

Alcoa Architectural Products

1 rue du Ballon
68500 Merxheim
France

Tel: 00 33 3 89 74 46 00 Fax: 00 33 3 89 74 46 90

e-mail: aapmerxheim@alcoa.com

website: www.alcoa.com/bcs/



Agrément Certificate
No 08/4510

PRODUCT SHEET 1 — REYNOBOND ARCHITECTURE WALL CLADDING PANELS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate of Confirmation relates to Reynobond Architecture Wall Cladding Panels, aluminium/polyethylene composite panels used to provide a decorative/protective façade over the external walls of buildings.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Practicability of installation — the panels are suitable for installation by cladding contractors providing they have undergone suitable training (see section 4).

Strength and stability — the panels can be incorporated in a cladding system designed to resist the wind loads normally encountered in the UK (see section 5).

Behaviour in relation to fire — in relation to the Building Regulations for reaction to fire, the panels may be regarded as having a Class 0 surface in England and Wales, and a 'low risk' material in Scotland (see section 6).

Air and water penetration — provided all joints between panels are adequately baffled, the cladding will minimise water entering the cavity. Any water collecting in the cavity will be removed by drainage and ventilation (see section 7).

Maintenance — damaged panels may be replaced individually without disturbing adjacent ones (see section 8).

Durability — in normal UK conditions, the panels should have a service life in excess of 30 years (see section 9).

The BBA has awarded this Agrément Certificate for Reynobond Architecture Wall Cladding Panels to Alcoa Architectural Products as fit for their intended use provided they are installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Greg Cooper: Chief Executive

Date of First issue: 14 January 2008

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

©2008

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Reynobond Architecture Wall Cladding Panels, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	A1	Loading
Comment:		The panels are acceptable for use as set out in sections 3.2 and 5.1 to 5.9 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The panels are judged to meet the Class 0 requirements. See sections 6.1 to 6.6 of this Certificate.
Requirement:	C2(b)(c)	Resistance to moisture
Comment:		The panels will meet the stated requirements. See sections 7.1 to 7.4 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The panels are acceptable. See sections 9.1 and 9.2 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The panels can contribute to a construction satisfying this Regulation. See sections 9.1 and 9.2, and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	1.1(a)(b)	Structure
Comment:		The panels are acceptable, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ . See sections 3.2 and 5.1 to 5.9 of this Certificate.
Standard:	2.4	Cavities
Comment:		The panels, when used in conjunction with fire-resistant materials, can meet this Standard, with reference to clauses 2.4.1 ⁽¹⁾⁽²⁾ , 2.4.2 ⁽¹⁾⁽²⁾ , 2.4.5 ⁽¹⁾⁽²⁾ and 2.4.9 ⁽¹⁾⁽²⁾ . See section 6.6 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The panels can contribute to satisfying this Standard, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 6.1 to 6.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The panels can contribute to satisfying this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The panels will contribute to meeting this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ to 3.10.3 ⁽¹⁾⁽²⁾ , 3.10.5 ⁽¹⁾⁽²⁾ and 3.10.6 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.4 of this Certificate. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The panels are acceptable. See sections 9.1 and 9.2 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		The panels will contribute to a roof satisfying this Regulation. See sections 7.1 to 7.4 of this Certificate.
Regulation:	D1	Stability
Comment:		The panels are acceptable as set out in sections 3.2 and 5.1 to 5.9 of this Certificate.
Regulation:	E5	External fire spread
Comment:		The panels are judged to meet the Class 0 requirements. See sections 6.1 to 6.6 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.5) and 2 *Delivery, storage and handling* (2.4).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of Reynobond Architecture Wall Cladding Panels, when installed and used in accordance with this Certificate, in relation to NHBC Standards, Chapter 6.9 *Curtain walling and cladding*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the use of Reynobond Architecture Wall Cladding Panels in relation to this Certificate, is not subject to the requirements of this Technical Manual.

General

This Certificate relates to Reynobond Architecture Wall Cladding Panels comprising an aluminium/polyethylene composite material, fixed to an aluminium sub-frame, to provide a decorative/protective rainscreen façade over the external walls of buildings.

The sub-frame and its attachment to the substrate wall are outside the scope of this Certificate as are other miscellaneous construction details.

It is important for designers, planners, contractors and/or installers to ensure that the installation of the cladding is in accordance with the Certificate holder's instructions and the information given in this Certificate.

This Certificate is a Confirmation of French Agréments 2/04-1081 and 2/01-845 issued by Centre Scientifique et Technique du Bâtiment (CSTB), to Alcoa Architectural Products and Reynolds Aluminium France SA respectively.

Technical Specification

1 Description

1.1 The Reynobond Architecture Wall Cladding Panels comprise two 0.5 mm thick aluminium alloy sheets (EN AW-3005, H46) bonded to either side of a core of low-density polyethylene (LDPE). The panels are available either plain edged (riveted system) or flanged (cassette system) to suit architectural requirements (see Figure 1). A Duragloss or PVDF coating available in various colours protects the exposed face. A polyester primer protects the unexposed face. The products are also available in a fire-retardant grade (FR).

1.2 The panels are manufactured in thicknesses of 3 mm, 4 mm and 6 mm and are available in 15 standard finishes. Non-standard panel sizes and finishes are available to order.

1.3 The standard 4 mm thick panel is available in nominal widths and lengths (mm) of:

- 1000 x 4000
- 1250 x 2500
- 1250 x 3200
- 1250 x 4000
- 1500 x 3000
- 1500 x 4000
- 2000 x 3000
- 2000 x 4000.

1.4 Plain edged panels are riveted directly to the aluminium sub-frame. Flanged panels are hung from the sub-frame using T-slots fitting onto pintle on the sub-frame⁽¹⁾. Flange widths can vary to suit the design requirements (see Figure 1).

(1) Not covered by this Certificate.

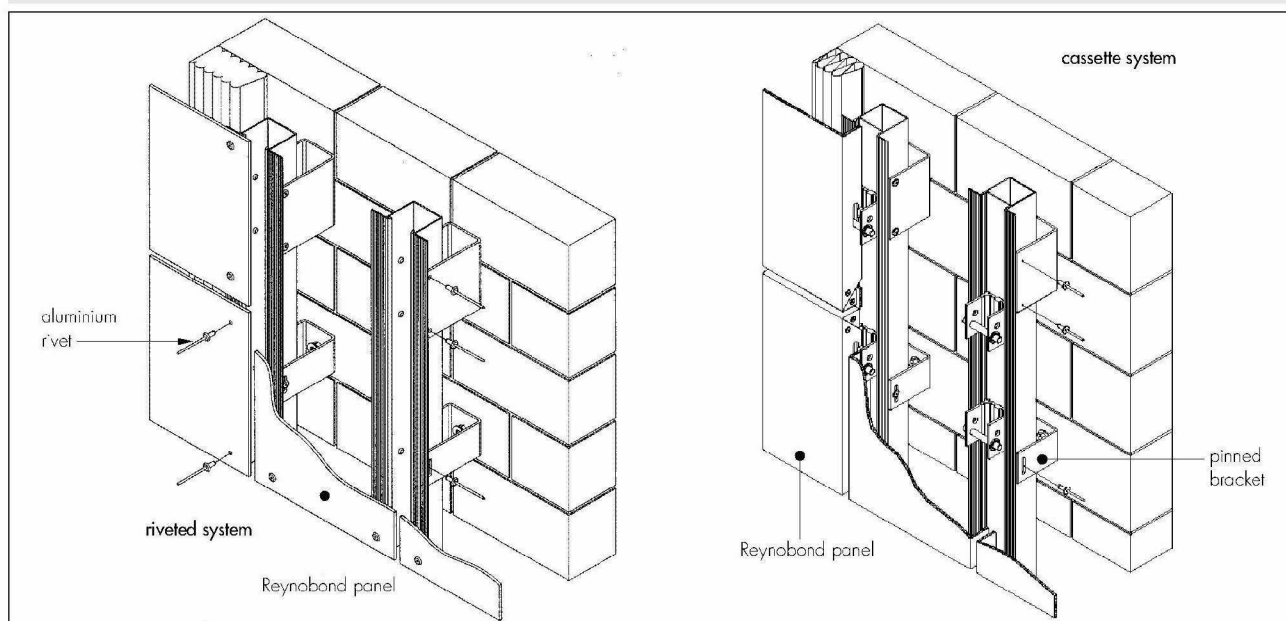
1.5 The panels have area weights as shown in Table 1.

Table 1 Panel weights

Thickness (mm)	Weight (Nm ⁻²)
3	45.9
4	55.1
6	73.6

1.6 Production control is by self inspections and verification testing by CSTB, who are ultimately responsible for ensuring that product quality is maintained.

Figure 1 Reynobond Architecture panels and typical fixing systems



2 Delivery, storage and handling

2.1 The panels, separated by blocks, are delivered to site in closed crates. The crates bear product details such as type, size, quantity, identification code, manufacturing references and colour.

2.2 To allow the panels to acclimatise, the crates should be stored on a dry, flat and level surface, suitably protected from the weather, for at least 24 hours before installation. The protective film on the panels should be removed as soon after installation as possible.

2.3 The panels should be handled with care to avoid damage. They should be lifted off, rather than slid across, each other. For temporary support during installation, polystyrene or foam wedges may be used.

2.4 Care should be exercised when handling the panels to avoid injury from sharp edges. Protective clothing should be worn and all Health and Safety rules observed.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Reynobond Architecture Wall Cladding Panels.

Design Considerations

3 General

3.1 Reynobond Architecture Wall Cladding Panels can be incorporated in back-ventilated and drained cladding systems. The cavity behind the cladding should be as wide as possible, with a minimum ventilation area of 10000 mm² per metre run of cladding (see section 7). The ventilation openings should be suitably protected, or baffled, to prevent the ingress of birds, vermin and rain.



3.2 The wall and the sub-frame to which the cladding is fixed should be structurally sound and constructed in accordance with the requirements of the relevant Building Regulations and Standards.

3.3 The wall to which the cladding is fixed should be watertight and have adequate resistance to the transmission of heat and sound.

3.4 The insulation behind the cladding should be suitably fixed to the supporting wall, and protected, to resist the forces of wind suction. Insulation should be of a rigid type (egg boards or batty). The ventilation pathway behind the cladding must not be allowed to become blocked nor the insulation dislodged where it may be vulnerable to wetting.

3.5 To allow for thermal expansion, a minimum gap of 2 mm per metre length between adjacent support rails should be provided. The cladding panels must not straddle this gap.

3.6 All design aspects of the installation should be checked by a suitably qualified chartered engineer or other appropriately qualified person. For advice on specific construction details, eg flue pipe penetrations, the Certificate holder should be consulted.

4 Practicability of installation

The products are suitable for installation by cladding contractors provided they have undergone suitable training. The Certificate holder can provide advice on installation if required.

5 Strength and stability

Wind loading



5.1 For design purposes, the panel properties given in Table 2 may be adopted.

Table 2 Panel properties⁽¹⁾

Panel thickness (mm)	Permissible stress (Nmm ⁻²)	Section modulus Z (cm ³ m ⁻¹)	Flexural rigidity EI (Nm ² m ⁻¹)
3	92	1.25	125
4	92	1.75	240
6	92	2.75	590

(1) The maximum panel centre deflection will be governed by specific project requirements but should not exceed 1/30 of the diagonal formed by four adjacent fixings or 50 mm, whichever is the lesser.

5.2 Aluminium rivets or pinned brackets should be used to attach the panels to the support frame (see Figure 1). The design should ensure adequate capacity against wind pressure/suction. To allow for panel expansion, fixings in clearance holes should be provided as required.

- 5.3 The maximum allowable wind pressure/suction will be the lesser value obtained by considering the panels and fixings separately.
- 5.4 When calculating wind loads, higher pressure coefficients applicable to corners of the building should be used.
- 5.5 Design of the sub-frame should be such as to limit mid-span deflections to $L/200$ and cantilever deflections to $L/150$.
- 5.6 Design of the sub-frame attachment to the substrate wall should be such as to ensure adequate pull-out capacity due to wind suction.
- 5.7 A suitably qualified engineer must check the design and installation of the cladding system.
- 5.8 The supporting wall must be able to take the full wind, as well as any racking, loads on its own – any contribution from the cladding should be ignored.
- 5.9 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 and BS 6399-2 : 1997.

Impact

- 5.10 As the products are susceptible to damage from hard body impacts, it is recommended that use is limited to locations where there is little possibility of such impacts, ie at ground level in private areas where there is some incentive to exercise care, and at higher levels in public areas, as described in categories C to F of BS 8200 : 1985.

6 Behaviour in relation to fire

-  6.1 A standard sample of the product, with a grey/green Duragloss 5000 coating, when tested for reaction to fire, achieved a classification of B-s2, d0 in accordance with EN 13501-1 : 2002. A fire retardant sample of the product, with a gold-coloured Duragloss finish, when tested for reaction to fire, achieved a classification B-s1, d0 in accordance with EN 13501 : 2002.

- 6.2 A fire retardant sample of the product, with a metallic grey PVDF finish, when tested in accordance with BS 476-6 : 1989, achieved a fire propagation index (I) of 0 and, when tested in accordance with BS 476-7 : 1997, achieved a Class 1 surface spread of flame.

- 6.3 As a consequence of sections 6.1 and 6.2, the products may be regarded as having a Class 0 surface in relation to the Approved Document B of The Building Regulations 2000 (as amended) (England and Wales) and Technical Booklet E of The Building Regulations (Northern Ireland) 2000 (as amended) and a 'low risk' material as defined in Annex 2C⁽¹⁾ and Annex 2E⁽²⁾ of The Building (Scotland) Regulations 2004 (as amended). The unexposed side of the products may also be regarded as having a class 0 surface.

- 6.4 These performances may not be achieved by other colours of the product and the designations of a particular colour should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — Test to conform with the Table to Annex 2C⁽¹⁾ or Annex 2E⁽²⁾ of Regulation 9

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).


Northern Ireland — Test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

- 6.5 For resistance to fire, the performance of a wall incorporating the product, can only be determined by tests from a suitably accredited laboratory, and is not covered by this Certificate.

- 6.6 Cavity barriers should be incorporated behind the cladding, as required by the national Building Regulations, but should not block essential ventilation pathways. Particular attention should be paid to preventing the spread of fire from within a building breaching the cladding system through window and door openings.

7 Air and water penetration

-  7.1 The products are suitable for use in back-ventilated and drained cladding systems.

-  7.2 The supporting wall must be watertight and reasonably airtight.

- 7.3 Providing all joints are adequately baffled, the amount of water entering the cavity by wind-driven rain will be minimal. Water collecting in the cavity due to rain or condensation will be removed by drainage and ventilation.

- 7.4 The air space between the back of the panels and the supporting wall or insulation should be as wide as possible and allow for conventional building tolerances. Guidance on recommended cavity widths is given in NHBC Standards 2007, Chapter 6.9.

8 Maintenance

- 8.1 The painted surface may be cleaned using hot and cold water with a mild cleaning agent using a non-abrasive pad or sponge. General household cleaners should not be used. After cleaning, the surface should be rinsed with clean water. For more difficult chemical soiling, the manufacturer's specialist advice must be sought.

- 8.2 Annual maintenance inspections should be carried out to ensure that rain-ware is complete and in good order and that such features as tiles, flashings and seals are in place and secure.

8.3 Damaged panels should be replaced as soon as practicable; work carried out should follow the manufacturer's instructions and all necessary health and safety regulations should be observed.

9 Durability



9.1 Based on historical evidence and testing, the products, when incorporated in a wall cladding system, can be expected to have an ultimate service life in excess of 30 years.

9.2 The performance of the coating will depend upon the colour chosen, building location, façade aspect and the immediate environment.

9.3 In a non-corrosive atmosphere, the products can be expected to retain a good appearance for up to 20 years. In coastal or severe industrial regions, this is reduced to 15 years. Colour change will be generally small and uniform on any one elevation.

Installation

10 General

10.1 Reynobond Architecture Wall Cladding Panels must be installed in accordance with the manufacturer's recommendations, the requirements of this Certificate and specifications laid down by the consulting engineer.

10.2 Installers must be trained and approved by the Certificate holder who can provide technical assistance at the design stage and at the start of the installation.

10.3 If significant colour variations between batches is likely, it may be necessary to mix the panels from different pallets so as to obtain a uniform shade over the façade.

11 Procedure

11.1 Based on a preliminary survey of the wall, and the architectural/structural design, a grid layout for the sub-frame is prepared.

11.2 The aluminium sub-frame is attached to the substrate wall via cleats.

11.3 For a riveted system, the panels are fixed directly to the sub-frame with aluminium rivets (see Figure 1).

11.4 For a cassette system (see Figure 1):

- the sliding pinned brackets are screwed to the vertical support rails at predetermined positions coinciding with the centre lines of the panel T-slots. To reduce installation time, this operation is normally performed in the shop rather than on site
- the panel is hung from the top pinned brackets. After minor adjustments, the pinned brackets are tightened against the vertical support rail using socket screws
- to lock the panel in position, the bottom pinned brackets are similarly adjusted and screwed tight against the vertical support rail when at the bottom end of the panel T-slot
- to achieve the required clearances, intermediate pinned brackets (if used) may need to be repositioned.

12 Investigations

12.1 Based on the CSTB Technical Approval, an assessment was made of the panels' resistance to wind and impact loading, durability, the production method and associated quality control procedures.

12.2 From test data, an assessment was made of the panels' behaviour in relation to fire.

12.3 Based on a user survey, an assessment was made of the panels' practicability of installation and the performance in use.

12.4 The Certificate holder's technical literature was examined for inconsistencies and general content.

Bibliography

BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*

BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

EN 13501-1 : 2002 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

13 Conditions

13.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

13.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

13.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- remain covered by a valid French Agrément; and
- are reviewed by the BBA as and when it considers appropriate.

13.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

13.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.