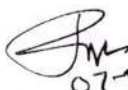


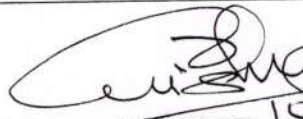
OUTER SHEET


SHEET NO. 1 OF 6

SPECIFICATION
FOR
'POLYAMIDE STRIPS'
OF
3-PHASE TRACTION MOTOR
TYPE 6FRA-6068 & 6FXA-7059


CHKD. By SSEE/TM


07-04-21
Recommended by CEE/TM


15-04-2024
Approved by PCEE


Prepared by SSE

SPECIFICATION FOR
'POLYAMIDE STRIPS' FOR
3-PHASE TRACTION
MOTOR.

Reviewed by


7/4/21
DY.CEE/TMD

CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA

NO. 4TMS.096.091
DATE : 05.04.2021

1.0 General:**1.1 Scope :**

This specification covers the manufacture and supply of 'Polyamide Strips' used in 3-Phase Traction Motor type 6 FRA 6068 & 6FXA 7059. Polyamide Strips are used during formation of coil, as Slot liner and at terminal box pocketing as Insulation in stator manufacturing.

1.2 Reference:

In the preparation of this specification assistance has been taken from ABB Delivery Instruction HZN 02239.

2.0 Constructional Requirements:

The material is to be made of Polyamide paper which is calendared, high-temperature resistant paper consisting of aromatic polyamide fibres.

3.0 Source of Raw Material:

3.1 Items as per para-5.0 shall be manufactured from polyamide insulating paper of following grades:

i) Nomex-410 of M/s Dupont/USA/Japan.

3.2 Firm (manufacturers of items as per para-5.0 below) shall offer raw material to the authorized inspection authority to verify the use of correct grade of insulating paper having sourced from specified polyamide insulating paper manufacturer only, before commencing prototype/bulk manufacture. The supplier shall furnish copies of original current (recent) invoices of procurement along with TC of polyamide insulating paper manufacturer to the Inspecting Authority.

4.0 QAP:

The tenderer shall submit the process of manufacturing in the form of QAP which includes quality plan from the stage of raw material procurement, through in process and final tests. The tenderer must submit their QAP along with tender. After getting order, QAP shall be duly approved by the competent authority before going for prototype inspection.

5.0 Size :

- (i) Polyamide Strip 0.13 mm thk x 8.4 mm wide x 90 mm long.
- (ii) Polyamide Strip 0.25 mm thk x 9 mm wide x 507 mm long.
- (iii) Polyamide Strip 0.25 mm thk x 9 mm wide x 417 mm long.
- (iv) Polyamide Strip ("U" Shaped Insulation) 5 mil thk x 25 mm wide x 140 mm long.
- (v) Polyamide Paper 0.38 mm x 914 mm in continuous roll of 10 metres.

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6.0 Properties:

Sl. No.	Test Parameters	Unit	Size				Test Method
1	Thickness <u>Normal Size</u> Permissible Deviation	mm	0.13		0.25	0.38	ASTM D 374
			+0.019 -0.012		+ 0.041 -0.020	+0.049 -0.032	
2	Width <u>Normal Size</u> Permissible Deviation	mm	8.4	25	9	914	ASTM D 374
			±0.05	±1	+0.02 -0.4	± 1%	
3	Length <u>Normal Size</u> Permissible Deviation	mm	90	140	507, 417	10 meter	ASTM D 374
			±0.1	±1	±0.2		
4	Apparent density (of bulk materials)	g/cm ³	0.80---1.2				IEC 554-2, Section 4
5	Mass per unit area Permissible Deviation	g/m ²	115		247	393	ISO 536 (DIN ISO 536)
			±7		±18	±23	
6	Force at rupture per 1 cm of tape width <u>In machine direction</u> In transverse direction	N	> 115		> 248	> 400	ISO 1924 (=DIN 53112)
			> 51		> 117	> 215	
7	Edge tearing strength <u>In machine direction</u> In transverse direction	N	> 40		> 76	> 108	IEC 394-2, Section 8 (=DIN 40634)
			> 80		> 105	> 150	
8	Tearing force <u>In machine direction</u> In transverse direction	N	> 1.5		> 3.3	> 5.3	ISO 1974
			> 3.0		> 5.1	> 9.5	
9	Elongation at rupture <u>In machine direction</u> In transverse direction	%	> 10		> 12	> 14	ISO 1924 (=DIN 53112)
			> 6		> 9	> 11	
10	Dielectric breakdown voltage <u>Delivered min</u> Folded min	kV	> 2.2		> 4.6	> 7.4	IEC 243-1 Section 4.1 and Section 9.1
			> 2.0		> 4.0	> 5.5	
11	Moisture content Mass content delivered	%	<4.5				Loss of weight after 1 hr. at 120° C
12	Shrinkage after 1 hr. at 285°C <u>In machine direction</u> In transverse direction	%	< 1.5				
			< 2.2				

Note: Before the test the test specimens are conditioned for 24 hrs. at 23° C/ 50% relative humidity.

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7.1 All the test specified in the specification shall be carried out preferably at manufacturer's works. The manufacturer shall arrange all the necessary machinery, apparatus, labour and assistance required for conducting the tests without Extra cost. If any testing facility is not available at firm's premises, the test has to be done from any NABL or Govt. Approved laboratory at own (Firm's) cost.

- 7.2 Inspection authority must check traceability like original Challan/invoice of imported raw material. Quantity of Raw material consumed against P.O under Inspection must be endorsed under Challan/Invoice.
- 7.3 The firm must produce original TC, WC & imported document etc. to the Inspection authority. TC should not be older more than one year at the time of Inspection.

8.1 Only after clear written approval of the results of the tests on the prototype is communicated by the Dř. CEE/TMD, to the manufacturer, the firm shall take-up bulk manufacture of the Polyamide Strips which shall be strictly with the same material and process as adopted for the prototype.

- 8.2 Any testing and approval by the purchaser of the design, drawing and prototype shall in no way absolve the supplier of his responsibilities under the terms and conditions of the contract.

Each roll shall be legibly marked at both ends with the following information:-

- Manufacturer's name or trademark.
- Purchase order reference and date.
- Name, size, Quality, batch no. of mfg. and date of expiry.

(a) The material (size: 0.38 mm x 914 mm) shall be supplied in 10 m roll wound on a hard tubular core / spools with an inside diameter of 76 mm and outside diameter of the roll 300 ± 15 mm and also sufficient tension to form a compact roll without deforming the construction of the paper. The paper shall wound tightly over the core such that the edges are not uneven and shall not get loosened when dropped over a floor from one meter height. Each roll of the material shall be suitably packed so that no damage can arise during transportation and it can be unloaded easily.

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10. Packing :-

(b) Other items should be packed as under as follows:

SI No	Item description	Qty/TM	Packing QTY.	Remarks
1	Polyamide Strip Size: 0.13 mm thk x 8.4 mm wide x 90 mm long	1134 Nos	1134 Nos	Item quantity per TM to be packed in a separate air tide packet. 30 packets of individual items to be kept in a cartoon. Sticker with Item details such as Name, size, Quantity of packets, batch no. Date of mfg. and date of expiry to be pasted each cartoon.
2	Polyamide Strip Size: 0.25 mm thk x 9 mm wide x 507 mm long	152 nos	152 nos	
3	Polyamide Strip Size: 0.25 mm thk x 9 mm wide x 417 mm long	152 nos	152 nos	
4	Polyamide Strip ("U" Shaped Insulation) Size: 5 mil thk x 25 mm wide x 140 mm long.	152 nos	152 nos	

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