WATERPROOFING FOR INTERNAL WET AREAS

Installation, Protection, Defects & Rectification

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

LESSON PLAN

- **Installation**
  - **Planning**
  - **Application**
- **Protection & Completion**
  - **Protection**
  - **Inspection & Testing**
- **Defects & Rectification**
  - **Defects**
  - **Repair of Defects**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

INSTALLATION

- **Planning**
  - **Plan sequence to avoid movement on freshly applied surface**
  - **Ensure “pot life” of waterproofing material does not expire on site**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

INSTALLATION

- **Planning – Factors influencing application**
  - **Size of team**
  - **Tools**
  - **Size of mixes**
  - **Detailing**
  - **Location of construction joints**
  - **Curing time of material**

Good Industry Practices
Waterproofing for
Internal Wet Areas
BOA Academy

Tools



1. Mortar bucket
2. Hopper gun
3. Broom
4. Mixing drill & attachments
5. Mixing container
6. Measuring containers
7. Roller
8. Cutting knife
9. Scissors
10. Steel float
11. Serrated trowel
12. Rubber gloves
13. Brushes

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Mixing

- **Mixing should be done on site in controlled environment**
- **Mixing equipment and container should be cleaned prior to mixing**
- **Machine mixing for better blending**
- **Material mixed – as fast as it can be laid**
- **Material exceeding pot life – DO NOT USE**
- **Correct ratio (2-component system)**
- **Mixing done by trained personnel**

Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

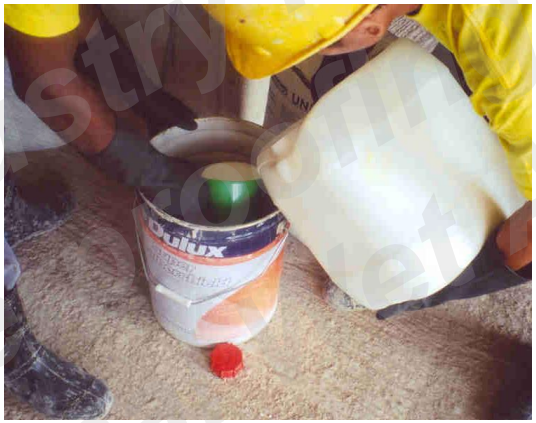
Mixing

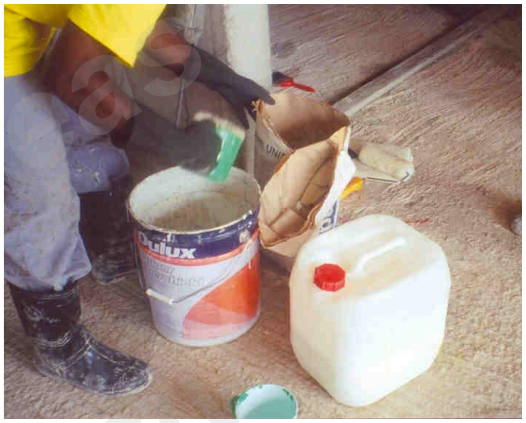
- **2-component System**
  - **Ensure materials accurately measured**
  - **Use clean and large enough mixing container**
  - **Pour liquid component into mixing container first**
  - **Powder component added slowly into container and mixed mechanically for the specified time**
  - **Mixture shall be homogeneous and lump-free**
  - **Achieve a workable liquid for application**
  - **Random tests or visual checks on the consistency during application**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Mixing of 2-component System











Good Industry Practices
Water Proofing for
External Wall Areas
BCA Academy

APPLICATION

Description of Areas	Application
Corners and confined areas	Brush application
Large vertical and horizontal areas	Roller application
High vertical walls	Spray application
Large horizontal surfaces	Self-leveling waterproofing material and evenly spread out with a serrated trowel

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Methods of Application / Tools



Roller and brush for different application areas

Spray method for vertical surfaces







Construction Best Practices
Waterproofing for
Internal Wet Areas
Academy

Wall-Floor Junction



Step 1
Brush application at corners



Step 2
Apply upturn with roller



Step 3
Apply membrane with roller



Step 4
Lay reinforcement at corners



Step 5
Cover reinforcement with a wet coat of membrane



Step 6
Completed 1st coat of membrane at corners

Good Industry Practices for Waterproofing Internal Wet Areas BCA

Pipe Penetration / Floor Outlet



Membrane dressed up to finished floor level



Dressing down to 50mm



Applying membrane outside pipe



Completing the application

Good Industry Practices Waterproofing for External Wet Areas BCA Academy

Floor Outlet (reinforcement)



Dressing down and application around floor outlet



Laying reinforcement onto the wet coating



Completing the application

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Walls and Floors



Roller application to wall



Roller application to floor



Completed wall application



Completed floor application

Good Waterproofing Practices for Internal Wet Areas BCA Academy

Liquid Applied Membrane
(Special Considerations)

- **Apply in several thin coats to achieve the required wet and dry film thickness, instead of one thick layer**
- **Observe over-coating time (previous coat must be dry and must not be tacky) and curing period of every coat**
- **Monitor and ensure correct coverage of liquid coatings**
- **Use “Wet Film Thickness Gauge” to measure, check and confirm thickness compliance**
- **Ensure adequate ventilation for proper setting and curing of material**
- **Ensure proper ventilation for the safety of workers working within confined spaces**

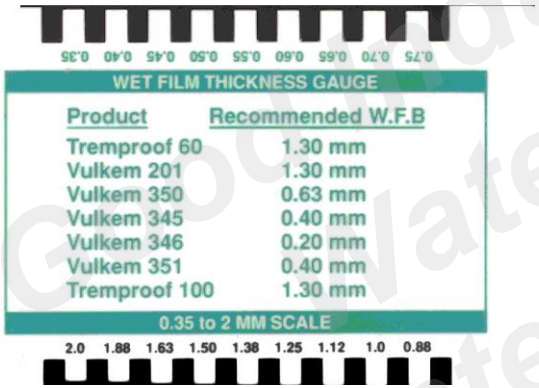
Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

Liquid Applied Membrane
(Special Considerations)

- **Attention shall be given to:**
  - **Minimum number of coats required**
  - **Wet film thickness (WFT) and coverage**
  - **Curing time between and after coats**
  - **Correct material viscosity used for vertical and horizontal applications**
  - **Priming where necessary**
  - **Termination at upturn**
  - **Minimum dry film thickness (DFT), e.g. pull-out tests on completed (destructive test require rectification**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

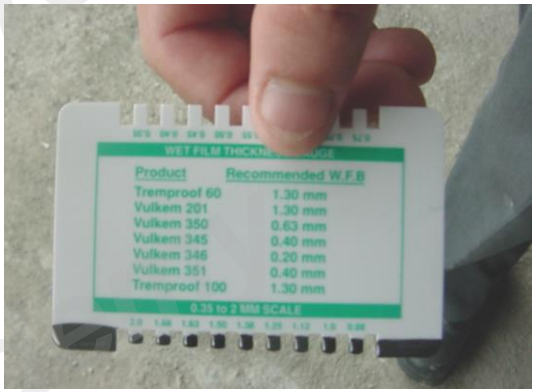
Wet Film Thickness (WFT)



Example of a Wet Film Gauge



Conducting checks on WFT



Verifying reading on WFT Gauge

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Curing

- **The completed waterproofing system should be left to cure**
- **Proper protection to be provided against any accidental damages**
- **Period and procedures of curing should comply to manufacturer's specifications and recommendation**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Repair of Damaged Areas

- **Any damaged materials should be removed and replaced with new materials.**
- **If damage is not localized, the membrane should be re-applied for the entire area.**
- **If damage is localized, cut out localized area and re-apply waterproofing to the localized area with sufficient lapping of minimum 100mm all round the localized area.**

Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

Repair of Damaged Areas

- ***Curing***
  - **The membrane should be left to cure after application of the final coat with proper protection against any accidental damages.**
  - **The period and procedures of curing should be done in accordance to the manufacturer's specifications and recommendation.**

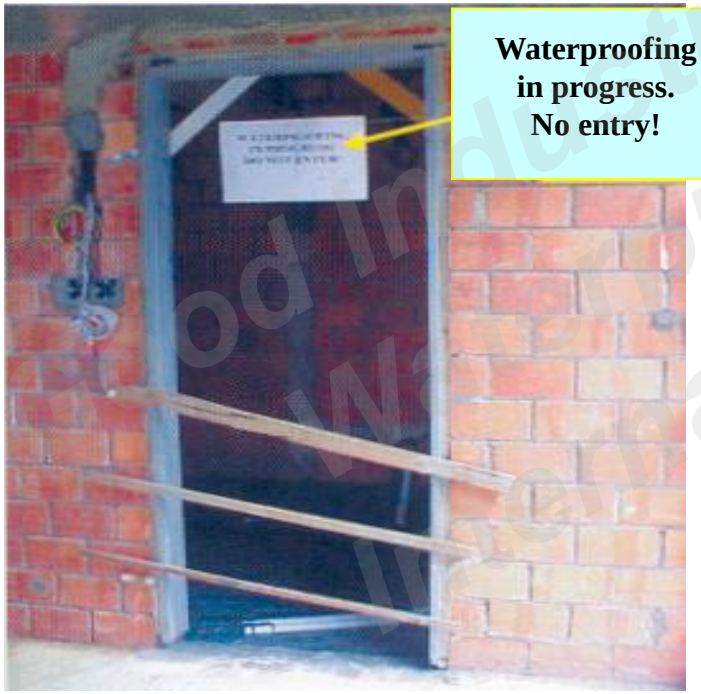
Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

PROTECTION & COMPLETION

- **Protection**
  - **Completed area must be cordoned**
  - **Notify any damage and carry out repair works**
  - **Slurry coat protection (required by certain products)**
  - **Avoid any damage to membrane**
  - **Pipes & floor openings should be fitted with temporary caps**
  - **Install protective screed after water-tightness test**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Protection



Entrance barricade

NO ENTRY
WATERPROOFING IN PROGRESS
FINE: S$500.00

UNIT NO: _____ BLOCK NO: _____

DESCRIPTION OF WORKS	DATE OF APPLICATION
1ST COAT	
2ND COAT	
M&E CONDENSATE PIPES	
WATERPROOFING TEST	

Example of a "NO ENTRY" sign

Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

Protection



Slurry Coat Protection



Opening protected from debris

Industry Practices
Internal Wet Areas
BCA Academy

Protection



Level Pegs



Screeding in progress

Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA

Protection

- ***Waterproofing Screed***
  - **In CP 82, waterproofing screed should be mixed according to the specified mix proportion by a mechanical mixer.**
  - **Ensure a workable and consistent mix for ease of trowelling to the required fall.**
  - **Cement mortar mix of 1 part cement to 3 or 4 parts washed sand by volume**
  - **Water/cement ratio not exceeding 0.40 is recommended by CP 82**

❖ **Alternatively, use Pre-packed waterproofing screed**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Protection

- ***Waterproofing Screed***
  - **Supervision would be required to ensure compliance of correct proportions of the mix:**
    - **correct dosage of waterproofing additive**
    - **correct water to cement ratio**
    - **correct cement-sand ratio**
    - **uniformity of mixing**
  - **The period and procedures of curing should be done in accordance to the manufacturer's specifications and recommendation.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Completion

Water-tightness Test

1. **Conducted during surface preparation before laying the waterproofing membrane (Structure water-tightness test)**
2. **After application of membrane and before laying of screed or final floor finishes**
3. **After laying of screed or final floor finishes, depending whether the final floor finishes are susceptible to staining, e.g. natural stones**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Completion

Procedures for water-tightness test

1. **Temporarily seal all outlets**
2. **Flood the whole area to minimum 25mm of water (measured form highest point)**
3. **Water level should not be higher than finished membrane level**
4. **Flooding time should be 24 hours**
5. **Inspect bottom of concrete slab for signs of leakage**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Water-tightness Test



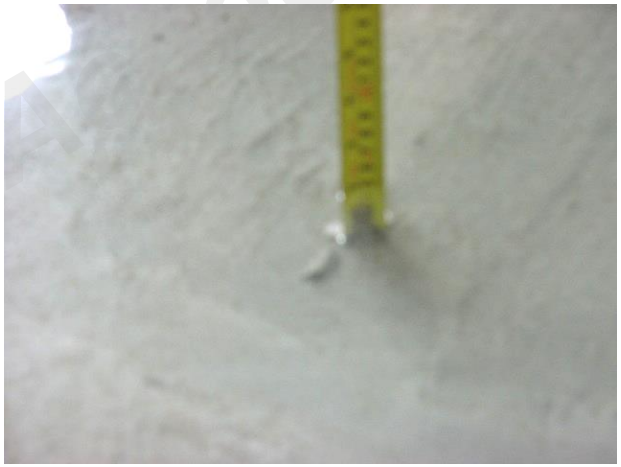
Structure water-tightness test



Water-tightness test after membrane application



Water-tightness test at sunken bath



Flood to minimum 25mm water for 24 hours

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Completion

Structure Water-tightness Test

- **If leakage is observed, repair all honey-combed and defective concrete areas by removing any unsound concrete and patch with suitable mortar (e.g. shrinkage compensated grout, polyurethane grout, polymer modified mortar, epoxy mortar).**
- **Special attention paid to corners and wall-floor joints.**
- **Conduct test again after repair to confirm soundness prior to waterproofing works.**

Good Industry Practices for Waterproofing Internal Wet Areas BCA Academy

Completion

Membrane Water-tightness Test

- **If leakage is found after the application of the waterproofing membrane, preferably, re-apply the membrane to the entire area.**
- **If leakage is localized, re-apply the waterproofing membrane at the localized area, with sufficient over-laps.**
- **Conduct test again after repair to confirm soundness of the waterproofing membrane.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Completion

Finishes Water-tightness Test

- **If final floor finishes are susceptible to staining, the water-tightness test can be conducted after screeding.**
- **If leakage is found, remove screed and re-apply waterproofing membrane.**
- **Conduct test again**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Completion

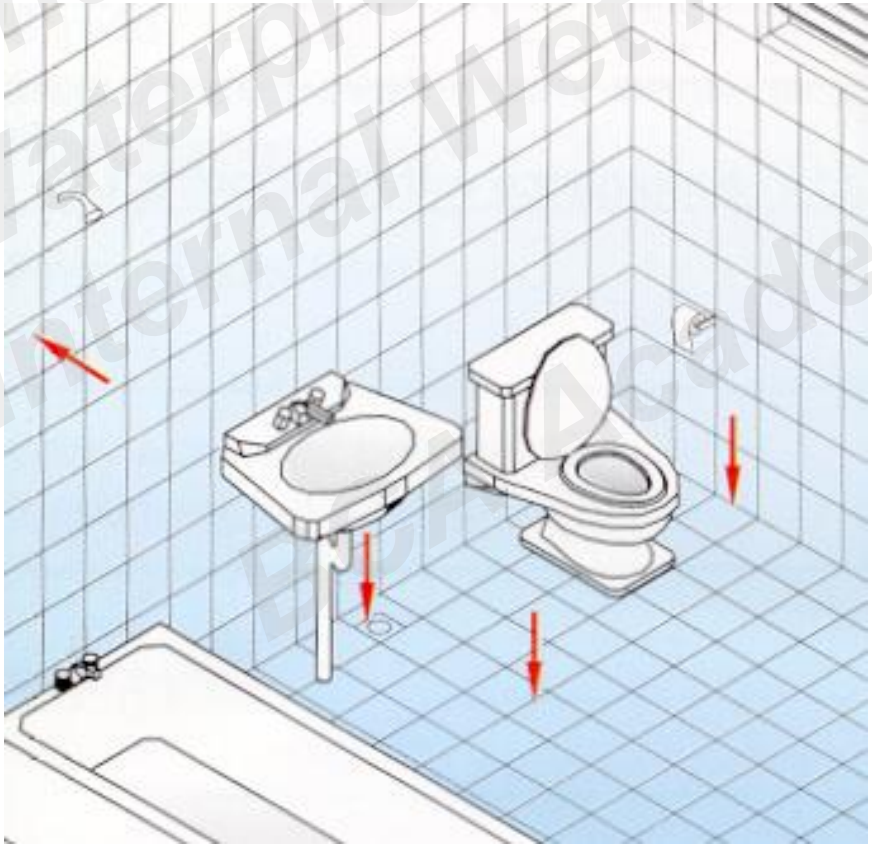
Water-tightness Test on Vertical Surfaces

- **Small areas on the walls should also be randomly selected and subjected to shower spray for duration of 15 minutes.**
- **Check for signs of dampness on the other side.**
- **Alternatively, a moisture meter can be used to check the moisture content before and after water spray for any significant increase in moisture.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

DEFECTS & RECTIFICATION

- **Defects during Service Life**
  - **Possible leak paths in wet areas**



Good Industry Practices
Waterproofing for
Internal Wet Areas
BDA Academy

DEFECTS & RECTIFICATION

- **Defects during Service Life**
  - **Common defects arising from such leaks**

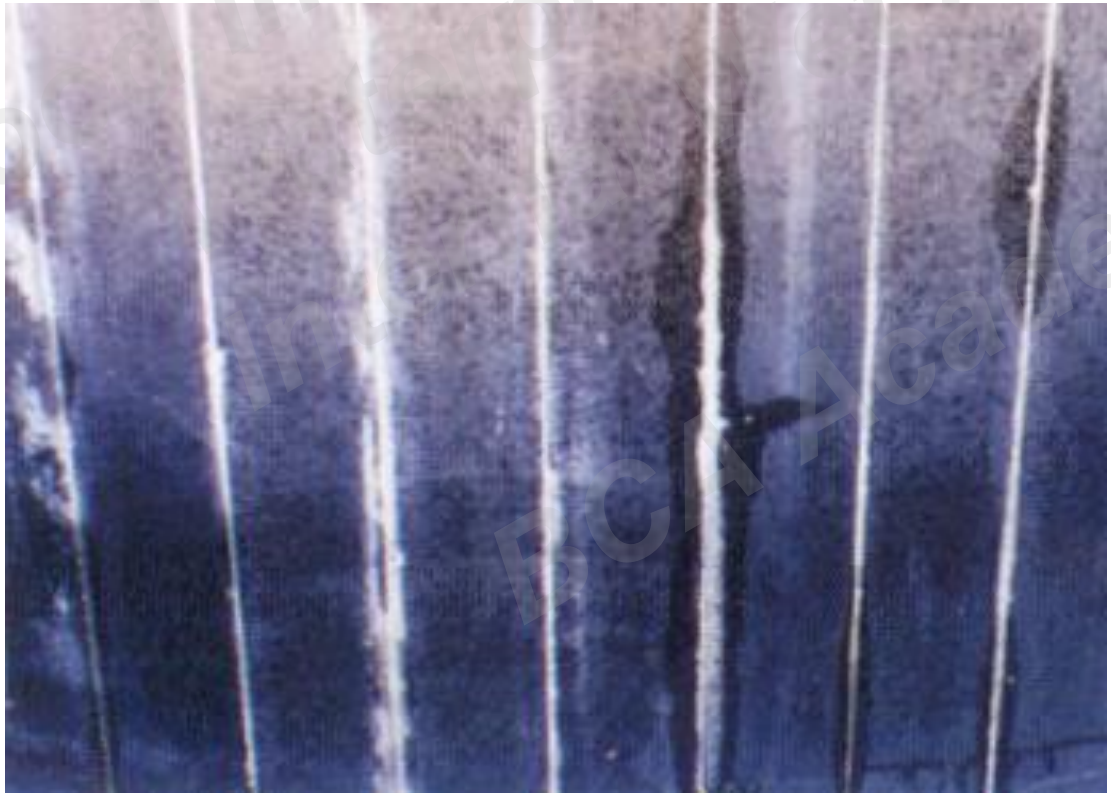


Leakage on ceiling, walls below and adjacent to wet areas

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

DEFECTS & RECTIFICATION

- **Defects during Service Life**
  - **Common defects arising from such leaks**



Efflorescence build up on wall due to water seepage

DEFECTS & RECTIFICATION

- **Defects during Service Life**
  - **Common defects arising from such leaks**



Paint flaking or peeling on the ceiling below wet areas

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

DEFECTS & RECTIFICATION

- **Defects during Service Life**
  - **Common defects arising from such leaks**



Corrosion to steel reinforcement bars or concrete spalling in the concrete slab below the wet areas

Good Industry Practices Waterproofing for Wet Areas BCA Academy

Defects during Storage

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Acrylic system			
Gellation 	**Material thickens up in pail and forms a gel-like consistency. Caused by improper storage (usually under heat where the solvents in the pail evaporate off) or due to expired shelf-life.**	**Always check expiry dates when receiving materials on site. Store materials away from heat and direct sun. Protect from extreme temperatures. <u>Note</u>: Stored material must be mixed prior to application.**	**Contact manufacturer for advice. If due to improper storage, certain acrylics may be re-constituted on site by adding the correct solvent.**

Good Industry Practices Waterproofing for Internal Wet Areas PCA Academy

Defects during Storage

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Polyurethane system			
Hardening of material	**Material sets in the can, lumpy appearance and hardens. Caused by improper storage or due to expired shelf- life.**	**Check expiry date. Observe proper storage on site. Some imported materials may not be 'tropicalised' - shelf-life is considerably shortened in different weather conditions. Make sure that original seal is not broken until prior to usage.**	**Contact manufacturer for advice. If due to improper storage, certain acrylics may be re-constituted on site by adding the correct solvent.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Defects during Storage

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Cementitious (Integral or crystallization type and liquid- applied type)			
Hardening of material 	**Powder component sets in container, lumpy appearance and hardens.**	**Check expiry dates. Store materials in a dry place, under cover and raise above ground.**	**Reject material.**
Rubber based system			
Hardening of material	**See above under polyurethane system.**	**See above under polyurethane system.**	**See above under polyurethane system.**

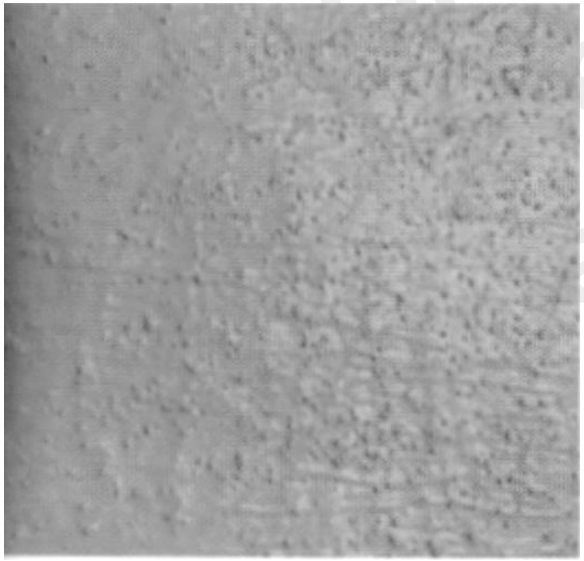
Good Industry Practices Waterproofing for Internal Wet Areas RCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Acrylic system			
Skinning 	**Surface skins / dries off too quickly trapping uncured material beneath. Usually caused by applying material too thickly or over- coating before previous coat has set sufficiently.**	**Ensure the correct coverage per coat and sufficient drying time between coats is followed, as per manufacturer's instructions.**	**Membrane needs to be removed and all uncured material scraped off and re-applied.**

Good Industry Practices Guide for Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Acrylic system			
Pin-holing 	**Tiny pin- holes appear on surface of membrane when set. Some pin- holes may breach through entire membrane. Caused by introduction of excessive air bubbles in material by over-stirring or over-working such as brushing of rolling over the same spot many times thus trapping air bubbles into the material.**	**Allow material to stand for 5 – 10 minutes after stirring. Apply to recommended coverage but do not work excessively over same area. Use correct application techniques as recommended by manufacturer.**	**Re-apply another coat over the affected area. If pin-holing is prevalent over the entire area, it may be advisable to re-apply the full system over the affected membrane.**

Industry Practices for Roofing for Coastal Wet Areas ECA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Acrylic system			
Blistering 	**Trapped moisture beneath membrane, evaporation rate higher than vapour permeability rate of membrane**	**Ensure substrate is kept dry before application of membrane. Check with moisture meter.**	**Usually done by cutting out blister to allow moisture to escape. Allow substrate to dry out re-application.**

Good Industry Practices in Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Polyurethane system			
Fail to set	**Membrane remains wet and sticky. Due to expired material or could also be caused by inadequate mixing. Sometimes may also be caused by contamination/ adulteration of materials.**	**Check expiry dates of material before usage. Ensure mixing instructions are followed strictly, i.e. do not hand-mix if mechanical mixing is required. Check substrate for suitability before application.**	**Remove material. Check whether substrate is contaminated by chemicals etc. Clean substrate and re-apply with fresh material.**
Solvent entrapment	**Material sets on surface but remains soft below. Caused by applying too thickly or too quickly before previous coat sets sufficiently.**	**Observe recommended coverage rates strictly and allow sufficient inter- coat drying time.**	**Remove entire system, clean substrate and re-apply the entire membrane again.**

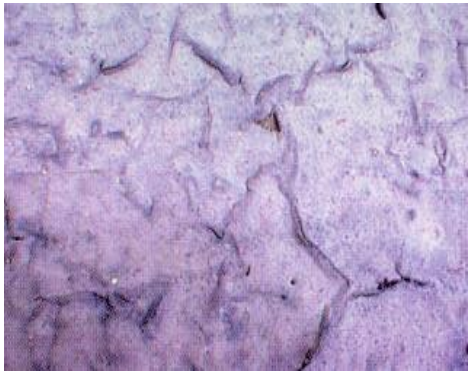
Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Polyurethane system			
Sagging or running of material on Walls 	**Material sags and creeps when applied to vertical surfaces. Caused by applying too thickly or using the wrong grade of materials**	**Most PU would have 2 formulations – vertical and horizontal. Vertical grades have thixotropic properties so that materials can be applied to vertical surfaces and will not sag or run. Observe coverage rates.**	**Cut out sagging area and clean substrate. Lightly sand edges to roughen it before applying further coats over the cut out area**
Blistering and pin-holing	**See above under acrylic.**	**See above under acrylic.**	

Industry Practices Painting for Interior Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Rubber based system			
Fail to set	**Remains soft and unset. Caused by expired materials, application too thick or insufficient ventilation for air-curing systems**	**Check expiry dates prior to usage. Ensure proper storage on site. Observe coverage rates. Ensure sufficient ventilation.**	**Remove material and discard, clean substrate and re- apply entire system.**
Surface cracks 	**Alligator cracking on surface. Caused mainly by prolonged UV exposure.**	**Protect membrane against direct sunlight or other forms of UV exposure. Most rubber-based or bitumen / rubber are sensitive to UV. Store material under shade and cover.**	**Grind surface and re-apply additional coat. If cracks right through, remove membrane and re-apply.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Rubber based system			
Blistering and pin-holing.	**See above under acrylic.**	**See above under acrylic.**	
Sagging or running of material on walls	**See above under polyurethane system.**	**See above under polyurethane system.**	**See above under polyurethane system.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Cementitious (Integral or Crystallization type and liquid-type) system			
Staining (ochre – for integral system only) 	**Applied substrate turned "rust" colour. Caused by chemical reaction between waterproofing compound and impurities in aggregates used for concreting.**	**Ensure that concrete aggregates do not contain excess silt or other impurities such as ferrous compounds**	**Stains are not harmful to system. However if objectionable, surface may be grind off to remove stains.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Cementitious (Integral or Crystallization type and liquid-type) system			
Hydrolysis (for liquid-applied system only) 	**Appearance of whitish stains on surface caused by migration of free lime. Usually the result of flooding with water before system sets sufficiently.**	**Ensure sufficient setting and curing time for membrane before subject to prolong contact with water.**	**Drain ponding water and allow to dry. Stains are efflorescence and may be removed by light scrubbing. Cure system properly first before subjecting to flood test.**

Good Industry Practices at Roofing for Internal Wet Areas BCA Academy

Defects during application, curing & drying

Defects	Causes	Preventive Measures	Recommended Remedial Methods
Cementitious (Integral or Crystallization type and liquid-type) system			
Surface cracking	**Tiny cracks appear on surface of set membrane. Usually caused by insufficient polymer mixing, over dilution with water or improper curing.**	**Check mixing ratio between dry component and liquid component. Ensure proper curing.**	**Grind affected areas and allow setting / curing properly. Re-apply affected area by additional coat if necessary. Normally cracks affect only just the surface. However, if cracks perpetrates throughout the membrane, then scrap off entire membrane and re-apply.**
Sagging or running of material on walls	**Material sags and creeps when applied to vertical surfaces. Caused by wrong water ratio during mixing or material applied too thickly.**	**See above under polyurethane system.**	**See above under polyurethane system.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Rectification

Rectification works for leakage

- **The waterproofing application requires extreme care, supervision, and strict adherence to the manufacturer's recommended procedures.**
- **Poor workmanship would result in leaks that are difficult and costly to repair.**
- **Wear and tear over time and improper renovation works may also lead to leakages.**
- **Main causes of leakage include natural deterioration of materials, poor workmanship at time of construction and improper subsequent renovation works.**

Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

Rectification

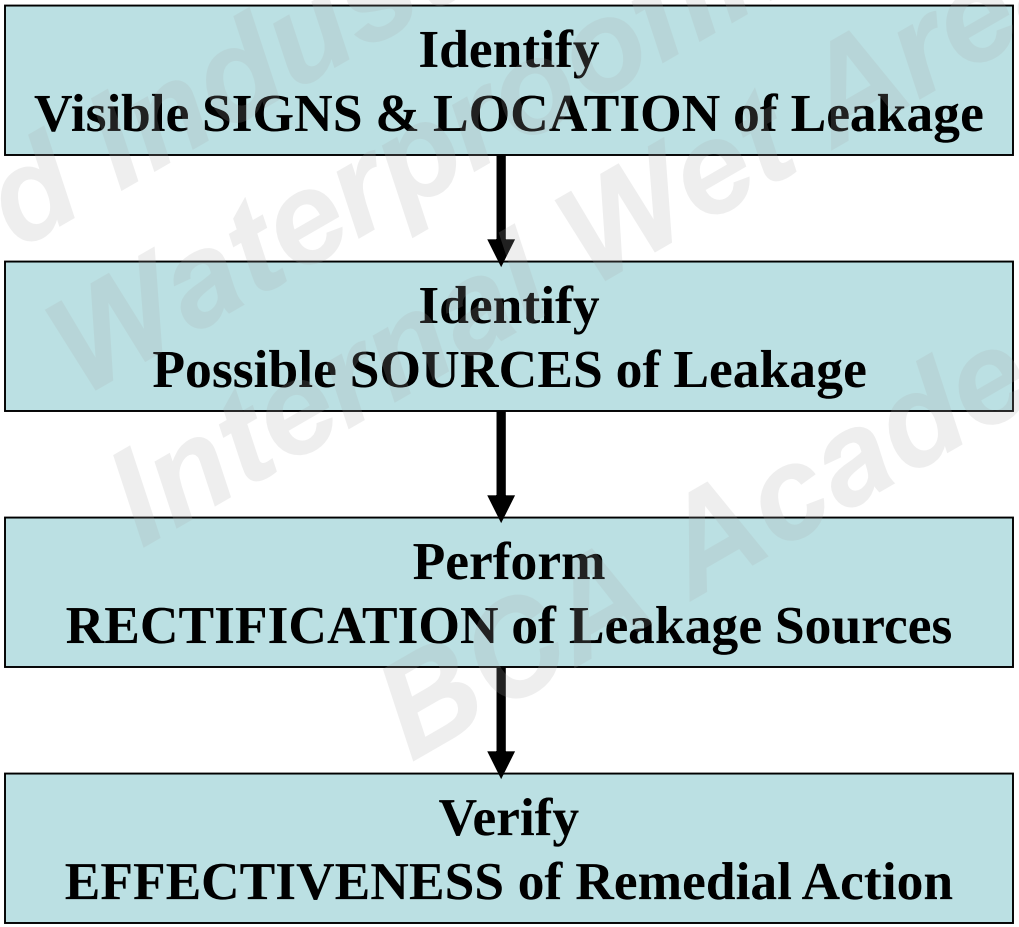
Rectification works for leakage

- **Ceiling leakage can occur over time due to deterioration of the integrity of the waterproofing membrane or floor screed**
- **Leakage can occur due to degradation of pointing between tiles and wall/floor joints and also deterioration of concrete infill/grout around pipes.**
- **Faulty pipes/sanitary fittings/fixtures such as leakage at joints of concealed pipes and misalignment at sanitary discharge pipes may also lead to leakage.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Rectification Works for Leakage

Rectification Procedure



Good Industry Practices
Waterproofing for
Internal Wet Areas
BCA Academy

Materials for Repair

1. Pre-packed Waterproofing Screed

- **The pre-packed waterproofing screed is able to produce good bond strength with low shrinkage.**
- **The use of pre-packed waterproofing screed allows better site control of quality and housekeeping.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Materials for Repair

2. Flexible Cementitious Membrane

- **Flexible cementitious membrane (or other approved water-based membrane) is recommended because it requires much less stringent surface preparation compared to solvent-based polyurethane membrane.**

- **It is able to achieve adequate bonding to the substrate even if the surface is wet and not totally free of dust.**

Good Industry Practices
Waterproofing for
Internal Wet Areas
BOA Academy

Materials for Repair

3. Chemical Grouts

- **Chemical grouts are materials which mix readily with water at the time of application.**
- **It provides good penetration of wet joints and cracks.**
- **It with the water to form a waterproof solid, stopping water that is infiltrating the structure.**
- **A common chemical grout is the Polyurethane injection grout, which upon contact with water, expands and form a tough, flexible foam seal that water penetration.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Materials for Repair

4. Re-screeding Method …

- **In general, this provides a more effective rectification to ceiling leakage.**
- **All the floor tiles, screed, squatting or pedestal pan and any other fixtures are first removed.**
- **Areas around pipes should be hacked slightly deeper (about 25mm more).**
- **Hacked surfaces should be cleaned free of loose particles.**
- **Ensure proper preparation of floor surface (e.g. existing floor tiles/screed to be completely removed, hacking around pipes/gully trap).**
- **The areas around pipes are then filled with a suitable material, e.g. non-shrink grout. The application of non-shrink grout is according to manufacturer's instructions.**

Good Industry Practices on Waterproofing for Internal Wet Areas BCA Academy

Materials for Repair

4. … Re-screeding Method

- **A good quality waterproof membrane is applied and left to cure to the manufacturer's requirements.**
- **A new layer of waterproofing screed is subsequently laid on the membrane after it is sufficiently cured.**
- **New floor tiles are subsequently laid and the pedestal pan (if applicable) and any other fixtures are re-installed.**
- **If squatting pan is to be re-installed, this should be done after the membrane had cured and before screeding work is carried out.**

Good Industry Practices for Waterproofing for Internal Wet Areas BCA Academy

Materials for Repair

Injection of Chemical Grout

- **This method creates less inconvenience to the homeowners. The repair work does not require hacking of tiles and removing of existing fixtures.**
- **Where leakage is observed, the specialist should first locate the crack that is causing the leak.**
- **The crack and surrounding concrete should be thoroughly cleaned to remove all loose, unsound, friable and deleterious materials.**
- **A 45-60 degree angle hole should then be drilled so as to intersect the crack at a depth of approximate 1/3 thickness of the concrete. The distance between the drill holes will depend on the characteristic of the proprietary product and site conditions.**

Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

Materials for Repair

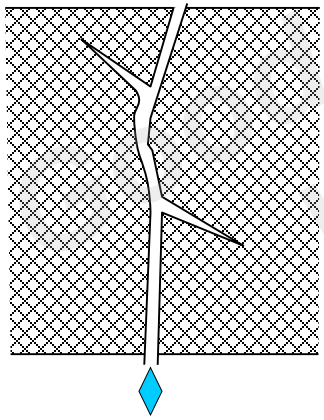
Injection of Chemical Grout

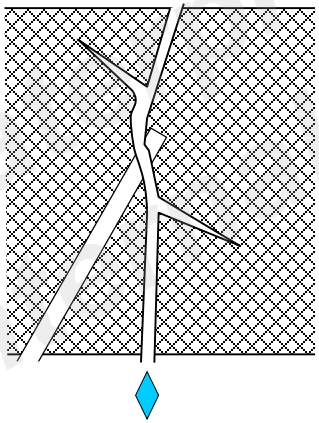
- To remove debris and improve penetration, the crack should be flushed with water prior to resin injection.
- A plastic injection packer is then inserted into the hole.
- For 2-component system, care should be taken to ensure correct mix ratio of the components.
- The chemical grout is then injected into the crack line using a suitable pump, with a specified pressure.
- Injection is considered completed once excess amount of un-reacted grout is observed to appear from the crack.
- Upon completion, the plastic packers can be removed and the surface surrounding the area should be cleaned on the following day and all holes are to be filled using an approved material e.g. non-shrink grout.

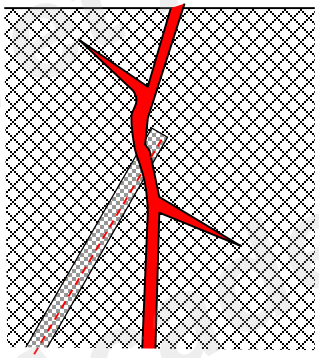
Good Industry Practices Waterproofing for Internal Wet Areas BCA Academy

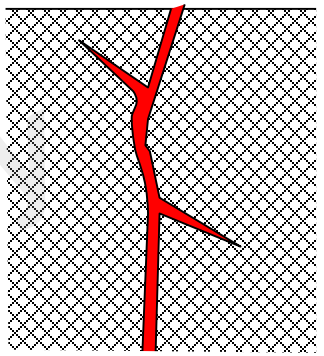
Sealing by Injection Method

Sealing of a crack in concrete structure









Industry Practices
Waterproofing for
Interior Wet Areas
BCA Academy

Sealing by Injection Method

Injection of Chemical Grout



Detection of Seepage

Indian Industry Practices
Waterproofing for
International Projects
Areas
Academy

Sealing by Injection Method

Injection of Chemical Grout



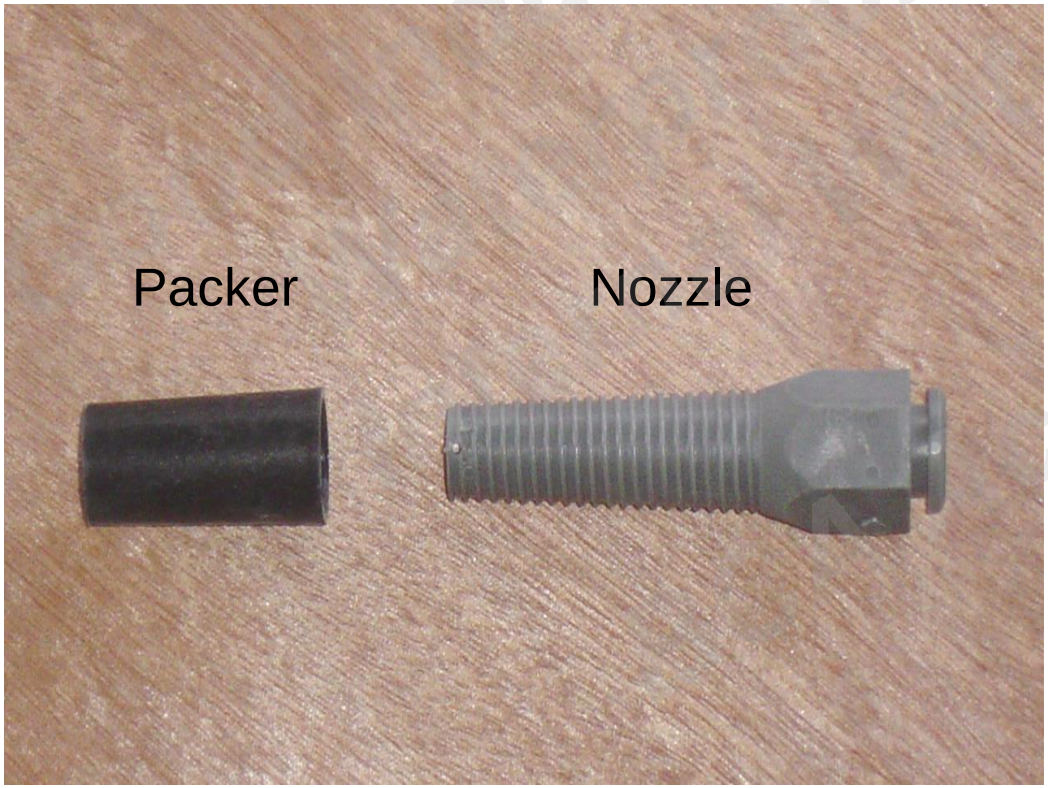
Pressure grout machine



Proprietary product

Sealing by Injection Method

Injection of Chemical Grout



Tools for chemical grouting

Sealing by Injection Method

Injection of Chemical Grout



Drilling hole

Sealing by Injection Method

Injection of Chemical Grout



Nozzles inserted along crack line

Good Industry Practices
Waterproofing for
Internal Wet Areas
By Academy

Sealing by Injection Method

Injection of Chemical Grout



Mixing of products

Sealing by Injection Method

Injection of Chemical Grout

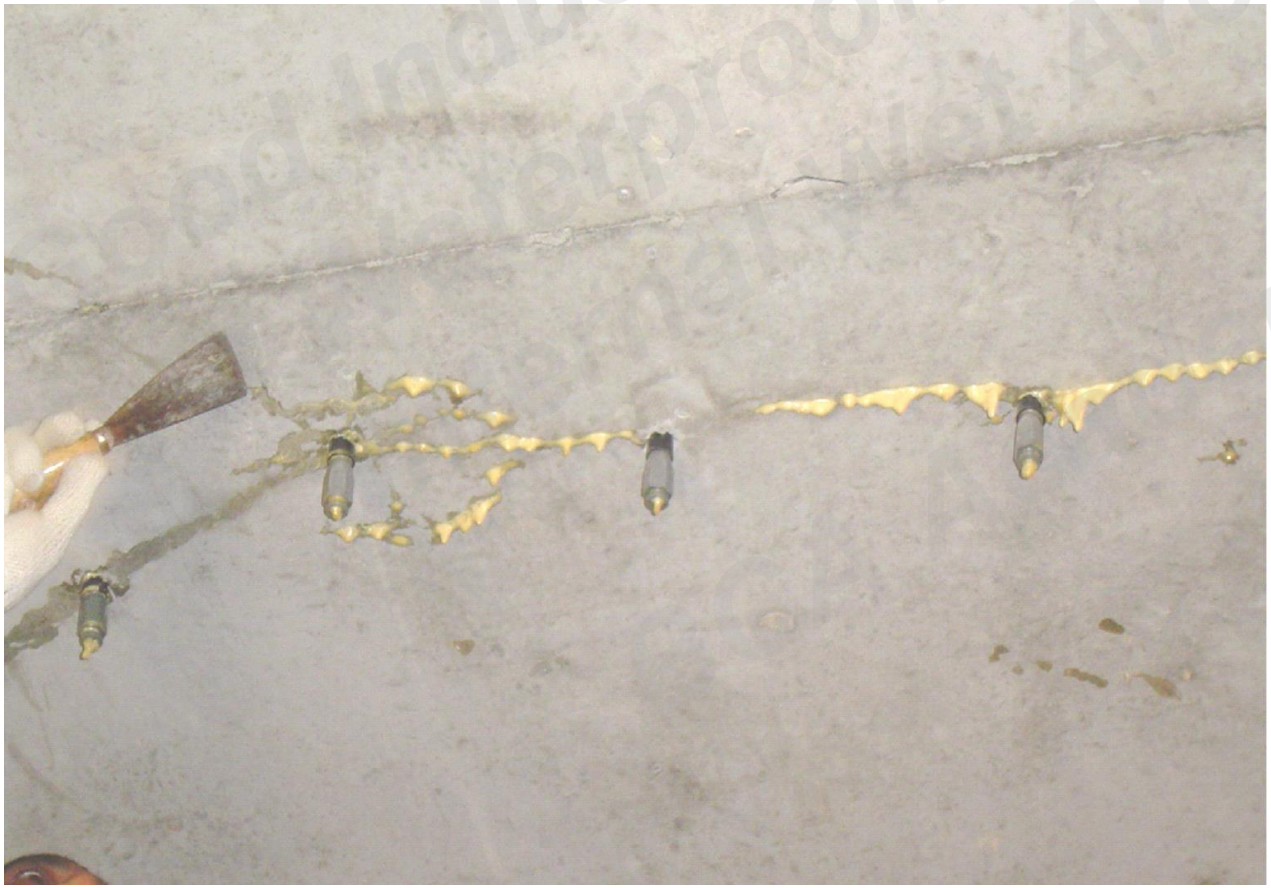


Grouting in progress

Good Industry Practices
Waterproofing for
Interior Wet Areas
Academy

Sealing by Injection Method

Injection of Chemical Grout



Fully grouted crack line

Good Industry Practices
Waterproofing for
Wet Areas
my