Elaboration of thermal management of Battery pack

1.After distances were finalized a geometry of 70 cells I.e., 1 module was made.

2.Heat generation through each cells were considered as 5Watt as calculated which was actually incorrect this heat generation calculated by the heat cells was during first 5 second after the Vehicle powers up i.e., while accelerating.While acceleration power consumed was larger and hence the heat generated.

3.Further the heat generation was averaged for whole lap time that was 2.77Watt.

4. Through hit and trial we varied speed of fans as 2,4,10,15 m/s and setup of some material of accumulator were modified such as material of wall was changed to Aluminium 6061 and value of heat transfer coefficient was changed to 25W/m^2 K. in Ansys while achieving the solution.

8. Initial cooling fan with a speed of 4m/s was ineffective(This value was taken we thought for 1 series connection the velocity would be divided) . The temperature reached 100 deg C against the value mentioned in rule-book of Formula Bharat which is 60 deg C.

9. We randomly put the velocity of fan to be 15m/s

10. A cooling fan with a speed of 15m/s was installed .Cubic feet per minute required for a fan to produce a power of 387.80W (70*2*106746.47W/m^3) was 5955 CFM or 2.81m^3/s flow rate. And our flow rate is 0.086m^3/s with velocity 33.28m/s resulting in a maximum temperature of 44 deg C.

10. Four blow-in fans with a power of 19.2 W each was decided to be installed , powered by an auxiliary battery.

Blade length was considered 12cm.

12. Inlet for the fans are placed at the back , as they are not allowed at the top and front.

13. The outlet is positioned at the downside , same as the inlet position.

14..Fans we are using would be used as exhaust fans so that when vehicle runs the air drifting back side should not oppose the direction of blown air.

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