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भारतीय मानक

चिनाई में गारा-मसाला तैयार करना और
उसका उपयोग — मार्गदर्शिका

Indian Standard

**PREPARATION AND USE OF MUD MORTAR
IN MASONRY — GUIDE**

UDC 691.532 : 693.2

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

One of the strategies of the new housing policy is to promote use of locally available low cost building materials. As both material and skill for mud mortar are locally available, its use in brick masonry will be a small step towards saving scarce material like cement which is also energy intensive and keeping the cost of construction on lower side. Further, mud mortar being thermal insulating material, helps in saving energy cost during usage of dwelling.

This standard is intended to serve as a guide in selecting proper type of raw material and using proper method for preparation and use of mud mortar for quality construction.

Indian Standard

PREPARATION AND USE OF MUD MORTAR IN MASONRY — GUIDE

1 SCOPE

1.1 This standard covers the selection of clay for mud mortar, methods of its preparation and use in masonry.

2 REFERENCES

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.1 For the purpose of this standard, definitions given in IS 2809 : 1972 shall apply.

4 SELECTION OF CLAY FOR MUD MORTAR

4.1 The clay or mixture of clays should preferably conform to the following mechanical composition.

Grain size analysis shall be done in accordance with the method given in IS 2720 (Part 4) : 1986.

Clay 18-22 percent by weight

Silt 40-45 per cent by weight

Sand 30-40 percent by weight

4.2 The total content of clay and silt be preferably not less than 60 percent by weight.

NOTE — In case of soils which are more sandy or clayey than the limits specified above, the same should be blended with more plastic clay or non-plastic materials as the case may be so as to bring the mechanical composition within the above specified limits.

4.3 Plasticity Index

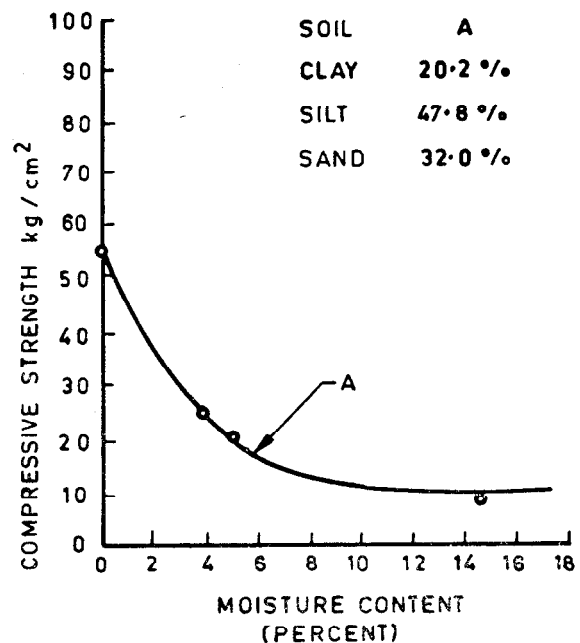
The plasticity index shall be determined in accordance with the method given in IS 2720 (Part 5) : 1970 for large and important projects and it should range between 12-15. However, in case of projects of lesser importance and smaller size, the field test as given in 7 may be sufficient.

5 DESIGN CONSIDERATIONS

5.1 The durability of masonry mortars depends upon the volume changes during the process of setting, hardening and later due to temperature variations, moisture movement in the surrounding, changes in its own moisture content and the extent to which mortar will internally accommodate the stresses induced by these volumetric changes before yielding.

5.2 The bond between the mortar and masonry units if ruptured by the volumetric changes and the structural movements results not only in reduction in strength of masonry but also in formation of channels of seepage of water and other solutions into the masonry. This would aggravate the process of deterioration and affect resistance to chemical attack in aggressive environment.

5.3 The compressive and bond strength of mud mortar decreases with the increase in moisture content in it. The compressive strength decreases by 0.8 to 1 N/mm² at 6-10 percent moisture content (see Fig. 1).



5.3.1 Moisture to the extent of 5 to 8 percent by weight is likely to penetrate in the mud mortar even after plastering or pointing the exposed surface of masonry.

5.3.2 Since the mud mortar is susceptible to weathering, mud mortar masonry may be used for temporary structures and low rise structures having adequate lateral stability.

5.3.3 Basic stress in masonry with bricks of 7 to 10 N/mm² and 3.5 N/mm² shall not exceed 0.2 N/mm² and 0.1 N/mm², respectively.

5.3.4 Thickness of mud mortar should not be more than 20 mm in case of brick masonry works and 30 mm in case of stone masonry works.

5.3.5 The masonry should preferably be plastered or pointed by cement or lime mortar externally to avoid erosion of mortar from joints.

5.3.6 Concentrated load should be distributed by providing plain concrete or RCC bed blocks or by using cement mortar masonry below the concentrated loads.

NOTE — For mud mortar construction in seismic zones refer IS 4326 : 1976.

6 PREPARATION OF MORTAR

6.1 The soil for preparation of mud mortar should be processed so as to be free from gravel coarse sand (particle size greater than 2 mm) lime and kankar particles vegetable matter, etc.

6.2 Coarse grit, kankar, etc, if present should be removed by wet sieving.

6.3 The sieved clay should be allowed to dry and then blended with plastic clay or a non-plastic locally available material (like rice husk, jute waste, wheat husk, etc) as the case may be, so as to bring the mechanical composition within the limits specified under **4.1** above.

Where wet sieving is not necessary, the soil shall be lightly broken up and wetted. The wet mass shall be tempered over under the feet, repeatedly turned over big spades and then thoroughly

kneaded. The kneaded mass shall than be left for rempering for at least 24 hours with the soil being preferably covered with wet gunny bags.

6.4 Immediately before use in the masonry a small quantity of the prepared soil shall be mixed with a further quantity of water to obtain the desired consistency and workability. The total moisture content of the prepared mortar shall be in the range of 35 to 40 percent by weight of soil.

7 FIELD TEST

7.1 For quick field observation and intermittent checks, sample test as given in Annex B may be made.

7.1.1 If the ball prepared as given in Annex B has deformed on drying and crumbles easily when pressed lightly, it may be inferred that sand content is excessive.

7.1.2 If the ball is hard but shows cracks on the surface, then the sand content is insufficient.

7.1.3 If the soil is not found suitable, as inferred above, the test should be repeated after modifying the composition of the soil, such as by mixing different proportions of two soils or by addition of sand or clay whichever is needed, for checking the stability.

ANNEX A

(Clause 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
2720 (Part 4) : 1986	Method of test for soils: Part 4 Grain size analysis (<i>second revision</i>)	2809 : 1972	Glossary of terms and symbols relating to soil engineering (<i>first revision</i>)
2720 (Part 5) : 1970	Method of test for soils: Part 5 Determination of liquid and plastic limits (<i>first revision</i>)	4326 : 1976	Code of practice for earthquake resistant design and construction of buildings (<i>first revision</i>)

ANNEX B

(Clause 7.1)

FIELD TESTS FOR SOIL FOR MASONRY MUD MORTAR

B-1 The soil should be ground to a fine powder and mixed with sufficient water, added in small quantities. The mix should then be kneaded into a plastic mass of the required consistency.

B-2 Take a handful of the soil prepared in **B-1**

and form into a ball of about 80 mm diameter.

B-3 Keep the ball in the sun for drying. When dried, examine the ball for loss of shape and surface cracks, if any.

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