

I n t e r n a t i o n a l   T e l e c o m m u n i c a t i o n   U n i o n

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**L.30**

(11/2007)

SERIES L: CONSTRUCTION, INSTALLATION AND  
PROTECTION OF CABLES AND OTHER ELEMENTS OF  
OUTSIDE PLANT

---

## **Markers on marinized terrestrial cables**

ITU-T Recommendation L.30



# **ITU-T Recommendation L.30**

## **Markers on marinized terrestrial cables**

### **Summary**

ITU-T Recommendation L.30 describes the types of markers that can be applied on marinized terrestrial cables (MTC) and related land cables (considered as part of MTC).

Moreover, markers also warn of approaching joints, transitions and/or any relevant variation on the cable that can be useful for future inspections, cable protection and/or repairing.

Both the materials and colours used for markers and their application points, are described.

### **Source**

ITU-T Recommendation L.30 was approved on 6 November 2007 by ITU-T Study Group 6 (2005-2008) under the ITU-T Recommendation A.8 procedure.

## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

## INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2008

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

## CONTENTS

	<b>Page</b>
1 Scope .....	1
2 References.....	1
3 Land cables .....	1
4 Marinized terrestrial cables.....	1
4.1 Type of markers.....	2
4.2 Marker material .....	2
4.3 Distance marker.....	2
4.4 Factory joint marker .....	2
4.5 Warning markers .....	3
4.6 Transition marker .....	3
4.7 In-line joint marker.....	4
5 Requirements for numbered and lettered tapes .....	4
6 Alternative markers .....	4

## **Introduction**

A marinized terrestrial cable is an underwater optical fibre cable construction, based on a conventional multi-fibre terrestrial cable core protected to withstand the marine environment, designed for unrepeated applications, that is, without underwater line amplifiers, hence without the need to carry electrical power and tested for use in non-aggressive shallow waters, with a varying repair capability.

The difference with respect to a repeaterless submarine cable can be found in the definition given, for such a cable, in [ITU-T G.972].

The purpose of establishing uniform marking techniques and procedures is to facilitate repairs and restoration of telecommunications in the event of an accidental cable break or natural disasters.

As such, markings and procedures contribute to the overall security of the MTC links.

# ITU-T Recommendation L.30

## Markers on marinized terrestrial cables

### 1 Scope

This Recommendation deals with:

- materials, dimensions and colours of tapes as well as their application points to be utilized for MTC marking;
- fundamental considerations to avoid any possible impairment to cable performance, and in their handling;
- requirements for numbered and lettered tapes.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T G.972] ITU-T Recommendation G.972 (2004), *Definition of terms relevant to optical fibre submarine cable systems*.

### 3 Land cables

Land cables are considered as part of marinized terrestrial cables.

For identification purposes, the outer sheath of the cable should preferably have a distinctive colour (for example, yellow, orange, etc.), taking into account any requirements for UV protection, or a proper marking, if applicable.

In addition, the outer drum surface should be marked, as an example, "MARINIZED CABLE X-Y land section" (X-Y being the connection section length) on both sides of the drum.

It is also recommended that the outer drum marking details the number and type of fibres contained in the cable as well as its overall weight.

### 4 Marinized terrestrial cables

While certain marker colours are presented in the following text, the actual colours may need to be different depending on the colour of the cable.

In all cases, the markers shall be distinctly recognizable against the colours of the cable, and the colour coding scheme for each particular MTC link shall be documented.

## 4.1 Type of markers

The following markers, as appropriate, can be applicable to marinized terrestrial cables.

Each marking should be applied without any impairment to cable performance and without affecting their handling operations (i.e., loading, laying and recovering/repairing). They include:

- a) distance markers;
- b) factory joint marker;
- c) warning markers;
- d) transition markers;
- e) in-line joint marker.

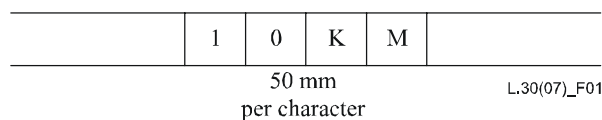
## 4.2 Marker material

The material should be waterproof self-adhesive tape, typically of about 50 mm width and of 125 µm nominal thickness. The material should be clearly identifiable after being immersed for 24 hours in a saturated aqueous solution of H<sub>2</sub>S at a temperature ranging between 20°C and 25°C.

Moreover, for laying, maintenance and recovery purposes, the materials used should be waterproof and corrosion resistant during the cable's operating lifetime. Besides, such materials should also be proofed against marine growth and sea vegetation.

## 4.3 Distance marker

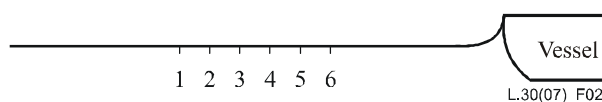
A distance marker shows the cable length from a point of origin with numbers and/or characters. A distance marker should be applied to the cable typically every one km with an accuracy within  $\pm 0.25\%$ . The marker should consist of double-wrapped numbered and/or lettered tapes affixed to the cable as shown in Figure 1.



**Figure 1 – Distance markers (km)**

Where the marker is applied over armoured cable, the numbered and lettered tapes should be affixed over a helical lapping typically of yellow tape applied with a 50% overlap.

The direction of the counting should be as shown in Figure 2.



**Figure 2 – Direction of marker count**

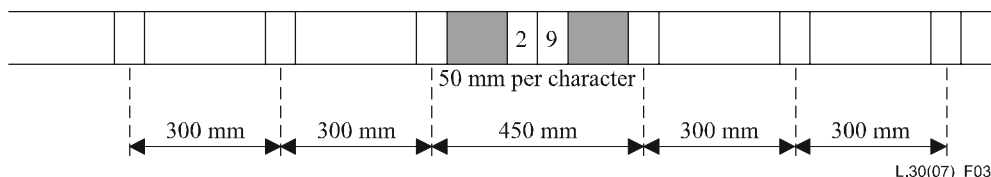
## 4.4 Factory joint marker

The factory joint marker should be applied to a cable joint referring to a complete, or portion of, a jointing of an optical fibre inside the cable and/or the protective elements of the fibre (i.e., tapes, armouring, etc.) during the manufacturing process that degrades the overall mechanical or dimensional properties of the original cable and requires attention during laying and maintenance handling operations.



A double-wrapped number tape or tapes should be affixed centrally, typically over the 450-mm middle wrapping. The joint marker should consist typically of five individual bands of blue tape affixed to the cable as shown in Figure 3. The middle band should consist of a helically lapped blue tape with a 50% overlap and with its extremities covered typically by a 50-mm wide double wrapping of the same type of tape. The four outer bands should consist typically of 50-mm double wrappings of blue tape.

Joints should be numbered sequentially.



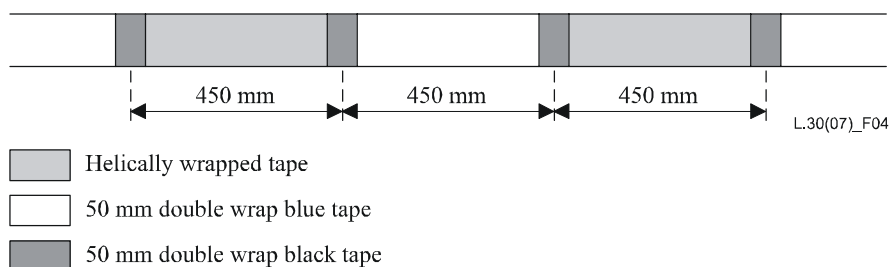
**Figure 3 – Joint markers**

#### 4.5 Warning markers

A warning marker is applied to warn of the approach of an unusual point on cables, such as joint box or branching unit. A warning marker should consist typically of two bands of coloured tape affixed to the cable as shown in Figure 4. Each band should consist typically of a helically lapped tape with 50% overlap and with its extremities covered typically by a 50-mm double wrapping of black tape. The colour of the markers is typically:

- red, at 6 km;
- yellow, at 2 km;
- light green, at 1 km.

The 6-km warning marker is not required where the length of the cable/link is less than 10 km.



**Figure 4 – Warning markers**

#### 4.6 Transition marker

The transition marker should be applied to warn of a change in cable type, for example from single armoured cable to double armoured cable. Cable transition can be achieved using either a transition cable or transition joint as mentioned in [ITU-T G.972], item 5015. The transition marker, where permitted, typically should consist of two bands of helically lapped tape applied with a 50% overlap, with a width of typically 150 mm, on either side of the transition.

#### **4.7 In-line joint marker**

The in-line joint marker should be applied to a cable end next to a joint box in order to identify its sequential number. The joint marker should consist typically of five individual bands of blue tape affixed to the cable as shown in Figure 3. The middle band should consist of a helically lapped blue tape with a 50% overlap and with its extremities covered typically by a 50-mm wide double wrapping of the same type of tape. The four outer bands should consist typically of 50-mm double wrappings of blue tape.

A double wrapped number tape or tapes should be affixed centrally, typically over the 450-mm middle wrapping.

Joints should be numbered sequentially.

#### **5 Requirements for numbered and lettered tapes**

The tape should be typically yellow/orange or blue, according to the colour identification in Table 1, with the size and colour of characters (letters and numbers) typically of 24 mm black, printed at intervals typically of not more than 12.5 mm throughout its length.

When more than one character is required, the printed tapes should be affixed so that the characters are side by side.

The tapes should adhere firmly without entrapped air.

**Table 1 – Tape colour identification**

<b>Tape application point</b>	<b>Colour</b>
Distance marker	Yellow
Factory joint marker	Blue
Warning marker	Red/yellow/light green inside black marker limits
Transition marker	Yellow
In-line joint marker	Blue

#### **6 Alternative markers**

Alternative markers can be considered, which are equivalent to the above, noting the possible advantages of the proposed markers.



## SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
<b>Series L</b>	<b>Construction, installation and protection of cables and other elements of outside plant</b>
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems