



BSI Standards Publication

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

Part 4: Typical values

National foreword

This Published Document is the UK implementation of IEC TR 60893-4:2014, including amendment A1:2017. It supersedes PD IEC/TR 60893-4:2014, which is withdrawn.

The text of IEC amendment 1:2017 has been provided in its entirety at the beginning of this document. BSI's policy of providing consolidated content remains unchanged; however, in the interest of expediency, in this instance BSI have chosen to collate the relevant content at the beginning of this document.

The UK participation in its preparation was entrusted to Technical Committee GEL/15, Solid electrical insulating materials.

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

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INTERNATIONAL STANDARD

AMENDMENT 1

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.035.01

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FOREWORD

This amendment has been prepared by IEC technical committee 15: Solid electrical insulating materials.

The text of this amendment is based on the following documents:

| | |
|---------------|------------------|
| Enquiry draft | Report on voting |
| 15/768/DTR | 15/784/RVC |

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

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

Replace, in this subclause, the existing Table 1 with the following new Table 1:

Table 1 – Typical values for SI types
(Reference: IEC 60893-3-6:2003/AMD1:2009, Table 5)

| Property | Test method in IEC 60893-2:2003 Subclause | Unit | Nominal thickness of sheet to which test is applicable mm | Type | |
|---|---|-------------------|---|-----------|-----------|
| | | | | SI GC 201 | SI GC 202 |
| Apparent modulus of elasticity in flexure | 5.2 | MPa | ≥1,5 | 13 000 | 13 000 |
| Compressive strength perpendicular to laminations | 5.3 | MPa | ≥5 | 160 | 160 |
| Shearing strength parallel to laminations | 5.5 | MPa | ≥5 | 20 | 20 |
| Tensile strength | 5.6 | MPa | ≥1,5 | 70 | 90 |
| Permittivity at 48 Hz – 62 Hz | 6.2 | – | ≤3 | – | 6,0 |
| Permittivity at 1 MHz | 6.2 | – | ≤3 | – | 6,0 |
| Dissipation factor at 48 Hz-62 Hz | 6.2 | – | ≤3 | – | 0,07 |
| Dissipation factor at 1 MHz | 6.2 | – | ≤3 | – | 0,07 |
| Comparative tracking index | 6.4 | – | ≥3 | 450 | 450 |
| Thermal endurance | 7.1 | TI | ≥3 | 180 | 180 |
| Density | 8.1 | g/cm ³ | All | 1,6-1,9 | 1,6-1,9 |

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 4: Typical values

FOREWORD

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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.

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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