TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

HEDRICH GROUP

INNOVATIONS FOR ROTORBLADES

Vacuum Infusion Equipment by HEDRICH

HEDRICH VACUUM SYSTEMS in association with the Hedrich Group, develop and produce innovative equipment and concepts for efficient production of high-quality composites.

MEETING CHALLENGES

Hedrich is working intensively on new innovative equipment concepts allowing to optimize and automate production processes of fibre composite components and thus to improve quality.

CONVENTIONAL METHOD

In the production of rotor blades, the materials to be impregnated (insert parts) as e.g. glass fibre mats are placed in the half shell which is sealed with foil against atmosphere and evacuated.
In conventional infusion processes, partially degassed and undegassed resin and hardener constituents are processed as carrier matrix. These constituents have an indefinite residual gas portion.

Before the infusion process is started, the constituents are often exposed to atmosphere causing additional absorption of gas (also air humidity). The resin is infused in the cavity and penetrates the inserted materials. Trapped air bubbles are partially eliminated by means of special inserts. Gas residues remain in the component causing blowholes.

The consequences are rework, impact to the mechanical properties and increased necessity for maintenance and repair, e.g. due to damage caused by osmosis.

ADVANTAGES OF THE PATENTED HEDRICH PROCESS

The aim is a rotor blade direct infusion process, in which the carrier matrix is under vacuum during the entire process, any absorption of gases being thus avoided. This will significantly increase the product quality preventing costs for rework to eliminate blowholes.

DEVELOPMENT OF A SPECIAL DEGASSING AND DOSING EQUIPMENT

In the first process step, this equipment prepares the two constituents resin and hardener separately from one another. During this preparation, gas and moisture dissolved in the constituents are removed to obtain optimally prepared constituents for the casting process.

HEDRICH Vacuum Infusion Equipment VIA 30

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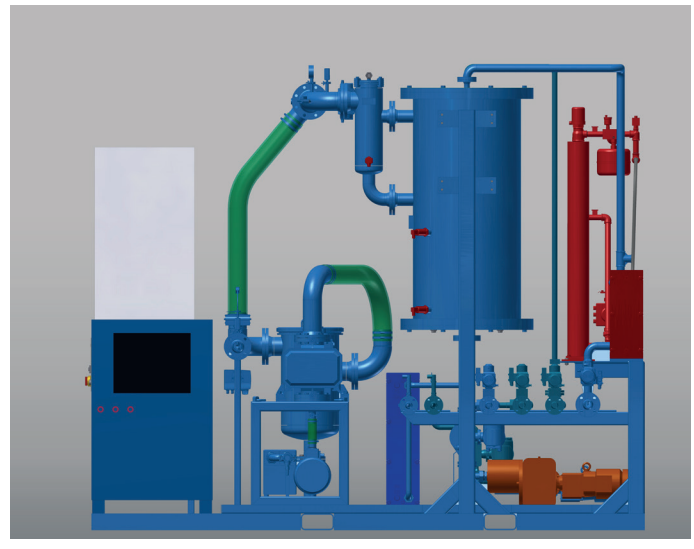
After the preparation process, the constituents are delivered into a ring pipe system by means of frequency-controlled high-precision gear dosing pumps. Flow meters determine the exact constituent quantity and give a feedback to the equipment control system. This combination allows to infinitely adjust the desired formulation ratios. The cast resin quantities are made available as required.

The resin/hardener mixing and filling station (INFUCUBE) is located close to the respective constituent filling port on the mould to obtain smallest possible quantities of reactive cast resin mixture. It performs the fully automatic infusion of the casting compound without contact to the atmosphere (re-absorption of gas).

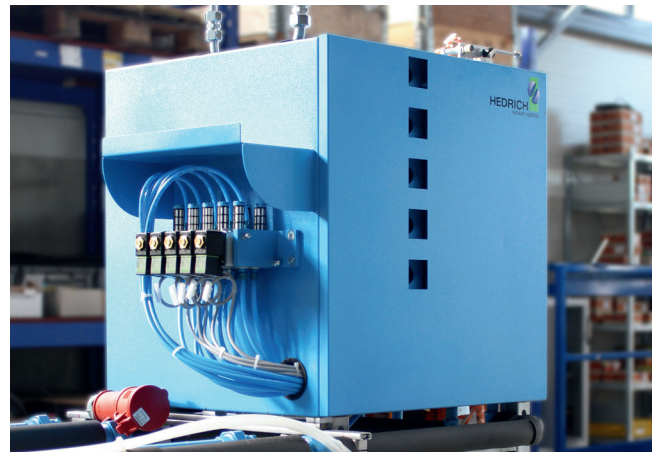


ADVANTAGES OF VACUUM INFUSION EQUIPMENT

- World's innovation: completely fully automatic vacuum casting of rotor blades without reabsorption of gas of the prepared cast resin components
- Quality improvement by less air accumulation
- Shorter mould occupation times and thus increase of production by abt. 10 %
- Elimination of additional post-curing times
- Minimization of cast resin disposal costs
- Less material consumption by lower safety margins
- Separate degassing of resin and hardener for quality improvement
- Casting quantities up to 70 kg/min
- Technology for infusion also applicable for the pressure gelation technology

The **INFU***CUBE* GEN2

The filling and mixing Station (INFUCUBE) controlls the cast resin replenishing operation according to the demand. When a minimum filling level is reached, the INFUCUBE will be automatically filled with cast resin compound depending on the quantity previously discharged. So only minor residual quantities of reactive cast resin material remain at the end of the casting process. The parts contaminated with reactive casting compound such as hoses and static mixer, are low-cost disposable products or process-related consumables. Flushing and cleaning operations are therefore not necessary.



INFUCUBE

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