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PLASTIC CAULKING AND POINTING MATERIALS

Tests are now being conducted at the National Bureau of Standards to determine the behavior of representative plastic caulking compounds. It is hoped that this investigation will afford information as to their performance and provide a basis for a specification which will assure more reliable compositions. As no definite conclusions have as yet been reached, this paper will deal with the more apparent characteristics of the materials.

Nature and Uses: Plastic caulking compounds are designed mainly for the weatherproof sealing of spaces between door or window frames and masonry, and vertical and horizontal joints of copings and cornices.

They should possess three outstanding qualities: adhesiveness, plasticity and permanence; and lesser ones such as durability of color in harmony with the masonry, a non-staining oil content, and ease of application.

Their compositions are variable, most of the materials consisting of non-drying or treated drying oils reduced to a plastic condition with pulverized silica, whiting, barium sulphate, titanium oxide, etc., with additions of asbestos fiber and some coloring matter. Most materials contain small amounts of drying oil and a volatile solvent, which cause a film or "skin" to be formed on the surface when exposed to the air. This is intended to serve as a protection against further evaporation or oxidation of the oils and is also desirable when the joint is to be covered with paint.

Plastic caulking materials are of two consistencies, the usual one being plastic enough to be forced through a 1/4 inch or 3/8 inch

tube and referred to as the "gun grade", and the other of stiffer consistency like that of glazing putty, and known as the "knife grade", to be applied with a putty knife or other hand tool.

Service Requirements: The purpose of these materials is to maintain airtight and watertight joints. The materials must remain appreciably elastic and have good bonding properties in order to function properly since the widths of joints are subject to change by settlement of the building, expansion and contraction, and other causes. Most masonry materials are porous; hence, capillary attraction tends to draw the oil from the plastic mass and if appreciable amounts of oil are so removed, the composition loses its plasticity and shrinks sufficiently to form cracks.

Elastic caulking materials must be resistant to such weathering agents as heat, cold, moisture, and sunlight. Such materials are less plastic in cold weather at a time when they are subject to more tensile strains caused by contraction of the masonry. Fillers of a calcareous nature will, if not protected by the "skin", be attacked by the action of the acid present in rainwater. Sunlight appears to have some injurious effect on caulking at the exposed surface, and sometimes produces appreciable changes of color.

Application Methods: When caulking around door or window frames, it is advisable to fill the joint to within an inch of the surface with oakum or rock wool and the remaining portion with caulking material, but before doing so, the joints should be clean and free from dust and dirt. Joints in porous stone masonry should be treated with a waterproofing material of the stearate type which is quite satisfactory for this purpose and does not discolor the masonry, if some of the treatment spreads over the exposed face. This treatment tends to prevent the excessive absorption of oils which is probably the main cause of the disintegration of the material. The masonry joint to which this material is applied should be dry, as considerable moisture adversely affects adhesion.

The caulking should be forced into the joint to a depth of at least 1/2 inch and preferably 1 inch. Application with a caulking gun frequently does not obtain such depths of filling, particularly for narrow joints, unless the nozzle is small enough to completely enter the void. Application with a putty knife is slow and expensive, but satisfactory results are more often obtained by this method.

When applied around door or window frames, it is sometimes desirable to paint the caulked joint. This gives a better appearance and serves to protect the caulking material from the weather. A wood bead or staff moulding placed around the frames and over the joints after caulking is considered good practice.

Stains from Plastic Caulking: Stone masonry is usually more apt to be stained by oils from caulking materials than brick or concrete; the denser stones, such as granite and marble, being more susceptible than the porous varieties. The removal of oil from the plastic usually causes excessive shrinkage, cracking, and ultimate failures resulting in an objectionable appearance. Oil stains on the more porous types of masonry usually disappear within a few weeks, but in the denser materials, such as marble and granite, they persist indefinitely.

Slumping of Caulking Materials: Most of the caulking materials used are of the "gun grade", which is quite plastic. In cold weather, this grade may become so stiff that it would be difficult to force it through the nozzle of a gun. Manufacturers, in an effort to supply a grade that will work well in cold weather, sometimes make it so plastic that it will flow or slump somewhat in vertical joints when used in hot weather. Some producers supply two consistencies, one for winter use and one for summer use. However, if shelf stocks are carried over from one season to another, the winter grade may be sold for summer use or vice versa, which may lead to difficulties. Identification of the proper consistency for a particular season should be made before purchase.

Specifications and Tests: Caulking materials are usually specified by brand name or purchased without quality requirements. Specifying this product by composition is not feasible because of difficulties encountered in identifying its ingredients and further it is fairly well proven that widely differing compositions give equally satisfactory results.

A rigorous specification for this material that requires an excellent product without reference to composition is one used by the Supervising Engineer of the Treasury Department:

"Pointing compound shall be light in color, elastic and waterproof. It shall not stain limestone, marble or terra cotta nor corrode copper. It shall not be affected by long exposure to extremes of outside temperatures. It shall gradually form a thin, tough "skin" on exposed surfaces, but underneath the surface, it shall remain plastic indefinitely. It shall be mixed to the proper consistency at the factory and shall be used as delivered."

A test procedure has been devised and is now being used at the National Bureau of Standards on all samples of caulking compounds submitted by Government departments. This concerns physical tests entirely and, although it does not determine durability, it does reject materials of poor early performance. The procedure has been outlined in detail in a paper published in the Proceedings of the American Society for Testing Materials, vol. 35, part II, p. 581 (1935).