

DETAIL SPECIFICATIONS

Name of Project: Annual rate contract for conservation, restoration, reconstruction & redevelopments works (surface cleaning, site clearance, brick masonry, stone masonry, lime concrete, lime mortar, structural strengthening, dismantling & demolishing, flooring, roofing, finishing, wood works repairs and water proofing works and other miscellaneous works) at Office of the Assistant Director of Archaeology, Western Circle (Rajkot) of Department of Archaeology, Gujarat.



**DEPARTMENT OF ARCHAEOLOGY
GANDHINAGAR**

01 SPECIFICATION FOR LIME MORTAR

This Specification covers materials, proportions, preparation and storage of lime mortars.

Materials: -

Lime: - Lime A, B and C class shall be used in the preparation of mortar and shall conform **to lime specification no. 3.3** and relevant IS codes. Aggregates: - Any of the following or their mixture in the given proportion shall be used.

Sand: --Sand should be angular to sub angular moderately sorted aggregate of nominal size of 150um to 1.18mm. River sand shall not be used.

Water: --For all mortars water used shall be free from mud, clay, acidic, basic or organic impurities and shall be drinkable.

Proportions: -

Different types of ratio shall be used for works as per different trades mentioned in BOQ in which the quantity of lime is based on standard lime.

The volume of lime for purpose of the table in lime specifications shall be on dry hydrated lime basis. Where Quick lime is used the ratio shall be worked out accordingly, so as to provide the necessary quantity of dry hydrated lime.

Preparation of mortar: -

Slaking of lime: - Quick Lime shall be properly slaked and then used. The hydrated lime can be used as such for making mortar or may be run into putty and then used for making mortar (In contrast to Quick lime.)

Tank slaking: -

Two or preferably three tanks lined with stone or brick large enough to permit, stirring and hoeing shall be prepared (generally tanks suitable for 5 quintals or 10 quintals of quick lime are used in practice).

One of these shall be at the higher level and about 0.5 m deep and the remaining about 0.7 to 0.8 m, deep at lower level such that the contents of higher tank shall flow into the lower tanks by gravity.

The upper tank shall be filled to half its depth with water. Quick lime shall be gradually added till it fills the entire bottom to about half the depth of water. (Never add water to lime). While quick lime is being added it shall be constantly stirred and hoed so as to break up the lumps. No part of the lime shall be allowed to expose above water level. As the lime slakes with evolution of heat temperature begins to rise and more lime or water may be added till the required

temperature is reached and that temperature should be maintained by the addition of more lime or water till all the lime apparently has slaked, the stirring and hoeing shall be continued during the above process and for some period even after the slaking is apparently over.

Maturing:

After the lime has cooled it shall be transferred to the lower tank allowing it to flow through I.S. sieve size 1.18mm, more water shall be added if required and it shall be left undisturbed as under Class B lime for minimum of 12 hours and be used in seven (7) days. The putty shall be allowed to mature but not allowed to dry out till it is used.

Making putty from hydrated lime:

The putty shall be obtained by adding hydrated lime to water in a tank and stirring to the consistency of cream and allowing to stand as under:

Class A lime = Not more than 12 hours. Class B lime = Minimum for 2 days.

Class C lime = Minimum for 2 days for mortar used for finishing coat of plaster and minimum of 16 hours for mortar used for other purposes.

The putty shall be allowed to mature but not allowed to dry out till it is used.

Making of coarse stuff:

Manual mixing: -- After the lime has matured as specified above, more water shall be added and the putty stirred, till milk of lime is obtained. The fine aggregate shall be added with a whirling motion of hand so that the aggregate falls evenly in the tank. The milk of lime shall be stirred and hoed continuously till the required quantity of fine aggregate is added.

Mortar mill (gharat) mixing:

Quick lime shall not be used directly while dry hydrated lime can be used directly for making mortar. Putty or dry hydrated lime and fine aggregates in required proportions shall be put along with water in the Gharat spreading uniformly all along its circumference and ground till a mortar of uniform color and desired consistency is obtained. As grinding is done the mixture shall be continuously raked and turned over and over specially from corners and sides. Mortar shall be ground not less 180 revolutions or for 1/2 hours minimum, considering a Gharat to have 15 rpm.

Mortar for final coat of plaster:

It shall be ground for a second time after an interval of 2 days for class C limes.

Storage of mortar:

Lime mortars prepared from Class A and Class B limes shall be used up as soon as possible after mixing but not later than 12 hours for Class A limes from the time of first grinding and 2 days for Class B limes from the time of making Putty or first grinding as the case may be. Mortars from

class C limes can be used for periods longer than 3 days after the making of mortar provided they are protected from drying out.

Rejection of mortar:

Dried out lime will not be used under any circumstances. Mortar not found in accordance with the Specifications above and unsuitable according to field and laboratory tests of lime mortar shall be rejected. The Contractor at his own cost shall remove rejected mortar from the site of work within 24 hours.

02 LIME SAND/SURKHI PLASTER (FOR UNDERCOATS AND EXCLUDING ITS USE ON FLOOR)

Scope:

The work covered by this specification shall be in furnishing and installation of lime plaster finish over walls, ceiling etc. For all plaster works, double scaffolding having two sets of vertical supports shall be provided, so that scaffolding is independent of walls. For ceiling scaffolding, in stages where required shall be done. Preferably, steel tubular scaffolding conforming to I.S. 2750 and carried out in accordance with I.S. 4014, shall be used.

Surface preparation:

Surfaces to be plastered shall be thoroughly cleaned of all dust, grease, oil and loose mortar. Efflorescence if any shall be removed by brushing and scraping and then applying few drops of hydrochloric acid added to water for 2 to 3 days. The entire surface shall then be thoroughly washed with brush and clean water.

Joints shall be raked out to depth of 20 mm. minimum with a hook tool made for the purpose. Care should be taken not to damage masonry edges while raking. All surfaces of concrete, old plaster and stone shall be roughened sufficiently for bond. Soft or crumbling stonework and other surfaces shall be dismantled and remade if required. All surfaces to be plastered shall be thoroughly wetted for 24 hours before commencing plaster and shall be kept damp during the progress of work. At the same time the wall should not be too wet, as plaster is then likely to fall out and will not be satisfactory. It is essential to maintain uniform suction of water by receiving surfaces, which shall be ensured by damping evenly all dry patches before applying plaster. The Engineer will inspect all preparatory work and plastering shall not be commenced, until the Engineer approves all preparatory works.

Materials:

Lime: - Lime B class shall be used in the preparation of mortar and shall, conform to lime specification.

Aggregates: - Any of the following or their mixture in the given proportion shall be used.

Surkhi: - Surkhi is the powdered burnt bricks, brickbats and is used as an admixture to lime both for making lime mortar and lime plaster. surkhi shall always be obtained from fully burnt or slightly under burnt, but never from over brunt bricks. surkhi obtained from burnt loam shall not contain any un-burnt soil. surkhi shall be perfectly clean, free from an admixture or any foreign. Surkhi shall not contain soluble sulphate more than 0.5% for exposed work and work in damp situations and not more than 1.0% when used for works in dry and internal situations.

Gur/ sugarcane molasses: - 'Lapti' gur, without impurities, is to be added in the specified proportion.

Gugal/bel:- 'Bhainsa' googal / Bel without impurities, is to be added in the specified proportion.

Methi: - Methi water to be prepared over a period of 3 days by keeping the methi soaked in water and hand-abraded on every day basis. The resultant liquid concoction should be filtered to make it ready for use.

Water: - For all mortars water used shall be free from mud, clay, acidic, basic or organic impurities and shall be drinkable.

Application & curing:

The first coat shall be done for saresi. Saresi is a lime plaster as specified in specification should be in ratio 1:1 (lime: Sand). The saresi shall be applied to the wall with trowel in thickness 5 to 8mm. The saresi surface shall be raked out, immediately after applying saresi when it is wet, by trowel at distances 30mm. to 45mm. in jig jag pattern. The saresi shall be done for complete area under execution and should be left for 2-3 days.

Now the surface shall be thoroughly wetted for 24 hours before applying Surkhi plaster. Ceiling plaster shall be completed before commencement of wall plaster. The Lime Surkhi plaster in ratio 1:1 (lime: sand) for wall shall be done from the top to bottom and if possible each wall should be done on the same day if to avoid defects or unevenness at the joints. To ensure even thickness and a true surface, about 150mm. x 150mm. of Lime Surkhi plaster shall first be applied horizontally and vertically at 2m. centers approximately, over the entire surfaces, to serve as gauges.

The lime surkhi mortar shall be filled between two gauges with a straight edge wooden piece (plainer or butkada). The plastered surface shall be firmly pressed to uniform plumb and plane. The surface shall be left for 24 hours. The surface shall develop cracks after 24 hours.

The surface shall be hammered at the cracks with the help of wet wooden sticks (jaal / bent wood) made for the purpose. The process should continue till the cracks are removed. The surface shall be left for 7 days and shall be cured.

All corners, angles, junctions, etc. shall be truly vertical, horizontal or carved as the case may be and shall be carefully finished. Rounding or chamfering of corners or junctions wherever required shall be done without any extra payment. No portion shall be left out initially to be patched up later on. Before applying Lime Sand, the entire surface of the Lime Sand plaster should be rechecked with a true straight edge (wooden or aluminum plainer 2.5m long), plumb, string, level, etc.

If any crack appears on surfaces or if any portion found soft or if sound defective due to less lime, improper curing or any other reason, the relevant portion shall be removed and redone as per the instruction of the Engineer.

The surface is thoroughly wetted before applying loi. Now the Lime Sand loi shall be apply in thickness 2mm. (ratio 1:2) is applied with the plainer. The surface shall be smoothened by rubbing and pressing.

The total thickness of the lime Lime Sand plaster, inclusive of all three coats could be from 15MM to 40 mm as required at site.

Measurement & payment:

The measurement shall be in Sq.M. as per drawings and BOQ. Opening shall be deducted in full and jambs or soffits shall be considered. The rate shall include jambs, curves at the junctions of walls, ceilings, arches etc. and at all corner. The above procedure shall apply to the both faces of the wall. No extra charge shall be paid for drip moulds, tapkas or grooves areas. If the average thickness of the plaster done by the Contractor is more than the specified one, then no extra payment shall be made.

03 SPECIFICATION FOR LIME

Scope:

This specification lays down requirements for the physical and chemical properties and supply and storage of the different classes of lime.

Terminology:

Fat Lime: The lime, which has high calcium oxide content and is dependent for setting and hardening solely on the absorption of carbon dioxide from the atmosphere.

Hydraulic Lime: Lime containing small quantities of silica and alumina and/or iron oxide which are in chemical combination with some of the calcium oxide content, giving a putty or mortar which has the property of setting and hardening under water.

Semi-Hydraulic Lime: It is defined by having less than 12% clay which will make a set under water after about 20 days. It is usually an off-white colour, and makes a fatty (fairly sticky) mix which is easy to use.

Lump Lime: Quicklime as it comes from kilns.

Classification:

Building limes shall be classified as below: -

Class A - Eminently hydraulic limes used for structural purposes.

Class B - Semi-hydraulic limes used for mortar for masonry work and plaster excluding finishing layers.

Class C - Fat limes used mainly for finishing coat in plastering, white washing and with suitable admixture, such as surkhi or any other pozzolanic material to produce artificial hydraulic mortar.

Physical and chemical requirements:

Physical requirements: -The physical requirements of building lime are as given in the Table below.

TABLE I.

Physical Requirements of Building Limes.

S.No.	Characteristics	Class A	Class B		Class C		Method of test. Refer to
		Hydrated Lime	Quick Lime	Hydrated Lime	Quick Lime	Hydrated Lime	
(i)	Fineness						IS:6932 (Part 4) –1973*
	a) Residue on 2.36 mm IS Sieve, percent, Max	Nil	--	Nil	--	Nil	
	b) Residue on 300 micron IS sieve, percent, Max	5	--	5	--	Nil	
	c) Residue on 212 micron IS Sieve, percent, Max	--	--	--	--	10	
(ii)	Residue on slaking:						IS: 6932 (Part 3) –1973**
	a) Residue on 850 micron IS Sieve, percent, Max	--	10	--	5	--	
	b) Residue on 300 micron IS Sieve, percent, Max	--	--	--	5	--	

S.No.	Characteristics	Class A	Class B		Class C		Method of test. Refer to
(iii)	Compressive strength, Min, N/mm ²						IS : 6932 (Part 7) –1973#
	a) at 14 days	1.75	1.25	1.25	--	--	
	b) at 28 days	2.8	1.75	1.75	--	--	
(iv)	Transverse strength, at 28 days, Min, N/mm ²	1.0	0.7	0.7	--	--	IS : 6932 (Part 4) –1973#
(v)	Workability bumps, Max	--	--	--	12	10	IS : 6932 (Part 8) –1973^
(vi)	Volume yield ml/g, Min	--	--	--	1.7	--	IS : 6932 (Part 6) – 1973%
(vii)	Soundness, Le Chaterlier expansion , mm, Max	5	--	5	--	--	IS : 6932 (Part 9) –1973***
(viii)	Popping and pitting	Free from pop and pit	--	Free from pop and pit	--	Free from pop and pit	IS : 6932 (Part 10) –1973%%

* Method of tests for building limes: Part 4 Determination of fitness of hydrated lime.

** Method of tests for building limes: Part 3 Determination of residue of slaking of lime.

@ Method of tests for building limes: Part 11 Determination of setting time of hydrated lime.

Method of tests for building limes: Part 7 Determination of compressive and transverse strengths.

^ Method of tests for building limes: Part 8 Determination of workability.

% Method of tests for building limes: Part 6 Determination of volume yield of quick lime.

*** Method of tests for building limes: Part 9 Determination of soundness.

%% Method of tests for building limes: Part 10 popping and pitting of hydrated lime.

Chemical requirements: -The chemical requirements of building limes shall be as given in Table

TABLE II
CHEMICAL COMPOSITION OF LIMES

<u>S.No</u>	<u>Characteristics</u>	<u>Class A</u>	<u>Class B</u>		<u>Class C</u>		<u>Method of test, ref.to</u>
		<u>Hydrate d</u>	<u>Quick</u>	<u>Hydrate d</u>	<u>Quick</u>	<u>Hydrated</u>	
(i)	Calcium and magnesium oxides, percent, Min (on ignited basis.)	60	70	70	85	85	IS:6932 (PART 1) - 1973*
(ii)	Magnesium oxides, percent (on ignited basis), Max	6	6	6	6	6	IS:6932 (PART 1) - 1973*
(iii)	Silica, alumina and ferric oxide, percent, Min (on ignited basis)	20	10	10	--	--	IS:6932 (PART 1) - 1973*
(iv)	Insoluble residue in dilute acid and alkali, percent, Max (on ignited basis)	15	10	10	2	2	IS:6932 (PART 5) - 1973*
(v)	Carbon dioxide, max (on oven dry basis).	5	5	5	5	5	IS:6932 (PART 2) - 1973@
(vi)	Free moisture content, percent, Max	2	--	2	--	2	IS:151411 959#
(vii)	Available lime as CaO, percent, Min (dry basis)	--	--	--	75	75	IS:151411 959#

* Method of tests for building limes: Part 1 Determination of insoluble residue, loss on ignition, insoluble matter, silicon dioxide, ferric and aluminium oxide, calcium oxide and magnesium oxide.

@ Method of tests for building limes : Part 2 Determination of carbon dioxide content. #
Method of sampling and test for quick lime and hydrated lime.

Supply and storage:

Class A- Lime shall be supplied as hydrated lime only.

Class B - Limes shall be supplied both as quick lime and hydrated lime.

Class C Hydrated lime- Or bag lime, a non-hydraulic lime available is produced by slaking with a precise amount of water which is driven off during the reaction, resulting in dry powder.

The material shall be supplied at the site and stacked as given below in a store or any other place to be dry and under cover well protected from rain.

Quick lime deteriorates quickly as it attracts moisture and carbon dioxide from atmosphere as such should be run to putty as quickly as possible. For storing it should be piled up and covered with a blanket of lime dust to exclude moist air.

When hydrated lime is to be stored for a long time it should be filled in bags and kept in a dry place.

Rejection of lime:

The Contractor at his own expense shall remove lime, which has been rejected by the Engineer, from the site of work within 3 days.

04 SPECIFICATION OF SURKHI

Scope:

This specification lays down requirements regarding fineness and strength of Surkhi as used in mortars.

General:

Surkhi is the name given to powdered burnt bricks, brickbats or burnt clay loams (Calcined clay Pozzolana) and is used as an ingredient to form a mixture with lime for making structural mortar or plastering mortar.

Manufacture:

Surkhi shall not contain any impurities and un-burnt soil.

General properties:

Surkhi shall be perfectly clean, free from any foreign matter and shall conform to I.S. 1344. Surkhi shall not contain soluble sulphate more than 0.5% for exposed work and work in damp situations and not more than 1.0% when used for works in dry and internal situations. Surkhi shall not be used in situations where there is much salt in the soil. On sieving through I.S. Sieve 3.35 mm no residue should be left on the sieve and on 1.70mm shall not be more than 10% by weight of the sample.

Lime Reactivity: When tested in accordance to Appendix B of I.S.1344 the lime reactivity of surkhi shall be such that the average compressive strength of test cubes (of side 7.06 cm.) on twenty eight days of curing shall not be less than 40 Kg./sq. cm. Cubes shall be prepared from one part of lime Surkhi mortar (1:2) mixed with three parts standard sand.

Drying Shrinkage: Drying shrinkage should be maximum 0.15 as per I.S. Code 1344, 1981.

Stacking

Surkhi shall be stacked on masonry or wooden platform in regular stacks as of size 2.0m x 2.0m x 0.6m at the places as directed by the engineer and shall be protected from dust, rains and dampness and shall be kept under adequate coverings provided by the contractor

05 LIME PLASTER (FINISHING COATES)**Scope:**

This specification covers lime-sand and lime surkhi plasters and lays down requirements for mortar for plaster and specified method of application of the different coats and mode of measurement & payment for lime plaster.

Materials:

Mortar for Plaster: Unless otherwise specified in the Bill of Quantities, lime mortar mixes shall be as per specification and shall be prepared as per specification of lime mortar. The mortar, which has set or hardened before being used shall be rejected and immediately, removed from site.

TWO/THREE COAT PLASTER:**APPLICATION OF RENDERING COAT:**

In this case the rendering coat shall be a combination of the rendering floating coat of the "Three coat Plaster" and done under one continuous operation except that the scratching of the

rendering coat as specified for three coat plaster work above shall not be done here and the total thickness shall be 12 mm.

APPLICATION OF FLOATING OR SECOND COAT:

The rendering coat shall be cleaned of all dirt, dust and other loose mortar droppings and lightly wetted. Patches 15 x 15 cm. Or strips 10 cm. Wide shall be applied at suitable spacing to act as gauges. Then the mortar shall be thrown with mason's trowel spread and rubbed to the required plain surface with wooden float. The surface obtained shall be dead true in all directions.

In case of lime and plasters the finishing coat shall generally be applied immediately as given below.

In case of lime-surkhi plasters the floating coat shall be allowed to slightly set and then lightly beaten criss cross with float's edge at close spacing for about 4 cm. This shall be cured to set completely for a minimum period of 10 days and then allowed to dry out completely.

APPLICATION OF FINISHING COAT WITH:

Immediately after the floating coat has been applied the finishing coat consisting of the cream of lime shall be applied with steel trowels rubbed and finished smooth. The rubbing should be continued till it is quite dry.

It shall be cured for at least 7 days, curing should be started only after 24 hours.

LOI:

The surface shall be cleaned of all dirt, dust and any mortar droppings etc. It shall be fully wetted and then the finishing coat shall be applied with suitable trowels rubbed hard and finished smooth.

JHIKI – MARBLE POWDER

Water proofing Jhiki plaster 5-8 mm thick to be done instead of Loi on the two coats of lime surkhi plaster, Lime is slaked with curd and gur in proportion – (50 Kg Lime: 2 Kg Curd: ½ Kg Gur) for 15 days with changing of water everyday. After 15 days, one part of this lime putty is mixed with 2 parts of Jhiki and manually grounded on stone. The process is repeated two to three times with interval of one day between the process. The obtained mixture is now ready for use on the prepared surface. The surface is prepared by cleaning it removing all dust and then receives a coat of solution of sugar and water. The Jhiki plaster is normally done in three coats with interval of one day between coats. Before applying fresh coat, the surface is given a rub using masons wooden hand held tool locally called 'batkara'.

No curing shall be done after the finishing coat has been applied

MEASUREMENT & PAYMENT:

The measurement shall be in Sq.M. as per Standard specification

06 POINTING WITH LIME MORTAR

Method

The raked joints of the stone wall or the brick wall to be pointed shall be kept wetted for the pointing to be done.

The mortar for pointing shall consist of 1 part by lime and 1 part by surkhi. This mortar shall be applied to the wetted joints uniformly. The joints of the pointed work shall be neatly defined by pointing lines being regular and uniform in breadth. The edges of the pointing shall be cut off parallel so that well defined lines are seen at 19 mm apart. The pointing shall be kept well-wetted least for 5 days after pointing is finished.

Measurement & payment:

1. The measurement shall be in Sq.M. as per Standard specifications.
2. For jambs, soffits, sills, etc., for openings not exceeding 0.5 m. each in area; for ends of joists, beams, posts, girders, steps, etc., not exceeding 0.5 m each in area; and for openings exceeding 0.5 m and not exceeding 3 m each, **deductions and additions** shall be made in the following manner:
 - No deduction shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 m each, and no addition shall be made for reveals, jambs, soffits, sills, etc., of these openings nor for finish around ends of joists, beams, posts, etc.
 - Deductions for openings exceeding 0.5 Sq.M but not exceeding 3 Sq.M each shall be made as follows and no addition shall be made for reveals, jambs, slits, sills, etc., of these 'openings':
 - I. When both faces of wall are pointed with the same type of pointing, deduction shall be made for one face only.
 - II. When two faces of wall are pointed with different types of pointing or if one face is plastered and the other pointed, deduction shall be made in the plaster or pointing on the side on which the width of reveals is less than that on the other side, but no deduction shall be made from plaster or pointing on the other side. Where widths of reveals on both faces of wall are equal, deduction of 50 percent of area of opening on each face shall be made from areas of plastering and/or pointing as the case may be.
 - III. When width of door frame is equal to thickness of wall or is projecting beyond thickness of wall, full deduction for opening shall be made from each pointed face of the wall.
 - IV. When only one face is pointed and the other face is not pointed, full deduction shall be made from pointing if width of reveal on the pointed side is less than that on unpointed side, but if widths of the reveals on both sides are equal or width of reveal on pointed side

is more, no deduction shall be made nor any addition shall be made for reveals, jambs, soffits, sills, etc.

In case of openings of area above 3 Sq.M each, deduction shall be made for opening on each face but jambs, soffits and sills shall be measured.

07 LIME CONCRETE (DHAR) ON FLOORING/ROOFING

Lime concrete:

This specification lays down requirements regarding materials, laying of sub-floor, and protection and finishing of lime concrete flooring.

Materials:

Lime: Lime shall be fat lime and shall conform to lime specifications

Surkhi: Surkhi shall conform to surkhi specifications

Brick aggregate: 25 mm nominal size stone aggregate.

Preparation of lime concrete

The main ingredient of this concrete is slaked lime as binding material. The slaked lime is obtained in various forms as hydrated lime powder, lime putty, slaked lime slurry that is prepared by grinding in suitable Grinding Mills. Slaked lime is first mixed with sand to prepare lime mortar which is then further mixed with coarse aggregates, in suitable proportion. For preparation of lime concrete, first hard impervious level base is prepared by stones or brick pitching.

Then quantity of sand is spread as the horizontal base. Generally, lime & sand are taken in ratio of 1:1 to 1:3 by volume. Measured quantity of slaked lime is then added to sand and then mixing is done. In this mixing, water is sprinkled continuously to make the whole mass plastic.

Then the whole mass is allowed to mature for 1 to 3 days. After that coarse aggregates of desired type are used to lay on the prepared hard impervious level surface. After that lime mortar which is made with sand & lime is introduced into the base. Sufficient water is sprinkled over the base and it is cut into the layers and then is turned upside down with the help of spade or shovel until the whole assembly has become uniform.

Laying of lime concrete

- Preparation of lime concrete laid to fall with 25 mm nominal thickness stone/brick aggregate and 50% lime mortar in 1:2 (1 lime: 1 surkhi 1 sand) laid over a sub-floor of stone/brick ballast and sand.
- Top layer finished with old lime putty. The surface thus applied with the paste is allowed to harden under normal temperature but protected from the direct sun and dusty wind.

- The surface of floor to be rammed with wooden dambusa till the surface is tight and compact with curing & Beating shall be carried for 7 days and further curing for next 7 days.
- In case of deep crack appearing in concrete top 3" of concrete layer shall be completely removed and relayed as per above mention method.

Properties of lime concrete

Lime concrete provides good bases to bear the sufficient loads and also provide certain degree of flexibility. It adjusts very well when it is in contact with surface. Lime concrete also exhibits certain degree of water proofing property and thus prevents subsoil dampness in floors and walls. Lime concrete also exhibits volumetric stability. It can be made easily and can be available at much cheaper rates. It also resists weathering effects and is very durable.

Traditional brick on edge flooring:

This specification lays down requirements regarding materials, laying of sub-floor, and protection and finishing of brick on edge flooring

Materials

- Lime: Lime shall be fat lime and shall conform to lime specifications
- Surkhi: Surkhi shall conform to surkhi specifications
- Brick aggregate: 25 mm nominal size stone aggregate.
- Traditional nanakshahi or lakhori bricks: 180mm x 100mm x 40mm

Laying method:

Providing and laying of the traditional brick on edge flooring with lakhori or nanakshahi bricks on 20mm thick lime concrete leveling course laid over the sub- base of 50mm thick bed of local sand evenly spread and rammed brick ballast bed 150mm thick including the filling of joints of the brick courses with lime mortar. Post construction the exposed mortar joints in floors to be neatly scraped and raked with metal brush.

Measurement & payment:

The measurement will be in square meters according to actual area of flooring/roofing.

08 ITEM DESCRIPTION

DISMANTLING OF BROKEN STONE MASONRY from the monument and numbering and carefully placing them at suitable place for design study and to be reused if possible. complete the work as per drawing and instruction of Engineer in charge.

Material

Broken stone masonry and other related material in all the type of existing condition of monument at site from all levels of monument (above the ground level and below the ground level)

Workmanship

Utmost care is to be taken while removal of debris and other related material not damage other parts of the monuments. The work is to be carried out manually/ by machinery, piece by piece in careful and systematic manner and to be taken to the desired location including lead and lift with the campus. each piece is to be numbered as directed by EIC and to be stacked as per the satisfaction and as directed by engineer in charge. The existing situation and the situation after removal of broken stone to be documented by photography and in architectural drawings. This include the fixing and reusing of the dismantled broken stones at original / proposed place also

Mode of measurement

The measurement unit will be Cubic meter and payment will be made per cubic meter The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This include the cost of the fixing and reusing of the dismantled broken stones at original / proposed place also. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

09 ITEM DESCRIPTION

DISMANTLING OF CARVED STONE from the monument and numbering and carefully placing them at suitable place for design study and to be reused if possible. Complete the work as per drawing and instruction of Engineer in charge.

Material

Craved stone other related material in all the type of existing condition of monument at site from all levels of monument (above the ground level and below the ground level)

Workmanship

Utmost care is to be taken while removal of carved stones and other related material not to damage other parts of the monuments. The work is to be carried out manually, piece by piece in careful and systematic manner and to be taken to the desired location including lead and lift with the campus. Each piece is to be numbered as directed by EIC and to be stacked

as per the satisfaction and as directed by engineer in charge. The existing situation and the situation after removal of carved stone is to be documented by photography and in architectural drawings. This include the fixing and reusing of the dismantled carved stones at original / proposed place also

Mode of measurement

The measurement unit will be Cubic meter and payment will be made per cubic meter The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This include the cost of the fixing and reusing of the dismantled carved stones at original / proposed place also This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

10 ITEM DESCRIPTION

DETAILED ARCHITECTURAL DRAWINGS to be prepared, missing details to be made in same ancient design style and approved before starting the work.

Special condition: Conceptual drawing will be provided by the Architect and detailed drawing will be prepared by the agency and approval will be taken from the architect and department before execution of work. Complete architectural drawings and architectural survey at various stages of work Material by using AutoCAD software and first taking measurement at site of the monument in complete detail. The sketches of the monuments with dimensions are to be retained for verification. 5 prints of each drawing to be submitted in minimum scale of 1:100 and details in appropriate scale., including plan, sections, sectional elevation, details, area showing damages etc. as directed by EIC /architect

Workmanship

All the drawing should be accurate and perfect showing all details and dimensions and conjecture of missing parts as per traditional temple, kund and vav architecture of Gujarat. All the drawings to be given for review and corrections to be made if any, as suggested by architect /EIC

Mode of measurement

The measurement will be for one job and payment will be made on completion of a job The decision of architect /engineer in charge will be final and binding to the contractor This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

11 ITEM DESCRIPTION

PHOTOGRAPHIC DOCUMENTATION to be done before, during the execution and after work. complete the work as per drawing and instruction of Engineer in charge.

Material

By using Digital SLR camera photography at site of each monument in complete detail. 5 prints of each photograph in size as reqd by dept. with proper description and name, dates etc to be submitted of existing condition of monument and restored and after conservation as directed by EIC /architect to be printed in matt finish on excellent quality photographic paper which has long life for archival purpose. All the digital photos to be submitted in 32 /64 GB pen drive.

Workmanship

The photography work should be excellent as per best industry standards

Mode of measurement

The measurement will be for one job and payment will be made on completion of a job The decision of architect /engineer in charge will be final and binding to the contractor This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

12 ITEM DESCRIPTION

RECONSTRUCTION OF MISSING/DAMAGED ASHLARS STONE MASONRY of Similar Sandstone duly plain dressed and set in 1:1:1 LSS mortar taking necessary safety measures and complete as directed by site in charge. complete the work as per drawing and instruction of Engineer in charge.

Material

Excellent quality of approved colour, hue, shade and quality, similar Sandstone duly as per the existing sandstone in monument. it should be of fine composition. a sample to be produced for approval from dept before procuring the material and approval to be obtained. 1:1:1 LSS mortar is to be used using excellent quality materials. The decision of architect /engineer in charge will be final and binding to the contractor. the contractor shall produce required test results from approved govt lab regarding various parameters of R and B dept Gujarat.

Workmanship

Work shall be carried out in excellent workmanship as the as per traditional temple and vav architecture of Gujarat. The decision of architect /engineer in charge will be final and binding to the contractor. The work is to be carried out at all levels (above the ground level and below the ground level)

Mode of measurement

The measurement unit will be Cubic meter and payment will be made per cubic meter. The decision of architect /engineer in charge will be final and binding to the contractor. No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

13 ITEM DESCRIPTION

RECONSTRUCTION OF MISSING/DAMAGED CARVED STONES of Samran, Amalsar, Shikhri, Kalash, kevar, chajli, pillar work, Gaumukh, Kanpit, Pat, Chat, slab etc. in similar Sandstone including carving, shaping, fixing and polishing by experienced artisan craftsman. complete the work as per drawing and instruction of Engineer in charge.

Material

Excellent quality of approved colour, hue, shade and quality, similar Sandstone as per the existing sandstone in monument for reconstruction work. it should be of fine composition and high density without and deformity. a sample to be produced for approval from dept before procuring the material and approval to be obtained. 1:1:1 LSS mortar is to be used using excellent quality materials. The decision of architect /engineer in charge will be final and binding to the contractor. the contractor shall produce required test results from approved govt lab regarding various parameters of R and B dept Gujarat.

Workmanship

Work shall be carried out in excellent workmanship as the as per traditional temple and vav architecture of Gujarat. various elements Samran, Amalsar, Shikhri, Kalash, kevar, chajli, pillar work, Gaumukh, Kanpit, Pat, Chat etc. in similar Sandstone including carving, shaping, fixing and polishing by experienced artisan craftsman. Complete the work as per drawing and instruction of Engineer in charge. The depth of the carving shall be proper and as required and directed by EIC /Architect. The decision of architect /engineer in charge will be final and binding to the contractor. The work is to be carried out at all levels (above the ground level and below the ground level)

Mode of measurement

The measurement unit will be Cubic meter and payment will be made per cubic meter. The decision of architect /engineer in charge will be final and binding to the contractor. No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

14 ITEM DESCRIPTION

PROVIDING AND FIXING SMALL DAMAGES IN THE MONUMENT WITH SIMILAR SANDSTONE/LIMESTONE BLOCKS (2"-3") simple blocks. complete the work as per drawing and instruction of Engineer in charge.

Material

Excellent quality of approved colour, hue, shade and quality, similar Sandstone as per the existing sandstone in monument. It should be of fine grain composition. A sample to be produced for approval from dept before procuring the material and approval to be obtained. 1:1:1 LSS mortar is to be used using excellent quality materials. The decision of architect /engineer in charge will be final and binding to the contractor. The contractor shall produce required test results from approved govt lab regarding various parameters of R and B dept Gujarat.

Workmanship

Work shall be carried out in excellent workmanship as the as per traditional temple and vav architecture of Gujarat. The decision of architect /engineer in charge will be final and binding to the contractor. The work is to be carried out at all levels (above the ground level and below the ground level)

Mode of measurement

The measurement unit will be per one piece and payment will be made perpiece The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

15 ITEM DESCRIPTION

PROVIDING AND FIXING MOLDING (GHAT KAM) WORK IN SIMILAR SANDSTONE/LIMESTONE. Complete the work as per drawing and instruction of Engineer in charge.

Excellent quality of approved colour, hue, shade and quality, similar Sandstone as per the existing sandstone in monument for reconstruction work. it should be of fine composition and high density. Craved stone other related material in all the type of existing condition of monument at site from all levels of monument (above the ground level and below the ground level)

Workmanship

Utmost care is to be taken while fixing of moulded stones / moulding and other related material not damage other parts of the monuments. The work is to be carried out manually, piece by piece in careful and systematic manner and to be fixed at desired location including

lead and lift with the campus. Each piece is to fixed as directed by EIC and to be stacked as per the satisfaction and as directed by engineer in charge.

Mode of measurement

The measurement unit will be Running meter and payment will be made per Running Meter The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

16 ITEM DESCRIPTION

PROVIDING AND FIXING MOLDING (NAKSHI KAM) WORK IN SIMILAR SANDSTONE. Complete the work as per drawing and instruction of Engineer in charge.

Material

Excellent quality of approved colour, hue, shade and quality, similar Sandstone as per the existing sandstone in monument for reconstruction work. it should be of fine composition and high density. Craved stone other related material in all the type of existing condition of monument at site from all levels of monument (above the ground level and below the ground level)

Workmanship

Utmost care is to be taken while fixing of stone with nakshikam and other related material not damage other parts of the monuments. The work is to be carried out manually, piece by piece in careful and systematic manner and to be fixed at desired location including lead and lift with the campus. Each piece is to fixed as directed by EIC and to be stacked as per the satisfaction and as directed by engineer in charge.

Mode of measurement

The measurement unit will be square meter and payment will be made per square meter The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.

17 ITEM DESCRIPTION

PROVIDING AND FIXING VARAN KAM (ANIMAL FIGURE, OTHER SCULPTURES) WORK IN SIMILAR SANDSTONE. Complete the work as per drawing and instruction of Engineer in charge.

Material

Excellent quality of approved colour, hue, shade and quality, similar Sandstone as per the existing sandstone in monument for reconstruction work. it should be of fine composition

and high density. Craved stone other related material in all the type of existing condition of monument at site from all levels of monument (above the ground level and below the ground level)

Workmanship

Utmost care is to be taken while fixing of stone with varan kam (Animal Figure, other sculptures) and other related material not damage other parts of the monuments. The work is to be carried out manually, piece by piece in careful and systematic manner and to be fixed at desired location including lead and lift with the campus. Each piece is to fixed as directed by EIC and to be stacked as per the satisfaction and as directed by engineer in charge.

Mode of measurement

The measurement unit will be Running meter and payment will be made per Running Meter The decision of architect /engineer in charge will be final and binding to the contractor No extra cost is going to pay for transportation or lifting and placing the material. This will be for the entire job up to satisfaction of EIC architect inclusive of all manpower, material, transport, insurance, tools, tackles etc. to complete the job.