



**Document: 10006.39**  
 Collection: 116: Substrate Specification Sheets (SSS)  
 Modified: 28/10/2016 10:20  
 Created: 20/06/2016 15:25

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# SWI001: Squash Plaster Working Instructions 1 - New Build

## Armourcoat (ASF) QA Working Instructions For Application Of Hard (White) Squash Court Plaster

### New Build and Full Re-plastering Of Existing Squash Courts Or Single Walls.

## 1 Armourcoat Squash Court Plaster

Armourcoat's Squash Court Plasters may be used with confidence to repair all traditionally built squash courts. They are not suitable for repairing prefabricated plastic-faced panel courts.

Armourcoat Topcoat Plaster is made from 99% pure gypsum, quarried in the UK. Only material deemed white (achieving 89% reflectance of Barium Sulphate) is used. Since gypsum is a natural material minor colour variations between batches are inevitable. However, these are kept to an absolute minimum by the addition of a whitening agent – Titanium Dioxide.

## 2 Contractor Responsibilities

Contractors must provide their own guarantees of work. Armourcoat Plasters are guaranteed by Armourcoat Limited for the purposes for which they are designed.

Armourcoat Limited accepts no responsibility for application failure.

It is the responsibility of the Contractor to ensure proper application control and management.

## 3 Pre-installation Checklist

- The court must be weathertight, clean and empty.
- Electricity, clean water and waste disposal shall be accessible.
- For brick or block work courts the door frame must be built into the rear wall, protruding 12 mm from the substrate line. Never second fix the door frame.
- For glass walls, channels shall be pre-fitted to protrude 12 mm from the substrate line.
- Maple or beech wood flooring shall be installed after plastering.
- Court lighting must be in place, working, or overhead lighting to 380 lux equivalent provided.
- In cold and hot climates, heater or cooling units shall be installed to provide a court temperature between 5oC and 23oC at time of plaster application.

## 4 Squash Court Substrates

Walls for Armourcoat Plaster Finishes must be built of first quality dense fletton or similar brick (21 N/mm<sup>2</sup>) or dense aggregate block (7 N/mm<sup>2</sup>). In-situ concrete is suitable providing the bond between concrete and basecoat is strengthened (see 7 – Application of Basecoat Plaster). Sand lime, flint lime or calcium silicate brick, lightweight aggregate blockwork or hollow clay pots should be avoided. If they have been used in court construction, seek advice from Armourcoat's Technical Advisory Service before proceeding. (Details see end of document).

### 4.1 Substrate Wall Preparation

The aim of these instructions is to set Armourcoat Surface Finishes standards for work and to address problems likely to be encountered.

- Correct wall preparation is vital. Armourcoat QA Contractors are expected to have the expertise and skills to work with all substrate types and allow for relevant factors when specifying substrate surface treatments.
- Only washed sands, free of earth pigments, metallic oxides, clay and marl may be used in squash court construction. Impurities cause staining.
- Substrate surfaces, prior to plastering, must be clean, free of all curing compounds, dust, laitance, oil, grease, salts and Polyvinyl Acetate (PVA) film resulting from use of overstrength priming.

- Use of curing compounds on in-situ concrete has caused cases of plaster failure. Wax-based compounds form an impervious film to lock in moisture, ensure strength development and enable effective concrete hydration. Designed to break down after approximately 30 days, they can take up to three months to degrade. Thus curing film must be removed totally by shot blasting or scabbling before applying Armourcoat.
- On dry walls, damp down continuously until just sufficient suction remains to give “hold” to the Basecoat. This is better and cheaper than using priming agents. If site problems dictate use of priming agents, follow manufacturer’s specification precisely. NEVER use priming agents overstrength or on dense, impervious substrates. The film that will form will cause delamination. PVA film contamination for instance can be revealed by wetting the wall. If present a white bloom will show after a few minutes. Plastering on this material is like trying to plaster a plastic bag. It does not work.

## 5 Mixed Substrates

Avoid, where possible, application of Armourcoat material over different substrates in the same wall. Expansion and movement differences will cause cracking, particularly in mixed brick and blockwork, mixed blockwork types, or between beams and columns running through brick or block walls. In such situations, a glass fibre mesh membrane must be incorporated in the Basecoat Plaster over the joints between materials. While not being a certain cure, serious crack problems are reduced. Clients should be told that hairline cracks are still likely.

**NOTE: Do NOT use Expanded Metal with building paper over beams or columns in squash court walls.**

### 5.1 Treatment of joints in mixed substrates

Apply Armourcoat Basecoat Plaster, 2-3 mm thick over joint lines and to 200 mm each side. Sandwich a 300 mm wide strip of Fibremesh (available from Armourcoat Limited) onto the applied Basecoat. Plaster with a further 1-2 mm layer, ensuring total wetting, flattening and incorporation of mesh into the plaster. When the plaster has stiffened, but is still tacky, overcoat with Basecoat Plaster (see 7 – Application of Basecoat Plaster)

## 6 Mixing

Armourcoat Squash Court Plaster is **NOT** a conventional plaster and demands specialist treatment. Incorrect mixing will cause pitting, pinholing, early system failure and attendant cost. Both Armourcoat Basecoat and Topcoat Plasters should be mixed in high-sided plastic containers using a slow speed (500-600 rpm) electric drill fitted with an Armourcoat paddle.

Mix all Armourcoat Plasters immediately before use, with clean, cold water.

- **Basecoat Plaster** - Add powder to water. Mix with a drill to a uniform, lump-free, creamy texture.
- **Topcoat Plaster** – Add powder to water. Mix with a drill to a uniform, lump-free, sloppy consistency (roughly 9.5 litres of water per bag of Topcoat Plaster). Allow to stand for 5-10 minutes, during which time, the plaster will thicken to a creamy texture. Mix again immediately prior to use, only adding more water to achieve the correct working consistency.

**NOTE: All mixing and application tools and containers must be kept in a clean, uncontaminated condition. Materials not cleaned out from a previous mixing will accelerate setting and affect the quality of work. Mixing buckets and tools should be washed at least hourly.**

## 7 Application of Basecoat Plaster

*To achieve the renowned Armourcoat finish and quality, these guideline must be followed.*

**Always uniformly dampen substrates before basecoating. A knapsack (horticultural) sprayer is ideal for this operation.**

### 7.1 Floating Squash Court Walls

Squash court walls must be plastered flat horizontally and vertically. Accuracy is best achieved with the plumb and dot method.

#### 7.2 Setting the Wall Plane by Plumb and Dot

- Install Armourcoat Out-of-Play lines with Basecoat Plaster, using a string line to achieve a perfect horizontal plane 12 mm proud of the substrate.
- Position three rows of timber dots (50 mm x 50 mm plywood squares) with Basecoat Plaster horizontally along the length of the wall, observing the bonding rules for in-situ concrete and smooth-faced engineering brick.
- Fix the first and third row of dots 150 mm above the floor and below the out-of-play lines.
- Locate the second row approximately 2.5 metres above the floor to line up vertically with the rows below and above. Set the end dots to the required depth (9 mm) over high spots. Using a string line between the end dots in each row, set all intermediate dots to a perfect plane by pressing in or building out until the dots line up.
- With a string line, plumb the vertical lines between the top and bottom rows.
- When the dots are set firm, use vertical screeds between the dots to produce ruling-off lines.
- On in-situ concrete and smooth-faced engineering bricks, bond the substrate before forming ruling-off lines using Basecoat Plaster gauged with R13 Resin mixed 1:3 with clean water immediately prior to use.
- Once the plaster on the vertical screeds is set firm, the wall can be floated. But first remove plywood dots and infill with Basecoat ensuring a good bond when infilling.

**NOTE: Experienced court plasterers can rule off the Basecoat using Out-of-Play lines and a temporary horizontal rule 150 mm above the floor. This gives excellent results, but is for experienced plasterers only, working in a team of three. The skill is in 'feathering' the Basecoat below the out-of-play line to accommodate the topcoat (3 mm).**

**ARMOURCOAT QA CONTRACTORS USING THIS APPROACH MUST GUARANTEE FLATNESS TO THE SATISFACTION OF THE CLIENT OR HIS AGENT.**

## 8 Substrate Types

### 8.1 In-Situ Concrete and Smooth-Faced Engineering Brick

Prepare surfaces thoroughly, as detailed in 4.1 or shot-blast in-situ concrete walls before plastering. Temperature changes can cause mass concrete walls to expand and contract, leading to Basecoat bond failure. The procedure, detailed below, to strengthened bond will prevent this.

- Set wall plane as described in 7.1 (Floating Squash Court Walls).
- Lightly spray wall with clean water between vertical screeds.
- Brush and stipple damp wall with a bonding coat of Basecoat Plaster gauged with Armourcoat R13 Resin mixed 1:3 with clean water immediately prior to use.
- Using a bonding slurry of Basecoat Plaster gauged with Armourcoat R13 Resin mixed 1:3 with clean water, trowel firmly into and over the stippled concrete surface: use strong up and down strokes to achieve a 2mm uniform coat, leaving no voids.
- While bonding slurry is still wet, working wet-on-wet, build Basecoat Plaster to 9 mm over high spots, one plasterer applying a tight coat about 2 metres ahead of the second plasterer applying the second coat. If only one plasterer is working, the wet-on-wet procedure still applies. If the slurry coat loses tackiness, re-coat before continuing to apply Basecoat Plaster.
- Straighten horizontally and vertically between levelling screeds to a flat, true surface. Fill all hollows while plaster is still wet.
- While Basecoat Plaster is still slack, rule off to a final, flat, true line, leaving a textured surface. **Do not trowel smooth with a steel trowel.**

### 8.2 Dense Concrete Blockwork or Common Clay Brick

These substrates do not need special bonding provided the following procedure is adopted:

- Set wall plane as already described (7.1 Floating Squash Court Walls).
- Wet or dampen wall to control excess background suction.
- Apply Basecoat Plaster as a continuous operation, starting with a tight coat pressed well into the surface pores and leaving no voids.
- Working wet on wet, build to thickness of 9 mm over high spots, as described for In-Situ Concrete (8.1).
- Straighten horizontally and vertically between levelling screeds to a flat-true surface. Fill and hollows while plaster is still wet.
- While Basecoat Plaster is still slack, rule off to a final, flat, true surface leaving a textured surface. **Do not trowel smooth with a steel trowel.**

### 8.3 Setting Time

Normal time on the Hawk for Basecoat Plaster is 1.5-2.0 hours, depending on conditions. Basecoat Plaster will have set sufficiently for Topcoat Plaster application after 3-4 hours.

## 9 Topcoat Plaster Application

**Armourcoat is not a conventional plaster and demands specialist treatment. If these instructions are adhered to, future problems and expense will be avoided.**

Armourcoat Topcoat Plaster is a three-coat system, applied wet-on-wet by firm trowelling, to a total depth of 3 mm. Ideally, Topcoat Plaster should be applied on the same day as Basecoat Plaster and as soon as Basecoat Plaster has set hard or the morning after but not later than this.

### 9.1 Application

- Squash Court Plaster application is a two-man process.
- Work only in an ambient temperature of 5 °C-23°C, or adjust temperature to suit with heaters or cooling units.
- Make up Topcoat Plaster with clean, cold water, as detailed in 6.
- Allow to stand for 5-10 minutes and whisk again. Add more water only if needed to produce the correct working consistency.
- Apply a first tight coat of plaster, squeezed well into Basecoat, filling pores and voids and eliminating air pockets.
- Apply the second coat, wet-on-wet, building out to 2.0-2.5 mm thickness. A team of two plasterers shall be employed, one applying the tight coat, working about 2 metres ahead of the other, laying on the second coat.

- When the second coat is applied, the first plaster to be applied will have started setting, but will be sticky to the touch.
- While firming, but not yet set, trowel flat before applying the final 0.5-1.0 mm coat.
- Trowel down at intervals without adding water, to achieve a flat, smooth and uniform finish.
- Most plasterers can plaster without using a sponge float or re-wetting. Both practices are to be avoided, as they will cause unsightly patchiness (see 10 Potential Problems and Solutions.)
- If coolers are not available in hot, dry working conditions (over 23 °C) the surface of the plaster may dry before the chemical set has taken place. This will cause the plaster to peel up under the trowel. In such cases, one plasterer should scour the surface with a wetted sponge float 2-3 metres square at a time with a wetted sponge float, used in a circular motion but be aware if the chemical set is affected by lack of water the plaster will be damaged.
- As the scourer progresses, his partner follows, trowelling off surplus “fat”.
- Once scouring and trowelling are complete, the team returns to the start point and trowels down to a hard finish.
- In such cases, a patchy finish can be expected, but, if the full set is achieved this will not affect the qualities or durability of the plaster, provided the application in all other respects has been done correctly.

**NOTE: If the applicator chooses to plaster in hot, dry working conditions, he will do so at his own risk.**

## 10 Potential Problems and Solutions

### 10.1 Temperature

Do not plaster when the court temperature is too low or too high. 5°C – 23°C are the optimum range.

### 10.2 Delamination

This is the most common cause of squash court plaster failure. It is usually the result of incorrect substrate preparation or failure to press and scrape the first layer of Basecoat Plaster into the substrate, with subsequent layers applied wet-on-wet, to achieve effective layer bonding.

### 10.3 Wet Plaster on Dry

Armourcoat Topcoat plaster is a three-layer system, applied wet on wet, to a total 3 mm thickness. If the first or second layers are allowed to lose stickiness or become touch-dry, subsequent layers will not bond sufficiently to withstand stresses of play and may delaminate. Armourcoat QA contractors must ensure that all Topcoat Coat Plaster layers are applied wet-on-wet.

### 10.4 Surface Blisters

If blisters appear when trowelling, **DO NOT** press them back onto the wall and hide them. Remove them and refill with fresh, wet Topcoat Plaster applied tight to the Basecoat. If this is not done, plaster patches will detach under impact, with financial cost to the applicator.

### 10.5 Discolouration

Armourcoat Topcoat Squash Court plaster should be trowelled to a finish without additional water. Scouring or using excessive water during the final trowelling may result in a patchy surface finish when dry. Titanium Dioxide (the whitener) is drawn out of the plaster and trowelling re-distributes it unevenly. Use a sponge float to give the plaster ‘life’ only as a last resort, as this can have the same effect. While patchiness may not be acceptable, the strength and integrity of the plaster are unaffected.

## 11 Setting Times

Normal working time on the Hawk for Basecoat Plaster is 1.5-2.0 hours, depending on conditions. Basecoat will set sufficiently for Topcoat Plaster application in 3-4 hours. Topcoat Plaster sets hard in 2.0-2.5 hours.

## 12 Curing

The complete Armourcoat Basecoat/ Topcoat Coat Plaster System requires 40 hours curing at between 5 °C and 23 °C. At over 23 °C, mist spray walls the morning after Topcoat or install coolers.

Dehumidifiers may be used after 48 hours. Courts may be put into play when plaster is visually dry. Depending on temperature, humidity and dehumidifier efficiency, this should be within four days of completion.

## 13 Armourcoat Material Storage

Basecoat and Topcoat Plasters can be stored for up to six months in warm (15°C+), dry conditions. Site storage and other variable conditions can reduce storage life to four months maximum.

## 14 Material Requirements

### 14.1 Basecoat

For 9 mm thickness over high spots, allow 16-19 kg/m<sup>2</sup>. This figure is for guidance only. Armourcoat QA Contractors are expected to assess material requirements on site. Build quality, uneven structure, cavities and mortar joints will require more material.

### 14.2 Topcoat Plaster

For 3 mm uniform thickness, allow 4.5 kg/m<sup>2</sup>.

## 15 Ordering Materials

### 15.1 Basecoat

|   |                    |
|---|--------------------|
| Four wall court (105 m <sup>2</sup> )       | 68 x 25 kg bags    |
| Glass rear wall courts (96 m <sup>2</sup> ) | 60x 25 kg bags     |
| Front wall refurbishment only               | 17-19 x 25 kg bags |

The above is a guide only, assuming true construction and Basecoat Plaster application to 9 mm over high spots. Armourcoat QA Contractors must assess contracts individually for material requirements. Poor build quality, cavities and mortar joints will require more material.

### 15.2 Topcoat Plaster

Topcoat Plaster is applied to a total thickness of 3 mm.

|   |                 |
|---|-----------------|
| Four wall court (105 m <sup>2</sup> )       | 18 x 25 kg bags |
| Glass rear wall courts (96 m <sup>2</sup> ) | 16 x 25 kg bags |
| Front wall refurbishment only               | 5 x 25 kg bags  |

### 15.3 R13 Resin

Only required in specific circumstances, as advised in these notes. Available only in 5 and 25 litre containers.

## 16 Additional Literature

| DOCUMENT  | REF  |
|---|------|
| Armourcoat Racket Sports Brochure   | ARB  |
| Squash Plaster Working Instructions New Build (White Plaster) and Re-plastering | SWI1 |
| Squash Plaster Working Instructions (Repairs) (White Plaster)                   | SWI2 |
| Squash Plaster Working Instructions (Overcoating System) (White Plaster)        | SWI3 |
| Squash Plaster Working Instructions (Four Hour Repairs) (White Plaster)         | SWI4 |
| Squash Plaster Working Instructions (Armourcolor)                               | SWI5 |
| Squash Plaster Working Instructions for Armourcolor Overcoating System          | SWI6 |

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| Armourcoat QA Advice Sheet on Plastering in Hot Climates (White Plaster) | SWI7 |
| Armourcoat QA Advice Sheet on Cleaning Squash Court Plaster              | SWI8 |

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