TECHNICAL SPECIFICATION for supply of Membrane Electrode Assembly (MEAs) for Proton Exchange Membrane Fuel cells

The due date for receiving the proposals against the EoI is 23rd March 2021 (Tuesday).

Rev 01	Approved Amrish Gupta		
	Prepared Dr Vasu Gollangi	Issued	Date 09/03/2021

Specification for Membrane Electrode Assembly (MEAs) for PEM Fuel cells

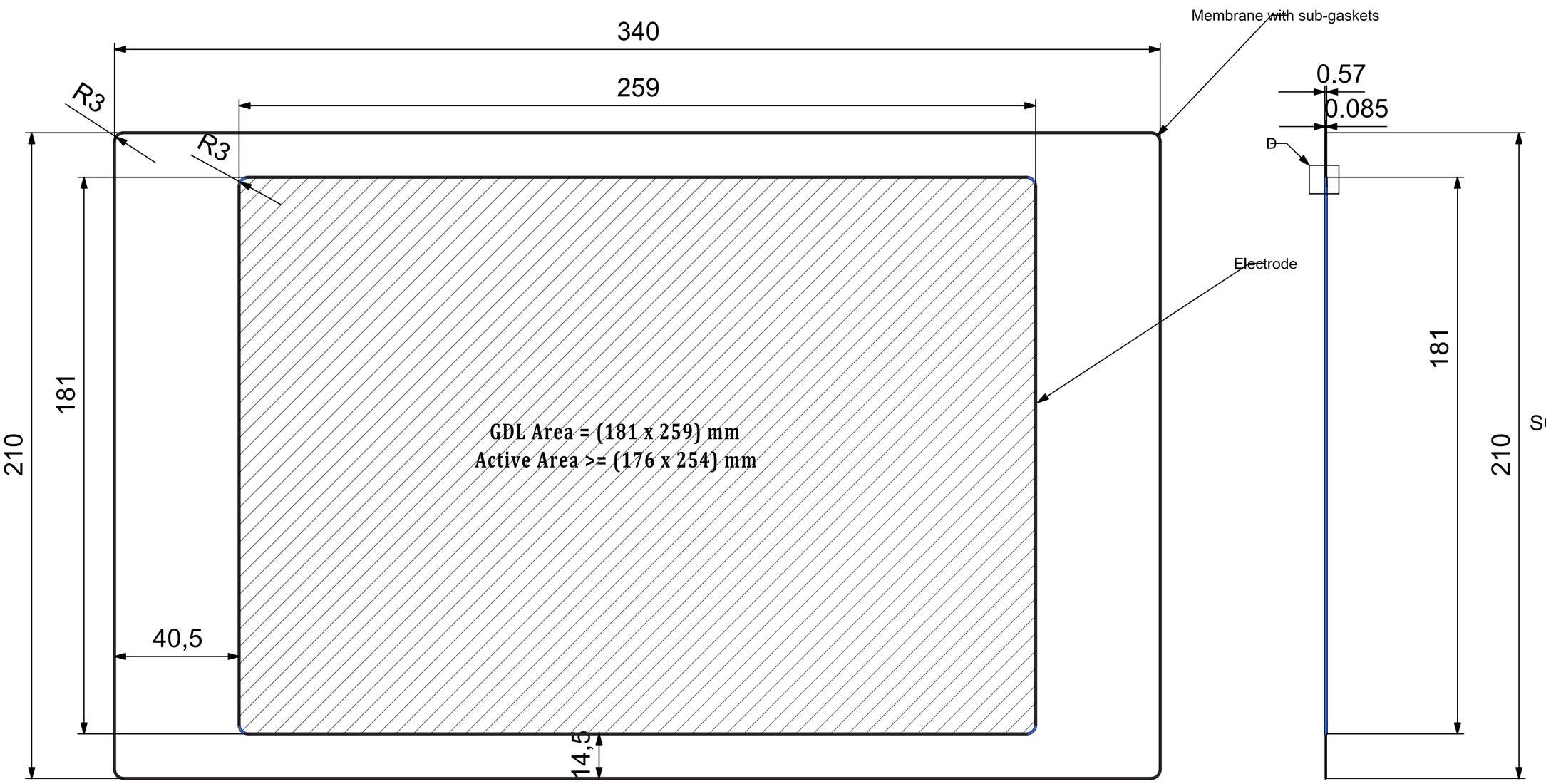
Quantity: 300 – 400 Nos

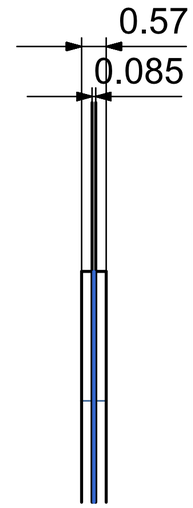
Sl.#	Item description	BHEL specifications
Item Specifications		
1	Membrane Electrode Assembly (MEA) as per drawing details	MEA has to be supplied as per drawing no. 4-PEMFC-62-28-02, Gas diffusion layer area:(181 X 259)mm (centred)
2	MEA thickness tolerances	Total Average MEA thickness in µm: 550+/-20 Membrane average thickness: 16µm to 18µm Thickness tolerances for membrane: +/-10% of average
3	Feed reactants stoichiometric ratios	Air: 2 to 3 and Hydrogen: 1.05 to 1.30
4	Required Current density of 1 A/cm2 – 1.5 A/cm2 at 0.65 VDC/Cell	The following operating parameters 1.Operatung Temperature: 60-70°C 2.Gauge Pressure: Pressure at cathode side 0.5 – 1 bar and 0.5-1 bar at anode side 3.Electrical conductivity of the graphite plate used in the cell assembly is : 50-55 S/cm 4.Dew point of air 45-55 Deg.C and Dew point of Hydrogen 35-45 Deg.C 5.Liquid cooling media: 60 wt% DI water 40 wt% ethylene glycol
5	Operational stability	More than 5000 hr. to reach maximum allowed degradation of 10% of initial voltage at 1A/cm2 or the performance values should meet similar degradation values even under cyclic operation over 5000 cycles (one ON/OFF cycle is 1hr)
6	Performance degradation rate in case of continuous operation	Below 8-10mV/1000 hr. at current density of 1 A/cm2
7	Electrolyte base material	PFSA membrane or equivalent to be used
8	Degradation rate for 5000 ON/OFF cycle over a period of 5000 hrs. cumulative operation	Below 10-12 mV/1000 cycles considering each cycle duration as 1 hr. of operation

9	Reinforcement of Non active area of MEA	Reinforcement is required around the active electrode on both sides of non-active membrane area
10	Differential pressure (DP) between anode and cathode	MEA should qualify for minimum differential pressure of 0.5 bar
11	Low temperature stability	MEA should be dimensionally stable even at temperatures below 0 Deg. C
12	Thickness of Non-active area (t)	It is overall thickness(t) of ion conducting membrane thickness with sub-gaskets on both sides of the membrane should not exceed 85µm
13	Manufacturer's Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch
14	Applicable Warranty period of 12 months	Vendor should agree for replacement of MEAs at their own cost in case of any defect/delamination is observed or any deviation from technical specifications of the Purchase Order in the supplied quantity
15	Supply of TWO free samples of Membrane Electrode Assembly(MEA) for technical evaluation at BHEL R&D, Hyderabad.	Vendor is required to supply minimum of TWO free samples of MEA as per the size requirements of drawing details at their own cost to the following Mr. Dnyndev Arjun (Sr. Engineer) Fuel Cells & Renewable Energy Systems(FCR) Vikasnagar, Balanagar Hyderabad- 500093 Cell: +919010324000 Email: devkitte@bhel.in
16	Delivery Time	Suppliers are requested to mentioned the delivery time.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)





DETAIL D
SCALE 10:1

Avg MEA thickness (Anode+Membrane+Cathode) is 550+/-20 Microns

NOTE

1. Anode and Cathode perimeters to fall within line profile.
2. Dimesion and tolerance for membrane applies to both anode and cathode separately.
3. Perimeter of GDL should be reinforced with sub-gasket material
4. Atleast one electrode needs to be marked - Cathode or Anode
5. Membrane+subgaskets should be less than or equal to 85 micron

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				

REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				

REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				

REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 25kW PEMFC STACK

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	Suresh Kumar O		06/03/21	N.A
CHD.	Dnyndev A		06/03/21	
APPD.	DR Vasu G		06/03/21	

DEPT.	SCALE	WEIGHT(Kg)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
FCR	1:1	.00	NA	0	NA
CODE 62					

TITLE: Membrane Electrode Assembly (MEA) - LTPEM

DRAWING NO. 4-PEMFC-62-28-02 REV.

SHEET NO. 01 NO OF SHEETS 01

COMP. FILE NAME | REF.DRG.NO. | INVENTORY NO.