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**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**

Matériaux isolants – Stratifiés industriels rigides en planches à base de résines thermodurcissables à usages électriques – 2003

Partie 3-3: Spécifications pour matériaux particuliers – Prescriptions pour stratifiés rigides en planches à base de résine mélamine



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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**

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60893-3-3 edition 2.1 contains the second edition (2003) [documents 15C/1523/FDIS and 15C/1537/RVD] and its amendment 1 (2011) [documents 15/489/CDV and 15/616/RVC].

A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60893-3-3 has been prepared by subcommittee 15C: Specifications, of IEC technical committee 15: Insulating materials.

In this revision of the IEC 60893 series of specifications, new material types have been included, changes have been made to the property requirements of some existing types, a new method for testing permittivity and dissipation factor has been added, and all non-specification data for each type has been moved to a new Part 4 document – IEC 60893-4 – Typical values.

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

The committee has decided that the contents of the base publication and its amendments 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- withdrawn,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
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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.

This 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 60893-3-3 contains one of the specification sheets comprising Part 3, as follows:

Sheet 3: Requirements for rigid laminated sheets based on melamine resins

INTRODUCTION (to amendment 1)

This amendment introduces revised limits for CHARPY and IZOD impact strengths for the requirements of all types of rigid laminated sheets based on melamine resins. These revised limits are based on the results of round-robin testing.

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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

1 Scope

This part of IEC 60693 gives the requirements for industrial rigid laminated sheets for electrical purposes based on melamine resins and different reinforcements.

Applications and distinguishing properties are given in Table 1.

Materials which conform to this specification meet established levels of performance. However, the selection of a material by a user for a specific application should be based on the actual requirements necessary for adequate performance in that application and not based on this specification alone.

2 Normative references

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 document (including any amendments) applies.

IEC 60893-1:—, *Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 1: Definitions, designations and general requirements*¹

[IEC 60893-3-3:2003](#)

[https://www.its-teh.com/standards/iec-60893-3-3-2003](#) IEC 60893-2:2003, *Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 2: Methods of test*

3 Designation

The sheets covered by this Specification are classified into types, which differ in reinforcement employed and in their distinguishing properties. The sheets are designated by

- the IEC standard number,
- a two-letter abbreviation denoting the resin,
- a second two-letter abbreviation, denoting the reinforcement,
- a serial number,
- nominal thickness x width x length in millimetres.

¹ To be published

Example of designation: Industrial rigid laminated sheet of type MF CC 201 with a nominal thickness of 10 mm, 500 mm wide, 1 000 mm long.

Sheet IEC 60893-3-3 – MF CC 201 – 10 x 500 x 1 000.

The following abbreviations are used in this Part 3 sheet:

<i>Type of resin</i>		<i>Types of reinforcement</i>	
MF	Melamine	CC	Woven cotton cloth
		GC	Woven glass cloth

4 Requirements

In addition to the general requirements given in IEC 60893-1, the laminated sheets shall also comply with the dimensional requirements given in Tables 2, 3 and 4 as well as with the other requirements given in Tables 5, 6 and 7.

Table 1 – Types of industrial rigid laminated sheets based on melamine resins

Laminate type			Applications and distinguishing characteristics ^a
Resin	Reinforcement	Serial number	
MF	CC	201	Mechanical and electrical applications. Arc and tracking resistant (coarse weave) ^b
	GC	201	Mechanical and electrical applications. High mechanical strength. Arc and tracking resistant. Low flammability
^a It should not be inferred from the contents of Table 1 that laminates of any particular type are necessarily unsuitable for applications other than those listed for them, or that specific laminates will be suitable for all applications within the wide description given.			
^b Fabric weaves of type PC and CC reinforcements.			
		<i>Mass per unit area</i> g/m ²	<i>Thread count</i> cm ⁻¹
Coarse weave		>130	≤30
These values are only for information. They are not to be considered as specification values. In general, the finer weave materials have better machining characteristics.			

Table 2 – Tolerances on thickness
(test method: see 4.1 of IEC 60893-2)

Nominal thickness mm	Tolerance (all types) ± mm	
	MF CC 201	MF GC 201
0,4	–	0,10
0,5	–	0,12
0,6	–	0,13
0,8	0,19	0,16
1,0	0,20	0,18
1,2	0,22	0,21
1,5	0,24	0,24
2,0	0,26	0,28
2,5	0,29	0,33
3,0	0,31	0,37
4,0	0,36	0,45
5,0	0,42	0,52
6,0	0,46	0,60
8,0	0,55	0,72
10,0	0,63	0,82
12,0	0,70	0,94
14,0	0,78	1,02
16,0	0,85	1,12
20,0	0,95	1,30
25,0	1,10	1,50
30,0	1,22	1,70
35,0	1,34	1,95
40,0	1,45	2,10
45,0	1,55	2,30
50,0	1,65	2,45
Where the nominal thickness is not one of the preferred thicknesses listed, then the tolerance for the next highest preferred nominal thickness shall apply.		
NOTE Other tolerances may be agreed between the supplier and the purchaser.		

Table 3 – Flatness
(test method: see 4.2 of IEC 60893-2)

Thickness <i>d</i> mm	Length of straight edge mm	
	1 000	500
$3 < d \leq 6$	10	2,5
$6 < d \leq 8$	8	2,0
$8 < d$	6	1,5

**Table 4 – Tolerances on width of cut strips
(minus tolerances only)**

Nominal thickness <i>d</i> mm	Nominal width, all types mm					
	$3 < b \leq 50$	$50 < b \leq 100$	$100 < b \leq 160$	$160 < b \leq 300$	$300 < b \leq 500$	$500 < b \leq 600$
0,4	0,5	0,5	0,5	0,6	1,0	1,5
0,5	0,5	0,5	0,5	0,6	1,0	1,5
0,6	0,5	0,5	0,5	0,6	1,0	1,5
0,8	0,5	0,5	0,5	0,6	1,0	1,0
1,0	0,5	0,5	0,5	0,6	1,0	1,0
1,2	0,5	0,5	0,5	1,0	1,2	1,2
1,5	0,5	0,5	0,5	1,0	1,2	1,2
2,0	0,5	0,5	0,5	1,0	1,2	1,5
2,5	0,5	1,0	1,0	1,5	2,0	2,5
3,0	0,5	1,0	1,0	1,5	2,0	2,5
4,0	0,5	2,0	2,0	3,0	4,0	5,0
5,0	0,5	2,0	2,0	3,0	4,0	5,0

NOTE Unilateral, all-negative tolerances are normally applied to the width of the cut strips, and are given in the above table. Other tolerances may be agreed upon between purchaser and supplier.

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