High-temperature foams with reduced resin absorption for producing sandwich materials

Field of the invention

The present invention relates to the field of producing high-temperature foams, such as are used in the construction of aeroplanes, ships and rail and other vehicles, in particular further processed into sandwich materials by joining with two outer layers. To this end there is provided a novel process for producing high-temperature foams (HT foams) which are particularly suitable for producing such sandwich components for lightweight construction. This process achieves an improvement in the processability of the HT foams produced according to the invention and a weight reduction of the sandwich materials. The HT foams are furthermore rigid particle foams which are markedly more economic to produce than rigid block foams.

The present invention in particular brings about a reduction in resin absorption in fibre composite processes through a process-related optimization of the surface constitution.

Prior art

Particle forms consist of a multiplicity of individual polymer foam beads which in a contouring mould are sintered at the interfaces by supplying energy. This affords a characteristic surface as is apparent in Fig. 1 in the example of a moulding made of expanded polypropylene (EPP). The boundaries of the individual foam pearls are still clearly apparent in the moulding.

In addition, it is a consequence of the process that some of the air used for the filling procedure always remains in the mould cavity, thus resulting in voids between the foam beads. The prior art relating to particle foam moulds discloses methods of minimizing these problems. Thus for example structured mould surfaces can blur the particle boundaries for the eye of the beholder by imprinting a primary structure into the foam surface.

However, this is of only secondary relevance when the moulding is to be utilized as a core for a sandwich construction. Surfaces that are as closed as possible are desired here. There are three substantial reasons for this: A depiction of the defects in the foam core on the surface of the (fibre composite) outer layers must be avoided. This phenomenon is regarded as a quality defect. In addition, to exploit the maximum lightweight construction potential, penetration of resin into the core material is to be avoided as far as possible. Finally when using prepreg outer layers penetration of the resin into the voids at the foam surface creates a risk of so-called “dry” points in the outer layer. These are in particular points on the form core surface where the resin has completely penetrated into the