

Issue date: 08th November 2007

Key changes since original publication (July 2005):

- 08 November 2007** Page 377 – Added new 3rd bullet in 'Key facts' to reference Thistle Durafinish
Page 378 – Added Thistle Durafinish to System components
Page 379 – Amended photo reference, and amended 3rd and 4th paragraph to include reference to Thistle Durafinish, and the reference to BS 5492: 1990 has also been changed
Page 383 – Amended Finish Plasters table to include new column for Thistle Durafinish and new line for minimum temperature
Page 384 – Inserted new paragraph to reference Thistle Durafinish, and both references to BS 5492: 1990 have been changed
Page 385 – Thistle Durafinish added to top paragraph in 2nd column
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- 22 December 2005** Page 380 - In the 120 minute ceiling spec C016045, Bonding Coat thickness changed from 13mm to 19mm.

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For a comprehensive and up to date library of information visit our website at: www.british-gypsum.com

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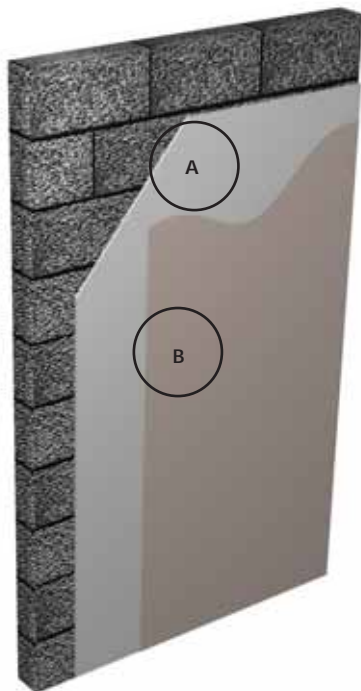
Plaster systems



Plaster systems

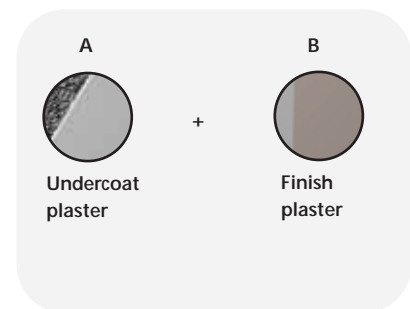
30 - 120 mins

Thistle building plaster systems include products for two / three coat hand application and one-coat hand or machine application. The choice will depend on a number of factors including trade skills and finish quality requirements. The plasters have been formulated to suit a wide variety of background types including concrete, brick, blockwork, sand / cement, expanded metal lath and plasterboard. The Thistle range also includes associated beads, reinforcing tapes and bonding agents. These have been manufactured, selected and tested to work reliably with Thistle plasters.



Sector

- ✓ Office / commercial
- ✓ Educational
- ✓ Residential
- ✓ Healthcare
- ✓ Leisure
- ✓ Industrial



Key facts

- Two / three coat or one coat options
- Hand or machine application
- Resilient and scuff-resistant for general purposes, and excellent resistance to accidental damage provided by Thistle Dura-Finish
- Free from inherent shrinkage cracking
- Controlled setting times
- Grades to suit most internal solid backgrounds
- Proven products

System components

Thistle plaster products

Thistle undercoat plasters



Bonding Coat

For smooth or low suction backgrounds (e.g. concrete, plasterboard or surfaces treated with bonding agents), and expanded metal lath.



Hardwall

High impact resistance and quicker drying surface. Suitable for application by hand or mechanical plastering machine to most masonry backgrounds.



Tough Coat

High coverage, good impact resistance. Suitable for application by hand or mechanical plastering machine to most masonry backgrounds.



Browning

For solid backgrounds of moderate suction with an adequate mechanical key.



Dri-Coat

Cement based, for replastering after installation of a damp-proof course.



X-Ray

Giving protection from x-rays in medical and dental x-ray installations.

Thistle finish coat plasters



Board Finish

For low-medium suction backgrounds (e.g. plasterboards, Thistle Dri-Coat).



Multi-Finish

For use over both undercoats and plasterboard.



Durafinish

To provide improved resistance to accidental damage.

Thistle one-coat plasters



Universal One Coat

For a variety of backgrounds. Suitable for application by hand or mechanical plastering machine.



Projection

For application by a mechanical plastering machine.

Plaster bonding agent / suction control products



ThistleBond-it

Bonding agent for pre-treatment of smooth backgrounds.



Thistle GypPrime

Suction control primer for high suction backgrounds.

Plaster beads and accessories



Thistle Plaster Angle Bead

A galvanised steel bead with expanded wings for reinforcing external angles.



Thistle Plaster Stop Bead

A galvanised steel bead with expanded wings for finishing and reinforcing plaster edges.



Thistle ProTape FT50 and FT100

Self-adhesive glass fibre mesh tapes for joint reinforcement.



Gyproc Joint Tape

Paper tape with centre crease for joint reinforcement, providing superior cracking resistance.

Plaster tools

A complete range of plastering tools and equipment is available.

▶ Refer to 11 - Products, Plaster and plaster accessories.



Application and finishing overview



Reference should be made to *BS EN 13914: 1990 Code of Practice for Internal plastering*.

Mixing

Thistle plasters should be mixed by adding to clean water in clean mixing equipment. Contamination from previous mixes adversely affects the setting time and the strength. Fresh contamination has more effect than old, so equipment should be washed just after mixing.

Thistle plasters (except Thistle Projection) are suitable for mixing by hand or mechanical whisk of a slow speed, high torque type. A range of suitable mixers and paddles is available in the Gyproc Tools range. While mechanical mixing speeds the process up, there is no need to continue mixing after dispersing lumps and achieving the right consistency - over-mixing wastes time and energy, can affect setting times, lead to deterioration in workability and create difficulty in achieving a flat finish.

Plastering onto solid backgrounds

Undercoat plasters should be applied with firm pressure, built out to the required thickness, ruled to an even surface, and lightly scratched to form a key for Thistle Multi-Finish or Thistle Dura-Finish.

Plastering onto metal lath

Application to expanded metal lath involves first a pricking-up coat, which should be forced through the metal lath in order to obtain a good key. The surface of the pricking-up coat must be wire-scratched to provide a good key for the floating coat, and allowed to set but not dry, before the floating coat of the same plaster is applied. Floating coats should be applied at a coat thickness not exceeding that recommended (see Design, Plaster thickness, later), up to a total plaster thickness of 25mm, and wire-scratched between each coat. The final floating coat should be ruled to an even surface and lightly scratched to form a key for Thistle Multi-Finish or Thistle Dura-Finish.

Undercoat plastering to plasterboard

Plaster should only be applied to the front face of plasterboards. Where a Thistle Bonding Coat / Thistle Multi-Finish or Thistle Dura-Finish system is applied to plasterboards, Gyproc Joint Tape should be used to reinforce joints and angles. Any gap between boards exceeding 3mm should be pre-filled with plaster, which is spread along each joint. Gyproc Joint Tape is then pressed firmly into the plaster, and immediately covered with a further application. The joints should be allowed to stiffen, but not dry, before undercoat plastering commences. Thistle Universal One Coat and Thistle Projection are also suitable for use on plasterboards where they combine the functions of both undercoat and finish plaster. For skimming:

▶ Refer to 10 - Finishing systems and decorative effects, Plaster skimming.

Projection plastering

Thistle Projection, Thistle Universal One Coat, Thistle Hardwall and Thistle Tough Coat are all suitable for machine application. Plaster should be sprayed on to the background in the form of a ribbon. The consistency should allow the ribbons to run together. When a substantial area has been covered, the plaster is worked and ruled as in hand plastering. It is easier to attain the required thickness of plaster in one application by machine, but the total thickness should not normally exceed 25mm, subject to background suitability.

One-coat hand plastering

Thistle Universal One Coat should be applied with firm pressure, built out to the required thickness and ruled to an even surface, filling in any slacks or hollows. As the plaster stiffens, further flattening and paring should be carried out. When sufficiently firm, the surface should be scoured with a sponge float and water as required, to raise fat to the surface. The plaster should then be progressively trowelled to a smooth matt finish.

Plastering following dpc treatment

Thistle Dri-Coat is the only British Gypsum plaster recommended for this application. Initial curing and shrinkage of the scratched undercoat must be allowed to take place prior to application of finish plaster. In good drying conditions, a minimum delay of 24 hours is required. In cold/damp conditions or where background suction is low, a longer delay will be necessary. If sufficient delay is not allowed, cracking or shelling of the finish coat may result. If the floor is solid, a 50mm gap should be left between the plasterwork and the floor level. Under no circumstances should the damp proof course be bridged.

Decoration

Thistle plasters can be decorated with most paint finishes and most wallcoverings. Follow manufacturer's recommendations. Impermeable finishes including tiles, should not be applied until the background and plaster are dry. A permeable paint can be used in the interim. Take care with Thistle Hardwall and Thistle Tough Coat which dry from the surface, appearing surface dry before they are fully dry in their depth. *BS EN 13914: 1990 Code of Practice for Internal Plastering* states that plastering should be done under similar or better lighting conditions than the final work will be judged in. This is particularly important for glossy finishes and / or low-angle natural or artificial lighting.

Tiling

Tiles up to 20kg/m² can be applied directly to the Thistle finish coats, except where the system includes a bonding agent. As the total weight of tiles and plaster applied over a bonding agent is limited to 20kg/m², consideration should be given to tiling directly to the background. If plastering to provide a background for tiles, avoid polishing the surface. Polished plaster surfaces should be roughened and a suitable primer used. Tiles should not be applied directly to Thistle undercoats, with the exception of Thistle Dri-Coat.

Performance (▶ Refer to 2 - Basic principles of system design)**BS****Table 1 – New or replacement ceilings to solid timber joists**

Timber joists with suitable timber noggings between joists to support board edges (unless otherwise stated). Ceiling specification as in table.

Detail	Ceiling specification	Flooring board type ²	Joist centres mm	Joist width (minimum) mm	System reference
30 minutes fire resistance BS					
1	One layer of 9.5mm Gyproc WallBoard or Gyproc HandiBoard with 2mm Thistle Board Finish or Thistle Multi-Finish	a	450	47	C014012
1	One layer of 12.5mm Gyproc WallBoard or Gyproc HandiBoard with 2mm Thistle Board Finish or Thistle Multi-Finish	b	600	38	C016002
60 minutes fire resistance BS					
2	Ribbed metal lath ¹ with 13mm Thistle Bonding Coat and 2mm Thistle Multi-Finish	b	600	44	C016016
2	Ribbed metal lath ¹ with 19mm Thistle Universal One Coat	b	600	38	C016017
120 minutes fire resistance BS					
2	Ribbed metal lath ¹ with 19mm Thistle Bonding Coat and 2mm Thistle Multi-Finish	b	600	48	C016045

¹ Where plaster is applied to ribbed metal lath, the plaster thickness is measured from the face of the lath, and the lath should be installed in accordance with the manufacturers' recommendations. With 120 minutes fire resistance construction, the metal lath is independently fixed with wire supports from the joist sides.

² Floor types: a Wood board t&g flooring, not less than 18mm (finished) thickness.

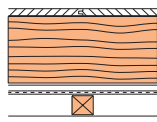
b Wood board t&g flooring, not less than 21mm (finished) thickness.

NB Thistle plasters are non-combustible when tested in accordance with *BS476: Part 4: 1970 (1984)*. For the purposes of national Building Regulations, gypsum plasters are designated as 'non-combustible materials' and also satisfy the requirements for Class 0 surfaces.

BS

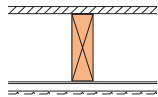
Table 2 – upgrading existing ceilings to solid timber joists

1



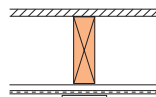
Existing lath and plaster ceiling supported by chicken wire securely fixed to the joists, battened with 38mm x 38mm timber (at 600mm centres with noggings or 450mm centres without noggings). Ceiling board type / applied plaster as in table.

2



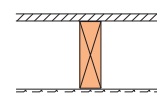
Existing ceiling underdrawn with metal lath¹ securely fixed to the joists. Ceiling plaster as in table.

3



Existing lath and plaster ceiling (up to 20mm thick) supported by chicken wire securely nailed to the joists. Ceiling board type / applied plaster as in table.

4



Existing ceiling removed and metal lath¹ securely fixed to the joists. Ceiling plaster as in table.








Detail	Board type / applied plaster	Joist centres mm	Joist width (minimum) mm	System reference
30 minutes fire resistance BS				
1	One layer of 12.5mm Gyproc HandiBoard or Gyproc WallBoard with 2mm Thistle Board Finish or Thistle Multi-Finish	600	38	C016020
60 minutes fire resistance BS				
1	Two layers of 12.5mm Gyproc FireLine with 2mm Thistle Board Finish or Thistle Multi-Finish	600	38	C016022
2	13mm Thistle Bonding Coat with 2mm Thistle Multi-Finish	600	37	C016024
1	Two layers of 10mm Glasroc MultiBoard with 2mm Thistle Board Finish or Thistle Multi-Finish	600	37	G106045
3	100mm x 10mm Glasroc MultiBoard strips, one layer of 12.5mm Glasroc MultiBoard with 2mm Thistle Board Finish or Thistle Multi-Finish	600	50	G106029
120 minutes fire resistance BS				
4	19mm Thistle Bonding Coat with 2mm Thistle Multi-Finish	600	48	C016045

¹ Where plaster is applied to ribbed metal lath, the plaster thickness is measured from the face of the lath, and the lath should be installed in accordance with the manufacturers' recommendations. With 120 minutes fire resistance construction, the metal lath is independently fixed with wire supports from the joist sides.

NB Floor type is a wood based t&g flooring, not less than 21mm (finished) thickness, or 20mm plain edge boarding with 3mm hardboard or plywood.

NB Thistle plasters are non-combustible when tested in accordance with BS476: Part 4: 1970 (1984). For the purposes of national Building Regulations, gypsum plasters are designated as 'non-combustible materials' and also satisfy the requirements for Class 0 surfaces.

Plaster selection

UNDERCOAT PLASTERS									
Specialist plasters	Suitability to background - key and suction			Plasterers' preference for workability					
Specialist requirements	Background suction	Background	Pre-treatment	 Thistle Bonding Coat For smooth, low suction or flexible backgrounds.	 Thistle Browning For bricks and blocks with moderate suction.	 Thistle Hardwall For most masonry backgrounds. Can be spray-applied. Higher impact resistance.	 Thistle Tough Coat For most masonry backgrounds. Can be spray-applied. Higher coverage.		
 Thistle Dri-Coat Cement-based, for replastering after installation of a damp-proof course. See Replastering walls following dpc treatment.	High  Medium  Low	Aircrete blocks		Thistle GypPrime in extreme cases		Suction control usually needed	✓	✓	
		Common bricks				✓	✓	✓	
		Medium-density blocks				✓	✓	✓	✓
		Dense blocks	Keyed			✓		✓	✓
			Smooth - mid suction			✓		✓	✓
			Smooth - low suction	ThistleBond-it		✓			
		Engineering bricks with raked joints				✓			
		Plasterboard & MultiBoard	All except MR			✓			
			MR	ThistleBond-it		✓			
		Cast insitu & precast concrete	Normal ballast		ThistleBond-it usually required (unless keyed)	✓			
Other aggregates (limestone, granite, etc)	ThistleBond-it			✓					
Painted / glazed surfaces			ThistleBond-it	✓					
Metal lathing				✓		Only when bridging columns, lintels, etc	Only when bridging columns, lintels, etc		
				Normal thickness	11mm to walls, up to 8mm to ceilings, plus 2mm of finish plaster				
				Setting time	1.5 - 2hrs	1.5 - 2hrs	1.5 - 2hrs	1.5 - 2hrs	
				Coverage per bag	2.75m ² @ 11mm	3.5m ² @ 11mm	3.0m ² @ 11mm by hand. Approx 10% less if sprayed	3.5m ² @ 11mm by hand. Approx 10% less if sprayed	
				Approx. water requirement	14.0 litres per bag	17.5 litres per bag	15.0 litres per bag	17.5 litres per bag	
				Dry set weight	12.1kg/m ² @ 11mm plus 3.4kg/m ² finish plaster	8.4kg/m ² @ 11mm plus 3.4kg/m ² finish plaster	9.3kg/m ² @ 11mm plus 3.4kg/m ² finish plaster	8.5kg/m ² @ 11mm plus 3.4kg/m ² finish plaster	

▶ Please refer to 2 - Basic principles of system design for general guidance.

Design

Plaster thickness

In general, normal thicknesses using undercoat/finish systems are 11mm to walls or up to 8mm to ceilings, plus 2mm of finish plaster. One-coat products are applied to the same total thickness i.e. 13mm to walls or up to 10mm to ceilings.

When using Thistle Durafinish, the specified thickness of 2mm must be applied for the full performance to be achieved.

When using a bonding agent or plastering ceilings, do not exceed the thicknesses given. In cases involving both the use of a bonding agent and a sloping or horizontal background (e.g. the underside of concrete stair or floor units) it is strongly advised to reduce thickness further to minimise stress placed on the bonding agent.

Greater thickness requires the use of a support for the plaster (e.g. metal lathing fixed in accordance with *BS EN 13914 Code of Practice for Internal Plastering*).

For plaster systems used on walls which do not use a bonding agent, thickness in excess of the recommendations up to a maximum of 25mm may be built up in a series of fully keyed coats of nominally 8mm. Total thickness over 25mm normally requires the use of a support for the plaster (e.g. metal lathing). If necessary this can be spaced away from the background e.g. by fixing to timber battens.

Backgrounds - general

All surfaces should be reasonably dry and protected from the weather. The suitability of a particular background for plastering should be considered in relation to its strength, suction, bonding properties, shrinkage or thermal movement characteristics, water and soluble salt content. Very high or low suction substrates should be pre-treated with a bonding agent. The use of ThistleBond-it is recommended for smooth and / or low suction backgrounds, whilst Thistle GypPrime is recommended for very dry, high suction backgrounds. The high suction of certain backgrounds can be suitably adjusted by sprinkling with water.

Brickwork / blockwork

The surface must be clean, dry and suitable to receive gypsum plaster. Control suction with water. If suction is severe the background should be pre-treated with Thistle GypPrime.

On high suction brickwork / blockwork the use of Thistle Hardwall or Thistle Tough Coat is recommended.

Aerated concrete blocks can give rise to high suction. Control suction with water or, if severe, pre-treat with Thistle GypPrime.

Low suction backgrounds such as some concrete blocks, or engineering bricks provide minimal absorption. The joints should be raked thoroughly to give an adequate mechanical key. Smooth backgrounds should be pre-treated with ThistleBond-it.

Dense aggregate concrete blocks do not require wetting prior to plastering, but the plaster should be applied with very firm pressure to ensure intimate contact with the background.

Concrete

The surface must be clean, dry and suitable to receive gypsum plaster. Any mould oil or other release agents present must be thoroughly removed from the surface.

Normal ballast concrete should be given sufficient time to mature before applying plaster. The plaster should not be applied onto a green background or when any free water is visible. Mature concrete will require wetting to displace the air before plastering. Clean water should be applied 5 - 10 minutes before plaster application.

In-situ or pre-cast concrete which is exceptionally smooth or which is made from limestone, brick, granite and certain lightweight aggregates, will require pre-treatment with ThistleBond-it. No-fines concrete does not require wetting prior to plastering.

Pre-cast concrete units should be plastered with Thistle Bonding Coat. In order to reduce the risk of cracking, the floating coat should be applied with sufficient pressure to fill all gaps between the units.

With composite ceilings, the concrete beams should be pre-treated with ThistleBond-it. If required, the suction of the infill panels can also be controlled.

Combination backgrounds

Ideally, the right product for each part of the background should be used, with joints formed using back-to-back Thistle stop beads, but this can be impractical, e.g. narrow concrete columns or lintels within block walls. These should be bridged using metal lathing and the plaster isolated from the concrete using building paper. For details refer to *BS EN 13914 Code of Practice for Internal Plastering*.

Pre-treatment of very high or low suction backgrounds

Backgrounds such as ceramic tiles, glazed bricks, exceptionally smooth concrete or concrete made from limestone, brick, granite and certain lightweight aggregates, will require preparation and pre-treatment with ThistleBond-it bonding agent prior to plastering. The surface should be thoroughly cleaned and allowed to dry before pre-treatment.

Thistle GypPrime bonding agent should be used to pre-treat surfaces where suction is extremely high. With some very porous surfaces, wetting alone may be insufficient as the water is almost immediately absorbed.

If there is any doubt about the suitability of a background for direct plastering, a trial panel should be plastered and tested for adhesion once dry. If adhesion is inadequate, the appropriate bonding agent must be applied to the background prior to plastering.

ThistleBond-it bonding agent is specially formulated for use on smooth backgrounds. It has many advantages over PVA and is the only bonding agent recommended for use with Thistle plasters. Benefits include:

- Contains fine aggregates for better mechanical adhesion.
- Applied in one coat only.
- Plaster is applied when ThistleBond-it is dry, allowing flexible timing of application.
- Plaster can be applied at normal thickness (i.e. up to 13mm); maximum 8mm on soffits.
- No dilution, so no confusion on site.
- Green coloured for ease of identification in application.

Thistle GypPrime bonding agent is specially formulated for the pre-treatment of very high suction backgrounds. It is the only suction control primer recommended for this use with Thistle plasters. It can be diluted as required, giving total flexibility, for different levels of suction control, and is yellow coloured for ease of identification.

ThistleBond-it and Thistle GypPrime should be applied strictly according to the user instructions. Care should be taken **not to exceed** the recommended plaster thickness otherwise bond failure may result. Where a greater thickness of plasterwork is required, due to an uneven background for example, an alternative carrier for the plaster should be specified, such as metal lath.

Sand / cement undercoats

Cement-based undercoats shrink on drying, usually with some cracking, which can appear several days or even weeks after application. If a Thistle finish plaster is applied before the shrinkage is complete there is an increased risk of delamination or cracking of the finish, particularly if the undercoat was not thoroughly keyed. The key provided to cement-based undercoats needs to be much better and the drying time allowance much longer than for gypsum-based undercoats. Retarded ready-mixed sand/cement mortars may have delayed shrinkage, and may contain additives which interfere with the setting or strength of Thistle finish plasters.

Expanded metal lath / beads

Plaster should only be applied to galvanised steel or epoxy coated stainless steel. Before plastering, all cut edges, damaged metal lath, staples, nail heads and ends of tying wire should be bent inwards and adequately protected by galvanising, painting or by applying a thick coat of lacquer.

Normal application to expanded metal lath employs a pricking-up coat which should be forced through the metal lath in order to provide a good key to the background. The surface of the pricking-up coat must be wire-scratched to provide a good key for a floating coat of the same undercoat plaster. The pricking-up coat must be allowed to set but not dry before the floating coat is applied.

Floating coats should be applied at a thickness of 8mm, up to a total plaster thickness of 25mm, and wire-scratched between each coat. The final floating coat should be ruled to an even surface and lightly scratched to form a key for Thistle Multi-Finish or Thistle Durafinish.

Machine applied plaster requires the use of spray lath.

Replastering walls following dpc treatment

Thistle Dri-Coat is the only British Gypsum plaster recommended for this application. The source of the rising dampness must be identified and eliminated. The existing plasterwork should be hacked off to a height at least 0.5m above either the new damp proof course or the last detectable sign of dampness. Where the old plaster is gypsum based, it must be completely removed. Following chemical damp-proof injection, old mortar joints, which are the site of the higher salt concentrations, should be thoroughly raked out and the face of the brickwork brushed with a wire brush. Ideally, replastering with Thistle Dri-Coat should be delayed as long as possible to allow the background to dry out. Before replastering, any salts brought to the surface of the background during drying should be carefully removed.

Heavy salt contamination in the background can cause persistent damp problems. Buildings such as old farmhouses, stables and barns not originally built with a damp-proof course, or buildings that have been exposed to storage of chemicals, are particularly at risk from this problem. Thistle Dri-Coat should not be used in these situations unless a proper survey shows that the risk from salts is minimal. An independent wall lining may be a better solution. Chimney breasts are another area where salt deposits may be heavy.

Application of Thistle Dri-Coat can proceed once the background is clean, sound, free from dust and efflorescence, and where only residual moisture is present. Low suction or smooth backgrounds, such as engineering bricks, should be treated prior to plastering with a water-resisting bonding aid (by others) which should be applied and plastered in accordance with the manufacturer's recommendations. Where the background is dry, it is important to control suction with the application of water. This prevents rapid drying of the plaster which would impair its strength. Angle beads must not be fixed with gypsum-based materials. See **Application and finishing overview** - Plastering following dpc treatment.

NB Thistle Dri-Coat should not be used below ground level as hydrostatic pressure can give rise to direct water penetration. A suitable tanking treatment must be specified in this situation.

Replastering walls – general application

Where the wall to be replastered is damp, replastering should be delayed for sufficient time to allow the background to dry out. Any source of penetrating dampness must be identified and eliminated. Before replastering, any salts brought to the surface of the background during drying should be carefully removed. The background must be clean, sound, and free from dust.