

RENDERCON® Admixtures – Men, Materials, Mix and Methodology for use in mortar for plastering with crushed sand (manufactured sand).

SCOPE

This document covers the 4Ms - Men, Material, Mix and Methodology for use of RenderCon's plastering admixtures "Super" and "5S" in mortar for brick binding and plastering.

Please refer Technical Datasheets of "Super" and "5S" in conjunction with this document. The methodology will be in line with IS 1661 "Code of Practice for application of cement and cement-lime plaster finishes".

Keeping in mind the environmental implications of dredging river sand, emphasis throughout this document will be on using crushed sand or manufactured sand replacing river sand. However, our products work with both river sand and crushed sand and the procedure is same.

For the ease of writing, crushed sand or manufactured sand are both referred to as crushed sand in this document.

MEN

Masons are mostly mindset driven and cannot believe something unpracticed by them. It will be hard to believe that crushed sand is a better alternate unless they have used it successfully before.

Version 1.0

ADMIXTURES

RENDERCON '5S'



Integrally to be mixed in cement mortar to offer hydrophobicity, efflorescence resistance in addition to the properties of RenderCon 'Super'.

RENDERCON 'SUPER'



Integrally to be mixed in cement mortar to offer Self-curing, crack resistance and to work as integral waterproofing compound.

MASON'S MINDSET – CRUSHED SAND



Masons are usually in a mindset of believing crushed sand is not suitable for plastering and river sand alone shall be used. In addition, it is substandard quality with crushed sand. Below are more reasons.

The reasons for this mindset is that

- a) Crushed sand being angular in shape will have higher rebound when applied on the wall during plastering.
- b) It needs higher water but dries up quickly, needing more water in intervals.
- c) It slips off the surface and will not stick to the wall.
- d) It usually offers a poor surface finish in comparison to river sand.
- e) It cracks up easily and the quality of mason's workmanship is questioned.
- f) It takes longer to execute wall plastering with crushed sand than river sand.

To ease this mindset, intense brainstorming is required. Necessity to ban river sand to increase availability of water for the people as a whole shall be emphasized. Additionally, with introduction of RenderCon's admixtures and masons getting used to crushed sand will relieve masons from all above issues.

Importantly, masons have to plaster a few walls to get used to crushed sand under a supervision having good experience with crushed sand in plastering. We have seen that after executing plastering of 300 to 700 sft, masons are more at ease to use crushed sand.

Indian Standard Code recommends crushed sand as an alternate for plastering in all the reference codes targeted for plastering. For example, IS 1542 "Indian Standard Code – Sand for plaster" is first prepared in 1960 and revised in 1977 to include crushed sand for use in plaster. More details are discussed in Material section of this document.

ANGULAR SHAPE



Crushed Sand is angular in shape while river sand is spherical in shape. Hence, the mortar mix has higher rebound with Crushed Sand. Semi-dry mix with RenderCon will reduce rebound.

DRIES UP FASTER



Crushed sand needs higher water for mixing. Mix also dries up faster. RenderCon products offer water reduction and water retention. Due to this, mix-water is reduced and drying will be slower.

POOR SURFACE FINISH



For the fear of cracking, in some cities washed crushed sand is used, which is deprived of fines affecting surface finish. RenderCon's products help resist cracks even with higher fines. Fines are required for surface finish.

GETTING USED TO CRUSHED SAND



Masons have to get used to Crushed Sand. Usually, it takes about a week's time to get used to plastering with crushed sand. Emphasis shall be on keeping the mix semi-dry to avoid slippage cracks.

INDIAN STANDARDS



IS Codes mention that crushed sand is suitable for plastering since 40 years.

MATERIALS

Cement shall be any brand of OPC / PPC / PSC.

Crushed Sand has always been a debatable thing both on size and gradation. It is needless to say that crushed sand shall have lower fines. But, how much fines are required for a proper finish besides resisting cracking?

In simple terms, crushed sand shall have no particles above 2.36mm to be suitable for plastering. The fines shall be less than 20% on 150 microns as passing to avoid cracking.

Minimum fines passing 150 microns as close to 20% are required to get a surface finish comparable to river sand. This need increases the susceptibility of fines to go over 20% due to variations in the crusher. Higher fines are usual to the tune of 5-10% depending on the quality control.

Despite high-technology manufactured sand crushers are deployed, consistently producing crushed sand with fines exactly at 20% is almost impossible.

With the use of RenderCon products, crushed sand up to 40% passing on 150 microns can also be used.

However, crushed sand, if contains particles above 2.36mm, not only increases rebound and slippage but also impedes good surface finish. In cities like Chennai, where plastering manufactured sand is not available, instruct crusher to supply crushed sand passing 2.36mm but unwashed. It will not be difficult to produce such crushed sand.

Along with RenderCon admixtures, quality and economy can be achieved.

CEMENT



Cement can be from any brand of OPC/ PPC / PSC

CRUSHED SAND – FROM IS 1542

Sieve, mm	% Passing	Upper Limit
4.75 & 2.36	95-100	100
1.18	90-100	100
0.600	80-100	100
0.300	20-65	65
0.150	0-20	20

PARTICLE SIZE DISTRIBUTION FROM ABOVE TABLE (ON UPPER LIMIT)

Sieve, mm	% of particles
Above 2.36 mm	0
2.36 – 1.18	0
1.18 – 0.600	0
0.600 – 0.300	35
0.300 – 0.150	45
Below 0.150	20

A little understanding of the above tables show that majority of particle size needed for plastering shall fall between 600 microns to 150 microns. However, when rock is crushed to obtain sand, challenge is in maintaining high 600 passing but reduce 150 microns. On washing, lot of particles between 600-150 also will be washed off unless very advanced technology crushing / washing is practiced at the crusher.

Instruct your crusher to supply sand passing 2.36 mm. If no special techniques are used in crushing / washing, it will be cheaper by a lot than river sand.

UNDERSTAND BACKGROUND

“Key” and “Suction” are to be assessed well based on the type of brick used.

Rake joints well to improve key. In case bricks with poor key are received, talk to the supplier for betterment next time. Scrape the brick with wire-mesh to improve key.

In case of concrete background (columns / beams), tack the concrete surface well to provide key for the mortar.

If the background is very hot, usually small quantity water is sprayed first for preventing moisture loss from applied mortar. For today’s bricks this is not required since concrete bricks do not have high absorption of water. Although AAC blocks are high on suction, background has to be dry to reduce drying shrinkage movement.

It is recommended to apply 1:2 or 1:3 cement : fine aggregate thick spatter-dash paste on the background to improve suction and best results. The quantity of water required in this depends on how hot the background is. A proper suction adjustment is mandatory in case of AAC blocks.

AAC BLOCK BACKGROUND

For AAC Block, enough care has to be taken in keeping the blocks dry completely during storage, brick laying, plastering and eliminate curing at all stages. Failing shrinkage cracking will be severe.

MIX

Mix can be any from 1:4 to 1:6 for both products. However, if hydrophobicity is desired, 1:4 with ‘5S’ shall be used.

PRODUCT SELECTION

1. Brick binder – “Super”
2. Internal Plaster – “Super”
3. Ceiling plaster – “Super”
4. External Plaster –
 - a) AAC Block – “5S” with 1:4
 - b) Red Clay Brick – “5S”
 - c) All other backgrounds – “Super”

If Red Clay bricks exhibit high efflorescence, “5S” shall be used on internal plastering also. However, at all times, ceilings shall be done with “Super” only.

RAKED / TOOLED BRICK JOINTS



To provide a good key for plaster with background, rake or tool all the brick joints.

AAC BLOCK



Vital is to eliminate curing everywhere. Read AAC Bulletin for more details.

RED CLAY BRICK



Use external with ‘5S’. Check for efflorescence. If high, use ‘5S’ for internal also.

SOLID BLOCK



Control mix-water to avoid slippage cracks. Keep mix semi-dry. Read more below.

METHODOLOGY

Cement and required quantity of Sand based on mix proportion shall be dry mixed thoroughly. Cut open RenderCon's sachet to find 2 sachets (L and P) in it. Pour the contents of the Powder sachet (P) on the dry mix of cement and sand. Mix them thoroughly.

Take required quantity of water and empty the liquid sachet (L) in this. Rinse the liquid sachet into the mix water. Mix this water into the dry mix of cement and sand. Mix it thoroughly. Add more water if required and mix everything homogenously for 3 to 5 mins. This ensures chemical is uniformly distributed to all the mortar. Keep the mix semi-dry.

To improve surface finish, sometimes a thinner over coat is required if the crushed sand is very coarse. In such case, marginally water may be added into the mix and applied over. This should be applied along with the underlying coat. As far as possible, this also shall be avoided. Based on w/c increase, surface crazing may appear.

A few masons prefer to add dry cement to improve sharpness of plaster at the corners. Do not add excess cement in any case. If added, such cement will not be self-cured. Water curing will be required, wherever cement is added additionally. However, we strongly condemn this practice, because such kind of mixes will behave unpredictably. Sometimes, it will be difficult to figure out unless the mason informs that he has added additional cement. To control this practice, best is to not issue masons additional cement other than required.

HOMOGENOUS SEMI-DRY MIX



Mix thoroughly the mortar for 3-5 minutes before application. At the end of mixing, mix shall be semi-dry (just wet) and homogenous on color and wetness.

ACCIDENTAL EXCESS WATER IN MIX



Additional cement should NOT be added. Wait for an hour for mix to dry, apply later. Discard, if mix is still slipping off due to wetness. Mix a fresh batch.

SLIPPAGE (CREEP) CRACKS



If the mortar is watery, mortar for plaster, slips off the background due to its self-weight. This causes cracking in the plaster. These cracks are usually in straight lines parallel to the ground and always appear in less than a few hours. Keep mortar semi-dry. Inspect wall after 30mins to 2hr to see any slippage cracks. Mortar will be still wet in such case, strike off the mortar in the crack and reapply.

PERIODIC INSPECTION

For the first few weeks, inspect walls on the next day of plastering to see their color. Pale-white dusting wall in less than 24 hours means that suction is much higher and need little more water in the spatter-dash, which is applied at the start.