HIA - WICA Code of Practice for Installation of Chemical Damp Proof Courses in Remedial Works

FORWARD

This standard has been prepared on the best knowledge and information available worldwide.

This standard is for procedures only and does not cover any standard for assessment of suitable damp coursing fluids.

This Code and specific fact sheets on applications will be available through HIA - WICA.

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Code

CODE OF PRACTICE

1. Scope

This HIA-WICA standard gives recommendations for the treatment of rising damp in buildings with existing masonry walls, whether solid or cavity walls, random rubble walls or stone walls. It describes the procedures to be used for diagnosing rising damp and indicates essential precautions and procedures for installing chemical damp proof courses.

This standard does not cover treatment of walls below ground level or under hydrostatic pressure.

Note. The successful treatment of rising damp not only depends on the following recommendations but also on the use of effective damp coursing fluids.

2. Definitions

dpc: Damp Proof Course; A continuous water proof barrier to rising damp created in a wall by a chemical treatment. Other definitions as per Australian Standards

3. Assessment of Buildings

3.1 General

Before installing a damp proof course it is essential to assess the following:

a) whether rising damp is present (see 3.2);
b) whether building is suitable for a particular system proposed (see3.3);
b) whether the building is to be modified and whether this will affect the installation of the dpc.

Installation should only be carried out if the survey has taken into account all these factors and any initial remedial measures have been taken.

3.2 Diagnosis of Rising Damp

Procedure- Before carrying out any treatment the following procedures is essential;

1-Confirm whether the building has rising damp or has suffered rising damp; **Note: A building may appear dry at time of inspection but shows signs of rising damp in the past which may become problems at a later date if treatment is not carried out, ie plaster patching.**

2-Clearly identify the damp areas. Excessive dampness Is normally visible. A moisture meter will more accurately determine the extent, but may still not show the true extent of rising damp. Further identification may be required;

3-Locate all possible sources of dampness. Pay particular attention to condensation, leaks from drains and spouting, internal plumbing, shower recesses or around window and door frames;

4-Trace any existing damp course around the building to check whether the dpc is bridged at any point internally or externally;

5-Locate any sections of wall where floor level is below the proposed level of the dpc. Specific measures may be required in these situations and should be advised separately.

6-If positive determination of rising damp is disguised by faults out lined in item 3 above, these faults may need attention first, allowing an appropriate drying out period before reassessing the building for rising damp. **Note: The drying period may take in excess of six months.**

Evidence of Rising Damp

Rising damp is indicated by excessive dampness to the base of the wall with a reducing moisture gradient going up the wall. Moisture contents in excess of 5% relative moisture content (determined with a moisture meter) will indicate the need for treatment Often a band or tide mark is visible above floor level. Hygroscopic salts deposits, eg chlorides or nitrates on the wall, bubbling paint or fretting plaster confirm a problem exists or has existed previously.

Surface moisture alone does not give conclusive proof of rising damp, so further evidence should be obtained by taking measurements within the wall. An electric moisture meter with a penetrating probe will indicate the presence of dampness, and when correctly used, is a valuable diagnostic instrument.

3.3 Conditions of Building

Most types of masonry walls may be treated using the methods described in this standard. The normal installation method will usually need to be modified for walls of thickness greater than 600mm, random rubble fill walls (see 6.) or walls of impermeable materials bonded by an irregular mortar course. If in doubt, professional advice should be sought;

The proposed dpc line may be bridged externally by paths, rubble etc. or internally by adjacent floors etc. In such cases, additional remedial action will be necessary;

Where buildings are heritage listed, the relevant statutory authority must be consulted;

Excessive detergent spillage eg. From leaking wastes in the vicinity of the problem area, may prevent an effective treatment by the methods described.

Some building materials present may be affected by the damp proofing materials and should be isolated.

4. Pre-installation Measures

Before installing chemical dpcs the measures given below are essential;

Expose the internal line of the proposed dpc by removing plaster, skirting boards and any other obstacle to effective treatment. Any timber in sound condition should be stored dry for reinstatement. Electrical circuits should be isolated to allow removal of electrical fittings (refer to electrical authorities for requirements). Confirm location of any pipe work in the walls.

Confirm the internal line of the dpc matches that of the external dpc and that the ensuing dpc installation will not be bridged. Where possible the dpc should installed at least 150mm above ground level, remove any external render to expose line of proposed dpc;

Where timber floors are installed, the timber adjacent to the damp walls eg. floor plates, may have rot. Timber floors are independently isolated from the walls and timber flooring should not touch the masonry walls. **Note: Installation of a damp course alone does not in itself prevent timber decay in floors and other items such as ventilation must be considered.**

Repair masonry defects, which may prevent the successful installation of the dpc, eg, loose bricks or fretted mortar. An integral waterproofing additive should be used in any mortar repairs.

5. Storage and Handling

It is essential to follow the manufacturers recommendations for storage and handling of damp coursing fluids and all relevant requirements under current Occupational Health and Safety Acts.

6. Installation of Damp Proof Courses

General

The object of installing a chemical dpc is to create a continuous barrier to rising dampness at the correct level in a wall. The following methods are described in this standard;

a) higher pressure injection (generally used for solvent based products);
b) lower pressure injection (generally used for solvent based and aqueous based products);
c) gravity feed transfusion (generally used for aqueous products).

In each case the procedure should consist of two distinct stages;

a) drilling a series of holes in a pattern depending on the thickness and form of construction of the walls and the method of treatment selected;
b) inserting the chemical dpc material in the appropriately method described below

Where angled holes are to be used, it is desirable that drill holes terminate in a bed joint and that the dpc material is injected into this joint to form a horizontal dpc;

If timber floors are to be reinstated, the dpc can be installed below floor level ensuring the dpc will not be bridged;

Where solid floors are installed, the dpc should be installed as close to the floor as possible. Any floor membrane should be linked to the dpc to ensure continuity of the moisture barrier. Where this is not possible, special attention should be given to the protection of the skirting;

A vertical dpc should be installed where the dpc changes level and to isolate walls to be treated from untreated walls which are likely to have rising damp. eg. in adjoining terrace buildings or garden walls, and should extend to 300mm above detected dampness;

Where random rubble fill walls have been identified, it is essential to treat them as cavity filled walls, ie, to treat the two masonry leaves and the cavity fill separately using the appropriate method. Specialist advice should be sought;

Variable speed percussion drills should be used to ensure drill holes do not fracture the masonry;

The volume of the dpc fluid used should be recorded to ensure product is not lost where masonry is cracked.

Pressure Injection Techniques

Higher Pressure Systems - Principally for Well Fired Masonry

Drill holes 10mm to 16mm in diameter along the line of the dpc at sufficiently close intervals to ensure the injected dpc material will from a continuous barrier (approx. 100mm to 120mm apart).

The holes should be drilled into the masonry units or into a suitable mortar course provided the mortar is sound. Holes can be drilled on an angle down through the masonry units into the mortar bed. Where the masonry units are impervious (eg blue stone) the drilled holes must terminate in the mortar bed;

Use the appropriate drilling method to suit the wall thickness and type of construction as follows;

a) single brick or solid masonry walls, drill from one side to 25mm from remote face of wall;
b) double brick walls, drill into header course, drill from both sides of wall or drill and inject each leaf in two stages from one side of wall. For party walls, there may be no possibility of having access to both sides of wall and all drilling must be from one side. **Note: Neighbours should be informed of works to party walls**.
c) thicker walls treated from one side by multiple injection is treated as follows;

    1) Drill the first set of holes from one side of the wall;
    2) Inject the dpc as described in 6.2.1.3;
    3) Drill through the existing holes beyond any vertical joint and repeat 2);
    4) Repeat 3) penetrating the wall at incremental depths of not more than 150mm.

d) For cavity walls, treat each leaf as an independent wall. Where access to one side is not available, the cavity must be clear to ensure no bridging of the damp course installed to the one leaf. The multiple treatment method as described in c) above can be used to treat the remote leaf;

Injection rods with a plastic or rubber grommet are used to seal the drill holes. Inject the dpc fluid into the holes until fluid exudes out of the masonry to form a continuous band along the line of injection. Typical pressure range from 0.7 to 0.9 Mpa, however, on site performance will dictate the working pressures used to avoid blow by and wastage

When the face of the masonry cannot be observed, eg. during double injection, pump a measured amount of fluid, as determined by the initial injection into the wall. The volume of material used will depend upon thickness and porosity of the substrate.

For multiple injection, the injection nozzles must be inserted beyond the vertical joint to avoid fluid loss in the wall. At all times, monitoring of the injection process is required to avoid sudden losses through cracks or fissures. Additional injection holes maybe drilled adjacent to previously drilled holes to ensure through impregnation.

Low Pressure Systems- Generally for Weak Masonry or Mortar Joints.

Drill holes 9mm to 16mm in diameter at 120mm to 150mm centres either horizontally or an angle of depression of 25 to 45 degrees terminating in a mortar joint at the level at which the dpc is to be formed;

The holes are drilled into a convenient mortar joint provided that mortar is sound (see 4.5), or into the masonry units. Use the appropriate drilling method to suit the wall thickness and type of construction as follows;

a) for solid walls up to 460mm in thickness, drill from one side and terminate the hole no less than 40mm from the opposite face;
b) for solid walls greater than 460mm, but less than 920mm, treat the wall as two separate sections of equal thickness drilling either horizontal or angled holes terminating no less than 40mm from the centre line of the wall;
c) For cavity walls, treat each leaf as a separate solid wall and proceed as described in a): if the cavity is filled with debris, ensure the debris is below the dpc line or take measures to ensure the dpc will not be bridged. **Note: For walls greater than 920mm, specialist advice should be sought.**

Carry out the injection using a single nozzle with an expanding seal. The injection equipment should have a pressure gauge fitted to monitor pressures. Injection pressures are usually 0.15Mpa to 0.3Mpa. Performance on site will determine the most appropriate pressure used to avoid blow by or fluid wastage. Inject each hole individually. The volume of fluid injected will depend on the thickness and porosity of the substrate.

Failure to maintain pressure directly after release of the operating trigger on the nozzle indicates possible fluid loss through a crack or fissure. In such cases, either drill a new injection hole adjacent to the original hole or caulk the crack or fissure before re-injecting.

Gravity Transfusion Methods.

Drill holes of 16 to 22mm dia. along the line of the proposed dpc in a convenient mortar course provided that the mortar is sound, or into the masonry at an angle of depression of 25 to 45 degrees terminating at the level at which the dpc is to be formed.

The diameter of the holes normally does not exceed 25mm and are space at no more than 170mm centres. Holes of greater diameter may be required where walls are greater than 1000mm thick.

Large diameter holes should be drilled only by rotary drill (no hammer) to avoid surface damage to the opposite face of the wall. When drilling through load bearing walls, eg. columns, it is essential to guard against structural failure. Drill the first holes at 340mm centres transfuses as described and fill with grout. Then drill the remaining holes and impregnate before grouting. Use the appropriate drilling method to suit the wall thickness and type of construction as follows;

a) for solid walls up to 120mm in thickness drill from one side and terminate the hole not less than 25mm from the opposite face;
b) for solid walls greater than 120mm in thickness, drill from one side of the wall terminating the holes within 40mm from the opposite face or drill from both sides terminating the holes no less than 40mm from the centre of the wall, or a staggered drilling pattern with the holes terminating not less than 40mm from the opposite face;
c) For cavity walls, drill from one or both sides. When injecting from one side, transfuse one leaf first and then drill through to give access to the far leaf for similar treatment.

Use a transfusion unit to dispense a measured quantity of fluid into the wall via the drilled holes. Usually, this will consist of a fluid container, which feeds to a tube inserted into the hole. It is essential to prevent fluid loss through cracks or fissures in the wall, by covering holes in the transfusion tube with a suitable dense material, caulking cracks and fissures and sealing around the transfusion tube, or drilling a new hole adjacent to the original failed hole.

Special care should be taken to seal around the transfusion tube and avoid air locks which could obstruct the transfusion process. Carefully monitor the fluid consumption to identify any defective areas and ensure satisfactory treatment. Do not remove the transfusion unit from the wall until the required volume of product has penetrated the wall. The time taken will vary from 2 to 3 hrs and may take as long as three days.

7. Finishing Work

Evaporation of solvent

Subject to reasonable ventilation and temperatures within a building, all solvents and smells should disappear within two weeks of the dpc insertion. Occasionally, special circumstances may cause longer solvent drying periods.

Drying of Masonry

A dpc is normally inserted into a damp wall, which will remain damp until natural dying has taken place. The drying time and extent of drying are determined by the prevailing conditions of temperature, humidity, ventilation and retained salt content. In addition some damp course fluids do not become effective for a period of some weeks. As a general rule, in a 225mm solid wall drying will take up to a year provided other sources of damp have also been rectified.

Replastering

To achieve maximum drying, and saturated wall surface finish should be removed up to 300mm above the highest point of detected rising damp as soon as possible after dpc insertion, to allow the substrate to dry. Damp surface finishes not removed will limit the amount of moisture movement to the surface for drying.

Internal finish- The function of new plaster is to hold back the hygroscopic salts and moisture introduced into the wall by rising damp and prevent the salts from migrating to the new plaster surface. In all cases, as long as possible should be given to drying out before re-plastering. With the correct "salt retardant" additive, re-plastering can be carried out as soon as the damp course fluid has dried, provided there are no other sources of moisture penetration.

Where the existing plaster surface has not deteriorated due to salts, the plaster may be left on the wall until drying out is complete. Replastering may be avoided if sufficiently dry, which may take up to one year. Maximum ventilation should be provided throughout the drying out period.

It is essential that plastering should comply with the specification of the installer. Additive are used in solid plaster to retain salts but allow drying of the wall through migration of water vapour. New plaster should not be a vapour barrier. Plasterboard of any specification is unsuitable to be applied directly to a treated wall.

Solid plaster basecoats should be at least 10mm thick. On uneven walls it may be necessary to have greater thickness of plaster which may need to be applied in more than one coat. The surface coat (hard finish) does not require any special additives.

Dry Lining- Dry lining systems can only be used where the walls are battened out to allow a vapour gap to the wall, or adhered directly over solid plaster base coats to match existing walls. Where battened, treated pine should be used or a membrane material used to isolate the battens. When applying dry linings, maximum drying time should be allowed.

Redecoration

Impervious wall coatings should not be applied until the walls have thoroughly dried, up to one year. All coatings used should allow the movement of water vapour such as water based paints. Installers recommendations should be followed.

External drill holes can be filled using a matching coloured mortar with clear waterproof additive.

Exposed brick walls will often show an accumulation of salts during the drying process. Where exposed brick walls with no covering are to be retained, washing with a weak acid solution after three monthly periods may be necessary. This should be confirmed with the dpc applicator.