HARDENING AND DUST-PROOFING CONCRETE FLOORS

1. GENERAL

1.01 This section covers the application of a chemical hardener to finished concrete floors to minimize or eliminate excessive dusting under traffic. The hardener may also be used as a priming treatment preliminary to painting.

1.02 The recommended floor hardener is a water solution of magnesium fluosilicate. This material overcomes dusting by chemical reaction with the free lime in the concrete thereby sealing the voids and producing a hard dense surface. The chemical reaction takes place quickly and the floor is ready for use as soon as the final application is dry. The resulting dense surface reduces paint absorption and the treatment also neutralizes any free alkali in the concrete that would be detrimental to paint. Hardeners may be used on exterior concrete and for terrazzo floors that are porous and show signs of disintegration.

1.03 Magnesium fluosilicate is a white crystalline powder which is readily soluble in cold water. While the solution is harmless to the normal skin it is advisable to avoid prolonged contact. As a hardening treatment it is preferable to oil, wax and varnish sealers. Sodium silicate (water glass) should not be used as a hardener since it leaves an alkaline residue which is harmful to paint and linoleum.

1.04 Magnesium fluosilicate hardening treatment slightly lightens the appearance of the floor. The lightening effect may produce a faded appearance on integrally colored concrete but the effect will gradually wear away. Treated floors develop a sheen under foot traffic.

1.05 Magnesium fluosilicate, also known as magnesium silicofluoride, may be purchased under this name in powder form from chemical supply firms. It is also available under various brand names in both liquid and powder forms. One of these contains a wetting agent which is intended to improve penetration. The latter is considerably more expensive and of questionable advantage under usual conditions.

2. EQUIPMENT AND MATERIALS

2.01 For preparation of floors:

Pails and mop wringers of small mopping units
Mop
Desk scrub brush or floor scrubbing machine
Floor squeegee
Pyrophosphate cleaner or garage floor cleaner for heavily soiled floors
Sol Speedi Dri, if needed
Hose, for garages and basements if applicable.

2.02 For application of hardener:

Pail and mop wringer or small mopping unit
Vessel for mixing the hardener such as a clean garbage can or drum
Mops
Palmyra floor brushes
Magnesium fluosilicate at the rate of approximately 2 lbs. per 100 sq. ft. for 2 coats.

3. PREPARATION OF THE FLOOR

3.01 The floor to be treated must be thoroughly clean before application of the hardener. New floors should be thoroughly cured and dry (preferably ten days or longer) before applying hardeners.

3.02 Mortar droppings, plaster and paint, are removed with an ice scraper, putty knife or floor machine equipped with steel wire brushes. Smooth new floors are hosed or swept or if necessary mopped with a pyrophosphate solution. Floors which have been in use for some time are mopped, or scrubbed with pyrophosphate solution. Garage floors soiled with oil deposits are scrubbed with garage floor cleaner. Oil absorbent powder (Sol Speedi Dri) sprinkled over the oil deposits some hours before scrubbing aids in absorbing the oil and expedites scrubbing in those areas. Thorough rinsing should follow mopping or scrubbing. The floor should be thoroughly dry before application of the hardener solution. This usually requires 24 hours or longer following mopping or scrubbing. B.S.P. H51.107 Floor Mopping and B.S.P. H51.108 Floor Scrubbing provides details regarding these procedures.

4. PREPARATION OF THE HARDENER

4.01 Powdered magnesium fluosilicate is dissolved in water in the following proportions.

(a) For initial application
One-half pound magnesium fluosilicate per gallon of water. One gallon will treat about 60 to 80 sq. ft.

(b) For second application
Two pounds magnesium fluosilicate per gallon of water. One gallon will treat about 120 to 140 sq. ft.

The magnesium fluosilicate is added to cold water in a pail, drum or mop tank and stirred with a paddle or stick until thoroughly dissolved, which requires only one or two minutes. The solution is then ready for use. The magnesium fluosilicate solution is slightly acid and consequently should not be stored for periods of more than a few days in metal containers.

4.02 If one of the prepared brands is used it is mixed with water according to the directions of the manufacturer.

5. APPLICATION OF THE HARDENER

5.01 The first application of magnesium fluosilicate solution consists of the half pound per gallon concentration and is applied by flushing a pail full at a time on the clean dry floor starting near one end of the room. The solution is immediately spread and respread over the area as it soaks in using the floor brush. This procedure is continued progressively until the entire floor has been treated. The solution is usually absorbed into the floor in irregular patches because of the varying porosity of concrete floors. Care must be taken so that the solution does not splash on equipment or trim as it may cause damage and is very difficult to remove when dry.

5.02 Where puddles form, they are respread from time to time for a period of one-half to one hour when any puddles still remaining are mopped up and the floor permitted to dry. It is preferable to permit the first application to dry for 24 hours especially in damp weather but in dry weather, if time for completion of the job is limited, the second application may be applied in about eight hours.

5.03 The second application consisting of the two pounds per gallon solution is applied as above. The coverage per gallon of solution in this application is about twice that of the first application. Again the solution is spread with the floor brush and when puddles form they are respread for a period of one-half to one hour. After final respreading any remaining puddles are removed with a mop and the floor permitted to dry. The floor can be used as soon as it appears to be thoroughly dry, which is usually a matter of two or three hours.

5.04 If the floor continues to show appreciable dust on sweeping, a third application may be made using a concentration of 2 lbs. of magnesium fluosilicate to the gallon but the need for a third treatment is an exception.

6. CARE OF TOOLS

6.01 Wash the pails, wringers, mops and brushes promptly to remove the magnesium fluosilicate solution. Avoid leaving any solution of magnesium fluosilicate in metal pails as it tends to rust the pails and the solution may deteriorate.