

PLASTERING – PAINT – VARNISHING – DPC

Building finishes – plastering – methods and types – special external finished for plastered surfaces – defects in plastering – pointing – white washing – colour washing – painting, varnishing and distempering. Proofing for dampness and fire – anti-termite protection

Building finishes

Floor finish

Wall finish

Ceiling finish

PLASTERING

Process of covering rough walls and uneven surfaces in the construction of houses and other structures with a plastic material called plaster or mortar.

OBJECTIVE OF PLASTERING

- To provide an even, smooth, regular, clean and durable finished surface
- To improve the appearance
- To protect the surfaces from the effects of atmospheric agencies
- To conceal the defective workmanship
- To cover up the use of inferior quality and porous materials and the joints formed in masonry work
- To provide a satisfactory base for white washing, colour washing, painting or distempering.
- Internal plastering, the object is to protect the surfaces against dust and vermin nuisance.

TYPES OF PLASTERS

- **Lime plaster** - an intimate mixture of equal proportion of lime and sand ground in a mortar mill to form a paste of required consistency.

- **Cement plaster** - an intimate mixture of Portland cement with sand with required amount of water to make a plastic mass.
- **Mud plaster** - prepared with equal volumes of clay or brick earth and of chopped straw, hay, loose soil or cow dung and hemp.
- **Waterproof plaster** – consists of one part cement, two parts of sand and pulverized alum at the rate of 12 kg/m³ of sand. In order to make this to be waterproof, soap water containing about 75 gm soap/litre of water is added.

Requirements of a Good Plaster

- Should provide a smooth, non-absorbent and washable surface.
- Should not shrink while drying which results in cracking of the surface.
- Should adhere firmly to the surface and resist the effects of atmospheric agencies.
- Should offer good insulation against sound and high resistance against fire.
- Should provide the surface a decorative appearance and should be durable.

METHODS OF PLASTERING

Method of Plastering

1. Internal plastering on surfaces of brick and concrete.
2. External wall plastering.
3. Soffit plastering / Soffit finishing with cement based easy plaster material and wall putty.
4. Improving joint of brick walls & structural concrete joints.

Internal Plastering on surfaces of Brick and Concrete

Surface where plastering is to be done will be cleaned. Level pegs on walls will be fixed with reference to the off lines to brick walls set out in floors. (Using centre plumb bob and nylon thread).

All the brick walls will be wetted before pasting mortar on walls.

First coat mortar filling (1:4 Cement and Sand) up to 15 mm will be applied on surfaces where required mortar thickness exceeds 25mm.

Walls and columns will be plastered 1:4 Cement and Sand to achieve semi rough finished surface.

Vertical joint of structural columns / walls & brick walls will be treated by fixing 200mm width chicken mesh with wire nails / concrete nails by centering the mesh to the vertical wall joint.

All the embedded service lines and provisions (Conduits, Boxes and etc.) will be completed on brick walls and check with the drawings.

Joints between walls and beams will be formed up to a maximum of 20mm and will be sealed using 30 minutes fire rated flexible filler. (Material descriptions will be submitted for the approval of the Engineer)

Internal plastering on surfaces of concrete columns, beams & walls which are aligned with surfaces of brick walls will be plastered and other concrete surfaces will be finished with cement base easy plaster. (Material descriptions will be submitted for the approval of the Engineer).

External Wall Plastering

Alignment and fixing level pegs on external wall surfaces will be done using the surveying instrument / centre plumb bobs.

Projections on the wall surfaces will be chipped off and cleaned after completing the level pegs on walls.

First coat mortar filling (1:4 Cement and Sand) up to 15 mm will be applied on surfaces where required mortar thickness exceed 25mm.

Cement paste on concrete surfaces will be applied to improve the bonding of plaster to the concrete surfaces.

Maximum width of 20mm horizontal grooves between walls and beams will be formed by cutting using grinders with diamond wheels after plastering the wall surface. This groove will be filled with approved weather sealant.

External wall plaster will be finished with rough surface.

1:10 slope at the external side of the window sill will be formed while plastering the window reveals.

Soffit Plastering / Soffit Finishing with Cement Based Easy Plaster

The slab soffits and beams' sides and soffits which are to be smooth surfaced painted finished will be smoothen with easy plaster (Material literature will be submitted separately) and places where concrete surfaces are uneven, will be roughen & leveled with cement and sand mortar plaster before applying easy plaster to make surface smooth.

Improving Joints of Brick Wall & Structural Concrete

- 200mm wide Chicken Mesh will be fixed at the joint.
- Concrete surfaces will be washed and cleaned.
- Concrete surface which are to be plastered will be roughen or put spot cement slurry.

Quality Controlling & Quality Assurance

- Experienced supervisory staff will be employed for carrying out the work.
- Selected masons will be engaged for plastering work.
- Vertical and alignment of walls will be checked while plastering.
- Mixing of mortar will be done under the supervision of foremen.
- Sieved sand will be used for plaster.

Methods of plastering (plastering may be applied in)



One coat (Cheap constn.) jobs)

Two coats (Ordinary Works)

Three coats (Superior jobs)

Plastering in Two coats

Procedure for carrying out the plastering in cement in two coats is as follows:

1. The mortar joints are raked out to a depth of 20mm and the surface is cleaned and well watered.
2. If the surface to be plastered is very rough, a preliminary coat is applied.
3. The first coat of plaster is now applied with a thickness of 9mm to 10mm for brick masonry.
4. To maintain uniform thickness screeds are formed on the wall surface by fixing dots.
5. Fixing a dot is just placing small quantity of plaster making a square of 150mm x 150mm.
6. Another dot is placed vertically below this and a vertical strip of plaster connecting these two dots are provided.
7. This screed. Screeds are placed at a distance of 2m and plaster is applied between them.
8. The second coat is applied after about 6 hours and the thickness of second coat is about 3mm to 12mm. It is finished as per the requirements.
9. The completed work is allowed to set for 24 hours and it is well watered for at least one week.

Plastering in Three coats

Procedure for plastering in three coats is the same as the above except that the number of coats is three. It is done as detailed in table below:

Coat	Name of coat	thickness	Remarks
First coat	Rendering coat	9mm to 10mm	Left for a period of 3 to 4 days to harden.
Second coat	Floating coat	6mm to 9mm	The purpose is to prepare an even surface
Third coat	Setting or finishing coat	3mm	This is similar to the second coat of two coat plaster.

SPECIAL EXTERNAL FINISHED FOR PLASTERED SURFACES

Stucco Plastering

- Stucco is the name given to a decorative type of plaster which gives an excellent finish.
- Mixture of lime, white stone, gypsum and oxides for colouring.
- Used for interior as well as exterior surfaces
- Usually laid in three coats making the total thickness of plaster of about 25mm
- First coat is called the scratch coat
- Second a finer coat, also known as brown coat
- Third coat is called the white coat or finishing coat
- Each coat should be permitted to dry thoroughly before the next coat is applied.

Special types of finishing (external plastered surfaces)

1. Smooth cast
2. Rough cast
3. Pebble dash
4. Scraped finish
5. Textured finish

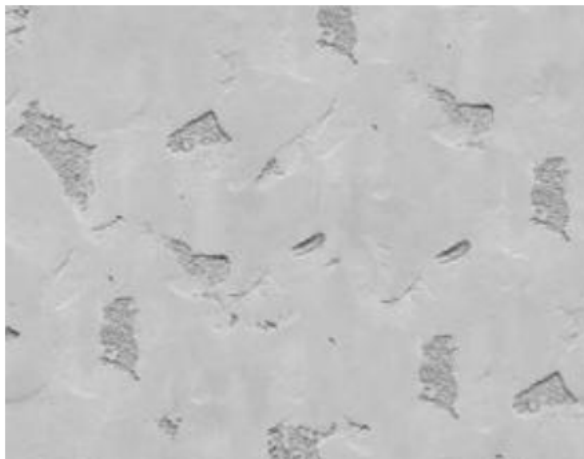


Fig. cat face texture



Fig. Dash finish



Fig. Lace finish



Fig. Sand or Float finish



Fig. Smooth finish



Fig. Fine worm finish



Fig. Stucco Textures

Santa Barbara Finish

Pebble dash

- Small pebbles or crushed stones of suitable size (usually varying from 10 to 20 mm) are thrown on to a freshly applied final coat of mortar and left exposed.
- The mortar of the final neat is usually made by mixing cement and coarse sand in the ratio of 1:3 and is laid in about 1mm thickness
- This finish possesses all the advantages of the rough cast finish and is recommended in similar condition.

Scrapped finish

- In this type of finish the final coat after being leveled and allowed to stiffen for a few hours, is scrapped with a steel straight edge, old saw blade or other such tool to remove the surface skin.
- In this case, the final coat is usually 6 to 12mm thick of which about 3mm is removed in the scrapping process.
- The scrapping is done after the setting has taken place.
- Scrapped finish is less liable to crack than plain finishes.

Textured finish

- In textured finish, ornamental patterns or textured surfaces are produced by working with various tools on the freshly applied final coat.
- This type of finish possesses all the advantages of the rough cast finish

Special Materials used in plastering

- **Plaster of Paris** –also known as calcium sulphate plaster and is obtained by heating gypsum
- **Keene's cement**- this is hardest and densest form of gypsum.
- **Barium plaster** – this is essentially made of barium sulphate
- **Acoustical plaster** – this is gypsum mixture, which is employed as a final coat to serve the purpose of a sound-repellent finish.

DEFECTS IN PLASTERING

The development of one or more local swellings on the finished plaster surface.



Fig. Blistering

The development of one or more fissures not assignable to structural cause.



Fig. Cracking

The development of a series of hair cracks on the finished plaster surface. Known as 'map crazing', when it forms a haphazard pattern over the wall surface affected.



Fig. Crazing

A deposit of soluble salts on the surface of the plaster or background.



Fig. Efflorescence

FLADING

The scaling away of patches of plaster surface due to lack or loss of adhesion with the previous coat.

The appearance on the surface of the plaster of the pattern of joints or similar breaks in the continuity of the surface characteristics of the background.



Fig. Grinning

The removal of substantial areas of plaster work from the background.



Fig. Peeling

POPPING OR BLOWING

The appearance on the surface of the plaster of conical hollows (pops or blows) in the backing and/or finishing coats.

Blistering of plastered surfaces: Small patches swell out beyond the plane and this is particularly seen inside the building

Crazing: development of fine hair cracks (cracks- formed – visible or invisible)

Efflorescence: Soluble salts are present in plaster materials as well as in building materials. When newly constructed wall dries out, soluble salts appear as a white crystalline substance.

Flaking: Formation of a very small loose mass on the plastered surface. And it is due to the failure of bond between coats of plaster.

Peeling: plaster from some portion of the surface comes off, a patch is formed. And it is due to failure of bond in coats of plaster.

Blow or Pop: A conical hole is formed on the surface (plaster may contain particles which expand on setting)

Rust stain: Seen on the plastered, especially when plaster is applied on metal lath.

Excessive dampness at certain points on the surface makes the portion soft. (The reasons are due to the presence of thinners in the finishing coat, presence of deliquescent salts, excessive suction of the under coat etc.,

Uneven surface is due to poor workmanship.

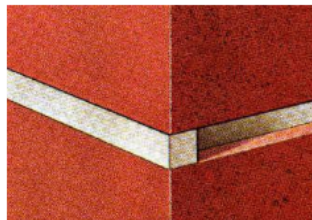
Remedies for minimizing the defects in plastering work:

- **Workmanship** – best in brickwork and plastering work.
- **Bond of brickwork** – should be proper.
- **Efflorescence** – removed by rubbing brushes on the surface.
- **Bricks of superior** class should be used.
- **Surface to be plastered** should be well watered so that it may not absorb water from the plaster.
- **Damp proof courses** should be provided at convenient places in the building.
- **Fresh plastered surfaces** should be protected from superfluous quantity of water and excessive heat.

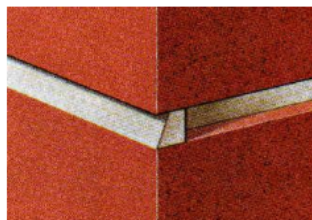
POINTING**Different Styles of Pointing Finish**

Fill joints flush with surface, then choose the type of finish of pointing:

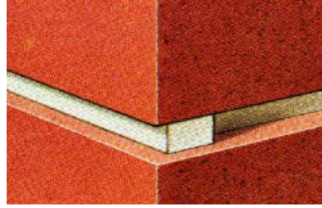
"Bucket handle pointing" can be done with metal pointing tool or with a short length of chopped off hosepipe run through the joint. Other types of pointing styles can be seen below.



Flush pointing Done by cutting off surplus and rubbing over with back of trowel



Weather struck pointing Done by using pointing trowel at an angle



Recessed pointing Done by raking out mortar with mortar rake

Pointing is the art of finishing the mortar joints of the walls or similar structure with either cement mortar or lime mortar in order to protect the joints from atmospheric agencies and also to improve the appearance of the structure.

Pointing is restored to:

- (i) Where a uniform and smooth surface is not required
- (ii) Where the exhibition of the natural beauty of the materials such as stone blocks, bricks, etc.,
- (iii) Where the materials used in construction can withstand effects of weather
- (iv) Where the workmanship is quite good

Procedure of pointing:

- ✓ Prior to pointing, all the mortar joints on the face are raked out by a special pointing tool to a depth of about $1\frac{3}{4}$ cm to provide an adequate key for the fresh mortar used for pointing.
- ✓ All the loose mortar and dust are then brushed out of joints and the wall surface is well washed, wetted with clean water and kept wet for a few hours.
- ✓ The joints after being prepared are filled with lime or cement mortar with a small trowel.
- ✓ The mortar is well pressed into the joints to ensure a solid contact with the internal old mortar joints.
- ✓ Excess mortar sticking to the sides is scraped away carefully.

The finished pointing is kept wet for about 4 days for lime pointing and 10 days for cement pointing.

- Lime pointing: it is done with lime mortar prepared with equal parts of lime and fine white sand, carefully ground in a mortar mill.
- Cement pointing: it is done with cement mortar prepared by mixing equal parts of cement and fine sand using it quickly before it starts setting.
- Surkhi pointing: in this case the mortar may consist of 1 part of lime and 2 part of surkhi.

Forms of pointing

- Struck joint pointing: the upper portion is inside the face of masonry by 12mm while the bottom portion of the pointing is flush with masonry.
- Tuck pointing: the joint, after having been raked, is filled with cement mortar. a groove 6mm wide and 3mm deep is formed along the centre of the joint while the previously applied cement mortar is soft. The groove is filled with lime putty which projects by 3mm. Lime putty is sometimes replaced by cement. The pointing gives a pleasing appearance.
- Recessed joint pointing: mortar is pressed behind the walls. It is used for high class masonry work.
- Flush pointing: it is suitable for brick as well as stone masonry. The raked portion of the joint is filled with mortar and surface made flush to the masonry for tooling.
- V-groove jointing: it derives its name for its shape. It is suitable for rubble and ashlar masonry work.
- Keyed joint pointing: after filling the joint with mortar a semi-circle is formed inside the pointing by some tool. The pointing gives an elegant appearance.
- Weathered joint pointing: as the name suggest, this type of joint gives adequate protection against weathering. However, it requires comparatively large quantity of water.

WHITE WASHING

1. Fresh lime is slaked at site of work and mixed thoroughly with sufficient quantity of water in a tub.
2. It is then screened through a clean cloth.
3. The clean gum dissolved in hot water is then added at the rate of 20 N per cum. Of lime.
4. The surface to be whitewashed should be cleaned before the work is started.
5. For whitewashing walls which are whitewashed before, the old loose whitewash is to be first removed and repairing to the plaster is carried out, if necessary.
6. The whitewash is applied with jute brush and the brush is so worked that a surface with uniform colour is obtained.
7. The three coats are generally applied; each after the previous coat has completely dried.
8. The lime is toxic for germs. It reflects light and thus it increases the brightness of the surface.
9. The whitewashing therefore is extensively used for interior wall surfaces and ceiling of houses.

COLORWASHING

1. This is prepared by adding the colouring pigment to the screened whitewash.
2. It should be seen that the colouring pigment is not affected by the presence of lime.
3. Ordinarily, the yellow earth is popular for colourwashing.
4. Generally, the walls are colourwashed and ceilings are whitewashed.
5. The mixture is to be kept constantly stirred during use.
6. The colourwash is applied in the same fashion as the whitewash.
7. A satisfactory work does not give out powder when the finished surface is rubbed with the fingers.
8. The process of colourwashing imparts cleanliness and pleasant appearance of the surfaces which are treated.