


<b>Title</b>	<b>Tender No. I-I/ET-TPT/GTE/23003/23-24 dated 22-09-2023 for Supply of One Directional Carbon Fiber Composite Plate</b>
<b>Sub Title</b>	<b>PART-A (II): Scope of Supply, work and technical specifications</b>


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	Title: Supply of One Directional Carbon Fiber Composite Plate	Tender No.
		I-I/ET-TPT/GTE/23003/23-24

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## 1 Introduction:

One directional Carbon Fiber Composite Plates (1-D CFC) to be used for multi plate diagnostic beam dump (MPDB) to study beamlet and beam group profile in terms of divergence.

DNB is a negative ion source based Neutral Beam. It has 1280 small beamlet divided into 16 groups. Our goal was to design MPDB to measure. (1) Total Beam Power (2) Profile of beamlets and (3) Divergence.

The main principle considered for the diagnostic beam dump design is the anisotropic thermal conductivity of the CFC material due to its 1D nature. The conductivity of the said CFC plate in the thickness (along the beam) direction will be significantly high compared to the planner (transverse) direction, so that the beamlet foot print pattern in which the heat flux (beamlets) falling on the front face will be transferred to back surface. After that an IR camera situated at the rear side of the MPDB will record the foot print pattern of beamlets. Ansys workbench is used to perform the transient thermal analysis and benchmark with the experimental observations in terms of time dependent temperature profile.

## 2 Scope of Supply and/or Scope of Service:

To supply of 01 nos. of One directional carbon fiber composite plate as described in technical specification.


## 3 Scope of Work:

To supply of 01 nos. of One directional carbon fiber composite plate as described in technical specification.

## 4 Technical Specifications

The required technical specifications are mentioned as below.

Sr. No.	Specification	Requirement
1	Material of plate	One directional carbon fiber composite
2	Quantity	01 nos.
3	Dimension of One directional Carbon Fiber Composite (1D CFC) plate	Preferred dimension Width –141 mm ( $\pm$ 5mm) Height – 355 mm ( $\pm$ 5mm)

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		Thickness - 20 mm ( $\pm$ 1mm)  Note: if mentioned dimension is not available, vendor may mention their dimension and also express possibility to achieve mentioned dimension (yes/No)
4	Quantity of required plates	01 nos.
5	Carbon Fibre orientation in plate	One directional orientation of Carbon Fibre along with thickness of plate (1D-CFC)
6	Ratio of Thermal conductivity W/m k (Thickness Vs Planner) of CFC plate	Preferred ratio : $K_{\text{Thickness}} > K_{\text{Planner}}$ (at least 3 times higher or more)  Note : mention thermal conductivity for all three Axis
7	Density (g/cm <sup>3</sup> )	Minimum 1.4
8	Ash content (PPM)	< 50 PPM
9	Machinability	Cutting and Drilling (Yes/No)
10	Operational Temperature range	At least 2000 C (mentioned max. temperature)

## 5 Acceptance tests:

Site acceptance test of One Directional Carbon Fiber Composite (1D CFC) plate will be carried out at ITER-India DNB lab in Institute for Plasma Research which include below mentioned inspections.

- (i) Visual inspection
- (ii) Dimension inspection

## 6 Document deliverables:

- The vendor should provide the test certificate of Thermal conductivity of 1D CFC plate material for all three axes (X, Y and Z) along with the delivery of material. All documentation shall be in English language only.

## 7 Packing requirement:

The vendor shall use required/special packing material to avoid any physical damage to 1D CFC plate during the transportation from vendor's site to ITER-India site.

If any damage is found in any item due to improper packing, at the delivery site; supplier shall replace the damaged item with new item at no extra cost on the purchaser.



## Appendix-1

### Technical Compliance Format

The supplier must fill, sign, and stamp the below table as part of compliance to the requirements. If the item under procurement is a COTS product the following clause may be added.

As an evidence of offered specifications the supplier shall submit appropriate documentary evidences such as product data sheets, catalogues, manuals etc. Simply specifying Comply / Yes etc. without proper verifiable evidences may not be considered.

Specifications for item name from ITER-India		Offered specification (to be filled by the supplier)	Remark (to be filled by the Supplier)
Specification	Values		
Material of plate	One directional carbon fiber composite		
Quantity	01 nos.		
Dimension of One directional Carbon Fiber Composite (1D CFC) plate	Preferred dimension Width –141 mm ( $\pm$ 5mm) Height – 355 mm ( $\pm$ 5mm) Thickness - 20 mm ( $\pm$ 1mm) Note: if mentioned dimension is not available, vendor may mention their dimension and also express possibility to achieve mentioned dimension (yes/No)		
Quantity of required plates	01 nos.		
Carbon Fibre orientation in plate	One directional orientation of Carbon Fibre along with thickness of plate (1D-CFC)		

Ratio of Thermal conductivity W/m k (Thickness Vs Planner) of CFC plate	Preferred ratio : $K_{\text{Thickness}} > K_{\text{Planner}}$ (at least 3 times higher or more)  Note : mention thermal conductivity for all three Axis		
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