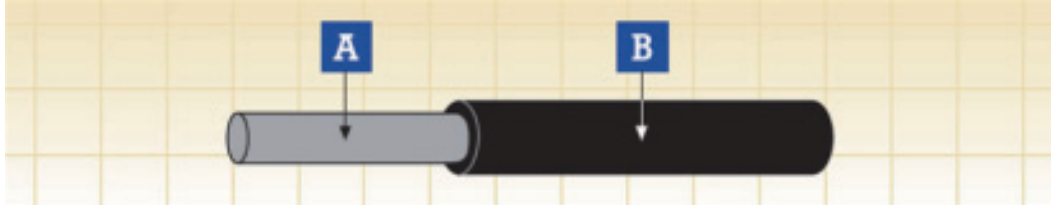


FIREROL High Temperature Single Core Unsheathed Cables

1.8/3 kV or 3.6/6 kV

EN 50382-2 (FRL-HT-3SU/FRL-HT-6SU)



A. Conductor B. Insulation

Construction

Conductor

Flexible tinned annealed copper wires (red copper only for 150 °C core temperature) class 5 according to HD 383

Insulation

Silicon rubber according to EN 50382-1 (EI 111)

Electrical & Mechanical Properties

Nominal Voltage

1.8/3 kV or 3.6/6 kV

Max. Conductor Temperature

120 °C/150 °C (fixed installation)

Min. Permissible Ambient Temperature

-25 °C/-40 °C (fixed installation)

Bending Radius

3 x Overall Diameter (D<12mm);

4 x Overall Diameter (D>12mm)

Chemical & Environmental Properties

EN 60684-2

No fluorine

EN 50305; EN 60811-2-1

Resistance to mineral oil & fuel oil, acid & alkali

EN 50305

Resistance to ozone

Fire Performance for Rolling Stock Application

EN 50306-2

Hazard levels HL1, HL2/HL3, HL4

DIN 5510-2

Protection level 1/2/3/4

BS 6853

Interior use 1a, 1b, II; Exterior use 1a, 1b, II

NF F 16-101

F0

Fire Performance in General

EN 50265-2-1; IEC 60332-1-2; NF C 32-070 2.1 (C2)

Vertical flame propagation for a single insulated wire or cable

EN 50266-2-4 + EN 50305; IEC 60332-3-24;

Vertical flame spread of vertically mounted bunched wires or cables

NF C 32-070 2.2 (C1); VDE 0472 Teil 804

EN 50268-2; IEC 61034-2; NF C 32-073 ;

Low Smoke Emission

NF C 20-902; NF F 16 101; VDE 0472 Teil 816

Halogen Free

EN 50267-2-1; IEC 60754-1; NF C 32-074;

NF C 20-454; VDE 0472 Teil 815

Low Corrosivity (Acidity & Conductivity)

EN 50267-2-2/3; IEC 60754-2; NF C 32-074;

NF C 20-453; VDE 0472 Teil 813

Low Toxicity

EN 50305; NF X 70-100; NF F 63 808; TM1-04; BS6853

Smoke Index

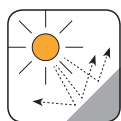
NF F 63 808; BS6853; NF F 16 101



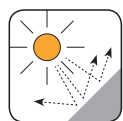
Impact Resistant



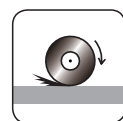
Highly Flexible



UV Resistant



Ozone Resistant



Abrasion Retardant



Cold Resistant



Resistance To Soldering Heat



Acid & Alkaline Resistant

EN 50382 High Temperature Rolling Stock Cables

FRL-HT-3SU 1.8/3 kV

| Nominal Cross-Sectional Area mm ² | Conductor Diameter (a) mm | Min. Mean Thickness of Insulation mm | Overall Diameter | | Weight kg/km | Max. Conductor Resistance | | Min. Insulation Resistance | |
|---|------------------------------|---|------------------|------------|-----------------|---------------------------|-----------------|----------------------------|-------------------|
| | | | Min. mm | Max. mm | | Tinned Conductor | Plain Conductor | 20 °C MΩ x km | 150 °C MΩ x km |
| | | | | | | 20 °C Ω/km | 20 °C Ω/km | | |
| 1.5 | 1.5 | 2.5 | 6.3 | 7.3 | 50 | 13.7 | 13.3 | 970 | 1.90 |
| 2.5 | 1.95 | 2.5 | 6.7 | 7.8 | 70 | 8.21 | 7.98 | 840 | 1.60 |
| 4 | 2.5 | 2.5 | 7.2 | 8.4 | 80 | 5.09 | 4.95 | 720 | 1.40 |
| 6 | 3.0 | 2.5 | 7.7 | 9.0 | 100 | 3.39 | 3.30 | 650 | 1.30 |
| 10 | 3.9 | 2.5 | 8.5 | 10.0 | 160 | 1.95 | 1.91 | 540 | 1.00 |
| 16 | 5.0 | 2.5 | 9.6 | 11.2 | 210 | 1.24 | 1.21 | 460 | 0.90 |
| 25 | 6.4 | 2.5 | 10.9 | 12.7 | 290 | 0.795 | 0.780 | 380 | 0.70 |
| 35 | 7.7 | 2.5 | 12.1 | 14.1 | 380 | 0.565 | 0.554 | 330 | 0.60 |
| 50 | 9.2 | 2.5 | 13.5 | 15.8 | 520 | 0.393 | 0.386 | 290 | 0.50 |
| 70 | 11.0 | 2.5 | 15.2 | 17.8 | 720 | 0.277 | 0.272 | 250 | 0.50 |
| 95 | 12.5 | 2.7 | 17.0 | 19.9 | 930 | 0.210 | 0.206 | 230 | 0.40 |
| 120 | 14.2 | 2.7 | 18.6 | 21.7 | 1140 | 0.164 | 0.161 | 210 | 0.40 |
| 150 | 15.8 | 2.7 | 20.1 | 23.5 | 1430 | 0.132 | 0.129 | 190 | 0.30 |
| 185 | 17.5 | 2.7 | 21.7 | 25.4 | 1720 | 0.108 | 0.106 | 170 | 0.30 |
| 240 | 20.1 | 2.7 | 24.1 | 28.2 | 2270 | 0.0817 | 0.0801 | 150 | 0.30 |
| 300 | 22.5 | 2.7 | 26.4 | 30.9 | 2750 | 0.0654 | 0.0641 | 140 | 0.20 |
| 400 | 25.8 | 2.9 | 29.9 | 34.9 | 3730 | 0.0495 | 0.0486 | 130 | 0.20 |

FRL-HT-6SU 3.6/6 kV

| Nominal Cross-Sectional Area mm ² | Conductor Diameter (a) mm | Min. Mean Thickness of Insulation mm | Overall Diameter | | Weight kg/km | Max. Conductor Resistance | | Min. Insulation Resistance | |
|---|------------------------------|---|------------------|------------|-----------------|---------------------------|-----------------|----------------------------|-------------------|
| | | | Min. mm | Max. mm | | Tinned Conductor | Plain Conductor | 20 °C MΩ x km | 150 °C MΩ x km |
| | | | | | | 20 °C Ω/km | 20 °C Ω/km | | |
| 2.5 | 1.95 | 3.0 | 7.6 | 8.9 | 80 | 8.21 | 7.98 | 920 | 1.80 |
| 4 | 2.5 | 3.0 | 8.1 | 9.5 | 100 | 5.09 | 4.95 | 800 | 1.60 |
| 6 | 3.0 | 3.0 | 9.0 | 10.6 | 120 | 3.39 | 3.30 | 750 | 1.50 |
| 10 | 3.9 | 3.0 | 9.5 | 11.1 | 180 | 1.95 | 1.91 | 610 | 1.20 |
| 16 | 5.0 | 3.0 | 10.5 | 12.3 | 230 | 1.24 | 1.21 | 520 | 1.00 |
| 25 | 6.4 | 3.0 | 11.8 | 13.8 | 310 | 0.795 | 0.780 | 430 | 0.80 |
| 35 | 7.7 | 3.0 | 13.0 | 15.2 | 410 | 0.565 | 0.554 | 380 | 0.70 |
| 50 | 9.2 | 3.0 | 14.4 | 16.9 | 550 | 0.393 | 0.386 | 330 | 0.60 |
| 70 | 11.0 | 3.0 | 16.1 | 18.9 | 740 | 0.277 | 0.272 | 280 | 0.50 |
| 95 | 12.5 | 3.0 | 17.5 | 20.5 | 940 | 0.210 | 0.206 | 260 | 0.50 |
| 120 | 14.2 | 3.1 | 19.3 | 22.6 | 1170 | 0.164 | 0.161 | 240 | 0.40 |
| 150 | 15.8 | 3.1 | 20.8 | 24.4 | 1460 | 0.132 | 0.129 | 220 | 0.40 |
| 185 | 17.5 | 3.2 | 22.6 | 26.5 | 1760 | 0.108 | 0.106 | 200 | 0.40 |
| 240 | 20.1 | 3.4 | 25.4 | 29.8 | 2340 | 0.0817 | 0.0801 | 190 | 0.30 |
| 300 | 22.5 | 3.4 | 27.7 | 32.4 | 2820 | 0.0654 | 0.0641 | 170 | 0.30 |
| 400 | 25.8 | 3.4 | 30.8 | 36.0 | 3780 | 0.0495 | 0.0486 | 150 | 0.30 |

(a)= For information, indicative only



IRM 903
Fuel Oil Resistant



IRM 902
Mineral Oil Resistant



Fire Retardant
NF C32-070-2.2(C1)
IEC60332-3-24/EN50266-2-4



Flame Retardant
NF C32-070-2.1(C2)
IEC60332-1-2/EN50265-2-1



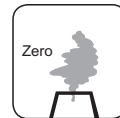
Low Toxicity
EN 50305: NF X70-100/NF
F63 800/1M1-04/BS 6855



Low Corrosivity
IEC60754-2/EN50267-2-2/3
NF C32-074/NF C20-453



Low Smoke Emission
IEC 61034-2 / EN 50268-2
NF C32-073/NF C 20-902

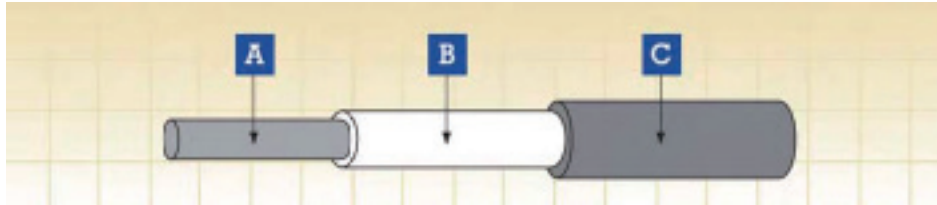


Zero Halogen
IEC 60754-1/EN 50267-2-1
NF C20-454

FIREROL High Temperature Single Core Sheathed Cables

1.8/3 kV or 3.6/6 kV

EN 50382-2 (FRL-HT-3S/FRL-HT-6S)



A. Conductor B. Insulation C. Sheath

Construction

Conductor

Flexible tinned annealed copper wires (red copper only for 150 °C core temperature) class 5 according to HD 383

Insulation

Silicon rubber according to EN 50382-1 (EI 112)

Outer Sheath

LSZH elastomeric compound according to EN 50382-1 (EM 105, EM 106 or EM 107)

Electrical & Mechanical Properties

Nominal Voltage

1.8/3 kV or 3.6/6 kV

Max. Conductor Temperature

120 °C/150 °C (fixed installation)

Min. Permissible Ambient Temperature

-25 °C/-40 °C (fixed installation)

Bending Radius

3 x Overall Diameter (D < 12mm);
4 x Overall Diameter (D > 12mm)

Chemical & Environmental Properties

EN 60684-2

EN 50305; EN 60811-2-1

EN 50305

No fluorine

Resistance to mineral oil & fuel oil, acid & alkali

Resistance to ozone

Fire Performance for Rolling Stock Application

EN 50306-2

DIN 5510-2

BS 6853

NF F 16-101

Hazard levels HL1, HL2/HL3, HL4

Protection level 1/2/3/4

Interior use 1a, 1b, II; Exterior use 1a, 1b, II

F0

Fire Performance in General

EN 50265-2-1; IEC 60332-1-2; NF C 32-070 2.1 (C2)

EN 50266-2-4 + EN 50305; IEC 60332-3-24;

NF C 32-070 2.2 (C1); VDE 0472 Teil 804

EN 50268-2; IEC 61034-2; NF C 32-073 ;

NF C 20-902; NF F 16 101; VDE 0472 Teil 816

EN 50267-2-1; IEC 60754-1; NF C 32-074;

NF C 20-454; VDE 0472 Teil 815

EN 50267-2-2/3; IEC 60754-2; NF C 32-074;

NF C 20-453; VDE 0472 Teil 813

EN 50305; NF X 70-100; NF F 63 808; TM1-04; BS6853

NF F 63 808; BS6853; NF F 16 101

Vertical flame propagation for a single insulated wire or cable

Vertical flame spread of vertically mounted bunched wires or cables

Low Smoke Emission

Halogen Free

Low Corrosivity (Acidity & Conductivity)

Low Toxicity

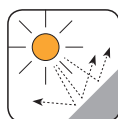
Smoke Index



Impact Resistant



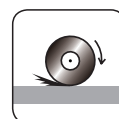
Highly Flexible



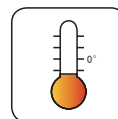
UV Resistant



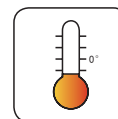
Ozone Resistant



Abrasion Retardant



Cold Resistant



Resistance To Soldering Heat



Acid & Alkaline Resistant

EN 50382 High Temperature Rolling Stock Cables

FRL-HT-3S 1.8/3 kV

| Nominal Cross-Sectional Area | Conductor Diameter (a) | Min. Mean Thickness of Insulation | Min. Average Sheath Thickness | Overall Diameter | | Weight | Max. Conductor Resistance | | Min. Insulation Resistance | |
|------------------------------|------------------------|-----------------------------------|-------------------------------|------------------|------|--------|---------------------------|-----------------|----------------------------|---------|
| | | | | Min. | Max. | | Tinned Conductor | Plain Conductor | 20 °C | 150 °C |
| | | | | | | | 20 °C | 20 °C | | |
| mm ² | mm | mm | mm | mm | mm | kg/km | Ω/km | Ω/km | MΩ x km | MΩ x km |
| 1.5 | 1.5 | 1.3 | 1.4 | 6.8 | 7.9 | 70 | 13.7 | 13.3 | 670 | 1.30 |
| 2.5 | 1.95 | 1.3 | 1.4 | 7.2 | 8.4 | 80 | 8.21 | 7.98 | 570 | 1.10 |
| 4 | 2.5 | 1.3 | 1.4 | 7.7 | 9.0 | 100 | 5.09 | 4.95 | 480 | 0.90 |
| 6 | 3.0 | 1.3 | 1.4 | 8.2 | 9.6 | 120 | 3.39 | 3.30 | 420 | 0.80 |
| 10 | 3.9 | 1.5 | 1.4 | 9.4 | 11.0 | 190 | 1.95 | 1.91 | 380 | 0.70 |
| 16 | 5.0 | 1.5 | 1.4 | 10.5 | 12.2 | 240 | 1.24 | 1.21 | 310 | 0.60 |
| 25 | 6.4 | 1.8 | 1.4 | 12.3 | 14.4 | 340 | 0.795 | 0.780 | 300 | 0.60 |
| 35 | 7.7 | 1.8 | 1.4 | 13.6 | 15.9 | 440 | 0.565 | 0.554 | 250 | 0.50 |
| 50 | 9.2 | 1.8 | 1.4 | 15.0 | 17.5 | 580 | 0.393 | 0.386 | 220 | 0.40 |
| 70 | 11.0 | 1.8 | 1.5 | 16.8 | 19.7 | 780 | 0.277 | 0.272 | 200 | 0.40 |
| 95 | 12.5 | 2.2 | 1.5 | 19.0 | 22.2 | 1020 | 0.210 | 0.206 | 190 | 0.40 |
| 120 | 14.2 | 2.2 | 1.6 | 20.8 | 24.3 | 1270 | 0.164 | 0.161 | 180 | 0.30 |
| 150 | 15.8 | 2.2 | 1.6 | 22.3 | 26.1 | 1560 | 0.132 | 0.129 | 160 | 0.30 |
| 185 | 17.5 | 2.4 | 1.7 | 24.5 | 28.6 | 1890 | 0.108 | 0.106 | 160 | 0.30 |
| 240 | 20.1 | 2.4 | 1.8 | 27.1 | 31.7 | 2480 | 0.0817 | 0.0801 | 140 | 0.20 |
| 300 | 22.5 | 2.4 | 1.9 | 29.5 | 34.6 | 2990 | 0.0654 | 0.0641 | 120 | 0.20 |
| 400 | 25.8 | 2.6 | 2.0 | 33.2 | 38.9 | 4010 | 0.0495 | 0.0486 | 120 | 0.20 |

FRL-HT-6S 3.6/6 kV

| Nominal Cross-Sectional Area | Conductor Diameter (a) | Min. Mean Thickness of Insulation | Min. Average Sheath Thickness | Overall Diameter | | Weight | Max. Conductor Resistance | | Min. Insulation Resistance | |
|------------------------------|------------------------|-----------------------------------|-------------------------------|------------------|------|--------|---------------------------|-----------------|----------------------------|---------|
| | | | | Min. | Max. | | Tinned Conductor | Plain Conductor | 20 °C | 150 °C |
| | | | | | | | 20 °C | 20 °C | | |
| mm ² | mm | mm | mm | mm | mm | kg/km | Ω/km | Ω/km | MΩ x km | MΩ x km |
| 2.5 | 1.95 | 2.6 | 1.4 | 9.9 | 11.6 | 130 | 8.21 | 7.98 | 870 | 1.70 |
| 4 | 2.5 | 2.6 | 1.4 | 10.4 | 12.2 | 150 | 5.09 | 4.95 | 750 | 1.50 |
| 6 | 3.0 | 2.6 | 1.4 | 10.9 | 12.8 | 180 | 3.39 | 3.30 | 670 | 1.30 |
| 10 | 3.9 | 2.6 | 1.4 | 11.8 | 13.8 | 240 | 1.95 | 1.91 | 570 | 1.10 |
| 16 | 5.0 | 2.6 | 1.4 | 12.8 | 15.0 | 300 | 1.24 | 1.21 | 480 | 0.90 |
| 25 | 6.4 | 2.9 | 1.4 | 14.7 | 17.2 | 410 | 0.795 | 0.780 | 430 | 0.80 |
| 35 | 7.7 | 2.9 | 1.4 | 15.9 | 18.6 | 510 | 0.565 | 0.554 | 380 | 0.70 |
| 50 | 9.2 | 2.9 | 1.5 | 17.5 | 20.5 | 660 | 0.393 | 0.386 | 330 | 0.60 |
| 70 | 11.0 | 2.9 | 1.5 | 19.2 | 22.4 | 870 | 0.277 | 0.272 | 280 | 0.50 |
| 95 | 12.5 | 2.9 | 1.6 | 20.8 | 24.3 | 1100 | 0.210 | 0.206 | 250 | 0.50 |
| 120 | 14.2 | 2.9 | 1.6 | 22.4 | 26.2 | 1330 | 0.164 | 0.161 | 230 | 0.40 |
| 150 | 15.8 | 2.9 | 1.7 | 24.1 | 28.2 | 1640 | 0.132 | 0.129 | 210 | 0.40 |
| 185 | 17.5 | 3.2 | 1.8 | 26.4 | 30.9 | 1990 | 0.108 | 0.106 | 210 | 0.40 |
| 240 | 20.1 | 3.4 | 1.9 | 29.4 | 34.4 | 2620 | 0.0817 | 0.0801 | 190 | 0.30 |
| 300 | 22.5 | 3.4 | 1.9 | 31.7 | 37.1 | 3120 | 0.0654 | 0.0641 | 170 | 0.30 |
| 400 | 25.8 | 3.4 | 2.0 | 35.0 | 40.9 | 4150 | 0.0495 | 0.0486 | 150 | 0.30 |



IRM 903
Fuel Oil Resistant



IRM 902
Mineral Oil Resistant



Fire Retardant
NF C32-070-2.2(C1)
IEC60332-3-24/EN50266-2-4



Flame Retardant
NF C32-070-2.1(C2)
IEC60332-1-2/EN50266-2-1



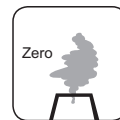
Low Toxicity
EN 50305; NF X70-100/NF
F63 809/TM1-04/BS 6853



Low Corrosivity
IEC60754-2/EN50267-2-2/3
NF C32-074/NF C20-453

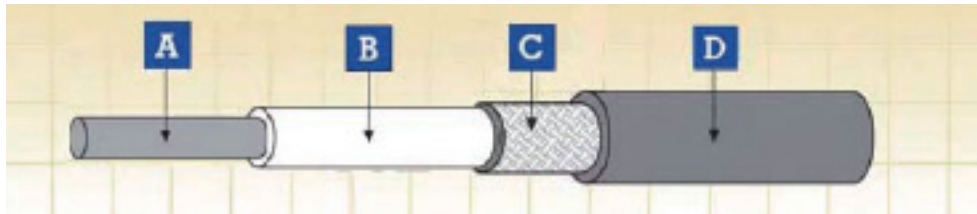


Low Smoke Emission
IEC 61034-2 / EN 50268-2
NF C32-073/NF C 20-902



Zero Halogen
IEC 60754-1/EN 50267-2-1
NF C20-454

FIREROL High Temperature Single Core Screened & Sheathed Cables 1.8/3 kV or 3.6/6 kV EN 50382-2 (FRL-HT-3S-OS/FRL-HT-6S-OS)



A. Conductor B. Insulation C. Screen D. Sheath

Construction

Conductor

Flexible tinned annealed copper wires (red copper only for 150 °C core temperature) class 5 according to HD 383

Insulation

Silicon rubber according to EN 50382-1 (EI 112)

Overall Screen

Tinned annealed copper wires

Outer Sheath

LSZH elastomeric compound according to EN 50382-1 (EM 105, EM 106 or EM 107)

Electrical & Mechanical Properties

Nominal Voltage

1.8/3 kV or 3.6/6 kV

Max. Conductor Temperature

120 °C/150 °C (fixed installation)

Min. Permissible Ambient Temperature

-25 °C/-40 °C (fixed installation)

Bending Radius

3 x Overall Diameter (D < 12mm);
4 x Overall Diameter (D > 12mm)

Chemical & Environmental Properties

EN 60684-2

EN 50305; EN 60811-2-1

EN 50305

No fluorine

Resistance to mineral oil & fuel oil, acid & alkali

Resistance to ozone

Fire Performance for Rolling Stock Application

EN 50306-2

DIN 5510-2

BS 6853

NF F 16-101

Hazard levels HL1, HL2/HL3, HL4

Protection level 1/2/3/4

Interior use 1a, 1b, II; Exterior use 1a, 1b, II

F0

Fire Performance in General

EN 50265-2-1; IEC 60332-1-2; NF C 32-070 2.1 (C2)

EN 50266-2-4 + EN 50305; IEC 60332-3-24;

NF C 32-070 2.2 (C1); VDE 0472 Teil 804

EN 50268-2; IEC 61034-2; NF C 32-073 ;

NF C 20-902; NF F 16 101; VDE 0472 Teil 816

EN 50267-2-1; IEC 60754-1; NF C 32-074;

NF C 20-454; VDE 0472 Teil 815

EN 50267-2-2/3; IEC 60754-2; NF C 32-074;

NF C 20-453; VDE 0472 Teil 813

EN 50305; NF X 70-100; NF F 63 808; TM1-04; BS6853

NF F 63 808; BS6853; NF F 16 101

Vertical flame propagation for a single insulated wire or cable

Vertical flame spread of vertically mounted bunched wires or cables

Low Smoke Emission

Halogen Free

Low Corrosivity (Acidity & Conductivity)

Low Toxicity

Smoke Index



Impact Resistant



Highly Flexible



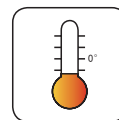
UV Resistant



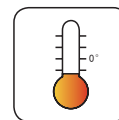
Ozone Resistant



Abrasion Retardant



Cold Resistant



Resistance To Soldering Heat



Acid & Alkaline Resistant

EN 50382 High Temperature Rolling Stock Cables

FRL-HT-3S-OS 1.8/3 kV

| Nominal Cross-Sectional Area | Conductor Diameter (a) | Min. Mean Thickness of Insulation | Min. Screen Wire Diameter | Min. Average Sheath Thickness | Overall Diameter | | Weight | Max. Conductor Resistance | | Min. Insulation Resistance | |
|------------------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|------------------|------|--------|---------------------------|-----------------|----------------------------|---------|
| | | | | | Min. | Max. | | Tinned Conductor | Plain Conductor | Resistance | |
| | | | | | | | | 20 °C | 20 °C | 20 °C | 150 °C |
| mm ² | mm | mm | mm | mm | mm | mm | kg/km | Ω/km | Ω/km | MΩ x km | MΩ x km |
| 1.5 | 1.5 | 1.3 | 0.16 | 1.4 | 6.8 | 7.9 | 113 | 13.7 | 13.3 | 670 | 1.30 |
| 2.5 | 1.95 | 1.3 | 0.16 | 1.4 | 7.2 | 8.4 | 134 | 8.21 | 7.98 | 570 | 1.10 |
| 4 | 2.5 | 1.3 | 0.21 | 1.4 | 7.7 | 9.0 | 171 | 5.09 | 4.95 | 480 | 0.90 |
| 6 | 3.0 | 1.3 | 0.21 | 1.4 | 8.2 | 9.6 | 205 | 3.39 | 3.30 | 420 | 0.80 |
| 10 | 3.9 | 1.5 | 0.21 | 1.4 | 9.4 | 11.0 | 283 | 1.95 | 1.91 | 380 | 0.70 |
| 16 | 5.0 | 1.5 | 0.26 | 1.4 | 10.5 | 12.2 | 381 | 1.24 | 1.21 | 310 | 0.60 |
| 25 | 6.4 | 1.8 | 0.26 | 1.4 | 12.3 | 14.4 | 539 | 0.795 | 0.780 | 300 | 0.60 |
| 35 | 7.7 | 1.8 | 0.31 | 1.4 | 13.6 | 15.9 | 682 | 0.565 | 0.554 | 250 | 0.50 |
| 50 | 9.2 | 1.8 | 0.31 | 1.4 | 15.0 | 17.5 | 882 | 0.393 | 0.386 | 220 | 0.40 |
| 70 | 11.0 | 1.8 | 0.31 | 1.5 | 16.8 | 19.7 | 1174 | 0.277 | 0.272 | 200 | 0.40 |
| 95 | 12.5 | 2.2 | 0.31 | 1.5 | 19.0 | 22.2 | 1483 | 0.210 | 0.206 | 190 | 0.40 |
| 120 | 14.2 | 2.2 | 0.31 | 1.6 | 20.8 | 24.3 | 1819 | 0.164 | 0.161 | 180 | 0.30 |
| 150 | 15.8 | 2.2 | 0.31 | 1.6 | 22.3 | 26.1 | 2188 | 0.132 | 0.129 | 160 | 0.30 |
| 185 | 17.5 | 2.4 | 0.31 | 1.7 | 24.5 | 28.6 | 2606 | 0.108 | 0.106 | 160 | 0.30 |
| 240 | 20.1 | 2.4 | 0.31 | 1.8 | 27.1 | 31.7 | 3318 | 0.0817 | 0.0801 | 140 | 0.20 |
| 300 | 22.5 | 2.4 | 0.31 | 1.9 | 29.5 | 34.6 | 4015 | 0.0654 | 0.0641 | 120 | 0.20 |
| 400 | 25.8 | 2.6 | 0.31 | 2.0 | 33.2 | 38.9 | 5170 | 0.0495 | 0.0486 | 120 | 0.20 |

FRL-HT-6S-OS 3.6/6 kV

| Nominal Cross-Sectional Area | Conductor Diameter (a) | Min. Mean Thickness of Insulation | Min. Screen Wire Diameter | Min. Average Sheath Thickness | Overall Diameter | | Weight | Max. Conductor Resistance | | Min. Insulation Resistance | |
|------------------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|------------------|------|--------|---------------------------|-----------------|----------------------------|---------|
| | | | | | Min. | Max. | | Tinned Conductor | Plain Conductor | Resistance | |
| | | | | | | | | 20 °C | 20 °C | 20 °C | 150 °C |
| mm ² | mm | mm | mm | mm | mm | mm | kg/km | Ω/km | Ω/km | MΩ x km | MΩ x km |
| 2.5 | 1.95 | 2.6 | 0.16 | 1.4 | 9.9 | 11.6 | 209 | 8.21 | 7.98 | 870 | 1.70 |
| 4 | 2.5 | 2.6 | 0.16 | 1.4 | 10.4 | 12.2 | 240 | 5.09 | 4.95 | 750 | 1.50 |
| 6 | 3.0 | 2.6 | 0.21 | 1.4 | 10.9 | 12.8 | 291 | 3.39 | 3.30 | 670 | 1.30 |
| 10 | 3.9 | 2.6 | 0.21 | 1.4 | 11.8 | 13.8 | 363 | 1.95 | 1.91 | 570 | 1.10 |
| 16 | 5.0 | 2.6 | 0.21 | 1.4 | 12.8 | 15.0 | 453 | 1.24 | 1.21 | 480 | 0.90 |
| 25 | 6.4 | 2.9 | 0.26 | 1.4 | 14.7 | 17.2 | 640 | 0.795 | 0.780 | 430 | 0.80 |
| 35 | 7.7 | 2.9 | 0.26 | 1.4 | 15.9 | 18.6 | 770 | 0.565 | 0.554 | 380 | 0.70 |
| 50 | 9.2 | 2.9 | 0.31 | 1.5 | 17.5 | 20.5 | 1012 | 0.393 | 0.386 | 330 | 0.60 |
| 70 | 11.0 | 2.9 | 0.31 | 1.5 | 19.2 | 22.4 | 1307 | 0.277 | 0.272 | 280 | 0.50 |
| 95 | 12.5 | 2.9 | 0.31 | 1.6 | 20.8 | 24.3 | 1586 | 0.210 | 0.206 | 250 | 0.50 |
| 120 | 14.2 | 2.9 | 0.31 | 1.6 | 22.4 | 26.2 | 1916 | 0.164 | 0.161 | 230 | 0.40 |
| 150 | 15.8 | 2.9 | 0.31 | 1.7 | 24.1 | 28.2 | 2309 | 0.132 | 0.129 | 210 | 0.40 |
| 185 | 17.5 | 3.2 | 0.31 | 1.8 | 26.4 | 30.9 | 2750 | 0.108 | 0.106 | 210 | 0.40 |
| 240 | 20.1 | 3.4 | 0.31 | 1.9 | 29.4 | 34.4 | 3420 | 0.0817 | 0.0801 | 190 | 0.30 |
| 300 | 22.5 | 3.4 | 0.31 | 1.9 | 31.7 | 37.1 | 4150 | 0.0654 | 0.0641 | 170 | 0.30 |
| 400 | 25.8 | 3.4 | 0.31 | 2.0 | 35.0 | 40.9 | 5200 | 0.0495 | 0.0486 | 150 | 0.30 |

(a)= For information, indicative only



IRM 903
Fuel Oil Resistant



IRM 902
Mineral Oil Resistant



Fire Retardant
NF C32-070-2.2(C1)
IEC60332-3-24/EN50266-2-4



Flame Retardant
NF C32-070-2.1(C2)
IEC60332-1-2/EN50266-2-1



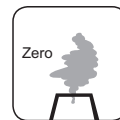
Low Toxicity
EN 50305; NF X70-100/NF
F63 809/TM1-04/BS 6855



Low Corrosivity
IEC60754-2/EN50267-2-2/3
NF C32-074/NF C20-453

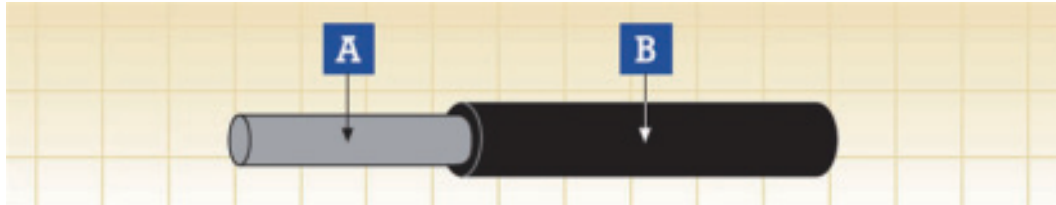


Low Smoke Emission
IEC 61034-2 / EN 50268-2
NF C32-073/NF C 20-902



Zero Halogen
IEC 60754-1/EN 50267-2-1
NF C20-454

FIREROL High Temperature Single Core Cables with Reinforced Insulation 3.6/6 kV EN 50382-2 (FRL-HT-6SURI)



A. Conductor B. Insulation

Construction

Conductor

Extra flexible tinned annealed copper wires (red copper only for 150 °C core temperature) class 6 according to HD 383

Insulation

Silicon rubber according to EN 50382-1 (EI 112)

Electrical & Mechanical Properties

Nominal Voltage

3.6/6 kV

Max. Conductor Temperature

120 °C / 150 °C (fixed installation)

Min. Permissible Ambient Temperature

-25 °C / -40 °C (fixed installation)

Bending Radius

3 x Overall Diameter (D < 12mm);
4 x Overall Diameter (D > 12mm)

Chemical & Environmental Properties

EN 60684-2

No fluorine

EN 50305; EN 60811-2-1

Resistance to mineral oil & fuel oil, acid & alkali

EN 50305

Resistance to ozone

Fire Performance for Rolling Stock Application

EN 50306-2

Hazard levels HL1, HL2/HL3, HL4

DIN 5510-2

Protection level 1/2/3/4

BS 6853

Interior use 1a, 1b, II; Exterior use 1a, 1b, II

NF F 16-101

F0

Fire Performance in General

EN 50265-2-1; IEC 60332-1-2; NF C 32-070 2.1 (C2)

Vertical flame propagation for a single insulated wire or cable

EN 50266-2-4 + EN 50305; IEC 60332-3-24;

Vertical flame spread of vertically mounted bunched wires or cables

NF C 32-070 2.2 (C1); VDE 0472 Teil 804

EN 50268-2; IEC 61034-2; NF C 32-073 ;

Low Smoke Emission

NF C 20-902; NF F 16 101; VDE 0472 Teil 816

Halogen Free

EN 50267-2-1; IEC 60754-1; NF C 32-074;

NF C 20-454; VDE 0472 Teil 815

Low Corrosivity (Acidity & Conductivity)

EN 50267-2-2/3; IEC 60754-2; NF C 32-074;

NF C 20-453; VDE 0472 Teil 813

Low Toxicity

EN 50305; NF X 70-100; NF F 63 808; TM1-04; BS6853

Smoke Index

NF F 63 808; BS6853; NF F 16 101

EN 50382 High Temperature Rolling Stock Cables

FRL-HT-6SURI 3.6/6 kV

| Nominal Cross-Sectional Area | Conductor Diameter (a) | Min. Mean Thickness of Insulation | Overall Diameter | | Weight | Max. Conductor Resistance | | Min. Insulation Resistance | |
|------------------------------|------------------------|-----------------------------------|------------------|------|--------|---------------------------|-----------------|----------------------------|---------|
| | | | Min. | Max. | | Tinned Conductor | Plain Conductor | Min. Insulation Resistance | |
| | | | | | | 20 °C | 20 °C | 20 °C | 150 °C |
| mm ² | mm | mm | mm | mm | kg/km | Ω/km | Ω/km | MΩ x km | MΩ x km |
| 50 | 9.2 | 3.0 | 15.2 | 17.8 | 560 | 0.393 | 0.386 | 340 | 0.70 |
| 70 | 11.0 | 3.0 | 16.9 | 19.8 | 770 | 0.277 | 0.272 | 300 | 0.60 |
| 95 | 12.5 | 3.0 | 18.3 | 21.4 | 970 | 0.210 | 0.206 | 270 | 0.55 |
| 120 | 14.2 | 3.1 | 20.1 | 23.5 | 1200 | 0.164 | 0.161 | 250 | 0.50 |
| 150 | 15.8 | 3.1 | 21.6 | 25.3 | 1480 | 0.132 | 0.129 | 220 | 0.45 |
| 185 | 17.5 | 3.2 | 23.4 | 27.4 | 1800 | 0.108 | 0.106 | 210 | 0.40 |

(a)= For information, indicative only

