MCMC MTSFB TC G025-3:2020

TECHNICAL CODE

BASIC CIVIL WORKS -
PART 3: MICRO TRENCH

Developed by

Malaysian Technical Standards Forum Bhd

Registered by

MCMC

Registered date:

20 May 2020

MCMC MTSFB TC G025-3:2020

Development of technical codes

The Communications and Multimedia Act 1998 ('the Act') provides for Technical Standards Forum designated under section 184 of the Act or the Malaysian Communications and Multimedia Commission ('the Commission') to prepare a technical code. The technical code prepared pursuant to section 185 of the Act shall consist of, at least, the requirement for network interoperability and the promotion of safety of network facilities.

Section 96 of the Act also provides for the Commission to determine a technical code in accordance with section 55 of the Act if the technical code is not developed under an applicable provision of the Act and it is unlikely to be developed by the Technical Standards Forum within a reasonable time.

In exercise of the power conferred by section 184 of the Act, the Commission has designated the Malaysian Technical Standards Forum Bhd (MTSFB) as a Technical Standards Forum which is obligated, among others, to prepare the technical code under section 185 of the Act.

A technical code prepared in accordance with section 185 shall not be effective until it is registered by the Commission pursuant to section 95 of the Act.

For further information on the technical code, please contact:

Malaysian Communications and Multimedia Commission (MCMC)
MCMC Tower 1
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
MALAYSIA

Tel: +60 3 8688 8000
Fax: +60 3 8688 1000
http://www.mcmc.gov.my

OR

Malaysian Technical Standards Forum Bhd (MTSFB)
Malaysian Communications & Multimedia Commission (MCMC)
Off Persiaran Multimedia
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
MALAYSIA

Tel: +60 3 8320 0300
Fax: +60 3 8322 0115
http://www.mtsfb.org.my

Contents

Committee representation

This technical code was developed by the Fixed Network Facilities Sub Working Group under the Network and Broadcast Infrastructure and Facilities Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB) which consists of representatives from the following organisations:

Core MTX Sdn Bhd

Digi Telecommunications Sdn Bhd

edotco Group Sdn Bhd

Malaysian Digital Economy Corporation

Maxis Bhd

Redsun Engineering Sdn Bhd

Telekom Malaysia Berhad

TIME dotcom Bhd

U Mobile Sdn Bhd

Universiti Teknikal Malaysia

Foreword

This technical code for Basic Civil Works - Part 3: Micro Trench (‘this ‘Technical Code’) was developed pursuant to section 95 and section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd (MTSFB) via its Fixed Network Facilities Sub Working Group under the Network and Broadcast Infrastructure and Facilities Working Group.

The *Basic Civil Works* documents consist of the following parts:

Part 1: General Requirements

Part 2: Open Trench

Part 3: Micro Trench

Part 4: Horizontal Directional Drilling

These series of Technical Codes shall replace SKMM/G/01/09, *Guideline on the Provision of Basic Civil Works for Communications Infrastructure in New Development Areas*.

This Technical Code (Part 3: Micro Trench) specifies the requirements for micro trench works for the installation and maintenance of communications network facilities. This Technical Code shall be read together with MCMC MTSFB TC G025-1:2020 for the common requirements.

This Technical Code shall continue to be valid and effective from the date of its registration until it is replaced or revoked.

BASIC CIVIL WORKS - PART 3: MICRO TRENCH

1. Scope

This Technical Code specifies requirements for micro trench works for the installation and maintenance of communications network facilities which covers:

a) planning for micro trench works;

b) technical specifications; and

c) installation procedures.

2. Normative references

The following normative references are indispensable for the application of this Technical Code. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

MCMC MTSFB TC G025-1:2020, *Basic Civil Works - General Requirements*

3. Abbreviations

For the purpose of this Technical Code, the following abbreviation applies:

GI	Galvanised Iron
HDPE	High Density Polyethylene
NFP	Network Facilities Provider
PVC	Poly Vinyl Chloride

4. Terms and definitions

The terms and definitions are as specified in MCMC MTSFB TC G025-1:2020.

5. Planning for micro trench works

Planning of micro trench works shall be done as described in MCMC MTSFB TC G025-1:2020.

6. Technical specifications

The micro trench works shall be done according to works and material specifications as follows.

6.1 Trenching

The micro trench technology shall be applied on routes that involve surfaces such as roads (asphalt), sidewalks (pavement) and other concrete-based surface. It is normally carried out by cutting a groove at a depth of 300 mm and width of 50 mm as shown in Figure 1.

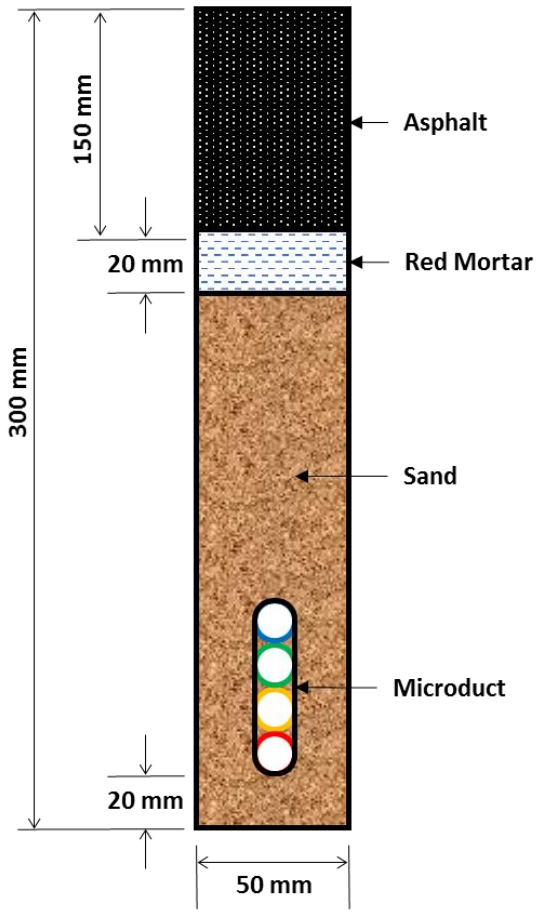

Figure 1. Micro trench cross-section view

6.2 Duct

The maximum diameter of duct allowed shall be 50 mm. There are various types of duct to be used for micro trench as follows:

a) High Density Polyethylene (HDPE) type duct;

   i) smooth wall duct with direct installed microducts (refer Figure 2);

   ii) bundled microducts (refer Figure 3);

   iii) individual microduct (refer Figure 4); and

b) Galvanised Iron (GI) pipe (refer Figure 5).

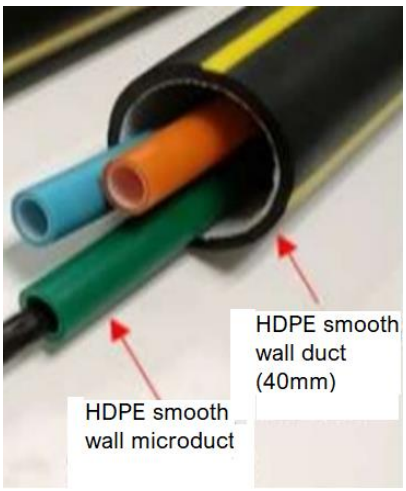

Figure 2. Multiple microducts inside HDPE smooth wall duct

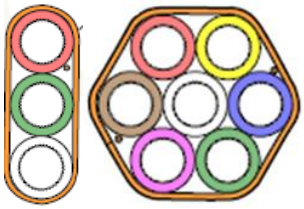

Figure 3. Bundled microducts

Figure 4. Individual microduct

Figure 5. GI pipe

An insulated metallic or any other metal-based wire shall be built-in inside the HDPE duct for precise route detection.

6.3 End cap

End caps shall always be used during the laying, storing and transporting of microducts to prevent the penetration of water or dust. They shall be removable and reusable, with diameter matched to the microducts as shown in Figure 6.

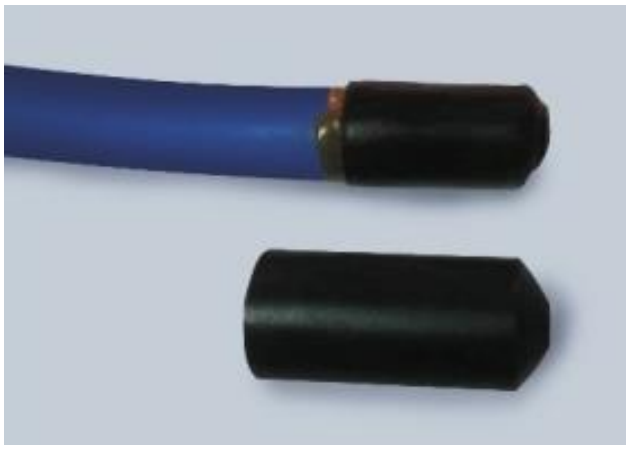

Figure 6. End cap for microducts

6.4 Connector

Connectors as shown in Figure 7 are used as sleeves for connecting 2 microducts and they can be removable and reusable. They should not affect the tensile strength and pressure of the microducts. Straight connectors are used to join 2 microducts that are similar in diameter, while "reducers" are used for different diameter.

Figure 7. Microduct connectors

7. Installation procedure

7.1 Road cutting

Micro trench is performed using an asphalt cutting machine as shown in Figure 8. Cutting speed may depend on the type of machine used. The route shall avoid any sharp turns in direction. Where such condition is unavoidable, the micro trench shall be made by angled cutting so as to comply with the minimum bending radius required for the microducts as illustrated in Figure 9.

Figure 8. Example of road cutting machine

Figure 9. Example of angled cutting

Where it is possible, the trenching shall be done on the road marker line. Upon reinstatement, the road marker line should be repainted according to the specifications by the relevant authorities.

In a condition where the trenching needs to be done on the carriage way, the project manager shall refer to the relevant authorities before work starts.

To ensure the trench is cut in a straight line, the trenching line should be suitably marked to guide the cutting.

7.2 Groove cleaning and drying

After trenching, the bottom of the trench shall be cleaned. It shall be cleared from any loose stones or pebbles which could exert undue pressure and force on the wall of the microducts, causing damage and deformation to microducts. The following procedures shall be carried out after cutting the groove:

a) remove debris from the sides of the excavation;

b) remove adjacent paving materials which were damaged as a result of excavation; and

c) clean the bottom of the trench.

7.3 Laying of duct

The duct comes in various sizes with very low friction level. The duct is a direct-buried type with high tensile strength and crush resistance.

The recommended distance between 2 points should not exceed 250 m as shown in Figure 10.

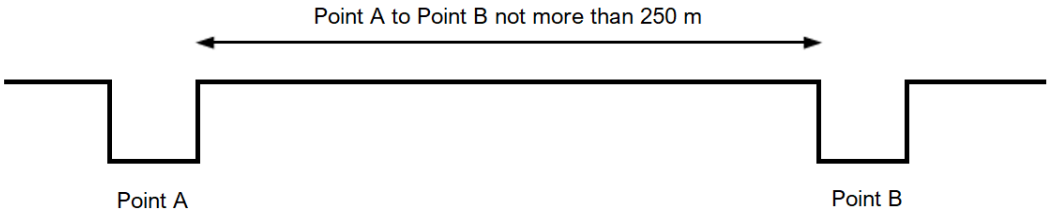

Figure 10. Recommended distance between two manholes

Before laying duct into the bottom of the trench, a sand bedding of approximately 20 mm in thickness shall be laid to provide cushion or absorption mechanism for the ducts. After laying the duct, a further topping using sand up to 60 mm of thickness shall be done to absorb mechanical shock forces from the top of road surface.

7.4 Lead-in duct to manhole

Connection to manhole or pit shall be accomplished by means of a conventional excavation with appropriate length. The dropping of the trench should be gradual from the access point to the manhole or pit in such a way to comply with minimum duct or cable bend radius requirements as shown in Figure 11.

Inside the manhole or pit, individual duct shall be separated and located at a suitable horizontal distance and they shall extend the length of the microducts inside the manhole or pit. Microducts and cable slack for each manhole is required according to the network design.

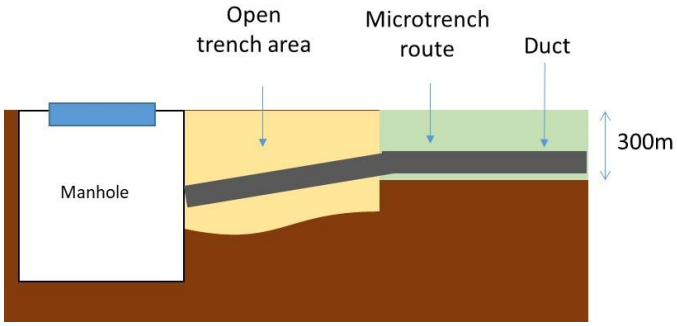

Figure 11. Lead-in duct side-view diagram

7.5 Backfilling

Backfilling shall satisfy the following performance requirements:

a) volumetric stability;

b) bond and adhere to the walls of the trench;

c) the entire excavation shall be fully filled and without different settling; and

d) the backfilling material shall be readily removable for future maintenance works on the microducts.

A suitable measure shall be taken to maintain the cable geometry and avoid undesired floating of the ducts during backfilling process.

Backfilling shall be performed according to the specifications as described in Figure 1.

The properties of the asphalt shall be similar to the existing surface for reinstatement.

8. Completion of works

The completion of works procedure shall be as specified in MCMC MTSFB TC G025-1:2020.

Acknowledgements

Members of the Fixed Network Facility Sub-Working Group

Mr Mohd Yusairi Abu Hassan (Chairman)	Telekom Malaysia Berhad
Mr Zulkefli Zabri (Vice Chairman)	Maxis Bhd
Mr Sufian Sulaiman (Secretary)	Telekom Malaysia Berhad
Mr Muhaimin Mat Salleh/ Mr Mohamad Hafiz Halal (Secretariat)	Malaysian Technical Standards Forum Bhd
Mr Hairul Razi Hamdan	Core MTX Sdn Bhd
Mr Ahmad Fadzly Misron	Digi Telecommunications Sdn Bhd
Mr Jaizan Zuki	edotco Group Sdn Bhd
Mr Mokhtar Daud	Malaysian Digital Economy Corporation
Mr Mohd Nazim Mahmud/ Mr Md Shaiful Zainal	Maxis Bhd
Mr See Boon Leng/ Mr Leong Woon Min/ Mr Ivan Leong Yoon Khong	Redsun Engineering Sdn Bhd
Mr Najib Fadil Mohd Bisri/ Mr Mohd Razman Rusli/ Mr Mohd Haslishah Jalil/ Mr Md Rawi Abu/ Mr Mohd Ariff Arifen/ Mr Noor Fadlee Muhammad Hairi/ Mr Mohd Syahrir Ribuan	Telekom Malaysia Berhad
Mr Abdulhadi Wahid/ Mr Mohd Faiz Hasmi	TIME dotcom Bhd
Mr Roslan Mohd Kasim	U Mobile Sdn Bhd
Ir Ts Dr Mohd Fauzi Ab Rahman/ Ir Dr Anas Abdul Latiff/ Mr Muhammad Taufiq Ahmad/ Mr Mohd Adzimnuddin Mohd Nor Azami	Universiti Teknikal Malaysia Melaka

By invitation:

Mr Husni Azam Yusof/ Mr Jeysudason	Allo Technology Sdn Bhd
Mr Than Kok How	Emtelle Asia Pacific (M) Sdn Bhd
Mr Mohd Hafiz Ramli/ Mr Affendy Ariffin	Dewan Bandaraya Kuala Lumpur
Mr Chandiramohan Ranjithan/ Ms Hazmatul Farha Hamzah/ Mr Muhammad Aidil Razak	Jabatan Kerja Raya Malaysia
Mr Zaharin Mohd Nadzri	SMARTSEL Sdn Bhd
Mr Kuo Hai Ann	Zettabits Technologies (M) Sdn Bhd