

fibretemp

beheizbare Formen

Description

fibretemp CFP heated moulds

Electrically-heated moulds of CFP composite materials

This invention of the University of Applied Sciences in Dortmund describes a method for constructing plastic moulds capable of being heated electrically. The moulds are preferably intended for almost any kind of production runs of moulded reinforced or not reinforced plastic-parts. Because of the special structure, in which the CFP laminate assumes both the loadbearing function and the resistance heating function, it is possible to realise considerable energy and cost savings. The special arrangement of the materials means that the moulds are very dimensionally stable during the manufacturing process, despite the differences in temperature which are present. This leads to hitherto unachieved dimensional reliability, even for large components.

The CFP heated moulds can be used in every application which calls for small or medium-sized runs of plastic components. In addition, the technology can be applied in order to heat structures with large surface areas, such as for example tanks and vessels. Examples of applications are wind turbine rotors, ships' hulls, interior cladding of aircraft and rail vehicles, moulded parts in the field of medical technology, heightened roofs for transporter and trailers, and large-scale primary and secondary structures for a wide variety of applications.

A large number of test results are now available. In an initial application in series production, interior cladding has already been successfully manufactured for the aircraft industry using corresponding moulds. The innovative mould construction led to reduction of manufacturing costs by one half. Mould temperatures of more than 100°C are currently in use. Mould temperatures of up to more than 200°C are possible.

The University of Applied Sciences in Dortmund is offering licences to interested companies together with the PROvendis patent utilisation agency.

The University of Applied Sciences in Dortmund supplies the know-how and, working together with its project partners from industry, is also able to offer complete production systems.

The value of fibretemp :

With this innovation electric heated moulds can be realised with high precision at very low cost and at nearly any size. Costs of moulds can be compared to costs of often used not heated GRP-moulds. The functionality of heating is integrated in the surface of the mould structure. By this way carbon reinforced composites are coming mechanronic. As the thermal capacity of moulds are very low they need less energy for being heated compared to common types of heated moulds or extra rooms for tempering or heating.

The innovation increases many thermal processes like moulding of prepregs, moulding duroplastic or even thermoplastic materials.

Example of practise of fibretemp :

- **Indoor-panels for aircraft industries:**

A positive for the indoor panel was milled: 6.5 m x 2.3 m was the size. The positive was easily formed by special layed carbon-fabrics, a honeycomb core and an additional carbon layer. Only the layer at the surface-site of the mould needs to be heated. The total weight of this mould, measuring 18 m² is less than 50 kg as its thermal capacity is very low too.

The indoor panels can be manufactured very easily: Laying prepregs honeycomb and additional prepregs, applying the vacuum, adding some thermal insulation and switching on electricity. With good insulation 100°C can be reached with electric power of only 2.000 W which is almost 133 W/m².

The difference of temperature measured at the surface is always less than 1°C.

As the productivity of these moulds is excellent, at this time moulds for the production of rotors for wind-industry are being developed. First tests are showing big benefits for this purpose. Additional results will follow soon.

After the positives had been manufactured the mould was finished within less than a week.

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- **Moulds for wind turbine rotors:**

The **fibretemp** -system is coming up to be a big benefit for manufacturing wind turbine rotors. Compared with other systems of heated moulds for wind turbine rotors moulds made by this system are less complicated but much more practical. First prototypes of those moulds have already been built. Manufactures like the very stiff but lightweight construction as well as the thermal capacity of these moulds. These moulds need much less electric energy for heating and can be heated up in short time. An additional benefit is the fast rate of cooling-down as this saves time during manufacturing.

The market potential of **fibretemp** :

This innovation can improve manufacturing wherever high temperatures are needed on large surfaces. Main market might be the production of rotors for wind industry as well as bodies for boat industry. The innovation is a high tech but low cost solution for heated moulds which can easily improve the efficiency for manufacturing of composite prepreps or any kind of formed materials at higher temperatures.

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The University of Applied Sciences and Arts is the fourth biggest University of applied Sciences in the state of Nordrhein-Westfalen (NRW, Germany). Around 8.000 students over all are studying at different faculties. At the faculty of mechanical engineering about 1.000 students are studying general mechanical design and automotive engineering.

The faculties is cooperating with many international industries and universities all over the world.

Partners of industry:

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