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Guidance on techniques for the measurement of the coefficient of friction (COF) between cables and ducts

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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GUIDANCE ON TECHNIQUES FOR THE MEASUREMENT OF THE COEFFICIENT OF FRICTION (COF) BETWEEN CABLES AND DUCTS

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IEC TR 62470, which is a technical report, has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
86A/1407/DTR	86A/1417/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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GUIDANCE ON TECHNIQUES FOR THE MEASUREMENT OF THE COEFFICIENT OF FRICTION (COF) BETWEEN CABLES AND DUCTS

1 Scope and object

This technical report describes three techniques to measure the coefficient of friction (COF) between cables and ducts. For a given technique, cable construction, installation method (pulling, pushing, or blowing), and duct size, the relative values of the COF can give some indication as to the relative ease of installation. The techniques can be used for traditional cables and ducts (see IEC 60794-3-10) as well as for microduct cables and microducts (see IEC 60794-5). A fibre or fibre unit may be evaluated in place of a cable in all techniques.

Methods A, B, and C are distinguished by the equipment used for measurements:

- method A – using a wheel around which the duct is wound, a cable with attached weight being pulled through the latter, while measuring the force needed for this;
- method B – using a device to clamp a duct specimen, a cable specimen placed inside, tilting both while measuring the angle at which the cable specimen starts to slide, or the angle which sustains sliding; and
- method C – using a device to clamp and straighten a cable specimen, a duct specimen placed around it, tilting both while measuring the angle at which the duct specimen starts to slide, or the angle which sustains sliding.

The COF when the cable is not moving with respect to the duct is the static COF, and will increase until sliding suddenly starts. The COF while the cable is sliding within the duct is the kinetic or dynamic COF. It should be noted that the static COF will generally be a higher value than the kinetic COF.

The results from the three methods can be compared qualitatively, but are not represented as being equivalent. None of the methods are represented as being the Reference Test Method. Method A will yield the kinetic COF; methods B and C will yield both static and kinetic COF.

Both the static and kinetic COF may be dramatically affected by lubrication of the cable and/or duct. While not specifically addressed herein, the intent of these methods may be used with lubricated cable/duct samples.

These methods do not constitute a routine test used in the general evaluation of the installation performance of cables in ducts. This parameter is not generally specified within a detail specification.

2 Reference documents

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

IEC 60794-1-1:2001, *Optical fibre cables – Part 1-1: Generic specification – General*

IEC 60794-3-10: *Optical fibre cables – Part 3-10: Outdoor cables – Family specification for duct, directly buried and lashed aerial optical telecommunication cables*

IEC 60794-5: *Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing*