Cooling sleeve simulation

OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

AIM AND OBJECTIVE

This master's thesis aims to develop and validate a CFD model of a motor cooling sleeve for an electric race car application. The objective is to accurately simulate the thermal and fluid flow behaviour of the cooling sleeve in order to evaluate its effectiveness in removing heat from the electric motor under representative operating conditions.

Particular emphasis is placed on detailed CFD modelling of the cooling sleeve geometry, including flow distribution, heat transfer mechanisms, and pressure losses. The work focuses on defining appropriate modelling strategies, boundary conditions, and thermal interfaces between the motor and cooling fluid, ensuring a realistic representation of cooling performance while maintaining computational efficiency.

A main technical challenge is achieving uniform cooling around the motor while limiting pressure drop and avoiding stagnant flow regions that can lead to local hot spots and reduced reliability. To address this, the thesis investigates the influence of sleeve geometry, inlet and outlet positioning, and flow path design on thermal performance, with attention to mesh quality, turbulence modelling, and sensitivity to operating parameters.

PROFILE

- Interested in **heat transfer and fluid dynamics**
- Interested in **CFD simulations**
- Mechanical, electromechanical, aerospace **engineering**
- Analytical mindset
- Motivated to apply theoretical knowledge to a **real**

RETURNS

- Unique experience within a racing team
- Genuine work experience to carry with you into your career
- Exposure to cutting edge technology and software

INTERESTED?

Send us your contact details and field of interest to

recruitment@formulaelectric.be