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COAXIAL COOLANT ROUTING IN MOTOR VEHICLES

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COAXIAL COOLANT ROUTING IN MOTOR VEHICLES

Initial situation:

Numerous components in motor vehicles such as e-machines, pulse inverters, batteries, control units require coolant cooling to ensure operation and service life.

This is usually realised via separate coolant supply and coolant return lines. The use of coaxial pipes which realise the supply and return in one line is so far only known in the automotive sector in the area of the refrigerant circuit of the air conditioning system as an internal heat exchanger.

Disadvantage:

The flow and return lines (hoses/pipes) require installation space and brackets and must be mounted separately in some cases.

Solution:

By means of a coaxial coolant routing, supply and return can be realised in one line.

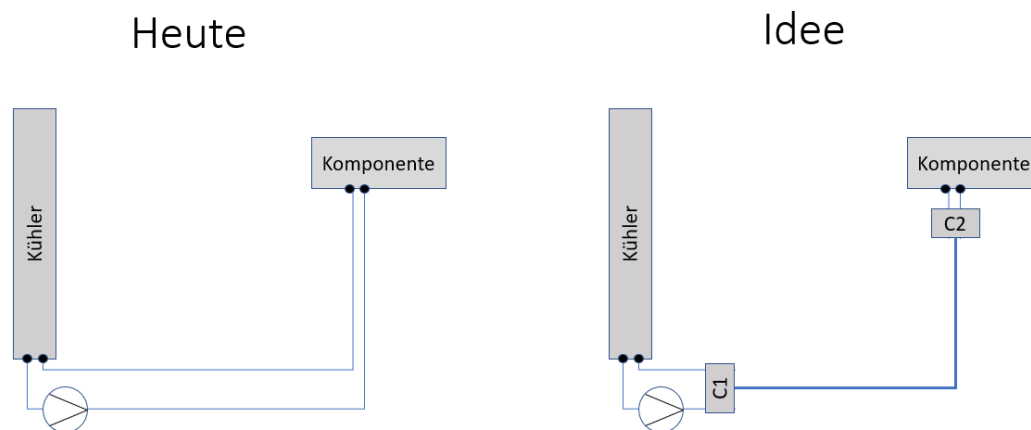
Advantages:

- Reduction of parts to be installed (costs, weight, installation space).
- By introducing support structures between the internal and external media guide, the line stability can be realised even with low wall thicknesses.
- The coolant guide can be used as an internal heat exchanger
- Possibility to avoid too high temperature spreads between the component to be tempered and the cooling medium by acting as an internal heat exchanger.
- By inserting an intermediate layer between the supply and return lines, the heat transfer between them can be reduced
- Simpler insulation of the coolant flow from the environment.

Technical implementation:

Today, the components to be tempered are connected to a cooler or heater by two separately running lines for heat dissipation or absorption.

As described in the sketch, the elements can also be connected in sections in a system with media lines running into each other, which in turn are connected via connectors (C1, C2) to the coolant circuit or the component to be cooled. The connectors can either serve as transfer points to the supply and return lines or connect directly to the component.



The sketch below describes a possible structure of a coaxial coolant line. The insulation layers and the supporting structural elements are to be interpreted as examples and can be omitted if necessary.

