TECHNY CHEMY

New Era Construction Chemicals

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Water Proofing Analysis

Waterproofing is as much an art as it is a Science. Mere knowledge of products available in the market will not suffice to solve waterproofing problems. The subject needs to be treated with a lot more understanding than that. Good products need to be blended in the right measure with the precise application methods and proper understanding of the ground situation. The job is best left to knowledgeable waterproofing professionals and skilled applicators.

Admixtures in concrete are the first line of defense against water entry and subsequent deterioration of concrete. Water reducing admixtures like Plasticizers and Super plasticizers help in obtaining dense, impermeable concrete with improved durability.

Despite all precautions adopted, it is imminently possible that water will seep through the formidable concrete barrier seeking the weak areas like construction joints, cold joints and honeycombs. This situation is more likely to occur in basements, sumps, swimming pools, other water retaining structures and roof slabs.

This specification booklet is designed to provide tailor made solutions for most of the conceivable waterproofing problems in the contemporary building industry. All the methods specified lay emphasis on the treatment being closest to the concrete surface. These Time Tested Chemical Waterproofing methods have been designed by Techny's Technical Team comprising of experienced Professionals.

UNDERSTANDING WATERPROOFING

To understand waterproofing it is vital to clearly differentiate waterproofing from damp proofing. The two terms are typically interchangeably used (almost wrongly). The following comparison should help clear the misconception.

DAMP PROOFING

- General seepage throughout the area and no physical dripping through single and multiple locations.
- There is no hydrostatic head.
- Damp-proofers will not be flexible enough to compensate hairline cracks or thermal movements.
- Damp-proofers are typically applied on vertical surfaces where stagnant water is not present.

WATERPROOFING

- Physical water drippings through single or multiple locations.
- Presence of a hydrostatic pressure head.
- Water-proofers will be flexible enough to accommodate thermal movements and compensate hairline cracks.

- Water-proofers are applied on both vertical and horizontal surfaces.
- Most waterproofing admixtures typically added to concrete or plaster as well as silicone based water repellent coatings can at best be grouped under damp proofing materials. Polymer - Cement composites (membrane coatings), Crystallization waterproofing systems and liquid applied polymer membranes can be classified under waterproofing materials.

SOME IMPORTANT CONSIDERATIONS FOR CONCRETING OF BASEMENT:

- Concrete must be a minimum of M20 grade with a low water-cement ratio
- It is necessary to use a water-reducer (Plasticizer or Super plasticizer as per IS:9103)
- It is recommended to avoid any construction joints in the raft as well as at the junction of raft and vertical wall. If not possible because of site conditions then epoxy bonding agent as Tec^{R} Bond EPO etc must be used.
- Number of lift joints: Lesser the better
- All construction joints horizontal or vertical must be bonded with either epoxy or acrylic bonding compounds. Use of water stops is also advisable.

KEY INFORMATION

PRESSURE GROUTING : For most of the above applications a hand operated- diaphragm type pump that produces pressure up to 40 psi would suffice. In cases of higher pressure heads/ hydrostatic pressures exceeding 3Kg/sqcm, a hand / compressor operated pump of pressure 140psi may be used.

RE-BAR PROTECTION : For protection of new re-bars TEC^{R} BEAT RB may be used. The mix may be prepared by blending one part TEC^{R} BEAT RB, half part water, one part cement and half part coarse sieved sand.

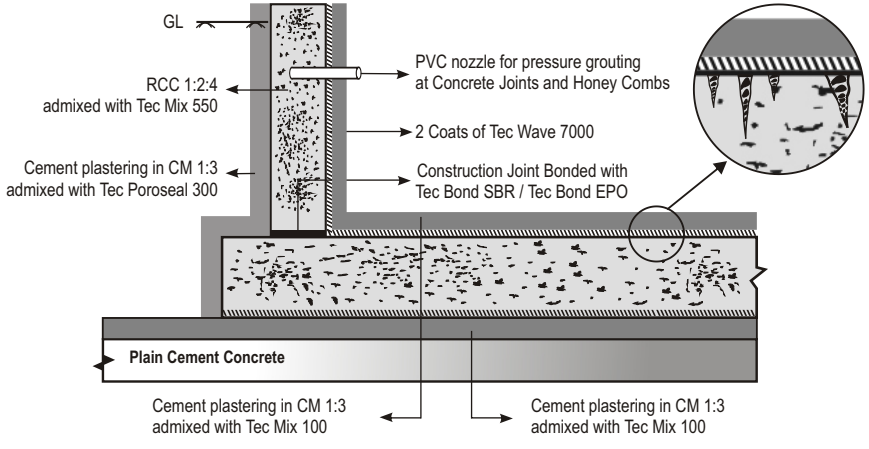
BONDING SLURRY : Bonding slurry for plain masonry/concrete surfaces may be prepared by mixing one part TEC^{R} BOND SBR with one part cement and half part water to obtain a stiff brushable consistency. For in accessible concrete lift joints the slurry may be prepared by mixing one part TEC^{R} BOND SBR with one part water one part cement and ½ part coarse sieved sand.

MODIFIED MORTAR : Modified mortar for thin set plastering applications, plastering of construction joints and honeycombs may be prepared by mixing 1part TEC^{R} BOND SBR with 4 parts cement, 12 parts coarse sieved sand and adequate water for workable consistency.

BASEMENT WATER PROOFING

CRYSTALLIZATION SYSTEM

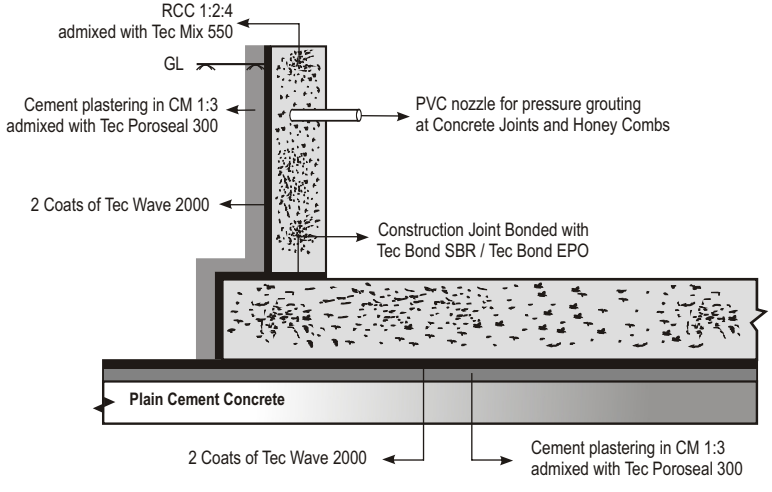
- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC^{R} MIX 100 liquid at 200ml per bag of cement carried out and finished neatly.
- Over the plastered surface two coats of TEC^{R} WAVE 7000 - Crystallization type waterproofing system is to be applied strictly following mix and application instructions for the product. The plastered surface should be saturated wet prior to application of TEC^{R} WAVE 7000.
- While the second coat of TEC^{R} WAVE 7000 is still tacky 12mm cement plastering in CM 1:3 admixed with TEC^{R} MIX 100 liquid at 200ml per bag of cement should be carried out and finished neatly.
- RCC for floor and walls should be cast at this stage. Concrete cold joints shall be treated with a bonding slurry prepared by mixing one part TEC^{R} BOND SBR with one part water one part cement and ½ part sieved sand.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC^{R} BOND SBR should be carried out.
- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC^{R} STOP.
- Neat cement slurry admixed with TEC^{R} SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nozzles provided using a hand operated grouting pump.
- The floor and wall surface shall be cleaned to be free of dust and loose particles.



- The walls and floor should then be coated with TEC® WAVE 7000- Crystallization type waterproofing system, applied strictly following mix and application instructions for the product.
- While the second coat of TEC® WAVE 7000 is still tacky, cement plastering in CM 1:4 admixed with TEC® POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should remain continuously water soaked for a minimum period of 7 days to ensure maximum crystallization of the crystalline waterproofing system.

MEMBRANE SYSTEM

- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC® MIX 100 liquid at 200ml per bag of cement carried out and finished neatly.
- Over the plastered surface two coats of TEC® WAVE 2000 Flexible waterproofing membrane coating system is to be applied strictly following mix and application instructions for the product. The plastered surface should be wetted but free of water puddles prior to application of TEC® WAVE 2000.
- While the second coat of TEC® WAVE 2000 is still tacky 12mm cement plastering in CM 1:3 admixed with TEC® MIX 100 liquid at 200ml per bag of cement should be carried out and finished neatly.
- RCC for floor and walls should be carried out at this stage. Concrete cold joints shall be treated with a bonding slurry prepared by mixing one part TEC® BOND SBR with one part water, one part cement and ½ part sieved sand.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC® BOND SBR should be carried out.

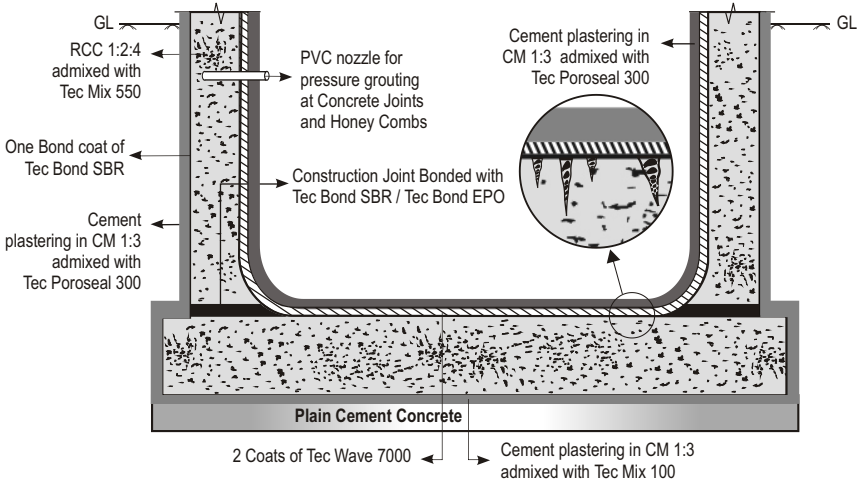


- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC[R] STOP.
- Neat cement slurry admixed with TEC[R] SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nozzles provided using a hand operated grouting pump.
- The floor and wall surface shall be cleaned to be free of dust and loose particles and then wetted ensuring there are no water puddles.
- Two coats of TEC[R] WAVE 2000- Flexible waterproofing membrane coating system is to be applied strictly following mix and application instructions for the product.
- While the second coat of TEC[R] WAVE 2000 is still tacky, cement plastering in CM 1:4 admixed with TEC[R] POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should be cured adequately for a minimum period of 7 days to optimize performance.

SUMP WATERPROOFING

CRYSTALLIZATION SYSTEM

- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC[R] MIX 100 liquid (@ 200ml per bag of cement) carried out and finished neatly.
- High performance super plasticizer TEC[R] MIX 550 liquid should be used as admixture for concreting at 250ml per bag of cement.

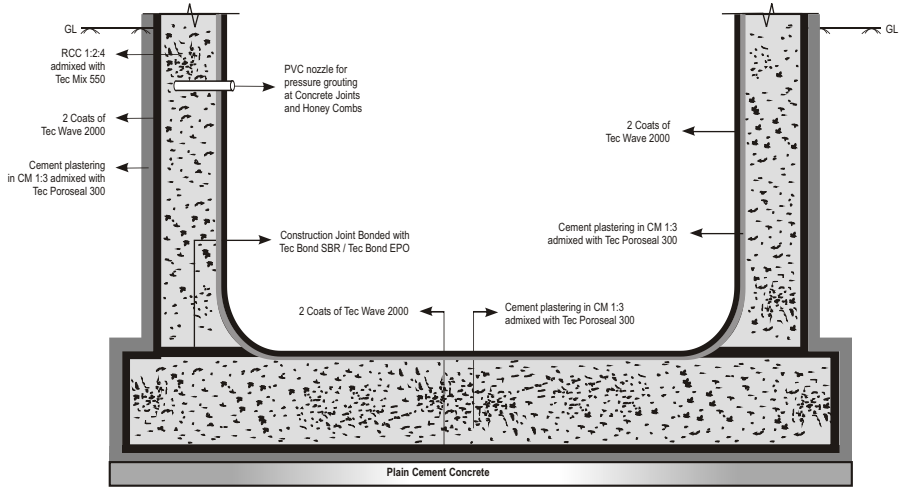


- External side of walls shall be coated with polymer bonding agent TEC® BOND SBR mixed with cement in 2 coats and plastered with cement sand mortar admixed withTEC® POROSEAL 300 (@ 500gms per bag of cement) while the second bond coat is tacky and green.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC® BOND SBR should be carried out.
- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC® STOP.
- Neat cement slurry admixed with TEC® SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nozzles provided using a hand operated grouting pump.
- The floor and wall surface shall be cleaned to be free of dust and loose particles.
- Walls and floor should be wetted throughly without any puddles of water is stagnated.
- The walls and floor should then be coated with TEC® WAVE 7000- Crystallization type waterproofing system, applied strictly following mix and application instructions for the product.
- While the second coat of TEC® WAVE 7000 is still tacky, cement plastering in CM 1:4 admixed with TEC® POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should remain continuously water soaked for a minimum period of 7 days to ensure maximum crystallization of the crystalline waterproofing system.

MEMBRANE SYSTEM

- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC® MIX 100 liquid (@ 200ml per bag of cement) carried out and finished neatly.
- RCC for floor and walls shall be carried out at this stage. High performance super plasticizer TEC® MIX 550 liquid should be used as admixture for concreting at 250ml per bag of cement.
- External side of walls shall be coated with polymer bonding agent TEC® BOND SBR mixed with cement in 2 coats and plastered with cement sand mortar admixed with TEC® POROSEAL 300 (@ 500gms per bag of cement) while the second bond coat is wet and green.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC® BOND SBR should be carried out.
- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC® STOP.

- Neat cement slurry admixed with TEC^{R} SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nozzles provided using a hand operated grouting pump.
- The floor and wall surface shall be cleaned to be free of dust and loose particles.
- Two coats of TEC^{R} WAVE 2000- Flexible waterproofing membrane coating system is to be applied strictly following mix and application instructions for the product.
- While the second coat of TEC^{R} WAVE 2000 is still tacky, cement plastering in CM 1:4 admixed with TEC^{R} POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should then be cured for a minimum period of 7 days.
- Water stagnation test may be carried out after completion of curing. Water should be stagnated at fluctuating pressure head for a minimum period of 3 days.

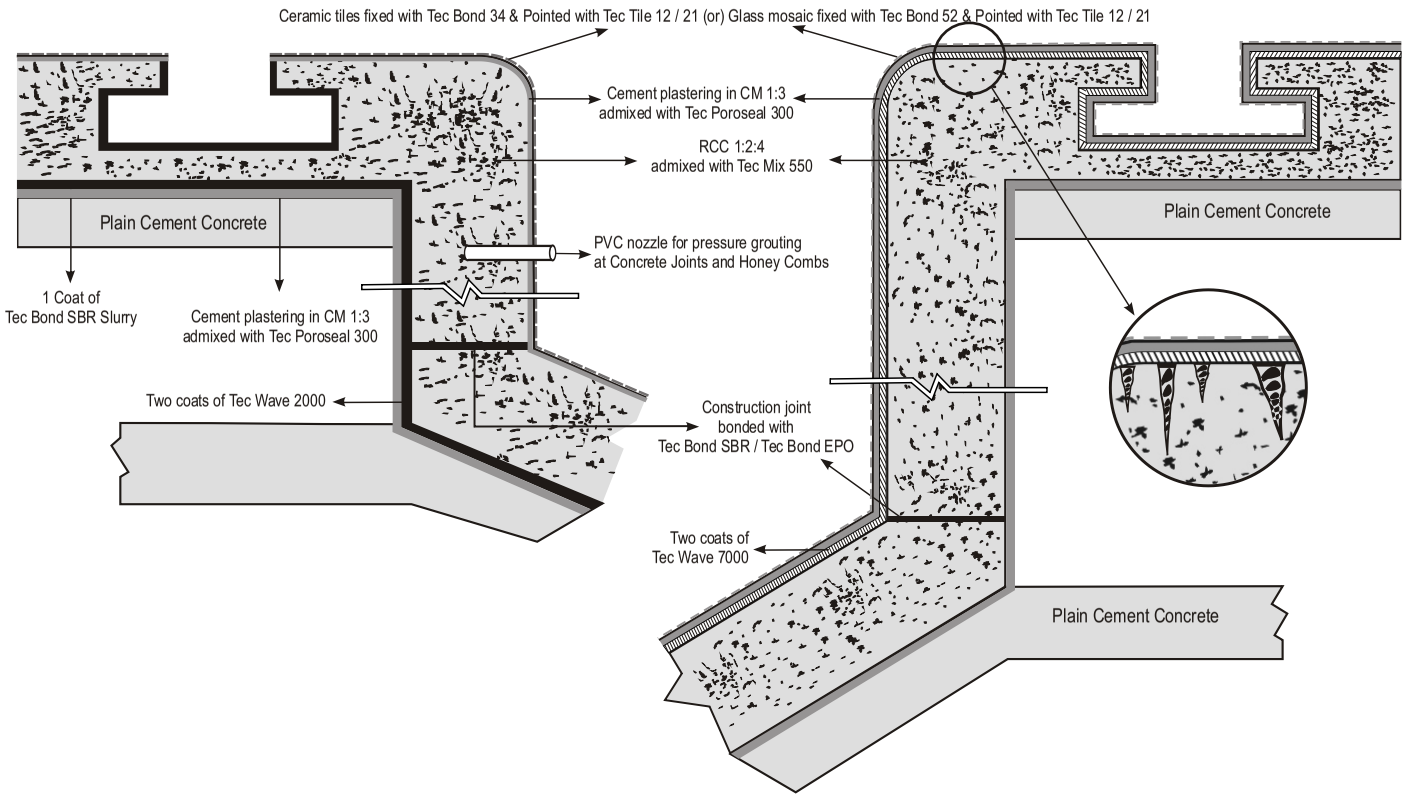


SWIMMING POOL AND RESERVOIR WATERPROOFING

CRYSTALLIZATION SYSTEM

- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC^{R} MIX 100 liquid (@ 200ml per bag of cement) carried out and finished neatly.
- Over the plastered surface two coats of TEC^{R} WAVE 7000 - Crystallization type waterproofing system is to be applied strictly following mix and application instructions for the product. The plastered surface should be saturated wet prior to application of TEC^{R} WAVE 7000.
- While the second coat of TEC^{R} WAVE 7000 is still tacky 12mm cement plastering in CM 1:3 admixed with TEC^{R} MIX 100 liquid at 200ml per bag of cement should be carried out and finished neatly.
- All reinforcement rods may be provided two coats of TEC^{R} BEAT RB- Re-bar coating system for long lasting protection.
- RCC for floor and walls should be carried out at this stage. High performance super plasticizer TEC^{R} MIX 550 liquid should be used as admixture for concreting at 250ml per bag of cement. Concrete cold joints shall be treated with a bonding slurry preparation prepared by mixing one part TEC^{R} BOND SBR with one part water one part cement and ½ part sieved sand.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC^{R} BOND SBR should be carried out.
- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC^{R} STOP.
- Neat cement slurry admixed with TEC^{R} SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nipples provided using a hand operated grouting pump.
- All clamps provided in the RCC should be grouted firmly and neatly using Polyester resin grout- TEC^{R} GROUT PGA.
- All the electrical fittings, boxes clamps and pipes that go underwater should be coated with TEC^{R} BEAT EP/ TEC^{R} BEAT ZR- Anti-corrosive coating system.
- The floor and wall surface shall be cleaned to be free of dust and loose particles.
- The walls and floor should then be coated with TEC^{R} WAVE 7000- Crystallization type waterproofing system is to be applied strictly following mix and application instructions for the product.

MEMBRANE **CRYSTALISATION**



- While the second coat of TEC® WAVE 7000 is still tacky, cement plastering in CM 1:4 admixed with TEC® POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should remain continuously water soaked for a minimum period of 7 days to ensure maximum crystallization of the crystalline waterproofing system.

MEMBRANE SYSTEM

- The PCC floor surface shall be cleaned to be free of dust and loose particles and 20mm cement plastering in Cement Mortar 1:3 admixed with TEC® MIX 100 liquid at 200ml per bag of cement carried out and finished neatly.
- Over the plastered surface, two coats of TEC® WAVE 2000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product. The plastered surface should be wetted but free of water puddles prior to application of TEC® WAVE 2000.
- While the second coat of TEC® WAVE 2000 is still tacky 12mm cement plastering in CM 1:3 admixed with TEC® MIX 100 liquid at 200ml per bag of cement should be carried out and finished neatly.
- All reinforcement rods may be provided two coats of TEC® BEAT RB- Re-bar coating system for long lasting protection.
- RCC for floor and walls should be carried out at this stage. High performance super plasticizer TEC® MIX 550 liquid should be used as admixture for concreting at 250ml per bag of cement. Concrete cold joints shall be treated with a bonding slurry preparation prepared by mixing one part TEC® BOND SBR with one part water one part cement and ½ part sieved sand.
- After removal of shutters, dressing the concrete joints and honeycombs and patching with modified Cement mortar prepared using TEC® BOND SBR should be carried out.
- Pockets should be drilled at weak concrete junctions and honeycombs and PVC nozzles fixed using instant plug- TEC® STOP.
- Neat cement slurry admixed with TEC® SWELL (@225 gms per bag of cement) shall be grouted under pressure through the nipples provided using a hand operated grouting pump.
- All clamps provided in the RCC should be grouted firmly and neatly using Polyester resin grout TEC® GROUT PGA.
- All the electrical fittings, boxes clamps and pipes that go underwater should be coated with TEC® BEAT EP/ TEC® BEAT ZR- Anti-corrosive coating system.
- The floor and wall surface shall be cleaned to be free of dust and loose particles.

- Over the walls and floor two coats of TEC® WAVE 2000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product.
- The concrete surface should be wetted but free of water puddles prior to application of TEC® WAVE 2000.
- While the second coat of TEC® WAVE 2000 is still tacky, cement plastering in CM 1:4 admixed with TEC® POROSEAL 300 (@ 500gms per bag of cement) should be carried out and finished neatly.
- The treated area should be cured adequately for a minimum period of 7 days.

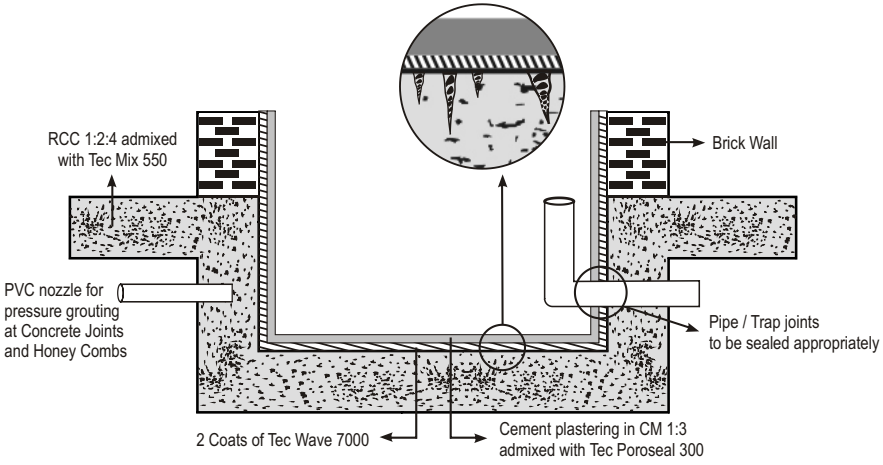
SUNKEN PORTIONS / TOILETS WATERPROOFING

CRYSTALLIZATION SYSTEM

- The inner areas of sunken portions and toilets shall essentially be of Reinforced cement concrete cast using high performance super plasticizer- TEC® MIX 550.
- The inner areas of the sunken portions shall be cleaned thoroughly and all cement droppings and deposits removed.
- Plastering of Construction joints and honeycombs with Latex modified mortar prepared by mixing one part TEC® BOND SBR with one part cement & four parts sand. This highly plasticized Mortar shall be finished smoothly with a trowel & allowed to set over night.
- Water stagnation should then be done in the Sunken Portion for a minimum period of 3 days.
- Leakages observed during the water stagnation period shall be sealed of by pressure grouting.
- Pressure Grouting: Drilling pockets at the leakage points and fixing PVC nozzles using instant plug- TEC® STOP. Through the points provided grouting neat cement slurry admixed with expansive grouting additive TEC® SWELL (@ 225gms per bag of cement) using a hand operated grouting pump. Once the nozzles are completely filled the points may be sealed with TEC® STOP.
- After the above process is complete the ponded water is to be removed and over the water saturated inner areas, two coats of TEC® WAVE 7000- Crystallization type waterproofing system is to be applied strictly following application instructions for the product.
- Over the still wet coat of TEC® WAVE 7000 one layer of cement plastering in CM 1:3 admixed with TEC® MIX 100 liquid (@ 200ml per bag of cement) should be carried out for walls and one layer of cement screed 1:1½:3 using 6mm downgraded chips admixed with TEC® MIX 100- liquid (@ 200ml per bag of cement) should be carried out

for floors and finished neatly with the corners adequately chamfered. The plastering and screed should be allowed to set over night.

- The treated area should be cured continuously for a minimum period of 7days.
- Prior to filling the sunken portions all plumbing line joints, sewer line joints and trap joints should be sealed with TEC® POLYSEAL G - Gun grade Polysulphide sealant for dry surfaces or with TEC® BOND EPO for wet surfaces. These joints should either be pressure tested or tested by water stagnation for 24 hours.
- On satisfactory completion of the above filling and flooring PCC may be carried out. Selecting fillers is vital and light weight non-absorbent fillers are recommended.
- Ceramic tile fixing may then be carried out for walls and floor using Tile fixing mortar- TEC® BOND 25.
- Tile joints may then be grouted with TEC® TILE 21- Epoxy tile joint grout.



MEMBRANE SYSTEM

- The inner areas of sunken portions and toilets shall essentially be of Reinforced cement concrete cast using high performance super plasticizer- TEC® MIX 550.
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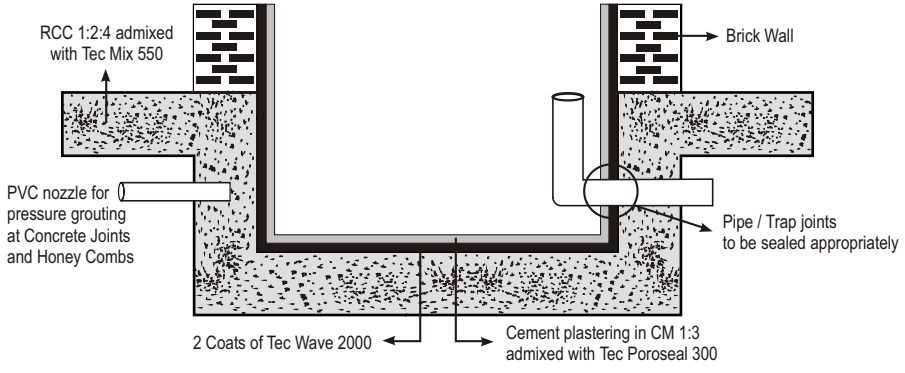
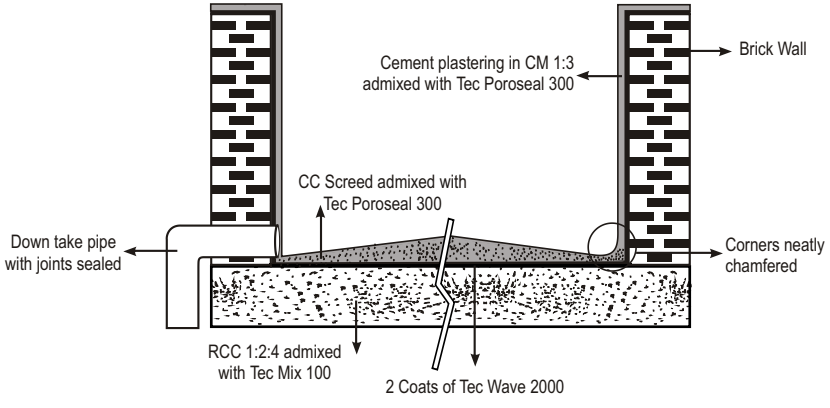
- Leakages observed during the water stagnation period shall be sealed of by pressure grouting.
- Pressure Grouting: Drilling pockets at the leakage points and fixing PVC nozzles using instant plug- TEC® STOP. Through the points provided grouting neat cement slurry admixed with expansive grouting additive TEC® SWELL (@ 225gms per bag of cement) using a hand operated grouting pump. Once the nozzles are completely filled the points may be sealed with TEC® STOP.
- After the above process is complete the ponded water is to be removed, the surface shall be cleaned to be free of dust, loose particles and water puddles.
- Over the walls and floor two coats of TEC® WAVE 2000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product.
- Over the still wet second coat of TEC® WAVE 2000 cement plastering in CM 1:3 admixed with TEC® POROSEAL 300 (@500gms per bag of cement) should be carried out over the floor and walls.
- The treated area should be cured adequately for a minimum period of 7days.
- Prior to filling the sunken portions all plumbing line joints, sewer line joints and trap joints should be sealed with TEC® POLYSEAL G - Gun grade Polysulphide sealant for dry surfaces or with TEC® BOND EPO for wet surfaces. These joints should either be pressure tested or tested by water stagnation for 24 hours.
- On satisfactory completion of the above filling and flooring PCC may be carried out. Selecting fillers is vital and light weight non-absorbent fillers are recommended.
- Ceramic tile fixing may then be carried out for walls and floor using Tile fixing mortar- TEC® BOND 25.
- Tile joints may then be grouted with TEC® TILE 21- Epoxy tile joint grout.



TERRACE WATERPROOFING: FLAT SLABS

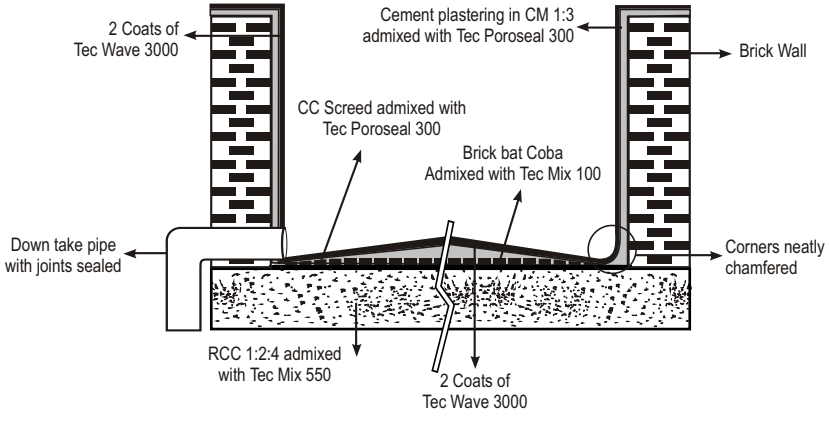
MEMBRANE SYSTEM:

- The RCC slab shall be cast using Integral Waterproofer TEC[R] MIX 100 as admixture (@ 200ml per bag of cement).
- Concrete cold joint should be provided with bonding slurry prepared by mixing one part TEC[R] BOND SBR with one part cement and ½ - 1 part water.
- The concrete surface shall be cleaned to be free of dust, loose particles, loosely adhering material and cement droppings. Chipping followed by scrubbing with a stiff wire brush and cleaning with brushes to remove fine dust shall form the sequence for surface preparation.
- The cleaned surface shall be wetted thoroughly but should be free of water puddles.
- Two coats of TEC[R] WAVE 2000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product The second coat can be applied when the first coat has reached tack-free stage. While coating, the parapet wall joints shall be provided with and intermediate layer of suitable fiber.
- Over the still wet second coat of TEC[R] WAVE 2000 cement plastering in CM 1:3 admixed with TEC[R] POROSEAL 300 (@500gms per bag of cement) should be carried out over the floor and walls. Parapet wall joints shall be chamfered and finished neatly.
- The treated area should be cured adequately for a minimum period of 7days.



HIGH FLEXIBILITY MEMBRANE SYSTEM OVER HP TILES

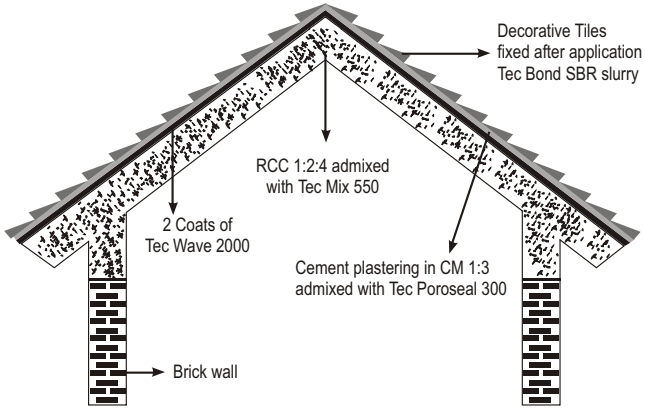
- This system should be adapted only over good quality tile substrates firmly laid with adequate slopes and outflow pipes.
- It is also vital to ensure that weathering course laid beneath the tiles is of high quality, firm and sound at the time of providing the waterproofing treatment.
- The tile surface to be coated shall be cleaned to be free of dust, loosely adhering materials, cement droppings and fine dust.
- The tile joints shall be raked clean to remove loose mortar.
- Re-pointing shall be done using CM 1:4 admixed with TEC^{R} SWELL (@ 450gms per bag of cement).
- The cleaned surface should be wetted but should be free of water puddles. The primer coat of TEC^{R} WAVE 3000 High flexibility waterproofing membrane coating system shall be applied and be allowed to reach tack-free stage.
- Two top coats of TEC^{R} WAVE 3000 should be provided over the primer coat, all as per mix and application instructions for the product.
- The treated area should be adequately cured for a minimum period of 7 days.



SLOPED ROOF WATERPROOFING

MEMBRANE SYSTEM

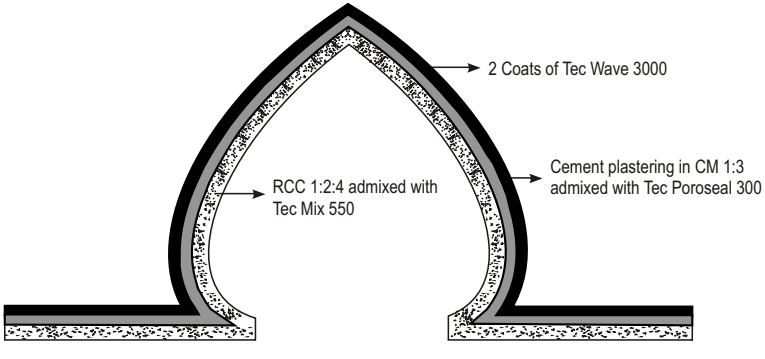
- The RCC slab shall be cast using High performance Super Plasticizer TEC[R] MIX 550 as admixture (@ 250ml per bag of cement).
- Concrete cold joint should be provided with a bonding slurry coat of TEC[R] BOND SBR.
- After adequate curing, the concrete surface shall be cleaned to be free of dust, loose particles, and loosely adhering material and cement droppings. Chipping followed by scrubbing with a stiff wire brush and cleaning with brushes to remove fine dust shall form the sequence for surface preparation.
- The cleaned surface shall be wetted thoroughly but should be free of water puddles.
- Two coats of TEC[R] WAVE 2000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product. The second coat can be applied when the first coat has reached tack-free stage.
- Over the cured second coat of TEC[R] WAVE 2000, one bond coat of TEC[R] BOND SBR cement plastering in CM 1:3 admixed with TEC[R] POROSEAL 300 (@500gms per bag of cement) should be carried out over the roof slab.
- The treated area should be cured adequately for a minimum period of 7days.



DOMES/ SHELLS AND FOLDED PLATE ROOF

HIGH FLEXIBLE MEMBRANE SYSTEM

- The RCC slab shall be cast using High performance Super Plasticizer TEC[R] MIX 550 as admixture (@ 250ml per bag of cement).
- Concrete cold joint should be provided with a bonding slurry coat of TEC[R] BOND SBR.
- After adequate curing, the concrete surface shall be cleaned to be free of dust, loose particles and cement droppings. Chipping followed by scrubbing with a stiff wire brush and cleaning with brushes to remove fine dust shall form the sequence for surface preparation.
- The cleaned surface shall be wetted thoroughly but should be free of water puddles.
- Two coats of TEC[R] WAVE 3000- flexible membrane waterproofing coating is to be applied strictly following mix and application instructions for the product The second coat can be applied when the first coat has reached tack-free stage.
- Over the cured second coat of TEC[R] WAVE 3000, one bond coat of TEC[R] BOND SBR cement plastering in CM 1:3 admixed with TEC[R] POROSEAL 300 (@500gms per bag of cement) should be carried out over the floor and walls. Corners shall be chamfered and finished neatly.
- The treated area should be cured adequately for a minimum period of 7days.



CHECK LIST TO BE FOLLOWED DURING WATER PROOFING WORKS

This is a generalized check list for all water proofing works. For unusual site conditions contact our technical wing for a specific checklist based on nature of seepage/leakage.

CHECKS PRIOR TO WATERPROOFING WORKS

- Check whether the area to be water proofed is free of debris?
- Whether bore's provided for sewer and waste lines (in sunken areas) have been done neatly?
- Whether bore size is adequate?
- Is the cement plastering completed to required height?
- Whether grooves for concealed waterlines have been provided?
- Check quality of construction joints, wall-floor joints, all piping joints and expansion joints?
- In case of basements and sub-floor water storage sumps/tanks, check ground water levels to assess the hydrostatic pressure.

CHECKS DURING TO WATERPROOFING WORKS

- Whether the surface preparation is adequate.
- If construction joints if any are treated correctly as per specification provided.
- Check if honey combs have been treated adequately and then pressure grouted.
- Depth of stagnated water is enough for testing.
- Check for persistent dampness during the testing period.
- If the observed dampness is due to cracks, check if the cracks have been filled and grouted.
- If the observed seepage is due to foreign bodies embedded in the concrete / masonry, these should be removed and the voids left behind should be filled with recommended repair mortars.
- Ensure that the testing is repeated till satisfactory results are obtained.
- Check if the mortar mixes are as specified and ensure that the recommended dosage of admixture has been added as per the mix instructions.
- Check if the bond coat has been mixed and applied correctly.
- Ensure that the plastering is applied over the bond coat while the bond coat is still tacky.
- Ensure that the corners in water retaining structures are chamfered adequately.
- Ensure that the mix and application instruction for each product is followed accurately.
- For flat slabs and sunshades ensure that the corners are neatly chamfered and make sure that the slopes are appropriate.
- Pressure test plumbing lines before concealing.
- Pressure test sewer and waste water lines before filling the sunken portions.

- Ensure excess water spouts are provided with proper slopes and adequately protected before filling in sunken areas.
- Check and re-check all pipe joints before filling of sunken portions
- At all stages ensure that the curing is adequate.

REPAIRS AND REHABILITATION

CRACK FILLING

It is vital to understand the nature of cracks before attempting to rectify them. For this purpose cracks may be classified as follows:

MINOR CRACKS: Cracks of width upto 6mm may be categorized as Minor cracks. These include shrinkage cracks, shear cracks and non-moving cracks.

MAJOR CRACKS: Cracks of width above 6mm may be categorized as Major cracks. Structural settlement cracks, beam/column- BW joint cracks, Cracks caused by warping of flat roof slabs-usually between Brick wall and slab, Roof slab-Parapet joint cracks and construction joint cracks. Repairing of structural settlement cracks should be done only after structural stabilization.

SPALLING RECTIFICATION

Damage caused by rebar corrosion is one of the major durability problems affecting the service life of concrete structures. Corrosion-prone as well as corrosion affected structures require systematic inspection and investigation by qualified professionals in order to assess the condition of concrete, presence of corrosion activity and extent and severity of corrosion. Repair designs must be based on the out come of these investigations.

To formulate effective and economical repair measures it is fundamental to understand the corrosion process of rebar embedded in concrete. Rebar embedded in concrete is generally well protected by the cover thickness provided. Two situations, namely lowered pH (usual pH value of concrete being greater than 11.5) due to ingress of Carbon-di-Oxide and presence of chloride ions either independently or in combination initiate the corrosion process in embedded rebar's. Once initiated the process continues until radial fractures lead up to de-lamination and ultimately spalling.

This specification booklet attempts to provide a generalized outline for repairing cracks and spalled concrete. In both cases it is vital to investigate and assess the reasons for distress before embarking on a repair path. Techny's Technical Team has the knowledge base and experience to guide you through these stages on specific case to case basis.

CRACK FILLING MINOR CRACKS

- Routing out the cracks with a mechanically operated groove cutter to form a neat groove and cleaning to be free of dust and loose particles.
- The opened groove shall be wetted thoroughly using a bottle sprayer.

- TEC® KRACKFILLER shall be mixed as per the mix instructions for the product and then be applied on to the opened groove ensuring proper filling without air bubbles. A putty knife or a spatula may be used for the purpose.
- On setting the filled material may either protrude or sag depending on the depth of the crack being filled.
- In case the filler protrudes, the projection may be rubbed down using fine finish polishing stones.
- In case the filler sags, one more layer of TEC® KRACKFILLER may be applied as soon as the first layer sets.
- Curing is vital for expansion of the filler material. The treatment should be cured adequately for a minimum period of 3 days. Curing membrane TEC® CURE WB may be applied as an alternative to water curing.

CRACK FILLING MAJOR CRACKS:

- The cracks should be chipped to form a neat 'V' shaped groove and cleaned to be free of dust and loose particles.
- The opened groove should then be wetted thoroughly.
- Over the still wet substrate one bond coat of TEC® BOND SBR modified slurry preparation shall be applied. The slurry shall be prepared by mixing one part of TEC® BOND SBR with one part of cement.
- While the bond coat is still tacky, the grooves shall be filled with cement mortar 1:4 admixed with TEC® SWELL (@ 450gms per bag of cement), well compacted and then finished neat.
- Curing is vital for expansion of the filler material. The treatment should be cured adequately for a minimum period of 3 days. Curing membrane TEC® CURE WB may be applied as an alternative to water curing.

SPALLING RECTIFICATION: ROOF SLAB

- The delaminated portions of the concrete roof slab shall be dismantled.
- The dismantled area shall be thoroughly cleaned by wire-brushing ensuring that the surface is free of dust and loose particles.
- The existing reinforcement rods shall be wire brushed to be free of rust and scales.
- Additional reinforcement if required may be provided. The additional reinforcement should be anchored to the existing portions of the concrete using TEC® GROUT PGA- Polyester Resin Based anchoring grout.
- Both the existing and new reinforcement rods shall be provided with two coats of TEC® BEAT ZR- Epoxy Zinc Rich reinforcement coating system.

- The reinforcement coating system should be allowed to self cure at room temperature for a minimum period of 48 hours.
- After the 48 hour curing period the dismantled area including the coated reinforcement shall be thoroughly water washed.
- Over the clean and water saturated concrete substrate one bond coat of TEC® BOND SBR modified slurry preparation shall be applied using a stiff bristled brush, working the slurry well into the substrate. The slurry shall be prepared by mixing one part of TEC® BOND SBR with one part of cement.
- While the bond coat is still tacky cement plastering in cm 1:4 shall be carried in layers of not more than 15mm. It is strongly recommended that the bond coat be repeated between each layer.
- Curing is vital for optimum performance of the repair job. The treatment should be cured adequately for a minimum period of 7 days. Curing membrane TEC® CURE WB may be applied as an alternative to water curing.

SPALLING RECTIFICATION: COLUMNS AND BEAMS

- The delaminated portions of the concrete beams/columns shall be dismantled exposing the corroded reinforcement bars.
- The dismantled area shall be thoroughly cleaned by wire-brushing ensuring that the surface is free of dust and loose particles.
- The existing reinforcement rods shall be wire brushed to be free of rust and scales.
- Additional reinforcement if required may be provided. The additional reinforcement should be anchored to the existing portions of the concrete using TEC® GROUT PGA- Polyester Resin Based anchoring grout.
- Both the existing and new reinforcement rods shall be provided with two coats of TEC® BEAT ZR- Epoxy Zinc Rich reinforcement coating system.
- The reinforcement coating system should be allowed to self cure at room temperature for a minimum period of 48 hours.
- After the 48 hour curing period the dismantled area including the coated reinforcement shall be thoroughly water washed.
- After allowing the washed surface to dry, one bond coat of TEC® BOND EPO- Two component Epoxy bonding agent shall be provided over the cleaned substrate. TEC® BOND EPO should be applied with a stiff bristled brush and worked well into the substrate.
- Slurry tight shuttering should immediately be fitted into position to enable Micro-concreting well with in the pot life of the bond coat.

- TEC® GROUT MC- Micro-concrete shall be mixed with water and then be poured into the slurry tight shuttering provided all as per the mix and pour instructions for the product.
- Curing is vital for optimum performance of Micro-concrete. The treatment should be cured adequately for a minimum period of 7 days. Curing membrane TEC® CURE WB may be applied as an alternative to water curing.
- Remove Plastering / Cover Concrete, wherever necessary and make grooves perpendicular to the Cracked Lines to the required length and depth.
- Drill holes, to fix plastic inserts and the TEC® BEAT ZR coated dowels for fixing welded mesh reinforcement, later.
- Drill holes at the bed/cracked, appropriate locations to the required depths for doing pressure grouting with cement slurry admixed with TEC® SWELL
- Clean the debris and the holes using an Air Compressor.
- Firmly fix the requisite diameter and length TEC® BEAT ZR coated steel rods in the grooves. (This has to be done only if the diameter of the rod is below 40 % of its original diameter)
- Fix nozzles in the drilled holes using instant plugging compound TEC® STOP.
- Providing one bond coat of TEC® BOND EPO over the old concrete surfaces.
- Providing adequate slurry tight shuttering for Micro Concreting.
- Provide suitably proportioned polymer modified plastering/ Micro concreting with TEC® GROUT MC over the entire welded mesh reinforcement area and other adjoining cover concrete/plastering removed areas demanding finishing to the suitable thickness.
- The treatment should be cured adequately or a minimum period of 14 days.

RE-BAR ANCHORING

Hole Preparation: For optimum performance the holes must be dust free and rough sided. Rotary drilling is recommended followed by flushing with air or water.

Rod Preparation: The rods shall be cleaned to be free of rust, flakes, oils, grease, etc.

Mixing and Placing: Mixing of one pack should be done in a single operation. Placing should be done within the gel time, which decreases with increase in temperature. Smooth, even consistency of grout should be ensured before placing. The following table may be used as a guideline for judging the gel time.

Temp. range (in ^{0}C)	Gel time range (in Min)	Minimum time before loading (in Hours)
20-30	40-80	3-7
30-49	15-40	1-3

Hole Diameter and Depth: The following table may be used as a guideline for deciding hole diameter for drilling.

Rod dia in mm	Hole dia in mm
8	16
12	20
16	20
20	25
25	32
32	38
40	45

Hole depth may be decided based on the pull out strength of TEC™ GROUT PGA which can be derived from the following extract of a Test Report.

Sample No.	Depth of 12mm RTS embedded in concrete	Diameter of Drilled hole	Contact area in mm2	Ultimate load in KN	Calculated bond stress in mm2
1.	100mm	20mm	6283.185	38.00	6.048
2.	100mm	20mm	6283.185	36.80	5.857

Compressive Strength

Initial Set (at minimum loading time)	20N/mm2
Final setting (after 7days curing at RT)	70N/mm2

POST APPLICATION - CHECK LIST

- **Specific Checklist for Sunken Portions - Post Water Proofing:** Ensure spouts are protected before filling. Check for damages by plumbers/ others working in the site before re-filling. Ensure that the damages if any are rectified.
- In case of swimming pools Decorative/ Ceramic tile fixing may be carried out may be fixed using TEC® BOND 34/ TEC® BOND 52 depending on the type of tile chosen. Tile join grouting may be carried out with TEC® TILE 12- General purpose tile joint grout or TEC® TILE 21- Epoxy tile joint grout.
- Although TEC® TILE 21 has remarkable chemical resistance in sunken portions, strong acids should not be used for cleaning. Besides damaging the grout strong acids will affect the ceramic tile and closet surfaces. Further on prolonged use they will badly damage the trap joints. It is recommended that strong acids be diluted with water 1:10 before being used for cleaning.
- During roof slab water proofing after adequately curing the plastered surface and testing for leaks final finishing may be carried out as decided upon. The final finish shall be properly sloped with adequate number of outflow pipes to allow free flow of water without stagnation. In case heat pressed tiles are used the joint grouting shall be carried out in CM 1:4 admixed with TEC® SWELL (@ 225gms per bag of cement).
- For high flexible membrane coatings mild foot traffic may be allowed over the treated area. Pointed loads and dragging sharp objects may cause the film to tear.
- After adequately curing the plastered surface and testing for leaks final finishing may be carried out as decided upon. If decorative tiles or HP tiles are to be fixed- one bond coat of TEC® BOND SBR should be provided over the plastered surface before spreading the base mortar. Further, the base mortar should be admixed with. TEC® MIX 100 (@ 200ml per bag of cement)
- In case heat pressed tiles are used the joint grouting shall be carried out in CM 1:4 admixed with TEC® SWELL (@ 225gms per bag of cement).
- In case Decorative Tiles are used the pointing should be done with general purpose Tile Joint Grout- TEC® TILE 12.
- In domes and shells the system is continuously exposed to the weather variations, we recommend periodical inspection.
- For repairs and rehabilitation works if any curing membrane is applied shall be removed completely before application of wall putty or paints.
- Desired finishes may be given to the floors and walls after consultation with our Technical Team.
- At no cost should the treated areas be dented, drilled or damaged for post treatment works.

TECHNICAL DATA

- To find the circumference of a circle, multiply its Ø by 3.1416
- To find the Ø of a circle , multiply its circumference by 0.31831
- To find the area of a circle, multiply the square of its Ø by 0.7854
- The radius of a circle multiplied by 6.283185 shall give its circumference.
- The area of the circle is the square of the circumference of the circle multiplied by 0.07258.
- Half of the circumference of a circle multiplied by half of its Ø shall give its area.
- To find the radius of a circle multiply the square root of its area by 0.56419.
- The product of the square root of the area of a circle and 1.12838 is its Ø.
- To find the Ø of a circle equal in area to a given square multiply the side of the square by 1.12838
- The Ø of a circle when multiplied by 0.8862 gives the side of a square equal to the area of the circle.

To find the side of the square inscribed in a circle multiply the Ø of the circle by 0.7071.

To find the side of a hexagon inscribed in a circle multiply the Ø of the circle by 5.

The side of the hexagon multiplied by 1.7321 will give the Ø of the circle inscribed in that hexagon.

The side of an equilateral triangle inscribed in a circle can be deducted by multiplying the Ø of the circle by 0.866.

The product of the side of an equilateral triangle and 0.57735 gives the Ø of the circle inscribed in that triangle.

The area of the surface of a sphere is the product of the square of the Ø and 3.1416.

The volume of a sphere is the product of the cube of its Ø and 0.5236.

The Ø of a pipe if doubled increases its capacity by four times.

To find the pressure in pounds per sq. inch at the base of a column of water, multiply the height of the column in feet by 0.433.

WEIGHTS AND MEASURES

Metric units

Linear Measures

10 millimetres	1 centimetre
10 centimetres	1 decimetre
10 decimetres	1 metre
10 metres	1 decametre
10 decametres	1 hectometre
10 hectometres	1 kilometre

Square Measures

100 sq. mm	1 sq. cm
100 sq. cm	1 sq. decimeter
100 sq. decimeters	1 sq. meter
100 Ares	1 hectare
100 Hectares	1 sq. kilometer

Weights

1000 milligrams	1gram
10 grams	1 decagram
10 decagrams	1 hectogram
10 hectograms	1 kilogram
100 kilograms	1 quintal
1000 kilograms	1 metric ton

Capacities

10 millilitres	1 centilitre
10 centilitres	1 decilitre

10 decilitres	1 litre
10 litres	1 decalitre
100 decalitres	1000liters
1000 litres	1 kilolitre
12 inches	1 feet
3 feet	1 yard
144 sq. inches	I sq. feet

Conversion Tables

Length

1 inch	25.4 millimetres
1 foot	30.48 cm
1 yard	0.9144 m
1 mile	1.6093 km
1 mm	0.03937 inch
1 cm	0.0328 foot
1 metre	1.904 yards
1 km	0.62137 mile

Centimetres		**Inches**
2.540	1	0.394
5.080	2	0.787
7.620	3	1.181
10.160	4	1.575
12.700	5	1.969
15.240	6	2.362
17.780	7	2.756
20.320	8	3.150
22.860	9	3.543

Kilometres		**Miles**
1.609	1	0.621
3.219	2	1.243
4.828	3	1.864
6.437	4	2.485
8.047	5	3.107
9.656	6	3.728
11.265	7	4.350
12.875	8	4.971
14.484	9	5.592

Volume

1 inch^3	16.387cm
1 foot^3	28.316 decimetres^3
1 centimetre^3	0.0610 inch^3
1 decimetre^3	0.0610 inch^3

Conversion factors

Multiply	By	To obtain
Acres	0.404686	Hectares
Acres	404700	Sq.m
Acres	0.001562	Sq. Miles
Cms	0.393701	Inches
Cubic Cms	0.061024	Cubic inches
Cubic Feet	6.228	Gallons
Cubic Feet	0.02832	Cubic Metres
Cubic Inches	16.3871	Cubic Cms
Cubic Metres	35.31445	Cubic feet
Cubic Metres	1.30794	Cubic yards
Feet	0.3048	Metres
Hectares	2.47105	Acres
Horse power	0.7457	Kilowatts
Inches	2.539998	Cm
Inches	25.39998	Millimetres
Kilowatts	1.341	Horsepower