

Novelis Deutschland GmbH

Werk Goettingen
Hannoversche Strasse 1
37075 Goettingen
Germany

Tel: 00 49 551-304-0 Fax: 00 49 551-304-474
e-mail: sales.goettingen@novelis.com
website: www.novelis-painted.com



Agrément Certificate
10/4718
Product Sheet 2

NOVELIS PVDF COIL-COATED ALUMINIUM SHEET AND COIL

FF2 AND FF2plus PVDF COIL-COATED ALUMINIUM COIL AND SHEET

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet, for use as external cladding.

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

Weathertightness — the product has adequate resistance to the passage of moisture (see section 6).

Properties in relation to fire — the product is not classified as 'non-combustible', but may achieve a Class 0 or 'low risk' classification, as defined in the national Building Regulations (see section 10).

Location — the product is suitable for use in external locations readily accessible to the public (see section 9).

Workability — the product can be worked by conventional techniques and is capable of accommodating a 2.5T bend at a minimum temperature of 20°C without damage (see section 7).

Durability — under normal conditions, the formed product will perform effectively as a cladding with an ultimate life of at least 40 years. In some industrial environments, maintenance painting to restore the sheet's appearance may be necessary after 20 years (see section 12).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. The product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 9 March 2010

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

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

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Regulations

In the opinion of the BBA, FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet, 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:	B3(4)	Internal fire spread (structure)
Comment:		The product is unrestricted under this Requirement. See section 10.3 of this Certificate.
Requirement:	B4(1)(2)	External fire spread
Comment:		The product may be unrestricted under this Requirement. See sections 10.1 and 10.2 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The product can contribute to meeting this Requirement. See section 6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See sections 12.1 to 12.5 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The product can contribute to a construction meeting this Standard. See sections 11.1 and 11.2 and 12.1 to 12.5 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 2.4.2 ⁽¹⁾⁽²⁾ , 2.4.3 ⁽²⁾ , 2.4.7 ⁽¹⁾ and 2.4.9 ⁽²⁾ . See section 10.3 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Standard:	2.7	Spread on external walls
Comment:		The product is not classified as ‘non-combustible’ and is therefore restricted under these Standards, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ , 2.6.6 ⁽²⁾ and 2.7.1 ⁽¹⁾⁽²⁾ . See sections 10.1 and 10.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ , 3.10.5 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (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 product is acceptable. See sections 12.1 to 12.5 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The product is acceptable. See sections 11.1 and 11.2 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		The product can contribute to satisfying this Regulation. See section 6 of this Certificate.
Regulation:	E4(4)	Internal fire spread – Structure
Comment:		The product is unrestricted under this Regulation. See section 10.3 of this Certificate.
Regulation:	E5(a)	External fire spread
Comment:		The product may be unrestricted under this Regulation. See sections 10.1 and 10.2 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* (1.3) and 3 *Delivery and site handling* (3.4).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet, when installed and used in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.9 Curtain walling and cladding*.

Technical Specification

1 Description

1.1 FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet is manufactured from 2 mm thick aluminium alloy of grade AW 5754 temper designation H42 to BS EN 1396 : 2007. Information on chemical composition and temper designation is given in BS EN 573-3 : 2009 and BS EN 515 : 1993 respectively.

1.2 The product is coil-coated with a primer (with basecoat for metallic finishes) and polyvinylidene fluoride (PVDF) topcoat to a total thickness of 21–26 µm (or 30 to 40 µm for metallic colours). Non-standard colours are available in thicknesses outside of the normal ranges by arrangement with the Certificate holder. A lacquer coat 3 µm thick is applied to the reverse side.

1.3 The product is available in a range of metallic and non-metallic colours at gloss levels of 10–40 units.

1.4 A protective polyethylene film, printed with the Novelis and FF2 logos, is applied to the top surface of the product.

1.5 The FF2plus product is made by the application of 0.14 mm thick aluminium foil to the reverse side of the FF2 product using a sound dampening adhesive. No assessment has been made by the BBA of the effectiveness of the sound dampening properties of the FF2plus product.

2 Manufacture

2.1 In a coil-coating process, aluminium coil is degreased, chemically pre-treated and coated on the face side with PVDF paint. Depending on the colour, the PVDF coating may be applied in two, three or four layers. The reverse side is coated with lacquer.

2.2 Quality control is exercised over raw materials, during manufacture and on the final product.

3 Delivery and site handling

3.1 FF2 and FF2plus are supplied in sheet form (FF2 can also be supplied in coil form) to specialist companies who form façade elements using a variety of folding, bending and roller curving machines. These façade elements are then delivered directly to site.

3.2 The product is normally delivered to site on trailers and unloaded by crane. The site must have adequate access and a suitable surface for this traffic.

3.3 During transport, the edges and corners of the products must be protected against damage, and the products should be restrained to prevent abrasion.

3.4 On site, the product should be stored on a firm, dry base, on bearers at a maximum spacing of 900 mm, away from the possibility of damage, and covered to prevent the ingress of water. They should be stored as close as possible to the building where they are to be installed and handled in accordance with the Manual Handling Operations Regulations 1992.

3.5 When required for installation, the product should be lifted from the stack, rather than dragged across it.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet.

Design Considerations

4 General

4.1 FF2 and FF2plus PVDF Coil-Coated Aluminium Coil and Sheet, after fabrication into façade elements, is suitable for use as non-loadbearing cladding.

4.2 Each elevation should be clad with material from the same batch.

5 Practicability of installation

The product should be installed by operatives experienced with this type of material.

6 Weathertightness



The formed product, when incorporated into a cladding system designed and installed in accordance with conventional good practice and section 13, will adequately resist the passage of moisture.

7 Workability

7.1 The product may be worked by conventional techniques including brake-pressing, roll forming, bending, drilling and punching. It is essential that the correct tools, in good condition, are used, to prevent any damage to the coating, and that any swarf should be removed. The protective film should be left on the product as long as possible to prevent scuffing or scratching of the paint finish.

7.2 To avoid cracking during forming, bends should be preformed at a minimum temperature of 20°C and at a minimum bending radius of 5 mm (equivalent to 2.5T, according to BS EN 13523-7 : 2001).

8 Compatibility

To prevent electro-chemical corrosion, direct contact with copper, or water run-off from copper, or direct contact with lead in coastal environments, should be avoided. Fixing devices must be of, or compatible with, aluminium. Precautions must also be taken (eg by using a strip sealant) to prevent direct contact with timber preserved with copper or fluoride compounds or treated with a fire retardant.

9 Location

9.1 The formed product is suitable for use at low level, in areas readily accessible to the public (eg alongside pedestrian thoroughfares and playing fields) where accidental damage is possible. Therefore, the product is suitable for use in categories B to F, as described in BS 8200 : 1985, Table 2, which are reproduced (in part) in Table 1.

Table 1 Categories — BS 8200

Category	Description	Examples	
B	Readily accessible to public and others with little incentive to exercise care. Chances of accidents occurring and of misuse	Walls adjacent to pedestrian thoroughfares or playing fields when not in category A	} Zone of wall up to 1.5 m above pedestrian or floor level
C	Accessible mainly to those with some incentive to exercise care. Some chance of accident occurring and of misuse	Walls adjacent to private open gardens. Back walls of balconies	
D	Only accessible, but not near a common route, to those with high incentive to exercise care. Small chance of accident occurring or of misuse	Walls adjacent to small fenced decorative gardens with no through paths	
E	Above zone of normal impacts from people but liable to impacts from thrown or kicked objects	1.5 m to 6 m above pedestrian or floor level in public areas	
F	Above zone of normal impacts from people but not liable to impacts from thrown or kicked objects	Wall surfaces of high positions other than those defined in E above	

9.2 The impact resistance of the product is determined by the impact resistance of the aluminium on which it is based. No adhesion failure of the coating will occur although hairline cracks may occur in areas of high stress.

10 Properties in relation to fire



10.1 When tested to BS 476-6 : 1989, a sample of the product with colour reference 1775 achieved an index performance, (I) of 0.0 with sub-index (i₁) of 0.0 and to BS 476-7 : 1997, achieved a Class 1 surface. This product therefore, has a Class 0 or 'low risk' surface as defined in the national Building Regulations.

10.2 This performance may not be achieved by other colours of the product. The designations of other colours 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 Table to Annex 2C⁽¹⁾ or 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.

10.3 The reverse sides of FF2 and FF2plus (ie incorporating the sound deadening film) are also Class 0 or 'low risk' surfaces.

10.4 The Certificate holder is also able to supply fire performance data according to Euro-classification documents.

11 Maintenance



11.1 In some areas (eg industrial areas and where cladding is sheltered directly beneath a soffit) it may be necessary to clean the installation periodically, both to restore its appearance and to remove potentially corrosive deposits. This can be done by hosing with water, using a neutral detergent.

11.2 Damaged panels may be replaced using normal installation techniques.

12 Durability



12.1 The formed product will perform effectively as a cladding with an ultimate life of at least 40 years.

12.2 In some industrial environments, maintenance painting to restore the sheet's appearance may be necessary after 20 years.

12.3 A planned maintenance cycle should be introduced if an extended design life is required.

12.4 The aluminium substrate is durable. Although it may be exposed (eg at cut edges, through impact damage, or at hairline cracks at the crown of the profile), it will perform satisfactorily in all normal atmospheric conditions (including coastal and industrial, but excluding areas where there are sources of abnormal corrosive contaminants, eg chemical works, cement works, copper foundries).

12.5 The coatings are colour-fast and the performance of the coating will depend upon the colour chosen, the environment, location and aspect. Colour changes will be slight and uniform on any one elevation.

Installation

13 General

The installation of FF2 and FF2plus PVDF Coil Coated Aluminium Coil and Sheet façade elements is carried out in accordance with BS 8200 : 1985 and the Certificate holder's installation instructions.

Technical Investigations

14 Tests

Tests were carried out in accordance with MOAT No 34 : 1986 to determine:

- impact resistance
- resistance to marking and staining
- ease of forming
- adhesion of sound-dampening film to FF2 plus product.
- scratch resistance
- effect of artificial weathering
- resistance to sulfur dioxide
- abrasion resistance
- effect of salt spray
- adhesion of paint layer

15 Investigations

15.1 Independent test data were examined relating to:

- surface spread of flame
- fire propagation.

15.2 Factory visits were made to examine the manufacturing process and obtain details of the raw material specifications and quality control procedures.

15.3 Visits were made to established sites to determine the performance of the product in use.

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 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*
- BS EN 515 : 1993 *Aluminium and aluminium alloys — Wrought products — Temper designations*
- BS EN 573-3 : 2009 *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Chemical composition and form of products*
- BS EN 1396 : 2007 *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*
- BS EN 13523-7 : 2001 *Coil coated metals — Test methods — Resistance to cracking or bending (T-bend test)*
- MOAT No 34 : 1986 *Precoated metal sheet roofing and cladding*

Conditions of Certification

16 Conditions

16.1 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.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 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
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 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.

16.5 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.