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TECHNICAL CONDITIONS FOR SMALL DIAMETER CO-AXIAL PAIRS (1)

NUMERISATION DANS L'ETAT DU DOCUMENT

R Article 1 - Application

Small diameter coaxial pairs are suitable for the transmission of 2-wire carrier frequency systems in the 60 to 1300 kc/s frequency band, the same frequencies being used for both transmission directions. In cases where it is more economical to do so, they should also be used for the transmission of 2-wire carrier frequency systems in the 60 to 1300 kc/s frequency band, different frequencies being used for each direction of transmission.

(1) Obligatory regulations are preceded by an asterisk thus : *

(revised on 1-1-1984)

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R Article 2 - Profitability

2.1. The profitability of operating carrier frequency systems over small diameter coaxial pairs compared with the operation of communications at audio frequency, or with that of carrier frequencies over balanced pairs, depends on certain conditions which should be studied in detail. Special consideration should be given to the following points :

2.1.1. Over lines where the laying of cables proves necessary for other reasons, the opportunity should be taken at the same time to include coaxial pairs in the tele-communications cables.

2.1.2. If the coaxial pairs are not used to the fullest extent by carrier frequency telephone circuits they are only economic above a minimum number of circuits.

2.1.3. The various carrier frequency telephone circuits only become economic if they are operated beyond a minimum distance.

2.1.4. If it is necessary to derive telephone circuits from a carrier frequency system, the number of telephone circuits operated on the partial lines should not be too small.

2.2. It is recommended that a comparison should be made between the profitability of the various solutions, in view of the fact that the cost may be different on the various Railways. In addition, the use of coaxial pairs can be dictated solely by operating reasons, for example the absence of interference, and this should be taken into account in calculating the profitability.

* Article 3 - Definition

Small diameter coaxial pairs shall be understood as being those with the following nominal dimensions :

Diameter of the internal conductor : 1.2 mm
Internal diameter of the external conductor : 9.4 mm
Thickness of the external conductor : 0.18 mm or 0.15 mm optional.

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R Article 4 - Arrangement of small diameter coaxial pairs in composite cables

4.1. Cables containing small diameter coaxial pairs may also include balanced pairs.

4.2. When coaxial pairs are arranged in a cable layer with star-quads or as combinable pairs, the external diameter of certain cable elements in this layer should be increased to make the cable as uniform as possible.

4.3. If this arrangement is unsuitable, a cable layer should be formed with the coaxial pairs only, placing them preferably in the centre.

NOTE : To avoid restricting the manufacturing alternatives on the part of the makers, the latter may exercise their discretion regarding details of manufacture, insofar as compliance with the electrical values allows.

x Article 5 - Electrical values of manufactured lengths

(standard length 425 m)

5.1. Insulation resistance measured with direct current at a temperature of + 20°C.

5.1.1. Between the internal and external conductors : 5 $\geqslant$ 6 GΩ/km.

5.1.2. If coaxial pairs are used for carrier frequency systems with floating potential, the insulation resistance between an external conductor on the one hand, and the other external conductors, the other conductors in the cable, and the metal cable sheathing on the other, must be $\geqslant$ 0.1 GΩ/km.

5.2. Linear resistance measured with direct current at a temperature of + 20°C.

5.2.1. Internal conductor : $\leqslant$ 16.5 Ω/km.

5.2.2. External conductor for a thickness of 0.18 mm : $\leqslant$ 7.5 Ω/km
for a thickness of 0.15 mm : $\leqslant$ 8.5 Ω/km

5.3. Characteristic impedance at 1000 kc/s

5.3.1. Nominal value 75 Ω.

5.3.2. Average value of manufactured lengths forming part of a repeater section 75 ± 1.5 Ω.

5.3.3. Difference in the value of a manufactured length in a repeater section in relation to the average value : $\leqslant$ 1 Ω.

5.3.4. If, in a national network, the manufactured lengths are laid according to a grouping plan, the average value defined in 5.3.2. can be 75 ± 2 Ω, and the difference in the value of a manufactured length defined in 5.3.3. can be $\leqslant$ 3 Ω, provided the conditions of Article 6 are met.

5.4. Permissible values of the reflection coefficient.

5.4.1. For all manufactured lengths of a repeater section : $\leqslant$ 0.6 % (reflection attenuation $\geqslant$ 5.2 N).

5.4.2. For 80% of manufactured lengths of a repeater section: $\leqslant$ 0.4% (reflection attenuation $\geqslant$ 5.5 N).

5.5 Crosstalk at 60 kc/s between small diameter coaxial pairs: Basic value of far-end crosstalk (far-end crosstalk attenuation less attenuation of the manufactured length).

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5.6. Dielectric strength tests

5.6.1. An alternating voltage of $1000V_{eff}$ at 50 c/s, or a continuous voltage of 1500V, is applied to the manufactured lengths between the internal and external conductors, for a period of 2 minutes.

5.6.2. An alternating voltage of $2000V_{eff}$ at 50 c/s, is applied for a period of 2 minutes between the external conductors, on the one hand, and the other conductors on the other, if the carrier frequency system incorporates external conductors to earth.

5.6.3. An alternating voltage of $2000V_{eff}$ at 50 c/s, is applied to the manufactured lengths between an external conductor and the other conductors or metal sheaths, for a period of 2 minutes, if the carrier frequency system does not incorporate external conductors to earth (floating potential).

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