CODE OF PRACTICE FOR TELECOMMUNICATION WIRING WORK 2024

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

1 July 2024

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TELECOMMUNICATIONS ACT 1999

CODE OF PRACTICE FOR TELECOMMUNICATION WIRING WORK 2024

In exercise of the powers conferred by section 30(1) of the Telecommunications Act 1999, the Info-communications Media Development Authority hereby issues the following Code of Practice:

1. PRELIMINARY

1.1 Citation and commencement

This Code may be cited as the Code of Practice for Telecommunication Wiring Work 2024 and shall come into operation on 1 July 2024.

1.2 Definitions

In this Code, unless the context otherwise requires –

"ANSI/EIA/TIA-455" means the ANSI/EIA/TIA-455 standard issued by American National Standards Institute/ Electronic Industries Alliance/ Telecommunications Industry Association titled General Requirements for Standard Test Procedures for Optical Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and other Fiber Optic Components;

"ANSI/EIA/TIA-568.3" means the ANSI/EIA/TIA-568.3 standard issued by American National Standards Institute/ Electronic Industries Alliance/ Telecommunications Industry Association titled Optical Fiber Cabling and Component Standard;

"building" means any permanent building or structure;

"cable" means a cable, wire or line used or intended to be used for telecommunications;

"cable distribution system" means a network of cable trays, cable ladders, trunking, conduits, and underfloor ducts, which enable cables to be laid from one point to another point within a building or a development;

"COPIF" means the Code of Practice for Info-communication Facilities in Buildings issued by IMDA, the latest draft of which was issued in 2018;

"development" means a single project consisting of 1 or more buildings;

"dwelling house" has the same meaning as in the Residential Property Act 1976;

"Effective Date" means the date this Code comes into operation, i.e., 1 June 2024;

"fibre interface point" means a point of interconnection between a user's internal optical fibre cable and any telecommunication system of a telecommunication licensee;

"fibre termination point" means the point where an optical fibre cable at a user's premises is terminated;

“GR-326” means the GR-326 standard issued by the Telcordia titled Generic requirements for single-mode optical connectors and jumper assemblies;

“IDA CP L1: 2000” or “Cancelled Code” means the Code of Practice for Internal Telecommunication Wiring 2000, which is cancelled pursuant to Section 1.8 below;

“IEC 61754” means the IEC 61754 standard issued by the International Electrotechnical Commission titled Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces;

“IMDA” means the Info-communications Media Development Authority constituted under the Info-communications Media Development Authority Act 2016;

“IMDA Act” means the Info-communications Media Development Authority Act 2016;

“ITU-T G.652” means the ITU-T G.652 recommendation issued by the International Telecommunications Union – Telecommunication Standardization Sector titled Transmission media and optical systems characteristics – Optical fibre cables - Characteristics of a single-mode optical fibre and cable;

“ITU-T G.652.D” means the G.652.D fibre type defined in ITU-T G.652;

“ITU-T G.657” means the ITU-T G.657 recommendation issued by the International Telecommunications Union – Telecommunication Standardization Sector titled Transmission media and optical systems characteristics–Optical fibre cables - Characteristics of a bending-loss insensitive single-mode optical fibre and cable;

“ITU-T L.400/L.12” means the ITU-T L.400/L.12 recommendation issued by the International Telecommunications Union – Telecommunication Standardization Sector titled Passive optical devices - Optical fibre splices;

“landed dwelling house” means any of the following types of dwelling houses –

(a) detached house;

(b) semi-detached house; or

(c) terrace house

but does not include a strata landed dwelling house;

“licensed contractor” means a person who holds a telecommunication wiring contractor class licence;

“licensed installer” means an individual who holds a telecommunication wiring installer class licence;

“licensed contractor/installer” refers to a licensed contractor and/or a licensed installer, as the case may be in the relevant context;

“main distribution frame room” means a room within a building or development that is used to house a main distribution frame and licensees’ installation, plant or systems;

“non-residential building” means a building used for any non-residential purpose and includes –

(a) office towers;

(b) shophouses and shopping complexes;

(c) convention and exhibition complexes;

(d) markets and food centres;

(e) hotels, boarding houses, guest houses, service apartments, student hostels and workers’ dormitories;

(f) resort developments;

(g) factories and warehouses;

(h) utilities and telecommunication installations;

(i) business or technology park developments;

(j) ports of entry for land, air and sea, including immigration checkpoints;

(k) bus terminals, bus interchanges, train stations, including Mass Rapid Transit System (MRT) stations or Light Rail Transit System (LRT) stations;

(l) fire stations, police stations, civil defence buildings, military camps, prison buildings, hospitals, government offices or embassies;

(m) places of worship;

(n) libraries, museums, community clubs or centres, association buildings, sports and recreational complexes, homes for the aged and hospices; and

(o) primary schools, secondary schools, junior colleges, universities, polytechnics, foreign and specialist schools;

"optical fibre" means any filament made of dielectric materials (usually plastic or glass) that guides light;

"optical fibre cable" means an assembly comprising 1 or more optical fibres;

“optical fibre connector” is a device which mechanically couples and aligns the cores of optical fibre cable so that light can pass between different optical fibre cables and from the optical fibre cable to any equipment;

“optical network terminal” means a powered device, provided by a telecommunication licensee, which will connect to the fibre termination point and convert optical signal from the fibre termination point to an electric signal for the customer premise equipment like residential gateway and modems;

"patch panel" means a hardware panel that facilitates cable termination using patch cords;

“SC/APC connector” means a standard connector / angle polished connector;

"single-mode optical fibre" means an optical fibre that guides one path of light;

"splice" means a permanent joining of optical fibres in a splice closure;

“strata landed dwelling-house” means any dwelling house comprised in a development the strata subdivision of which is permitted under a written permission granted by the competent authority under section 14 (4) of the Planning Act (Cap. 232) or authorised by the Minister under section 21 (6) of the Planning Act;

“Telecommunications Act” means the Telecommunications Act 1999;

“telecommunication equipment room” means a room within a building or a development that is used to house a licensee’s installation, plant or system;

“Telecommunication licensee” means a person to whom a licence has been granted under section 5 or 7 of the Telecommunications Act;

“telecommunication riser” means a compartment that is used to house and distribute local cables vertically from the main distribution frame room or telecommunication equipment room to the individual storeys of a building;

“telecommunication wiring contractor class licence” means a class licence mentioned in regulation 5 of the Telecommunication (Wiring Work) Regulations 2024 and granted by the Authority under section 5 of the Telecommunications Act;

“telecommunication wiring installer class licence” means a class licence mentioned in regulation 4 of the Telecommunication (Wiring Work) Regulations 2024 and granted by the Authority under section 5 of the Telecommunications Act;

“underground pipes” –

(a) in relation to a landed dwelling house, means the pipes which extend from the boundary of the house into the house;

(b) in relation to a development consisting of strata landed dwelling houses, means the pipes which extend from the boundary of the development to the main distribution frame room or to the retaining wall of the development (as the case may be) and which extend from the main distribution room or retaining wall to each strata landed dwelling house within the development; and

(c) in relation to a development consisting of a building or buildings other than landed dwelling-houses or strata landed dwelling houses, means the pipes which extend from the boundary of the development to the main distribution frame room or to the retaining wall of the development (as the case may be) and which extend from the main distribution frame room or retaining wall to the telecommunication equipment room or telecommunication riser within the development;

"user" means a person who has subscribed to or intends to subscribe to any telecommunication service of a telecommunication system licensee;

"wiring work" means the installation, modification, maintenance or repair of any wiring -

(a) that is or is intended to be used for connection to any telecommunication system of a telecommunication system licensee; and

(b) that is not carried out by or on behalf of a telecommunication system licensee;

"Wiring Work Regulations" refer to the Telecommunications (Wiring Work) Regulations 2024;

"YD/T 1258.3" means the YD/T 1258.3 standard issued by The Ministry of Industry and Information Technology of the People's Republic of China titled The series of indoor optical fiber cables. Part 3: Simplex and duplex cable for use in premises cabling.

1.3 Purpose of this Code

1.3.1 This Code is intended to –

(a) specify the technical standards and specifications for the carrying out of wiring work involving optical fibre cables, including the wiring workmanship and practices which licensed contractors and licensed installers are required to comply with;

(b) support IMDA's licensed contractor and licensed installer class licensing regimes; and

(c) ensure that wiring work involving optical fibre cables is carried out to satisfactory standards, so as to ensure delivery of quality telecommunication services to users' premises.

1.4 Legal Effect of this Code

1.4.1 Every licensed contractor and licensed installer shall comply with the provisions of this Code.

1.4.2 For the avoidance of doubt, the obligations contained in this Code are in addition to those contained in the IMDA Act, the Telecommunications Act, the Wiring Work Regulations, as well as other regulations, licences or codes of practice issued by IMDA. To the extent that any provision of this Code is inconsistent with the terms of the IMDA Act, Telecommunications Act, the Wiring Work Regulations, or the conditions of any licence issued by IMDA, the provisions of the IMDA Act, Telecommunications Act, the Wiring Work Regulations, or licences (as the case may be) shall prevail and the relevant provision of this Code to the extent of the inconsistency —

(a) has effect subject to the provisions of the IMDA Act, the Telecommunications Act, the Wiring Work Regulations, or the conditions of any licence issued by IMDA (as the case may be); or

(b) having regard to the provisions of the IMDA Act, the Telecommunications Act, the Wiring Work Regulations, or the conditions of any licence issued by IMDA (as the case may be), does not have effect.

1.4.3 If any provision of this Code is held to be unlawful, all other provisions will remain in full force and effect.

1.5 Application of this Code

1.5.1 This Code is published in conjunction with the class licensing scheme for licensed contractors and licensed installers set out in the Wiring Work Regulations.

1.5.2 Technical standards and specifications for wiring works involving optical fibre cables are set out in this Code to ensure delivery of quality telecommunication services to users' premises.

1.5.3 In this Code, where reference is made to ANSI/EIA/TIA-455, ANSI/EIA/TIA-568.3, GR-326, IEC 61754, ITU-T G.652, ITU-T G.657, ITU-T L.400/L.12, YD/T 1258.3, implementation of this Code shall be based on the versions of these standards or recommendations that are valid at the time of performance of the relevant obligation.

1.5.4 This Code covers wiring work involving optical fibre cables.

1.6 Right to Modify

1.6.1 IMDA may modify this Code on its own initiative at any time.

1.7 Waiver

1.7.1 IMDA may waive the application, to any licensed contractor or licensed installer, of all or any part of this Code in accordance with section 30(6) of the Telecommunications Act. A waiver shall be subject to such terms and conditions as IMDA may specify.

1.7.2 A licensed contractor or licensed installer may also make an application for waiver, in relation to the technical standards and specifications to be complied with under this Code, in writing to IMDA, and such application shall state the nature and extent of and reasons for the proposed waiver and shall be accompanied by such plans and particulars as may be required to support the application.

1.7.3 Without limiting the types of waiver which IMDA may grant, a waiver may be permanent, or temporary (either for a fixed period or effective until the occurrence of a specific event), or on a one-time basis.

1.7.4 IMDA may waive or suspend any provision of this Code that imposes an obligation on IMDA in any situation in which such action is necessary in the public interest.

1.8 Cancellation

1.8.1 The Code of Practice for Internal Telecommunication Wiring 2000 (i.e., the **Cancelled Code**) is cancelled with effect from the Effective Date.

1.8.2 For the avoidance of doubt, nothing in Section 1.8.1 shall exempt any licensed contractor/installer from his obligation to comply with any applicable requirements under the Cancelled Code for purposes of the installation, maintenance or repair of telecommunication wiring to the extent that these requirements applied to him prior to the Effective Date.

1.9 Savings Provision

1.9.1 Except as otherwise provided, and so far as it is not inconsistent with the provisions of this Code, any action, approval, decision, exemption and notification taken, granted, issued, made, published or approved by IMDA in relation to any matter under the Cancelled Code, will continue in effect and will be deemed to have been taken, granted, issued, made, published or approved by IMDA under the corresponding provisions of this Code.

2 OPTICAL FIBRE CABLES

2.1 General

2.1.1 This section specifies the requirements for wiring work involving optical fibre cables.

2.1.2 A licensed contractor/installer installing optical fibre cable in dwelling house shall comply with the requirements relating to optical fibre cables set out in paragraphs 4.3.1(a), 5.5.1(a), 6.7.1(a) and 7.9.1(a) of COPIF.

2.1.3 The licensed contractor/installer shall ensure that optical fibre cables are properly installed in cable trunkings, on cables trays and/or in underground pipes.

2.2 Single-Mode Optical Fibre Cables

2.2.1 Any licensed contractor/installer carrying out wiring works involving optical fibre cables shall only use single-mode optical fibre cables which are compliant with:

(a) the specifications in sub-category G.652.D in the ITU-T G.652 Recommendation for installation of optical fibre cables in underground pipes; or

(b) the G.657 Category A fibre specifications in the ITU-T G.657 Recommendations for installation of optical fibre cables as internal telecommunication wiring with a lower bending radius of 15mm.

2.3 Minimum Bending Radius Requirements

2.3.1 In general, sharp bends in optical fibre cables may cause significant signal losses and mechanical failure and thus reduce the life span of such optical fibre cables.

2.3.2 During the installation of optical fibre cables, the licensed contractor/installer shall ensure that the bending radius of each optical fibre cable shall exceed the minimum bending radius as specified in the technical specifications provided by the optical fibre cable manufacturer. In the absence of such technical specifications, the telecommunication wiring contractor/installer shall ensure that the bending radius of each optical fibre cable shall, at the minimum, be at least 20 times the diameter of the optical fibre cable with reference to the ANSI/EIA/TIA-568.3 standard.

2.4 Cable Tensile Strength Requirements

2.4.1 The licensed contractor/installer shall ensure that the cable tensile stress on any G.652.D and G.657 Category A optical fibre cables do not exceed the ratings specified in either the ITU Recommendations G.652.D and G.657 Category A specifications or the manufacturer's specifications, whichever is more stringent.

2.5 Use of Optical Fibre Connectors

2.5.1 Any licensed contractor/installer carrying out wiring works involving optical fibre cables shall use an SC/APC connector for the termination of optical fibre cables.

2.5.2 To ensure proper installation and to achieve low insertion loss and high return loss, a factory-made fibre cable assembly which is pre-terminated in an SC/APC connector shall be used for splicing with the installed optical fibre cable at the end points. Such cable assembly shall be installed in accordance with the requirements specified in Appendix A to this Code.

2.5.3 As dirt at the end face of the ferrule (i.e., the ceramic ring or cap in an optical fibre connector that ensures that the fibre being connected are accurately aligned) prevents the end face of an optical fibre cable from coming into full contact with that of another optical fibre cable, the ferrule shall be cleaned before each connection, to remove dirt and to prevent high insertion loss.

2.6 Fusion Splicing of Optical Fibre Cables

2.6.1 The licensed contractor/installer shall when joining optical fibre cables:

(a) employ fusion splicing, as this will ensure minimal reflection loss and insertion loss;

(b) ensure that the optical fibre splices performed via fusion splicing shall not exceed the maximum optical attenuation and minimum return loss as specified in the ANSI/EIA/TIA-568.3 standard when measured in accordance with the ANSI/EIA/TIA-455 standard. The licensed contractor/installer may also refer to the recommendations under ITU-T L.400/L.12 on the fusion splicing procedure, and optical and mechanical tests to be performed for the spliced joints; and

(c) ensure that the spliced region of the optical fibre cable is protected by either treating the spliced region using the recoating process or inserting a splice protection sleeve over the spliced region so as to protect the spliced joint from breaking.

2.7 Installation of Optical Fibre Cables

2.7.1 The licensed contractor/installer shall ensure that the optical fibre cables installed can be distinguished from one another (e.g., via a colour coding system) and are labelled in a consistent manner to facilitate the ease of identification (e.g., a labelling system).

2.7.2 The licensed contractor/installer shall ensure that all access points to the optical fibre cables, including splice enclosures and connectors, are easily accessible and are properly labelled to facilitate future installation and maintenance.

2.7.3 The licensed contractor/installer shall test all optical fibre cables for continuity before and after cable installation and any cables found to be defective shall be replaced.

2.8 Safety Requirements

2.8.1 The licensed contractor/installer shall ensure that the optical fibre cable from the telecommunication riser or gate pillar to each dwelling house shall be designed, constructed and installed to present no hazard or danger, be it for normal usage or under fault conditions, to users, personnel working on or inspecting the system, or to any other person.

2.8.2 The licensed contractor/installer shall ensure that the grounding system and bonding of metal enclosures (if any) containing active telecommunication equipment are carried out in accordance with the Energy Market Authority's requirements.

2.8.3 The licensed contractor/installer shall comply with the requirements set out in paragraph 15.7 of COPIF.

2.9 Record Keeping

The licensed contractor/installer shall ensure that proper records and documentation of all wiring works involving optical fibre cables undertaken are kept for a period of at least 12 months after the date of completion of the relevant wiring works, and to provide a copy of the records/documentation of such works to the person/entity who has engaged the licensed contractor/installer to carry out the relevant works, so as to facilitate future installation and maintenance of the optical fibre cabling system. Such records and documentations shall, at the minimum, include drawings or schematics setting out the following:

(a) the layout of the cable distribution system (carrying the optical fibre cable) in the development/building;

(b) the respective optical fibre cable routes, sizes of cables and quantities of cables from the fibre interface point to the fibre termination points and/or fibre patch panels (if any);

(c) the fibre patch cords at local fibre patch panel in telecommunication risers, closets and user’s telecommunication system equipment rooms (if any); and

(d) information to assist in the identification of the installed cables, patch panels and fibre termination points. The information shall correspond to the actual labelling on the optical fibre cables, patch panels and fibre termination points.

2.10 Test Criteria for Optical Fibre Cables

2.10.1 The licensed contractor/installer shall, after completing any wiring works involving optical fibre cables, carry out the tests set out in paragraph 15.8.1 of COPIF to confirm that the cables are in good working condition upon completion of installation works.

2.10.2 The licensed contractor/installer shall keep records of the results of any tests carried out pursuant to Paragraph 2.10.1 above for a period of at least 12 months after the date of completion of the relevant wiring works, and to provide a copy of the results of the said tests to the person/entity who has engaged the licensed contractor/installer to carry out the wiring works involving optical fibre cables.

APPENDIX A

REQUIREMENTS ON CABLE ASSEMBLY PRE-TERMINATED IN AN SC/APC CONNECTOR

Item	SC/APC
Insertion loss	≤ 0.2dB
Return loss	≥ 60dB
Working Temperature	-25C° to + 75 C°
Storing Temperature	- 40 C° to + 85 C°
Apex offset	<50μm
Radius	5mm -12mm
Fibre Height	-100mm
End-face angle	8 ±0.3
Endurance	500 times
Standard	IEC61754 / GR-326 / YD/T1258.3