

Offene Arbeit (in English)



TECHNISCHE
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Modeling and optimization of cooling channels in a water-cooled machine



Institut für
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Introduction

High power density is always expected for machines in vehicles, where the space and weight are extremely limited. However, the crucial issue for high power density is the thermal problem. An effective cooling design is therefore important for these applications.

Most machines are water-cooled with liquid flowing in the channels on the stator outer surface. A typical spiral channel is shown in Fig. 1 as an example. The geometric parameters: the channel width b , channel height h and the width between adjacent channels t influence the cooling effects. The aim of this thesis is to set up a simulation model in fluid field and temperature field in order to investigate their influence.

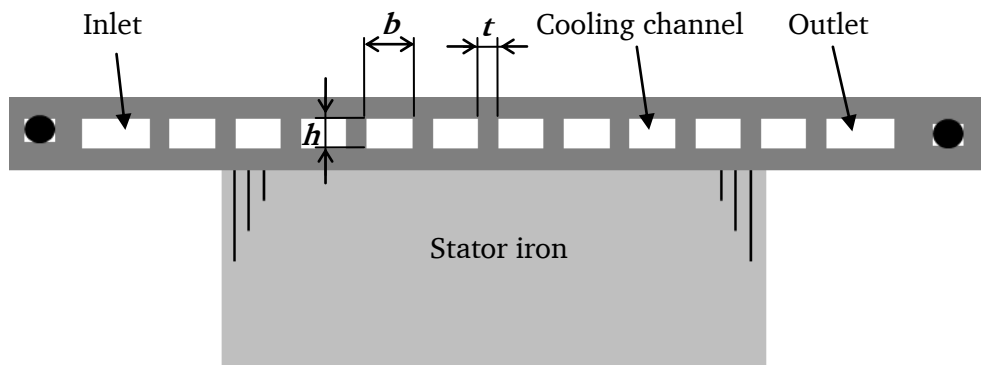


Fig. 1 Cross section of a stator cooling system with spiral channels

Task

In this thesis, the student should perform the following tasks:

- Get theoretical knowledge of fluid dynamics and heat transfer.
- Set up a simulation model in *Ansys (Fluent)*.
- Investigate the influences of the given channel geometries.
- Evaluate different channel patterns and shapes.

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