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# ALIEN PROPERTY CUSTODIAN

## CEMENT AND ASBESTOS BASE MIXTURES USED AS PLASTER WORK COVERING LAYERS OR WALLS

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The invention described below concerns mixtures with a base of cement, particularly molten cement, and asbestos, which are employed as coverings on all metal, wood or masonry surfaces for protecting them against corrosion and destruction.

The new mixture is characterized by the fact that the cement employed is a molten cement and that the diluting liquid is a solution of an alcaline silicate in water.

Under these conditions, the setting of the molten cement takes place only slowly owing to the very low amount of calcium salts set free by said molten cement undergoing hydration, these salts forming with the alcaline silicate an insoluble calcium silicate; this slow setting permits the preparing of the mixture in advance and leaves all the time desirable for applying the mixture in a sufficiently liquid state. On the contrary, all the other types of cements diluted with an alcaline silicate in aqueous solution would set almost instantaneously. The molten cement imparts to the mixture remarkable hardness and compactness; the alcaline silicate increases its compactness and cohesion. This plastering has a remarkable adherence, even on metal.

It is thus possible to prepare, for all sorts of applications, more or less thick plasterings or covering layers, or walls with exceptional adhering, hardness, solidity properties and offering a high degree of protection against corrosion and destruction, whilst constituting a good insulation against heat and cold.

By way of example, there have been given below a certain number of these mixtures.

*Example 1*

For obtaining 1 kg of plastering, one will mix:

| | Gr. |
|---|---|
| Molten aluminous cement | 180 |
| Very fine asbestos fibres | 80 |
| Chalk in powder | 110 |
| Fontainebleau sand (silicous, very fine) | 270 |
| The whole diluted with an aqueous solution of sodium and/or potassium silicate at 30–40° Bé | 360 |
| | 1.000 |

By stirring, there will be obtained a clear paste which, after cleaning the surface to be protected, is applied either with the brush or with the spray tube, or, if it is to be applied upon the inner surface of pipes, by centrifugation, the pipe containing the liquid plaster being rotated rapidly about its axis.

The aqueous solution of alcaline silicate gradually yields the water necessary for the slow setting of the molten cement and, by slowly reacting upon the chalk ($CaCO_3$) and upon the small amount of calcium salts set free by the molten cement, it gives an insoluble calcium silicate.

The silicous sand serves as a filler and by reason of its hardness it prevents the wear of the plastering surface.

After is has been applied, the plastering is left to dry during 2 to 3 days, whereupon the plastered piece is placed in a drying stove traversed by the burnt gases from a coke furnace, brought down to a temperature of 150 to 300° C., or, if the piece cannot be placed in a stove, a fire will be lighted next to it in order to subject the plastering to the warm gases coming from the fire. The warm carbon dioxide will accelerate the fixing of the alcaline silicate in presence of the calcium carbonate under formation of insoluble calcium silicate.

When taken out of the stove, the plastered piece may be immersed, while still warm, into bitumen or into another hydrocarbon used for covering; this bitumen, rendered very fluid by the heat, will penetrate into the very fine pores of the plastering and will also deposit, as a thin continuous film, upon the surface of the plastering, thereby producing an absolutely water- and gas-tight clogging up of the plastering.

This treatment is particularly suitable for pipes which are to be used for conveying very pure water, since it is known that such waters will at a length dissolve substantially any substances except however bitumen and the other hydrocarbons suitable for covering.

*Example 2*

The plastering of Example 1 may be modified in a manner to avoid the necessity of heating. For this, it is merely necessary to add a small amount of hydraulic lime or air hardening lime in a manner to ensure that all the alcaline silicate is transformed into insoluble calcium silicate by suitably activating this transformation.

The thus modified formula may for instance be as follows:

| | Gr. |
|---|---|
| Molten aluminous cement | 170 |
| Very fine asbestos fibres | 70 |
| Chalk in powder | 100 |
| Hydraulic or air hardening lime | 40 |
| Fontainebleau sand | 260 |
| Sodium and/or potassium silicate at 30–40° Bé | 360 |
| | 1.000 |

*Example 3*

The two above plasterings, when they are not clogged up by a bitumen film, present the drawback of necessitating a certain time for becoming insoluble. This insolubility is accelerated and may in fact be reached very rapidly by adding to the alkaline silicate either insoluble casein, or

powdered sodium fluosilicate, in the proportion of 1 to 3% of insoluble casein or 2 to 10% of sodium fluosilicate according to the desired rate of becoming insoluble. The chalk may then be omitted.

The thus modified formula may for instance be the following:

| | Gr. |
|---|---|
| Molten aluminous cement | 300 |
| Very fine asbestos fibres | 120 |
| Fontainebleau sand | 220 |
| Potassium silicate at 30–40° Bé. added with 1–3% insoluble casein or 2–10% sodium fluosilicate in powder | 360 |
| | 1.000 |

If it is desired to increase the resistance to wear of the above plasterings, the silicous sand may be replaced by a filler of a harder powdery substance, as for instance emery or silicon carbide.

This filler may be added until it forms a proportion of 80% by weight of the whole. There is thus obtained a less liquid plastering capable of forming a thicker covering layer, which is very compact and has a high resistance to wear, the main applications of which being the following:

Inner plastering of pipes used for conveying muddy or sandy waters, covering of metal masts or bridges exposed to winds carrying fine sand.

*Example 4*

If, on the contrary, it is desired to obtain a less compact covering layer, in order to permit applying it in a still greater thickness, the sand will be replaced by porous substances such as cork, pumice stone, vermiculite (mica) scraps, which will be projected upon the surface of a first semi-liquid layer or added during the stirring.

The thus modified formula may for instance be as follows:

| | Gr. |
|---|---|
| Molten aluminous cement | 150 |
| Asbestos fibres | 70 |
| Chalk in powder | 100 |
| Alkaline silicate at 30–40° Bé | 400 |
| Cork, pumice scraps | 280 |
| | 1.000 |

According as to whether the pores of such a plastering will be sufficiently fine or coarse, they will be filled, after drying of the plastering, either with molten or dissolved bitumen, or with a varnish with a base of natural rubber resin, or of synthetic resin, or cellulose, gum, or with one of the above substances to which there has been mixed a filler such as cement containing asbestos powder.

Such a clogging up will yield a continuous surface film, anchored in the mass by the filling of all the pores; a layer of this sort will present no risks of cracking and will form a surface non-penetrable to liquids and gases. This covering will be used with advantage for the pipes and tanks conveying or storing extremely pure or corroding waters, acid liquids or the like.

The plastering according to the formula of Example 4, if prepared with a sufficiently low consistence, may be projected in a more or less thick layer upon walls for constituting an insulating covering against heat or noise, or a protection against fire. In this case, it will receive no clogging up treatment.

If the plastering is projected under sufficient thickness on two plates of thin sheet metal or wood, the two plates being thereafter strongly applied against one another by their plastered sides, there will be obtained sufficiently thick and solid panels for constituting walls, for instance the inner walls of ships, which are non-combustible.

More generally, the plasterings or covering layers according to the invention may be adapted to the great variety of uses, particularly for articles such as pipes, tanks, boilers (inside and outside), fire boxes, condensers; they will protect the metal against all causes of corrosion or attack, for instance from any kinds of water, salt fogs, hot gases and fumes, acids produced in the combustion of sulphurous fuel oils or coal, corroding action of crude oils, benzines, fuel oils, even if sulphurous, alcohols, creosotes, whether cold or warm, or the like.

The addition of potassium silicate to the sodium silicate gives a better viscosity suitable for the spreading of the plasterings or coverings.

The plasterings of this sort are practically indestructible owing to their adherence, their hardness and their compactness.

Applied with one clogging layer to concrete constructions, pipes or tanks, they will impart to these an absolute and everlasting impermeability to gases and water.

They will further effectively protect masonry and wood, serve for constituting incombustible panels and prevent the evaporation of benzines in the storage tanks during summer months, while maintaining the viscosity of the heavy oils during the cold months by greatly reducing the cooling down of the oils.

The numerical indications and the auxiliary substances indicated above do not, of course, present any limitative character and may be varied at will without thereby departing from the frame of the invention.

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