

## **JUNIPER STREET REFURBISHMENT**

### **Scope of Works of Architect/Design Team Leader**

The original design brief as presented by NMGM called for the refurbishment and enhancement of the first floor storage facilities and roof at Juniper Street warehouse in order that the museum artefacts could be stored in a safe and environmentally appropriate manner.

The basis of the work was as follows:-

1. Removal of existing asbestos based corrugated roof sheeting
2. Replacement with a Kingspan KS 1000 RW composite roof panel system to provide an appropriate U value. This system has a 60mm core of LPC approved urethane insulation as is designed specifically for situations where close control of the internal environment is a priority.
3. Refurbish the roof trusses to the loading bay and Units A & C. This included the replacement of purlins etc.
4. Dismantle the existing roof trusses in Units B, D, E and F and replace with new to provide additional head room in order that a mezzanine deck could be inserted within Units B, E and F.
5. Provide a new guttering and parapet protection system to all areas of the roof.
6. Infill existing loading points no longer required.
7. Design the layout and co-ordinate the installation of the mezzanine decks along with fixed store units and proprietary partitioning.
8. Upgrade fire protection between Units by providing fire lobbies to areas where vulnerable artifacts are to be stored.
9. Provide upgraded staff facilities.
10. Provide decoration to all first floor store areas and staff facilities.
11. Co-ordinate installation and design of Mechanical and Electrical items.
12. Co-ordinate structural works design and installation.

**PROJECT:** RE-FURBISHMENT AND STRUCTURAL ALTERATIONS  
AT NATIONAL MUSEUMS AND GALLERIES JUNIPER STREET  
STORE, LIVERPOOL.

**REFERENCE:** 97075/RTH/TDB/tb.

**DATE:** OCTOBER 1999.

**DOCUMENT:** STRUCTURAL DESIGN CONCEPT AND BUILDING  
CONSTRUCTION INFORMATION FOR INCLUSION  
IN CDM HEALTH AND SAFETY FILE. (**SHEET 1**)

**GENERAL STRUCTURAL CONCEPT:**

The structural works included in this building contract generally comprised the introduction of new mezzanine storage decks at first floor level within units B2, D2, E2 and F2. This required the replacement of the existing steel fabricated roof trusses with new 'tied' steel portal rafters, to provide increased headroom in these areas.

Other miscellaneous structural works were involved with the re-cladding of the roof and the introduction of a new lift and reference should be made to the drawings listed on the attached register for further information regarding the as-built structure:

It should be noted that Steelbeam Ltd. undertook the detailed design of the new tied portal roof structure, on behalf of the main contractor, Whittfield and Brown Ltd. and reference should be made to their calculations and drawings as necessary.

Steelwork Sub-contractor:

Steelbeam Ltd.  
Road One  
Winsford Industrial Estate  
Winsford, Cheshire  
CW7 3BB.                      01606 863 111

Main Contractor:

Whittfield and Brown Ltd.  
Appleton Village  
Widnes, Cheshire  
WN8 6EQ                      0151 420 1000

**EXISTING BUILDING CONSTRUCTION:**

The existing warehouse building generally comprises two storey, reinforced concrete frame construction, supporting a reinforced concrete 'flat slab' at first floor level and dual pitched fabricated steel roof trusses/purlins below a corrugated roof sheet. The external elevations and internal partition walls are generally pre-cast concrete and masonry construction.

Continued.

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**EXISTING BUILDING CONSTRUCTION** Continued:

It should be noted that T. D. Bingham Partnership have carried out an assessment of the inherent fire resistance of the existing structural elements and reference should be made to our report dated August 1998 for further information.

**MEZZANINE FLOOR STRUCTURE:**

The new mezzanine floor structures comprises an arrangement of mild steel universal column and beam sections, supporting a system of proprietary pressed metal 'z' joists below a plywood decking. Steel cross-braced bays maintain lateral stability.

The new mezzanine posts have been located, where possible, over the existing reinforced concrete columns between the ground and first floor. This arrangement provides for a maximum uniformly distributed imposed load on the mezzanine floor of 4.5kN/sq.m, reducing the allowable storage load on the existing first floor slab in these areas to 7.5 kN/sq.m.

A preliminary design appraisal indicated that a similar form of mezzanine structure could be constructed on the first floor on a maximum 4.5m square grid, with no restriction on the location of the posts across the floor. This would restrict the storage load on the first floor in these areas to a maximum of 6.0 kN/sq.m, assuming a maximum load on the mezzanine floor of 4.5 kN/sq.m. It should, however, be noted that although that the first floor appears to be of a similar construction throughout the building, it would be necessary to undertake a specific design appraisal to confirm the suitability of the remaining floor areas for the location of additional mezzanine structures. Similarly, a design assessment would be required in consideration of any significant structural amendments required to the new mezzanines and a Chartered Structural Engineer should therefore be consulted as necessary.

Continued.

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**NEW ROOF STRUCTURE:**

The existing fabricated steel roof trusses over units B2, D2, E2 and F2 were removed and replaced with new tied steel portal rafters supported on the existing structural frame so as to increase the headroom in these units sufficiently to allow the introduction of the mezzanine floors at first floor level. It is important to note that the tie across the portal rafters is a primary structural member and should not therefore be removed unless in the process of demolition at which time a Chartered Structural Engineer should be consulted to determine the appropriate method / sequence.

The original corrugated roof sheeting and supporting purlins have been replaced throughout the building and now includes pressed metal 'z' purlins supporting a composite steel roof sheet.

End

# Product Data Sheet

## KS1000 RW Roof Panel

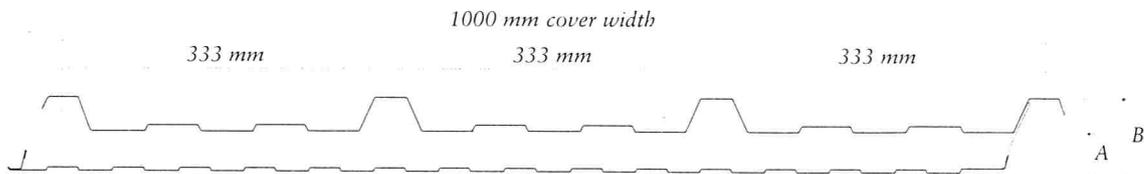
### APPLICATION

The KS1000 RW Roof Panel is a through fixed roof panel, which can be used for all building applications where the roof slope is 4° or more.

Also suitable to support roof tile construction.

Product Reference	Application Description
KS1000 RW	Standard roof panel for use in normal applications.
KS1000 RW - FM	Trapezoidal roof panel with Factory Mutual approval for roof and wall applications.
KS1000 RW - LPC	Trapezoidal roof panel with Loss Prevention Council approval for roof applications.

### DIMENSIONS & WEIGHT



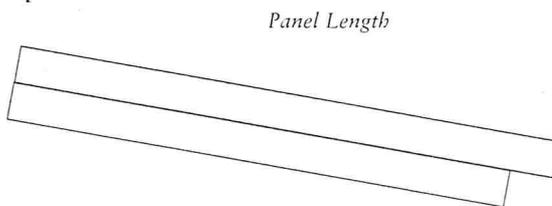
<b>A - core thickness</b> (mm)	30	40	50	60	80	100
<b>B - overall dimension</b> (mm)	65	75	85	95	115	135
<b>Weight</b> kg/m <sup>2</sup>	0.5/0.4 steel	9.5	9.9	10.3	10.7	11.5
	0.7/0.4 steel	11.4	11.8	12.2	12.6	13.4
	0.7/0.5 alum.	5.2	5.6	6.0	6.4	7.2

### PRODUCT TOLERANCES

Cut to Length	-0.05%	+0.1%
Liner Sheet Length	-0.1%	+0.1%
Cover Width	-0mm	+3mm
Thickness	-2mm	+2mm
End Square	-3mm	+3mm

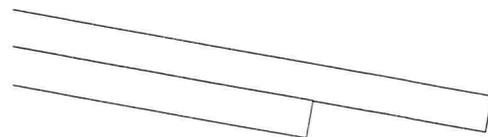
### AVAILABLE LENGTHS

Standard lengths 1.8 to 12 metres. 12 to 22 metres can be supplied but are subject to a transport surcharge. Panels less than 1.8m long can be supplied but do not have a cut back and are subject to extra charge.



### PANEL END CUT BACK

All panels are normally produced with a minimum cut back of 35mm, cut backs up to 175mm can also be manufactured. If flush ended panels (no cut back) are required they can be manufactured and are subject to a surcharge. Maximum recommended cut back for panel end lapping is 175mm. Panels less than 1.8m long which require a cutback are subject to extra charge.



# Product Data Sheet

## KS1000 RW Roof Panel

### MATERIALS - STEEL

#### Substrate

- Galvalite, hot-dipped zinc coated steel to BS EN10147:1992. Grade Fe E220G with a Z275 zinc coating.
- ZaluTite, hot-dipped \*aluminium/zinc coated steel to BS6830 may be recommended in some cases.
- 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 HP200 Plastisol: 200 micron thick high performance coating applied to the weatherside of the panel. Designed to achieve high levels of durability and colour stability, is highly resistant to damage in transit and on-site.
- Colorcoat Pvf2: 27 micron thick stoved fluorocarbon coating which has excellent colour stability even at temperatures as high as 120°C.
- Colorcoat Silicone Polyester: An economical coating with medium term life for worldwide use.
- Reverse side of sheet coated with a light grey polyester coating.
- 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 HP200 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.
- Reverse side of sheet coated with a light grey polyester coating.
- 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 0.28mm to 0.5mm depending on panel thickness.

#### 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%

- Alternatively the weather sheet can be supplied in mill finish.

#### 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 Lap Tape

All side laps have a factory applied anti condensation tape. A specially developed side lap tape is factory applied to panels for low-temperature chill stores at extra cost.

#### Factory Applied Side & End Lap Protection

If specifiers require additional under lap corrosion protection, this can be factory applied at extra cost.

\* Does not apply to FM and LPC approved products.

# Product Data Sheet

## KS1000 RW Roof Panel

### PERFORMANCE

#### Thermal Insulation

Panel Thickness mm	U value W/m <sup>2</sup> K	
	CFC Free $\lambda = 0.020$	HCFC Free $\lambda = 0.022$
30	0.54	0.60
40	0.43	0.47
50	0.35	0.38
60	0.30	0.33
80	0.23	0.25
100	0.19	0.20

U - Thermal transmittance W/m<sup>2</sup>K

$\lambda$  - Long-term Thermal conductivity W/mK

#### Biological

Kingspan 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. KS1000 RW panels are FM and LPC approved with steel facings.

#### Acoustics

All KS1000 RW panels have a single figure weighted sound reduction  $R_w = 27$ dB.

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

Kingspan KS1000 RW 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

Kingspan Insulated Panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with BS5750: Part 2, ISO9002 and EN29002 standards, ensuring long term reliability and service life.

### GUARANTEES & WARRANTIES

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

### PACKING

#### Standard Packing

KS1000 RW panels are stacked weather sheet to weather sheet (to minimise pack height). The top, bottom, sides and ends are protected with foam 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	30	40	50	60	80	100
No. panels/pack (max)	22	18	16	14	12	8

#### 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 Kingspan Technical Services Department.

# Product Health & Safety Data Sheet (C.O.S.H.H.)

## KINGSPAN INSULATED ROOF & WALL PANEL SYSTEMS

### Data References

- Consumer Protection Act 1987
- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health (COSHH) Regulations 1988
- Environmental Protection Act 1991

### Uses

The products are used for roof and wall cladding industrial and commercial buildings

Refer to Kingspan installation instructions for use. To be used in accordance with approved practices and building regulations. If any other use is to be considered please contact Kingspan Technical Services.

### Composition

Panels comprising coated steel or aluminium outer and liner sheets autoadhesively bonded to a rigid urethane core.

### Health Hazards

Consideration of the composition of this product indicates that in normal use it does not present a health hazard. The reaction of the insulation core has no known toxic effects.

### Fire Hazards

It is prudent to take precautions against ignition, fire and smoke hazard.

In fire situations beware of low visibility due to soot and avoid smoke inhalation. Smoke contains carbon monoxide and other gases, which may be injurious to health if inhaled. If smoke or fumes are inhaled seek fresh air and medical assistance immediately.

Panel which may have been subjected to very high temperatures may lose their normal strength.

### Storage, Handling and Use

The panels insulation core is a combustible product when exposed to a direct flame of sufficient intensity and therefore should be handled accordingly. Precautions must be taken to minimise the hazards in storage, handling and use. Good practices suggest the following precautions:

#### Storage

1. Store in a location free from any ignition hazard such as open flames, cutting and welding torches, high surface temperatures, electric heaters and other forms of direct radiant heat.
2. Do not stack more than 2.5 metres in height. Ensure stability of stack and provide adequate aisle space for access between stacks.
3. Store packs off the ground and on a slope, so

that should rain water penetrate the wrapping water will drain away.

4. Support the packs evenly with bearers spaced at 2m. Bearers should always be placed one directly above another.

### Installation

1. During the fixing operation or whilst handling, laceration of the skin is possible on the edge of the sheet.

2. Product is supplied in heavy bundles and injury may result from incorrect lifting or handling.

3. Cutting the product may cause flying swarf which could injure skin, particularly eyes. Cutting can also produce dust which can cause irritation if inhaled.

4. If hot working using flame or other ignition hazard must be done near exposed urethane core, the product should be protected with a heat resistant material.

### Precautions

- Protective clothing particularly gloves should be worn to avoid skin lacerations.
- Eye protection should be used when cutting.
- Handling sheets and bundles should be in accordance with HSE recommendations.
- Do not use flame cutting equipment, blow lamps or any high temperature equipment or process near the panels.
- If subject to abnormally high temperatures ensure adequate ventilation.
- In a fire, breathing apparatus should be worn.

### COSHH

Employers must ensure that there are measures in place that will control or limit the exposure of their employees to any substance hazardous to health.

Occupational Exposure Standards (O.E.S.) for nuisance dusts, e.g. urethane foam, are detailed in Health and Safety Executive Guidance Note EH 40 (current issue).

Further information on dust hazards may be obtained from EH 44/84 'Dust in the Workplace' - general principles of protection.

### Disposal Precautions

Waste foam should be disposed of regularly in a designated location in accordance with the requirements of Local Authorities and the Environmental Protection Act 1991. It is important that the accumulation of waste foam is avoided to prevent wind dispersal. Packaging material is combustible. Store away from sources of ignition prior to disposal.

Ensure polythene wrapping/packaging is kept away from children. Observe usual precautions with polythene bags.