
Sumitomo Ribbon Specification

SE-X**

Optical Fiber Ribbon

with 4, 6, 8, 12, 24 or 36 Fibers



*78 Alexander Drive, Research Triangle Park, NC 27709
Phone (919) 541-8100, Fax (919) 541-8265
www.sumitomoelectric.com*

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1. General

This specification covers the design requirements and performance standards for the supply of optical fiber ribbons as described below. The features described in this document are intended to provide information on the performance of Sumitomo Electric Lightwave's optical ribbon and aid in handling and installation. Please refer to the separate fiber specification for details regarding the optical fiber.

1.1 Ribbon Description

Sumitomo Optical Fiber Ribbons provide an excellent way to boost the productivity of your fiber installations. The ribbon is composed of 4, 6, 8, 12, 24 or 36 individual optical fibers, each brilliantly colored according to TIA specifications. The optical fibers are individually coated with a dual acrylate coating system that consists of a soft inner layer for superior bending protection and a high modulus outer layer which provides excellent mechanical protection to the fiber. After an ink layer is applied to each fiber for identification purposes, the coated optical fibers are arranged into a linear array and encapsulated with a high modulus acrylate jacket. Modular ribbons (8-, 24-, and 36- fiber optical ribbons) are constructed by extruding a second high modulus acrylate jacket over two ribbons aligned edge-to-edge. The modular ribbon may then be split into the two sub-ribbons. The ribbon and fiber coatings may be easily removed with standard thermal strippers for mass splicing or the individual fibers may be peeled apart for single fiber access. The convenience of the flat matrix design and our guarantee against fiber curl ensures high precision fusion splicing and easy fiber identification in the field.

Sumitomo's optical fiber ribbons have been rigorously tested against Bellcore's GR-20 standards.

1.2 Quality

Sumitomo ensures a high level of quality through ISO / TL 9000 registered Quality Management Systems and our commitment to continuous improvement. Guaranteed, high quality products have been manufactured at Sumitomo's facility in Research Triangle Park, North Carolina since 1984.

1.3 Reliability

Sumitomo ensures product reliability through rigorous qualification testing of each product family to meet or exceed industry standards. Both initial and periodic qualification testing are performed to assure the ribbon's performance and durability in the field environment.

Sumitomo supports industry standards organizations such as Telcordia (Formerly Bellcore), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC), American Society for Testing and Materials (ASTM), Rural Utilities Service (RUS), The Institute of Electrical and Electronics Engineers (IEEE), and Insulated Cable Engineers Association (ICEA).

2. Ribbon Design

2.1 General

Sumitomo's optical fiber ribbons come in fiber counts of 4, 6, 8, 12, 24 or 36. The ribbon is robust enough for additional processing or end-user handling in the field, and at the same time, can be easily peeled apart to access the underlying fibers cleanly without special tools.

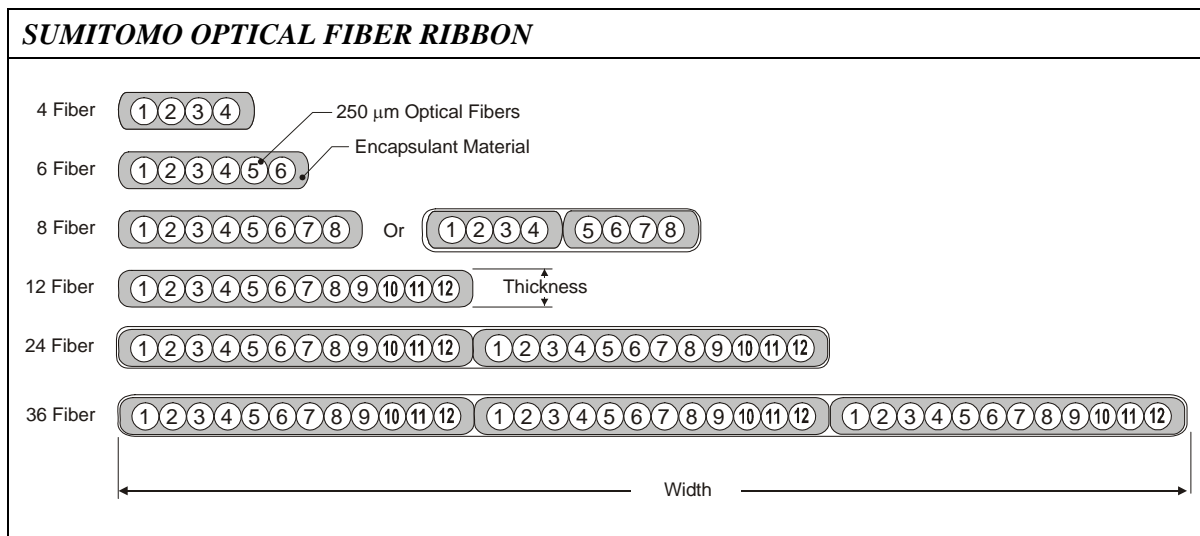
2.2 Fiber Color Coding

The UV acrylate coated fibers are color coded with highly distinguishable, vibrant colors according to the following table. All colors meet Munsell standards as specified in TIA-359 and TIA-598.

| FIBER COLOR CODE | | | |
|-------------------------|--------|---------|--------|
| FIBER # | COLOR | FIBER # | COLOR |
| 1 | Blue | 7 | Red |
| 2 | Orange | 8 | Black |
| 3 | Green | 9 | Yellow |
| 4 | Brown | 10 | Violet |
| 5 | Slate | 11 | Rose |
| 6 | White | 12 | Aqua |

2.3 Ribbon Matrices

The colored fibers are held together in the form of a flat ribbon by a UV cured acrylate matrix. The encapsulant material is easily removed from the fibers either with industry standard thermal strippers or by peeling the material away from the fibers. Fibers within the ribbon are arranged in the order as shown above. Eight fiber ribbons can be either straight or modular. Twenty-four and thirty-six fiber ribbons are modular.



2.4 Ribbon Dimensions

| OPTICAL FIBER RIBBON DIMENSIONS | | | | |
|--|-------------|---------------|-------------------|----------------|
| PART NUMBER | FIBER COUNT | NOMINAL WIDTH | NOMINAL THICKNESS | NOMINAL WEIGHT |
| SE – *RX004-B | 4 | 1.10 mm | 0.31 mm | 0.43 Kg/km |
| SE – *RX006-B | 6 | 1.60 mm | 0.31 mm | 0.65 Kg/km |
| SE – *RX008-B | 8 | 2.10 mm | 0.31 mm | 0.86 Kg/km |
| SE – *TX008-B | 8 | 2.10 mm | 0.40 mm | 0.86 Kg/km |
| SE – *MX008-B | 8 (Mod) | 2.15 mm | 0.32 mm | 0.86 Kg/km |
| SE – *RX012-B | 12 | 3.15 mm | 0.31 mm | 1.25 Kg/km |
| SE – *RX024-B | 24 (Mod) | 6.40 mm | 0.33 mm | 2.66 Kg/km |
| SE – *RX036-B | 36 (Mod) | 9.60 mm | 0.33 mm | 4.16 Kg/km |

2.4 Ribbon Markings

Ribbon markings apply only to 8, 12, 24 and 36 fiber ribbons due to size limitations of 4 & 6 fiber ribbons. Unless otherwise specified the entire length of the ribbon may be marked in black with the name “SUMITOMO” & color code marks according to TIA-598 at intervals not greater than 300 mm. If requested, ribbons can be provided without marking.

| FIBER COLOR CODE | |
|-------------------------|--------|
| FIBER # | COLOR |
| 1 | Blue |
| 2 | Orange |
| 3 | Green |
| 4 | Brown |
| 5 | Slate |
| 6 | White |
| 7 | Red |
| 8 | Black |
| 9 | Yellow |
| 10 | Violet |
| 11 | Rose |
| 12 | Aqua |

| RIBBON MARKING CODES | | | | | |
|-----------------------------|---------|-------|----------|-------|----------|
| RIB # | CODE | RIB # | CODE | RIB # | CODE |
| 1 | BL 1 | 25 | DD-BL 25 | 49 | 4D-BL 49 |
| 2 | OR 2 | 26 | DD-OR 26 | 50 | 4D-OR 50 |
| 3 | GR 3 | 27 | DD-GR 27 | 51 | 4D-GR 51 |
| 4 | BR 4 | 28 | DD-BR 28 | 52 | 4D-BR 52 |
| 5 | SL 5 | 29 | DD-SL 29 | 53 | 4D-SL 53 |
| 6 | WH 6 | 30 | DD-WH 30 | 54 | 4D-WH 54 |
| 7 | RD 7 | 31 | DD-RD 31 | 55 | 4D-RD 55 |
| 8 | BK 8 | 32 | DD-BK 32 | 56 | 4D-BK 56 |
| 9 | YL 9 | 33 | DD-YL 33 | 57 | 4D-YL 57 |
| 10 | VI 10 | 34 | DD-VI 34 | 58 | 4D-VI 58 |
| 11 | RS 11 | 35 | DD-RS 35 | 59 | 4D-RS 59 |
| 12 | AQ 12 | 36 | DD-AQ 36 | 60 | 4D-AQ 60 |
| 13 | D-BL 13 | 37 | 3D-BL 37 | 61 | 5D-BL 61 |
| 14 | D-OR 14 | 38 | 3D-OR 38 | 62 | 5D-OR 62 |
| 15 | D-GR 15 | 39 | 3D-GR 39 | 63 | 5D-GR 63 |
| 16 | D-BR 16 | 40 | 3D-BR 40 | 64 | 5D-BR 64 |
| 17 | D-SL 17 | 41 | 3D-SL 41 | 65 | 5D-SL 65 |
| 18 | D-WH 18 | 42 | 3D-WH 42 | 66 | 5D-WH 66 |
| 19 | D-RD 19 | 43 | 3D-RD 43 | 67 | 5D-RD 67 |
| 20 | D-BK 20 | 44 | 3D-BK 44 | 68 | 5D-BK 68 |
| 21 | D-YL 21 | 45 | 3D-YL 45 | 69 | 5D-YL 69 |
| 22 | D-VI 22 | 46 | 3D-VI 46 | 70 | 5D-VI 70 |
| 23 | D-RS 23 | 47 | 3D-RS 47 | 71 | 5D-RS 71 |
| 24 | D-AQ 24 | 48 | 3D-AQ 48 | 72 | 5D-AQ 72 |

| <i>FIBER TYPE MARKING</i> | |
|----------------------------------|-----------------------|
| FIBER TYPE | RIBBON MARKING |
| Single Mode Fiber | SM |
| 50/125um Multi-Mode Fiber | MM50 |
| 62.5/125um Multi-Mode Fiber | MM62 |

2.5 Handling & Compatibility

The optical fiber ribbons are fully compatible with Sumitomo's mass fusion splicing equipment and other commercially available splicing techniques. The matrix and coatings are easily stripped with thermal strippers. The matrix material can also be cleanly pulled away from the individual 250 μm colored fibers if single fiber access is needed from the ribbon end or in midspan using Sumitomo's ribbon midspan access kit, MA-1. Sumitomo's ribbon is fully compatible with commercially available mass fusion splicers and mass mechanical splice systems.

3. Ribbon Performance

The finished ribbon can be subjected to the following mechanical and environmental conditions without a permanent increase in attenuation or damage to the ribbon.

| <i>MECHANICAL PERFORMANCE</i> | | |
|--------------------------------------|-----------------|--------------------------|
| PROPERTY | TEST PROCEDURE | SPECIFICATION |
| Ribbon Twist Resistance | Telcordia GR-20 | 12 in. length \pm 180° |
| Ribbon Flatness | Telcordia GR-20 | Pitch > 0.4 m |
| Strippability | Telcordia GR-20 | > 30 mm |
| Peelability | Telcordia GR-20 | Fully Peelable |

| <i>ENVIRONMENTAL PERFORMANCE</i> | | |
|--|-----------------|--|
| PROPERTY | TEST PROCEDURE | SPECIFICATION |
| Temperature: Operation Storage / Shipping | EIA/TIA-455-3 | -40 to +70 °C (-40 to +158 °F) -40 to +75 °C (-40 to +167 °F) |
| Ribbon Aging | EIA/TIA-455-3 | 168 hours @ 85°C |
| Color Coding Permanence | Telcordia GR-20 | Fiber Colors are Stable after Aging |

4. Testing and Inspection

The optical properties of all fibers are measured prior to ribbon manufacturing and remain traceable throughout the manufacturing process and the lifetime of the ribbon.

After ribboning, 100% of all fibers in each length of ribbon are measured with bi-directional OTDR at all operating wavelengths. The attenuation for each fiber is recorded. Ribbon dimensional measurements are also made at final inspection and recorded.

5. Packaging and Shipping

Ribbon is supplied in standard lengths of 1, 2, 4, or 6 km as specified at the time of purchase. Each length will be shipped on a separate plastic reel as detailed below. Each reel is wrapped in a plastic covering to protect the optical fiber ribbon from dirt and moisture. The reels are then packaged into cardboard boxes for shipment.

| STANDARD PRODUCTION LENGTHS & SHIPPING WEIGHTS (RIBBON & REEL) | | | | |
|---|-----------------|-----------------|------------|-------------|
| RIBBON SIZE | STANDARD LENGTH | | | |
| | 1 Km | 2 Km | 4 Km | 6 Km |
| 4 | 3.1 Kg | 3.5 Kg | 4.3 Kg | 5.2 Kg |
| 6 | 3.3 Kg | 3.9 Kg | 5.2 Kg | 6.5 Kg |
| 8 | 3.5 Kg | 4.3 Kg | 6.1 Kg | 7.8 Kg |
| 12 | 3.9 Kg | 5.2 Kg | 7.8 Kg | 10.4 Kg |
| 24 (CK Reel) | 5.5 Kg | 7.3 Kg | 10.6 Kg | 14.0 Kg |
| REEL DIMENSIONS | | | | |
| REEL TYPE | REEL CODE | FLANGE DIAMETER | REEL WIDTH | REEL WEIGHT |
| Plastic | "BV" | 10 in. | 6.69 in. | 0.9 Kg |
| ABS Plastic | "C" | 16 in. | 10.25 in. | 2.6 Kg |
| ABS Plastic | "CK" | 16 in. | 14.57 in. | 3.8 Kg |

Each box/reel is marked with the manufacturer's name and address, product type, fiber count, attenuation specs, and ribbon length. A final inspection test report with attenuation performance data for each fiber is in the box along with shipping labels.

6. Installation / Handling Practices

Sumitomo has incorporated a wide range of technical support and training services for our fiber optic cable products into our Technical Support Services (TSS) program. TSS offers training in the areas of cable installation, sheath entry, splicing, testing, and system troubleshooting. The services are available in a variety of media formats and can be customized to better accommodate individual training needs. The TSS program consists of an extensive series of recommended procedure documents, training courses with classroom and hands-on instruction, as well as demonstration video tapes. Please contact Sumitomo's Customer Service department for more information.

7. Ordering Information

To learn more about Sumitomo's cables or to place an order, call, fax, e-mail, or write us at:

Sumitomo Electric Lightwave Corp.
78 Alexander Drive
Research Triangle Park, NC 27709
Attn: Customer Service Department

Phone: 800-358-7378
919-541-8100
Fax: 919-541-8265
E-mail: info@sumitomoelectric.com

Sumitomo Electric Lightwave Corp. reserves the right to improve, enhance, or modify the cable's features and specifications. For special requirements different than those shown above, please contact our Inside Sales Department. Each Sumitomo Electric Lightwave Corp. optic cable and/or its manufacture may be covered by one or more of the following US Patents: 4,715,677 4,729,629 4,763,983 4,770,489 4,828,349 4,953,945 5,043,037 5,082,347 5,165,003 D331,567 5,247,599 5,410,901 5,471,555 5,642,452.

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