| JACKET SLIP STRENGTH @ 50 °C—Continued | |
|---|---|
| | Load in newtons (pound-force) |
| Temperature Cycling ..... | |

| FILLER EXUDATION (GRAMS) | |
|---|---|
| Heat Age ..... | |
| Humidity Exposure ..... | |
| Temperature Cycling ..... | |

| SURGE TEST (KILOVOLTS) | |
|---|---|
| Conductor to Conductor ..... | |
| Shield to Conductors ..... | |

[58 FR 29328, May 20, 1993, as amended at 60 FR 1711, Jan. 5, 1995; 69 FR 18803, Apr. 9, 2004]

### § 1755.900 Abbreviations and Definitions.

The following abbreviations and definitions apply to §§1755.901 and 1755.902:

(a) *Abbreviations.*
(1) ADSS All dielectric self-supporting;
(2) ASTM American Society for Testing and Materials;
(3) °C Centigrade temperature scale;
(4) dB Decibel;
(5) CSM Central strength member;
(6) dB/km Decibels per 1 kilometer;
(7) ECCS Electrolytic chrome coated steel;
(8) EIA Electronic Industries Alliance;
(9) EIA/TIA Electronic Industries Alliance/Telecommunications Industry Association;
(10) FTTH Fiber-to-the-Home;
(11) Gbps Gigabit per second or Gbit/s;
(12) GE General Electric;
(13) HDPE High density polyethylene;
(14) ICEA Insulated Cable Engineers Association, Inc.;
(15) Km kilometer(s;)
(16) LDPE Low density polyethylene;
(17) m meter(s;)
(18) Max. Maximum;
(19) Mbit Megabits;
(20) MDPE Medium density polyethylene;
(21) MHz-km Megahertz-kilometer;
(22) Min. Minimum;
(23) MFD Mode-Field Diameter;
(24) nm Nanometer(s;)
(25) N Newton(s;)
(26) NA Numerical aperture;
(27) NESC National Electrical Safety Code;
(28) OC Optical cable;
(29) O.D. Outside Diameter;
(30) OF Optical fiber;
(31) OSHA Occupational Safety and Health Administration;
(32) OTDR Optical Time Domain Reflectometer;
(33) % Percent;
(34) ps/(nm · km) Picosecond per nanometer times kilometer;
(35) ps/(nm² · km) Picosecond per nanometer squared times kilometer;
(36) PMD Polarization Mode Dispersion;
(37) RUS Rural Utilities Service;
(38) s Second(s);
(39) SI International System (of Units) (From the French *Système international d'unités*); and
(40) µm Micrometer.

(b) *Definitions*—(1) *Accept; Acceptance* means Agency action of providing the manufacturer of a product with a letter by mail or facsimile that the Agency has determined that the manufacturer's product meets its requirements. For information on how to obtain Agency product acceptance, refer to the procedures listed at *http://www.usda.gov/rus/telecom/listing_procedures/index_listing_procedures.htm*, as well as additional information in RUS Bulletin 345–3, *Acceptance of Standards, Specifications, Equipment Contract Forms, Manual Sections, Drawings, Materials and Equipment for the Telephone Program*, available for download at *http://www.usda.gov/rus/telecom/publications/bulletins.htm*.

(2) *Agency* means the Rural Utilities Service, an Agency which delivers the United States Department of Agriculture's Rural Development Utilities Programs.

(3) *Armor* means a metal tape installed under the outer jacket of the cable intended to provide mechanical protection during cable installation and environmental protection against rodents, termites, etc.

(4) *Attenuation* means the loss of power as the light travels in the fiber usually expressed in dB/km.

(5) *Bandwidth* means the range of signal frequencies that can be transmitted by a communications channel with defined maximum loss or distortion. Bandwidth indicates the information-carrying capacity of a channel.

(6) *Birefringence* means the decomposition of a pulse of light entering the fiber into ''two polarized pulses'' traveling at different velocities due to the different refractive indexes in the polarization axes in which the electric fields oscillate. Different refractive indexes in the fiber may be caused by an

asymmetric fiber core, internal manufacturing stresses, or through external stresses from cabling and installation of the fiber optic cable, such as bending and twisting.

(7) *Cable cutoff wavelength* means the shortest wavelength at which only one mode light can be transmitted in any of the single mode fibers of an optical fiber cable.

(8) *Chromatic dispersion* means the broadening of a light pulse as it travels down the length of an optical fiber, resulting in different spectral components of the light pulse traveling at different speeds, due to the fact that the index of refraction of the fiber core is different for different wavelengths.

(9) *Cladding* means the outer layer of an optical fiber made of glass or other transparent material that is fused to the fiber core. The cladding concentrically surrounds the fiber core. It has a lower refractive index than the core, so light travelling in the fiber is maintained in the core by internal reflection at the core-cladding interface.

(10) *Core* means the central region of an optical waveguide or fiber which has a higher refractive index than the cladding through which light is transmitted.

(11) *Cutoff wavelength* means, in single mode fiber, the shortest wavelength at which only the fundamental mode of an optical wavelength can propagate.

(12) *Dielectric cable* means a cable which has neither metallic members nor other electrically conductive materials or elements.

(13) *Differential group delay* means the arrival time differential of the two polarized light components of a light pulse traveling through the optical fiber due to birefringence.

(14) *Graded Refractive Index Profile* means the refractive index profile of an optical fiber that varies smoothly with radius from the center of the fiber to the outer boundary of the cladding.

(15) *List of Acceptable Materials* means the latest edition of RUS Informational Publication 344–2, ''*List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers.*'' This document contains a convenient listing of products which have been determined to be acceptable by the Agency. The List of Acceptable Materials is available on the Internet at *http://www.usda.gov/rus/telecom/materials/lstomat.htm.*

(16) *Loose tube buffer* means the protective tube that loosely contains the optical fibers within the fiber optic cable, often filled with suitable water blocking material.

(17) *Matched cable* means fiber optic cable manufactured to meet the requirement of this section for which the calculated splice loss using the formula below is ≤0.06 dB for any two cabled fibers to be spliced.

$$\text{LOSS (dB)} = -10\ \text{LOG}_{10}\ [4/(\text{MFD}_1/\text{MFD}_2 + \text{MFD}_2/\text{MFD}_1)^2],$$

where subscripts 1 and 2 refer to any two cabled fibers to be spliced.

(18) *Mil* means a measurement unit of length indicating one thousandth of an inch.

(19) *Minimum bending diameter* means the smallest diameter that must be maintained while bending a fiber optic cable to avoid degrading cable performance indicated as a multiple of the cable diameter (Bending Diameter/Cable Diameter).

(20) *Mode-field diameter* means the diameter of the cross-sectional area of an optical fiber which includes the core and portion of the cladding where the majority of the light travels in a single mode fiber.

(21) *Multimode fiber* means an optical fiber in which light travels in more than one bound mode. A multimode fiber may either have a graded index or step index refractive index profile.

(22) *Numerical Aperture (NA)* means an optical fiber parameter that indicates the angle of acceptance of light into a fiber.

(23) *Optical fiber* means any fiber made of dielectric material that guides light.

(24) *Optical point discontinuities* means the localized deviations of the optical fiber loss characteristic which location and magnitude may be determined by appropriate OTDR measurements of the fiber.

(25) *Optical waveguide* means any structure capable of guiding optical power. In optical communications, the term generally refers to a fiber designed to transmit optical signals.

(26) *Polarization mode dispersion* means, for a particular length of fiber, the average of the differential group delays of the two polarized components of light pulses traveling in the fiber, when the light pulses are generated from a sufficient narrow band source. The differential group delay varies randomly with time and wavelength. The term PMD is used in the industry in the general sense to indicate the phenomenon of birefringence (polarized light having different group velocities), and used specifically to refer to the value of time delay expected in a specific length of fiber.

(27) $PMD_Q$ means the statistical upper bound for the PMD coefficient of a fiber optic cable link composed of M number of randomly chosen concatenated fiber optic cable sections of the same length. The upper bound is defined in terms of a probability level Q, which is the probability that a concatenated PMD coefficient value exceeds $PMD_Q$. ITU G recommendations for fiber optic cables call for M = 20 and Q = 0.01%. This $PMD_Q$ value is the one used in the design of fiber optic links.

(28) *Ribbon* means a planar array of parallel optical fibers.

(29) *Shield* means a conductive metal tape placed under the cable jacket to provide lightning protection, bonding, grounding, and electrical shielding.

(30) *Single mode fiber* means an optical fiber in which only one bound mode of light can propagate at the wavelength of interest.

(31) *Step Refractive Index Profile* means an index profile characterized by a uniform refractive index within the core, a sharp decrease in refractive index at the core-cladding interface, and a uniform refractive index within the cladding.

(32) *Tight tube buffer* means one or more layers of buffer material tightly surrounding a fiber that is in contact with the coating of the fiber.

[74 FR 20561, May 5, 2009]

### § 1755.901 Incorporation by Reference.

(a) *Incorporation by reference.* The materials listed here are incorporated by reference where noted. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any change in these materials will be published in the FEDERAL REGISTER. The materials are available for purchase at the corresponding addresses noted below. All are available for inspection at the Rural Development Utilities Programs, during normal business hours at room 2849–S, U.S. Department of Agriculture, Washington, DC 20250. Telephone (202) 720–0699, and e-mail *norberto.esteves@wdc.usda.gov*. The materials are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these materials at NARA, call (202) 741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

(b) The American National Standards Institute/Institute of Electrical and Electronics Engineers, Inc. ANSI/IEEE C2–2007, *The National Electrical Safety Code*, 2007 edition, approved April 20, 2006, (''ANSI/IEEE C2–2007''), incorporation by reference approved for §1755.902(a), §1755.902(p), §1755.903(a), §1755.903(k) and §1755.903(n). ANSI/IEEE C2–2007 is available for purchase from IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854, telephone 1–800–678–4333 or online at *http://standards.ieee.org/nesc/index.html*.

(c) The following Insulated Cable Engineers Association standards are available for purchase from the Insulated Cable Engineers, Inc. (ICEA), P.O. Box 1568, Carrollton, GA 30112 or from Global Engineering Documents, 15 Iverness Way East, Englewood, CO 80112, telephone 1–800–854–7179 (USA and Canada) or 303–792–2181 (International), or online at *http://global.ihs.com:*

(1) ICEA S–110–717–2003, *Standard for Optical Drop Cable*, 1st edition, September 2003 (''ICEA S–110–717''), incorporation by reference approved for §1755.903(a), §1755.903(b), §1755.903(c), §1755.903(d), §1755.903(e), §1755.903(f), §1755.903(g), §1755.903(l), §1755.903(n), §1755.903(p), §1755.903(u); and

(2) ANSI/ICEA S–87–640–2006, *Standard for Optical Fiber Outside Plant Communications Cable*, 4th edition, December