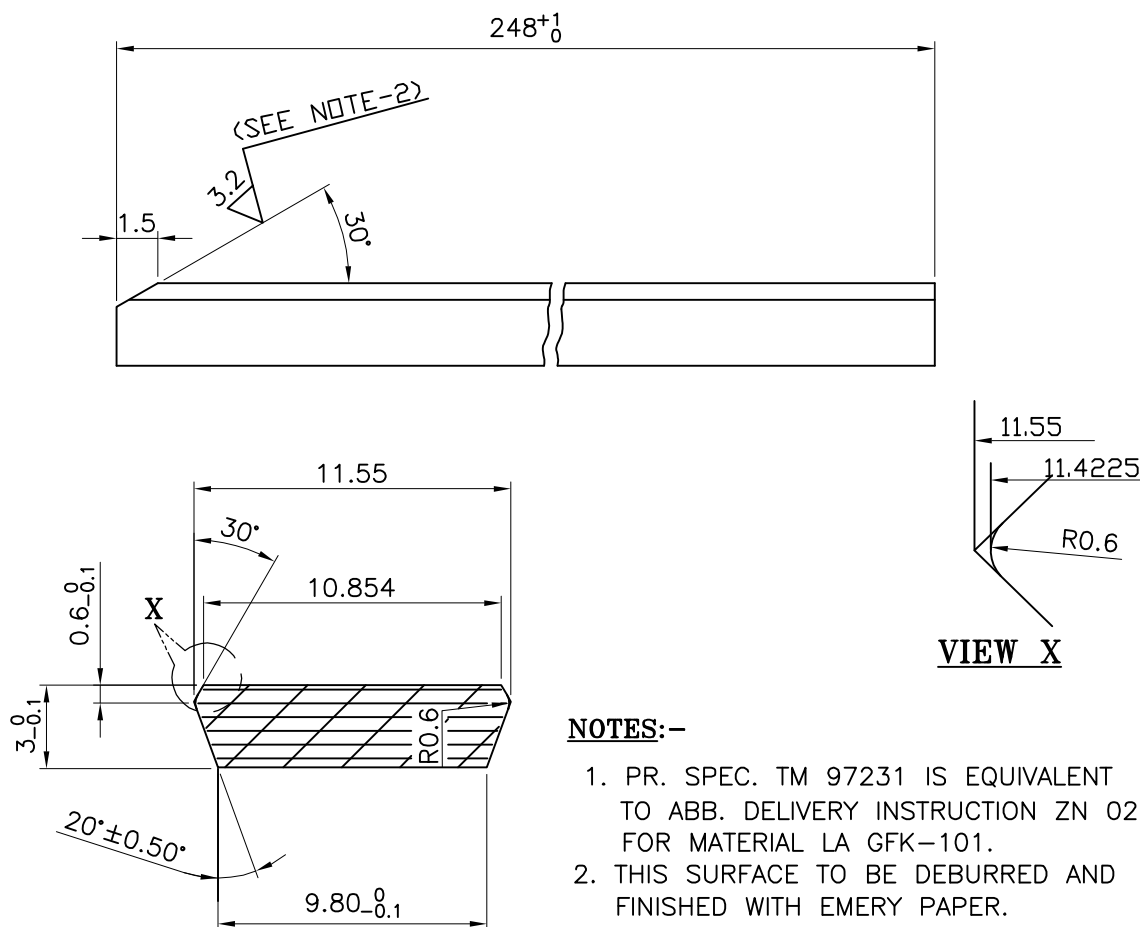


THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED.  
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY  
WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	ADDITIONAL INFORMATION	SIM DRG. NO.
		CHECKED	01	12.09.13	CHECKED		3EHM 413048
		APPROVED			APPROVED		
ZONE			ZONE		DRG. DIGITIZED & UPDATED.	STATUS OF DRAWING	
						DISTRIBUTION OF PRINTS	TME-1, TNX-1 TXM-3



## NOTES:-

1. PR. SPEC. TM 97231 IS EQUIVALENT TO ABB. DELIVERY INSTRUCTION ZN 02148 FOR MATERIAL LA GFK-101.
2. THIS SURFACE TO BE DEBURRED AND FINISHED WITH EMERY PAPER.
3. THIS DRG IS SIMILAR TO CLW DRG. NO. 4 TWD 096.050 ALT-2.

REF. DRG. NO.		001		STATOR SLOT WEDGE		TM 97231		KG		0.013					
59	64	65	75	25	27	29	58	59	34	45	55	56	58	65	
VAR00		REMARKS		ITEM NO.		DESCRIPTION		STD		MATL. CODE		UNIT WT.			
								46		MATL. SPCN.		68		71	
28		CARD TYPE-3		28		CARD TYPE-1		28		CARD TYPE-2					
SIGN. & DATE		Bharat Heavy Electricals Ltd. Bhopal		NAME		SIGN		DATE		NO. OF VAR.					
				DRN. R.B.V.		-SD-		03.09.10							
				CHD. D.K.		-SD-		03.09.10							
				APPD. VIKAS		-SD-		03.09.10							
INVENTORY NO.		DEPT. TME		UNTOL. DIMS. GR.		SCALE		WEIGHT (K.G.)		REF. TO ASSY. DRG.		ITEM NO.		NO. OF ITEM	
		405		GR. 'M' TM20079		N.T.S.		0.013		04453364053		008		001	
										DRAWING NO.				REV.	
										4 445 33 64 051				01	
										SHT. NO.		01		NO. OF SHT.	
														01	



# PRODUCT STANDARD TME DIVN. BHOPAL

TM 97231

PAGE 1 OF 3

TME/2011

## Material Specification of Glass Fibre Plastic, GFK 101, Slot Wedges And Sections

### 1. General

#### 1.1 Scope

This instruction lays down all the requirements which are made for the material GFK 101.

#### 1.2 Description, Definition

GFK 101 slot wedges and sections are made from parallel glass fibre rovings by continuous drawing, using heat resistant epoxy resin as a binder.

#### 1.3 Product Designation

Designation Text : DI -GFK 101

#### 1.4 Dimensions

For semi-finished products : see order,  
For components, : see order drawing.

#### 1.5 Delivery Documents, Destination For Delivery

As per order.

#### 1.6 Order

The order is the summary of the particulars and regulations that apply to the delivery. BHEL 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").

#### 1.7 Supplier's Product Designation

The material GFK 101 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 material.

#### 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.

...cont'd

COI T AND CONI TIAL  
 This information is the property of BHARAT HEAVY ELECTRICALS LTD.  
 It must not be used directly or indirectly in any way detrimental to the interests of the company

Revision Details: As per revision sheet			Distribution	Qty.	Approved (S.P.Singh) <i>15/02/22</i> Sr.DGM/TME		
Rev. No.	Date of Rev	Reaffirmed Year	TME TXM TNX QTM	1 1 1 2	<i>Ashish Tiwari</i> 15/02/22 Prepared Ashish Tiwari DY.MGR/TME	<i>V.Rawtiya</i> 15/02/22 Checked V.Rawtiya DGM/TME	Dt. of 1 <sup>st</sup> Issue  02.04.97
00	02.04.97	Feb 2022					



# PRODUCT STANDARD

## TME DIVN. BHOPAL

TM 97231

TME/2011

PAGE 2 OF 3

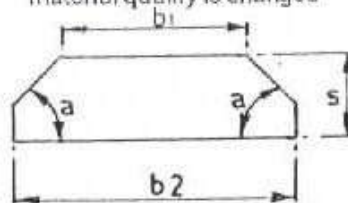
## 2.0 Requirements

## 2.1 Properties

Code	Size, term	Unit	Values	Test Method
01100	Composition Glass fibre content	Mass-%	$\geq 60$	ISO 1172 <sup>1)2)</sup> (= DIN EN 60)
01120	Density	g/cm <sup>3</sup>	$\geq 1.8$	ISO 1183 <sup>1)2)</sup> (= DIN 53479)
12100	Flexural bending strength delivered at 23 deg. C <sup>3)</sup>	N/mm <sup>2</sup>	$> 500$	ISO 178 (= DIN 53452, SN 277103) <sup>1)2)</sup>
	at 150 deg. C relative to the measured value at 23 deg. C	%	$\geq 50$	
	aged for 30 days at 180 deg. C measured at 23 deg. C	N/mm <sup>2</sup>	$> 450$	
13160	Pressure shear strength in the dummy slot short time at 23° C		$> 3\,000$	CHL 10123 <sup>1)</sup>
	short time at 150° C	N/cm	$> 2\,000$	
1350	Splitting load at 23°C, in longitudinal direction <sup>4)</sup>	N	$> 1\,200$	DIN 53436 <sup>1)2)</sup>

## 1) Type test

A type test must be carried out on a normal wedge to assess the material when either a supplier or the material quality is changed

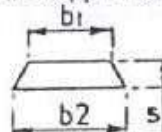
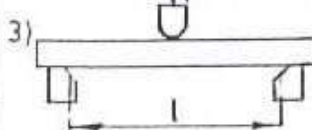


Normal wedge

$b_1$	$5.5 \pm 0.1$ mm
$b_2$	$9.6 \pm 0.1$ mm
$s$	$5.5 \pm 0.05$ mm
$a$	66 deg.

## Acceptance test

To be carried out on wedges with any cross section which corresponds to the order, after the result of the type test has confirmed that the supplier is in a position to fulfil the requirements for the standard wedge.



Evaluation for trapezium shaped wedges  
Flexural strength  $B$

Approximation calculation

$$2.8 P \cdot l$$

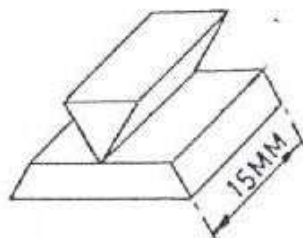
$$B = \frac{2.8 P \cdot l}{s (b_1 + b_2)} \quad \text{N/mm}$$

In case of doubt, i.e. if  $B$  falls short of the required value by  $\leq 10\%$  the exact calculation must be used

$$3 P \cdot l (b_1 + 2b_2)$$

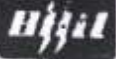
$$B = \frac{3 P \cdot l (b_1 + 2b_2)}{(b_1^2 + 4b_1 \cdot b_2 + b_2^2)}$$

4)



Note: The code numbers in section 2.1 serve as internal functional key and have therefore no significance for the supplier.





# PRODUCT STANDARD

## TME DIVN. BHOPAL

TM 97231

TME 2011

PAGE 3 OF 3

### 2.2 Additional Requirements

No cracks must be visible in the cut surfaces of the rods under a 6-fold magnifying lens.

### 2.3 Consignment

#### 2.3.1 Form of the Consignment

In factory lengths or ready-cut components and if required machined in accordance with the order drawing.

#### 2.3.2 Packing

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

#### 2.3.3 Transport

The shipment is to be made by rail or road transport in such a way that it can be unloaded easily.

#### 2.3.4 Identification

Each item of the consignment (crate, palette etc.) must be labelled securely and indelibly (e.g. with an adhesive label or and appendage) with the following details : Drawing No., Material designation and component description quantity and eventually batch and test numbers.

### 2.4 Permissible Variations

#### 2.4.1 Dimensions

For semi-finished products: see order or order drawing.  
For constituents : see order drawing.

### 3.0 Reference to ABB standards

This spec is equivalent to ABB spec. ZN02148 calling identification Nos. ZN02148.

\*\*\*\*\*

**COPYRIGHT AND CONFIDENTIAL**

The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD.  
It must not be used directly or indirectly in any way detrimental to the interest of the company