

## ZPAU & ZPAU-SH Main Signalling Cables (AC Electrified Lines)

### Applications

The cables are designed for connection between traffic control centers and equipment shelters along the trackside. The cables are specially designed to give good induction protection (R.F= 0.26 at inductive voltage 100V/km) and are suitable for installation in intercity railways electrified at 25KV ac.



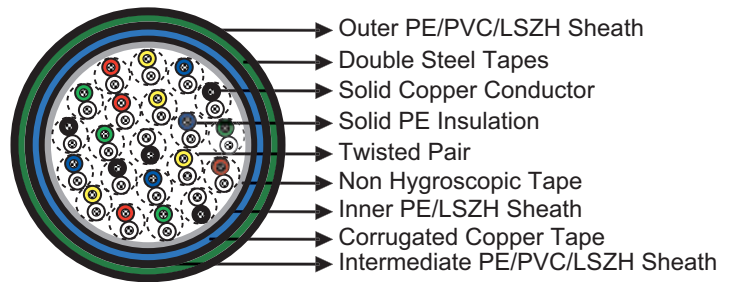
### Standards

- SNCF CT 445 / SNCT ST 698G
- NF F 55-698

### Construction

• Conductors: Solid annealed copper, 1.0/1.5 mm<sup>2</sup> nominal cross section area.

- Insulation: Solid polyethylene.
- Cabling Element: Each two conductors are twisted together to form a pair.
- Stranding: Pairs are helically stranded in layers to form the cable core.
- Core Wrapping: Plastic tape(s) with overlapping.
- Inner Sheath: PE sheath. LSZH FR option can be offered upon request to NF C 32 070.2.2 (C1).
- Electrostatic Shield: One corrugated copper tape.
- Intermediate Sheath: PE/PVC sheath. LSZH FR option can be offered upon request to NF C 32 070.2.2 (C1).
- Electromagnetic Shield: Two helically applied steel tapes of 0.5mm.
- Outer Sheath: PE/PVC Sheath. LSZH FR option can be offered upon request to NF C 32 070.2.2 (C1).
- Remarks: ZPAU: PE/PVC Sheath; ZPAU-SH: LSZH Sheath.



### Electrical Characteristics at 20°C

|  |                 |         |         |
|--|-----------------|---------|---------|
| Nominal Conductor Diameter                                     | mm              | 1.13    | 1.38    |
| Nominal Cross Section Area                                     | mm <sup>2</sup> | 1.0     | 1.5     |
| Maximum Conductor Resistance (DC)                              | Ω/km            | 18.1    | 12.31   |
| Minimum Insulation Resistance @500 V DC (3mins)                | MΩ.km           | 5000    | 5000    |
| Maximum Mutual Capacitance @1000Hz (AC)                        | nF/km           | 55      | 55      |
| Maximum Capacitance Unbalance (pair to pair) @800Hz            |                 |         |         |
| 100% cases   | pF/500 m        | 400     | 400     |
| 90% cases  | pF/500 m        | 200     | 200     |
| Attenuation @45KHz   | dB/km           | 2.5     | 2.5     |
| Characteristic Impedance @45KHz                                | Ω               | 120     | 120     |
| Dielectric Strength, conductor to conductor (DC voltage 3secs) | V               | 4500    | 4500    |
| Operating Voltage (AC/DC)                                      | V               | 450/750 | 450/750 |
| Peak Value (AC)  | V               | 900     | 900     |



## ➤ Mechanical and Thermal Properties

- Minimum Bending Radius: 8×OD (static); 16×OD (dynamic)
- Temperature Range: -40°C to +70°C (during operation); -20°C to +50°C (during installation)

## ➤ Reduction Factor

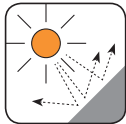
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|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Inductive Voltage (V/km) Em | 28   | 32   | 37   | 42   | 47   | 50   | 70   | 80   | 100  | 120  | 170  | 225  |
| Reduction Factor @50Hz Rk   | 0.75 | 0.70 | 0.60 | 0.50 | 0.40 | 0.35 | 0.30 | 0.28 | 0.26 | 0.25 | 0.24 | 0.25 |

## ➤ Dimensions and Weight

| Cable Code                              | No. of Pairs | Nominal Sheath Thickness mm |         |       | Nominal Overall Diameter mm | Nominal Weight kg/km |
|---|--------------|-----------------------------|---------|-------|-----------------------------|----------------------|
|   |              | Inner                       | Intern. | Outer |                             |                      |
| 1.13mm Conductor, 2.3mm Insulated Wire  |              |                             |         |       |                             |                      |
| RS/ZPAU-2Y2Y(K)2YB2Y-1P1S               | 1            | 1.0                         | 0.8     | 1.6   | 16.2                        | 490                  |
| RS/ZPAU-2Y2Y(K)2YB2Y-2P1S               | 2            | 1.0                         | 0.8     | 1.6   | 17.0                        | 550                  |
| RS/ZPAU-2Y2Y(K)2YB2Y-3P1S               | 3            | 1.0                         | 0.8     | 1.6   | 22.2                        | 820                  |
| RS/ZPAU-2Y2Y(K)2YB2Y-4P1S               | 4            | 1.0                         | 0.8     | 1.6   | 23.8                        | 890                  |
| RS/ZPAU-2Y2Y(K)2YB2Y-7P1S               | 7            | 1.0                         | 0.8     | 1.7   | 26.7                        | 1080                 |
| RS/ZPAU-2Y2Y(K)2YB2Y-14P1S              | 14           | 1.2                         | 0.8     | 1.8   | 32.3                        | 1560                 |
| RS/ZPAU-2Y2Y(K)2YB2Y-21P1S              | 21           | 1.2                         | 1.1     | 2.0   | 37.2                        | 1990                 |
| RS/ZPAU-2Y2Y(K)2YB2Y-28P1S              | 28           | 1.2                         | 1.1     | 2.2   | 41.4                        | 2380                 |
| RS/ZPAU-2Y2Y(K)2YB2Y-56P1S              | 56           | 1.3                         | 1.3     | 2.5   | 52.9                        | 3700                 |
| 1.38mm Conductor, 2.55mm Insulated Wire |              |                             |         |       |                             |                      |
| RS/ZPAU-2Y2Y(K)2YB2Y-14P1.5S            | 14           | 1.2                         | 0.8     | 1.8   | 35.0                        | 2050                 |
| RS/ZPAU-2Y2Y(K)2YB2Y-21P1.5S            | 21           | 1.2                         | 1.1     | 2.0   | 39.5                        | 2525                 |



Anti Induction



UV Resistant



Mineral Oil Resistant



Rated voltage

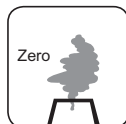


Buried in Ciround



Laid In Ducts

PE Sheath



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

PVC Sheath



Flame Retardant  
NF C32-070-2.1(C2)  
IEC 60332-1/EN 50265-2-1

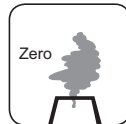
LSZH Sheath



Flame Retardant  
NF C32-070-2.1(C2)  
IEC 60332-1/EN 50265-2-1



Fire Retardant  
NF C32-070-2.2(C1)  
IEC 60332-3/EN50266



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



Low Smoke Emission  
IEC 61034/NFC20-902  
EN 50268/NF C32-073



Low Corrosivity  
EN 50267-2-2/NF C32-074  
IEC 60754-2/NF C20-453



Low Toxicity

