

**Raychem**  
**Wire & Cable**

Raychem Zerohal 100F has been developed to meet the exceptionally demanding requirements of French norm NF F 63-808.

The construction is a dual wall combination of Raychem formulated polymer blends developed to meet the specification requirements.

- Qualified to NF F 63-808
- Halogen free, low smoke
- Highly flame retarded
- Flexible, easy to install
- Small size, lightweight (thin wall constructions)

**Zerohal 100**

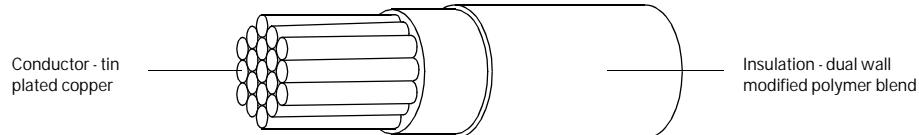
Type 100F  
Wire and cable

Careful attention has also been paid to additional features identified by installers as desirable; flexibility, non wrinkling, ease of stripping and compatibility with standard stripping equipment, lack of recoil and mechanical robustness.

Resistance to stress crazing in commonly used solvents is also an inherent feature of Zerohal 100F.

**Approvals**

NF F 63-808 (Railway rolling stock - Halogen free, electrical conductors and cables with thin insulation and protective layers.)

**Ordering information**

Conductor		Insulated wire						
Cross sectional area	Size	Stranding No x nom dia (mm)	Diameter (mm)	Maximum resistance at 20°C	Diameter (mm)	Maximum weight	Raychem Part Number	NF F 63-808 designation
mm <sup>2</sup>			min max	ohms/km	min max	kg/km		
0.60	20	19x0.20	0.96 1.01	31.10	1.47 1.55	7.40	100F0111-20	E 250-S-0.60-NF F 63-808
0.93	18	19x0.25	1.19 1.26	20.00	1.70 1.80	11.21	100F0111-18	E 250-S-0.93-NF F 63-808
1.34	16	19x0.30	1.45 1.52	14.00	1.99 2.09	15.40	100F0111-16	E 250-S-1.34-NF F 63-808
1.82	14	37x0.25	1.68 1.82	10.50	2.30 2.42	21.13	100F0111-14	E 250-S-1.82-NF F 63-808
2.61	12	37x0.30	2.02 2.12	7.35	2.62 2.77	27.91	100F0111-12	E 250-S-2.61-NF F 63-808
4.32	10	61x0.30	2.53 2.90	4.46	3.29 3.46	48.38	100F0111-10	E 250-S-4.32-NF F 63-808

**Physical characteristics****Handleability**

Zerohal 100F is easy to strip, increases stripblade life in comparison with wires employing aromatic polymer insulation, and is designed for minimum recoil during harnessing operations.

**Small size**

Zerohal 100F offers the benefit of up to 50% size and weight savings in comparison with the thick wall constructions defined in NF F 63-826. This can reduce the volume of typical wire bundles by up to 75%.

**Lightweight**

The weight of wire and cable in a typical modern, sophisticated railcar can be reduced by up to 500 kg by employing Zerohal 100F as an alternative to and in comparison with NF F 63-826 constructions.

# Zerohal 100F

## Typical properties

Test	Method	Typical value
Max. operating temperature	NF F 63-808	105°C
Insulation shrinkage (150°C)	NF F 63-808	< 0.5%
Low temperature bend	NF C 32-027	-25°C
Hot compression	NF C 32-029	150°C
Accelerated ageing	NF C 32-027, NF C 32-025	No voltage breakdown
Voltage rating	NF F 63-808	250 V rms*
Notch resistance	NF F 63-808	Pass
Abrasion resistance	NF F 63-808	Pass
Insulation blocking (150°C)	NF F 63-808	Pass
Cut-through resistance	NF C 93-522	Pass
Dielectric breakdown	NF F 63-808	> 5 kV
Insulation resistance (20°C)	NF F 63-808	> 5000 M ohms. km (K'-factor)
Oil resistance (ASTM No. 2)	NF C 32-021, NF C 32-024 70°C 24 h	Pass
Insulation:		
Tensile strength	NF C 32-024	> 30 MPa
Elongation at break	NF C 32-024	> 100%

For further details please consult French Norm NF F 63-808.

\* Suitable for use at an operating voltage of 750/1300 Volts AC

## Environmental properties

Fluid resistance  
Zerohal 100F wire demonstrates outstanding resistance to most acids, alkalis, hydrocarbon solvents, fuels, lubricants and water.

Voltage rating  
Zerohal 100F is available as a 250 V rms. rated wire.

## Fire hazard characteristics

Zerohal 100F is a halogen free insulation system and does not contain phosphorus or sulphur. It meets the flame propagation, fire propagation, Indice de fumée and corrosivity requirements of NF F 63-808.

## Flammability

Zerohal 100F passes IEC 332 (parts 1, 3) flammability tests in addition to the French Norm NF C 32070 (tests 1 and 2).

## Indice de fumée

Zerohal 100F is qualified to NF F 63-808 with an Indice de fumée of typically less than 2.

## Fire hazard properties

Test	Method	Typical value
Flame propagation	NF C 32-070	< 30 sec after burn, > 200 mm undamaged length
Fire propagation	NF C 32-070 (test 2)	Classification C1
Indice de fumée	NF F 16-101	< 2
Corrosivity	NF C 20-453	> pH 4

# Zerohal 100

## Other available constructions

Zerohal 100F is also available as twisted pair and triple and screened and jacketed single, pair, triple and quad constructions as defined in NF F 63-808 specification as follows.

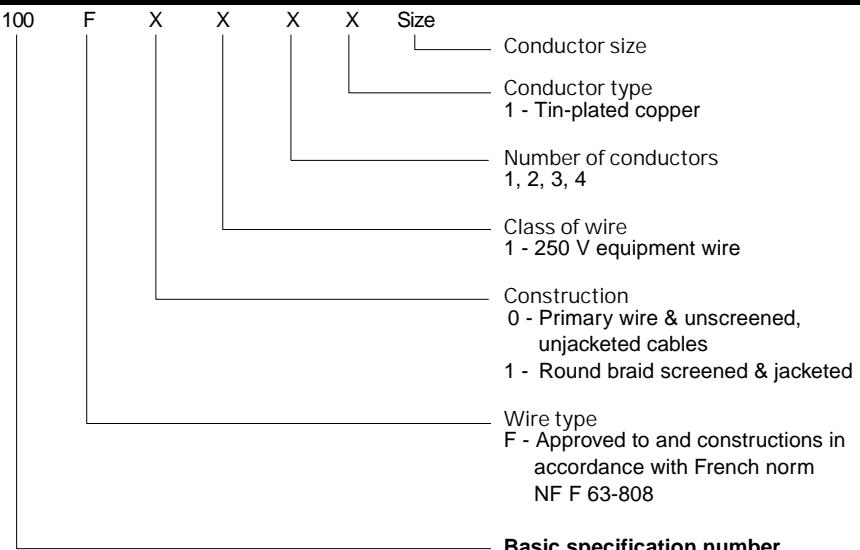
Raychem part number	100F0121 4(E)	100F0131 4(E)	100F1111 2(E)	100F1121 3(E)	100F1131 3(E)	100F1141 3(E)
NF F 63-808 designation	E 250-S-2x †-NF F 63-808	E 250-S-3x †-NF F 63-808	E 250-S-BLG- †-NF F 63-808	E 250-S-BLG-2x †-NF F 63-808	E 250-S-BLG-3x †-NF F 63-808	E 250-S-BLG-4x †-NF F 63-808



Conductor size	OD Max. (mm)	Weight Max. (kg/km)										
20	3.10	15.24	3.35	22.87	—	—	4.42	35.06	4.67	40.91	5.07	55.82
18	—	—	—	—	2.99	21.42	4.92	45.52	5.21	54.60	—	—
16	—	—	—	—	3.20	26.29	5.53	57.64	—	—	6.41	96.82
14	—	—	—	—	—	—	6.20	73.15	—	—	—	—

† = conductor cross sectional area in mm<sup>2</sup>. — = construction not defined in NF F 63-808.

## Part numbering system



Insulation colours available depend on conductor size:

Conductor CSA (mm <sup>2</sup> )	4.32	2.61	1.82	1.34	0.93	0.60
Conductor size	10	12	14	16	18	20
Insulation colour	Green	White	Yellow	Green	Whilte	Yellow

100F1111, 100F1121, 100F1131, 100F1141 constructions have a black outer sheath.

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