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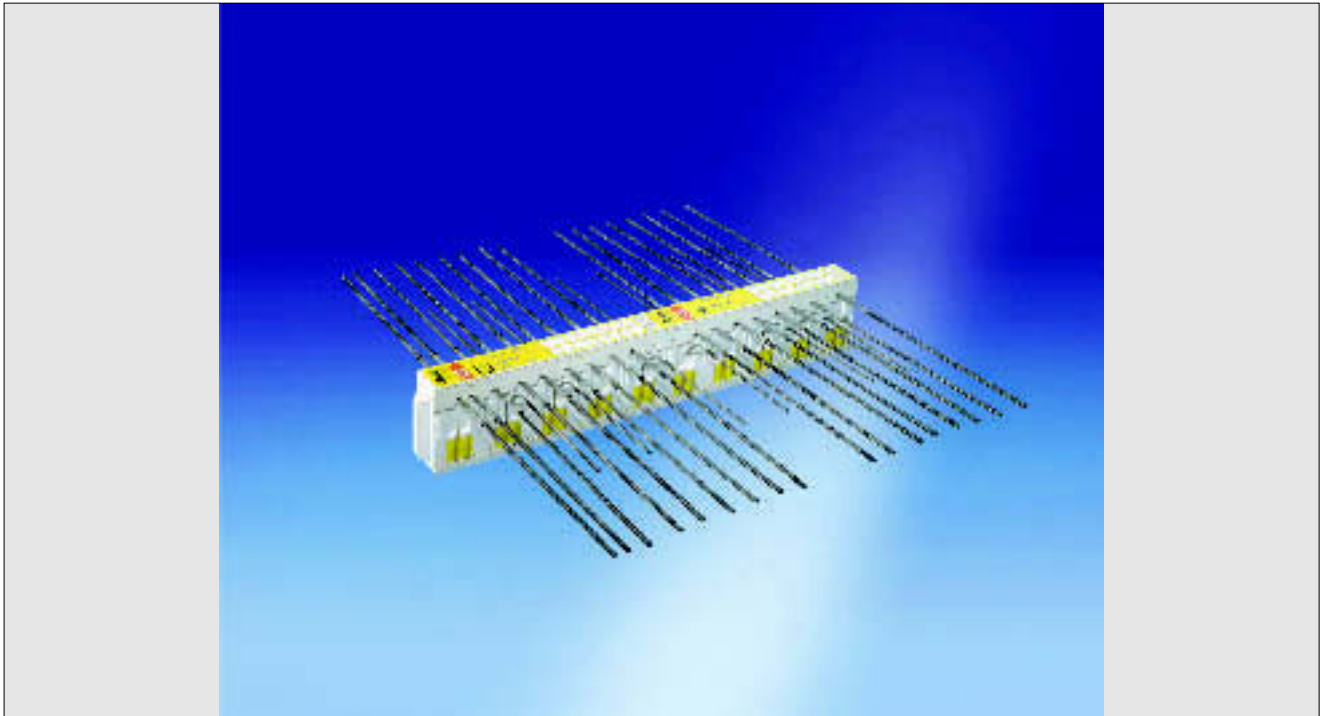
**Agrément
Certificate
No 05/4277**

Designated by Government
to issue
European Technical
Approvals

SCHÖCK ISOKORB RANGE OF LOADBEARING THERMAL INSULATION COMPONENTS

Rupteurs thermiques
Tragendes Wärmedämm element

Product



• THIS CERTIFICATE RELATES TO THE SCHÖCK ISOKORB RANGE OF LOADBEARING THERMAL INSULATION COMPONENTS.

• The products are for use in reinforced concrete structures to form a thermal break between balcony and internal floor, whilst transferring load and maintaining full structural integrity.

Regulations

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



The Secretary of State has agreed with the British Board of Agrément the requirements of the Building Regulations to which screws can contribute in achieving compliance. In the opinion of the BBA, the Schöck Isokorb Range of Loadbearing Thermal Insulation Components if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	A1	Loading
Comment:		The products have sufficient strength and stiffness to sustain and transmit the design loads in accordance with sections 7.3 to 7.7 of this Certificate.
Requirement:	B3(1)	Internal fire spread (structure)
Comment:		The fire protection plates incorporated in the products will provide up to 90 minutes fire resistance. See section 10.3 of this Certificate.
Requirement:	L1(a)(i)	Dwellings
Requirement:	L2(a)	Buildings other than dwellings
Comment:		The products contribute towards the overall thermal insulation of the building envelope in reducing cold bridging between internal and external elements. See section 9.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See section 11.1 of this Certificate.

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2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, the Shöck Isokorb Range of Loadbearing Thermal Insulation Components, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The products comply with the requirements of this Regulation. See section 11.1 of this Certificate.
Regulation:	9	Building standards — construction
Standard:	1.1(a)(b)	Structure
Comment:		Reinforced concrete walls and floors incorporating the products have sufficient strength and stiffness to sustain and transmit the design loads in accordance with sections 7.3 to 7.7 of this Certificate.
Standard:	2.3	Structural protection
Comment:		The fire protection plate incorporated in the products will provide up to 90 minutes resistance (medium). See section 10.3 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The products contribute towards the overall thermal insulation of the building envelope in reducing cold bridging between internal and external elements. See section 9.1 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the Schöck Isokorb Range of Loadbearing Thermal Insulation Components, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 11.1 of this Certificate.
Regulation:	D1	Stability
Comment:		The products have sufficient strength and stiffness to sustain and transmit the design loads in accordance with sections 7.3 to 7.7 of this Certificate.
Regulation:	E4(1)	Acoustic conditions in schools
Comment:		When incorporating the fire protection plates, the products will provide up to 90 minutes fire resistance. See section 10.3 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The products contribute towards the overall thermal insulation of the building envelope in reducing cold bridging between internal and external elements. See section 9.1 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: *6 Delivery and site storage.*

Technical Specification

5 Description

5.1 The Schöck Isokorb Range of Loadbearing Thermal Insulation Components allow full transfer of load from an external balcony into the main structure whilst providing a thermal break to reduce heat loss to the outside. The products are used primarily in reinforced concrete structures and are designed to form integrally with the floor construction.

5.2 Each product within the range consists of a moulded thermal break of high-density polystyrene,

incorporating plastic-sleeved, high-density pairs of high-strength, concrete thrust-force bearing blocks. There are varying numbers of blocks (between 4 and 18) to every 1 m length of product depending on load requirements. An arrangement of stainless steel, straight and bent bars pass through the EPS moulding and thrust-force bearing blocks to act as tension and shear reinforcement. They form continuity between the balcony and floor construction.

5.3 The types and descriptions of the product range are listed in Table 1 and shown in Figure 1

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Figure 1 Range of products

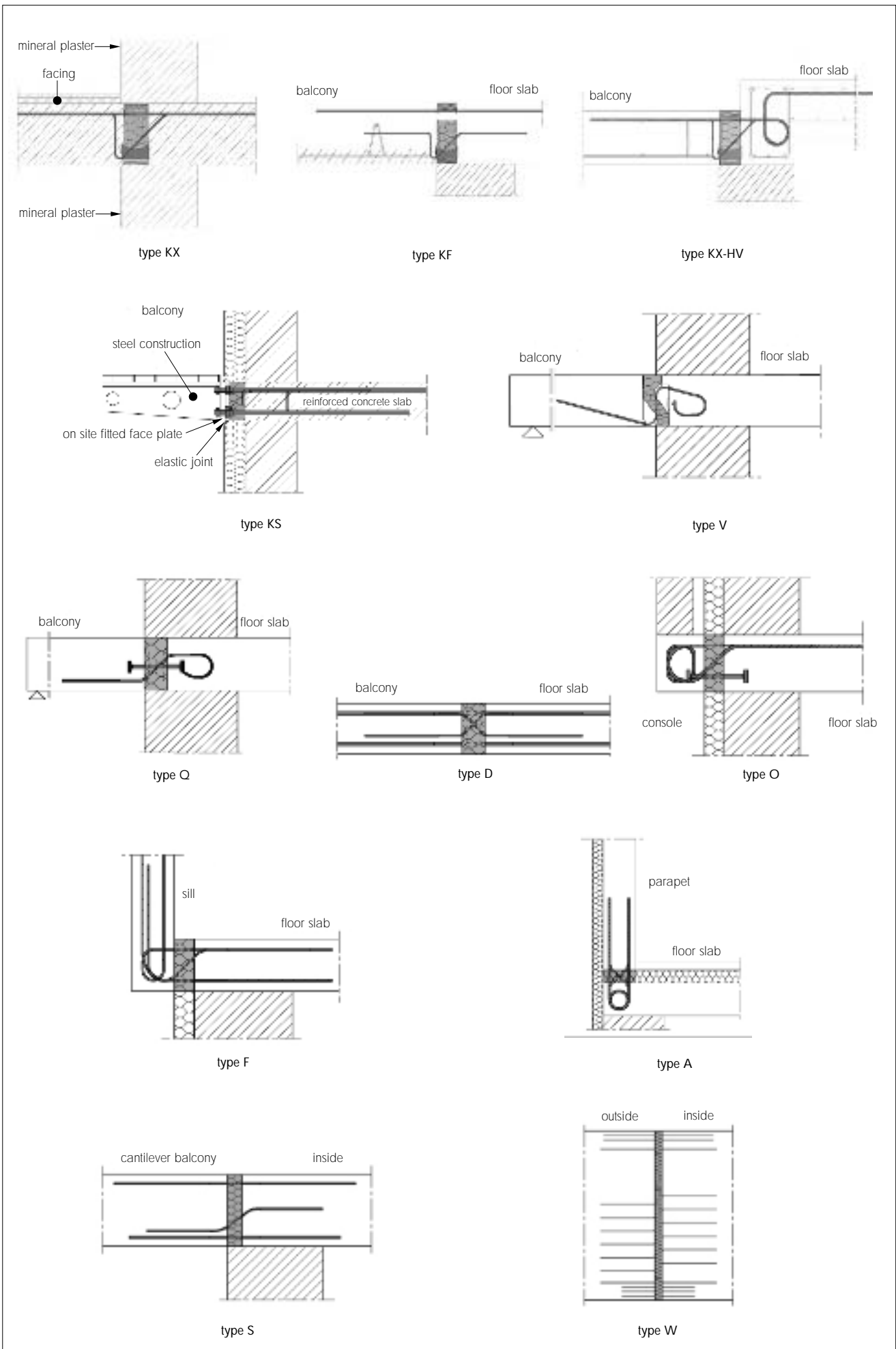


Table 1 Range of products covered by this Certificate

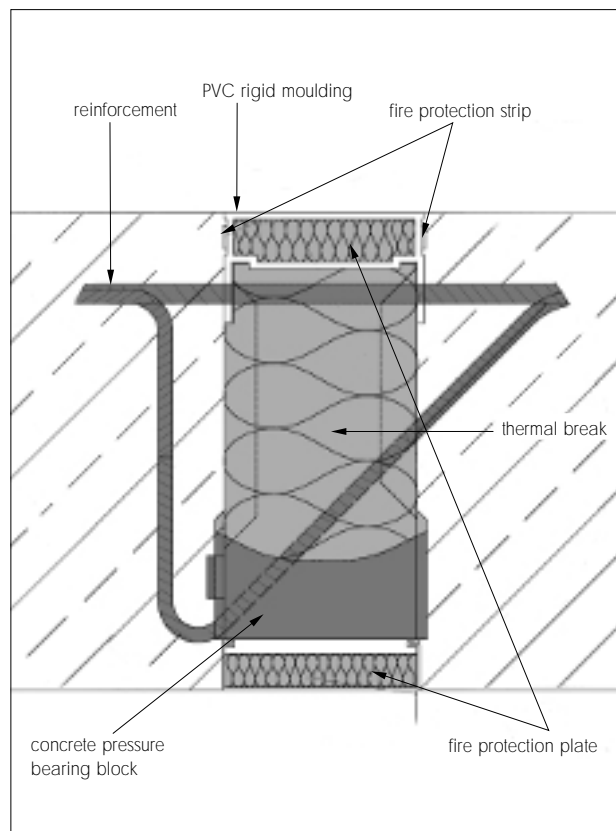
Reference	Application
KX	In-situ reinforced cantilever balcony for transferring bending moment and shear into concrete floor
KF	Precast concrete cantilever balcony for transferring bending moment and shear into concrete floor
KX-HV	Cantilever balcony with step-up for transferring bending moment and shear into concrete floor
KS	Cantilever steel balcony for transferring bending moment and shear into concrete floor
V	In-situ concrete balcony with flexible joint, plus additional end support using podium or columns for transferring lateral and shear forces into floor slab
Q	In-situ concrete balcony with flexible joint, plus additional end support using podium or columns for transferring shear forces into floor slab where stress and height are critical
D	In-situ concrete balcony within same area as main floor requiring transfer of positive and negative bending moment and shear force
O	Reinforced concrete corbel for transferring bending moment and shear
F	Providing insulation between protruding balustrades and transferring bending moment and shear force
A	Parapet for transferring positive and negative bending moment and shear forces
S	In-situ concrete balcony to carry bending moment and shear force into floor without use of thrust blocks
W	Balcony wall transferring bending moment and shear force into internal structural wall

5.4 Components of the products include:

- reinforcement — stainless steel ribbed reinforcement bar, to German Standard BS 500 NR is used to pass through the products with high-yield ribbed reinforcement bar, to German Standard BS 500 S used as continuity steel to lap onto floor and balcony reinforcement. Both bar types are either cut-stump or press-welded together to form a full-strength butt joint
- thermal break — expanded polystyrene moulding (Polystrol Hardfoam), forms the thermal break and houses the thrust-force bearing blocks
- concrete pressure bearing block (KX and KF products only) — each pair of thrust-force bearing block consists of an outer plastic sleeve of HD-PE plastic containing high-strength, fibre reinforced concrete
- PVC rigid moulding — used on KX and KF products and made from extruded PVC bonded to the top and bottom of thermal break using Dorus MS 294 adhesive. The top moulding (see Figure 2) contains slotted holes in each side to receive the stainless steel reinforcement bars. A fire safety strip made from Roku-strip and bonded to sides of upper PVC rigid moulding provides additional fire protection to reinforcement, should opening up of thermal break occur through concrete shrinkage or slight rotational movement of the balcony floor
- fire protection plates — made from fibreglass cement-bonded board complying to DIN 4102-2 : 1977, provided to top and bottom of products

when required, to form an effective fire protection to the reinforcement

Figure 2 Details of mouldings



- identification sticker — affixed to the top of each product type and bears the BBA Certificate number, product reference, manufacturing plant and installation instructions

5.5 Continuous quality control is exercised during manufacture.

6 Delivery and site storage

Products within the range are normally supplied to order in packages containing full or part orders. During off-loading care must be taken to avoid bending reinforcement or damaging the expanded polystyrene moulding. Packages must be stored undercover and away from direct sunlight or in contact with solvents or other harmful chemicals.

Design Data

7 General

7.1 The Schöck Isokorb Range of Loadbearing Thermal Insulation Components, when designed and installed in accordance with the Certificate holder's installation instructions, have the capability to transfer tensile, shear and compressive forces via the steel reinforcement and the thrust-force bearing blocks through to the supporting structure.

7.2 The minimum strength of concrete used in the balcony and supporting floor must be at least 25 Nmm⁻².



7.3 The quantities of tensile and/or shear reinforcement to be provided within each of the products, to resist the balcony or other direct loads, must be calculated by a Structural Engineer in accordance with BS 8110-1 : 1997 or BS EN 1992-1-1 : 2004 (Eurocode 2). All tension reinforcement should be 20 mm diameter or less and shear or lateral reinforcement, 14 mm diameter or less. The Certificate holder is able to provide design data on request.

7.4 Calculations should be carried out to ensure that the compressive force on individual concrete pressure-bearing blocks does not exceed 24.6 kN working load and the concrete adjacent to shear reinforcement bends is not overstressed. The Certificate holder's advice should be sought in this respect.

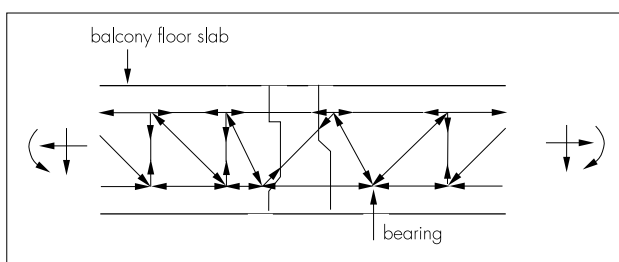
7.5 The cut-stump or press welding between stainless steel and continuity high-yield reinforcement is carried out under strict factory control and in accordance with German Standards. In-house testing is regularly carried out to ensure strength parameters are achieved. Site welding is not to be undertaken under any circumstances.

7.6 The maximum tensile rod spacing is generally 300 mm but must not exceed the requirements given in Eurocode 2 or BS 8110-1 : 1997.

7.7 The anchor length of steel reinforcement should be in accordance with Eurocode 2 or BS 8110-1 : 1997.

7.8 The mechanism of structural resistance of the KX, KF, and QF products is shown in Figure 3 in a framework model form.

Figure 3 Framework model



7.9 Tension reinforcement forming each of the products should not be bent on site, but remain straight.

8 Strength

Ultimate tensile strength of stainless steel used in the product range is in accordance with German Standards and can be taken as 550 Nmm⁻². Ultimate tensile high-yield steel ribbed reinforcement (butt welded to the stainless steel reinforcement) can

be taken as 550 Nmm⁻². Test result data can also be obtained from the Certificate holder to verify specified tensile and shear resistance figures.

9 Hygrothermal performance



9.1 The thermal performance of the KX product was examined using a finite element computer program, adopting a minimum vertical cavity insulation thickness of 80 mm (with a conductivity value of 0.35 Wm⁻¹K⁻¹). In combination with the product, an internal minimum temperature well in excess of that critical to the formation of condensation is achievable.

9.2 It is essential that all construction details recommended by the Certificate holder be followed, with particular attention to ensuring that the cavity insulation is in full contact with the top and bottom plates or faces of the KX product.

9.3 Products other than the KX should be examined separately to ensure that any cold bridging is eliminated through careful design detailing around balcony constructions.

10 Behaviour in relation to fire

10.1 The use of the products, when incorporating top and bottom fire protection plates and PVC rigid moulding, will not introduce any additional hazard in respect of behaviour in a fire situation if installed in accordance with the Certificate holder's instructions.

10.2 The nominal cover to reinforcement should be that appropriate to 'mild' exposure in accordance with BS 8110-1 : 1997, Table 3.4 and Figure 3.2, or as required for fire resistance in accordance with BS 8110-2 : 1985, Section 4, whichever is the greater.



10.3 Top and bottom fire protection plates will provide up to 90 minutes fire resistance.

10.4 Test results have indicated that the products incorporating the fire protection plates are capable of achieving up to 90 minutes loadbearing capacity, 90 minutes integrity and 90 minutes insulation.

11 Durability



11.1 Balconies constructed with Isokorb products will have a service life of not less than 60 years.

11.2 Reinforcement, forming part of each product, should be provided with nominal concrete cover as stated in Table 3.3 of BS 8110-1 : 1997 to meet durability requirements, depending on conditions of exposure.

Installation

12 General

The Schöck Isokorb Range of Loadbearing Thermal Insulation Components installation instructions are given on the label affixed to each product. Each label contains information on product type, diameter of reinforcement and full installation instructions.

13 Procedure

13.1 The following procedure applies to the KX range of products. Top and bottom reinforcement is laid and fixed to standard detailing requirements, leaving sufficient space to insert the Isokorb product.

13.2 The Isokorb product is seated within the reinforcement and its position checked for correct alignment and wired to the top and bottom reinforcement. The nearest distribution bar must butt against the pressure pad, or alternatively an additional 8 mm diameter reinforcing bar should be used.

13.3 A final position check is then made prior to pouring concrete.

13.4 During pouring, the concrete should be evenly distributed around the product. Care should be taken when using vibrators so as to not dislodge the product.

Technical Investigations

The following is a summary of the technical investigations carried out on the Schöck Isokorb Range of Loadbearing Thermal Insulation Components.

14 Investigations

An examination was made of data relating to existing approval documents for the DIBT Zulassungsnummer Z-15.7-86 and Z-15.7-86-2 including:

- Test report for endurance and static load test by TUM and MPA Karlsruhe
- Advisory opinion on fire behaviour by IBMB
- Advisory opinion on modification and expansion of DIBT Zulassungsnummer Z-15.7-86 and Z-15.7-86 by D.BG.

Bibliography

BS 8110-1 : 1997 *Structural use of concrete — Code of practice for design and construction*
BS 8110-2 : 1985 *Structural use of concrete — Code of practice for special circumstances*

BS EN 1992-1-1 : 2004 *Eurocode 2 : Design of concrete structures. General rules and rules for buildings*

DIN 4102-2 : 1977 *Fire behaviour of building materials and building components; Building components; Definitions, requirements and tests*

Conditions of Certification

15 Conditions

15.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

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

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

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

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

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

15.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.



In the opinion of the British Board of Agrément, the Schöck Isokorb Range of Loadbearing Thermal Insulation Components are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 05/4277 is accordingly awarded to Schöck Bauteile GmbH.

On behalf of the British Board of Agrément

Date of issue: 5th December 2005

Chief Executive

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For technical or additional information, contact the Certificate holder (see front page).
For information about the Agrément Certificate, including validity and scope, tel: Hotline 01923 665400, or check the BBA website.