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Delivery Instruction

Polyimide Foil, PI Fo 1

PL -

Designation text: DI-PI Fo 1	Documentation no.: HZN 02575
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General

1.1 Scope

This instruction lays down all the requirements which are made for the semi-finished product PI Fo 1.

1.2 Description, Definition

PI Fo 1 is an aromatic polyimide foil ("Kapton").

1.3 Product Designation

For semi-finished product	Designation text	Identification number
Width	Bn thickness x width - PI Fo 1	GMN 590813 P9... (see order for item no.)

1.4 Dimensions

See order.

1.5 Delivery Documents, Destination For Delivery

See order.

1.6 Order

The order is the summary of the particulars and regulations that apply to the delivery. ABB reserves the right to test all the requirements listed, test material for which is included in the order. The order can contain requirements which differ from or supplement instruction (except the section 2.1 "Properties").

Supplier's Product Designation

Semi-finished product PI Fo 1 must receive from the supplier a designation of quality which must be changed if alternations are made to the composition, the quality of the raw materials, the method of manufacture or other factors that could influence the technological properties of the semi-finished product.

1.8 Acceptance of New Products

Attainment of the properties listed is not in itself sufficient for the acceptance of new, previously unaccepted products. Only if after particular experiments, practical service tests and if necessary, other considerations have been taken into account, it appears that the new product is acceptable and interchangeable, may we decide to convert to it.

1.9 Comparison of Standards

DIN 40634, Type F 1410 (only partly matching).

FOR INFORMATION ONLY

2 Requirements

2.1 Properties

Code	Size, term	Unit	Values				Test method
90100	Thickness s	mm	0.025	0.050	0.075	0.125	
	perm. deviation		± 0.002	± 0.004	± 0.006	± 0.010	
01150	Mass per unit area	g/m ²	36	72	108	180	DIN 53352
	perm. deviation		± 4	± 7	± 10	± 15	
10050	Tensile strength at 23 °C	N/mm ²	> 160				ISO 1184
11550	Elongation at rupture at 23 °C	%	> 50				ISO 1184
35300	Dielectric strength at 23 °C	kV/mm	> 220	> 180	> 160	> 120	IEC 243 (= DIN 53481, VSM 77107)
74450	Shrinkage after 30 min. at 300 °C	%	≤ 0.5				DIN 40634 page 1 section 2.9.3

2.3 Consignment

2.3.1 Form of the Consignment

In widths wound on cores with an inside diameter of 76 mm.
Outside diameter of the rolls approximately 152 mm.

2.3.2 Packing

The individual shipments are to be packed so that no damage can arise during transport.

2.3.3 Transport

The consignment must be delivered by rail or road so that it can be unloaded by crane or fork-lift truck without special facilities. The space between the floor of the vehicle and the individual packages, and between layers of packages, must be at least 10 cm.

2.3.4 Identification

Each item of the consignment (crate, palette, roll etc.) must be labelled securely and indelibly (e.g. with an adhesive label or an appendage) with the following details: ABB designation text of product and identification number, quantity and eventually batch and test numbers.

2.4 Permissible Variations

2.4.1 Dimensions

For thickness : see section 2.1 "Properties"
For width b : $\pm 5\%$.

Note:

The code numbers in section 2.1 serve as internal functional key and have therefore no significance for the user of the delivery instruction.

**SCHEDULE OF TECHNICAL REQUIREMENTS
FOR MANUFACTURE & SUPPLY OF
POLYIMIDE FOIL (KAPTON) P1 F0 1
&
POLYAMIDE PAPER (NOMEX) PA P1
FOR
3-PHASE TRACTION MOTOR OF ELECTRIC
LOCOMOTIVES**

APRIL'2008

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ISSUED BY

**TRACTION MOTOR DEPARTMENT
CHITTARANJAN LOCOMOTIVE WORKS
CHITTARANJAN - 713331
WEST BENGAL**

PREPARED BY-

J. K. H. 18.4.08

CHECKED BY-

[Signature]

SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURE & SUPPLY OF POLYIMIDE FOIL (KAPTON) P1 F0 1 & POLYAMIDE PAPER (NOMEX) PA P1 FOR 3-PHASE TRACTION MOTOR OF ELECTRIC LOCOMOTIVES.

1. **Scope:** This schedule of technical requirement (STR) is being issued to serve as guidelines to manufacturers/firms for manufacturing Polyimide Foil (KAPTON) P1 F0 1 & Polyamide Paper (NOMEX) PA P1, format of quality assurance plan to be followed, minimum machinery and plant, testing facilities and measurement facilities required. This STR should be read in conjunction with the relevant CLW specification. The firm should satisfy themselves having complied with the requirements of the specification and STR.
2. **Reference:** ABB's Specn. No. HZN - 02575 & HZN - 02239.
3. **General Requirement:** The firm should be certified to ISO 9001 by an agency accredited by NABCB.
4. **Desired aspect in QAP:** As per format CLW/MLAS/EL/F/04 ----- Appendix - 4 (1/1) to be followed.
5. **M&P, Testing & Measuring instruments:** List of typical M&P required for manufacture, testing & measuring instruments finished in Annexure - I is for general guidance only and actual manufacturing operations, specific testing & measuring instruments shall be submitted and get approved by the firm as a part of QAP.
6. **Internal Quality Control System:**
 - 6.1. The manufacture shall procure all the raw-materials from standard brand preferably from RDSO/CLW approved sources along with test certificates and source should be available as & when asked for.
 - 6.2. Quality Assurance Process of incoming materials, manufacturing process used for the subject items, including type of tests, supplying criteria, governing spec., acceptance norms, agency if test, format of records etc.
 - 6.3. Detailed process flow chart indicating process of manufacture and individual product.
 - 6.4. The testing & measuring equipments shall be and the validity of calibration should be current and calibration certificate issued by the calibration agency should be maintained.
 - 6.5. Relevant standards like IS/BS/IEC etc. shall be available with the firm.

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PREPARED BY-

J.K. Mahabadi
18.4.08.

CHECKED BY-

J.K. Mahabadi

Format: CLW/MLAS/EL/F/04 ----- Appendix-4(1/1)**QAP to be submitted by the vendor shall cover the following aspects:**

1. Organisation Chart clearly bringing out the quality control set up.
2. Qualification log sheets of the personnel manning the quality control set up.
3. Process flow chart indicating the process of manufacture of an item or a family of items from which the process is same.
4. Details of sub-vendors:
 - The name of the item for which sub-vendor is approved.
 - The name of the approving agency.
 - Inspection criteria of the sub-vendor.
 - The sub-vendor has ISO-9001 certification.
 - The primary vendor approves QAP of the sub-vendor.
 - Sub-vendor has submitted the Quality Manual of the Primary Vendor.
 - The sub-vendor has all the requisite infrastructure of manufacturing and testing facilities, preferably under one roof.
 - The primary vendor is following periodical inspection schedule for sub-vendor strictly.
5. Quality Assurance System – Inspection and testing plan.
 - Incoming Material
 - Process control
 - Product control

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This must be furnished in the following format.

Subject/Product /Process	Sample size & its frequency of Inspection	Parameters of Inspection	Mode of Inspection/ Equipment used	Acceptance Limit/Criteria/ Specified Value	Action taken on rejection

PREPARED BY-

J. K. Chaudhary
18.4.08

CHECKED BY-

[Signature]

ANNEXURE-I

REQUIREMENTS FOR POLYIMIDE FOIL (KAPTON) P1 F0 1 & POLYAMIDE PAPER (NOMEX) PA P1**A. Machinery:**

1. Automatic slitting machine (digital) range 510 mm & 914 width.
2. Dust free space for working and air condition space for storing self-life items.

B. Testing facilities:

1. Weighing machine with least count (03 digital after decimal).
2. BDV tester upto 10 KV with mA meter.
3. Necessary laboratory for composition analysis.

C. Measuring instruments:

1. Vernier caliper.
2. Micrometer.
3. Paper micrometer.
4. Scale/tape.

D. Other requirement

1. Authorisation of OEM.
2. DGFT import certificate (Polyimide film/foils/tapes).

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PREPARED BY-

S. K. Handa
18.4.08.

CHECKED BY-

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