

SPECIFICATION OF ROLL OUT DRUM

A) GEOMETRY (Refer Figure-1)

Table-1: Tube geometry and quantity

No	Description	DRUM
1	ID (Inner Diameter), mm	$254^{+0.1}_{-0.1}$
2	T (Thickness), mm	4 ± 0.05
3	L (Length), mm	2200
4	Straightness, better than	1 mm
5	Quantity, No's	2

Note: Surface finish of the DRUM outer surface shall be MATTY.

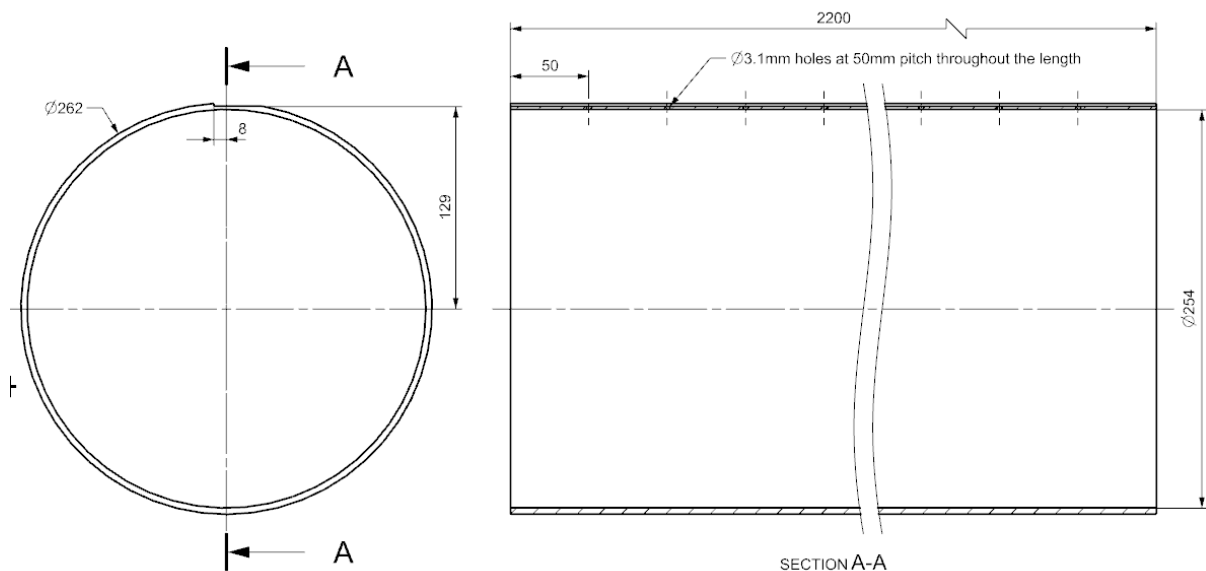


Figure-1: Tube nomenclatures used in Table-1

The roll out drum should be drilled $\Phi 2.5$ mm holes at 50 mm pitch in a straight line (along tube axis) on one side after curing as per Figure 1.

An Aluminium strip with M3x1D threaded holes with wire inserts at 50mm pitch (To be matched with the holes in Roll out drum) to be bonded on the ID of the roll out drum.

B) MATERIAL

- T700/Epoxy or equivalent (Highly preferable). Resin System should be 135 degree Celsius cure system.
- Composite tube should withstand service temperature of -50°C to $+100^{\circ}\text{C}$.

C) LAY UP SEQUENCE

Table-2: Lay-up sequences and orientations

Lay up	Angle	Thickness (mm)
1 st	0 degree	0.2
2 nd	90 degree	0.2
	Multiple alternating 0 and 90 degree to complete thickness	3.4
Last	0 degree	0.2

Note:

Zero degree Layers' joints to be spaced in staggered manner.

D) LAMINA LEVEL PROPERTIES

Table - 3: Typical properties carbon fiber

No	Property	Unit	Value
1	Young's Modulus, E_L^T	G Pa	230
2	Tensile Strength, σ_L^T	M Pa	4900
3	Density	Kg/m ³	1800
4	Elongation	%	1.5-1.9
4	Single Ply Thickness	mm	0.1mm

Note:

- Suffix "L" refers to fiber direction

E) PROCESS OF FABRICATION

1. Roll wrap/prepreg wrapped technology.
2. Suitable mandrels to meet the geometrical tolerance.
3. The assembly may be cured in an autoclave/programmed Oven as per recommended cure cycle for the adhesive system.
4. Top layer will have surface protection coating from polyurethane.

F) QUALITY ASSURANCE PROVISIONS

1. Certificates for the physical and mechanical properties of the prepreg used to be provided at the time of quotation.

2. Log sheets for cure cycle, temperature and pressure used for curing to be provided.
3. Cured drums to be individually marked with suitable identification.
4. NDT certificate for inspection to identify manufacturing defects of drums to be provided.
5. Dimensional inspection certificates giving details of ID, OD, thickness, straightness of all the drums to be provided.
6. Certificate giving physical and mechanical properties of the cured lay-up laminate to be provided at the time of delivery.
7. Inspection at vendor's location before the delivery of the product.

G) PACKAGING AND SHIPPING

- I. The batch number, serial number of the drums should be clearly labeled on each drums.
- II. These numbers should be traceable to the respective inspection/ test reports if conducted.
- III. The fabricated drums should be packed properly and protected from environment like, humidity, vibration, shock, etc. Necessary desiccants, humidity indicators should be provided in the package in order to keep the package intact.