

Issue 35 • Quarter 2, 2022

Standards Quarterly Update:

What you need to know now for the future of your network

Welcome to the 35th edition of the *Standards Advisor*. This report is issued quarterly and provides updates on the standards relevant to the structured cabling industry, and the impact they have on your network design, planning and operations.

This summary represents standards meetings held during the second quarter of 2022 and reports on activities from all aspects of the cabling industry. These activities range from the applications standards (IEEE 802.3 and T11 Fiber Channel) to the cabling standards (ANSI/TIA, ISO/IEC, IEC, ITU-T and CENELEC). It also covers new developments in the world of multi-source agreements (MSAs).

72nd ISO/IEC JTC1/ SC25 WG3 meeting: No meetings were held in Q2

The next scheduled ISO/IEC JTC1/SC25 WG3 meeting will be held September 26-30, 2022, Location TBD.

TIA TR-42 meeting: June 6-10, 2022, Virtual meeting

The following standards were approved for ballot, re-ballot, or default ballot:

- ANSI/TIA-5017-A Security
- ANSI/TIA-1179-A Healthcare
- ANSI/TIA-1183-B Balun-less measurement methods
- ANSI/TIA-568-5-1, addendum to ANSI/TIA-568.5
- TIA TSB-184-A-2, power delivery over single-pair
- ANSI/TIA-568.7 Industrial single-pair
- ANSI/TIA-526.14-D, adoption of IEC 61280-4-1:2021 Installed cabling plant multimode attenuation measurement
- ANSI/TIA-4920000-C, adoption of IEC 60793-2 optical fibres – Production specifications
- ANSI/TIA-621.1, adoption of IEC 61755-1:2022 singlemode connector optical interfaces – general and guidance
- ANSI/TIA-622.1, adoption of IEC 61755-2-1:2022 SM connector optical interfaces – non-angled physically contacting fibre
- ANSI/TIA-622.2, adoption of IEC 61755-2-2:2022 SM connector optical interfaces – angled physically contacting fibre

The following standards were re-affirmed or approved for publication:

- ANSI/TIA-568.0-E.1 Addendum for single pair
- ANSI/TIA-862-C Intelligent Building Systems
- ANSI/TIA-569-E-1 Updated environmental requirements per ASHRAE updates
- ANSI/TIA-5071 Testing of single-pair
- ANSI/TIA-568-5-1, addendum to ANSI/TIA-568.5
- ANSI/TIA-568.3-E Optical Fiber Cabling and Components

1. TR-42.1 Commercial Building Cabling

- Authorized publication of ANSI/TIA-568.0-E.1 Addendum for single pair.
- Authorized publication of ANSI/TIA-862-C Intelligent Building Systems.
- Approved for ballot ANSI/TIA-5017-A Security.
- Resolved comments and approved ballot circulation of ANSI/TIA-1179-A Healthcare.
- Partially resolved comments on ANSI/TIA-942-C Data Centers. Interim meeting scheduled for July 7 to finish.
- No update on ANSI/TIA-757-C Outside Plant.

2. TR-42.3 Pathways and Spaces

- Approved publication of ANSI/TIA-569-E-1 updated environmental requirements per ASHRAE updates.
- Reaffirmed ANSI/TIA-5048 AIM systems.
- Agreed that changes to ANSI/TIA-607 Grounding and Bonding are not required, though the requirements for ground rods are more restrictive in TIA than in the NEC.

3. TR-42.5 Definitions

The following definitions were added:

- immersion cooling: A cooling technique in which equipment is directly immersed in a dielectric fluid which removes heat.
- coaxial cable, dual shield: A coaxial cable with a shield consisting of a foil layer overwrapped by a concentric wire braid layer, or of two concentric wire braid layers without a foil between them.
- coaxial cable, tri-shield: A coaxial cable with a shield consisting of a foil layer overwrapped by a concentric wire braid layer and a second foil layer.
- coaxial cable, quad-shield: A coaxial cable with a shield consisting of a foil layer overwrapped by a concentric wire braid layer, a second foil layer, and a second wire braid layer.

The following definition was deferred to 42.7:

- structural return loss: A ratio, expressed in dB, of the power of the outgoing signal to the power of the reflected signal, referenced to the cable's measured characteristic impedance.

4. TR-42.7 Copper Cabling Systems

- Resolved comments and approved publication of ANSI/TIA-5071 testing of single-pair.
- Resolved comments and approved publication of ANSI/TIA-568.4-E coaxial cabling systems.
- Resolved comments and authorized another ballot circulation of ANSI/TIA-1183-B Balun-less measurement methods.
- Authorized circulation of ballot for TIA TSB-184-A-2, power delivery over single-pair.
- Authorized circulation of ballot for ANSI/TIA-568-5-1, addendum to ANSI/TIA-568.5.

5. TR-42.99 Industrial Telecommunications Infrastructure

- Resolved comments and authorized another ballot for ANSI/TIA-568.7 industrial single-pair.

6. TR-42.11 Optical Fiber Systems

- ANSI/TIA-568.3-E Optical Fiber Cabling and Components. All comments were resolved, and document was approved for publication.
- ANSI/TIA-526.14-D, adoption of IEC 61280-4-1:2021 Installed cabling plant - multimode attenuation measurement. All comments were resolved, and document was approved as default ballot.
- New project was approved for ANSI/TIA-568.3-E-1 to incorporate polarity content from TSB-5069.

7. TR-42.12 Optical Fibers and Cables

- ANSI/TIA-492 series restructuring project
 - ANSI/TIA-4920000-C, adoption of IEC 60793-2:2019, was approved as ANSI ballot and be circulated prior to the October meeting.
 - ANSI/TIA-492AAAF-1, adaption of IEC 60793-2-10, was approved as a new project to adopt the newly published IEC 60793-2-10:2022 that contains the AMD1.

- ANSI/TIA-455 adoption from IEC
 - ANSI/TIA-455-111 (FOTP-111), adoption of IEC 60793-1-34 Measurement methods – fibre curl, was approved for publication if no technical comments (ballot closes after the closing of meeting).
 - ANSI/TIA-455-133, adoption of IEC 60793-1-22 Length Measurement, waiting for stable IEC document.
 - ANSI/TIA-455-203, adoption of IEC 61280-1-4 Light Source Encircled Flux Measurement Method, waiting for stable IEC document.
 - ANSI/TIA-455-204, adoption of IEC 60793-1-41 Bandwidth, waiting for stable IEC document.
- Revision of ANSI/TIA-598-D-2014 Optical Fiber Color Coding
 - Correspondence group presented updated Munsell color chip round robin data. Next phase of study will shift focus to round robin of ink-draw samples and generating preliminary CIELAB values and delta E.
- Committee reviewed the difference between TIA and IEC on tensile testing and stress corrosion parameter. The possibility of harmonizing TIA to IEC was discussed, all members are encouraged to evaluate further and provide feedback at the October meeting

8. TR-42.13 Passive Optical Devices and Metrology

- IEC adoption projects continue to progress with following documents approved as ballots (pending IEC publication). The current adoption series is the singlemode connector optical interfaces.
 - ANSI/TIA-621.1, adoption of IEC 61755-1:2022 General and guidance.
 - ANSI/TIA-622.1, adoption of IEC 61755-2-1:2022 Non-angled physically contacting fibres.
 - ANSI/TIA-622.2, adoption of IEC 61755-2-2:2022 Angled physically contacting fibres.
 - ANSI/TIA-622.4, adoption of IEC 61755-2-4:2015 Non-angled physically contacting fibres, reference connection, is in open ballot and closes on July 5.
 - ANSI/TIA-622.5, adoption of IEC 61755-2-5:2015 Angled physically contacting fibres, reference connection, is in open ballot and closes on July 5.
- Committee reviewed the qualification testing requirement difference between ANSI/TIA-568.3 and the IEC 61753 series performance standards. Discussions will continue to determine best approach to harmonize TIA and IEC specifications.

The next scheduled TIA TR-42 meeting will be held October 3-7, 2022, St. Petersburg, FL, USA.

The next scheduled CLC TC86BXA meeting will be held December, 2022, Brussels, Belgium.

IEEE 802.3 Ethernet meetings: Interim meeting—May 7-17, 2022, Virtual meeting

Due to COVID-19, IEEE 802 and IEEE 802.3 continue to hold telephonic meetings in place of the scheduled face-to-face meetings. IEEE 802 is planning to hold the July 2022 plenary meetings face-to-face in Montreal, Canada, but also to allow remote access.

Single-twisted-pair copper standards

1. IEEE P802.3da Single Pair Multidrop Segments Enhancement Task Force

- This project is developing extensions to the Clause 147 10BASE-T1S multidrop (10 Mbps shared media) PHY defined in 802.3cg, interoperable with the PHY in 802.3cg. The major objectives the project is working on include the following (for more objectives, [see objectives on the IEEE 802.3da site](#)):

1. Adding interoperable multidrop power over Ethernet and reach extensions for multidrop to better accommodate building automation.
2. Extending multidrop networks to support at least 16 nodes and 50m of reach (32 nodes and 70m are desired, but the objective is only 15 nodes and 50m)
3. Define plug-and-play multidrop powering, and
4. Selecting a single equipment connector.

- The Task Force has adopted a baseline and is in Task Force review of a protocol for automatically configuring the node ID's associated with the (IEEE 802.3cg) Clause 148 Physical Layer Collision Avoidance (PLCA) protocol. The task force has also adopted minor corrections to the PLCA (Clause 148) state diagrams to eliminate potential race conditions and improve predictable behavior.
- The Task Force has been exploring proposals for powering a multidrop segment. The issue of defining the electrical loading of a new powered node as well as protocols for managing transients as new nodes are connected are being discussed, but no text has been adopted.
- The Task Force is focused on reusing the already specified active PHY components of the 10BASE-T1S PHY in IEEE Std 802.3cg clause 147. This means that focus has been on the electrical parameters for the shared-media 'mixing segment' – wiring that connects the various multidrop nodes, and on the interface to the media. While progress has been made, work remains to be done to account for the variability of multidrop connection points and loading on the line. This is necessary to enable less engineered solutions suitable for installation outside of carefully configured equipment interconnects.
- The Task Force heard presentations regarding inductive compensation of the attached nodes to minimize impact on the mixing segment. The task force heard several presentations directed towards completing a plug and play specification of a mixing segment which should put the work back on track.

- While the Task Force's formal timeline shows a standard in mid-2023, there is consensus that this timeline will not be met. With the mixing segment beginning to converge, the task force is expected to adopt a new timeline in the next quarter and begin more complete draft review in late Q3.

2. IEEE P802.3cy Greater than 10 Gb/s Electrical Automotive Ethernet Task Force

- This project is developing new electrical (as opposed to optical) PHY specification for greater than 10 Gb/s Ethernet, at distances of up to 11m, suitable for automotive use. It is primarily driven by requirements for autonomous vehicle networking, and the project scope includes both symmetric and asymmetric transmission (where one of the directions is at a much lower speed).
- The project has been reviewing and finalizing a draft for initial Working Group ballot beginning in July.
- The draft includes:
 - Link segment electrical parameters, based on channels with shielded differential pair cabling suitable for automotive use, with 8 GHz bandwidth. Both twisted pair or parallel pair constructions are considered. Because it is required to operate in an automotive environment, this cabling differs from existing twinax data center cabling.
 - A 25 Gb/s PHY using PAM-4 line coding at about 14 Gbaud and Reed-Solomon FEC.
 - Specifications for energy efficient Ethernet operation including links with asymmetric data rates
- While the initial plan and objectives for this project included 50 Gb/s and 100Gb/s links formed from 2 or 4 25 Gb/s links into 50 Gb/s or 100 Gb/s link respectively, combination of links is expected to become its own project, and is expected to be dropped from the project objectives in July.
- The project is on track to a completed standard in Q3 2023.
- While motivated by automotive applications, the standard does not limit the application of the PHY and may find use in short-range high-speed applications on shielded balanced pair cabling which could be used as an alternative to direct-attach twinaxial cables.

3. IEEE P802.3dd Maintenance #17: Power over Data Lines of Single Pair Ethernet

- This project completed with approval by the IEEE-SA Standards Board in June 2022.
- This project has adopted corrections to the specifications introduced by IEEE 802.3bu and IEEE 802.3cg. These address several technical and editorial issues found during the implementation of single-pair Ethernet powering using classification.
- Specifically, initial implementations for automotive applications did not use the classification functionality, and the interest and implementation of single-pair powering for in-building applications uncovered several specifications requiring minor modification.

- As a maintenance project, no new features (e.g., powering levels) are added.
4. **IEEE P802.3de: IEEE Time Synchronization for Point-to-Point Single Pair Ethernet Task Force**
 - This project is making minor changes to support TSN with the new point-to-point 10 Mb/s Single Pair Ethernet PHYs (10BASE-T1L and 10BASE-T1S) specified by IEEE 802.3cg with the 802.3 specifications used for Time Sensitive Networking.
 - The project completed its initial Standards Association ballot, and resolved comments. The initial recirculation closes July 1, and is expected to conclude this project, with approval at the September 2022 Standards Board meeting.
 5. **IEEE 802.3dg Greater than 10 Mb/s Long-Reach Single-Pair Ethernet Study Group / IEEE P802.3dg 100 Mb/s Long-Reach Single-Pair Ethernet Task Force:**
 - Project documentation put together by the Greater than 10 Mb/s Long-Reach Single-Pair Ethernet Study Group was approved for a new project IEEE P802.3dg, a 100 Mb/s long-reach PHY Single-Pair Ethernet PHY project (with powering).
 - While the group also considered including 1 Gb/s long-reach PHYs in the project, the study group declined to specify 1 Gb/s operation, and 1 Gb/s is NOT included in the new project.
 - IEEE P802.3dg held its first meeting in May 2022, and is expected to begin by solidifying requirements for applications for 100 Mb/s long-reach single-pair Ethernet (likely called 100BASE-T1L). The new 100BASE-T1L project objectives include a 500m-reach 100 Mb/s PHY for industrial and building automation environments, with line powering, and supporting low latency operations. This is expected to be further advanced at the July meeting, with baseline proposals for new physical layer devices near the end of 2022, on a timeline for a standard in late 2024, early 2025.
 9. **IEEE P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force**
 - This project will define standards for 100, 200, and 400 Gb/s over 50 m multimode fiber and over 100 m multimode fiber.
 - This will allow for Top-of-Rack switch elimination by connecting Middle-of-Row switches directly to servers (VR).
 - This will also provide switch-to-switch connectivity and support the installed base of multimode fiber (SR).
 - Draft 3.1 was reviewed by the Standards Association.
 10. **IEEE P802.3df 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force**
 - This Task Force is a result of the Beyond 400G Study Group
 - The objectives include:
 - 200G over 1 pair of SMF up to 500 m
 - 200G over 1 pair of SMF up to 2 km
 - 400G over 2 pairs of SMF up to 500 m
 - 400G over 4 pairs of SMF up to 2 km
 - 800G over 8 pairs of MMF up to 50 m
 - 800G over 8 pairs of MMF up to 100 m
 - 800G over 8 pairs of SMF up to 500 m
 - 800G over 8 pairs of SMF up to 2 km
 - 800G over 4 pairs of SMF up to 500 m
 - 800G over 4 pairs of SMF up to 2 km
 - 800G over 1 pair of SMF with 4 wavelengths over 2 km
 - 800G over 1 pair of SMF up to 10 km
 - 800G over 1 pair of SMF up to 40 km
 - 1.6T over 8 pairs of SMF up to 500 m
 - 1.6T over 8 pairs of SMF up to 2 km
 - Baseline proposals are being considered.

Optical Fiber Standards

6. **IEEE P802.3cs Central office consolidation (super PON) Task Force**
 - The main objectives of this Study Group are:
 - Support a passive point-to-multipoint ODN with a reach of at least 50 km with at least 1:64 split ratio per wavelength pair
 - Support at least 16 wavelength pairs for point-to-multipoint PON operation
 - Support the MAC data rate of 10Gb/s downstream
 - Support the MAC data rates of 2.5Gb/s and 10Gb/s upstream
 - Support tunable transmitters
 - Draft 3.4 completed Standards Association Review.
7. **IEEE P802.3cw 400 Gb/s Operation over DWDM Systems Task Force**
 - This project was split from P802.3ct for the 400G objective.
 - The main objective is:
 - 400 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system (400GBASE-ZR).
 - DP-16QAM coherent modulation format will be used for 400GBASE-ZR
 - Draft 2.0 was prepared for Working Group review.
8. **IEEE P802.3cz Multi-Gigabit Optical Automotive Ethernet Task Force**
 - This project will define the performance characteristics of an automotive link segment and an optical PHY to support 2.5, 5, 10, 25, and 50 Gb/s over 40 m of automotive cabling.
 - This Task Force will focus on glass fiber and P802.3dh will focus on plastic optical fiber.
 - Draft 2.1 was reviewed by the Working Group.

The next scheduled meeting of IEEE 802.3 will be a face-to-face IEEE 802 plenary meeting from July 10-15, 2022, in Montreal, Canada. Electronic access will be provided. IEEE 802.3 Task Force electronic Interims are expected to continue telephonically in the meantime, and the IEEE 802.3 interim in September is still expected to be held telephonically. Information can be found at <http://www.ieee802.org/3/calendar.html>

1. Common Electrical Interface – 224G Development Project (CEI-224G)

- This project will develop a body of knowledge summarized into a white paper that will enable new project launches for specific next generation 224 Gbps clauses.
- PAM4, PAM6, and PAM8 modulation formats are being considered.

2. Co-Packaging Framework Project

- The Co-Packaging Framework IA is an umbrella project that will study the application spaces and relevant technology considerations for co-packaging of communication interfaces with one or more ASICs.
- Co-packaging Framework Document was published.

3. Implementation Agreement for a 3.2 Tb/s Co-Packaged Optical (CPO) Transceiver

- This Implementation Agreement specifies key aspects and electro-optical-mechanical details of a 3.2 Tb/s Co-Packaged Optical Module.
- This project will draw on 400G-FR4 and 400G-DR4 IEEE standards as well as the CPO JDF.
- Project was launched at the February meeting.
- Draft Implementation Agreement is under review.

The next scheduled OIF Standards meeting will be held on August 2-4, 2022 in Toronto, Canada

1. FC-PI-8 Ad Hoc (128GFC Serial)

- After discussions and technical contributions throughout multiple meetings, the committee voted and agreed to exclude optical link training as requirement for 128GFC. Optical training was originally proposed to allow more pre-emphasis which reduces TDECQ for longer MM links. BER measurement results at 53.125Gbps show that optical link training is not needed for 56.1Gbps.
- Committee reviewed the first round of comments for FC-PI-8 and resolved 40 of 76 technical comments (120 total comments). Two interim meetings are scheduled prior to the August meeting to resolve remaining comments.

- There were debates on whether 128GFC should be at the same rate of 106.25Gbps (as Ethernet) or at the faster rate of 112.2Gbps. The committee took a vote and arrived at an impasse. There is a call for contribution for the two interim meetings to justify both cases.

The next scheduled INCITS T11 meeting will be virtual/face-to-face on August 9-11, 2022, Chicago, IL, USA.

The next scheduled IEC SC48B meeting will be virtual September 12-16, 2022.

WG1: Fibres and Cables/Fibres and associated measuring methods

Documents in revision:

- IEC 60793-1-1 ED5: General and guidance. Document is in CDV stage, ballot closes on 2022-04-15.
- IEC 60793-1-22 ED2: Length Measurement. Agreed revision within correspondence group will be incorporated and document will be circulated as 1st CD. A 2-week questionnaire will also be sent out to the NCs for proposed revisions.
- IEC 60793-1-40 ED3: Attenuation measurement methods. The definition of attenuation will be modified to be compatible with electropedia.org. Document approved for 1st CD circulation.
- IEC 60793-1-41 ED4: Bandwidth. Adding direct coupling between source and detection apparatus for Method A. Document approved for 1st CD circulation.

- IEC 60793-1-44 ED3: Cut-off wavelength. Document is approved for CDV stage, ballot will be circulated after the April meeting.
- IEC 60793-1-45 ED3: Mode field diameter. An error was found and will be rectified on the distance, d , between the fibre end and the detector. Document approved for 1st CD circulation.
- IEC 60793-1-46 ED2: Monitoring of changes in optical transmittance. Correspondence group continues to discuss revision topics.
- IEC 60793-2-50: Sectional specification for class B single-mode fibres. Revision to add a 200um coating nominal outer diameter option for B-654 A/C, B fibres are under discussion. Document approved for 1st CD circulation.
- IEC 60793-2-60 ED2: Product specifications – Sectional specification for category C single-mode intraconnection fibre. Correspondence group continues to discuss revision work surrounding additional fibre diameters, fibre cut-off wavelength and strip force. More contributions are expected at the October meeting.

- IEC TR 62284 ED2: Effective area measurements of single-mode optical fibres – Guidance. Draft CD will be reviewed at the October meeting.
- IEC TR 62285 ED3: Application guide for non-linear coefficient measuring methods. Document is in CDV stage, ballot closes on 2022-05-27.

New standards in progress:

- IEC TR 63309 ED1: Active fibres - Characteristics and Measurement Methods – Guidance. 2nd CD comment resolution completed; document is approved for DTR stage.

Published documents:

- IEC 60793-2-10/AMD1 ED7: Optical fibres - Product specifications - Sectional specification for category A1 multimode fibres Amendment 1. Document has been published in 01-2022. Modifies zero dispersion wavelength and zero dispersion slope for A1-OM2, A1-OM3, A1-OM4 and A1-OM5.

WG3: Fibres and Cables/Cables

Documents in revision:

- IEC 60794-1-1: Optical fibre cables - Generic specification. CDV ballot closes 2022-04-15. Early comments were resolved and finalized comment resolutions will be circulated for review. If no objection, document is approved for FDIS.
- IEC 60794-2-10 ED2: Indoor optical fibre cables - Family specification for simplex and duplex cables. In CDV stage, ballot closes on 2022-04-15.
- IEC 60794-2-20 ED4: Indoor optical fibre cables - Family specification for multi-fibre optical cables. In CD stage, ballot closes on 2022-07-15.
- IEC 60794-2-22 ED2: Indoor optical fibre cables – Detail specification for multi-simplex breakout optical cables for use in terminated breakout cable assemblies. CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-2-50 ED3: Indoor cables – Family specification for simplex and duplex cables for use in terminated cable assemblies. CD comment resolution completed, approved to circulate as CDV.

New standards in progress:

- IEC TR 63309 ED1: Active fibres - Characteristics and Measurement Methods – Guidance. 2nd CD comment resolution completed; document is approved for DTR stage.

Published documents:

- IEC 60794-1-22 Environmental test methods document is being split into individual documents. All below documents are in CD stage.
 - IEC 60794-1-201 ED1: Temperature cycling, Method F1
 - IEC 60794-1-205 ED1: Water penetration, Method F5
 - IEC 60794-1-207 ED1: Nuclear radiation, Method F7
 - IEC 60794-1-208 ED1: Pneumatic resistance, Method F8
 - IEC 60794-1-209 ED1: Ageing, Method F9
 - IEC 60794-1-210 ED1: Underwater cable resistance to hydrostatic pressure, Method F10
 - IEC 60794-1-212 ED1: Temperature cycling of cables.
 - IEC 60794-1-213 ED1: Microduct pressure withstand, Method F13
 - IEC 60794-1-214 ED1: Cable UV resistance test, Method F14
 - IEC 60794-1-216 ED1: Compound flow (drip), Method F16
 - IEC 60794-1-217 ED1: Cable shrinkage.
 - IEC 60794-1-218 ED1: Mid-span temperature cycling test for exposed buffer tubes, Method F18
- IEC 60794-1-23 Cable elements test methods document is being split into individual documents. Once all individual test methods are published, -1-23 will be withdrawn.
 - IEC 60794-1-301 ED1: Bend test for cable elements. In CDV stage, ballot closes on 2022-05-20.

- IEC 60794-1-302 ED1: Ribbon dimensions and geometry – visual method. CD will be circulated prior to next meeting.
- IEC 60794-1-303 ED1: Ribbon dimensions – Aperture gauge). CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-1-305 ED1: Ribbon tear (separability). In CDV stage, ballot closes on 2022-04-15.
- IEC 60794-1-306 ED1: Ribbon torsion. CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-1-307 ED1: Tube Kinking. 1st CD comment resolution completed, approved to circulate as 2nd CD.
- IEC 60794-1-308 ED1: Ribbon residual twist test. CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-1-309 ED1: Bleeding and evaporation. In CDV stage, ballot closes on 2022-04-15.
- IEC 60794-1-311 ED1: Tensile strength and elongation at break of buffer tubes. In CDV stage, ballot closes on 2022-05-20.
- IEC 60794-1-312 ED1: Elongation of buffer tubes at low temperature. In CDV stage, ballot closes on 2022-05-20.
- IEC 60794-1-24 Electrical test methods document have been split into individual documents. -1-24 has been withdrawn and replaced by 60794-1-401 to -1-404.
 - IEC 60794-1-404 CDV comment resolution completed; document moves to FDIS stage.
- IEC 60794-2-23 ED1: Indoor optical fibre cables – Detailed specification for multi-fibre cables for use in MPO connector terminated cable assemblies. CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-2-24 ED1: Indoor optical fibre cables – Detailed specification for multiple multi-fibre unit cables for use in MPO connector terminated breakout cable assemblies. CD comment resolution completed, approved to circulate as CDV.
- IEC 60794-7 ED1: Fire resistant optical fibre data communication cables. WG will continue comment resolution at the next meeting.
- IEC TR 63431 ED1: Microduct technology – Guidance. In CD stage, ballot closes on 2022-06-05.
- IEC TR 63442 ED1: Guidelines for the assessment of rodent resistance for optical fibre cable. In CD stage, ballot closes on 2022-07-08.

Published documents:

- IEC 60794-1-219 ED1: Environmental test methods – Material compatibility test, Method F19
- IEC 60794-1-220 ED1: Environmental test methods – Salt spray corrosion test, Method F20
- IEC 60794-1-310 ED1: Cable element test methods – Strippability, Method G10 (split from IEC 60794-1-23 Method G10).
- IEC 60794-1-404 ED1: Electrical test methods – Current-temperature test, Method H4 (split from IEC 60794-1-24 Method H4).
- IEC 60794-3-40 ED2: Outdoor cables – Family specification for cables for storm and sanitary sewers
- IEC 60794-3 ED5: Outdoor cables - Sectional specification.

Document Withdrawn or Rescinded:

- IEC 60794-1-24 Electrical test methods. Replaced by 60794-1-401 to -1-404.
- IEC 60794-2-51 Indoor cables – Detail specification for simplex and duplex cables for use in cords for controlled environment.
- IEC 60794-3-50 Outdoor cables – Family specification for gas pipe cables and subducts for installation by blowing and/or pulling/dragging in gas pipes
- IEC 60794-3-60 Outdoor cables – Family specification for drinking water pipe cables and subducts for installation by blowing and/or pulling/dragging/floating in drinking water pipes

The next scheduled IEC SC86A meeting will be held on October 27-31, 2022, in San Francisco, CA, USA

1. WG4: Standard tests and measurement methods

A large number of documents are in revision:

- IEC 61300-2-2: Mating durability (1CD)
- IEC 61300-2-5: Torsion test (FDIS)
- IEC 61300-2-6: Strength of coupling mechanism (CDV)
- IEC 61300-2-11: Axial compression (CDV)
- IEC 61300-2-18: Dry heat -High temperature endurance (FDIS)
- IEC 61300-2-19: Damp heat (steady state) (1CD)
- IEC 61300-2-21: Composite temperature/humidity cyclic test (2CD)
- IEC 61300-2-22 : Change of temperature (CDV)
- IEC 61300-2-26: Salt mist (CDV)
- IEC 61300-2-27: Dust (1CD)
- IEC 61300-2-33: Assembly and disassembly of fibre optic mechanical splices, fibre management systems and closures (CDV)
- IEC 61300-2-34: Resistance to solvents and contaminating fluids of interconnecting components and closures (CDV)
- IEC 61300-2-38: Sealing for pressurized fibre optic closures (CDV)
- IEC 61300-2-43: Screen testing of return loss of single-mode PC optical fibre connectors (FDIS)
- IEC 61300-2-44: Corrigendum Damp heat, cyclic (COR)
- IEC 61300-2-50: Fibre optic connector proof test with static load - Singlemode and multimode (WD)
- IEC 61300-3-3: Active monitoring of attenuation and return loss (1CD)
- IEC 61300-3-4: Attenuation (FDIS)
- IEC 61300-3-6: Return loss (WD)
- IEC 61300-3-14: Error and repeatability of the attenuation settings of a variable optical attenuator
- IEC 61300-3-27: Method for measurement of hole/fibre core position of rectangular ferrules (4CD)
- IEC 61300-3-30: Endface geometry of rectangular ferrule (WD)
- IEC 61300-3-34: Attenuation and return loss of random mated connectors (WD)
- IEC 61300-3-35: Visual inspection of fibre optic connectors and fibre-stub transceivers. (FDIS)
- IEC 61300-3-45: Attenuation of random mated multi-fibre connectors (FDIS)
- IEC 61300-3-46: MT Ferrule Bore Diameter Measurement (1CD)
- IEC 61300-3-48: Spring compression force of the coupling sleeve for rectangular ferrule multi-fibre connectors
- IEC 61300-3-50: Crosstalk for optical spatial switches
- IEC 61300-3-52: Guide hole and alignment pin deformation constant, CD for 8 degree angled PC rectangular ferrule, single mode fibres

Documents prepared for publication:

- IEC 61300-1: General and guidance.
- IEC 61300-2-1: Vibration (sinusoidal)
- IEC 61300-2-46: Damp heat, cyclic (Corrigendum)
- IEC 61300-3-7: Wavelength dependence of attenuation and return loss
- IEC 61300-3-33: Withdrawal force from a resilient alignment sleeve using pin gauges

2. WG6: Standards and specifications for fibre optic interconnecting devices and related components

Documents in revision:

- IEC 61753-021-02: Fibre optic connectors terminated on single-mode fibre to category C (CDV)
- IEC 61753-021-06: Grade B/2 single-mode fibre optic connectors for category OP (CDV)
- IEC 61754-13: Type FC-PC connector (1CD)
- EC 61755-1: Optical interfaces for single mode non-dispersion shifted fibres (CDV)

- IEC 61755-2-1: Fibre optic interconnecting devices and passive components - Connector optical interfaces for single-mode fibres - Part 2-1: Connection parameters of non-dispersion unshifted physically contacting fibres - non-angled (FDIS)
- IEC 61755-2-2: Connection parameters of dispersion unshifted physically contacting fibres – angled (FDIS)
- IEC 61755-3-1: Connector parameters of dispersion unshifted single-mode physically contacting fibres - non-angled 2,5 mm and 1,25 mm diameter cylindrical full zirconia ferrules (3CD)
- IEC 61755-3-2 Ed2: Connector parameters of dispersion unshifted single mode physically contacting fibres – angled 2,5 mm and 1,25 mm diameter cylindrical full zirconia ferrules (3CD)
- IEC 61755-3-5: Connector parameters of non-dispersion shifted single mode physically contacting fibres - non-angled 2,5 mm and 1,25 mm diameter cylindrical composite ferrule using Cu-Ni-alloy as fibre surrounding material (3CD)
- IEC 61755-3-7: Connector parameters of non-dispersion shifted single mode physically contacting fibres - non-angled 2,5 mm and 1,25 mm diameter cylindrical composite ferrules using titanium as fibre surrounding material (3CD)
- IEC 61755-3-8: Connector parameters of non-dispersion shifted single mode physically contacting fibres – angled 2,5 mm and 1,25 mm diameter cylindrical composite ferrules using titanium as fibre surrounding material (3CD)
- IEC TR 62627-1 : : Fibre optic connector cleaning methods (DTR)

New standards in progress:

- IEC 61753-022-07: Hardened fibre optic connectors terminated on multimode fibre for category A – Outdoor aerial environment (2CD)
- IEC 61753-022-13: Fibre optic connectors terminated on multimode fibre for category OP+ HD – Extended outdoor protected environment with additional heat (2CD)
- IEC 61754-36: Fibre optic connector interfaces- Part 36: Type SAC connector family (FDIS)
- IEC 61754-37: Fibre optic connector interfaces- Part 37: Type MDC connector family (FDIS)
- IEC 61754-7-4 – Fibre optic connector interfaces – Part 7-4: Type MPO connector family – One fibre row 16 fibres wide (4CD)
- IEC 61754-7-5– Fibre optic connector interfaces – Part 7-4: Type MPO connector family – Three fibre rows (1CD)
- IEC 62005-9-5 for the reliability qualification of sealed closures (NP)
- IEC 62664-1-10 ED1: Fibre optic interconnecting devices and passive components - Fibre optic connector product specifications - Part 1-10: MPO-PC multimode connectors terminated on IEC 60793-2-10 category A1-OM2b to A1-OM5b fibre (NP)
- IEC 63267-1: Optical interfaces for multimode fibres - General and guidance.(FDIS)
- IEC 63267-2-2: Connection of 50 µm core diameter multimode physically contacting fibres - Non-angled for reference connector application, at wavelength of 850 nm using selected A1a fibre only (1CD)
- IEC TR 63323 Ed1: Fibre optic interconnecting devices and passive components – A study of an SC connector adaptor with safety lock mechanism. (2CD)

Published standards:

- IEC 61754-20: Amendment Type LC connector family (CDV)
- IEC 61754-4: Type SC connector family (FDIS)
- IEC 61754-6: Type MU connector family (FDIS)

3. WG7- Standards and specifications for fibre optic passive components

Documents in progress:

- IEC 61753-043-02: Wavelength selective simplex cords with single-mode fibre and cylindrical ferrule connectors for category C (FDIS)
- IEC 61753-053-02: Non-connectorized, single-mode fibre, electrically controlled, variable optical attenuator for category C - Controlled environments (FDIS)
- IEC 61753-081-02: Non-connectorized single-mode fibre optic middle-scale 1 x N DWDM devices for category C. (CDV)
- IEC 61753-081-03: Non-connectorized single-mode fibre optic middle-scale 1 x N DWDM devices for category OP – Outdoor protected environment (2CD)
- IEC 61753-081-06: Non-connectorized single-mode fibre optic middle-scale 1 x N DWDM devices for category OP+ – Extended outdoor protected environment (3CD)

- IEC 61753-082-02: Part 082-02: Pigtailed single-mode fibre optic 1,31/1,55 µm WWDM devices for category C - Indoor controlled environment (1CD)
- IEC 61753-089-2: Non-connectorized single-mode bidirectional OTDR monitoring WWDM devices for category C (FDIS)
- IEC 62077: Generic specification for circulators.(FDIS)

Published standards:

- IEC 61753-051-2: Single mode fibre plug style fixed attenuator
- IEC 61753-091-2: Single mode fibre optic pigtailed style circulators for category C

The next scheduled IEC SC86B meeting will be held October 24 - November 4, 2022, San Francisco, CA, USA.

IEC SC86C meeting: No meetings were held in Q2

The next scheduled IEC SC86C meeting will be held on October 28-29, 2022, San Francisco, CA, USA.

IEC TC46 SC46C/WG7: April 25, 2022, Virtual meeting

Highlights of the meeting include:

- The IEC 61156-1 ED4: "Multicore and symmetrical pair/quad cables for digital communications - Part 1: Generic specification" was approved by the committee for publication. The UK delegation identified a need to change the wording describing the common mode impedance of the cable termination. The committee agreed that this change was important and so the committee has asked the IEC secretariate if this change can be accommodated by adding it to the reviewed compilation of comments. This would allow the committee to review the change one last time before the document moves to the FDIS stage.
- A proposal to remove delay parameters from IEC 61156-1-3 "Multicore and symmetrical pair/quad cables for digital communications - Part 1-3: Electrical transmission parameters for modelling cable assemblies using symmetrical pair/quad cables" was discussed. As the delay parameters are fundamental for the coupled transmission lines, it was decided to reject this proposal. A new compilation of comments will be prepared. The results of the revised CC will lead to the preparation of a new CD.
- A revision of the IEC 61156-11 ed2 "Multicore and symmetrical pair/quad cables for digital communications - Part 11: Symmetrical single pair cables with transmission characteristics up to 1,25 GHz - Horizontal floor wiring - Sectional specification" was discussed and a CDV has been circulated. Progress on this document will support the possible revision of the 61156-12 ed2 document concerned with work area wiring.
- A new version of IEC 61156-13 ed1 "Multicore and symmetrical pair/quad cables for digital communications - Part 13: Symmetrical single pair cables with transmission characteristics up to 20 MHz - Horizontal floor wiring - Sectional specification" was discussed and a CDV has been circulated. Progress on this document will support the start of a project to prepare IEC 61156-14 ed1 concerned with work area wiring.
- Comments on the IEC 61156-15 "Multicore and symmetrical pair/quad cables for digital communications - Part 15: Symmetrical pair/quad cables for horizontal floor wiring with transmission characteristics up to 1 000 MHz and resistance to fire performance characteristics - Sectional specification" CD were reviewed. Resolutions reached by the group will be circulated in a new CD.
- With respect to the assessment of the market relevance for 25G cable standards or a 1250 MHz cable standard, it has been discussed that WG7 should prepare a summary for SC46C showing that:
 - A 25G cable currently cannot be included in current documents.
 - A possible option could be evolving out of the (intense) discussion in JTC1/SC25/WG3 about cable sharing for T1-C channels.

The next scheduled IEC TC46 SC46C/WG7 meeting will be virtual September 22, 2022

1. SG15Q6: Characteristics of optical components, subsystems and systems for optical transport networks

Documents in progress:

- Draft new Recommendation L.ncip "Optical/Electrical hybrid cables for access point and other terminal equipment" was reviewed. An informative appendix III "Chinese experience" and informative appendix IV showing examples of use of splitters inside protective housings was added.
- Revision of L.250/L.90 (Topologies for optical access networks) with the inclusion of C-RAN and 5G was discussed.
- Revision of L.340/L.74 (Maintenance of telecommunication underground facilities). Inspection items for tunnels, maintenance holes and handholes are added.
- Revision of LSTP-GLT (Guide on how to use L documents)
- Announcement was made that Q16 will become Q7 at the next meeting in September.

The next scheduled ITU-T SG15 meeting will be virtual September 19-30, 2022.

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