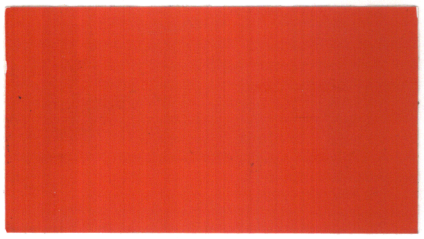
CI/SfB | | (4-) | Nh2 |
NOVEMBER 1995

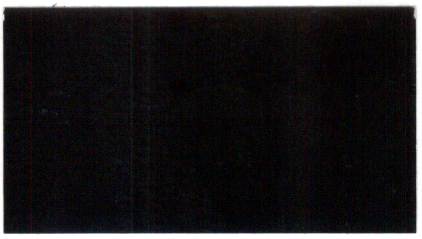
COLORCOAT Pvf_2

Colorcoat Silicone Polyester
Colorcoat Architectural Polyester

manufactured and coated solely by British Steel



VERMILION*



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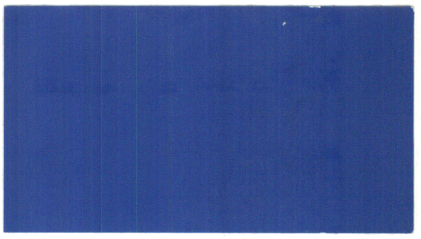
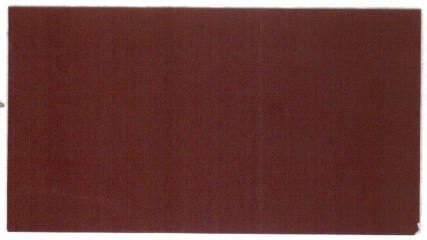


BAHAMA BLUE



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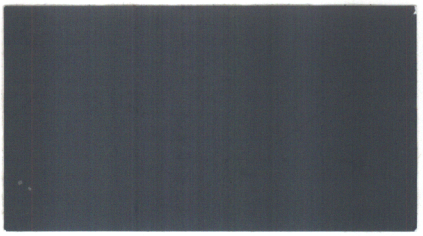
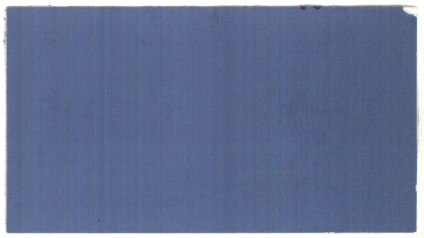
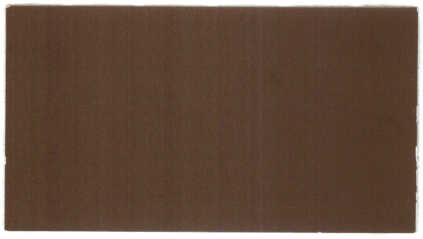


SLATE GREY



MOUNTAIN BLUE



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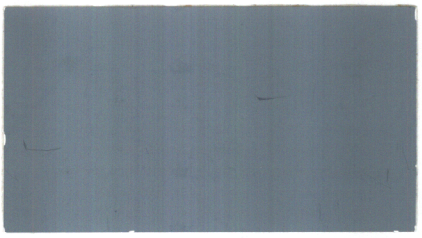
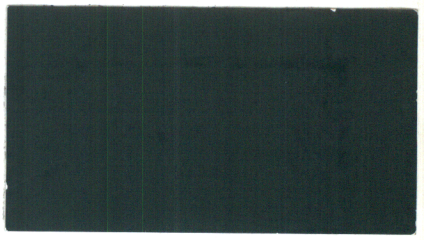
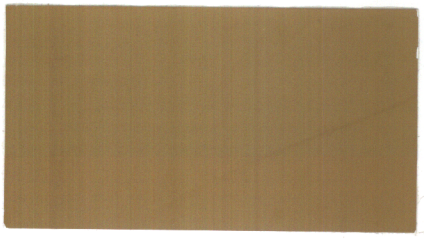


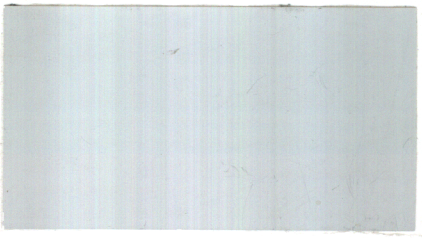
ALASKA GREY



PINEWOOD GREEN

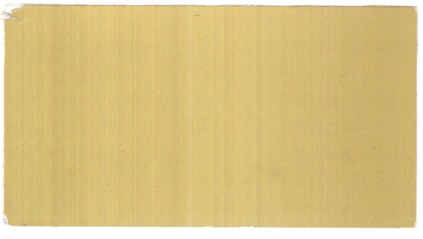


KALAHARI

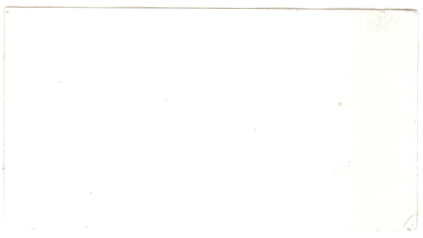


OYSTER

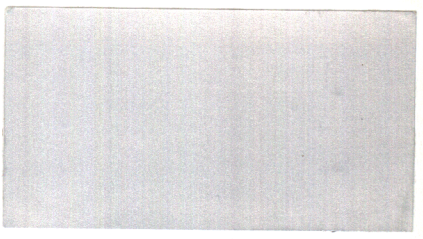
GLEN



MOROCCO



WHITE



METALLIC SILVER*

WARD
CLADDING
SYSTEMS

WARD CLADDING SYSTEMS
Sherburn, Malton
North Yorkshire YO17 8PQ
Tel: 01944 710888
Fax: 01944 710555

All material supplied by Ward Cladding Systems under the colour names shown on this card is Colorcoat, manufactured and coated solely by British Steel.

Notes:

Printed colour samples are for guidance only. Please obtain actual product samples from British Steel or your supplier before ordering or specifying.

*Not available in Silicone Polyester nor in Architectural Polyester.

COLORCOAT Pvf_2

Colorcoat Silicone Polyester
Colorcoat Architectural Polyester

manufactured and coated solely by British Steel

Colorcoat Pvf_2 is British Steel's roofing and cladding steel with a 27 micrometre (nominal thickness) stoved fluorocarbon coating on a substrate of either Galvatite hot-dip zinc coated steel to BS EN 10147 or Zalutite hot-dip zinc/aluminium alloy coated steel to BS 6830. A Pvf_2 coating is available on a stainless steel substrate under the name Colorcoat HyClad (separate information is available from British Steel).

Colorcoat Silicone Polyester and Colorcoat Architectural Polyester are British Steel's roofing and cladding steels with a 25 micrometre (nominal thickness) coating on Galvatite hot-dip zinc coated steel to BS EN 10147.

The standard reverse-side coating on these products is a specially formulated two-coat protective system of corrosion-resistant primer topped with a heat cured high-performance polyester. It is suitable for most internal environments.

Some of the colours on this card may not be as readily available as others; early consultation with the profiler is the best way to ensure that the material you select will be available at the required time.

Specifying

Colorcoat is the registered trademark for the organic coated steels manufactured solely by British Steel Strip Products. You should specify *Colorcoat* together with the coating name to ensure that you get the genuine British Steel product.

Colours

Colorcoat is manufactured to produce consistent colours, but by the very nature of colour, some slight variation can occur between coils coated at different times. If tonal consistency is critical, all profiles for a single elevation should come from the same production batch. This applies to all Colorcoat, but variation is more noticeable in light colours, particularly white and metallic finishes. Indeed, such colour variation between batches is characteristic of all coloured products, from wallpaper to steel cladding.

Metallic Silver Pvf_2 may also exhibit directionality, which should be taken into account during erection.

If accessories in other materials must match Colorcoat, then the best reference is the colour of the Colorcoat profiled sheet as delivered.

Vermilion (04E55) should not be used in industrial atmospheres containing sulphurous fumes.

Nearest RAL or British Standard references

Alaska Grey	RAL 7000	Mountain Blue	RAL 5014
Bahama Blue	RAL 5015	Oyster	RAL 7035
Black	RAL 9005	Pinewood Green	BS 14C39
Glen	RAL 6021	Slate Grey	RAL 7012
Java	RAL 8024	Tundra	RAL 3009
Kalahari	RAL 1011	Vermilion	BS 04E55
Metallic Silver	—	White	RAL 9010
Morocco	RAL 1002		

Performance

The performance of Colorcoat Pvf_2 and of the two Colorcoat polyesters on this card is defined by the *Period to Re-paint Decision*, which is the length of time before a building owner needs to consider whether to re-paint the cladding. Given a regular maintenance programme, the life expectancy of Colorcoat cladding is forty years or more.

Durability of Colorcoat Pvf_2 in Europe (Zones 1 and 2): Period to Re-paint Decision (years)

Inland	Coastal
Walls and roof	Walls and roof
15	10

Notes:

1. This table applies to the area of Europe defined as Zones 1 and 2 in British Steel's publication *The Colorcoat Building: Durability*. These figures are the minimum periods which can be expected and may be used without further reference to British Steel. The actual durability of Pvf_2 in any particular location in the world will depend upon the exact specification and intended environment. Consult British Steel or the profile or panel manufacturer for further advice.

2. Figures under the *Coastal* heading are for buildings within 1 km of any coast.

3. The *Period to Re-paint Decision* begins from the date the material is delivered to site, but not more than 18 months after manufacture by British Steel.

Durability of Colorcoat Silicone Polyester and Colorcoat Architectural Polyester

The *Period to Re-paint Decision* in normal, un-polluted inland environments is about ten years for buildings in Europe (Zones 1 and 2 in British Steel's publication *The Colorcoat Building: Durability*) and five to ten years in other parts of the world. British Steel can give more specific figures for both Europe and elsewhere once the location and environment are specified.

Agrément certificates

British Board of Agrément Certificates:
Colorcoat Pvf_2, Colorcoat Silicone Polyester, Colorcoat Architectural Polyester: 91/2717.

Zalutite: 87/1869

WARD CLADDING SYSTEMS

Printed November 1995

FM APPROVED

FIRE SPECIFICATION PRODUCTS

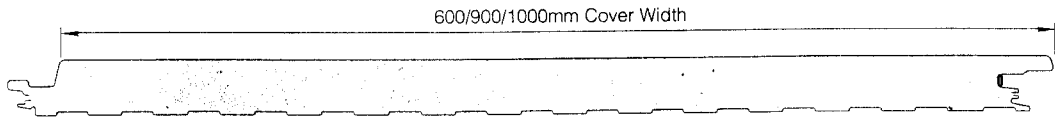
Fire specification wall systems which comply with Loss Prevention Council (LPC), Factory Mutual (FM) and BS 476 are available from Ward.

For further information please contact Ward Technical Services Department on:

Tel: 01944 710888 or

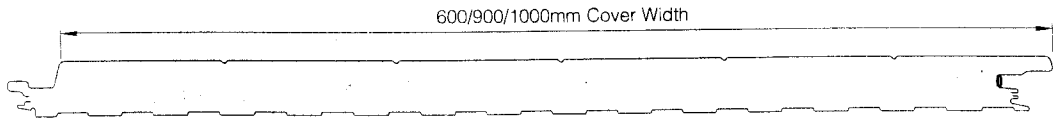
Fax: 01944 710638

DW600/900/1000 A Stucco Panel



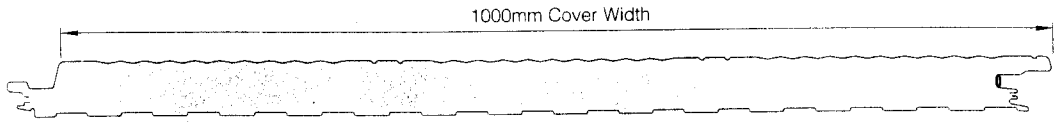
Panel thickness: 45, 60, 80mm **Note:** 600mm wide not FM approved.

DW600/900/1000 B Panel



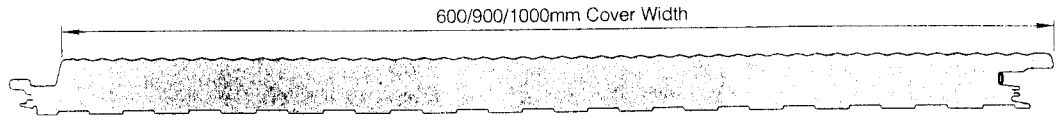
Panel thickness: 45, 60, 80mm

DW1000 C Panel



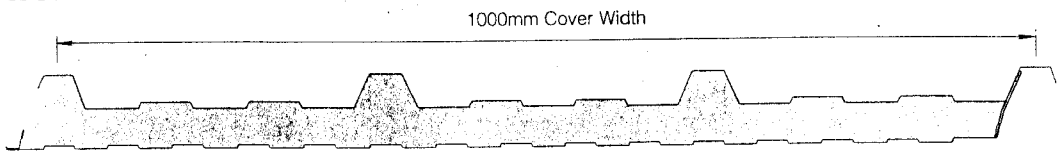
Panel thickness: 45, 60, 80mm

DW600/900/1000 D Panel



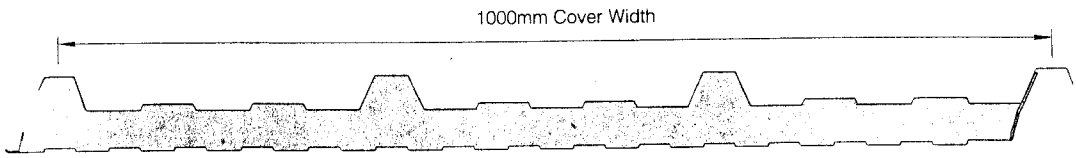
Panel thickness: 45, 60, 80mm

IP1000 Panel



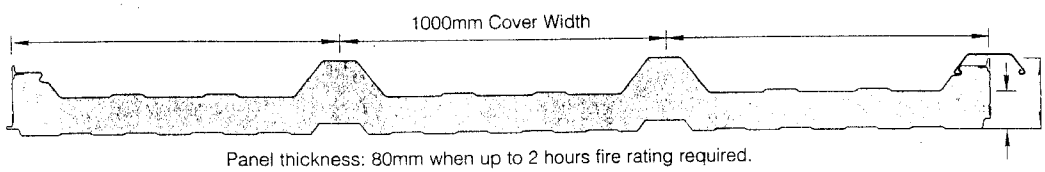
Panel thickness: 30, 40, 50, 60, 80, *100mm
Note: 100mm not FM approved

IP1000 FW Firewall Panel



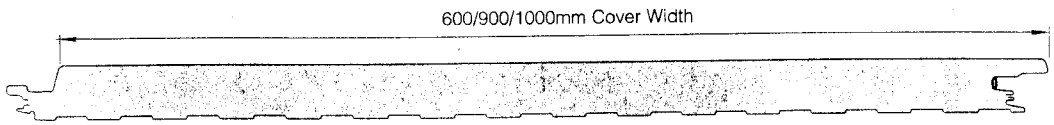
Panel thickness: 40mm when up to 2 hours fire rating required.

DR1000W/DR1000FW



Panel thickness: 80mm when up to 2 hours fire rating required.

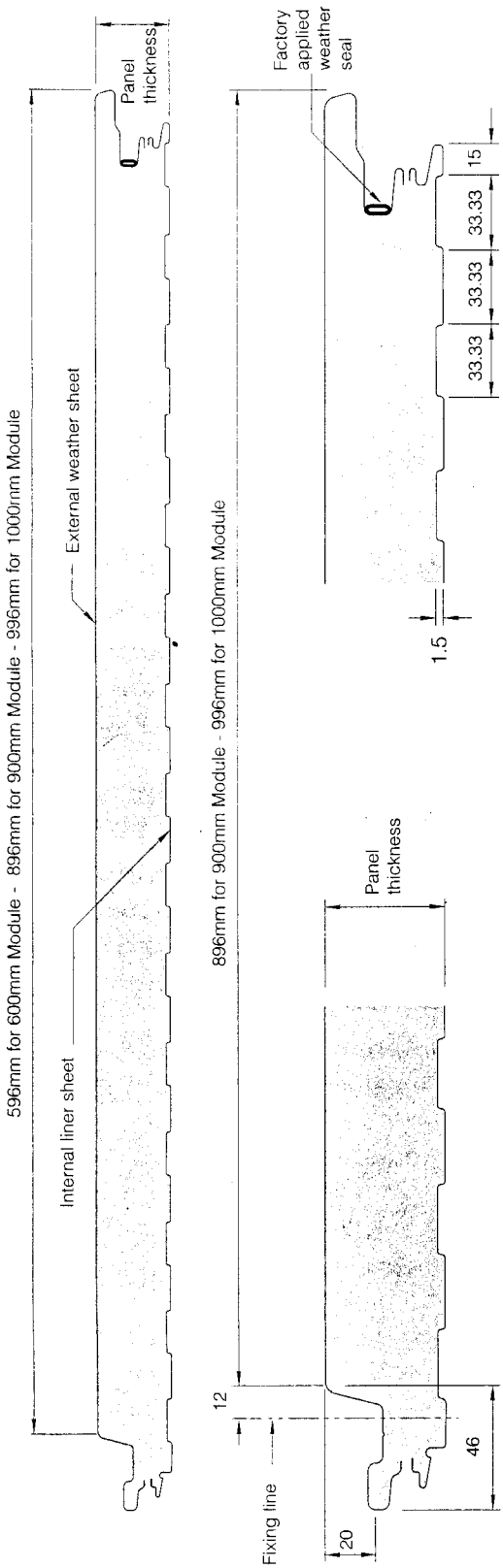
DW600/900/1000 Firewall Panel



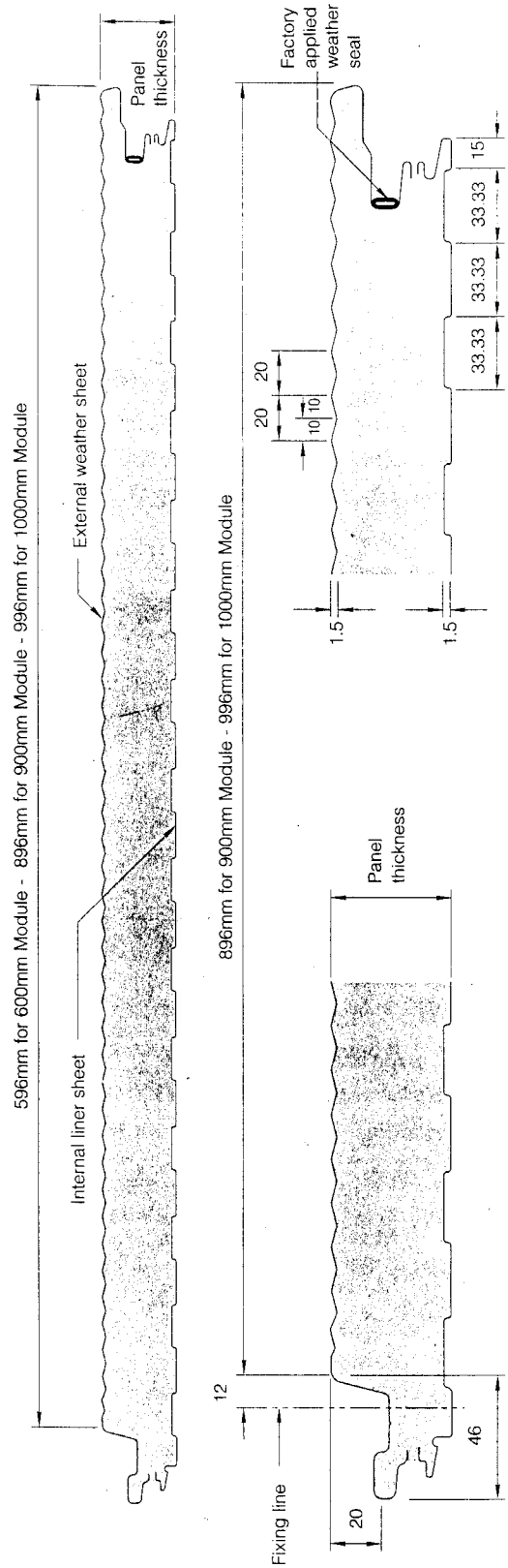
Panel thickness: 80mm when up to 1/2 hour fire rating required.

DW1000 A/D Panel Dimensions

PANEL A DIMENSIONS



PANEL D DIMENSIONS



AVAILABLE PANEL THICKNESSES

45 mm
60 mm
80 mm

MATERIALS - STEEL

SUBSTRATE

- Galvatite, hot-dipped zinc coated steel to BS EN10147:1992. Grade Fe E220G with a Z275 zinc coating.
- Galvalloy hot-dip alloy-coated steel substrate (≈95% Zn/5% Al) to BS EN 10214. Grade S220GD+ZA with a ZA255 alloy coating.
- Standard external sheet thickness 0.5mm, standard internal sheet thickness 0.4mm. Other thicknesses can be supplied to special order.

COATINGS - EXTERNAL WEATHER SHEET

- Colorcoat HPS200: A combination of an advanced 200 micron thick coating system with the exclusive Scintilla finish applied to the weatherside of the panel, on Galvalloy hot-dip alloy-coated steel substrate (≈95% Zn/5% Al). Designed to provide superior durability, colour stability and enhanced corrosion resistance. Backed by British Steel's Confidex guarantee.
- Colorcoat Pvf2: 27 micron thick stoved fluorocarbon coating on Galvatite hot-dipped steel substrate which has excellent colour stability even at temperatures as high as 120°C.
- Colorcoat Silicone Polyester: An economical coating on Galvatite hot-dipped steel substrate with medium term life for worldwide use.
- The sheet is available in either plain or stucco embossed finish.

COATINGS - INTERNAL LINER SHEET

- Colorcoat Lining Enamel: 22 micron thick coating developed for use for the internal lining of insulated panels. Standard colour is "bright white" with an easily cleaned surface.
- Colorcoat HPS200 Plastisol: 200 micron thick coating used in areas where there is high internal humidity, or a corrosive environment.
- Colorcoat Stelvetite Foodsafe: This is a 150 micron thick chemically inert polymer film bonded to steel suitable for cladding the interior of cold stores, food processing buildings and other hygiene applications.
- The sheet is available in either plain or stucco embossed finish.

MATERIALS - *ALUMINIUM

SUBSTRATE

- *Aluminium substrate, grades 3003/4/5 series.
- Standard external sheet thickness 0.7mm standard internal sheet thickness 0.5mm.

COATINGS - EXTERNAL WEATHER SHEET

- The range of external coatings is:

Coating System	Thickness Microns	Gloss % Range
Pvf2	25	35%
Abrasion Resistant (A.R.S)	28	30%
Polyester	22	30%

COATINGS - INTERNAL LINER SHEET

- Standard internal facing is white polyester coated, plain or stucco embossed.

INSULATION CORE

The rigid closed cell insulation core is available in three specifications:-

- *Polyurethane (PUR)
- Polyisocyanurate (PIR)
- PUR available with HCFC free option

SEALS

FACTORY APPLIED SIDE JOINT SEAL

All side joints have a factory applied seal fitted into the groove to automatically seal the joint between panels.

* Does not apply to FM and LPC approved products.

PERFORMANCE

THERMAL INSULATION

Panel Thickness mm	U value W/m²K CFC Free λ = 0.020	U value W/m²K HCFC Free λ = 0.022
45	0.44	0.48
*50	–	0.43
60	0.33	0.36
80	0.24	0.27

U - Thermal transmittance W/m²K
λ - Long-term Thermal conductivity W/m²K
*50mm thickness HCFC free product only available in 500m minimum order quantity.

BIOLOGICAL

Ward panels are normally immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are not considered deleterious.

FIRE

Steel and aluminium outer and inner facings have Class 1 surface spread of flame to BS476: Part 7: 1987, and are Class 0, as defined by Building Regulations. The panels are rated FAA/SAA to BS476 : Part 3 : 1975. DW600*/900/1000 panels are FM and LPC approved with steel facings.

* 600mm wide not FM approved.

ACOUSTICS

All DW1000 panels have a single figure weighted sound reduction Rw = 27dB.

Sound Reduction Index (SRI)

Frequency Hz	63	125	250	500	1k	2k	4k	8k
SRI dB	14	14	19	24	27	34	43	52

BUILDING REGULATIONS

Ward DW1000 insulated panels conform to the following Building Regulation requirements:

A. Structure.
B. Fire: Class 0, FAA/SAA.
L. Conservation of fuel & power.
F. Ventilation.

QUALITY & DURABILITY

Ward Insulated Panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with BS EN ISO 9002 standards, ensuring long term reliability and service life.

GUARANTEES & WARRANTIES

British Steel plc and Ward will provide external coating and product warranties and guarantees on an individual project basis.

PACKING

STANDARD PACKING

DW1000 panels are stacked weather sheet to weather sheet (to minimise pack height). The top, bottom, sides and ends are protected with cardboard and timber packing and the entire pack is wrapped in plastic.

The number of panels in each pack depends on panel thickness, as shown in the table.
Typical pack height is 1100mm.

Panel core thickness	45	60	80
No. panels/pack (max)	19	14	11

SEA FREIGHT

Fully timber crated packs are available on projects requiring delivery by sea freight shipping, at additional cost.

DELIVERY

All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

SITE INSTALLATION PROCEDURE

Site assembly instructions are available from The Ward Technical Services Department.

Design Performance
Roof and Wall Cladding

INTRODUCTION

The designer of any building must fulfil the client's requirements whilst meeting the necessary statutory regulations. The objective of this section is to support the specifier in the task of cladding selection by highlighting a range of pertinent issues which must be considered if an appropriate solution is to be achieved.

Outline information is provided to allow an overview of such topics as client requirements, regulations and standards and various cladding performance issues.

Ward insulated panels can be readily tailored to suit the demands of the individual project in each of these areas, thereby providing a high quality high performance and economic solution.

THE CLIENT'S REQUIREMENTS

It is essential that when specifying a cladding system, the fundamental client demands are satisfied.

The choice of cladding system must harmonise with the overall building concept whilst satisfying all the requirements of the design brief. As the cladding will typically form the majority of the envelope area, it must be of a suitable quality to ensure that the envelope it forms will:

- Perform its function effectively
- Meet aesthetic requirements
- Be constructed to schedule and within budget
- Provide acceptable long term performance with low maintenance

To meet these demands the specifier must ensure that the system selected will provide a reliable, easily constructed and economical solution. While some systems may initially appear to offer economic benefits their predictable performance failures and potential for site delays may seriously affect their overall suitability. A successful long term solution therefore depends on practical technology which can be accomplished and maintained at an acceptable economic level.

In addition to the four general areas outlined above the client may also call for detailed attention to be paid to:

- Weatherproofing: exposure, drainage, reliability
- Economics: capital outlay, life cycle, payback, running costs
- Technical performance: heat, air moisture
- Environmental impact: CO_2, greenhouse effect, ozone depletion
- Future flexibility: change of use, extendability
- Warranties: performance, life cycle
- Safety in use: construction, maintenance

DESIGNER/TEAM RESPONSIBILITY

The design team must fully consider the client requirements to ensure that the cladding system selected will, in practice, satisfy the current building needs whilst providing long term integrity and flexibility. Some of these issues are listed below while other areas are covered in more detail in later sections.

Design Performance
Roof and Wall Cladding

AESTHETICS

The overall aesthetic of the building is dependent upon the primary envelope components. Ward insulated panels are manufactured with a range of contemporary profiles and finishes which offer the designer a wide variety of solutions. Being fully insulated there is no requirement for ventilation in the Ward 'warm' concept panels which allows the outer profiles to take various forms from heavily contoured deep trapezoidal to minimal profile flat sheets.

Each of the Ward systems can be factory finished in any of the British Steel Colorcoat HP200, HPS200 or PVF_2 ranges. While both profile and finish can be adapted for the individual project needs, Ward wall panel systems can also provide diversity of architectural expression by being horizontally or vertically fixed and having flexible module sizes.

WEATHERPROOFING

The basic function of the building envelope is to provide the necessary degree of interior and exterior environmental separation to protect the occupants. Weatherproofing is central to this design objective and cladding systems must respond to the demands with 'waterproof' materials and weatherproof jointing systems. This is particularly true of roofing systems where exposure is severe and presents greater potential for leaks.

Ward insulated panels address weathering issues by minimising the number of potential weak points such as end lap junctions, yet ensuring reliable weathering seals are easily formed where required.

Ward insulated panels can accommodate the weatherproofing needs of virtually all wall and roofing applications with roofing systems capable of operating down to a finished pitch of 1°.

ECONOMICS

Often the foremost concern of the client is that of obtaining a satisfactory solution at an 'economic' cost. It is the specifiers responsibility to meet the budget requirements whilst safeguarding the client against 'unforeseen' costs. This places a burden on the specifier to assess and convey the predicted installed cost in conjunction with any future maintenance expense commonly associated with the specified system.

The economic benefit of specifying Ward insulated panels stem from the cumulative capital cost, reduced labour costs and excellent in-service running and maintenance costs.

By specifying a Ward system potential opportunities exist to make capital savings in other areas such as the heating and ventilation plant due to the reliable long term performance of the building envelope.

ROOF AND WALL CLADDING CONCEPTS

There are basically two insulating concepts for profiled metal cladding systems:

'COLD' CONSTRUCTION

This form of construction incorporates insulation, usually above the support purlins, with a ventilation space between the insulant and the outer sheet. Vapour permeable insulation is acceptable in this type of assembly but, since it is necessary to control condensation, a vapour control layer and breather membrane are required. Such assemblies are typically known as site assembled multi part cladding systems and are classified as 'cold' constructions.

'WARM' CONSTRUCTION

In this form of construction the insulation is sandwiched between, and in full contact with, two metal skins which are fixed above the support purlins. The system must utilise vapour resistant insulants and due to the homogeneous nature of the assembly, there is no requirement for a separate vapour control layer, breather membrane or ventilation.

Ward factory insulated cladding panels satisfy these requirements and are classes as 'warm' constructions.

'Warm construction offers a more stable envelope in all aspects of performance but particularly reduce the interstitial condensation risk, potential for corrosion and existence of thermal bridges. Essentially this type of construction keeps the building, structure and envelope components 'warm'.

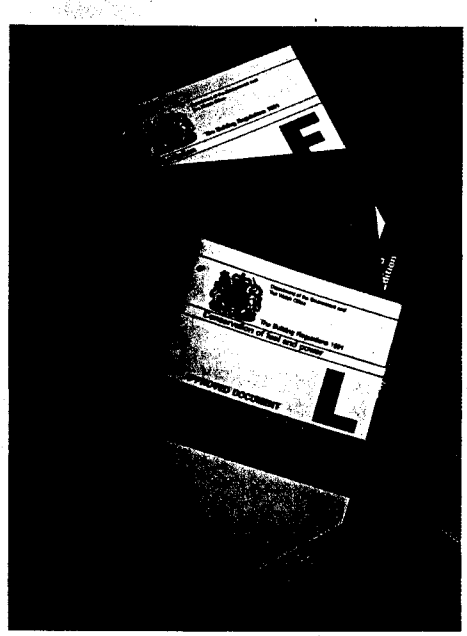
STATUTORY REQUIREMENTS

In the UK whenever a new building is constructed, or an existing one is extended, altered or undergoes a change of use, it is necessary that the works comply with the current Building Regulations.

Those sections of the Regulations particularly relevant to profiled cladding systems are Parts B, 'F' and 'L', each of which should be satisfied by following the approaches indicated within the regulations or by complying with the appropriate reference documents.

BUILDING REGULATION REQUIREMENTS

Approved Document 'B' deals with fire safety and is divided into 5 sections. Sections 2-4 are directly relevant to the design of roof and wall cladding and relate to internal and external spread of fire. Essentially they require that in the event of a fire any cladding should resist the surface spread of flame, limit the rate of heat release if ignited, remain stable for a reasonable period and inhibit the unseen spread of fire and smoke within concealed spaces of the structure or fabric. These aspects will be covered in greater detail in Section 8 (Fire Safety).



Approved documents 'L' (Conservation of fuel and power) and 'F' (Ventilation) of the Building Regulations along with their 1995 Revisions and the BRE Report 262 'Thermal Insulation Avoiding Risks' outline the required statutory minimum level of performance in these two areas.

Principally, Parts 'F' and 'L' are relevant to the transfer of heat, air and moisture through the building envelope. They directly affect the design of roofing and cladding assemblies and must be satisfied to if an acceptable solution is to be provided.

Parts 'F' and 'L' of the Building Regulations were amended in 1995 and whilst the aim of these amendments was to reduce energy use and associated CO_2 emissions in line with government commitments, the practical outcome was essentially to increase certain insulation standards by introducing a requirement to incorporate thermal bridges in U-value calculations.

These more onerous regulations require the design team to ensure that they specify a system which offers a performance commensurate with the improved minimum standards over the life of the building.

PART F: VENTILATION

Part F deals with two specific requirements. Section F1 deals with the provision of adequate ventilation for people within a building whilst section F2 deals with the provision of adequate ventilation in roofs to prevent excessive condensation. It is clear that only section F2 is specifically relevant to the design and installation of roofing and cladding.

ROOF CLASSIFICATION: F2

While roof and wall cladding are often of a similar construction Part F2 only requires ventilation of roof cladding to provide condensation control (there is no similar statutory requirement for wall cladding).

F2 is relevant to both domestic and non-domestic buildings and for this purpose the provisions deal with the two basic roof types which have been outlined above :

Cold Roofs: those roofs where moisture from the building can permeate the insulation (e.g. site assembled multi-part cladding systems).

Warm Roofs: those roofs where moisture cannot permeate the insulation (e.g. factory manufactured insulated panel).

RELEVANT REQUIREMENTS (TO METAL WALL AND ROOF CLADDING)

The aim of Part F2 is to prevent 'excessive condensation' in:

a) a roof assembly

b) a roof void above an insulated ceiling

The objective is to prevent condensation substantially or permanently reducing the thermal or structural performance of the insulant or assembly. However, no definition is provided to clarify what 'excessive' or 'substantially' means in terms of condensate regularity, quantity and duration.

It is a responsibility of the designer to satisfy himself that the cladding system specified will either prevent condensation or maintain it within 'acceptable' limits.

F2 is divided into two sections which lay down the requirements for the various typical forms of 'cold roof'.

Section 1 applies to roofs with a pitch of 15° or greater and involves both double pitch and lean-to roofs where the insulation layer is incorporated at the horizontal ceiling line. The requirement demands that cold roofs are ventilated at eaves level in a manner equivalent to a continuous 10mm wide strip while a lean-to roof must also incorporate vents at high level or at the abutment equivalent to a continuous 5mm wide strip.

Section 2 applies to roofs with a pitch of 15° or less and those where the ceiling line follows the pitch of the roof. The requirements demand that ventilation be provided at eaves level equivalent to a continuous 25mm wide strip. In pitched situations further ventilation at the ridge equivalent to a continuous 5mm strip is required. In addition a clear 50mm continuous free air space must exist between the insulant and underside of the roof deck where the ceiling line follows the roof pitch.

The provisions make it clear that in 'warm' roof construction no ventilation is required since they are deemed to present no risk of condensation. In contrast 'cold' roofs are deemed to require adequate ventilation, a vapour control layer and a breather membrane if the appropriate guidance provided in BRE 262 is followed.

BRE 262 – Thermal Insulation: avoiding risks indicates these needs diagrammatically and comments accordingly. In doing so, however, it's guidance on ventilation of industrial profiled metal roofs seem to contradict the requirement (set out in F2) for a clear 50mm air space between the top of the insulation layer and underside of the weathering sheet. BRE262 shows the troughs of the weathering sheet in full contact with the insulant thus eliminating the ventilation space at these locations and solely relying on the rib void ventilation for moisture vapour removal.

However, as a guidance document, compliance with its recommendations must be assumed to satisfy the requirements of F2. Besides this apparent contradiction the report does provide an extensive guide to the use of cold roofs constructed with profiled metal sheets. It states that regarding condensation within the construction "This is a substantial risk with cold roofs" (p.10). It stresses the need for protective measures such as providing an effective VCL, the provision of ventilation within the profiles of the weathering skin and the incorporation of a breather membrane to drain condensate to the eaves gutter.

It also notes that in cold roofs "condensate can form on the inner face of the outer skin, due to radiation to the night sky, and sometimes freezes there" and "condensate can saturate the insulation and corrode fixings and edges of metal sheet."

Bearing in mind the regulatory requirements to prevent 'excessive' condensate which will 'substantially' reduce the thermal and structural performance, cold roof specification presents obvious hazards.

While calculation methods for condensation accumulation, such as that contained in BS5250, utilise steady state criteria it is clear that these are inappropriate for the accurate assessment of the dynamic conditions experienced in ventilated 'cold' lightweight metal roofs.

Specification of a 'warm' concept construction, as provided by Ward, ensures that the potentially serious condensation issues present with 'cold' constructions are avoided.

PART L: CONSERVATION OF FUEL AND POWER

Section 2 of Part L deals specifically with non-domestic buildings. Part L requires the provision of adequate insulation levels with the objective of limiting heat loss through the building envelope and preventing local condensation at thermal bridges. The 1995 amendments also introduced the concept of limiting uncontrolled air leakage through the building fabric.

There are principally three methods which can be employed to satisfy the requirements set out in Section 2 of Part L with respect to thermal transfer through the building envelope. (In each case manufacturers certified thermal conductivity data should be used in preference to generic material values). The three methods are:

1. elemental method
2. calculation method
3. energy use method

The most widely used approach is the first method since it avoids time consuming and complex calculations due to the simple need for each element to meet statutory standards. There are listed below:

Roofs

- Roofs with loft space 0.25 Wm^2K
- Insulated sloping roofs with no loft space:
  - residential 0.35 Wm^2K
  - other 0.45 Wm^2K

Walls

- Exposed walls 0.45 Wm^2K
- Semi exposed walls 0.6 Wm^2K

Rooflights

- 3.3 Wm^2K

Doors

- Vehicle access or other large door 0.7 Wm^2K

The regulations set amended maximum allowances for the areas of windows, doors and rooflights as outlined below. However, where the elemental U-value is improved beyond the set level, these maximum areas may be increased accordingly.

	Windows/Doors	Rooflights
Residential	30%	20%
Places of Assembly, offices and shops	40%	20%
Industrial and storage buildings	15%	20%

Whilst the elemental method is most commonly used, the second two approaches, although complex, do offer a degree of flexibility in specification and design. They may be of benefit when such flexibility is required or novel design solutions are involved. In non-residential buildings a maximum U-value of 0.7 Wm^2K for external walls, floors and roofs can be accommodated if there are sufficient counter-measures to offset the additional heat loss which occurs through these areas.

THERMAL BRIDGING: IMPACT

In complying with the amended requirements for limiting heat loss through the fabric, thermal bridges within an assembly and of a repetitive nature must be taken into account on a proportional basis. This means that the more regular these bridges become the greater they impact the assembly U-value. The most common approach to overcome this calculated thermal deficiency is by incorporating increased levels of insulation.

Section 2 also requires that provision be made to limit thermal bridging around openings and reduce uncontrolled air leakage through the building fabric.

The design team must select a cladding system which:

- meets the statutory thermal transmittance values
- utilises certified λ-values in preference to generic values
- accommodates repeating thermal bridges in any calculation procedure and offsets these with additional necessary insulation
- controls condensation by insulating thermal bridges
- limits uncontrolled air leakage

Each of these demands can be satisfied by specifying Ward factory insulated cladding panels.

CLADDING PERFORMANCE

The aim of Ward factory insulated cladding panels is to meet the regulatory demands while providing long term integrity, reliability and durability.

By utilising a 'warm' construction concept, Ward factory insulated cladding panels inherently reduce the number of materials involved, simplify the assembly process, ensure continuity and proper placement of insulation, minimise thermal bridges and eliminate significant panel air leakage.

The benefits are readily apparent when reviewing the onerous requirements which are avoided by utilising 'warm' roof and wall factory insulated cladding panels.

Avoid – ventilation of assembly to remove potential condensate

Avoid – installation of separate vcl membrane

Avoid – installation of additional insulation to accommodate thermal bridges

Avoid – installation of a breather membrane to drain condensate

Design Performance
Internal/External Environment

The design and specification of any cladding system must necessarily consider the environmental conditions which have to be accommodated. This involves assessing:

- The external environment
- The internal environment

EXTERNAL ENVIRONMENT

The external environment can be assessed by reviewing local weather data and site exposure in conjunction with relevant British Standards, Codes of Practice or Meteorological publications. Where this is unavailable standard data can be utilised to model 'typical' UK design conditions. These values are set out by various bodies such as: British Standards Institute, the Building Research Establishment and CIBSE.

Typically average winter conditions are generally used as design parameters as these reflect the greatest demands placed upon the building envelope.

The severity of the external environment will impact the selection of envelope materials and must be carefully considered during the design, maintenance or retrofit of the construction. Where extreme conditions are probable their regularity and duration must be addressed if the envelope performance is to be correctly designed. Thus while 'average' conditions will provide basic data for baseline 'steady state' analysis, any significant cyclical swing in conditions must also be integral to the design considerations.

INTERNAL ENVIRONMENT

The internal environment is a principal determining factor when selecting the appropriate form of construction for any buildings.

It is governed by three areas:

- The function of the building
- The occupancy of the building
- The conditioning system design within the building

Each of these areas will contribute to the overall nature of the internal environment and impact the specification of the envelope which will aim to protect, separate and control this environment.

- **The function of the building**

The function determines to a large degree the internal environment since it directly influences the severity and range of acceptable environmental conditions. However, the function will also affect the occupancy load and the conditioning system design.

- **The occupancy of the building**

The occupancy type and load will directly impact the internal environmental conditions. The nature, regularity and duration of such occupancy loads should be an essential element when reviewing the likely internal conditions.

- **The conditioning systems within the building**

The conditioning system and envelope design will determine the level of environmental control available within the building. It will also directly affect the type of atmosphere which can be maintained (ie, wet, dry, hot, cold, etc).

HEAT, AIR AND MOISTURE FLOWS

The principle risk posed by the interior environment is normally considered to be that of condensation. It varies with a number of factors:

- Internal temperature
- Internal relative humidity
- Envelope air tightness
- Envelope vapour control

The internal temperature and relative humidity levels will determine how effective the air and vapour barriers must be to achieve the desired performance. Whilst normally the objective is to prevent condensation there may be occasions where limiting its occurrence below prescribed levels will be satisfactory.

INTERNAL ENVIRONMENT CLASSIFICATIONS

In an attempt to assist designers and specifiers of metal cladding systems, various bodies within the industry provide classifications of building environments. These are based on the factors listed above but essentially focus on the humidity levels likely to be present.

The British Standards Institute (BS 5427), Metal Cladding & Roofing Manufacturers Association (MCRMA) and British Steel divide building environments into three main categories:

Grade A: 'Normal' Humidity
Factories and warehouses for normal manufacturing and storage purposes where no significant quantities of water vapour are added to the atmosphere by the occupants or processes.

Grade B: 'Medium' humidity
Buildings with high occupancy rates or buildings with intermittent heating (eg public halls, supermarkets, churches, sports halls). Buildings with unflued gas or oil heating systems.

Grade C: 'High' humidity
Buildings containing large open areas of water, (eg swimming pools) and buildings where large quantities of water are used or produced in processes (eg textiles, paper making).

While the MCRMA expand category 'C' to include special cases, British Steel adopt a Grade D to include buildings where the environments require special consideration (eg cold stores, ice rinks, etc).

BUILDING ENVELOPE APPLICATIONS

Having agreed the internal environmental data and appropriately classified the building, it is then essential to specify the cladding system type accordingly.

Grade A buildings have minimal requirements due to low humidity levels. However, they still have to be designed to comply with the Building Regulations, BR262 and ensure there is no thermal performance degradation over the life of the cladding system due to interstitial condensation, cold bridges or missing insulation. In Grade B class buildings the achievement of the requisite vapour control characteristics will only be reliably met by the installation of a warm roof system which prevents any risk of cavity condensation causing thermal degradation.

In the high risk Grade C environments only superior systems will provide the necessary protection against condensation. Ward factory insulated cladding panels meet this requirement due to their ability to provide excellent control over the flow of heat, air and moisture.

Design Performance
Internal/External Environment

Essential to any cladding selection process is the need to ensure that any apparently suitable system specification is practicable and can actually be achieved on site. Failure to address this aspect may result in poor environmental control and significant condensation accumulations within the assembly. This in turn may lead to rapid system degradation. Ward factory insulated cladding panels consistently fulfil the need for a practical site solution.

Product Data Sheet

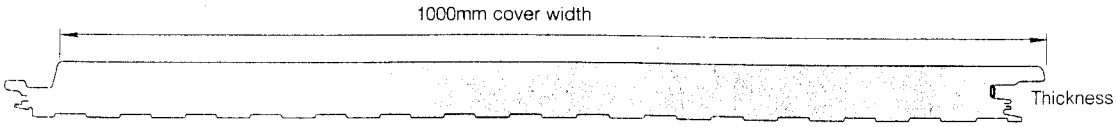
APPLICATION

The DW wall panels are secret fixed panels which can be laid horizontally or vertically and are suitable for walls for all building applications except where there are low temperature internal conditions.

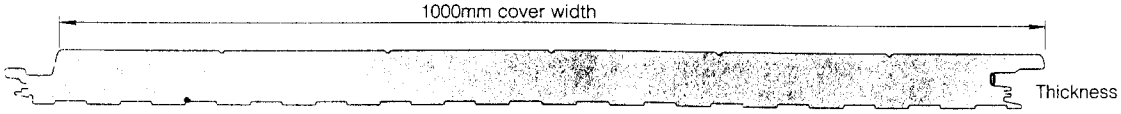
Product Reference	Application Description
DW1000 A-D	Standard wall panel for use in normal applications.
DW1000 A-D – FM	Architectural wall panel with Factory Mutual approval for wall applications.
DW1000 A-D – LPC	Architectural wall panel with Loss Prevention Council approval for wall applications.

DIMENSIONS & WEIGHT

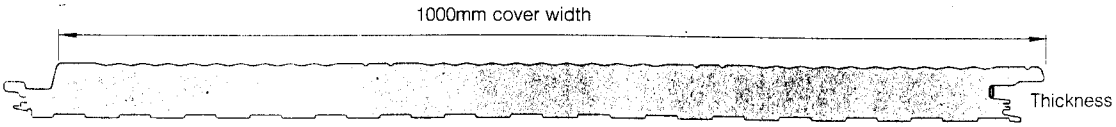
Profile A



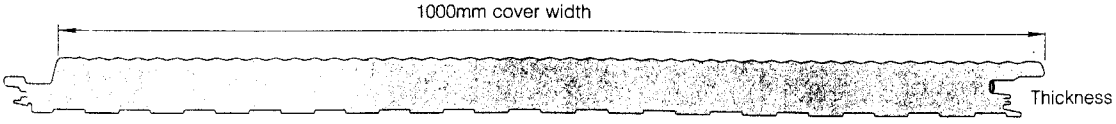
Profile B



Profile C



Profile D



Thickness (mm)		45	60	80
Weight kg/m²	0.7/0.4 steel	11.5	12.1	12.9
	0.7/0.4 alum.	5.4	6.0	6.8

PRODUCT TOLERANCES

Length	–5mm	+5mm
Width	–2mm	+2mm
Thickness	–2mm	+2mm
End Squareness	–3mm	+3mm
Flatness (per metre)	–2mm	+2mm

AVAILABLE LENGTHS

Standard lengths 1.8 to 12 metres. Panels less than 1.8m long can be supplied and are subject to an extra charge.

These panels cannot be end lapped.