# Telcordia (Bellcore) vs. RUS Specifications

For OSP Copper Exchange Cable

## Construction

### Conductor

Both use solid annealed copper in 19, 22, 24 and 26 gauges.

### Conductor Insulation

Both permit polypropylene or high density polyethylene in solid or foam-skin forms. Telcordia specification also permits medium density polyethylene, but this is rarely used.

### Units/Cores

Both use 25 pair units, as well as 50 and 100 pair multi-units. Telcordia specification cables use mirror image construction on cables 1200 pair and larger. Smaller sizes and all RUS cables use a fully color-coded core construction.

### Filling Compound

The entire core assembly of both products is filled with an extended thermoplastic rubber (ETPR) compound with an 80°C flow rating.

### Spare Pairs

Telcordia specification cables use spare pairs in cables over 900 pairs. One spare pair is included for every 300 pairs plus one extra spare pair. These spare pairs are utilized when there are defective pairs in the cable. RUS does not permit the use of spare pairs. However, RUS does permit a limited number of pairs to deviate from selected electrical requirements.

### Sheath

Both permit the use of low density, linear low density or medium density polyethylene jacket material. Telcordia specifications require uncoated metals as shielding materials, except when bonding is required. RUS specifies coating both sides of aluminum and steel for corrosion protection. Flooded and bonded designs are allowed by both Telcordia and RUS depending on the application.

## Exchange Cable Electrical Requirements per RUS Specifications

| | | ANSI/ICEA S-85-625-2002 Solid Insulated, Aircore | | | | RUS 7 CFR 1755.390 (PE-39) Solid Insulated, Filled Core | | | | RUS 7 CFR 1755.890 (PE-89) Foam-skin Insulated, Filled Core | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 19 | 22 | 24 | 26 | 19 | 22 | 24 | 26 | 19 | 22 | 24 | 26 |
| Mutual Capacitance, Average @ 73 ± 5°F, 1 kHz, (nF/mile) | ≤ 12-pair | 83 ± 7 | | | | 83 ± 7 | | | | 83 ± 7 | | | |
| | > 12-pair | 83 ± 4 | | | | 83 ± 4 | | | | 83 ± 4 | | | |
| Mutual Capacitance, Max. @ 73 ± 5°F, 1 kHz, (nF/mile) | ≤ 12-pair | 94 | | | | 94 | | | | 94 | | | |
| | > 12-pair | 92 | | | | 92 | | | | 92 | | | |
| Capacitance Difference, Max. @ 23 ± 2°C, (%) | ≥ 75-pair | -- | | | | 2 | | | | 2 | | | |
| Capacitance Unbalance, Max. Pair-to-Pair @ 73 ± 5°F, (pF/kft) | Individual Pair | 80 | | | | 80 | | | | 80 | | | |
| | RMS (> 12-pair only) | 25 | | | | 25 | | | | 25 | | | |
| Capacitance Unbalance, Max. Pair-to-Ground @ 73 ± 5°F (pF/kft) | Individual Pair | 800 | | | | 800 | | | | 800 | | | |
| | Cable Average (> 12-pair only) | 175 | | | | 175 | | | | 175 | | | |
| DC Conductor Resistance, Max. @ 68°F, (ohms/sheath-mile) | | 45.0 | 91.0 | 144.0 | 232.0 | 45.0 | 91.0 | 144.0 | 232.0 | 45.0 | 91.0 | 144.0 | 232.0 |
| DC Resistance Unbalance, Maximum (%) | Individual Pair | 5.0 | | | | 5.0 | | | | 5.0 | | | |
| | Average | 1.5 | | | | 1.5 | | | | 1.5 | | | |
| Dielectric Strength, Minimum (kV) | Conductor to Conductor | 5.0 | 4.0 | 3.0 | 2.4 | 7.0 | 5.0 | 4.0 | 2.8 | 4.5 | 3.6 | 3.0 | 2.4 |
| | Core to Shield, Single Jacket | 10 | | | | 15 | | | | 10 | | | |
| | Core to Shield, Double Jacket | 20 | | | | 20 | | | | 20 | | | |
| Insulation Resistance, Min. (gigohm•mile) | | > 1.0 | | | | > 1.0 | | | | > 1.0 | | | |
| Attenuation, Max. Average @ 68°F, 0.772 MHz (dB/kft) | >12-pair | 3.3 | 4.7 | 5.9 | 7.4 | 2.8 | 4.0 | 5.0 | 6.5 | 3.2 | 4.5 | 5.6 | 7.1 |
| | ≤12-pair | 3.6 | 5.2 | 6.5 | 8.1 | 3.1 | 4.4 | 5.5 | 7.2 | 3.5 | 5.0 | 6.2 | 7.8 |
| ELFEXT Minimum @ 0.772 MHz*, (dB/kft) | Mean Power Sum | 51 | 49 | 49 | 47 | 51 | 49 | 49 | 47 | 51 | 49 | 49 | 47 |
| | Worst Pair Power Sum | 45 | 43 | 43 | 43 | 45 | 43 | 43 | 43 | 45 | 43 | 43 | 43 |
| NEXT Minimum @ 0.772 MHz*, (dB/kft) | Mean Power Sum | 47 | | | | 47 | | | | 47 | | | |
| | Worst Pair Power Sum | 42 | | | | 42 | | | | 42 | | | |

**RUS specifications also require crosstalk testing at 1.600, 3.150 and 6.300 MHz.*

## Exchange Cable Electrical Requirements per Telcordia GR-421-CORE

| | | Solid Insulated Aircore | | | | Foam-Skin Insulated Aircore | | | | Solid Insulated Filled Core | | | | Foam-Skin Insulated Filled Core | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 19 | 22 | 24 | 26 | 19 | 22 | 24 | 26 | 19 | 22 | 24 | 26 | 19 | 22 | 24 | 26 |
| Mutual Capacitance, Avg. @ 73 ± 4°F, 1 kHz, (nF/mile) | ≤ 12-pair | 83 ± 7 | | | | 83 ± 7 | | | | 83 ± 7 | | | | 83 ± 7 | | | |
| | > 12-pair | 83 +4/-5 | | | | 83 +4/-5 | | | | 83 ± 4 | | | | 83 ± 4 | | | |
| Mutual Capacitance, Max. @ 73 ± 4°F, 1 kHz, (nF/mile) | ≤ 12-pair | 94 | | | | 94 | | | | 94 | | | | 94 | | | |
| | > 12-pair | 92 | | | | 92 | | | | 92 | | | | 92 | | | |
| Capacitance Difference, Max. @ 23 ± 2°C, ≥75 pair, (%) | | No requirement | | | | | | | | | | | | | | | |
| Capacitance Unbalance, Max. Pair-to-Pair @ 73 ± 4°F, (pF/kft) | Individual Pair | 80 | | | | 80 | | | | 80 | | | | 80 | | | |
| | RMS (> 12-pair only) | 25 | | | | 25 | | | | 25 | | | | 25 | | | |
| Capacitance Unbalance, Max. Pair-to-Ground @ 73 ± 4°F (pF/kft) | Individual Pair | 800 | | | | 800 | | | | 800 | | | | 800 | | | |
| | Cable Average (> 12-pair only) | 175 | | | | 175 | | | | 175 | | | | 175 | | | |
| | Lot Average (> 12-pair only) | 105 | | | | 105 | | | | 105 | | | | 105 | | | |
| DC Conductor Resistance, Max. @ 68°F, (ohms/sheath mile) | Individual Conductor | 45 | 91 | 144 | 232 | 45 | 91 | 144 | 232 | 45 | 91 | 144 | 232 | 45 | 91 | 144 | 232 |
| | Lot Average | 44 | 89 | 140 | 225 | 44 | 89 | 140 | 225 | 44 | 89 | 140 | 225 | 44 | 89 | 140 | 225 |
| DC Resistance Unbalance, Max. (%) | Individual Pair | 5.0 | | | | 5.0 | | | | 5.0 | | | | 5.0 | | | |
| | Cable Average | 1.5 | | | | 1.5 | | | | 1.5 | | | | 1.5 | | | |
| | Lot Average | 1.1 | | | | 1.1 | | | | 1.1 | | | | 1.1 | | | |
| Dielectric Strength, Min. (kV) | Conductor to Conductor | 5 | 4 | 3 | 2.4 | - | 1.4 | 1.2 | 1 | 7 | 5 | 4 | 2.8 | 4.5 | 3.6 | 3 | 2.4 |
| | Core to Shield, Single Jacket | 10 | | | | 5 | | | | 15 | | | | 10 | | | |
| | Core to Shield, Double Jacket | 20 | | | | 20 | | | | 20 | | | | 20 | | | |
| Insulation Resistance, Min. (gigohm•mile) | | > 1.0 | | | | > 1.0 | | | | > 1.0 | | | | > 1.0 | | | |
| Attenuation, Maximum Avg. @ 68°F, 0.772 MHz (dB/kft) | > 12-pair | 3.3 | 4.7 | 5.9 | 7.4 | - | 5 | 6.3 | 7.9 | 2.8 | 4 | 5 | 6.4 | 3.2 | 4.5 | 5.6 | 7.0 |
| | ≤ 12-pair | 3.6 | 5.2 | 6.5 | 8.1 | - | 5.5 | 6.9 | 8.7 | 3.1 | 4.4 | 5.5 | 7 | 3.5 | 5 | 6.2 | 7.7 |
| ELFEXT, Minimum @ 0.772 MHz**, (dB/kft) | Mean Power Sum | 51 | 49 | 49 | 47 | 51 | 49 | 49 | 47 | 51 | 49 | 49 | 47 | 51 | 49 | 49 | 47 |
| | Worst Pair Power Sum | 45 | 43 | 43 | 43 | 45 | 43 | 43 | 43 | 45 | 43 | 43 | 43 | 45 | 43 | 43 | 43 |
| NEXT, Minimum @ 0.772 MHz**, (dB/kft) | Mean Power Sum | 47 | | | | 47 | | | | 47 | | | | 47 | | | |
| | Worst Pair Power Sum | 42 | | | | 42 | | | | 42 | | | | 42 | | | |

***GR-421-CORE also requires crosstalk testing at 0.150, 1.600, 3.150 and 6.300 MHz.*