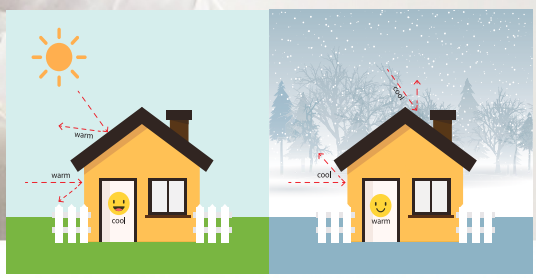
SHIBAM

5^0C? 55^0C?

No Problem



SINICON PP

Heat Proofing & Climate Control
Plaster Aggregate

"Making Interior COOL during SUMMER and WARM during WINTER"

The New Heat Barrier For OLD and NEW Buildings

SINICON PP

Heat Proofing Plaster

Roof | Wall | Ceiling

In use since 1991

Architect | Design FREEDOM

- **No design constrains**
  Any design can be made suitable for tropical climate.
- **Goodbye to trussed roof**
  No need of truss structure and roof tiles/sheet for heat proofing.
- **Aesthetic Friendly**
  Roof tiles, if required, can be mounted on Sinicon PP plastered slope roof or may be designed to suit the environmental compulsions.
- **Design Flexibility**
  Enormous design flexibilities to suit Architect's imagination
- **Light weight**
  Additional floors, structures, fire walls etc. can be constructed using Sinicon PP.

Builder | Execution SAFE & EASY

- **Protects Quality**
  Direct replacement for good quality river sand in plastering.
- **Protects Brand**
  Protects structure from developing cracks due to extreme heat.
- **Save Labour & Time**
  Better labour output, better surface-finish and speedy completion of project.
- **Easy Transportation & Storage**
  Packed and light weight makes handling easy.
- **Save Maintenance Cost**
  Reduce maintenance requirements substantially.

Sinicon PP, a climate control plastering aggregate used like sand in the internal and external plastering (Roof, Wall & Ceiling) of a building. Sinicon PP ensures cool interior in summer and warm interior in winter making it a perfect material for a future compatible building.

BENEFITS

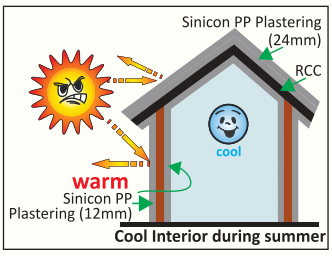
- Cool Interior during summer
- Warm Interior during winter
- Double the life of a building
- No more plaster cracks/spalling due to extreme heat
- Exceptional thermal insulation
- Energy saving "green" product
- Completely fire proof
- Better acoustics - Good for high traffic area
- Vermine and Termite resistant
- Durable & easy to apply
- Ultra light weight reduces high rise structural building costs
- Application same as like sand, no special skill required
- Permanent solution

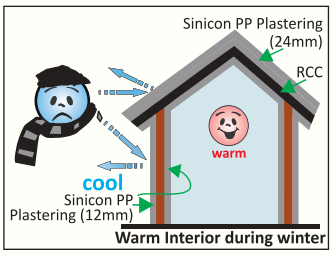
Roof (RCC Flat or Slope)

Sinicon PP plaster thickness - Minimum 24mm or as required to suit the climatic condition at the location.
Mix Ratio 3 : 1 (Sinicon PP : Cement)

Internal/External Wall & Ceiling

Sinicon PP plaster thickness - Minimum 12mm or as required to suit the climatic condition at the location.
Mix Ratio 4.5 : 1 (Sinicon PP : Cement)





Sinicon PP
~~Sand~~ + Cement + Water = Plaster

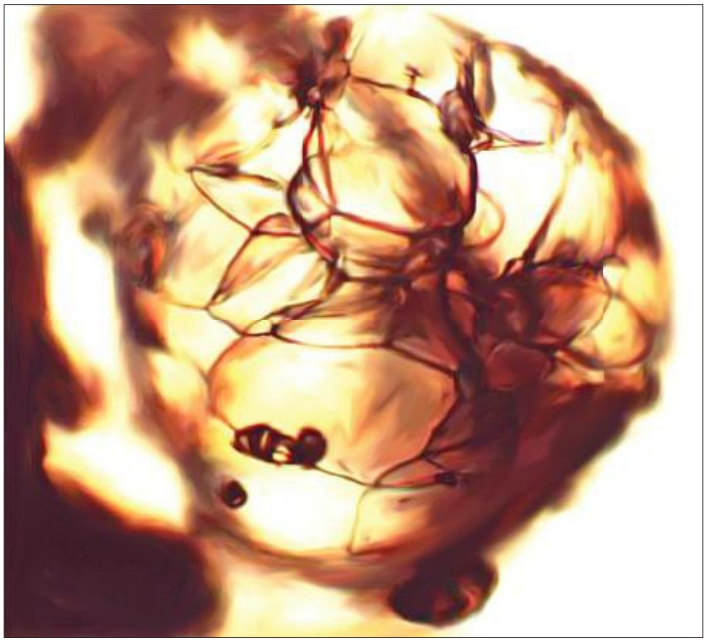
Table of Contents

"Creating liveable space and extending asset value... naturally"

1.0 MATERIAL PROPERTIES

1.1 Introduction

Sinicon PP is derived out from unique volcanic glass, a large deposit of which is found at only one location in South Africa and nowhere else on earth. Its properties are similar to classical perlite but it differs in that the processed form is ideally suited for use with cementitious and other binders. It also has truly exceptional fireproofing properties.



Sinicon PP Granule (250X magnification)

The volcanic glass ore is crushed and passed through a series of specially developed processing equipments and through this patented process crushed grains are converted into a multitude of well sealed glass beads. It also alters the chemistry of the glass and results in a higher melting point. Under the microscope, each tough bead comprises a froth of glass-walled closed cells each enclosing a near vacuum. Expanded Sinicon PP is therefore best described as comprising millions of tiny sealed "thermos flasks", hence its absolutely unique and unrivalled insulating and fireproofing properties.

1.2 Excellent thermal insulator

The thermal property of Sinicon PP is very low due to its low density and physical structure. The 'k' value of Sinicon PP in loose form and when mixed with binders are as follows:

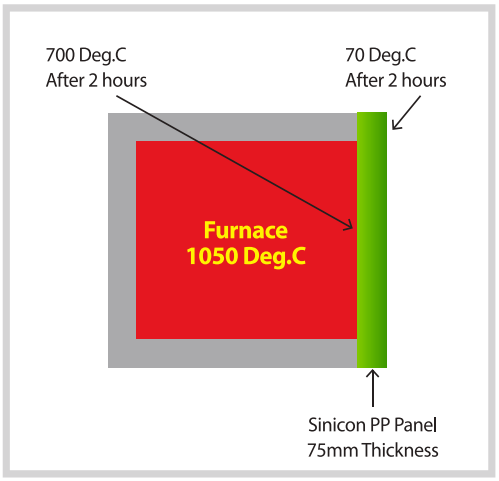
When binders like cement added for plastering application, the K value will be as follows:

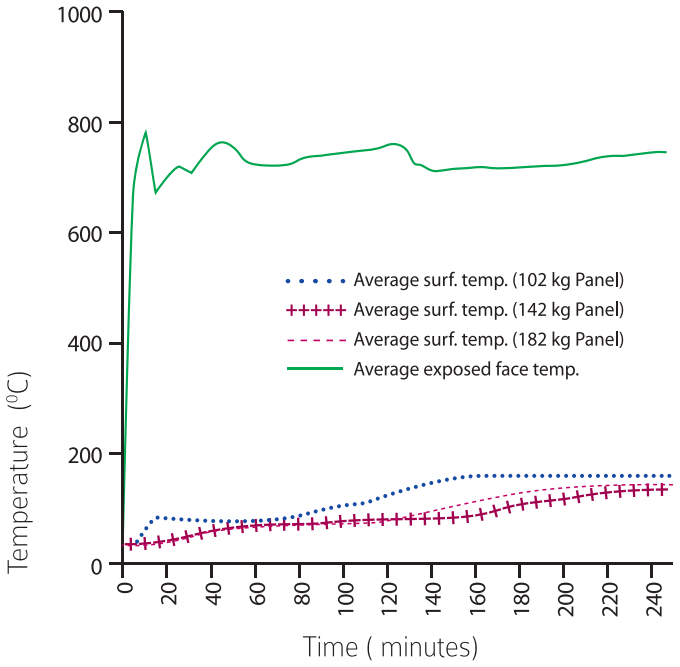
a) Sinicon PP in loose state : 0.05 W/m °C
b) Sinicon PP : Cement 4.5 : 1 : 0.13 W/m °C
c) Sinicon PP : Cement 3 : 1 : 0.15 W/m °C

Note : The 'k' value of a conventional cement plaster is 0.72 W/m °C.

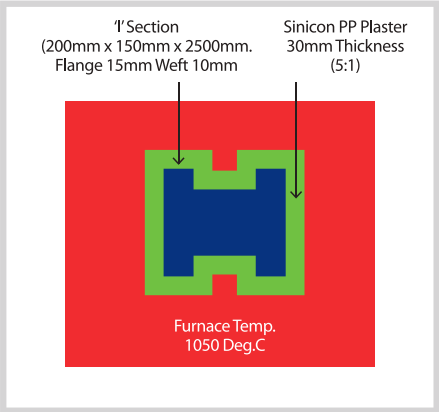
Test Data

1. A Furnace Test in which one panel of the furnace has been removed and replaced by Sinicon PP panel thickness of 75mm. The furnace has then been put to test for a period of 2 hours and the result has been mentioned in the table below.





2. A Furnace Test in which and 'I' section has been plastered 30mm thickness of 4.5 : 1 Sinicon PP : Cement ratio and this 'I' section has been put in a furnace and tested for a period of 2 hours and the result has been mentioned in the table below.



1.3 Ultra lightweight

Density in the loose state is 100 kg/m³ and, when mixed with cement, practical concrete densities ranging from 300 kg/m³ to 1000 kg/m³ can be achieved. The Sinicon PP concrete will therefore float on water.

The density at various Sinicon PP : Cement proportion follows:

Ratio 3 : 1 : 770 kg/m³
Ratio 4.5 : 1 : 670 kg/m³
Ratio 6 : 1 : 480 kg/m³
Ratio 10 : 1 : 360 kg/m³

Note : Sand + Cement (4:1) Mortar will have a density of approx. 2000 kg/m³.

1.4 Exceptional Fire Resistance

Notwithstanding the high melting temperature of 1250°C Sinicon PP concrete can also maintain its structural integrity at high temperatures due to its thermal insulating property. The latter ensures a very high thermal gradient on the outer surface during fire conditions resulting in very low temperatures immediately below the fire exposed surface. Indeed, even if the surface melts, it coalesces into molten glass beads which insulate and protect the interior.

1.5 Compatibility with Portland Cement and Other Binders

Unlike conventional Perlite, which is often friable and delicate with many fractured cells, Sinicon PP has a well-sealed tough structure. This prevents severe bead damage during mixing and facilitates low water absorption, hence proper curing of the cement.

1.6 Superior Strength

Ultra lightweight concretes are generally weak and, in the case of aerated concrete, are extremely vulnerable to total slump shortly after casting, especially if any vibration or disturbance is present. Sinicon PP concrete does not rely on air-entrainment and can be cured under any conditions of vibration. Once cured, the product exhibits surprising strength in comparison to other lightweight concretes. Strength varies with density but practical strengths in the range up to 23 MPa are quite achievable.

1.7 Adhesion (Spray or Plaster)

Sinicon PP, which, when mixed with cement, can be plastered (without the use of additives) either with a trowel or by spray to most common surfaces with good adhesion. In the case of doubtful/smooth surfaces, a recognised cleaning procedure, followed by the application of a bonding agent, i.e a plaster grip primer, is recommended. In this case, Sinicon PP plaster will even adhere to smooth steel.

1.8 Low Water Permeability

The Sinicon PP, when mixed with cement in the correct ratio, can be deemed to be completely watertight without the use of any additives (Ref. PCI Report). Substrate corrosion is therefore minimised.

1.9 Non-toxic Dust

No dust is healthy. Sinicon PP, due to its amorphous (non-crystalline) structure has however been demonstrated to be a very low health risk dust.

1.10 Zero Smoke and Zero Fumes

Due to its inorganic structure "Sinicon PP" evolves zero smoke and zero fumes under fire conditions.

1.11 Amazing resistance to spalling

Under fire conditions and, more severely, under water quench conditions following extreme heat, (e.g. from a fire hose) conventional concrete will spall and lose its integrity. Sinicon PP exhibits no such tendency and, following a fire, the material generally need not be replaced.

1.12 Improved Acoustic Properties

Being a soft material with the vaccum feature in the Sinicon PP it improves the acoustic properties of the building.

1.13 Test Reports:

CEPT India, National Test House India, Dubai Test Lab, SABS, CSIR and COMRO and PCI 23 1 4SABS , CSIR, COMRO and PCI Test Reports are available. These include mobile hydrocarbon fire tests, plus density, permeability, smoke emission, strength tests and abrasion tests.

2.0 PRODUCT PACKAGING

Sinicon PP is supplied in 10Kg (100Ltrs) polypropylene Jumbo Bags with detailed mixing instructions.

Note : Volume of 1 cement bag (50w33ltrs. One Sinicon PP Jumbo Bag is equal to the volume of 3 standard cement bags. Being light weight product Sinicon PP bag of 100Ltrs is only 10Kg in weight!

Printed instruction on Sinicon PP bag

SINICON PP
MIXING INSTRUCTIONS

	Mix Ratio	SINICON PP	Cement	Water (may vary with cement type)	Approximate Compacted Volumetric Yield
3 : 1 Volume Mix Ratio	Sinicon PP : Cement 1 Bag : 1 Bag	~1 Bag ± 100 Ltr.	~1 Bag ± 33 Ltr.	For Plaster Mix = 28 to 37 Ltr. For Screed Mix = 25 to 30 (Dry Mix) Ltr.	± 0.093m³
	3 : 1 Mix Ratio by Volume	1 Bag = ± 100 Litres	1 Bag = ± 33 Litres	IMPORTANT : DON'T USE TOO MUCH WATER !	93 Ltr.
4.5 : 1 Volume Mix Ratio	Sinicon PP : Cement 3 Bags : 2 Bags	~1 Bag ± 100 Ltr.	~1 Bag ± 33 Ltr.	For Plaster Mix = 74 to 93 Ltr. For Screed Mix = 58 to 72 (Dry Mix) Ltr.	± 0.280m³
	4.5 : 1 Mix Ratio by Volume	3 Bags = ± 300 Litres	2 Bags = ± 66 Litres	IMPORTANT : DON'T USE TOO MUCH WATER !	280 Ltr.
6 : 1 Volume Mix Ratio	Sinicon PP : Cement 2 Bags : 1 Bag	~1 Bag ± 100 Ltr.	1 Bag ± 33 Ltr.	39 to 45 Ltr.	± 0.186m³
	6 : 1 Mix Ratio by Volume	2 Bags = ± 200 Litres	1 Bag = ± 33 Litres	IMPORTANT : DON'T USE TOO MUCH WATER !	186 Ltr.
10 : 1 Volume Mix Ratio	Sinicon PP : Cement 7 Bags : 2 Bags	~1 Bag ± 100 Ltr.	1 Bag ± 33 Ltr.	134 to 170 Ltr.	± 0.651m³
	10 : 1 Mix Ratio by Volume	7 Bags = ± 700 Litres	2 Bags = ± 66 Litres	IMPORTANT : DON'T USE TOO MUCH WATER !	651 Ltr.

Note 1 : For plaster mixes grade 32.5n CEM 11 (or higher) cement is recommended.
Note 2 : During plaster application PRESS APPLY the mix on the wall/ceiling/roof surfaces.
Note 3 : Sinicon PP screeds must be thoroughly compacted before allowing to dry. Inadequate compaction will result in a reduction of final compressive strength.

SINICON PP SUITABILITY GUIDE

TYPICAL APPLICATIONS	3 : 1 Volume Mix	4½ : 1 Volume Mix	6 : 1 Volume Mix	10 : 1 Volume Mix
PLASTER - EXTERNAL	✔	✔	✕	✕
PLASTER - INTERNAL	✔	✔	✕	✕
LIGHTWEIGHT SCREEDS	✔	✔	✕	✕
BUILT - UP FLOORS	✔	✔	✕	✕
INSULATING ROOF DECKS	✔	✔	✔	✕
FIRE SEALS	✔	✔	✔	✔
CASTABLES	✔	✔	✔	✔
SPRAY APPLICATIONS	✔	✔	✔	✕
CAST THERMAL INSULATION	✕	✕	✔	✔

✔ = Suitable ✕ = Not Suitable For more details visit : www.sinicon.net Made in South Africa

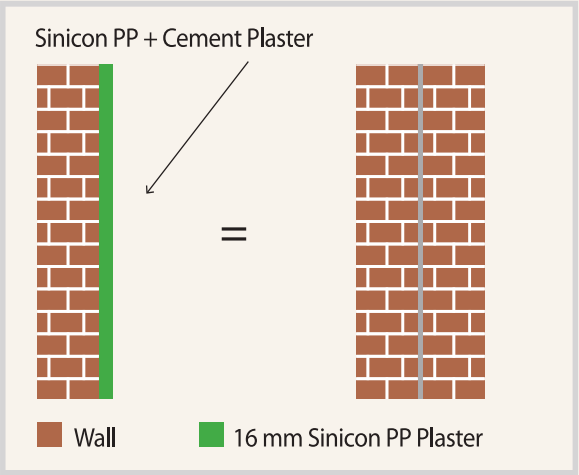
3.0 APPLICATION

3.1 Applications of Sinicon PP

1) External and internal plastering
2) Heat proofing/insulating roof decks.
3) Light weight concrete screed for metal roof.
4) Building up of floors
5) Fire proofing of structures and fire seals
6) Pre-cast Items
7) Cast thermal insulations
8) Architectural design applications
9) As loose-fill (without cement) to fill cavities for thermal insulation purposes.

DOUBLE WALL?

With just a 16mm plaster on either side (inside or outside) of the wall would give a difference in room temperature same as having a two double clay bricks wall as shown in the picture.



3.2 Suitability guide

Mix Ratio (by volume) Sinicon PP : Cement	3:1 1 Bag Sinicon PP (100l) + 1 Bag OPC (33l)	4.5:1 1.5 Bag Sinicon PP (150l) + 1 Bag OPC 33l)	6:1 2 Bag Sinicon PP (200l) + 1 Bag OPC (33l)	10:1 3.5 Bag Sinicon PP (350l) + 1 Bag OPC (33l)
TYPICAL PROPERTIES				
External Plaster	√	√	x	x
Internal Plaster	√	√	√	x
Built -up Floors	√	√	x	x
Insulating roof decks	x	√	√	x
Fire Seals	√	√	√	√
Castables	√	√	√	√
Spray Applications	√	√	√	x
Cast Thermal Insulation	x	x	√	√

Note: Before selecting a mix, check structural design and properties.

"OPC" = Ordinary Portland Cement √ = suitable X= Not suitable

3.3 Typical Properties

See below table.

1 Recommended water content as indicated in bold however, for plastering and casting application use higher water content.

2 The data in the table is expected values using quality OPC, standard mixing times, proper curing practice and correct water ratio.

3 Important Note: The water : cement ratio is very important. Numbers shown are per 100 Ltr. of Sinicon PP.

Mix Ratio (by volume) Sinicon PP : Cement	3:1 1 Bag Sinicon PP (100l) + 1 Bag OPC 50Kg (33l)		4.5:1 1.5 Bag Sinicon PP (150l) + 1 Bag OPC 50Kg (33l)		6:1 2 Bag Sinicon PP (200l) + 1 Bag OPC 50Kg (33l)		10:1 3.5 Bag Sinicon PP (350l) + 1 Bag OPC 50Kg (33l)	
Water (l) per 10kg (100l) bag of Sinicon PP	Low Water 23	High Water 29	Low Water 19.2	High Water 24.2	Low Water 19.2	High Water 24.2	Low Water 19.2	High Water 24.2
Slump (mm)	55	250	45	240	50	230	30+	90+
Flow (mm)	370	635	380	580	365	365	355	570
Measured Air Content (%)	12	16	15	18	21	21	22	21
Drying Shrinkage (%)	0.17	0.16	0.18	0.19	0.16	0.16	0.12	0.12
Watering Expansion (%)	0.14	0.14	0.17	0.17	0.15	0.14	0.1	0.1
7 day ISO flexuaral strength (Mpa)	3.7	1.9	3.4	2.0	1.5	1.1	-	-
28 day ISO flexuaral strength (Mpa)	4.9	2.7	4.2	2.5	1.8	1.3	-	-
7 day ISO compressive strength (Mpa)	14.2	5	12.6	5.2	3.9	3.9	-	-
28 day ISO compressive strength (Mpa)	19.8	7.5	16.9	6.3	4.4	2.9	-	-
7 day 100mm cube strength (Mpa)	16.9	7.3	15.6	6.9	4.7	3.1	1.2	0.8
28 day 100mm cube strength (Mpa)	23	10	19	8.7	6	4.3	1.7	1.4
Wet Density (Kg/m3)	1400	1150	1250	1000	900	800	750	700
Dry Density (Kg/m3)	1100	900	800	650	550	450	360	350

3.4 Plastering Yield

Approximately 11 bags of Sinicon PP will be required for each cubic metre (M^3) of concrete/plaster to be mixed (cement and water to be added to this quantity of Sinicon PP). This applies to all mixes mentioned in the table of Typical Properties above.

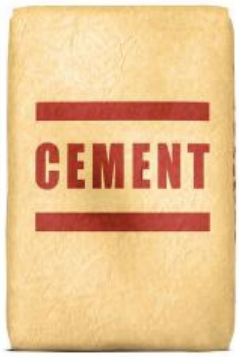
In the cases of general plastering applications, one Jumbo Bag of Sinicon PP can give the following plastering yield.

1) Plaster Mix for internal/external wall and ceiling plaster - Sinicon PP : Cement (4.5 : 1) at 12mm thickness is **80 Sq. Ft.**
2) Plaster Mix for roof plaster - Sinicon PP : Cement (3 : 1) at 24mm thickness is **42 Sq. Ft.**

3.5 Plaster Mixing Quantities

1. A plaster mixing of Sinicon PP : Cement at 3 : 1 ratio is as follows:

1 X 100Ltr. Sinicon PP Bag



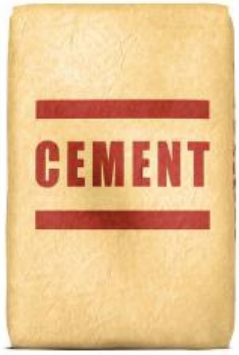
1 X 33Ltr (50Kg) Cement

29 Ltr* Water

* Lower the water content better the result.

2. A plaster mixing of Sinicon PP : Cement at 4.5 : 1 ratio is as follows:

1.5 x 100Ltr. Sinicon PP Bag



1 X 33Ltr (50Kg) Cement

36.3 Ltr*Water

* Lower the water content better the result.

3.6 Plaster Mixing Methods

1. General : All the principles of good concrete practice apply to Sinicon PP mixes
2. Equipment : A mechanical means of mixing is suggested. A pan mixer is preferable as a drum mixer tends to make balls. If this equipment is not available, manual mixing with shovels is acceptable. (As Sinicon PP is a non-absorbent volcanic glass, water will not be absorbed into the material. The use of a sealed, leak proof container is, therefore, recommended to prevent leaching of the required amount of water).
3. Mixing
   a. Mix Sinicon PP and cement in the dry state first (a little water may be used to dampen slightly in order to suppress dust).
   b. Add the correct amount of water (refer to the Typical Property Table and note that the water quantity is given in litres per 100Ltr of Sinicon PP!). The product

may appear very dry, especially if hand-mixed, but this is correct. It is important to monitor the amount of water added since small differences in water content have a large effect on overall consistency and slump.

c. Mix, but do not overdo, mixing time - about 30 seconds in a pan mixer is all that is required (longer mixing entrains too much air).

3.7 Plastering

1. Use conventional plastering methods for plastering Sinicon PP plaster, however, press apply the plaster on the surface instead of throwing.

2.

Gunnite : Sinicon PP concrete may also be gunnited. Because lower air velocities are used than for ordinary gunniting procedures, the rebound is lower. A further advantage is that the rebound can be reused.

3.8 Some Very Important Tips

1. The water content is extremely important. Too much water will yield poor results and lead to shrinkage, weak concrete and cracking. Use only the water per Typical Properties table.
2. When plastering, use good conventional plastering techniques. Particular attention should be paid to the degree to which the plaster has set prior to levelling with straight edge. As with any plaster, it should be set sufficiently so that it is difficult to cause an indentation by applying thumb pressure. If the straight edge is applied prematurely, it will cause the plaster to de-bond from the wall and slump cracks will form. On smooth surfaces, use Sinicon Pratley plaster grip primer.
3. As with any concrete or plaster, proper curing under damp conditions and out of direct sunlight is vital for success.
4. The application will determine the exact water : cement ratio. For example - for casting and plastering applications, the user may decide to use the high water content (refer to the Typical Properties table) whereas for screeds a drier consistency and stronger product may be preferred, hence the low water content may be chosen.
5. Once applied, the surface must be kept moist for the first 14 days while curing. If the finished product is to be exposed to direct sunlight or fast cured, contact our office for advice on specialised additives.

4 HOW A SINICON PP CEMENT PLASTER MORTAR APPLICATION SPECIFICATION (EXAMPLE) TO BE PRESCRIBED?

Wall and Ceiling Plastering

Provide and apply 12mm thick single coat internal, external and ceiling plaster in Sinicon PP cement heat proofing mortar at a ratio of 4.5 : 1 (Sinicon PP : Cement) with minimum water content for all plan / curved surfaces of brick / block / RCC Walls and finishing the same in correct line, level & plumb, making of edges, corners, sill, grooves etc. As per drawings & relevant specifications including all necessary surfaces preparations as per Sinicon PP heat proofing plaster methods; cleaning with wire brush to remove fungus/ dusts, hacking of surfaces to receive plaster if surface is smooth, wetting and cement grouting of surfaces, curing after application for 14 days, cleaning etc. complete at all levels and all heights. Apply base coat and top coat painting as per specification.

Roof Plastering (Screeding)

Provide and apply minimum 24mm thick single coat roof plaster (screed) in Sinicon PP cement mortar at a mix ratio of 3:1 (Sinicon PP : Cement) with minimum water content for all plain/slope surface of RCC roof and finishing the same in correct gradient to ensure water is not accumulated anywhere on the roof surface and the corners joints / junctions of roof and retain wall chamfered to avoid water seepage as per Sinicon PP heat proofing plastering methods; cleaning with wire brush to remove fungus / dusts, hacking of concrete surface to receive plaster, washing, wetting and cement grouting of surface, curing after application for 14 days, cleaning etc compete at all the roof surfaces. Apply base coat of white cement as per specification.

ATTENTION

BUILDERS & CONTRACTORS

PROBLEMS

- Cracks?
- Leakage/Seepage?
- Spalling?
- Faster Aging of Buildings?

REASONS

Mechanical and Physical properties of building structures are suddenly deteriorated due to the **Excessive Heat Absorption of Building Structure** and also due to Tropical Climate. Usage of materials such as M sand, Rock Sand etc. that absorbs large amount of thermal energy add to the problems.

The influence of excessive heat on the concrete structures are :

- **Stress and Strain characteristics** increases thus leads to loss of stiffness in concrete.
- **Modulus Elasticity** decreases causing cracks in concrete.
- **Compressive Strength** decreases leads to loss of structural integrity thus negatively affect the load bearing capacity.
- **Tensile Strength** decreases leads to cracking.
- **Shrinkage and creep** increases resulting cracks.
- **Concrete – Steel reinforcement Bond strength** decreases.
- **Radiation Shielding Effectiveness** decreases.

REMEDY

Plaster your valuable building structure with SINICON PP, and get rid off all the problems almost completely. Sinicon PP also protect moisture absorption hence substantially reduces the corrosion in the reinforcement steel, increasing building life.

"SINICON PP makes your building structure remain strong in all weather and provides the building interior cool during summer and warm during winter."

SHIBAM

Roofing Shingles | Waterproofing Materials | Construction Chemicals |
Thermal & Acoustic Insulation | Stone Coated Metal Roofing Tiles

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