injecting a grout. However, this process is specifically designed for a cement slurry and therefore cannot be used for a geopolymer grout.

[0012] The grout proposed by the invention therefore aims to solve the problems encountered for known grouts that set, whether this involves cement slurry or geopolymer grout. Thus, the grout disclosed by the present invention aims notably to solve the problems that lead both to the presence of water in the cement slurry and the lack of fluidity of existing geopolymer grouts.

Summary

[0013] In an aspect, the present disclosure proposes a geopolymer grout for protecting prestressing reinforcements, the geopolymer grout comprising metakaolin, fly ash and an activator mixture, the activator mixture comprising sodium hydroxide and sodium silicate, wherein the Na_2O:SiO_2 molar ratio of the sodium silicate is between 0.40 and 0.70, and wherein the metakaolin BET specific surface area is greater than or equal to 25 m2/g. In particular, the Na_2O:SiO_2 molar ratio of the sodium silicate is between 0.51 and 0.60.

[0014] In the geopolymer grout, the sodium silicate may moreover exhibit a mass content of water of between 52.1% and 72.1%, and the activator mixture may exhibit a mass content of water less than 65%.

[0015] In the geopolymer grout, the activator mixture may moreover exhibit a mass content of water of between 40% and 65%. In particular, the mass content of water is between 56% and 63%.

[0016] In the geopolymer grout, the metakaolin:fly ash:alkaline silicate solution:sodium hydroxide mass ratio may be 1:1:2-3:0.15-0.35.

[0017] In the geopolymer grout, the metakaolin:fly ash:alkaline silicate solution:sodium hydroxide mass ratio may moreover be 1:1:2.4-2.6:0.19-0.23.

[0018] The geopolymer grout may moreover have a pH of between 13 and 14.

[0019] The geopolymer grout may moreover exhibit reaction-aqueous-solution bleeding less than 0.5% of the total mass of the grout.

[0020] In the geopolymer grout, the BET specific surface area (Brunauer-Emmett-Teller theory) of the metakaolin alone or of a mixture comprising the metakaolin and

the fly ash may be greater than or equal to 25 m^2/g and preferably greater than or equal to 30 m^2/g.

[0021] In an aspect, the present disclosure also proposes a process for manufacturing a geopolymer grout, the geopolymer grout comprising metakaolin, fly ash and an activator mixture, the activator mixture comprising sodium hydroxide and sodium silicate, the $Na_2O:SiO_2$ molar ratio of the sodium silicate being between 0.40 and 0.70, and the metakaolin BET specific surface area is greater than or equal to 25 m2/g, wherein the manufacturing process comprises an activation step in which the metakaolin and the fly ash are activated by the activator mixture in order to obtain polymerization of the aggregate.

[0022] The manufacturing process may moreover comprise a prior step of homogenizing the metakaolin and the fly ash.

[0023] The manufacturing process may moreover comprise a kneading step in which the activator mixture is kneaded with the metakaolin and the fly ash.

[0024] In one example of the manufacturing process, water is added at the start of the kneading step, the amount of water added being between 1% and 4% of the weight of the geopolymer grout. The water added is useful only for improving the fluidity of the grout. This is because the water is not necessary for the polymerization step, thereby minimizing its use. In relation to the amounts of metakaolin, fly ash and activator mixture that are required to manufacture the grout, water thus represents a marginal amount, thus avoiding the risks associated with quality and stability when the grout is setting.

[0025] In one example of the manufacturing process, in a prior milling step, the metakaolin alone or a mixture comprising the metakaolin and the fly ash is milled in order to obtain a BET specific surface area greater than or equal to 25 m^2/g and preferably greater than or equal to 30 m^2/g.

[0026] In an aspect, the present disclosure also proposes a process for installing a structural cable, comprising the following steps:

- fitting a duct containing at least one reinforcement,
- tensioning the reinforcement,
- injecting a geopolymer grout into the duct, and

wherein the geopolymer grout comprises metakaolin, fly ash and an activator

mixture, the activator mixture comprising sodium hydroxide and sodium silicate, the $Na_2O:SiO_2$ molar ratio of the sodium silicate being between 0.40 and 0.70, and wherein the metakaolin BET specific surface area is greater than or equal to 25 m2/g.

[0027] The installation process may moreover comprise, before injecting the geopolymer grout into the duct, a step of kneading the geopolymer grout for 2 to 5 minutes with an energy of approximately 9 kilojoules per liter, thus obtaining an equivalent fluidity through a Marsh cone with a 10 mm diameter nozzle of between 25 seconds and 35 seconds.

[0028] The installation process may moreover comprise, during the injection of the geopolymer grout into the duct, the use of a hose, the hose having an inside diameter greater than 25 mm and a length limited to 100 m.

[0029] In one example of the installation process, the grout is pumped during the injection, the pumping flow rate of the grout being between 0.5 m^3/h and 1.5 m^3/h.

[0030] It should be noted that neither the process for manufacturing the geopolymer grout nor the installation process requires a step of heating the components of the geopolymer grout or the grout itself. These processes can be implemented at ambient temperature, by contrast for example with the injection of petroleum wax, which requires the wax to be heated above its melting point. As a result, the phenomenon of retraction of the geopolymer wax after being injected is insignificant or even nonexistent.

Brief description of the drawings

[0031] Other features, details and advantages of the invention will become apparent from reading the description set out below and from analyzing the appended drawings, in which:

Figure 1

[0032] [Fig. 1] is a basic diagram illustrating an example of a prestressing cable.

Description of embodiments

[0033] The geopolymer grout according to the invention is a mineral material in stable liquid form, the formulation of which does not comprise any or comprises only