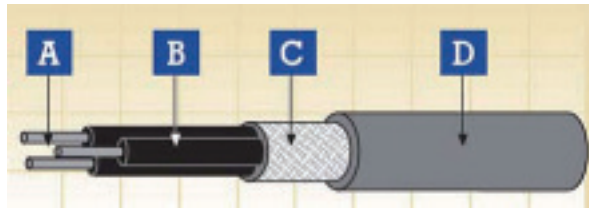


## FIREROL Medium Wall Multicore Overall Screened Cables 300/500 V or 0.6/1 kV EN 50264-3-2 (FRL-MW-05M-OS/FRL-MW-1M-OS)



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

### Application

- Used as power and control cable for protected installations inside and outside of rail and transport vehicles, where handling and installation cost are an important factor.
- Used in control, auxiliary and main circuit wiring such as cable harnesses, switchboards and control panels, driver desks etc.

### Construction

#### Conductor

Flexible tinned annealed copper wires, stranded as per HD 383 (IEC 60228) class 5

#### Insulation

LSZH elastomeric compound as defined in EN 50264-1 (EI 106 to EI 110)

#### Overall Screen

Tinned annealed copper wires

#### Outer Sheath

LSZH elastomeric compound as defined in EN 50264-1 (EM 101 to EI 104)

### Electrical & Mechanical Properties

|                                      |  |
|--------------------------------------|--|
| Nominal Voltage                      | 300/500 V or 0.6/1 kV  |
| Max. Conductor Temperature           | 90 °C (fixed installation)   |
| Min. Permissible Ambient Temperature | -25 °C / -40 °C (fixed installation)   |
| Bending Radius                       | Fixed installation:<br>4 x Overall Diameter (D<12mm);<br>5 x Overall Diameter (D>12mm)<br>Flexible installation:<br>8 x Overall Diameter (D<12mm);<br>10 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;<br>NF C 32-070 2.2 (C1); VDE 0472 Teil 804   | Vertical flame spread of vertically mounted bunched wires or cables |
| EN 50268-2; IEC 61034-2; NF C 32-073 ;<br>NF C 20-902; NF F 16 101; VDE 0472 Teil 816 | Low Smoke Emission  |
| EN 50267-2-1; IEC 60754-1; NF C 32-074;<br>NF C 20-454; VDE 0472 Teil 815             | Halogen Free  |
| EN 50267-2-2/3; IEC 60754-2; NF C 32-074;<br>NF C 20-453; VDE 0472 Teil 813           | Low Corrosivity (Acidity & Conductivity)                            |

# EN 50264 Rolling Stock Cables

EN 50305; NF X 70-100; NF F 63 808; TM1-04; BS6853  
NF F 63 808; BS6853; NF F 16 101

Low Toxicity  
Smoke Index

FRL-MW-05M-OS 300/500 V

| Nominal Cross-Sectional Area (a) | Conductor Diameter (b) | Min. Mean Thickness of Insulation | Core Dimensions |      | Min. Screen Wire Diameter | Min. Average Sheath Thickness | Overall Diameter |       | Weight | Max. Conductor Resistance<br>20 °C | Min. Insulation Resistance |                       |
|----------------------------------|------------------------|-----------------------------------|-----------------|------|---------------------------|-------------------------------|------------------|-------|--------|------------------------------------|----------------------------|-----------------------|
|                                  |                        |                                   | Min.            | Max. |                           |                               | Min.             | Max.  |        |                                    | EI 110<br>20 °C            | EI 106/7/8/9<br>20 °C |
|                                  |                        |                                   |                 |      |                           |                               |                  |       |        |                                    |                            |                       |
| n x mm <sup>2</sup>              | mm                     | mm                                | mm              | mm   | mm                        | mm                            | mm               | kg/km | Ω/km   | MΩ x km                            | MΩ x km                    |                       |
| 2x1                              | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.16                      | 0.6                           | 6.0              | 7.1   | 70     | 20.0                               | 15.0                       | 7.5                   |
| 4x1                              | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.16                      | 0.7                           | 7.0              | 8.2   | 110    | 20.0                               | 15.0                       | 7.5                   |
| 7x1                              | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.16                      | 0.7                           | 8.2              | 9.6   | 150    | 20.0                               | 15.0                       | 7.5                   |
| 9x1                              | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.21                      | 0.8                           | 10.2             | 11.9  | 220    | 20.0                               | 15.0                       | 7.5                   |
| 12x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.21                      | 0.8                           | 10.9             | 12.7  | 260    | 20.0                               | 15.0                       | 7.5                   |
| 19x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.26                      | 1.0                           | 13.2             | 15.4  | 400    | 20.0                               | 15.0                       | 7.5                   |
| 24x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.26                      | 1.0                           | 15.2             | 17.8  | 500    | 20.0                               | 15.0                       | 7.5                   |
| 32x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.26                      | 1.0                           | 16.6             | 19.4  | 610    | 20.0                               | 15.0                       | 7.5                   |
| 37x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.26                      | 1.0                           | 17.2             | 20.1  | 670    | 20.0                               | 15.0                       | 7.5                   |
| 40x1                             | 1.25                   | 0.4                               | 2.0             | 2.4  | 0.26                      | 1.2                           | 18.2             | 21.3  | 740    | 20.0                               | 15.0                       | 7.5                   |
| 4x1.5                            | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.16                      | 0.7                           | 8.0              | 9.4   | 140    | 13.7                               | 14.0                       | 7.0                   |
| 7x1.5                            | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.21                      | 0.7                           | 9.6              | 11.3  | 220    | 13.7                               | 14.0                       | 7.0                   |
| 9x1.5                            | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.21                      | 1.0                           | 12.1             | 14.2  | 290    | 13.7                               | 14.0                       | 7.0                   |
| 12x1.5                           | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.21                      | 1.0                           | 13.0             | 15.2  | 360    | 13.7                               | 14.0                       | 7.0                   |
| 19x1.5                           | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.26                      | 1.0                           | 15.3             | 17.9  | 540    | 13.7                               | 14.0                       | 7.0                   |
| 24x1.5                           | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.26                      | 1.2                           | 18.1             | 21.2  | 700    | 13.7                               | 14.0                       | 7.0                   |
| 32x1.5                           | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.26                      | 1.2                           | 19.8             | 23.2  | 860    | 13.7                               | 14.0                       | 7.0                   |
| 37x1.5                           | 1.5                    | 0.5                               | 2.4             | 2.9  | 0.26                      | 1.2                           | 20.5             | 24.0  | 960    | 13.7                               | 14.0                       | 7.0                   |
| 4x2.5                            | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.21                      | 0.7                           | 9.2              | 10.8  | 200    | 8.21                               | 13.0                       | 6.5                   |
| 7x2.5                            | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.21                      | 0.8                           | 11.1             | 13.0  | 310    | 8.21                               | 13.0                       | 6.5                   |
| 9x2.5                            | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.26                      | 1.0                           | 13.9             | 16.3  | 440    | 8.21                               | 13.0                       | 6.5                   |
| 12x2.5                           | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.26                      | 1.0                           | 15.0             | 17.5  | 520    | 8.21                               | 13.0                       | 6.5                   |
| 19x2.5                           | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.26                      | 1.2                           | 17.8             | 20.8  | 770    | 8.21                               | 13.0                       | 6.5                   |
| 24x2.5                           | 1.95                   | 0.5                               | 2.9             | 3.4  | 0.26                      | 1.2                           | 20.6             | 24.1  | 970    | 8.21                               | 13.0                       | 6.5                   |

(a)= One earth conductor (green/yellow) can be included upon request

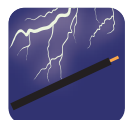
(b)= For information, indicative only



**FRL-MW-1M-OS 0.6/1 kV**

| Nominal Cross-Sectional Area (a) | Conductor Diameter (b) | Min. Mean Thickness of Insulation | Core Dimensions |          | Min. Screen Wire Diameter | Min. Average Sheath Thickness | Overall Diameter |      | Weight | Max. Conductor Resistance<br>20 °C | Min. Insulation Resistance |                       |
|----------------------------------|------------------------|-----------------------------------|-----------------|----------|---------------------------|-------------------------------|------------------|------|--------|------------------------------------|----------------------------|-----------------------|
|                                  |                        |                                   | Min.            | Max.     |                           |                               | Min.             | Max. |        |                                    | EI 110<br>20 °C            | EI 106/7/8/9<br>20 °C |
|                                  |                        |                                   |                 |          |                           |                               |                  |      |        |                                    |                            |                       |
| <b>TWO CORES</b>                 |                        |                                   |                 |          |                           |                               |                  |      |        |                                    |                            |                       |
| 1.5                              | 1.5                    | 0.7                               | 2.8             | 3.3      | 0.16                      | 0.70                          | 7.9              | 9.9  | 90     | 13.7                               | 21.0                       | 10.5                  |
| 2.5                              | 1.95                   | 0.7                               | 3.2             | 3.8      | 0.16                      | 0.70                          | 8.7              | 10.7 | 120    | 8.21                               | 17.2                       | 8.6                   |
| 4                                | 2.5                    | 0.7                               | 3.8             | 4.4      | 0.21                      | 0.80                          | 10.2             | 12.7 | 170    | 5.09                               | 14.2                       | 7.1                   |
| 6                                | 3.0                    | 0.7                               | 4.2             | 5.0      | 0.21                      | 0.80                          | 10.9             | 13.6 | 210    | 3.39                               | 12.2                       | 6.1                   |
| 10                               | 3.9                    | 0.7                               | 5.1             | 5.9      | 0.21                      | 1.00                          | 13.4             | 16.6 | 320    | 1.95                               | 9.8                        | 4.9                   |
| 16                               | 5.0                    | 0.7                               | 6.1             | 7.2      | 0.26                      | 1.00                          | 16.0             | 19.8 | 470    | 1.24                               | 7.9                        | 3.9                   |
| 25                               | 6.4                    | 0.9                               | 7.8             | 9.1      | 0.26                      | 1.20                          | 19.8             | 24.6 | 690    | 0.795                              | 7.3                        | 3.6                   |
| 35                               | 7.7                    | 0.9                               | 9.0             | 10.6     | 0.31                      | 1.40                          | 22.8             | 27.9 | 940    | 0.565                              | 6.7                        | 3.3                   |
| 50                               | 9.2                    | 1.0                               | 10.6            | 12.4     | 0.31                      | 1.40                          | 26.4             | 32.3 | 1260   | 0.393                              | 6.3                        | 3.1                   |
| <b>THREE CORES</b>               |                        |                                   |                 |          |                           |                               |                  |      |        |                                    |                            |                       |
| 1.5                              | 1.5                    | 0.7                               | 2.8             | 3.3      | 0.16                      | 0.70                          | 8.4              | 10.4 | 120    | 13.7                               | 21.0                       | 10.5                  |
| 2.5                              | 1.95                   | 0.7                               | 3.2             | 3.8      | 0.16                      | 0.70                          | 9.2              | 11.4 | 160    | 8.21                               | 17.2                       | 8.6                   |
| 4                                | 2.5                    | 0.7                               | 3.8             | 4.4      | 0.21                      | 0.80                          | 10.8             | 13.3 | 230    | 5.09                               | 14.2                       | 7.1                   |
| 6                                | 3.0                    | 0.7                               | 4.2             | 5.0      | 0.21                      | 0.80                          | 11.6             | 14.3 | 300    | 3.39                               | 12.2                       | 6.1                   |
| 10                               | 3.9                    | 0.7                               | 5.1             | 5.9      | 0.26                      | 1.00                          | 14.4             | 18.0 | 500    | 1.95                               | 9.8                        | 4.9                   |
| 16                               | 5.0                    | 0.7                               | 6.1             | 7.2      | 0.26                      | 1.20                          | 17.4             | 21.3 | 680    | 1.24                               | 7.9                        | 3.9                   |
| 25                               | 6.4                    | 0.9                               | 7.8             | 9.1      | 0.26                      | 1.20                          | 21.3             | 26.1 | 970    | 0.795                              | 7.3                        | 3.6                   |
| 35                               | 7.7                    | 0.9                               | 9.0             | 10.6     | 0.31                      | 1.40                          | 24.5             | 29.8 | 1330   | 0.565                              | 6.7                        | 3.3                   |
| 50                               | 9.2                    | 1.0                               | 10.6            | 12.4     | 0.31                      | 1.60                          | 28.3             | 34.6 | 1820   | 0.393                              | 6.3                        | 3.1                   |
| <b>FOUR CORES</b>                |                        |                                   |                 |          |                           |                               |                  |      |        |                                    |                            |                       |
| 1.5                              | 1.5                    | 0.7                               | 2.8             | 3.3      | 0.16                      | 0.70                          | 9.1              | 11.3 | 150    | 13.7                               | 21.0                       | 10.5                  |
| 2.5                              | 1.95                   | 0.7                               | 3.2             | 3.8      | 0.21                      | 0.80                          | 10.4             | 12.9 | 220    | 8.21                               | 17.2                       | 8.6                   |
| 4                                | 2.5                    | 0.7                               | 3.8             | 4.4      | 0.21                      | 0.80                          | 11.8             | 14.5 | 290    | 5.09                               | 14.2                       | 7.1                   |
| 6                                | 3.0                    | 0.7                               | 4.2             | 5.0      | 0.21                      | 1.00                          | 13.1             | 16.1 | 400    | 3.39                               | 12.2                       | 6.1                   |
| 10                               | 3.9                    | 0.7                               | 5.1             | 5.9      | 0.26                      | 1.00                          | 15.9             | 19.5 | 640    | 1.95                               | 9.8                        | 4.9                   |
| 16                               | 5.0                    | 0.7                               | 6.1             | 7.2      | 0.26                      | 1.20                          | 19.3             | 23.6 | 860    | 1.24                               | 7.9                        | 3.9                   |
| 25                               | 6.4                    | 0.9                               | 7.8             | 9.1      | 0.31                      | 1.40                          | 24.0             | 29.3 | 1290   | 0.795                              | 7.3                        | 3.6                   |
| 3x35+25                          | 7.7/6.4                | 0.9/0.9                           | 9.0/7.8         | 10.6/9.1 | 0.31                      | 1.4                           | 26.9             | 32.9 | 1910   | 0.565/0.795                        | 6.7                        | 3.3                   |
| 3x50+25                          | 9.2/6.4                | 1.0/0.9                           | 10.6/7.8        | 12.4/9.1 | 0.31                      | 1.6                           | 31.5             | 38.2 | 2560   | 0.393/0.795                        | 6.3                        | 3.1                   |

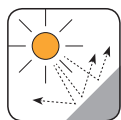
(a)= For information, indicative only



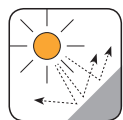
Corona Resistant



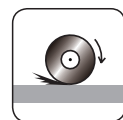
Highly Flexible



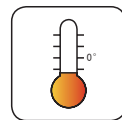
UV Resistant



Ozone Resistant



Abrasion Retardant



Cold Resistant



Resistance To Soldering Heat



Acid & Alkaline Resistant



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



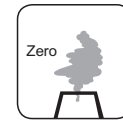
Low Toxicity  
EN 50305: NF X70-100/NF  
F63 808/TM1-04/BS 6853



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