

Request for amendment under Section 75(1) Patents Acts 1977

Annex 2: "marked-up" copy of the claims showing the requested amendments of 21 December 2018 with respect to the claims as originally granted

CLAIMS:

- 1 A method of manufacturing ~~a product selected from: a thermal insulation material; a mineral fibre product; a wood board product including chip board, orientated strand board, particle board, medium density fibre board, wood facing products; and foundry sands;~~ in which the mineral fibre product is a mineral wool insulation product, comprising the steps of:
- Providing a collection of loose matter comprising non-woven ~~material~~ mineral fibres;
 - applying a binder solution to the collection of loose matter by spraying the binder solution on to the mineral fibres between formation of the fibres and collection of the fibres to form a batt, the binder solution being a substantially formaldehyde free binder solution having a pH of greater than 6 comprising: a carbohydrate, an acid precursor derivable from an inorganic salt which makes up at least 5% by dry weight of the uncured binder solution, a source of nitrogen and water, and in which the acid precursor comprises one or more inorganic ammonium salts; and
 - Curing the binder to form a thermoset binder, in which the curing of the binder occurs in a curing oven using forced hot air circulation ;
- and in which the quantity of binder in the finished mineral wool insulation is greater than 1 % and less than 20% measured by dry weight of the finished mineral wool insulation product.

- ~~2~~ A method in accordance with ~~claim 1~~, in which the curing of the binder occurs in a curing oven using forced hot air circulation.
- ~~32~~ A method in accordance with ~~any preceding claim~~claim 1, in which the collection of loose matter comprises materials selected from: ~~fibres, fibrous materials, mineral fibres, glass fibres and stone wool fibres, cellulosic fibres, wood fibres, wood shavings, wood particles, sawdust and particles.~~
- ~~4~~ A method in accordance with ~~any of preceding claim~~, in which the product is a mineral fibre insulation product.
- ~~53~~ A method in accordance with any preceding claim, in which the reaction of the binder upon curing is essentially a Maillard type reaction.
- ~~6~~ A method in accordance with any preceding claim, in which the binder solution is applied by spraying.
- ~~74~~ A method in accordance with any preceding claim, in which the binder solution comprises a carbohydrate selected from a monosaccharide, a monosaccharide in its aldose or ketose form, a sugar, a reducing sugar and a carbohydrate having a reducing aldehyde.
- ~~85~~ A method in accordance with any preceding claim, in which the acid precursor makes up less than 20% by dry weight of the uncured binder solution.
- ~~96~~ A method in accordance with any preceding claim, in which the binder solution comprises between 10% - 20% by dry weight of acid precursor to carbohydrate.
- ~~10~~ A method in accordance with any preceding claim, in which the acid precursor comprises one or more inorganic ammonium salts.
- ~~117~~ A method in accordance with any preceding claim, in which the acid precursor comprises one or more of an ammonium sulphate and an ammonium phosphate ~~and~~ an ammonium nitrate.
- ~~128~~ A method in accordance with any preceding claim, in which the acid precursor makes up at least 7% by dry weight of the uncured binder solution.

~~139~~ A method in accordance with any preceding claim, in which the acid precursor makes up at least 9% by dry weight of the uncured binder solution.

~~1410~~ A method in accordance with any preceding claim, in which the carbohydrate comprises a reducing sugar.

~~1511~~ A method in accordance with any preceding claim, in which the carbohydrate comprises dextrose.

~~1612~~ A method in accordance with any preceding claim, in which the binder is derived essentially from a carbohydrate and an inorganic ammonium salt in aqueous solution.

~~1713~~ A method in accordance with any preceding claim, in which the binder comprises additives selected from: silanes, mineral oils, coupling agents, silicones, surfactants, hydrophilic additives, hydrophobic additives, waxes and substances useful for controlling the pH.

~~1814~~ A method in accordance with any preceding claim, in which the binder solution comprises at least 10% solids and less than ~~70~~20% solids determined as bake out solids by weight after drying at 140 °C for 2 hours.

~~19~~ A method in accordance with any preceding claim, in which the acid precursor comprises a species selected from the group consisting of sulphates, phosphates and nitrates.

~~2015~~ A method in accordance with any preceding claim, in which the binder solution applied to the collection of loose matter has a viscosity at 20°C which is less than 1.5 Pa.s and greater than 2×10^{-4} Pa.s.