# Product: 2412F

## Category 6+ Cable, 4 Pair, F/UTP, CMR

### Product Description

Category 6+ Premise Horizontal Cable (350MHz), 4 Pair, 23 AWG Solid Bare Copper Conductors, F/UTP - Foil Shielded, Riser-CMR, PVC Jacket

### Technical Specifications

#### Product Overview

| | |
|---|---|
| Suitable Applications: | Premise Horizontal Cable, Ethernet 1000BASE-T, Ethernet 100BASE-TX, Ethernet 10BASE-T, Surveillance, PoE++, PoE+, PoE, Noisy Environments |
| Patent: | https://www.belden.com/resources/patents |

#### Construction Details

**Conductor**

| AWG | Stranding | Material | No. of Pairs |
|---|---|---|---|
| 23 | Solid | BC - Bare Copper | 4 |

**Insulation**

| Material | Color Code |
|---|---|
| PO/FEP - Polyolefin / Fluorinated Ethylene Propylene | White/Blue Stripe & Blue, White/Orange Stripe & Orange, White/Green Stripe & Green, White/Brown Stripe & Brown |

| | |
|---|---|
| Bonded-Pair: | No |

**Outer Shield Material**

| Type | Material | Coverage | Drainwire Type |
|---|---|---|---|
| Tape | Polyester + Bi-Laminate (Alum+Poly) | 100% | 24 AWG (Solid) TC |

**Outer Jacket Material**

| Separator Material | Material | Nominal Diameter | Ripcord |
|---|---|---|---|
| Center Member (Patented X-Spline®) | PVC - Polyvinyl Chloride | 0.290 in | No |

#### Electrical Characteristics

**Electricals**

| Max. Conductor DCR | Max. DCR Unbalance | Max. Capacitance Unbalance | Nom. Mutual Capacitance | Nom. Velocity of Prop. |
|---|---|---|---|---|
| 93.8 Ohm/km | 5% | 330 pF/100m | 14 pF/ft | 68% |

**Delay**

| Frequency [MHz] | Max. Delay | Max. Delay Skew | Nominal Velocity of Propagation (VP) [%] |
|---|---|---|---|
| 100 MHz | 537.6 ns/100m | 45 ns/100m | 68% |

**High Freq**

| Frequency [MHz] | Max. Insertion Loss (Attenuation) | Min. NEXT [dB] | Min. PSNEXT [dB] | Min. ACR [dB] | Min. PSACR [dB] | Min. ACRF (ELFEXT) [dB] | Min. PSACRF (PSELFEXT) [dB] | Min. RL (Return Loss) [dB] | Max./Min. Input Impedance (unFitted) | Max./Min. Fitted Impedance | Min. TCL [dB] | Min. ELTCTL [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.772 MHz | 1.8 dB/100m | 77.0 dB | 77.0 dB | 75.2 dB | 76.2 dB | 73.0 dB | 70.0 dB | 19.4 dB | 100 +/- 15 | 100 ± 15 Ohm | 40.0 dB | 37.2 dB |
| 1 MHz | 2.0 dB/100m | 75.3 dB | 75.3 dB | 73.3 dB | 74.3 dB | 70.8 dB | 67.8 dB | 20.0 dB | 100 +/- 15 | 100 ± 15 Ohm | 40.0 dB | 35.0 dB |
| 4 MHz | 3.7 dB/100m | 66.3 dB | 66.3 dB | 62.6 dB | 63.6 dB | 58.8 dB | 55.8 dB | 23.0 dB | 100 +/- 15 | 100 ± 15 Ohm | 40.0 dB | 23.0 dB |
| 8 MHz | 5.2 dB/100m | 61.8 dB | 61.8 dB | 56.6 dB | 57.6 dB | 52.7 dB | 49.7 dB | 24.5 dB | 100 +/- 15 | 100 ± 15 Ohm | 40.0 dB | 16.9 dB |
| 10 MHz | 5.8 dB/100m | 60.3 dB | 60.3 dB | 54.5 dB | 55.5 dB | 50.8 dB | 47.8 dB | 25.0 dB | 100 +/- 15 | 100 ± 15 Ohm | 40.0 dB | 15.0 dB |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 MHz | 7.4 dB/100m | 57.2 dB | 57.2 dB | 49.9 dB | 50.9 dB | 46.7 dB | 43.7 dB | 25.0 dB | 100 +/- 15 | 100 ± 15 Ohm | 38.0 dB | 10.9 dB |
| 20 MHz | 8.3 dB/100m | 55.8 dB | 55.8 dB | 47.5 dB | 48.5 dB | 44.8 dB | 41.8 dB | 25.0 dB | 100 +/- 15 | 100 ± 15 Ohm | 37.0 dB | 9.0 dB |
| 25 MHz | 9.3 dB/100m | 54.3 dB | 54.3 dB | 45.1 dB | 46.1 dB | 42.8 dB | 39.8 dB | 24.3 dB | 100 +/- 15 | 100 ± 15 Ohm | 36.0 dB | 7.0 dB |
| 31.25 MHz | 10.4 dB/100m | 52.9 dB | 52.9 dB | 42.5 dB | 43.5 dB | 40.9 dB | 37.9 dB | 23.6 dB | 100 +/- 15 | 100 ± 15 Ohm | 35.1 dB | 5.1 dB |
| 62.5 MHz | 15.0 dB/100m | 48.4 dB | 48.4 dB | 33.4 dB | 34.4 dB | 34.9 dB | 31.9 dB | 21.5 dB | 100 +/- 15 | 100 ± 15 Ohm | 32.0 dB | |
| 100 MHz | 19.3 dB/100m | 45.3 dB | 45.3 dB | 26.0 dB | 27.0 dB | 30.8 dB | 27.8 dB | 20.1 dB | 100 +/- 15 | 100 ± 15 Ohm | 30.0 dB | |
| 155 MHz | 24.6 dB/100m | 42.4 dB | 42.4 dB | 17.9 dB | 18.9 dB | 27.0 dB | 24.0 dB | 19.5 dB | 100 +/- 22 | 100 ± 15 Ohm | 28.1 dB | |
| 200 MHz | 28.3 dB/100m | 40.8 dB | 40.8 dB | 12.5 dB | 13.5 dB | 24.8 dB | 21.8 dB | 18.7 dB | 100 +/- 22 | 100 ± 15 Ohm | 27.0 dB | |
| 250 MHz | 32.1 dB/100m | 39.3 dB | 39.3 dB | 7.2 dB | 8.2 dB | 22.8 dB | 19.8 dB | 18.0 dB | 100 +/- 32 | 100 ± 15 Ohm | 26.0 dB | |
| 300 MHz | 35.6 dB/100m | 38.1 dB | 36.1 dB | 2.5 dB | 1.5 dB | 21.3 dB | 18.3 dB | 17.5 dB | 100 +/- 32 | 100 ± 15 Ohm | 25.2 dB | |
| 350 MHz | 38.9 dB/100m | 37.1 dB | 35.1 dB | | | 19.9 dB | 16.9 dB | 17.0 dB | 100 +/- 32 | 100 ± 15 Ohm | 24.6 dB | |
| 400 MHz | 42.0 dB/100m | 36.3 dB | 34.3 dB | | | 18.8 dB | 15.8 dB | 16.6 dB | 100 +/- 32 | 100 ± 15 Ohm | 24.0 dB | |
| 450 MHz | 45.0 dB/100m | 35.5 dB | 33.5 dB | | | 17.7 dB | 14.7 dB | 16.2 dB | 100 +/- 32 | 100 ± 15 Ohm | 23.5 dB | |
| 500 MHz | 47.9 dB/100m | 34.8 dB | 32.8 dB | | | 16.8 dB | 13.8 dB | 15.9 dB | 100 +/- 32 | | 23.0 dB | |
| 550 MHz | 50.6 dB/100m | 34.2 dB | 32.2 dB | | | 16.0 dB | 13.0 dB | 15.6 dB | 100 +/- 32 | | 22.6 dB | |

**Voltage**

| UL Voltage Rating |
|---|
| 300 V (CMR) |

## Mechanical Characteristics

**Temperature**

| UL Rating | Operating | Installation | Storage |
|---|---|---|---|
| 75°C | -20°C To +75°C | 0°C To +50°C | -20°C To +75°C |

**Bend Radius**

| Stationary Min. | Installation Min. |
|---|---|
| 1.0 in | 2.25 in |

| | |
|---|---|
| Max. Pull Tension: | 25 lbs |
| Bulk Cable Weight: | 41 lbs/1000ft |

## Standards and Compliance

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|---|---|
| Environmental Suitability: | Riser, Indoor |
| Sustainability: | Product Lens™, Environmental Product Declaration (EPD) Available |
| Flammability / Fire Resistance: | UL 1666 Riser, FT4, FT4, IEC 60332-1-2 |
| NEC / UL Compliance: | 800, CMR |
| CEC / C(UL) Compliance: | CMR |
| ICEA Compliance: | S-116-732-2013 |
| IEEE Compliance: | IEEE 802.3bt Type 1, Type 2, Type 3, Type 4 |
| NEMA Compliance: | ANSI/NEMA WC-66 |
| Data Category: | Category 6 |
| TIA/EIA Compliance: | ANSI/TIA-568.2-D Category 6 |
| CPR Euroclass: | Eca |
| European Directive Compliance: | EU CE Mark, EU Directive 2015/863/EU, EU Directive 2011/65/EU (ROHS II), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16 |
| APAC Compliance: | China RoHS II (GB/T 26572-2011) |

## Part Number

| | |
|---|---|
| Plenum Number: | 2413F |

**Variants**

| Item # | Color | Putup Type | Length | UPC |
|---|---|---|---|---|
| 2412F 0101000 | Black | Reel | 1,000 ft | 612825003809 |
| 2412F 006A500 | Blue | Reel-in-Box | 500 ft | 612825003731 |
| 2412F 0061000 | Blue | Reel | 1,000 ft | 612825003748 |
| 2412F 0081000 | Gray | Reel | 1,000 ft | 612825003755 |
| 2412F 0051000 | Green | Reel | 1,000 ft | 612825003724 |
| 2412F 0031000 | Orange | Reel | 1,000 ft | 612825003700 |
| 2412F 0021000 | Red | Reel | 1,000 ft | 612825003694 |

| | | | | |
|---|---|---|---|---|
| 2412F 009A500 | White | Reel-in-Box | 500 ft | 612825003762 |
| 2412F 0091000 | White | Reel | 1,000 ft | 612825003779 |
| 2412F 0041000 | Yellow | Reel | 1,000 ft | 612825003717 |

## Product Notes

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|---|---|
| Notes: | Electrical values are expected performance based on cable testing and representative performance within a typical Belden system. Values above 300 MHz are for Engineering Information Only. Shield is Bonded to Jacket Inner Wall for Electrical Stability. Print Includes Descending Footage Markings from Max. Put-Up Length to 0. |

## History

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|---|---|
| Update and Revision: | Revision Number: 0.397 Revision Date: 06-05-2020 |