

ABSTRACT

This project aims to describe the heat transfer analysis of annulus water jacket cooling of AC-50 induction motor using Openfoam software. It also aims to find the outlet temperature of fluid and final temperature of the motor. This AC-50 induction motor finds its application in electric vehicles which replaces the IC engines in near future.

PROBLEM STATEMENT

- Modelling the geometry of the annulus cylinder with inlet and outlet water jackets.
- Tetrahedral meshing using SALOME.
- SnappyHex meshing using openFOAM.
- Studying the final temperature of inner wall which is in contact with motor.
- Studying the outlet temperature of water jacket.
- Changing the mesh size and comparing the results.
- Changing the geometry of inlet and outlet and comparing the results with original geometry.



Fig 1 AC-50 INDUCTION MOTOR [1]

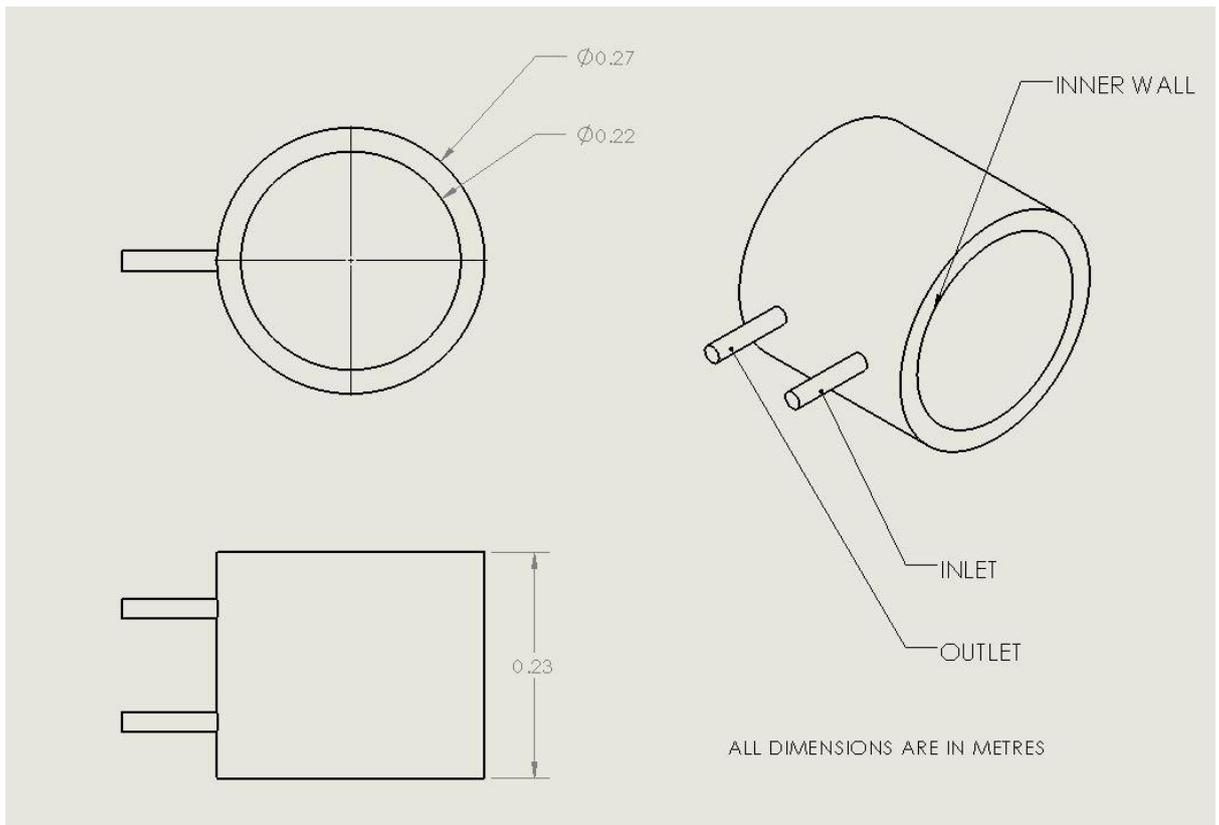


Fig 2 DIMENSIONS OF ANNULUS WATER JACKET

INITIAL CONDITIONS

- Ethylene Glycol is used as cooling fluid to cool the motor.
- Flow is considered to be laminar.
- Both inlet and outlet are subjected atmospheric pressure.
- Acceleration due to gravity is given vertical downward direction which guides the flow.
- The temperature of fluid at inlet is room temperature.
- The inner wall which is in contact with motor's surface area has heat flux of 34.68 KW/m^2 .
- The Temperature difference between the inlet and outlet is limited to 15°C with constant mass flow rate.
- Solver Type - buoyantSimpleFoam

REFERENCES

- [1.]. Zainal Ambri Abdul Karima and Abdul Hadi Mohd Yusoff. Cooling System for Electric Motor of an Electric Vehicle Propulsion: Advanced Materials Research Vol 903 (2014) pp 209-214