



BSI Standards Publication

# Insulating materials — Industrial rigid laminated sheets based on thermosetting resins for electrical purposes

Part 4: Typical values

Currently in preview, click buy full version

### National foreword

This Published Document is the UK implementation of IEC/TR 60893-4:2014. It supersedes PD IEC TR 60893-4:2003 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/15, Solid electrical insulating materials, to Subcommittee GEL/15/6, Rigid fibrous reinforced laminates for electrical purposes.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2014.  
Published by BSI Standards Limited 2014

ISBN 978 0 580 70401 7  
ICS 29.035.01

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2014.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---



# TECHNICAL REPORT

---

**Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes –  
Part 4: Typical values**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

P

ICS 29.035.01

ISBN 978-2-8322-1908-9

**Warning! Make sure that you obtained this publication from an authorized distributor.**

Currently in preview, click buy full version

CONTENTS

FOREWORD ..... 3

INTRODUCTION ..... 5

1 Scope ..... 6

2 Normative references ..... 6

3 Typical values for industrial rigid laminated sheets ..... 7

    3.1 Typical values for industrial rigid laminated sheets based on epoxy resin ..... 7

    3.2 Typical values for industrial rigid laminated sheets based on melamine resin ..... 7

    3.3 Typical values for industrial rigid laminated sheets based on phenolic resin ..... 7

    3.4 Typical values for industrial rigid laminated sheets based on polyester resin ..... 7

    3.5 Typical values for industrial rigid laminated sheets based on silicone resin ..... 7

    3.6 Typical values for industrial rigid laminated sheets based on polyimide resin ..... 7

Bibliography ..... 15

Table 1 – Typical values for EP types (Reference: IEC 60893-3-2:2003/AMD1:2011, Table 5) (1 of 2) ..... 8

Table 2 – Typical values for MF types (Reference: IEC 60893-3-3:2003/AMD1:2011, Table 5) ..... 10

Table 3 – Typical values for PF types (Reference: IEC 60893-3-4:2003/AMD1:2012, Table 5) (1 of 2) ..... 11

Table 4 – Typical values for UP types (Reference: IEC 60893-3-5:2003/AMD1:2009, Table 5) ..... 13

Table 5 – Typical values for SI types (Reference: IEC 60893-3-6:2003/AMD1:2009, Table 5) ..... 14

Table 6 – Typical values for PI type (Reference: IEC 60893-3-7:2003/AMD1:2009, Table 5) ..... 14

License copy: Tech Street, ISO Exchange - Michigan, Version correct as of 11/11/2014, (c) The British Standards Institution 2014

Currently in preview, click buy full version

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSULATING MATERIALS –  
INDUSTRIAL RIGID LAMINATED SHEETS BASED  
ON THERMOSETTING RESINS FOR ELECTRICAL PURPOSES –****Part 4: Typical values**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 60893-4, which is a technical report, has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This second edition cancels and replaces the first edition, published in 2003. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the typical values of modulus of elasticity in flexure and of comparative tracking index of EPGC (Epoxy Glass Cloth) types have been changed;
- b) the typical values of new material types introduced in IEC 60893-3-2:2003/AMD1:2011 have been included.

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

Enquiry draft	Report on voting
15/705/DTR	15/714A/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.

A list of all the parts in the IEC 60893 series, published under the general title *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes* can be found on the IEC website.

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.

## INTRODUCTION

This part of IEC 60893 is one of a series which deals with industrial rigid laminated sheets based on thermosetting resins for electrical purposes.

The series consists of four parts:

- Part 1: Definitions, designations and general requirements (IEC 60893-1)
- Part 2: Methods of test (IEC 60893-2)
- Part 3: Specifications for individual materials (IEC 60893-3)
- Part 4: Typical values (IEC 60893-4)

IEC 60893-4 is a technical report that deals with typical value information that is not part of the requirements for these laminates.

# INSULATING MATERIALS – INDUSTRIAL RIGID LAMINATED SHEETS BASED ON THERMOSETTING RESINS FOR ELECTRICAL PURPOSES –

## Part 4: Typical values

### 1 Scope

This part of IEC 60893 serves as a technical report and presents tables of typical values for properties that are not studied and not given in Table 5 of IEC 60893-3-2:2003/AMD1:2011, IEC 60893-3-3:2003/AMD1:2011, IEC 60893-3-4:2003/AMD1:2012, IEC 60893-3-5:2003/AMD1:2009, IEC 60893-3-6:2003/AMD1:2009, IEC 60893-3-7:2003/AMD1:2009. The purpose of these typical values is to give general guidance and should not be considered as specification requirements.

The following tables give typical values for the different types of industrial laminated sheets for electrical purposes described in the Part 3 sheets of IEC 60893.

### 2 Normative references

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

IEC 60893-2:2003, *Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 2: Methods of test*

IEC 60893-3-2:2003, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3-2: Specifications for individual materials – Requirements for rigid laminated sheets based on epoxy resins*  
IEC 60893-3-2:2003/AMD1:2011

IEC 60893-3-3:2003, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3-3: Specifications for individual materials – Requirements for rigid laminated sheets based on melamine resins*  
IEC 60893-3-3:2003/AMD1:2011

IEC 60893-3-4:2003, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3-4: Specifications for individual materials – Requirements for rigid laminated sheets based on phenolic resins*  
IEC 60893-3-4:2003/AMD1:2012

IEC 60893-3-5:2003, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3-5: Specifications for individual materials – Requirements for rigid laminated sheets based on polyester resins*  
IEC 60893-3-5:2003/AMD1:2009

IEC 60893-3-6:2003, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3-6: Specifications for individual materials – Requirements for rigid laminated sheets based on silicone resins*  
IEC 60893-3-6:2003/AMD1:2009