Anti-Crack Render (ACR) Systems Application Instructions

Table of Contents

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ACR SYSTEM DESCRIPTIONS

Dryvit ACR Systems are a range of polymer based, anti-crack renders, designed to outperform the shrinkage and cracking characteristics of traditional renders. The range offers a wide variety and choice of colours and textures.

The systems can also be used to match and complement Dryvit's External Insulation Systems in areas where insulation is not required.

Dryvit ACR 50

A cost-effective system incorporating a wide choice of Dryvit Standard and Speciality finishes. Dryvit Stucco Build is used where the substrate requires levelling, offering greater flexural strength than that of a traditional sand/cement render system.

Dryvit ACR 150

A single component pre-bagged polymer modified render Dryvit Stucco Build incorporating an alkali resistant glass fibre reinforcement to increase the flexural strength, crack and impact resistance of the system. Available with a wide choice of Dryvit Standard and Speciality finishes.

Dryvit ACR 200

A crack resistant polymer modified cementitious base coat incorporating an alkali resistant glass fibre reinforcement available with a wide range of Dryvit Standard and Speciality Finishes. Dryvit Stucco Build is used where the substrate requires levelling, offering greater flexural strength than that of a traditional sand/cement render system.

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LIST OF DRYVIT BROCHURES AND PUBLICATIONS REFERENCED IN THIS DOCUMENT

Product type	Product name	Data sheet reference
Re-profiling mortar	Stucco Build	DS EN 04 53 04
Base coat	Genesis	DS EN 04 50 03
	Genesis DM Plus	DS EN 04 50 15
	Fibercoat	DS EN 04 50 17
Reinforcing Mesh	Standard	DS EN 04 56 01
	Standard Plus 150	
	Standard Plus 160	
	Panzer 260	
	Panzer 500	
	Panzer 700	
	Detail mesh	
Key coats/Primers	Primax	DS.EN.04.51.01
	Primesil	DS.EN.04.51.05
	Color Prime	DS.EN.04.51.02
	Color Prime S	DS.EN.04.51.03
	Color Prime Plus	DS EN 04 51 07
	Demandit Smooth	DS EN 05 54 02
	Wood Prime	DS EN 04 51 08
Standard Finishes	Drytex	DS EN 04 53 01
	PMR	DS EN 04 52 08
	FD PMR	DS.EN.04.52.14
	SLK	DS.EN.04.52.11
	TR	DS EN 04 52 05
	HDP	DS EN 04 52 11
	Weatherlastic Finishes	DS.EN.04.54.10
Speciality finishes	Ameristone(1)	DS EN 04 52 01
	TerraNeo(1)	DS EN 04 52 02
	Stone Mist(1)	DS EN 04 52 03
	Stone Mist T(1)	DS EN 04 52 04
	Custom Brick(1)	DS EN 04 52 15
	Drytex Wood Effect	DS EN 04 53 03
Decorative coatings	Demandit Smooth	DS EN 04 54 02
	Silstar/Silstar Pro	DS EN 04 54 04
	HyDroPhobic	DS EN 04 54 20
	Wood Glaze	DS EN 04 54 07
Insulation	Stone Wool Dual Density	DS EN 04 56 08.1
	Stone Wool Lamella	DS EN 04 56 08.3

(1) Can be applied by pattern to form a Custom Brick Effect

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Standard finishes and textures

Texture		Size (mm)	Texture		Size (mm)
Sandblast (SB)		1.2	Sandpebble Fine (SPF)		1.2
Quarzputz Fine (QPF)		1.2	Sandpebble (SP)		1.6
Quarzputz (QP)		2.0	Sandpebble 2 (SP2)		2.0
Lymestone (LS)		0.6	Sandpebble 3 (SP3)		3.0
Freestyle (FS)		0.6			

Product type	**Product name**	**Data sheet reference**
Ancillary items	Render Beads	Available on request
	Compressible seals, backer rods and sealants	
	Fungicidal Wash	
	Efflorescence Remover	
Dryvit reference documents	Dryvit Information Sheets	DIS Series
	Technical Guidance Notes	GN Series
	ACR 50 Installation Details	DUK 961
	ACR 150 Installation Details	DUK 962
	ACR 200 Installation Details	DUK 963

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1. General installation requirements

Project conditions

1.1 Health and safety

- Always wear appropriate PPE for the task undertaken including the use of suitable protective clothing, dust mask and eye protection where specified.
- Refer to individual product Safety Data Sheets (SDS) for full information.

1.2 Storage

- All products should be stored in a cool dry location, off the ground, in sealed packaging and protected at all times from rain or water exposure.
- Products should be stored away from prolonged expose to direct sunlight.
- Maximum storage temperature shall not exceed 38°C. Minimum storage temperature shall not be less than 5°C. except for the following products:

Product	**Minimum storage temperature (°C)**
Demandit Smooth and Reflectit	7°C
Ameristone, TerraNeo and Lymestone	10°C

- Refer to individual product data sheets for full storage information.

1.3 Application

- Application of wet materials shall not take place during inclement weather unless appropriate protection is provided.
- All materials shall be protected from inclement weather until they are completely dry.
- Before application of Dryvit products, the air and surface temperatures must be 5°C or above and must remain so for a minimum of 24 hours or until the product is dry, except for the following products:

Product	**Minimum air and surface temperature (°C)**
FD PMR	1°C
Demandit Smooth, Demandit Sanded, Stone Mist, Stone Mist T and Reflectit	7°C
Ameristone, TerraNeo and Lymestone	10°C

- These temperatures shall be maintained with adequate air ventilation and circulation for a minimum of 24 hours (48 hours for Ameristone, TerraNeo and Lymestone) or until the products are completely dry.
- Cool or humid conditions may extend the required drying time.
- Refer to individual product data sheets for full application information.

1.4 Inspection of substrate

- The system is suitable for use on solid constructions. Common substrates include, in-situ concrete, pre-cast concrete, blockwork and brick.
- The system can also be applied over a wide range of sheathing carried on light gauge steel frames. For application instructions over sheathing or direct render boards consult Dryvit UK Ltd.
- The substrate must be clean, dry, structurally sound, free of loose material, voids, projections, hot spots, release agents, coatings, or other materials that may affect adhesion.
- There shall be no planar irregularities greater than 12 mm within any 3 m radius. On solid substrates any irregularities over this limit will require re-profiling using Stucco Build.
- Wall sheathing must be installed in accordance with manufacturer's requirements and securely fastened in accordance with the contract documents.
- The requirements for Dryvit ACR renders are similar to applying sand and cement renders and the guidance provided in BS EN 13914-1 *Design, preparation and application of external rendering and internal plastering. External rendering*, BS 8000-0 *Workmanship on construction sites. Introduction and general principles*, PD 6697 *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2* and relevant part of Eurocode 6 *Design of masonry structures* and associated Nation Annexes should be followed at all times.
- Before commencing rendering, all brick and blockwork mortar joints are flush pointed and have had a minimum of 28 days curing. This should be increased during prolonged wet spells. Any additional recommendations or requirements from the block or brick manufacturer should also be followed or discussed with Dryvit UK Ltd.
- When the ACR system is applied onto wet mortar joints there's a possibility of the mortar lines showing through the render finish .
- The majority of masonry substrates are suitable for Dryvit ACR renders, but certain precautions or surface preparation may be required. This is particularly the case where different material types are found within the same façade. Buildings constantly move due to seasonal and daily weather conditions. Cracking of the substrate can occur, generally at the weak points in the building and where insufficient movement or restraint is included in its design. Dryvit ACR Systems can crack where the substrate has not been correctly designed or constructed to accommodate potential movement. All movement joints in the substrate must be reflected through the system.
- The type of substrate should be considered to determine where it is considered to be low (dense concrete, engineering bricks etc), medium or high porosity (lightweight and aerated autoclaved blocks etc).
- It is recommended that all substrates should receive an application of undiluted Dryvit Primax acrylic primer over the surface, to improve bond and reduce mirroring of the mortar joints through the render.
- Low porosity substrates should receive an application of undiluted Dryvit Primax acrylic primer over the surface. If increased adhesion is required then an expanded metal lath (EML) should be considered, securely fixed to the substrate to provide a mechanical key. prior to ACR render application.
- High porosity substrates should initially be dampened by spraying with water, avoiding saturation, followed by a spray or brush applied surface sealer coat of undiluted Primax. The Primax should be left dry before applying the ACR render.
- When applying ACR in hot weather, do not apply in direct sunlight and always try to work in the shade. When hot weather persists, it is recommended that an even mist spray of clean water is applied to the substrate before application to reduce surface suction.

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1.5 Flashing at system terminations

- Ensure that all flashings, sills and trim are installed in accordance with the manufacturer's installation requirements and the contract documents.
- Refer to the Dryvit ACR System Installation Details for further information and guidance on all standard system details.

1.7 Transition at roof lines

- Ensure the roof has positive drainage, i.e. all runoff shall be directed to the exterior and away from the structure.
- Roof flashing shall be installed in accordance with industry guidelines, manufacturer's instructions and contract documents.
- Runoff diverters shall be installed in accordance with industry guidelines, manufacturer's instructions and contract documents. Attention must be paid to the eaves/chimney intersections and sloped roof/wall intersections.
- Hold the system a minimum of 150 mm above flat roofs.

1.8 Openings

- Continuous flashing at heads of openings are specified and installed as indicated in the contract documents and Dryvit ACR System Installation Details.
- For windows or doors that do not have integral flashing, a field-applied flashing shall be installed in accordance with industry guidelines, manufacturer's instructions and contract documents.
- Individual windows that are ganged to make multiple units require that the heads be continuously flashed and the joints between the units are fully sealed.
- In accordance with the recommendations given in BS EN 13914-1 *Design, preparation and application of external rendering and internal plastering. External rendering,* sills and flashings should project beyond the face of the rendering by a minimum 40 mm.

1.9 Roof junctions and decks

- Where the system terminates above poured decks, patios, landings, etc. they must be properly sloped and waterproofed to direct water away from the walls.

1.10 Utilities

- Provisions must be made to ensure that the system terminates properly at lighting fixtures, electrical outlets, hose bibs, dryer vents, satellite dishes etc.
- It is the responsibility of the client/main contractor to assess existing extract ducts and extend the flues. Any works to boilers should be carried out by a registered Gas Safe engineer.

1.11 Grade level terminations

- The system shall be terminated a minimum of 150 mm above finished grade. Refer to the Dryvit ACR System Installation Details for above and below grade termination guidance.

1.12 Sealants/seals

- Dryvit materials shall be completely dry prior to installation of sealant materials (typically 48 to 72 hours). Humid or cool conditions may further extend drying times.
- For compressible weather seals refer to the manufacturer's installation instructions.
- Substrate to receive frame seals should be free of contamination and installed in accordance with manufacturers installation instructions.

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2 Materials required for the installation of the ACR Systems

2.1 Materials supplied by Dryvit UK Ltd.

ACR system components	50	150	200
Stucco Build(1)	O	✓	O
Primax	O	✓	O
Standard Plus 150 mesh(2)		✓	✓
Cementitious base coat			✓
Primer/key coat	✓	✓	✓
Finish	✓	✓	✓

(1) O = Optional dependant on substrate

(2) Dryvit Reinforcing mesh is available in the following widths and lengths:
- Standard Plus 150 mesh - 1 m x 50 m
- Detail - 240 mm x 45.7 m and 330 mm x 50 m

The project specification will identify the project specific materials necessary to complete the application of the system.

- Termination, movement joints and beads etc.
- Dryvit Base coat.
- Dryvit Reinforcing Mesh.
- Dryvit Primer – where specified
- Dryvit Finishes
- Dryvit Decorative Coating – where specified
- Expanded metal lath (EML)
- Compressible seal, window frame seal beads and joint sealant– where specified.

2.2 Materials supplied by others

- Cement meeting the requirements of EN 197-1 type CEM I or CEM II (grey or white) for use with Genesis base coat
- Clean potable water
- Joint sealant and closed cell backer rods
- Compressible polyurethane joint sealing tape – Contact Dryvit for information.

3 Mixing Instructions

- All materials must be mixed and installed in accordance with the instructions given on the relevant product data sheet.
- Under no circumstances shall, additives such as sand, aggregates, rapid binders, anti-freeze, accelerators, etc. be added to any Dryvit materials. Such additives will adversely affect the performance of the material and void all warranties.
- Due to shipping and storage, there may be some separation of bucket materials. Prior to use, remix the material thoroughly using a Dryvit recommended mixing paddle, powered by a slow speed drill.
- Buckets should be opened using a utility knife or Dryvit Bucket Opener.

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4 Installation of the ACR Systems

4.1 Installation of Stucco Build (ACR 50 and optional for ACR 200)

- Prepare and prime the substrate as described Section 1.4.
- Mix the Stucco Build in accordance with the instructions given on the relevant product data sheet.
- Apply the Stucco Build in layers, by hand trowel or wet spray from 6 mm to 12 mm thickness. Multiple coats are necessary to achieve thicknesses greater than 12 mm.
- Corners of all openings and penetrations shall be reinforced with a minimum 240 mm x 300 mm section of Detail mesh placed diagonally to the opening. This will reduce the potential for cracking at these high stress areas. The mesh is installed centrally within the Stucco Build application.
- The Stucco Build shall be worked with a straight edge or screed rail to achieve an even plane to the wall. Once it has begun to stiffen it can be floated to remove excessive roughness.
- To finish, it should be floated with a plastic/polyurethane/steel float only after the Stucco Build has lost sufficient moisture so any wet sheen on the surface is no longer visible but before the Stucco Build has started to harden. Usually 1 to 2 hours after application and when the Stucco Build no longer sticks to a steel trowel when placed against it. At temperatures lower than 20°C the setting and curing times may be further extended.
- Do not over trowel the surface as this may cause excessive fines to be brought to the surface, resulting in cracking.
- During cool, damp conditions the Stucco Build may require protection from rain, wind and dust.
- Where required a final 3 mm thick application of Stucco Build can be applied to achieve a fair faced finish.

4.2 Installation of Stucco Build and Standard Plus 150 mesh (ACR 150)

- Prepare the substrate and mix the Stucco Build as described Section 4.1.
- Apply the first coat of Stucco Build by hand trowel or wet spray.
- Prior to installing the Standard Plus 150 reinforcing mesh, it should be inspected to ensure that it has been furnished by Dryvit UK Ltd.
- Corners of all openings and penetrations shall be reinforced with a minimum 240 mm x 300 mm section of Detail mesh placed diagonally to the opening. This will reduce the potential for cracking at these high stress areas.
- The mesh is installed centrally within the Stucco Build application. With the curve of the mesh against the Stucco Build, trowel from the centre to the edges avoiding wrinkles, until the mesh is fully embedded and no longer visible.
- Whilst still wet, apply a second pass of Stucco Build ensuring the mesh is fully embedded centrally within the Stucco Build. Multiple coats are necessary to achieve thicknesses greater than 12 mm.
- The Stucco Build shall be worked with a straight edge or screed rail to achieve an even plane to the wall. Once it has begun to stiffen it can be floated to remove excessive roughness.

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- To finish, it should be floated with a plastic/polyurethane/steel float only after the Stucco Build has lost sufficient moisture so any wet sheen on the surface is no longer visible but before the Stucco Build has started to harden. Usually 1 to 2 hours after application and when the Stucco Build no longer sticks to a steel trowel when placed against it. At temperatures lower than 20°C the setting and curing times may be further extended.
- Do not over trowel the surface as this may cause excessive fines to be brought to the surface, resulting in cracking.
- During cool, damp conditions the Stucco Build may require protection from rain, wind and dust.
- Where required a final 3 mm thick application of Stucco Build can be applied to achieve a fair faced finish.

4.3 Installation of the cementitious base coat and Standard Plus 150 mesh (ACR 200)

- Prepare the substrate and mix the Stucco Build as described Section 4.1.
- Mix the specified base coat in accordance with the instructions given on the relevant product data sheet.
- Prior to installing the Standard Plus 150 reinforcing mesh, it should be inspected to ensure that it has been furnished by Dryvit UK Ltd.
- Corners of all openings and penetrations shall be reinforced with a minimum 240 mm x 300 mm section of Detail mesh placed diagonally to the opening as illustrated above. This will reduce the potential for cracking at these high stress areas.
- The base coat can be applied in with a single application or using the double pass method. The recommended method is to apply the base coat in two passes.

Single pass method

- For a single application, the base coat is applied in one pass to ensure that the overall minimum thickness is sufficient to fully embed the reinforcing mesh.
- Using a stainless-steel trowel, apply the base coat on the entire surface of the substrate, to an area slightly larger than the width and length of a piece of Standard Plus 150 reinforcing mesh, in a uniform thickness of approximately 2.5 mm.
- Immediately place the reinforcing mesh against the wet base coat mixture. With the curve of the mesh against the wall, trowel from the centre to the edges avoiding wrinkles until the mesh is fully embedded centrally in the base coat layer and no mesh pattern is visible.
- The reinforcing mesh shall be continuous at corners and mesh edges overlapped not less than 100 mm. Do not lap the reinforcing mesh within 200 mm of a corner.
- Protect completed work from water penetration and run-off.
- Allow the Genesis/Primus M to cure a minimum of 24 hours before proceeding with application of the primer/finish coat. Cool, damp conditions may require longer drying times. Do not apply finish to a wet or damp base coat.

Double pass method

- Using a stainless-steel trowel, apply the base coat on the entire surface of the substrate to an area slightly larger than the width and length of the cut reinforcing mesh. The reinforcing mesh may be installed either vertically or horizontally. The thickness of the first pass should be uniform and a minimum of 1.6 mm.

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- Immediately place the reinforcing mesh against the wet base coat mixture. With the curve of the mesh against the wall, trowel from the centre to the edges avoiding wrinkles, until the mesh is fully embedded and no long visible. Trowel smooth to a uniform thickness slightly more than the thickness of the reinforcing mesh.
- The reinforcing mesh shall be continuous at corners and mesh edges overlapped not less than 100 mm. Do not lap the reinforcing mesh within 200 mm of a corner.
- Allow the base coat to cure until it is firm to the touch.
- Trowel a second tight coat of the base coat mixture over the first coat to fully cover the reinforcing mesh. The result should be such that the reinforcing mesh is centred within the base coat thickness.
- Do not allow the first pass to completely dry prior to the second pass application or an excessive amount of base coat mixture will be necessary to fully coat the wall surface.

4.4 Beads

Bead type	Description and use
Stop beads	Used to provide a straight termination at windows, door frames and changes to the façade. They can also be used to form neat arris when forming conventional sealant/mastic joints.
Corner beads	Used at all corners to provide a straight crisp edge and provide increased strength and resistance to impact damage.
Bellcast beads	Used at the ACR base termination above the damp proof membrane or tanking to provide a neat termination for the render and a flared to manage water runoff.
Movement beads	Often used as a preferred alternative to mastic sealants they can be installed at vertical locations where movement is expected, such as an existing joint in the structure or to accommodate thermal movement. They can also be used horizontally as a day joint or architectural feature.

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- Beads are cut to length and secure to the substrate with base coat, AP Adhesive dabs or non-corrosive mechanical fixings are located at 300 to 600 mm.
- Once located a thick skim of Stucco Build or base coat is applied over the bead and allowed to set.
- Once cured, the ACR system can start to be installed. The Stucco Build, base coat and mesh layers are applied to the required thickness taking care to push the render tight onto the bead. The Stucco Build or base coat is recessed approximately 1 to 2 mm so once the finish is to be applied it will sit flush with the exposed part of the bead.
- All beads should be wiped clean before the finish or coating dries.

4.6 Sealant joint installation

- All vertical and horizontal movement joints in the building structure should be extended through the system.
- A vertical and horizontal movement joint shall be incorporated:
  - In accordance with project specific guidance and Dryvit UK Ltd's recommendations.
  - when abutting dissimilar materials
  - at a substrate transition
- Expansion joints are required around penetrations in the system.
- Expansion and movement joints shall be 19 mm wide.

4.7 Horizontal and vertical expansion joints

- These can be achieved by installing a movement profile or stop beads with a low modulus sealant with a closed cell backer rod or a Dryvit compressible weather seal with or without sealant.

5 Dryvit primers

- Prior to applying the Dryvit primers, the base coat shall have cured for a minimum of 24 hours and shall be dry and hard. Cure time may be longer depending on environmental conditions.
- Inspect the Stucco Build or base coat for any irregularities such as trowel marks, board lines, rough corners and edges, improper reinforcing mesh embedment as well as efflorescence.
- Correct all irregularities and remove all efflorescence prior to applying the Dryvit primer.
- The primer shall be applied in accordance with the relevant product technical data sheet.

6 Dryvit finishes

- The selected finish shall be applied in accordance with the relevant product technical data sheet.
- Prior to applying the Dryvit finish, the base coat shall have cured for a minimum of 24 hours and shall be dry and hard.
- Inspect the base coat for any irregularities such as trowel marks, board lines, rough corners and edges, proper reinforcing mesh embedment as well as efflorescence.
- Correct all irregularities and remove any efflorescence prior to applying the selected Dryvit Finish.
- When Dryvit primers are used they should be dry before the application of the finish.
- Drying time of the base coat and primer will depend on both environmental conditions and permeability of the substrate.

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- All Dryvit finishes must be installed by applicators trained by Dryvit UK Ltd.
- Apply continuously to a natural break such as corners, expansion joints or tape line maintaining a wet edge at all times.
- Whenever possible, order enough material in a single batch to complete the project to avoid potential colour variations from batch to batch.
- Sufficient personnel and scaffolding must be provided to continuously finish a distinct wall area, otherwise cold joints will result.
- On hot windy days, the wall may be fogged with clean potable water to cool the wall and facilitate finish installation. As with other plaster materials, installation work should precede the sun. For example, work the shady or cool side of the building. If this is not possible, scaffold should be shaded with suitable tarpaulin, netting or cloth.
- Do not introduce water to the finish material once it is installed on the wall as this will cause colour variations.
- Each applicator must use the same tool and hand motion and match the texture of the applicators above, below and on each side.
- Do not apply Dryvit materials in the rain.
- Do not apply Dryvit finish material in sealant joints.

7 Maintenance and repair

Dryvit Information Sheets are available on request from Dryvit UK Ltd. These describe the inspection, maintenance and cleaning procedures for our system together with a range of remedial methods.

8 Applicator training

To attain a Trained Contractor Certificate of Competence(1), individual installers must demonstrate they are conversant in all the application techniques demonstrated to them and discussed within the Dryvit programme of training undertaken. They must understand the importance of attention to detail in all aspects of installing the ACR System and finishes.

(1) The Trained Contractor Certificate indicates certain employees of the company have been instructed in the proper application of Dryvit products and have received copies of Dryvit's Application Instructions and Specifications. The Trained Contractor Program is not an apprenticeship or endorsement. Each trained contractor is an independent company experienced in the trade and bears responsibility for its own workmanship. Dryvit UK Ltd. assumes no liability for the workmanship of a trained contractor.

DISCLAIMER
Information contained in this document conforms to standard detail and product recommendations for the installation of the Dryvit ACR System as of the date of publication of this document and is presented in good faith. Dryvit UK Ltd. assumes no liability, expressed or implied, as to the architecture, engineering or workmanship of any project. To ensure that you are using the latest, most complete information, contact Dryvit UK.

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