· providing a dry mortar/concrete composition, comprising plant raw materials, enabling the production of an insulating mortar/concrete and wet-sprayable by means of a screw pump, that provides a homogeneous deposit on the substrate, in a repeatable manner;

· providing a wet mortar/concrete composition, comprising the dry composition mentioned in the aims above and water, wet-sprayable by means of a screw pump, that meets at least one of the aims above;

· providing a binder for use in the dry composition mentioned in the aims above that meets at least one of the aims above;

· providing a kit comprising the binder and the plant filler for use in preparing the dry composition mentioned in the aims above that meets at least one of the aims above;

· providing a method for the production of an insulating mortar/concrete that meets at least one of the aims above.

Summary

These and other aims are achieved by the present disclosure, a first aspect of which relates to a dry mortar composition, wet-sprayable, in particular by means of a screw pump, enabling the production of an insulating mortar characterized in that:

(i). it comprises:

-A- at least one binder, itself comprising:

- -A1- at least one primary binder comprising lime and/or at least one alumina source and/or at least one calcium sulphate source, preferably at least one alumina source;
- -A2- at least one water-retaining agent;
- -A3- preferably at least one surfactant;

-B- at least one biosourced filler, preferably of plant origin;

the ratio B/A - volume of dry filler B in litres/mass of dry binder A in kg - being comprised between - in increasing order of preference - 4 and 9; 4 and 7.9; 4.6 and 7.5 L/kg;

(ii). it is intended to be mixed with a liquid, preferably water, with a water/A weight ratio comprised between 0.8 and 5, preferably between 1 and 4, and even more preferably between 1.5 and 3.5;

(iii). once mixed, it is pumpable in a screw pump as defined in a test **T1**, defined below.

It is to the inventors' credit that they have developed this dry composition, the precursor to a wet formulation capable of being pumped and sprayed, in particular with a screw pump of the type fitted to, for example, renderers' spraying machines, without losing the insulating property sought for these mortars.

In addition to the pumpability of the wet formulation, the composition according to the invention meets a "sprayability" specification, that is, for example, that said wet formulation, when it is sprayed and applied in a layer approximately 5 cm thick, to a vertical substrate made from concrete blocks, holds on this vertical substrate, without creep or flow, for the time necessary for the hardening and bonding thereof in hardened form to the vertical substrate, at an ambient temperature of comprised for example between 5°C and 35°C and at a relative humidity RH comprised between 20 and 90 per cent.

Preferably, and still with a view to improving the wet application and pumping thereof in a sufficient time for it to be compatible with the requirements of construction, this composition is characterized, once mixed with a liquid - preferably water - with a water/A weight ratio comprised between 0.8 and 5, by a setting time, measured using a method **M1**, comprised between 1 and 24 hours, preferably between 1 and 8 hours.

According to an example thereof, the present disclosure relates to a binder A comprising - in dry weight/weight % and in increasing order of preference-:

- -A1- primary binder: [5 – 95]; [10 – 85]; [15 – 75];
  of which:
  - lime: [10 – 95]; [20 – 70]; [30 – 60];
  - alumina source and/or calcium sulphate source: [0 – 90]; [5 – 30]; [7 – 15];
- -A2- water-retaining agent: [0.1 – 5]; [0.5 – 3]; [0.8 – 2];
- -A3- surfactant [0 – 2]; [0.01 – 1]; [0.05 – 0.5];
- -A4- secondary binder [0 – 85]; [5 – 50]; [7 – 15];
- -A5- lubricating mineral filler with a particle size d90 less than 100 µm: [0 – 40]; [0 – 30]; [0 – 20];
- -A6- mineral spacing filler with a particle size d90 greater than or equal to 100 µm: [0 – 40]; [0 – 35]; [0 – 30];
- -A7- water-repellent additive: [0 – 1.5]; [0 – 1]; [0 – 0.5];
- -A8- setting retarder additive: [0 –3]; [0 – 2]; [0 – 1];
- -A9- accelerating additive: [0 – 3]; [0 – 2]; [0 – 1];
  -A10- thickening additive: [0 – 2]; [0.1 – 1]; [0.2 – 0.8].

According to another example thereof, the invention relates to a kit comprising the binder (A) and one or more biosourced fillers (B), preferably of plant origin, of the dry composition according to the present disclosure.

According to another aspect thereof, the present disclosure relates to a wet mortar composition obtained, in particular from the composition according to the invention, pumpable in a screw pump with an air gap (E) between a rotor and a stator of between 4 and

30 mm, and preferably with a 2L6 or 2R6 jacket.

According to another aspect thereof, the present disclosure relates to a hardened mortar obtained from the wet composition according to the invention as set out above.

According to another aspect thereof, the present disclosure relates to an External Thermal Insulation (ETI) or Internal Thermal Insulation (ITI) system comprising hardened mortar according to the invention as set out above and applied in layer(s) over a total thickness comprised between 2 and 30 cm, preferably between 5 and 15 cm, and coated with a waterproof render of a minimum thickness of 10 mm, characterized in that the hardened mortar comprises lime and at least one alumina source and in that said system meets the test for ETI in accordance with EOTA standard ETAG 004.

Finally, another aspect of the present disclosure also relates to a method for applying an insulating mortar comprising the following steps:

1. preparing a mixture of liquid (preferably water) and the dry composition as set out above, i.e. comprising the binder (A) and the biosourced filler (B), in a water/binder (A) weight ratio that is given below, on an increasing scale of preference:
   - $[Water/A] \geq 0.8$; $[Water/A] \geq 1.0$; $[Water/A] \geq 1.5$;
   - $0.8 \leq [Water/A] \leq 5$; $1 \leq [Water/A] \leq 4$; $1.5 \leq [Water/A] \leq 3.5$;
2. preferably, pumping the mixture prepared in step 1 by means of a screw pump,

3.1. spraying the mixture prepared in step 1 onto a vertical or sloping substrate, or to fill a timber- or metal-framed structure on site, or to produce prefabricated walls;

or

3.2. spraying and spreading the mixture on a horizontal surface to form a screed;

or

3.3. pouring the mixture prepared in step 1 into formwork to produce a wall, to fill between two partitions, or into a mould to produce a prefabricated element, in particular blocks or pre-walls or panels.

Definitions

Throughout the present description, all singulars equally denote the singular or the plural.

The definitions given below by way of example can be used to interpret the present description:

- *"mortar"* or "concrete" denotes either a dry or wet or hardened mixture of one or more organic and/or mineral binders, fillers of mineral and/or plant origin and optionally fillers and/or admixtures and/or additives;
- "*insulating"* mortar: denotes a class T "thermally insulating rendering mortar" in accordance with EN 998-1 or a concrete in the form of a coat the thermal conductivity λ of which, measured after *complete drying* according to the so-called hot plate method of NF EN 12664, is less than or equal to - in W/m.K and in increasing order of preference - 0.2; 0.15; 0.12; 0.1; 0.08; 0.07;

CLAIMS

1 - Dry mortar composition, wet-sprayable in particular by means of a screw pump, enabling the production of an insulating mortar characterized in that:

(i). it comprises:

-A- at least one binder, itself comprising:

- -A1- at least one primary binder comprising lime and/or at least one alumina source and/or at least one calcium sulphate source, preferably at least one alumina source;
- -A2- at least one water-retaining agent;
- -A3- preferably at least one surfactant;

-B- at least one biosourced filler, preferably of plant origin;

the B/A ratio - the volume of dry filler -B- in litres/mass of dry binder -A- in kg - being comprised between - in increasing order of preference - 4 and 9; 4 and 7.9; 4.6 and 7.5 L/kg;

(ii).it is intended to be mixed with a liquid - preferably water - with a water/A weight ratio comprised between 0.8 and 5, preferably between 1 and 4, and even more preferably between 1.5 and 3.5;

(iii).once mixed, it is pumpable in a screw pump as defined in a test **T1**.

2 - Composition according to claim 1, characterized, after mixing with a liquid, preferably water, in a water/A weight ratio comprised between 0.8 and 5, by a setting time, measured using a method **M1**, comprised between 1 and 24 hours, preferably 1 and 8 hours.

3 - Composition according to claim 1 or 2, characterized in that the primary binder A1 comprises lime and at least one alumina source.

4 - Composition according to any one of the preceding claims, characterized in that the alumina source is selected from the following types: geopolymer cements, slags, quick-setting cements, calcium aluminate cements (CAC), calcium sulphoaluminate (CSA) cements or mixtures of these species, used alone or in a mixture.

5 - Composition according to at least one of the preceding claims, characterized in that the water-retaining agent -A2- has a water retention greater than or equal to - in increasing order of preference - 50, 60, 70, 80, 90%, according to the retention measuring method **M2**, this water-retaining agent preferably being selected from the polysaccharides, and even more preferably from the group comprising - or even better constituted by - cellulose or starch ethers and mixtures thereof; methyl celluloses, hydroxypropyl celluloses, hydroxyethyl

celluloses, methyl hydroxypropyl celluloses, methyl hydroxyethyl celluloses and mixtures thereof; modified or unmodified guar ethers and mixtures thereof; or a mixture of these different species.

6 - Composition according to at least one of the preceding claims, characterized in that it comprises at least one secondary binder -A4- different from the binder -A1- and selected from Portland cements, quick-setting cements, slags, geopolymer cements, natural pozzolans, sodium silicates, potassium silicates, lithium silicates, organic binders or mixtures thereof.

7 - Composition according to at least one of the preceding claims, characterized in that the biosourced filler -B-, preferably of plant origin, is essentially composed of cellulose, hemicellulose and/or lignin, said filler preferably comprising

- at least one component, fibres, fibrils, dust, powder, chips -
- said component originating
  - · from at least part of at least one plant raw material,
  - · in at least one particulate form,
- this plant raw material preferably being selected from the group comprising, or even better constituted by - hemp, flax, cereal straw, oat, rice, canola seed, maize, sorghum, miscanthus, rice, sugar cane, sunflower, kenaf, coconut, olive stones, bamboo, wood or mixtures thereof.

8 - Wet composition obtained from the composition according to at least one of claims 1 to 7, characterized in that it is pumpable in a machine fitted with a screw pump with an air gap (E) between a rotor (20) and a stator (18) of between 4 and 30 mm.

9- Hardened mortar obtained from the wet composition according to claim 8, characterized by a thermal conductivity λ less than or equal to - in W/m.K and in increasing order of preference - 0.15; 0.12; 0.1; 0,08; 0.07.

10 - External Thermal Insulation (ETI) or Internal Thermal Insulation (ITI) system comprising hardened mortar according to claim 9 and applied in layer(s) over a total thickness comprised between 2 and 30 cm, preferably between 5 and 15 cm, and coated with a waterproof render of a minimum thickness of 10 mm, characterized in that the hardened mortar comprises lime and at least one alumina source and in that said system passes the test for ETI in accordance with EOTA standard ETAG 004.

11 - Method for applying an insulating mortar comprising the following steps:

1. Preparing a mixture of liquid - preferably water - and the dry composition according to at least one of claims 1 to 7, that is, comprising the binder -A- and the filler of plant origin -B-, in the water/binder -A- weight ratio given below, on an increasing scale of preference:

- [Water/A] ≥ 0.8; [Water/A] ≥ 1.0; [Water/A] ≥ 1.5;
- 0.8 ≤ [Water/A] ≤ 5; 1 ≤ [Water/A] ≤ 4; 1, 5, 8 ≤ [Water/A] ≤ 3,5 ;

2. Preferably, pumping the mixture prepared in step 1 by means of a screw pump,

3.1 Spraying the mixture prepared in step 1

→ onto a vertical or inclined substrate,

→ to fill a timber- or metal-framed structure on site,

→ or to produce prefabricated walls;

or

3.2. Spraying and spreading the mixture on a horizontal surface to form a screed;

or

3.3. Pouring the mixture prepared in step 1 into formwork to produce a wall, to fill between two partitions, or into a mould to produce a prefabricated element, in particular blocks, pre-walls or panels.