

IPC-4413
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Specification for Finished Fabric
Woven from Low Dk Glass
for Printed Boards

An international standard developed by IPC



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Specification for Finished Fabric Woven from Low Dk Glass for Printed Boards

Developed by the Woven Glass Reinforcement Task Group (3-12D)
of the Base Materials General Committee 3-10 of IPC

Users of this publication are encouraged to participate in the
development of future revisions.

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Table of Contents

1	SCOPE	1	1.11.14.1 Broken Pick	3
1.2	Purpose	1	1.11.14.2 Mis-picks	3
1.3	Designation	1	1.11.15 Plain Weave	3
1.4	Classification	1	1.11.16 Splits	3
1.5	Measurement Units	1	1.11.17 Spread Glass Fabric	3
1.6	Definition of Requirements	1	1.11.18 Tears	3
1.7	Process Control Requirements	1	1.11.19 TEX System	3
1.8	Order of Precedence	1	1.11.20 Waste	3
1.8.1	Conflict	2	1.11.21 Waviness	3
1.8.2	Clause References	2	1.12 Yarn Nomenclature	3
1.8.3	Appendices	2	1.12.1 US System	3
1.8.3.1	Appendix A	2	1.12.2 SI/Metric	4
1.8.3.2	Appendix B	2	1.12.3 Conversion from US System to SI	4
1.8.3.3	Appendix C	2	2	APPLICABLE DOCUMENTS
1.9	Use of "Lead"	2	2.2	American Society for Testing and Materials
1.10	Abbreviations and Acronyms	2		(ASTM)
1.11	Terms and Definitions	2	2.3	International Standards
1.11.2	Bias Filling Yarns	2	2.4	National Conference of Standards Laboratories
1.11.3	Bow Filling Yarns	2		(NCSL)
1.11.4	Creases	2	3	REQUIREMENTS
1.11.5	Defects	2	3.2	Filament Diameter
1.11.5.1	Major Defect	2	3.3	Bare Glass Nominal Measurement
1.11.5.2	Minor Defect	2	3.4	Chemical Requirements
1.11.5.3	Defect per Hundred Units	2	3.4.1	1 Finish Level (Organic Content)
1.11.6	Low Dk Glass (Electrical Grade Glass Fiber)	2	3.5	Workmanship
1.11.6.1	Permittivity (Dielectric Constant) for Base Low Dk Glass	2	3.6	Alternate Fabric Styles and Weaves
1.11.6.2	Density	2	4	QUALITY ASSURANCE
1.11.7	End Missing	3	4.2	Responsibility for Inspection
1.11.8	Feather Length	3	4.2.1	Test Equipment and Inspection Facilities
1.11.9	Fabric Finish	3	4.2.2	Preparation of Samples
1.11.10	Free Eye	3	4.2.3	Standard Laboratory Conditions
1.11.11	Leno End Out	3	4.3	Inspection Requirements and Acceptability
1.11.12	Lot or Batch Size	3	4.3.1	Sample Size
1.11.13	Mark	3	4.3.2	Sampling Plans
1.11.13.1	Heavy Mark	3	4.3.3	Acceptable Quality Level (AQL)
1.11.13.2	Light Mark	3	4.4	Test Methods
1.11.14	Pick	3	4.4.1	Fabric Appearance

4.4.2 Fabric Count.....8

4.4.3 Weave Type.....8

4.4.4 Fabric Thickness.....8

4.4.5 Weight per Unit Area.....9

4.4.6 Fabric Length.....9

4.4.7 Fabric Width.....9

4.4.8 Finish Level (Organic Content).....9

4.4.9 Bias or Bowed Filling.....9

5 PREPARATION FOR DELIVERY 10

5.2 Packing.....10

5.3 Marking.....10

6 NOTES 10

6.2 New Styles.....10

APPENDIX A 11

APPENDIX B 13

APPENDIX C 15

Tables

Table 3-1 Classification of Defects5

Table 3-2 Filament Diameter Designations5

Table 3-3 Nominal Length per Weight6

Table 4-1 Sample Size per Number of Rolls Shipped7

Table 4-2 Sample Size per Yardage of Individual Roll Shipped and the Acceptable Quality Level.....7

Table A1-1 Cross Reference to ISO Standards 11

Table AI-2 Cross Reference Between IPC-4413, ASTM and ISO Documents 11

Table BI-1 Finished Glass Styles for SI System 13

Table BI-2 Finished Glass Styles for US System 14

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Specification for Finished Fabric Woven from Low Dk Glass for Printed Boards

1 SCOPE

This specification covers finished fabrics woven from low Dk electrical grade glass fiber yarns that are intended as a reinforcing material in laminated plastics for electrical and electronic use. All fabrics covered by this specification are plain weave.

1.2 Purpose This specification determines the nomenclature, definitions, general and chemical requirements for the glass, and physical requirements for finished woven glass fiber fabrics.

1.3 Designation Appendix II of this standard provides a style designator for each finished fabric glass style, with specifications on yarn, fabric count, thickness and weight in both SI and US system. Fabrics listed in Appendix II also categorize fabrics by their current availability status.

1.4 Classification

CLASS 1 General Electronic Products Includes products suitable for applications where the major requirement is function of the completed assembly.

CLASS 2 Dedicated Service Electronic Products Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failures.

CLASS 3 High Performance/Harsh Environment Electronic Products Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when required, such as life support or other critical systems.

1.5 Measurement Units All dimensions and tolerances in this specification are expressed in hard SI (metric) units and bracketed soft imperial [inch] units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1 mm [0.0394 in] will be expressed in millimeters and inches. All dimensions < 1 mm [0.0394 in] will be expressed in micrometers and microinches.

1.6 Definition of Requirements The words **shall** or **shall not** are used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance.

The word “should” reflects recommendations and is used to reflect general industry practices and procedures for guidance only.

Line drawings and illustrations are depicted herein to assist in the interpretation of the written requirements of this Standard. The text takes precedence over the figures.

1.7 Process Control Requirements The primary goal of process control is to continually reduce variation in the processes, products, or services to provide products or processes meeting or exceeding User requirements. Process control tools such as IPC-9191, JESD557 or other User-approved system may be used as guidelines for implementing process control.

Manufacturers of Class 3 products **shall** develop and implement a documented process control system.

A documented process control system, if established, **shall** define process control and corrective action limits.

This may or may not be a statistical process control system. The use of “statistical process control” (SPC) is optional and should be based on factors such as design stability, lot size, production quantities, and the needs of the Manufacturer, see 4.1.

Process control methodologies **shall** be used in the planning, implementation and evaluation of the manufacturing processes used to produce soldered electrical and electronic assemblies. The philosophy, implementation strategies, tools and techniques may be applied in different sequences depending on the specific company, operation, or variable under consideration to relate process control and capability to end product requirements.

When a decision or requirement is to use a documented process control system, failure to implement process corrective action and/or the use of continually ineffective corrective actions would be grounds for disapproval of the process and associated documentation.

1.8 Order of Precedence The contract takes precedence over this Standard, referenced standards and drawings. In the event of conflict, the following order of precedence applies: