.6	1.2	16.2	276
4x2x1.0	2	0.6	1.2	17.8	340



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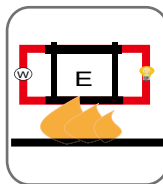
Conductor		RE-2X(St)H PiMF...CI. FE 180 PH30/PH60			
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	kg/km
5x2x1.0	2	0.6	1.3	19.8	418
8x2x1.0	2	0.6	1.3	23.6	605
10x2x1.0	2	0.6	1.4	28.2	764
12x2x1.0	2	0.6	1.5	29.3	893
16x2x1.0	2	0.6	1.6	33.0	1153
20x2x1.0	2	0.6	1.7	36.0	1411
24x2x1.0	2	0.6	1.8	41.6	1701
1.5mm ²					
2x2x1.5	2	0.6	1.1	16.0	241
3x2x1.5	2	0.6	1.2	17.2	324
4x2x1.5	2	0.6	1.3	19.2	414
5x2x1.5	2	0.6	1.3	21.1	496
8x2x1.5	2	0.6	1.4	25.4	740
10x2x1.5	2	0.6	1.5	30.3	932
12x2x1.5	2	0.6	1.6	31.5	1091
16x2x1.5	2	0.6	1.7	35.4	1410
20x2x1.5	2	0.6	1.8	38.7	1727
24x2x1.5	2	0.6	1.9	44.7	2080
2.5mm ²					
2x2x2.5	2	0.7	1.2	18.4	324
3x2x2.5	2	0.7	1.3	19.8	439
4x2x2.5	2	0.7	1.4	22.0	563
5x2x2.5	2	0.7	1.5	24.5	691
8x2x2.5	2	0.7	1.6	29.4	1033
10x2x2.5	2	0.7	1.7	35.1	1298
12x2x2.5	2	0.7	1.8	36.5	1519
16x2x2.5	2	0.7	1.9	41.0	1965
20x2x2.5	2	0.7	2.1	45.0	2434
24x2x2.5	2	0.7	2.2	51.9	2927



Rated Voltage



Standard



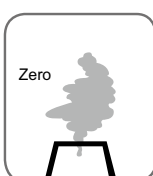
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



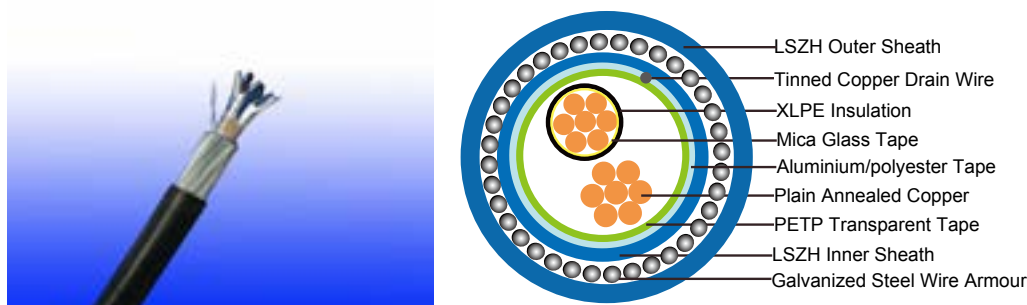
Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Fire Resistant Overall Screened, Armoured Instrumentation Cables (Single Pair)

RE-2X(St)HSAWAH...CI. FE 180 PH30/PH60



APPLICATION

The unarmoured LSZH sheathed cables are generally used for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm (for 2.5mm^2).

Binder tape: PETP transparent tape.



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Overall Screen: Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Inner Sheath: LSZH compound.

Armouring: Galvanized steel wire armour.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range fixed installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 160°C

Minimum bending radius: 10 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	µH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4

Minimum Insulation resistance (20°C)	Mohm/km	1000				
Maximum Mutual Capacitance	nf/km	250				
Capacitance Unbalance	pf/500m	500				
Maximum L/R (ratio)	μH/Ω	25	25	25	40	60
Operating Voltage	V	500				
Dielectric Strength for 1 minute	AC	V	≥2000			
	DC	V	≥3000			

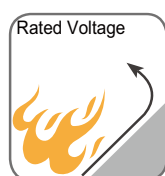
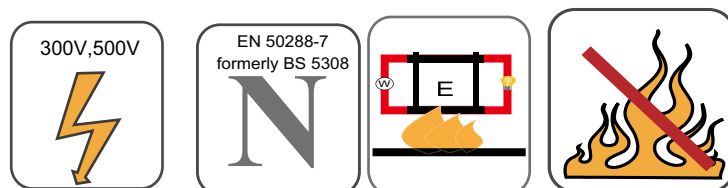
CONSTRUCTION PARAMETERS

300V

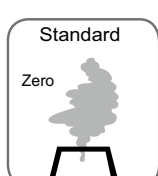
Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
1x2x0.5	2	0.4	0.9	0.9	1.3	10.8	245
1x2x0.75	2	0.4	0.9	0.9	1.3	11.1	261
1x2x1.0	2	0.4	0.9	0.9	1.3	11.5	280
1x2x1.5	2	0.5	0.9	0.9	1.4	12.4	325

500V

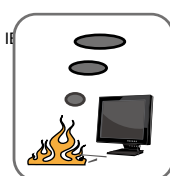
Conductor		RE-2X(St)H...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
1x2x0.5	2	0.6	0.9	0.9	1.3	11.5	270
1x2x0.75	2	0.6	0.9	0.9	1.3	11.8	286
1x2x1.0	2	0.6	0.9	0.9	1.3	12.1	305
1x2x1.5	2	0.6	0.9	0.9	1.3	12.6	332
1x2x2.5	2	0.7	1.0	0.9	1.4	14.0	407



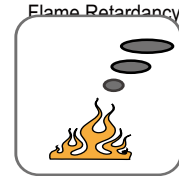
Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Flame Retardancy



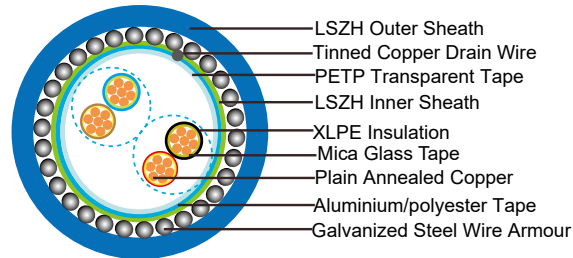
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FIREFLIX Fire Resistant Instrumentation & Data Cables

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Fire Resistant Overall Screened, Armoured Instrumentation Cables (Multipair)

RE-2X(St)HSWAH...CI. FE 180 PH30/PH60



APPLICATION

The unarmoured LSZH sheathed cables are generally use for indoor installation and suitable for wet and damp areas. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm(for 2.5mm^2).

Binder tape: PETP transparent tape.

Overall Screen:Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm^2 .

Inner Sheath: LSZH compound.

Armouring: Galvanized steel wire armour.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range during installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 250°C

Minimum bending radius: 10 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	μH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				



Maximum Mutual Capacitance		nf/km	250				
Capacitance Unbalance		pf/500m	500				
Maximum L/R (ratio)		μH/Ω	25	25	25	40	60
Operating Voltage		V	500				
Dielectric Strength for 1 minute	AC	V	≥2000				
	DC	V	≥3000				

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x2x0.5	2	0.4	0.9	0.9	1.4	15.4	431
3x2x0.5	2	0.4	1.0	0.9	1.4	16.3	490
4x2x0.5	2	0.4	1.0	0.9	1.4	17.4	553
5x2x0.5	2	0.4	1.1	0.9	1.5	19.1	644
8x2x0.5	2	0.4	1.1	0.9	1.5	21.8	808
10x2x0.5	2	0.4	1.1	0.9	1.5	24.8	964
12x2x0.5	2	0.4	1.2	0.9	1.5	25.7	1054
16x2x0.5	2	0.4	1.2	0.9	1.6	28.3	1252
20x2x0.5	2	0.4	1.3	0.9	1.6	30.5	1441
24x2x0.5	2	0.4	1.3	1.25	1.7	35.2	1918
0.75mm ²							
2x2x0.75	2	0.4	1.0	0.9	1.4	16.2	476
3x2x0.75	2	0.4	1.0	0.9	1.4	16.9	530
4x2x0.75	2	0.4	1.1	0.9	1.5	18.6	626
5x2x0.75	2	0.4	1.1	0.9	1.5	19.9	703
8x2x0.75	2	0.4	1.1	0.9	1.5	22.7	892
10x2x0.75	2	0.4	1.2	0.9	1.6	26.4	1101
12x2x0.75	2	0.4	1.2	0.9	1.6	27.2	1187
16x2x0.75	2	0.4	1.3	0.9	1.6	30.0	1421
20x2x0.75	2	0.4	1.4	1.25	1.7	33.2	1871
24x2x0.75	2	0.4	1.4	1.25	1.8	37.3	2192
1.0mm ²							
2x2x1.0	2	0.4	1.0	0.9	1.4	16.9	516
3x2x1.0	2	0.4	1.1	0.9	1.5	18.1	604
4x2x1.0	2	0.4	1.1	0.9	1.5	19.4	688
5x2x1.0	2	0.4	1.1	0.9	1.5	20.8	777
8x2x1.0	2	0.4	1.2	0.9	1.5	24.1	1015
10x2x1.0	2	0.4	1.2	0.9	1.6	27.8	1233
12x2x1.0	2	0.4	1.3	0.9	1.6	28.8	1358
16x2x1.0	2	0.4	1.4	1.25	1.7	32.6	1860
20x2x1.0	2	0.4	1.4	1.25	1.8	35.1	2136

Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
24x2x1.0	2	0.4	1.5	1.25	1.8	39.6	2513
1.5mm ²							
2x2x1.5	2	0.5	1.1	0.9	1.5	18.8	622
3x2x1.5	2	0.5	1.1	0.9	1.5	19.7	706
4x2x1.5	2	0.5	1.2	0.9	1.6	21.7	840
5x2x1.5	2	0.5	1.2	0.9	1.6	23.3	954
8x2x1.5	2	0.5	1.3	0.9	1.6	27.0	1259
10x2x1.5	2	0.5	1.4	1.25	1.7	32.2	1758
12x2x1.5	2	0.5	1.4	1.25	1.7	33.1	1905
16x2x1.5	2	0.5	1.5	1.25	1.8	36.7	2308
20x2x1.5	2	0.5	1.6	1.25	1.9	39.7	2693
24x2x1.5	2	0.5	1.7	1.25	1.9	44.8	3172

500V

Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x2x0.5	2	0.6	1.0	0.9	1.4	16.9	496
3x2x0.5	2	0.6	1.0	0.9	1.4	17.7	551
4x2x0.5	2	0.6	1.1	0.9	1.5	19.4	648
5x2x0.5	2	0.6	1.1	0.9	1.5	20.9	727
8x2x0.5	2	0.6	1.2	0.9	1.5	24.1	935
10x2x0.5	2	0.6	1.2	0.9	1.6	27.9	1134
12x2x0.5	2	0.6	1.3	0.9	1.6	28.9	1238
16x2x0.5	2	0.6	1.4	0.9	1.7	32.0	1493
20x2x0.5	2	0.6	1.4	0.9	1.7	34.3	1693
24x2x0.5	2	0.6	1.5	1.25	1.8	39.7	2273
0.75mm ²							
2x2x0.75	2	0.6	1.0	0.9	1.4	17.5	529
3x2x0.75	2	0.6	1.1	0.9	1.5	18.8	616
4x2x0.75	2	0.6	1.1	0.9	1.5	20.1	699
5x2x0.75	2	0.6	1.2	0.9	1.5	21.9	803
8x2x0.75	2	0.6	1.2	0.9	1.6	25.3	1035
10x2x0.75	2	0.6	1.3	0.9	1.6	29.3	1261
12x2x0.75	2	0.6	1.3	0.9	1.7	30.3	1378
16x2x0.75	2	0.6	1.4	0.9	1.7	33.4	1648
20x2x0.75	2	0.6	1.5	1.25	1.8	36.9	2160
24x2x0.75	2	0.6	1.6	1.25	1.9	41.9	2562
1.0mm ²							
2x2x1.0	2	0.6	1.0	0.9	1.4	18.2	569
3x2x1.0	2	0.6	1.1	0.9	1.5	19.5	667
4x2x1.0	2	0.6	1.1	0.9	1.5	21.0	762

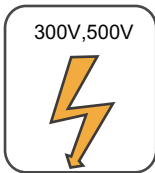


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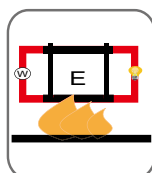
Conductor		RE-2X(St)HSWAH...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
5x2x1.0	2	0.6	1.2	0.9	1.6	23.0	892
8x2x1.0	2	0.6	1.2	0.9	1.6	26.4	1145
10x2x1.0	2	0.6	1.3	0.9	1.7	30.8	1415
12x2x1.0	2	0.6	1.4	0.9	1.7	31.9	1556
16x2x1.0	2	0.6	1.5	1.25	1.8	36.1	2121
20x2x1.0	2	0.6	1.5	1.25	1.8	38.7	2414
24x2x1.0	2	0.6	1.6	1.25	1.9	43.9	2866
1.5mm ²							
2x2x1.5	2	0.6	1.1	0.9	1.5	19.5	650
3x2x1.5	2	0.6	1.2	0.9	1.5	20.6	754
4x2x1.5	2	0.6	1.2	0.9	1.6	22.4	879
5x2x1.5	2	0.6	1.3	0.9	1.6	24.4	1017
8x2x1.5	2	0.6	1.3	0.9	1.7	28.3	1336
10x2x1.5	2	0.6	1.4	1.25	1.8	33.7	1863
12x2x1.5	2	0.6	1.5	1.25	1.8	34.8	2043
16x2x1.5	2	0.6	1.6	1.25	1.9	38.6	2471
20x2x1.5	2	0.6	1.7	1.25	2.0	41.8	2880
24x2x1.5	2	0.6	1.8	1.25	2.0	47.2	3390
2.5mm ²							
2x2x2.5	2	0.7	1.2	0.9	1.5	21.7	791
3x2x2.5	2	0.7	1.2	0.9	1.6	23.0	925
4x2x2.5	2	0.7	1.3	0.9	1.6	25.1	1093
5x2x2.5	2	0.7	1.4	0.9	1.7	27.6	1287
8x2x2.5	2	0.7	1.4	0.9	1.7	31.9	1698
10x2x2.5	2	0.7	1.6	1.25	1.9	38.4	2393
12x2x2.5	2	0.7	1.6	1.25	1.9	39.5	2610
16x2x2.5	2	0.7	1.7	1.25	2.0	43.8	3182
20x2x2.5	2	0.7	1.9	1.25	2.1	47.6	3764
24x2x2.5	2	0.7	2.0	1.25	2.2	54.1	4470



Rated Voltage



Standard



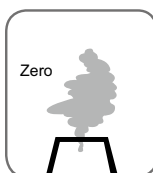
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



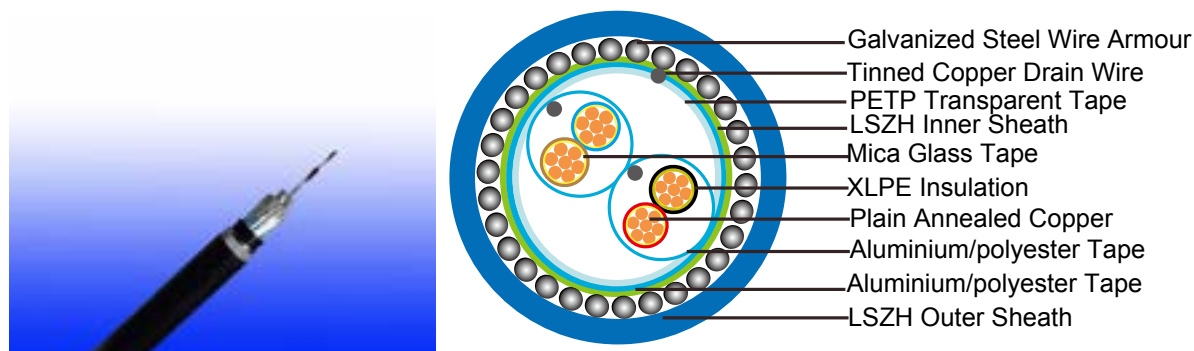
Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Fire Resistant Individual and Overall Screened, Armoured Instrumentation Cables (Multipair)

RE-2X(St)HSWAH PIMF...CI. FE 180 PH30/PH60



APPLICATION

The armoured LSZH sheathed cables are generally used when the risk of mechanical damage is increased. The galvanized steel wire armour provides excellent protection. Generally, the cables are used within industrial process manufacturing plants for communication, data and voice transmission signals and services. Also used for the interconnection of electrical equipment and instruments, the LSZH sheath can reduce toxic smoke and fume emission.

STANDARDS

Basic design to BS EN 50288-7 (formerly BS 5308)

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

300V, 500V

CABLE CONSTRUCTION

Conductor: Plain or metal coated copper wire, solid, stranded or flexible according to IEC 60228 class 2, IEC 60228 class 1 and class 5 also can be offered.

Fire Barrier: Mica glass tape.

Insulation: Extruded XLPE compound according to EN 50290-2-29. PVC, PE, PP compound can be offered as options.

Pairs: Two insulated conductors uniformly twisted together with a lay not exceeding 100mm ($\leq 1.5\text{mm}^2$) nor 150mm (for 2.5mm^2).



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Individual Screen: Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Binder tape: PETP transparent tape.

Overall Screen:Aluminium/polyester tape is applied over the laid up pairs with metallic side down in contact with tinned copper drain wire, 0.5mm².

Inner Sheath: LSZH compound.

Amouring: Galvanized steel wire armour.

Outer Sheath: Thermoplastic LSZH compound according to EN 50290-2-22.

Outer Sheath Option: Thermoplastic LSZH compound. UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

COLOUR CODE

Insulation Colour: Colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting.

Outer sheath: Black. Other colours can be offered upon request.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation: -30°C - +90°C

Temperature range during installation: -5°C - +50°C

Maximum short circuit temperature (5 Seconds): 250°C

Minimum bending radius: 10 x Overall Diameter

ELECTRICAL PROPERTIES

300V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5
Insulation thickness (nominal)	mm	0.35	0.38	0.4	0.45
Insulation thickness (minimum)	mm	0.26	0.26	0.26	0.35
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3
Minimum Insulation resistance (20°C)	Mohm/km	1000			
Maximum Mutual Capacitance	nf/km	250			
Capacitance Unbalance	pf/500m	500			
Maximum L/R (ratio)	µH/Ω	25	25	25	40
Operating Voltage	V	300			
Dielectric Strength for 1 minute	AC	V	≥1000		
	DC	V	≥2000		

500V

Conductor Area Size	mm ²	0.5	0.75	1.0	1.5	2.5
Insulation thickness (nominal)	mm	0.55	0.55	0.55	0.6	0.7
Insulation thickness (minimum)	mm	0.44	0.44	0.44	0.44	0.53
Conductor resistance (20°C)	ohm/km	36.7	25.0	18.5	12.3	7.4
Minimum Insulation resistance (20°C)	Mohm/km	1000				
Maximum Mutual Capacitance	nf/km	250				
Capacitance Unbalance	pf/500m	500				
Maximum L/R (ratio)	µH/Ω	25	25	25	40	60
Operating Voltage	V	500				
Dielectric Strength for 1 minute	AC	≥2000				
	DC	≥3000				

CONSTRUCTION PARAMETERS

300V

Conductor		RE-2X(St)HSWAH PiMF...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x2x0.5	2	0.4	1.0	0.9	1.4	16.6	490
3x2x0.5	2	0.4	1.0	0.9	1.4	17.3	546
4x2x0.5	2	0.4	1.1	0.9	1.5	19.0	644
5x2x0.5	2	0.4	1.1	0.9	1.5	20.4	724
8x2x0.5	2	0.4	1.1	0.9	1.5	23.3	919
10x2x0.5	2	0.4	1.2	0.9	1.6	27.2	1135
12x2x0.5	2	0.4	1.2	0.9	1.6	27.9	1124
16x2x0.5	2	0.4	1.3	1.25	1.7	31.7	1683
20x2x0.5	2	0.4	1.4	1.25	1.7	34.1	1930
24x2x0.5	2	0.4	1.5	1.25	1.8	38.6	2289
0.75mm ²							
2x2x0.75	2	0.4	1.0	0.9	1.4	17.2	524
3x2x0.75	2	0.4	1.1	0.9	1.5	18.4	613
4x2x0.75	2	0.4	1.1	0.9	1.5	19.8	697
5x2x0.75	2	0.4	1.2	0.9	1.5	21.5	803
8x2x0.75	2	0.4	1.2	0.9	1.6	24.8	1040
10x2x0.75	2	0.4	1.3	1.25	1.6	29.3	1451
12x2x0.75	2	0.4	1.3	1.25	1.6	30.0	1578
16x2x0.75	2	0.4	1.4	1.25	1.7	33.4	1878
20x2x0.75	2	0.4	1.5	1.25	1.8	36.1	2180
24x2x0.75	2	0.4	1.5	1.25	1.8	40.6	2534



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Conductor		RE-2X(St)HSWAH PiMF...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
1.0mm ²							
2x2x1.0	2	0.4	1.0	0.9	1.4	18.0	567
3x2x1.0	2	0.4	1.1	0.9	1.5	19.2	667
4x2x1.0	2	0.4	1.2	0.9	1.5	20.9	779
5x2x1.0	2	0.4	1.2	0.9	1.6	22.7	895
8x2x1.0	2	0.4	1.2	0.9	1.6	26.0	1154
10x2x1.0	2	0.4	1.3	1.25	1.7	31.0	1621
12x2x1.0	2	0.4	1.4	1.25	1.7	32.1	1774
16x2x1.0	2	0.4	1.5	1.25	1.8	35.5	2141
20x2x1.0	2	0.4	1.5	1.25	1.8	38.1	2443
24x2x1.0	2	0.4	1.6	1.25	1.9	43.2	2901
1.5mm ²							
2x2x1.5	2	0.5	1.1	0.9	1.5	20.0	681
3x2x1.5	2	0.5	1.2	0.9	1.6	21.4	805
4x2x1.5	2	0.5	1.2	0.9	1.6	23.1	927
5x2x1.5	2	0.5	1.3	1.25	1.6	25.8	1232
8x2x1.5	2	0.5	1.3	1.25	1.7	29.9	1604
10x2x1.5	2	0.5	1.4	1.25	1.8	34.8	1972
12x2x1.5	2	0.5	1.5	1.25	1.8	36.0	2166
16x2x1.5	2	0.5	1.6	1.25	1.9	39.9	2627
20x2x1.5	2	0.5	1.7	1.25	2.0	43.2	3067
24x2x1.5	2	0.5	1.8	1.25	2.0	48.8	3613

500V

Conductor		RE-2X(St)HSWAH PiMF...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
0.5mm ²							
2x2x0.5	2	0.6	1.0	0.9	1.4	18.0	548
3x2x0.5	2	0.6	1.1	0.9	1.5	19.3	638
4x2x0.5	2	0.6	1.1	0.9	1.5	20.7	724
5x2x0.5	2	0.6	1.2	0.9	1.6	22.7	845
8x2x0.5	2	0.6	1.2	0.9	1.6	26.1	1075
10x2x0.5	2	0.6	1.3	0.9	1.7	30.4	1327
12x2x0.5	2	0.6	1.4	0.9	1.7	31.5	1453
16x2x0.5	2	0.6	1.5	1.25	1.8	35.6	1983
20x2x0.5	2	0.6	1.5	1.25	1.8	38.2	2244
24x2x0.5	2	0.6	1.6	1.25	1.9	43.3	2662
0.75mm ²							

Conductor		RE-2X(St)HSWAH PIMF...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
2x2x0.75	2	0.6	1.1	0.9	1.5	19.0	608
3x2x0.75	2	0.6	1.1	0.9	1.5	20.0	682
4x2x0.75	2	0.6	1.2	0.9	1.6	21.9	807
5x2x0.75	2	0.6	1.2	0.9	1.6	23.6	911
8x2x0.75	2	0.6	1.3	0.9	1.6	27.3	1186
10x2x0.75	2	0.6	1.4	1.25	1.7	32.6	1671
12x2x0.75	2	0.6	1.4	1.25	1.7	33.5	1797
16x2x0.75	2	0.6	1.5	1.25	1.8	37.1	2160
20x2x0.75	2	0.6	1.6	1.25	1.9	40.2	2507
24x2x0.75	2	0.6	1.7	1.25	2.0	45.6	2974
1.0mm ²							
2x2x1.0	2	0.6	1.1	0.9	1.5	19.8	652
3x2x1.0	2	0.6	1.2	0.9	1.5	21.0	752
4x2x1.0	2	0.6	1.2	0.9	1.6	22.8	875
5x2x1.0	2	0.6	1.3	0.9	1.6	24.8	1010
8x2x1.0	2	0.6	1.3	0.9	1.7	28.8	1320
10x2x1.0	2	0.6	1.4	1.25	1.7	34.1	1828
12x2x1.0	2	0.6	1.5	1.25	1.8	35.4	2020
16x2x1.0	2	0.6	1.6	1.25	1.9	39.3	2436
20x2x1.0	2	0.6	1.7	1.25	1.9	42.3	2807
24x2x1.0	2	0.6	1.8	1.25	2.0	48.1	3331
1.5mm ²							
2x2x1.5	2	0.6	1.1	0.9	1.5	20.8	712
3x2x1.5	2	0.6	1.2	0.9	1.6	22.2	842
4x2x1.5	2	0.6	1.3	0.9	1.6	24.2	988
5x2x1.5	2	0.6	1.3	1.25	1.7	27.0	1305
8x2x1.5	2	0.6	1.4	1.25	1.7	31.3	1703
10x2x1.5	2	0.6	1.5	1.25	1.8	36.4	2094
12x2x1.5	2	0.6	1.6	1.25	1.9	37.8	2320
16x2x1.5	2	0.6	1.7	1.25	2.0	41.9	2809
20x2x1.5	2	0.6	1.8	1.25	2.0	45.2	3249
24x2x1.5	2	0.6	1.9	1.25	2.1	51.4	3857
2.5mm ²							
2x2x2.5	2	0.7	1.2	0.9	1.6	23.4	875
3x2x2.5	2	0.7	1.3	0.9	1.0	24.8	1029
4x2x2.5	2	0.7	1.4	0.9	1.7	27.2	1232
5x2x2.5	2	0.7	1.5	1.25	1.8	30.6	1639
8x2x2.5	2	0.7	1.6	1.25	1.8	35.5	2162
10x2x2.5	2	0.7	1.7	1.25	2.0	41.6	2684
12x2x2.5	2	0.7	1.8	1.25	2.0	43.0	2958
16x2x2.5	2	0.7	1.9	1.25	2.1	47.7	3602

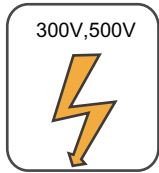


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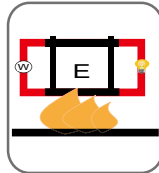
Conductor		RE-2X(St)HSWAH PIMF...CI. FE 180 PH30/PH60					
No. of Pairs X Cross Section	Class of Conductor	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Armour Wire Diameter	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Approx. Weight
mm ²	No./mm	mm	mm	mm	mm	mm	kg/km
20x2x2.5	2	0.7	2.1	1.25	2.2	51.9	4255
24x2x2.5	2	0.7	2.2	1.25	2.4	59.2	5086



Rated Voltage



Standard



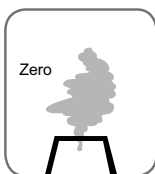
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2



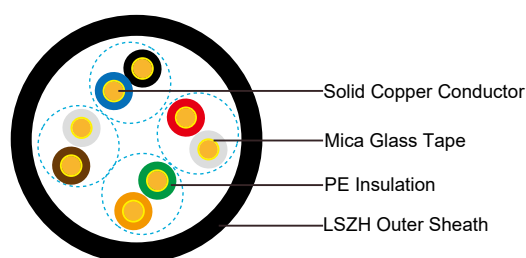
Low Smoke Emission
IEC 61034-2

Fire Resistant CAT5E Data Cables

CAT5E U/UTP4P24

CAT5E F/UTP4P24

CAT5E SF/UTP4P24



APPLICATION

Cat5E is a cable standard for Gigabit Ethernet and other network protocol, suitable for basic voice and data installations up to 100 MHz. In addition, these cables can be offered with copper wire braid armoured & flame retardant outer sheath, providing additional mechanical protection still maintaining the flexibility of the cable.

STANDARDS

Basic design adapted to EN 50173

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

60V

CABLE CONSTRUCTION

Conductors: 24AWG solid bare copper.

Fire Barrier: Mica glass tape.

Insulation: HDPE.

Twinning: Two coloured insulated conductors twisted together to form a pair.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655:section 2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite



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properties can be offered as option.

Cat5E F/UTP: These cables have collective shielding of Aluminium/polyester tape with drain wire.

Cat5E SF/UTP: These cables have double collective shieldings of Aluminium/polyester tape & copper wire braid.

PHYSICAL AND THERMAL PROPERTIES

Temperature range: -30°C - +75°C

Minimum bending radius during installation (mobile state): 8 x Overall Diameter

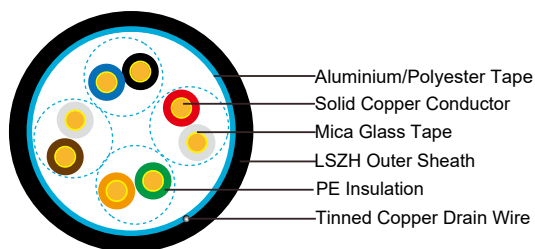
Minimum bending radius during operation (fixed state): 4 x Overall Diameter

ELECTRICAL PROPERTIES

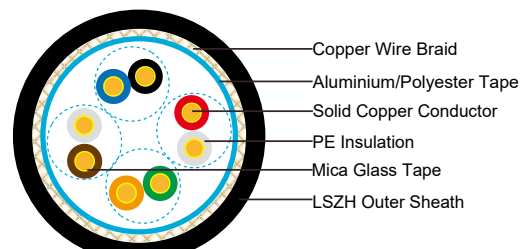
AWG		24
Nominal Conductor Diameter	mm	0.5/0.51/0.53
Maximum DC Resistance@20°C	Ω/100m	9.38
Maximum DCR Unbalance	%	5
Maximum Mutual Capacitance	pF/m	55.8
Maximum Capacitance Unbalance	pF/100m	330
Characteristic Impedance@1-100MHz	Ω	100±15
Maximum Propagation Delay Skew	ns/100m	45

TRANSMISSION PROPERTIES

FREQ MHz	Maximum Attenuation dB/100m	Minimum NEXT dB	Minimum PSNEXT dB	Minimum ELFEXT dB/100m	Minimum PSELFEXT dB/100m	Minimum RL dB
0.772	1.8	67.0	64.0	66.0	63.0	—
1	2.0	65.3	62.3	63.8	60.8	20.0
4	4.1	56.3	53.3	51.7	48.7	23.0
8	5.8	51.8	48.8	45.7	42.7	24.5
10	6.5	50.3	47.3	43.8	40.8	25.0
16	8.2	47.3	44.3	39.7	36.7	25.0
20	9.3	45.8	42.8	37.7	34.7	25.0
25	10.4	44.3	41.3	35.8	32.8	24.3
31.25	11.7	42.9	39.9	33.9	30.9	23.6
62.5	17.0	38.4	35.4	27.8	24.8	21.5
100	22.0	35.3	32.3	23.8	20.8	20.1



F/UTP CAT5E



SF/UTP CAT5E

CONSTRUCTION PARAMETERS

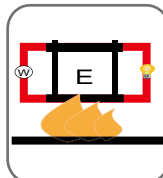
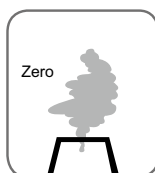
Cable Code	Conductor Diameter	Diameter Over Insulation	Pairs	Screen	Nominal Overall Diameter
	mm	mm			mm
Cat5E U/UTP4P24	0.50/0.51	0.91	4	Nil	5.1
Cat5E F/UTP4P24	0.53	1.00	4	Overall Aluminum Tape Screen	6.3
Cat5E SF/UTP4P24	0.53	1.00	4	Overall Aluminum Tape Screen & Copper Wire Braid	6.6



Rated Voltage



Standard

Circuit Integrity
IEC 60331-21/BS 6387Flame Retardancy
BS EN 60332-1-2Reduced Fire Propagation
EN 60332-3-24Halogen Free
IEC 60754-1Low Corrosivity
IEC 60754-2Low Smoke Emission
IEC 61034-2



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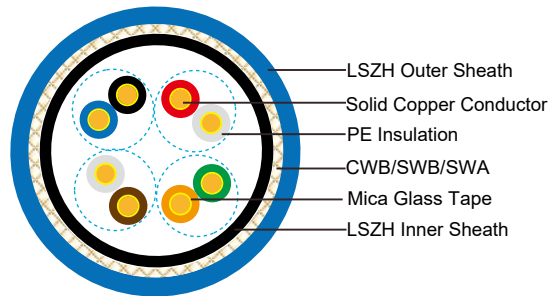
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Fire Resistant CAT5E CWB/SWB/SWA Armoured Data Cables

CAT5E U/UTP4P24 CWB/SWB/SWA

CAT5E F/UTP4P24 CWB/SWB/SWA

CAT5E SF/FTP4P24 CWB/SWB/SWA



APPLICATION

Cat5E is a cable standard for Gigabit Ethernet and other network protocol, suitable for basic voice and data installations up to 100 MHz. In addition, these cables can be offered with copper wire braid armoured & flame retardant outer sheath, providing additional mechanical protection still maintaining the flexibility of the cable.

STANDARDS

Basic design adapted to EN 50173

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

60V

CABLE CONSTRUCTION

Conductors: 24AWG solid bare copper.

Fire Barrier: Mica glass tape.

Insulation: HDPE.

Twinning: Two coloured insulated conductors twisted together to form a pair.

Inner Sheath: Thermoplastic LSZH compound.

Armouring:

cwb: Copper Wire Braid

swb: Steel Wire Braid

swa: Steel Wire Armour

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655:section 2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option. Compliance to fire performance standard (IEC 60332-1, IEC 60332-3, UL 1581, UL 1666 etc) depends on the oxygen index of the PVC compound and the overall cable design. LSPVC can also be provided upon request.

Cat5E F/UTP: These cables have collective shielding of Aluminium/polyester tape with drain wire.

Cat5E SF/UTP: These cables have double collective shieldings of Aluminium/polyester tape & copper wire braid.

PHYSICAL AND THERMAL PROPERTIES

Temperature range: -30°C - +75°C

Minimum bending radius during installation (mobile state): 8 x Overall Diameter

Minimum bending radius during operation (fixed state): 4 x Overall Diameter

ELECTRICAL PROPERTIES

AWG		24
Nominal Conductor Diameter	mm	0.50/0.53
Maximum DC Resistance@20°C	Ω/100m	9.38
Maximum DCR Unbalance	%	5
Maximum Mutual Capacitance	pF/m	55.8
Maximum Capacitance Unbalance	pF/100m	330
Characteristic Impedance@1-100MHz	Ω	100+/-15
Maximum Propagation Delay Skew	ns/100m	45

TRANSMISSION PROPERTIES

FREQ MHz	Maximum Attenuation dB/100m	Minimum NEXT dB	Minimum PSNEXT dB	Minimum ELFEXT dB/100m	Minimum PSELFEXT dB/100m	Minimum RL dB
0.772	1.8	67.0	64.0	66.0	63.0	—
1	2.0	65.3	62.3	63.8	60.8	20.0
4	4.1	56.3	53.3	51.7	48.7	23.0
8	5.8	51.8	48.8	45.7	42.7	24.5
10	6.5	50.3	47.3	43.8	40.8	25.0
16	8.2	47.3	44.3	39.7	36.7	25.0
20	9.3	45.8	42.8	37.7	34.7	25.0
25	10.4	44.3	41.3	35.8	32.8	24.3
31.25	11.7	42.9	39.9	33.9	30.9	23.6

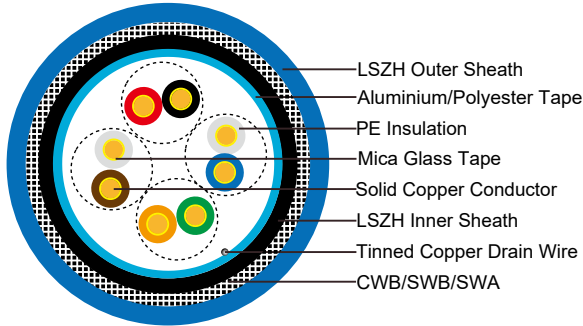


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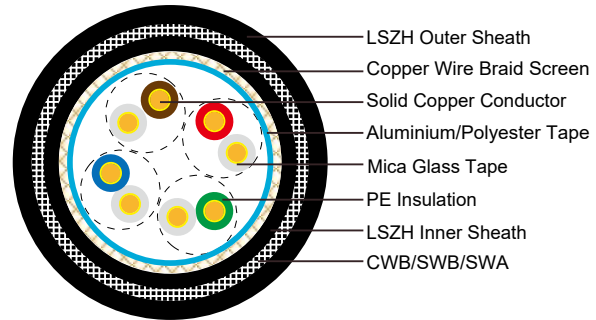
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FREQ MHz	Maximum Attenuation dB/100m	Minimum NEXT dB	Minimum PSNEXT dB	Minimum ELFEXT dB/100m	Minimum PSELFEXT dB/100m	Minimum RL dB
62.5	17.0	38.4	35.4	27.8	24.8	21.5
100	22.0	35.3	32.3	23.8	20.8	20.1



F/UTP CAT5E



SF/UTP CAT5E

CONSTRUCTION PARAMETERS

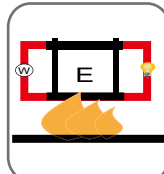
Cable Code	Construction No. of elements×No. of cores in element ×Conductor diameter	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Nominal Weight
	mm	mm	mm	mm	mm	kg/km
CAT5e U/UTP4P24 CWB	4×2×0.5	0.2	0.6	1.0	7.68	97
CAT5e U/UTP4P24 SWB	4×2×0.5	0.2	0.6	1.0	7.68	93
CAT5e U/UTP4P24 SWA	4×2×0.5	0.2	0.6	1.0	8.68	165
CAT5e F/UTP4P24 CWB	4×2×0.53	0.2	0.6	1.0	8.28	116
CAT5e F/UTP4P24 SWB	4×2×0.53	0.2	0.6	1.0	8.28	112
CAT5e F/UTP4P24 SWA	4×2×0.53	0.2	0.6	1.0	9.28	192
CAT5e SF/UTP4P24 CWB	4×2×0.53	0.2	0.6	1.0	8.76	123
CAT5e SF/UTP4P24 SWB	4×2×0.53	0.2	0.6	1.0	8.76	119
CAT5e SF/UTP4P24 SWA	4×2×0.53	0.2	0.6	1.0	9.76	216



Rated Voltage



Standard



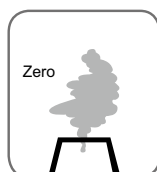
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2



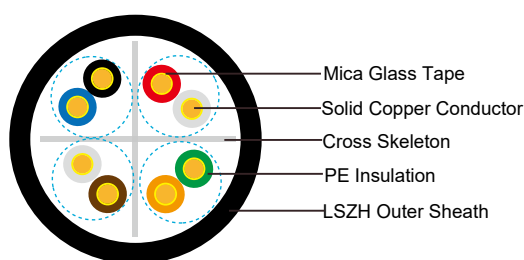
Low Smoke Emission
IEC 61034-2

Fire Resistant CAT6 Data Cables

CAT6 U/UTP4P23

CAT6 F/UTP4P23

CAT6 SF/FTP4P23



APPLICATION

Cat6 Cable is a cable standard for Gigabit Ethernet and other network protocol, suitable for 10BaseT, 100BaseTx & 1000BaseT (Gigabit Ethernet) application. In addition, these cables can be offered with copper wire braid armoured & flame retardant outer sheath, providing additional mechanical protection still maintaining the flexibility of the cable.

STANDARDS

Basic design adapted to EN 50173

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

60V

CABLE CONSTRUCTION

Conductors: 23AWG solid bare copper.

Fire Barrier: Mica glass tape.

Insulation: HDPE.

Twinning: Two coloured insulated conductors twisted together to form a pair.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655:section 2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite



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properties can be offered as option.

Cat6 F/UTP: These cables have collective shielding of Aluminium/polyester tape with drain wire.

Cat6 SF/UTP: These cables have double collective shieldings of Aluminium/polyester tape & copper wire braid with drain wire.

PHYSICAL AND THERMAL PROPERTIES

Temperature range: -30°C - +75°C

Minimum bending radius during installation (mobile state): 8 x Overall Diameter

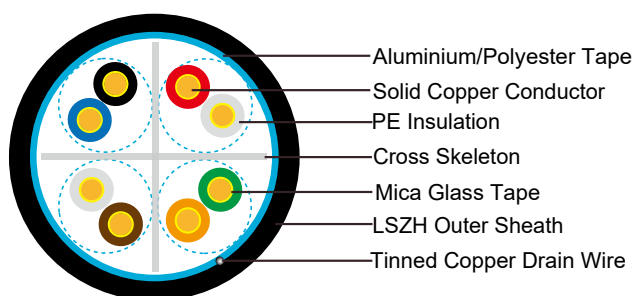
Minimum bending radius during operation (fixed state): 4 x Overall Diameter

ELECTRICAL PROPERTIES

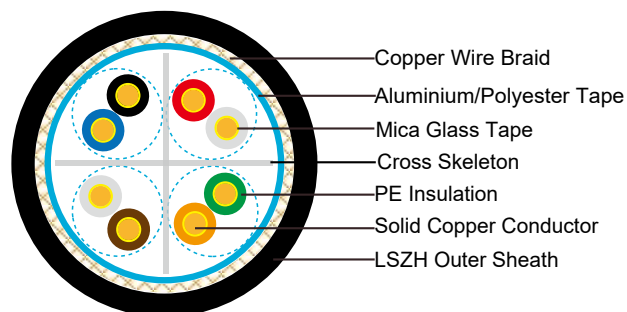
AWG		23
Nominal Conductor Diameter	mm	0.56/0.57/0.58
Maximum DC Resistance@20°C	Ω/100m	9.38
Maximum DCR Unbalance	%	3
Maximum Mutual Capacitance	pF/m	5.8
Maximum Capacitance Unbalance	pF/100m	30
Characteristic Impedance@1-100MHz	Ω	100+/-15
Maximum Propagation Delay Skew	ns/100m	18

TRANSMISSION PROPERTIES

FREQ MHz	Maximum Attenuation dB/100m	Minimum NEXT dB	Minimum PSNEXT dB	Minimum ELFEXT dB/100m	Minimum PSELFEXT dB/100m	Minimum RL dB
0.772	1.8	76.0	74.	70.0	67.0	—
1	2.0	74.3	72.3	67.8	64.8	20.0
4	3.8	65.3	63.3	55.7	52.7	23.0
8	5.3	60.8	58.8	49.7	46.7	24.5
10	6.0	59.3	57.3	47.8	44.8	25.0
16	7.6	56.3	54.3	43.7	40.7	25.0
20	8.5	54.8	52.8	41.7	38.7	25.0
25	9.5	53.3	51.3	39.8	36.8	24.3
31.25	10.7	51.9	49.9	37.9	34.9	23.6
62.5	15.4	47.4	45.4	31.8	28.8	21.5
100	19.8	44.3	42.3	27.8	24.8	20.1
155	25.2	41.5	39.5	23.9	20.9	18.8
200	29.0	39.8	37.8	21.7	18.7	18.0
250	32.8	38.3	36.3	19.8	16.8	17.3



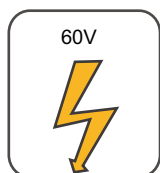
F/UTP CAT6



SF/UTP CAT6

CONSTRUCTION PARAMETERS

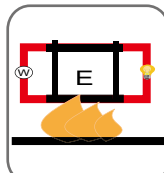
Cable Code	Conductor Diameter	Diameter Over Insulation	Pairs	Screen	Overall Diameter
	mm	mm			mm
Cat6 U/UTP4P23	0.56/0.57	1.02	4	Nil	6.0
Cat6 F/UTP4P23	0.57/0.58	1.02	4	Overall Aluminum Tape Screen	6.3
Cat6 SF/UTP4P23	0.57/0.58	1.02	4	Overall Aluminum Tape Screen & Copper Wire Braid	6.6



Rated Voltage



Standard



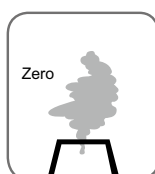
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2



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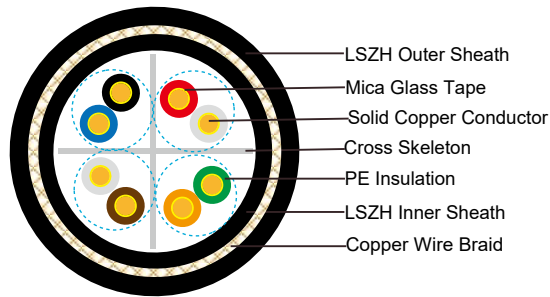
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Fire Resistant CAT6 CWB/SWB/SWA Armoured Data Cables

CAT6 U/UTP4P23 CWB/SWB/SWA

CAT6 F/UTP4P23 CWB/SWB/SWA

CAT6 SF/UTP4P23 CWB/SWB/SWA



APPLICATION

Cat6 Cable is a cable standard for Gigabit Ethernet and other network protocol, suitable for 10BaseT, 100BaseTx & 1000BaseT (Gigabit Ethernet) application. In addition, these cables can be offered with copper wire braid armoured & flame retardant outer sheath, providing additional mechanical protection still maintaining the flexibility of the cable.

STANDARDS

Basic design adapted to EN 50173

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

VOLTAGE RATING

60V

CABLE CONSTRUCTION

Conductors: 23AWG solid bare copper.

Fire Barrier: Mica glass tape.

Insulation: HDPE .

Twinning: Two coloured insulated conductors twisted together to form a pair.

Inner Sheath: Thermoplastic LSZH compound, coloured black.

Armouring:

cwb: Copper Wire Braid

swb: Steel Wire Braid

swa: Steel Wire Armour

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655:section 2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

Cat6 F/UTP: These cables have collective shielding of Aluminium/polyester tape with drain wire.

Cat6 SF/UTP: These cables have double collective shieldings of Aluminium/polyester tape & copper wire braid.

PHYSICAL AND THERMAL PROPERTIES

Temperature range: -30°C - +75°C

Minimum bending radius during installation (mobile state): 8 x Overall Diameter

Minimum bending radius during operation (fixed state): 4 x Overall Diameter

ELECTRICAL PROPERTIES

AWG		23
Nominal Conductor Diameter	mm	0.56/0.57/0.58
Maximum DC Resistance@20°C	Ω/100m	9.38
Maximum DCR Unbalance	%	3
Maximum Mutual Capacitance	pF/m	5.8
Maximum Capacitance Unbalance	pF/100m	30
Characteristic Impedance@1-100MHz	Ω	100+/-15
Maximum Propagation Delay Skew	ns/100m	18

TRANSMISSION PROPERTIES

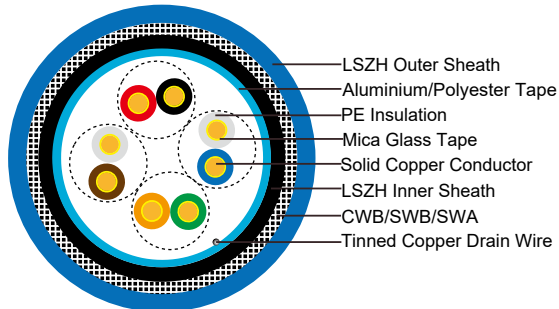
FREQ MHz	Maximum Attenuation dB/100m	Minimum NEXT dB	Minimum PSNEXT dB	Minimum ELFEXT dB/100m	Minimum PSELFEXT dB/100m	Minimum RL dB
0.772	1.8	76.0	74.0	70.0	67.0	—
1	2.0	74.3	72.3	67.8	64.8	20.0
4	3.8	65.3	63.3	55.7	52.7	23.0
8	5.3	60.8	58.8	49.7	46.7	24.5
10	6.0	59.3	57.3	47.8	44.8	25.0
16	7.6	56.3	54.3	43.7	40.7	25.0
20	8.5	54.8	52.8	41.7	38.7	25.0
25	9.5	53.3	51.3	39.8	36.8	24.3
31.25	10.7	51.9	49.9	37.9	34.9	23.6
62.5	15.4	47.4	45.4	31.8	28.8	21.5
100	19.8	44.3	42.3	27.8	24.8	20.1
155	25.2	41.5	39.5	23.9	20.9	18.8
200	29.0	39.8	37.8	21.7	18.7	18.0
250	32.8	38.3	36.3	19.8	16.8	17.3



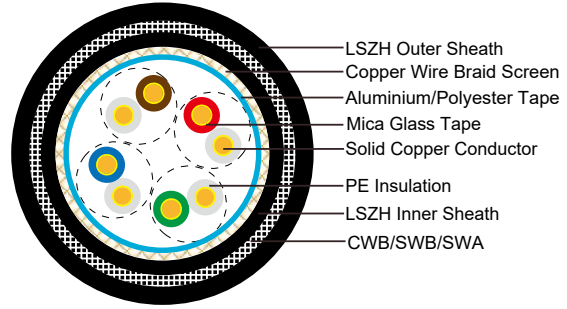
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F/UTP CAT6



SF/UTP CAT6

CONSTRUCTION PARAMETERS

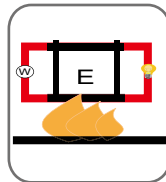
Cable Code	Construction No. of elements×No. of cores in element×Conductor diameter	Nominal Insulation Thickness	Nominal Inner Sheath Thickness	Nominal Outer Sheath Thickness	Nominal Overall Diameter	Nominal Weight
	mm					
CAT6 U/UTP4P23 CWB	4×2×0.56/0.57	0.2	0.6	1.0	7.88	115
CAT6 U/UTP4P23 SWB	4×2×0.56/0.57	0.2	0.6	1.0	7.88	109
CAT6 U/UTP4P23 SWA	4×2×0.56/0.57	0.2	0.6	1.0	8.88	189
CAT6 F/UTP4P23 CWB	4×2×0.57/0.58	0.2	0.6	1.0	8.48	126
CAT6 F/UTP4P23 SWB	4×2×0.57/0.58	0.2	0.6	1.0	8.48	132
CAT6 F/UTP4P23 SWA	4×2×0.57/0.58	0.2	0.6	1.0	9.48	213
CAT6 SF/UTP4P23 CWB	4×2×0.57/0.58	0.2	0.6	1.0	8.96	154
CAT6 SF/UTP4P23 SWB	4×2×0.57/0.58	0.2	0.6	1.0	8.96	148
CAT6 SF/UTP4P23 SWA	4×2×0.57/0.58	0.2	0.6	1.0	9.96	242



Rated Voltage



Standard



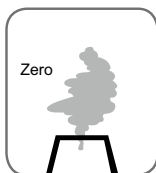
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1

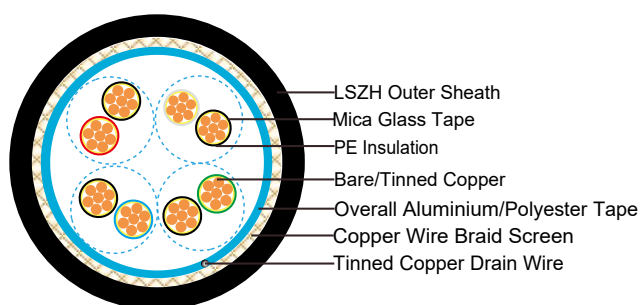


Low Corrosivity
IEC 60754-2



Low Smoke Emission
IEC 61034-2

Fire Resistant RS 485 Databus Cables



APPLICATION

U/UTP CAT6

The cables are designed for RS 485 data connections where continued functionality is required during a fire situation. This cable combines low capacitance insulation with one of the highest levels of screening to provide high speed, interference free, data transmission where continued functionality is required during a fire situation.

STANDARDS

Basic design adapted to EIA/TIA 485

FIRE PERFORMANCE

Circuit Integrity	IEC 60331-21; BS 6387
Flame Retardance (Single vertical wire or cable test)	IEC 60332-1-2; EN 60332-1-2
Halogen Free	IEC 60754-1; EN 50267-2-1
No Corrosive Gas Emission	IEC 60754-2; EN 50267-2-2
Minimum Smoke Emission	IEC 61034-2; EN 61034-2

CABLE CONSTRUCTION

Multipair RS 485 Overall Screened Databus Cable

Conductors: Tinned copper wire, stranded according to IEC 60228 class 2.

Fire Barrier: Mica glass tape.

Insulation: Foam PE or foam skin PE.

Cabling Elements: Insulated cores are twisted to form pairs with varying lay length to minimize crosstalk. Two pair cable had four cores laid in quad formation.

Cabling: Pairs are cabled together in concentric layers.

Overall screen: Aluminum/polyester tape with tinned copper drain wire.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).



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Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

Multipair RS 485 Overall Double Screened Databus Cable

Conductors: Tinned copper wire, stranded according to IEC 60228 class 2.

Insulation: Foam PE or foam skin PE.

Cabling Elements: Insulated cores are twisted to form pairs with varying lay length to minimize crosstalk. Two pair cable had four cores laid in quad formation.

Cabling: Pairs are cabled together in concentric layers.

Overall screen: Aluminium/polyester tape+copper wire braid.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

MULTIPAIR RS 485 INDIVIDUAL & OVERALL SCREENED DATABUS CABLE

Conductors: Tinned copper wire, stranded according to IEC 60228 class 2.

Insulation: Foam PE or foam skin PE.

Cabling Elements: Insulated cores are twisted to form pairs with varying lay length to minimize crosstalk. Two pair cable had four cores laid in quad formation.

Cabling: Pairs are cabled together in concentric layers.

Individual Screen: Individual aluminium/polyester tape.

Overall Screen: Copper wire braid.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

MULTIPAIR RS 485 OVERALL SCREENED DATABUS CABLE

Conductors: Tinned copper wire, stranded according to IEC 60228 class 2.

Insulation: Foam PE or foam skin PE.

Cabling Elements: Insulated cores are twisted to form pairs with varying lay length to minimize crosstalk. Two pair cable had four cores laid in quad formation.

Cabling: Pairs are cabled together in concentric layers.

Overall Screen: Copper wire braid.

Outer Sheath: Thermoplastic LSZH compound type LTS3 as per BS 7655-6.1 (Thermosetting LSZH compound type SW2-SW4 as per BS 7655-2.6 can be offered).

Outer Sheath Option: UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option.

PHYSICAL AND THERMAL PROPERTIES

Temperature range during operation (fixed state): -20°C - +90°C

Temperature range during installation (mobile state): -5°C - +60°C

Minimum bending radius: 8 x Overall Diameter

ELECTRICAL PROPERTIES

Dielectric test	1000 V r.m.s. for 5' (core-core)
	1000 V r.m.s. for 5' (core-screen)
Impedance	120Ω
Capacitance	45 nF/km conductor to conductor
	90 nF/km conductor to shield

CONSTRUCTION PARAMETERS

Multipair RS 485 Overall Screened Databus Cable

RE-02Y(St)Y / RE-02YS(St)Y

No. of pair x	Nominal Cross Sectional Area	No./Nominal Diameter of Strands	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
No.	mm ²	No/mm	mm	mm	mm	kg/km
1	0.22	7/0.2	0.7	1.1	6.0	21
2	0.22	7/0.2	0.7	1.1	9.2	42
4	0.22	7/0.2	0.7	1.1	10.7	68
1	0.50	16/0.2	0.7	1.1	6.6	32
2	0.50	16/0.2	0.7	1.1	10.3	68
4	0.50	16/0.2	0.7	1.1	12.2	115
1	0.75	24/0.2	0.7	1.1	7.1	40
2	0.75	24/0.2	0.7	1.1	11.2	84
4	0.75	24/0.2	0.7	1.1	13.3	144
1	1.00	30/0.2	0.7	1.1	7.2	49



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2	1.00	30/0.2	0.7	1.1	11.6	105
4	1.00	30/0.2	0.7	1.1	13.6	182

Multipair RS 485 Overall Double Screened Databus Cable

RE-02Y(St)CY / RE-02YS(St)CY

No. of pair x	Nominal Cross Sectional Area	No./Nominal Diameter of Strands	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
No.	mm ²	No/mm	mm	mm	mm	kg/km
1	0.22	7/0.2	0.7	1.1	6.5	34
2	0.22	7/0.2	0.7	1.1	9.6	67
4	0.22	7/0.2	0.7	1.1	11.2	97
1	0.50	16/0.2	0.7	1.1	7.1	48
2	0.50	16/0.2	0.7	1.1	10.8	97
4	0.50	16/0.2	0.7	1.1	12.7	150
1	0.75	24/0.2	0.7	1.1	7.6	57
2	0.75	24/0.2	0.7	1.1	11.8	116
4	0.75	24/0.2	0.7	1.1	13.8	182
1	1.00	30/0.2	0.7	1.1	7.7	67
2	1.00	30/0.2	0.7	1.1	12.1	138
4	1.00	30/0.2	0.7	1.1	14.2	222

Multipair RS 485 Individual & Overall screened Databus Cable

RE-02Y(St)Y pimf / RE-02YS(St)Y pimf

No. of pair x	Nominal Cross Sectional Area	No./Nominal Diameter of Strands	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
No.	mm ²	No/mm	mm	mm	mm	kg/km
1	0.22	7/0.2	0.7	1.1	6.4	35
2	0.22	7/0.2	0.7	1.1	9.6	69
4	0.22	7/0.2	0.7	1.1	11.2	106
1	0.50	16/0.2	0.7	1.1	7.0	49
2	0.50	16/0.2	0.7	1.1	10.8	100
4	0.50	16/0.2	0.7	1.1	12.7	159
1	0.75	24/0.2	0.7	1.1	7.5	58
2	0.75	24/0.2	0.7	1.1	11.8	119
4	0.75	24/0.2	0.7	1.1	13.6	174
1	1.00	30/0.2	0.7	1.1	7.6	68
2	1.00	30/0.2	0.7	1.1	12.1	142
4	1.00	30/0.2	0.7	1.1	14.2	234

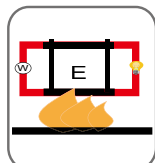
Multipair RS 485 Overall Screened Databus Cable

RE-02YCY / RE-02YSCY

No. of pair x	Nominal Cross Sectional Area	No./Nominal Diameter of Strands	Nominal Insulation Thickness	Nominal Sheath Thickness	Nominal Overall Diameter	Approx. Weight
No.	mm ²	No/mm	mm	mm	mm	kg/km
1	0.22	7/0.2	0.7	1.1	8.4	31
2	0.22	7/0.2	0.7	1.1	11.7	61
4	0.22	7/0.2	0.7	1.1	13.6	91
1	0.50	16/0.2	0.7	1.1	9.0	44
2	0.50	16/0.2	0.7	1.1	12.9	91
4	0.50	16/0.2	0.7	1.1	15.1	142
1	0.75	24/0.2	0.7	1.1	9.5	53
2	0.75	24/0.2	0.7	1.1	13.9	109
4	0.75	24/0.2	0.7	1.1	16.0	174
1	1.00	30/0.2	0.7	1.1	9.6	63
2	1.00	30/0.2	0.7	1.1	14.2	131
4	1.00	30/0.2	0.7	1.1	16.6	213



Standard



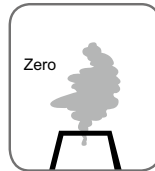
Circuit Integrity
IEC 60331-21/BS 6387



Flame Retardancy
BS EN 60332-1-2



Reduced Fire Propagation
EN 60332-3-24



Halogen Free
IEC 60754-1



Low Corrosivity
IEC 60754-2

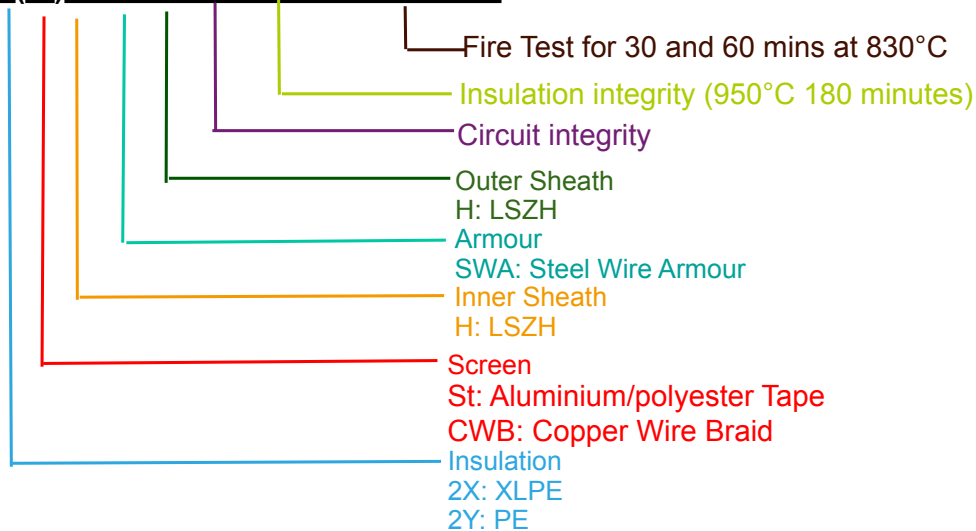


Low Smoke Emission
IEC 61034-2



TYPE CODES

RE-2X(St)HSAWAH...CI. FE 180 PH30/PH60



EN 50288-7 COLOUR CODE

Unless otherwise specified e.g. by means of numbered cores or tapes, the coding for identification shall be given in IEC 60189-2 or EN 60708, as appropriate. The colours shall meet the requirements of 4.4 of EN 50288-1.

Coloured or numbered non-hygroscopic binder tapes may be applied over screened cabling elements as identification.

4.4 OF EN 50288-1:

When required, the insulated conductors shall be identified by colours and/or additional ring markings and/or symbols achieved by the use of coloured insulation or by a coloured surface using extrusion, printing or painting. Colours shall be clearly identifiable and shall correspond reasonably with the standard colours shown in HD 402.

The colour(s) or the symbol used for core identification shall be durable such that it cannot be removed when tested to EN 50289-3-8.

Technical Information for Fire Properties

FLAME RETARDANCE IN ACCORDANCE WITH DIFFERENT STANDARDS

The following standards specify a method for flame propagation test for single core cables. The single cable sample undergoes the flame action of a bunsen burner. The test only lasts few minutes.

The IEC 60332-1 standards are taken over as EN standards and transferred to national standards Example: IEC 60332-1 becomes EN 60332-1 and introduced in Germany as DIN EN 60332-1.

Flame retardance in accordance with EN 60332:2004

EN 60332:2004 Tests on electrical and optical cables under fire conditions. The standard applies to single insulated wires (cables) and requires a vertical flame test with a maximum flame climb of 450mm. The test lasts between 1 and 8 minutes, depending on the cable diameter.

EN 60332-1-1:2004 / BS EN 60332-1-1:2004 / IEC 60332-1-1:2004 / DIN EN 60332-1-1:2004 / VDE 0482-1-1:2005-06 Test on electrical and optical cables under fire conditions. Test for a vertical flame propagation for a single insulated wire or cables.

EN 60332-1-2:2004 / BS EN 60332-1-2:2004 / IEC 60332-1-2:2004 / DIN EN 60332-1-2:2004 / VDE 0482-1-2:2005-06 / CEI 60332-1-2(CEI 20-35/1-2) Tests on electrical and optical fiber cables under fire conditions. Test for a vertical flame propagation for a single insulated wire or cable – Procedure for 1kW premixed flame.



This standard specifies a method of test for resistance to vertical flame propagation for a single insulated wire or cable. Part 1-1 specifies the test apparatus and Part 1-2 specifies the test procedure.

The cable sample is deemed to pass the test if the distance between the lower edge of the top support and the onset of charring is greater than 50mm. In addition, a failure shall be recorded if burning extends downward to a point greater than 540mm from the lower edge of the top support.

EN 60332-1-2:2004 specifies the use of 1kW premix flame and is for general use, except that the procedure may not be suitable for the testing of small insulated conductors or cables of less than 0.5mm sq cross section because the conductor melts before the test is completed, or for the testing of small optic fiber cables because the fiber will be broken before the test is completed. In this case, the procedure given by EN 60332-2-1/2 is recommended.



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EN 60332-2-1:2004 / BS EN 60332-2-1:2004 / IEC 60332-2-1:2004 / DIN EN 60332-2-1:2004 / VDE 0482-2-1:2005-06 Tests on electrical and optical cables under fire conditions. Test for a vertical flame propagation for a single small insulated wire or cable.

EN 60332-2-2:2004 / BS EN 60332-2-2:2004 / IEC60332-2-2:2004 / DIN EN 60332-2-2:2004 / VDE 0482-2-2:2005-06 / CEI 60332-2-2 (CEI 20-35/2-2) Test on electric and optical fiber cables under fire conditions. Tests for vertical flame propagation for a single small insulated wire or cable. Procedure for diffusion flame. This test applies to small dimensions cables.

This standard specifies a method of test for resistance to vertical flame propagation for a single insulated wire or cable. Part 2-1 specifies the test apparatus and Part 2-2 specifies the test procedure.

Flame retardance in accordance with NF C32-070-2.1(C2)

NF C32-070:2001 Insulated conductors and cables for installation - Classification tests on conductors and cables with regard to fire behavior.

NF C32-070 2.1 Procedure for 1 kW pre-mixed flame.

The NF F 32070 2.1 (Category C2) and IEC 60332-1-2 are very similar. The sole difference is the time during which the flame is applied.

Flame retardance in accordance with EN 50265-1:1999 (replaced by EN 60332)

EN 50265-1:1999 / BS EN 50265-1:1999 / DIN EN 50265-1:1999 / VDE 0482-265-1:1999-04 – Common test methods for cables under fire conditions. Test for resistance to a vertical flame propagation for a single insulated conductor or cable. Apparatus (Replaced by EN 60332-1-1:2004 and EN 60332-2-1:2004).

EN 50265-2-1:1999 / BS EN 50265-2-1:1999 / DIN EN 50265-2-1:1999 / VDE 0482-265-2-1:1999-04 – Common test methods for cables under fire conditions. Test for resistance to a vertical flame propagation for a single insulated conductor or cable. Part 2-1: Procedure 1kW pre-mixed flame (Replaced by EN 60332-1-2:2004).

EN 50265-2-2:1999 / BS EN 50265-2-2:1999 / DIN EN 50265-2-2:1999 / VDE 0482-265-2-2:1999-04 – Common test methods for cables under fire conditions. Test for resistance to a vertical flame propagation for a single insulated conductor or cable. Part 2-2: Procedure Diffusion flame (Replaced by EN 60332-2-2:2004).

Flame retardance in accordance with BS 4066 Part 1 & 2 (replaced by EN 60332)

BS 4066-2:1980 (superseded) – Tests on electric cables under fire conditions. Method of test on a single vertical insulated wire or cable.

This standard is no longer in force and is replaced by BS EN 50265-2-1 which was also superseded by BS EN 60332-1:2009.

Flame retardance in accordance with NBN C 30-004 (cat. F1)

NBN C 32-004 specifies a method of test for measuring the vertical flame propagation characteristics of a single wire or cable. The cable specimen is deemed to have passed the test and categorized as F1 if after burning has ceased, the charred or affected portion does not reach within 50mm of the lower edge of the top clamp which is equivalent to 425mm above the point of flame application.

Flame retardance in accordance with IEEE 383

In the IEEE 383 test, cables are supported by a one foot wide vertical rack eight feet high. The cables are positioned in the centre six inches of the rack, spaced one-half diameter apart. The rack is centered in an eight foot enclosure. A ten inch ribbon burner ignites the cable with a 21 kW (70000 BTU). The burner is positioned 2 feet above the floor and 9 to 12 inches of cables are exposed to direct flames for 20 minutes. Cables on which flame extends above the top of the 8 foot rack fail the test.

REDUCED FIRE PROPAGATION IN ACCORDANCE WITH DIFFERENT STANDARDS

These standards specify a method for fire propagation test for vertically mounted bunched cables. These tests simulate the chimney effect in vertical installation of bunch of cables. A certain number of cable sections with a length of 3.5 m is fastened to a vertical ladder in an adapted chamber. The amount of combustible materials for cables and duration of flame application depends on the category the cable has to meet.

Resistance of the wires bundle arranged vertically to the spread of the flame should be such that after a certain time and stopping the source of ignition, flame is extinguished by itself and the length of charred fragments will not exceed 2.5 m in height measured above the lower edge of the burner.



Reduced fire propagation in accordance with IEC 60332-3

This test is the most common one to verify the behaviour of a cables for the fire propagation. The cables are installed on a bunch of vertical ladder inside a metal cabinet and undergo the action of a ribbon flame at 750°C. The standard is subdivided in several parts that differ one from the other for the quantity of cable to be installed, the installation mode and the flame application time.



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0482-332-3-10:2010-08 – Common test methods for cables under fire conditions. Tests on electric and optical fiber cables under fire conditions - Part 3-10: Test for vertical flame spread of vertically mounted bunched wires or cables.

EN 60332-3-21:2009 / BS EN 60332-3-21:2009 / IEC 60332-3-21 ed1.1 / DIN EN 60332-3-21 / VDE 0482-332-3-21:2010-08 / CEI EN 60332-3-21:2009 (CEI 20-22/3-1)– Procedures. Tests on electric and optical fiber cables under fire conditions - Part 3-21: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category A . F/R

-Installation In one layer (front).

-Installation In two layers (front and rear)

-The quantity of the Installed cable is equal to 7 litres/m of combustible materials for cables

-The time of application of the flame is 40 minutes

EN 60332-3-22:2009 / BS EN 60332-3-22:2009 / IEC 60332-3-22 ed1.1 / DIN EN 60332-3-22:2009 / VDE 0482-332-3-22:2010-08 / CEI EN 60332-3-22:2009 (CEI 20-22/3-2)– Procedures. Tests on electric and optical fiber cables under fire conditions - Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cable - Category A

-Installation In one layer (front).

-The quantity of the installed cable is equal to 7 litres/m of combustible materials for cables

-The time of application of the flame is 40 minutes

EN 60332-3-23:2009 / BS EN 60332-3-23:2009 / IEC 60332-3-23 ed1.1 / DIN EN 60332-3-23:2009 / VDE 0482-332-3-23:2010-08 / CEI EN 60332-3-23:2009 (CEI 20-22/3-3)– Procedures. Tests on electric and optical fiber cables under fire conditions - Part 3-23: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category B

-Installation In one layer (front).

-The quantity of the installed cable is equal to 3.5 litres/m of combustible materials for cables

-The time of application of the flame is 40 minutes

EN 60332-3-24:2009 / BS EN 60332-3-24:2009 / IEC 60332-3-24 ed1.1 / DIN EN 60332-3-24:2009 / VDE 0482-332-3-24:2010-08 / CEI EN 60332-3-24:2009 (CEI 20-22/3-4) – Procedures. Tests on electric and optical fiber cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted



bunched wires or cables - Category C

-Installation In one layer (front).

-The quantity of the installed cable is equal to 1.5 litres/m of combustible materials for cables

-The time of application of the flame is 20 minutes

EN 60332-3-25:2009 / BS EN 60332-3-25:2009 / IEC 60332-3-25 ed1.1 / DIN EN 60332-3-25: 2009 / VDE 0482-332-3-25:2010-08 / CEI EN 60332-3-25:2009 (CEI 20-22/3-5)– Procedures. Tests on electric and optical fiber cables under fire conditions - Part 3-25: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category D

-Installation In one layer (front).

-The quantity of the installed cable is equal to 0.5 litres/m of combustible materials for cables

-The time of application of the flame is 20 minutes.

Summary of test condition:

IEC	60332-3-21	60332-3-22			60332-3-23		60332-3-24		60332-3-25	
BS EN 50266	50266-2-1	50266-2-2			50266-2-3		50266-2-4		50266-2-5	
CEI	20-22/3-1	20-22/3-2			20-22/3-3		20-22/3-4		20-22/3-5	
Category	AF/R	A			B		C		D	
Conductor cross-sections mm ²	>35	>35	≤35		>35	≤35	>35	≤35	>35	≤35
NMV(litres per metre of cable)	7	7			3.5		1.5		0.5	
Minimum length of test pieces(m)	3.5	3.5			3.5		3.5		3.5	
Standard ladder (500 mm wide): • number of layers • maximum width of test sample	1front+1rear 300mm	≥1front 300mm	1front 300mm	- -	≥1front 300mm	1front 300mm	≥1front 300mm	1front 300mm	≥1front 300mm	
Wide ladder (800 mm wide): • number of layers • maximum width of test sample	- -	- -	- -	1front 600mm	- -	- -	- -	- -	- -	
Positioning of test pieces	Spaced 0.5×Diameter cable (Max.20mm)	Touching	Spaced 0.5×Diameter cable (Max.20mm)		Touching	Spaced 0.5×Diameter cable (Max.20mm)	Touching	Spaced 0.5×Diameter cable (Max.20mm)	Touching	
Number of burners	1	1	1	2	1		1		1	
Ladder mounting	Front and rear	Front, Wider ladder for larger cables			Front		Front		Front	
Flame application time(min)	40	40	40		40		40		40	



Test conditions	Wind speed: <8 m/s; Temperature: 5°C - +40°C
Extent of the charred portion	≤2.5m above the bottom edge of the burner, neither at the front nor at the rear of the ladder.

Reduced fire propagation in accordance with NF C32-070-2.2(C1)

NF C32-070 :2001 Insulated conductors and cables for installation.

-Classification tests on conductors and cables with regard to fire behavior.

A 1600mm vertically installed bundled of cable is exposed to the effects of a radiating oven (approx 830°C) and forced ventilation. Pilot flames arranged above the oven burn off the emitted gases. The test duration is 30 minutes, with the ventilation stopped for every 10 minutes during the flame application period. The cable sample is classified under Category C1 according to NF F 32070-2.2 if the carbonised part of the cable sample does not extend more than 0.8m above the upper base of the oven.

Depending on the damaged length, they can be further classified into 4 classes A, B, C and D according to NF F 16-101 as follows:

Category	Test Result
A	No damaged length from top of the oven in upper position.
B	Damaged length from top of oven in upper position not extending more than 50mm.
C	Damaged length from top of oven in upper position not extending more than 300mm.
D	Damaged length from top of oven in upper position not extending above the top of the chimney.

Reduced fire propagation in accordance to EN 50266-1, EN 50266-2-2, EN 50266-2-3, EN 50266-2-4.

EN 50266-1:2001 / BS EN 50266-1:2001 / DIN EN 50266-1:2001 / VDE 0482-266-1:2001-09– Common test methods for cables under fire conditions. Test for vertical flame spread of vertically mounted bunched wires or cables - Part 1: Apparatus (Replaced by EN 60332-3-10:2009).

EN 50266-2-1:2001 / BS EN 50266-2-1:2001 / DIN EN 50266-2-1:2001 / VDE 0482-266-2-1:2001-09 / CEI EN 50266-2-1– Common test methods for cables under fire conditions. Test for vertical flame spread of vertically mounted bunched wires or cables - Part 2-1 : Procedures. Category A F/R (Replaced by EN 60332-3-21:2009).

EN 50266-2-2:2001 / BS EN 50266-2-2:2001 / DIN EN 50266-2-2:2001 / VDE 0482-266-2-2:2001-09 / CEI EN 50266-2-2– Common test methods for cables under fire conditions. Test for vertical flame spread of vertically mounted bunched wires or cables. - Part 2-2: Procedures. Category A (Replaced by EN 60332-3-22:2009).



EN 50266-2-3:2001 / BS EN 50266-2-3:2001 / DIN EN 50266-2-3:2001 / VDE 0482-266-2-3:2001-09 / CEI

EN 50266-2-1– Common test methods for cables under fire conditions. Test for vertical flame spread of vertically mounted bunched wires or cables

- Part 2-3: Procedures. Category B (Replaced by EN 60332-3-23:2009).

EN 50266-2-4:2001 / BS EN 50266-2-4:2001 / DIN EN 50266-2-4:2001 / VDE 0482-266-2-4:2001-09 / CEI EN 50266-2-4:2001 – Common test methods for cables under fire conditions. Test for vertical flame spread of vertically mounted bunched wires or cables - Part 2-4: Procedures. Category C (Replaced by EN 60332-3-24:2009).

Reduced fire propagation in accordance with BS 4066-3

BS 4066-3:1994 (superseded) – Tests on electric cables under fire conditions. Tests on bunched wires or cables.

This standard is no longer in force and is replaced by the BS EN 50266-1:2001.

Reduced fire propagation in accordance with NBN C 32-004 (F2)

NBN C 32-004 specifies a method of test for measuring the vertical flame propagation characteristics of a bunch of cables. The cable specimen is deemed to have passed the test and categorized as F2 if after burning has ceased, the extent of charred or affected portion does not reach a height exceeding 2.5m above the bottom edge of the burner.

HALOGEN CONTENT TEST IN ACCORDANCE With DIFFERENT STANDARDS

In the event of a fire, many fumes are produced. This test is concerned with the possibilities of corrosive acid gases being released from halogen containing cables and the damage such cables can cause (to equipments). These standards specify a method for determination of the amount of halogen acid gas, evolved during combustion of compound.



Halogen content test in accordance with EN 50267-2-1

EN 50267-2-1:1998 / BS EN 50267-2-1:1999 / DIN EN 50267-2-1: 1999 / VDE 0482-267-2-1:1999-04 / CEI EN 50267-2-1:1999 (CEI 20-37/2-1) Common test methods for cables under fire conditions- Test on gases evolved during combustion of materials from cables- Part 2-1: Procedures. Determination of the amount of halogen acid gas. This part of the standard defines the method to measure the amount of halogen acid evolved and which should be expressed in hydrochloric acid. The amount of halogen acid contained in the test solution is determined by a titration method.

If the cables are described as zero halogen or halogen free, it is recommended that the hydrochloric acid yield should be less than 0.5%.



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Halogen content test in accordance with IEC 60754-1

IEC 60754-1 ed 2.0 Common test methods for cables under fire conditions. Test on gases evolved during combustion of materials from cables. Part 1: Procedures. Determination of the amount of halogen acid gas. Basically, this is same as EN 50267-2-1.

Halogen content test in accordance with BS 6425-1

BS 6425-1:1990(superseded): Test on gases evolved during the combustion of materials from cables. Method for determination of amount of halogen acid gas evolved during combustion of polymeric materials taken from cables.

This standard is no longer in force and is replaced by the EN 50267-2-1.

ACID GAS EMISSION TEST IN ACCORDANCE WITH DIFFERENT STANDARDS

The following standards specify a method for determination of acidity of gas evolved during combustion of cables by measuring PH and conductivity. This test allows to determine the corrosivity of the acid gases generally halogens, that develop during the electric cable combustion.

Acid gas emission test in accordance with EN 50267-2-2

EN 50267-2-2:1999 / BS EN 50267-2-2:1999 / DIN EN 50267-2-2:1999 / VDE 0482-267-2-2:1999- 04/ CEI EN 50267-2-2:1999 (CEI 20-37/2-2). Common test methods for cables under fire conditions- Test on gases evolved during combustion of materials from cables- Part 2-2: Procedures. Determination of degree of acidity of gases for materials by measuring PH and conductivity.

The standard states that the pH and the conductivity of a test solution should be measured, using calibrated PH and conductivity meters.

If the cables are described as zero halogen or halogen free, it is recommended that at least both of the following requirements should be met for each of the individual materials of a cable:

-The PH value should not be less than 4.3 when related to 1 litre of water

-The conductivity should not be less than 10us/mm when related to 1 litre of water

EN 50267-2-3:1999 / BS EN 50267-2-3:1999 / DIN EN 50267-2-3:1999 / VDE 0482-267-2-3:1999-04 / CEI EN 50267-2-3:1999 (CEI 20-37/2-



3). Common test methods for cables under fire conditions- Test on gases evolved during combustion of materials from cables- Part 2-3:Procedures. Determination of degree of acidity of gases for cables by determination of the weighted average of pH and conductivity.

The standard states that the pH and the conductivity of a test solution should be measured, using calibrated pH and conductivity meters. The results from the different components of the cable are then weighted.

Acid gas emission test in accordance with IEC 60754-2

IEC 60754-2 ed1.0 Test on gases evolved during combustion of electric cables - Part 2 : Determination of degree of acidity of gases evolved during combustion of materials taken from electric cables by measuring pH and conductivity.

Acid gas emission test in accordance with NF C32-074

NF C32-074 Common test methods for cables under fire conditions - Test on gases evolved during combustion of materials from cables. This standard is equivalent to IEC 60754-2

Acid gas emission test in accordance with BS 6425-2

BS 6425-2:1993 (superseded) test on gases evolved during the combustion of materials from cables. Determination of degree of acidity (corrosivity) of gases by measuring pH and conductivity. This standard is no longer in force and is replaced by the EN 50267-2-2:1999.

Acid gas emission test in accordance with DIN VDE 0472-813 / VDE 0472-813:1994

DIN VDE 0472-813 / VDE 0472-813:1994 Corrosivity of combustion gases. The standards are no longer in force and are replaced by the EN 50267-2-2 & VDE 0482-267-2-2.

SMOKE DENSITY TEST IN ACCORDANCE WITH DIFFERENT STANDARDS

The smoke density measurement taken from a material under fire conditions gives an indication of the visibility through the smoke. This is important as reduced visibility in a real fire situation makes it more difficult to escape from the fire thus increasing the threat to human life from the toxic gas, fumes and heat.

The following standards specify the method for measuring the generation of smoke from cables during fire.

Smoke density test in accordance with IEC 61034-1 & IEC 61034-2

IEC 61034-1:2005 / EN 61034-1:2005 / BS EN 61034-1:2005 / DIN EN 61034-1:2006 / VDE 0482-1034-1:2006 Measurement of smoke density of cables burning under defined conditions. Part 1: Test apparatus

IEC 61034-2:2005 / EN 61034-2:2005 / BS EN 61034-2:2005 / DIN EN





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61034-2:2006 / VDE 0482-1034-2:2006 / CEI EN 61034-2:2006 (CEI 20-37/3-1) Measurement of smoke density of cables burning under defined conditions.

Part 2: Test procedure and requirements.

The standard specifies a method of measurement of smoke density of cables. Part 1 specifies the test apparatus and Part 2 specifies the test procedure.

The test is usually performed inside a chamber of 3mx3mx3m and the test is sometimes described as 3 metres cube test. The test is performed by monitoring the transmittance reduction of a white light beam, running from one side of the chamber to the other, at a set height, thus monitoring the build up of smoke inside the chamber. The minimum percentage of light transmittance is often used to determine if the cable has passed or failed the test, often a minimum light transmittance of 60% is applied in order to classify a cable as low smoke.

Smoke density test in accordance with NF C32- 073

NF C32 073 Common test methods for cables under fire conditions.

- Measurement of smoke density of cables burning under defined conditions.

This standard is equivalent to IEC 61034-2

Smoke density test in accordance with BS 7622-1 & BS 7622-2

BS 7622-1:1993 (superseded) – Measurement of smoke density of electric cables burning under defined conditions. Test apparatus.

BS 7622-2:1993 (superseded) – Measurement of smoke density of electric cables burning under defined conditions. Test procedure and requirements.

The standards are no longer in force and were replaced by the EN 50268-1:2000 and EN 50268-2:2000 even though they too were superseded by EN 61034-1:2005 and EN 61034-2:2005.

Smoke density test in accordance with EN 50268-1 & EN 50268-2

EN 50268-1:2000 / BS EN 50268-1:2000 / DIN EN 50268-1:2000 / VDE 0482-268-1:2000 (superseded) – Common test methods for cables under fire conditions. Measurement of smoke density of cable burning under defined conditions. Part 1: Apparatus.

EN 50268-2:2000 / BS EN 50268-2:2000 / DIN EN 50268-2:2000 / VDE 0482-268-2:2000 (superseded) – Common test methods for cables under fire conditions. Measurement of smoke density of cable burning under defined conditions. Part 2: Procedure.

The standards are no longer in force and are replaced by the EN 61034-1:2005 and EN 61034-2:2005. Although these standards have been withdrawn, they are still called upon in some specification documents such as in the London Underground specification 1-085.

Smoke density test In accordance with DIN VDE 0472-816 / VDE 0472-816:1994

DIN VDE 0472-816/VDE 0472-816:1994 Testing of cables, wires and flexible cords. Smoke Density.

The standards are no longer in force and are replaced by the EN 50268-1, VDE 0482-268-1, EN 50268-2 & VDE 0482-268-2 which are also replaced by the EN 61034-1:2005 and EN 61034-2:2005.

OXYGEN INDEX TEST IN ACCORDANCE WITH DIFFERENT STANDARDS

The oxygen index is defined as the minimum concentration of oxygen, expressed as volume percentage, in a mixture of oxygen and nitrogen that will just support combustion of a material initially at room temperature under specified test conditions.



Oxygen Index test in accordance with ASTM D 2863

ASTM D 2863-10 Measuring the minimum oxygen concentration to support candle-like combustion of plastics (Oxygen Index).

The test is performed in accordance with the procedure specified in ASTM 2863-95 using test piece cut from the outer sheath of the cable. The apparatus holds a small specimen which is clamped vertically in a tube in an atmosphere where the relative concentration of oxygen and nitrogen can be changed. The aim is to test the flammability of the sample with a small pilot flame to find the minimum oxygen concentration required to just sustain combustion of the sample.

Oxygen index test in accordance with ISO 4589-2

ISO 4589-2:1996 Determination of burning behaviour by oxygen index Part 2: Ambient temperature test. Specimens measuring 100mm long by 6mm wide are used for testing. The test is performed in accordance with the procedure specified in the standard.

TEMPERATURE INDEX TEST IN ACCORDANCE WITH DIFFERENT STANDARDS

This is a test for assessing the performance of a material when it is tested in accordance with BS 2782: Part 1: Method 143a and 143b. The oxygen index of a material will drop when the temperature rises. When the temperature rises and the oxygen index drops to 21%, the material will burn automatically. This temperature is defined as temperature index.



For example, the oxygen index of the coal at room temperature is 50% and when the temperature climbs to 150°C, its oxygen index drops to 21% and the coal will burn by itself automatically. The temperature index of the coal is defined as 150°C. In general, the temperature index of fire retardant cable exceeds 250°C.

Temperature index test in accordance with BS 2782

BS 2782: Part 1:1989 Method 143a and 143b Temperature of materials. Determination of flammability.



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Specimens measuring nominally 100mm long by 6.5mm wide by 3mm thick are used for testing. The specimens are then tested in accordance with the test procedure specified in the standard.

Temperature index test in accordance with ISO 4589-3

ISO 4589-3:1996 Determination of burning behaviour by oxygen index Part 3: Elevated temperature test.

Specimens measuring 100mm long by 6mm wide are used for testing. The test is performed in accordance with the procedure specified in the standard.

TOXICITY TEST IN ACCORDANCE WITH DIFFERENT STANDARDS

Toxicity test in accordance with NES 02-713

Measuring a fume from a material exposed to a controlled fire conditions gives an indication of the fumes which may be produced in a real fire situation. A standard method of test for determining the toxicity of materials under fire condition is Defense Standard NES 02-713- Toxicity. This method gives the level of toxicity of the fumes produced from the material under test. During the test, the test specimen is heated via direct flame application at 1150°C.

The flame is applied via a bunsen burner with a flame height of between 100mm and 125mm formed with a methane gas and an external supply of compressed air. The specimen toxicity is determined from accurate pre-analysis weight (4pp) colorimetric tubes and ion chromatography.

The test may determine the following species: Hydrogen Bromide, Hydrochloric Acid, Hydrogen Fluoride, Formaldehyde, Nitrous gases, Carbon Monoxide, Carbon Dioxide, Acrylonitrile, Phenol, Hydrogen Sulphide, Sulphur Dioxide, Hydrocyanic Acid, Ammonia. The concentration in ppm for each gas detected are provided. The toxicity index of the specimens summates the toxic gases, taking into account of their level of danger to humans. The smaller the toxicity index, the better the product. A limit of 5 is often applicable.

Toxicity test in accordance with NF C 20-454

NF C 20-454 base environmental testing procedures. Fire behaviour. Analysis and titration of gases evolved during pyrolysis or combustion of materials used in electrotechnics. Exposure to abnormal heat or fire. Tube furnace method.

The test defined by this standard serves to define the conventional toxicity index (cti) of the gases emitted by the insulating or sleeving materials during combustion at 800°C.



Toxicity test in accordance with NF X 70-100

NF X 70-100 Fire Tests; Analysis of gaseous effluents.

The test is conducted within a tube furnace where the temperature is set at either 400°C, 600°C, 800°C (commonly 600°C is used for most of the materials or 800°C for some electrical products) for 40 minutes throughout the test by analysis of the toxicity index of the gases including CO, CO₂, HCl, HBr, HCN, HF and SO₂.



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