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BRE CERTIFICATION LIMITED

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PRODUCT
SCOTTSDALE CONSTRUCTION SYSTEM

SUPPLIED BY
Scottsdale Construction System Ltd

SUMMARY
The Scottsdale Construction System *(*SCS) has been assessed to confirm, within limitations, its suitability as a prefabricated cold formed steel frame system for use in constructions up to four storeys high for single or multi occupancy residential or commercial buildings having a variety of floor plans.

Frames are manufactured from standard SCS 500 Series profile cold-formed galvanised steel C-sections rolled from steel coil of thickness 0.75mm to 1.2mm by Scottsdale Construction System Ltd Licensed Users using Scottsdale technology hardware and software. The SCS technology is a fully automated cold rolling process manufacturing the frame components to precise dimensions, forming and punching the frame component connections and connecting holes, all predetermined under the control of the SCS proprietary software. The frame components so produced are then assembled for use in either load-bearing or non load-bearing applications which have been approved by an appropriately qualified engineer competent in the design of light weight steel frame structures.

The construction system is based around a series of individual factory and/or site assembled wall frames, ceiling frames, roof frames, roof trusses, joists, floor frames and lintels which are then assembled on site by installers approved by Scottsdale Construction System Ltd's Licensed Users to provide the required loadbearing structure.

Specific components (outside scope of this certificate) including dry lining, insulation materials, timber decking (for floors), exterior wall cladding and tile roofing are installed/constructed onsite by others to an agreed specification to achieve either a hybrid or warm frame structural system. Details involving these components, including concrete tiled roofs and brick clad walls, have been assessed in evaluating the overall performance of the system in completed buildings. However, as these components are outside the scope of the certificate an architectural designer should ensure that all of the requisite ancillary parts are suitably designed, detailed and fixed to the SCS steel frames.

The SCS is for use above damp proof course level on suitably designed and prepared foundations appropriate to the site conditions. Those foundations are outside the scope of this certificate.

The performance characteristics covered by this certificate are:
- Structural Performance Weathertightness and Durability
- Thermal transmittance and condensation risk Site installation
- Acoustic performance Factory production
- Reaction and resistance to fire

BRE Certification has examined the SCS design methodology and typical construction details for a variety of wall, floor and roof constructions that designers can use to provide finished buildings. Two design applications, a four storey apartment building and a two storey house have been assessed and found to be satisfactory. In all instances projects utilising the SCS technology for load bearing application will require specific structural design carried out by an appropriately

qualified Structural Engineer proficient in lightweight steel frame structures. However, individual project specific design calculations are outside the scope of this certificate.

Conventional masonry cavity walls and concrete roof tiles have been used to assess the performance of the SCS in this certificate. Other wall and roof cladding solutions have not been assessed and are therefore outside the scope of this certificate. Full weathertightness must be achieved as soon as is practicable after erection of the system.

Characteristics of the SCS and method of application have been reviewed with respect to the Building Regulations, British and European Standards and other relevant publications in the United Kingdom current in December 2007.

The assessment is described in the following pages, which form integral parts of this certificate and which shall be read in its entirety.

CONDITIONS OF USE

0.1 The Scottsdale Construction System (SCS), as assessed by BRE Certification, is suitable for use in single or multi occupancy residential and commercial buildings up to four storeys in height providing that the Scottsdale design methodology, which shall be readily available, is utilised by appropriately qualified Structural Engineers to carry out site and project specific design calculations. Such calculations are outside the scope of this certificate but will need to demonstrate compliance with the requirements of the relevant Building Regulations.

0.2 The Scottsdale technology hardware and software shall only be used by users approved and licensed by Scottsdale Construction System Ltd. An appropriately qualified engineer engaged by the Licensed User is responsible for ensuring the stability of the structure during construction and shall retain full control of the design of the superstructure, including the holding down provisions and the loadings imposed on and by the overall construction. That engineer shall supply holding-down details and loadings to allow the design of the building's foundation by others.

0.3 The external masonry cladding for the buildings (outside scope of this certificate) shall be designed and installed in accordance with BS5628 *Code of practice for use of masonry: materials and components, design and workmanship* and incorporate a drained cavity with a minimum width of 50mm nominal. The structural design and spacing of any proprietary wall tie and channel system for tying masonry cladding to steel frames including connections shall be determined by the SCS Licensed User's appropriately qualified Engineer.

0.4 The structural framing system for the roof is covered by this certificate but not the remainder of the roof design (e.g. roof covering) as it is to individual specification. Loads arising from the roof lining and covering need to be assessed and properly taken into account in the structural design of the SCS wall frames.

0.5 The SCS should only be used above over-site damp proof membrane (DPM) level.

0.6 The SCS is designed to be erected within a short period of time. Full weathertightness shall be achieved as soon as is practicable after erection of the system.

0.7 U-values for typical SCS elements have been calculated. However as wall frame configurations are project specific, U values will need to be calculated for those walls and used with relevant information from other components in order to meet regulatory requirements.

0.9 Prior to transportation to site each frame shall be checked, labelled with a unique identification number, placed in a stillage and covered, as specified by Scottsdale, to protect it against water ingress and from potential wind damage during transportation. The correct procedures for storage, lifting and handling shall be followed; failure to do so may result in damage to the frames.

0.10 The performance of conventional elements supplied within the building (e.g. staircases, windows, door sets, fittings and services -plumbing, drainage, mechanical, heating or electrical) has not been assessed. These elements shall satisfy all necessary Building Regulation and legislative requirements.

0.11 The performance of the SCS depends on correct installation. It shall be installed and maintained strictly in accordance with the requirements of this certificate and the Certificate holder's installation instructions. No cut-outs of any steel structural members are permitted without obtaining written approval from the SCS Licensed User's Structural Engineer. The quality of installation actually achieved on specific sites is not covered by this Certificate. Therefore it is recommended that the quality of installation and workmanship is subject to appropriate checks by a competent person working for the Licensed User for each installation. The certificate user should ensure that the contractors constructing, for example, the: foundations, roofing, masonry cladding, insulation and dry lining are experienced and competent for the given task and are familiar with relevant parts of the Scottsdale Technical Manual.

STATEMENT

It is the opinion of BRE Certification that the Scottsdale Construction System is satisfactory for use within the stated conditions provided that it is used in accordance with the supplier's instructions and the requirements of this certificate.

CONFIRMATION

For and on behalf of BRE Certification Ltd.

Date : December 2007

1 Technical Specification

1.1 Description of System

1.1.1 The Scottsdale Construction System (SCS) utilises Scottsdale technology hardware and software to produce a wide range of cold-formed steel framed elements. These elements can be designed to be either load bearing or non load bearing.

1.1.2 The elements include: wall frames, ceiling frames, roof frames, roof trusses, joists, floor frames, and lintels. Completed elements are assembled according to the overall building design to provide the load carrying structure of that building.

1.1.3 The framed elements are combined with other building products (outside scope of this certificate) e.g. insulation, lining boards, external claddings, timber suspended flooring, doors, windows, in order to complete the building construction. These products are supplied by others to fulfil specific functional requirements.

1.1.4 The SCS is suitable for use in the construction of single or multi occupancy residential and commercial buildings up to four storeys in height. The storey heights can be up to 3.1m.

1.1.5 Frames are manufactured from standard SCS 500 Series profile cold-formed galvanised steel C-sections (see Table 1 for an explanation of SCS section profile references) rolled from steel coil of thickness 0.75mm to 1.2mm using Scottsdale technology tools. The steel coil is typically grade S350G to BS EN 10326 *Continuously hot-dip coated strip and sheet of structural steels. Technical delivery conditions,* though other grades may be used. SCS load-span tables are available giving section properties and ultimate capacities in bending or axial loading for any combination of length, lateral braced condition and steel grades.

1.1.6 The framing is produced directly, using Scottsdale's computer controlled roll forming process, from fabrication drawings generated by Scottsdale's Licensed Users using Scottsdale's Gcad software. The Gcad software produces the complete framing structure which can be viewed on screen from any angle and zoomed for close inspection of any area. Special frame requirements (e.g. noggins or service duct openings) can be accurately placed using the software.

1.1.7 Gcad interfaces directly with the roll forming software to input the frame part list and section forming, cutting and hole forming instructions for the roll forming machinery.

1.1.8 Wall frames typically consist of single suitably sized S350G C-section studs at a maximum spacing of 600mm centres screwed or riveted into U-section top and bottom rails. A minimum of 1 row of noggins between the studs, typically at 1200 mm centres vertically, is provided for internal lining board fixing. C-section profiles have nominal dimensions ranging from 64mm x 37mm x 0.75mm to 140mm x 47mm x1.2mm. Specific panel configurations are determined to meet required design and performance requirements e.g. load capacity, fire resistance.

1.1.9 Wall frames typically include a 50 mm thick mineral wool insulation layer* within the stud and are finished on the inner face with a vapour barrier* and 2 layers of lining board*, of which either the outer one is, or both are, fire rated to provide the requisite fire resistance of the wall (*outside scope of this certificate).

1.1.10 Wall frame bracing, when needed, is typically provided by either 120mm wide x 1.0mm thick S350G X-Bracing with tensioners, or K-braces.

1.1.11 Ceiling frames typically consist of single suitably sized S350G C-Sections at maximum 600mm centres with noggins at 1200mm centres for fixing of the plasterboard.

1.1.12 Roof frames typically consist of suitably sized S350G C-Sections at 400mm centres with noggins at 1200mm centres. Rafters span between combinations of:

- Roof support and roof support
- Roof support and load bearing wall
- Load bearing wall and load-bearing wall

1.1.13 Lintels are generally of truss design, typically 300-400mm in depth spanning up to 3.0m in length. For greater spans the lintel can be plated on one or both sides using a full depth plate 1.0mm thick riveted or screwed at 150-200mm centres. The capacity of plated lintels has not been assessed.

1.1.14 The structural frames are made weathertight on site, by others. A variety of wall and roof claddings can be used to provide weathertightness to SCS buildings. Only the use of suitably designed and installed conventional masonry skins with a 50mm minimum cavity designed and installed to BS 5628:Part 3 *Code of practice for use of masonry: materials and components, design and workmanship*, and concrete roof tiles have been used to assess the performance of the SCS in this certificate. Full weathertightness shall be achieved as soon as is practicable after erection of the system.

1.1.15 SCS floor construction (outside scope of this certificate) typically comprises:

- 22mm T&G glued flooring grade chipboard walking surface
- 36mm thick Hunton Fibre Silencio acoustic isolation layer
- 18mm thick T&G and glued chipboard layer
- 260mm deep lattice floor joist containing within its depth a 100mm mineral wool quilt
- Resilient Bars at 400mm centres
- 2 layers of 15mm wallboard

1.1.16 BRE Certification has examined calculations for two example SCS designs (SCS submitted designs); one for a four storey multi-occupancy apartment building and a second for a two storey house with a duo-pitch roof. Storey heights in these designs range from 2.4m to 3.1m.

1.1.17 Based on examination of the those calculations, a SCS building typically utilises the structural components listed in Table 1 below.

Element	*Section designation	Centres	Lateral Bracing (maximum)
Walls	SCS-500-90-350-75 or SCS-500-140-350-120	400 and 600 mm dependent on the load to be carried.	1200mm
Lintels	SCS-500-90-350-75	N/A	
Floor Joists	SCS-400-64-350-75 or SCS-500-90-350-75	400mm	800mm
Ceiling	SCS-500-90-350-75	400mm	1200mm
Roof	2 x SCS-500-90-350-75 back to back or 1 x SCS-500-140-350-120	400mm	1200mm
* SCS section designations comprise the prefix SCS followed by four hyphen separated numbers referencing in sequence (1) profile shape, (2) section depth in mm, (3) bending strength in N/mm_2, (4) section thickness in mm x 10_3 .			

Table 1. Typical Scottsdale Construction System Elements used in the exemplar structural designs

1.1.18 The connections used in the SCS fall into one of the following categories:

Screw/Rivets. Rivets/TEK Screws of two diameters, 4.8mm and 6.3mm are used to make connections between cold formed steel elements to make the frames. Rivet capacities for different material thicknesses and material designation are calculated using Annex A.1.14 of BS 5950 Part 5 *Structural use of steelwork in building: code of practice for design of cold formed thin gauge sections*.

Holding Down Anchors: These are used to fix the wall frames to the foundation slab and are specified by the SCS Licensed User's appropriately qualified structural engineer but are typically 12mm diameter and 90-100mm in length passing through a 50mm square galvanised washer.

1.2 Product Performance

1.2.1 General

1.2.1.1 Based on the performance recorded in the following sections of this certificate the SCS is considered suitable for use in the construction of single or multi-occupancy residential or commercial buildings up to four storeys in height with a variety of floor plans.

1.2.2 Weathertightness

1.2.2.1 The SCS submitted designs are clad with conventional concrete roof tiles and masonry cladding (with 50mm cavity) incorporating window and door openings. They are assessed as demonstrating that buildings incorporating SCS can be adequately detailed to resist the passage of moisture assuming the use of suitably detailed materials and adequate workmanship.

1.2.3 Structural Performance

1.2.3.1 The structural design of each building shall be undertaken in accordance with the SCS Design Manual on a project specific basis by an appropriately qualified structural engineer competent in lightweight steel frame appointed by the SCS Licensed User. That engineer shall ensure compliance with the requirements and conditions of this certificate.

1.2.3.2 Buildings using the SCS technology are designed on the basis of braced frame principles. Horizontal loads arising from wind loads are transmitted to longitudinal or transverse walls via the diaphragm action of the floors. Braced wall frames transmit the stability loads to the foundations. Any uplift forces acting on the frames are resisted by holding down bolts fixed to the foundations.

1.2.3.3 BRE Certification has examined the SCS design methodology for two applications: a two storey detached house and a four storey multi-occupancy apartment building. Design is in accordance with the following codes of practice:

BS 6399: Part 1: 1996 *Loading for building: code of practice for dead and imposed loads*

BS 6399: Part 2: 1997 *Loading for buildings: code of practice for wind loads*

BS 6399: Part 3:1988 *Loading for buildings: code of practice for imposed roof loads*.

BS 5950: Part 5: 1998 *Structural use of steelwork in building: code of practice for design of cold formed thin gauge sections*

The ultimate capacities of SCS cold-formed steel sections presented in the SCS load-span tables have been determined using the Australian limit state steel code AS/NZS 4600 *Cold Formed Steel Structures* rather than BS 5950 Part 5. Scottsdale produced a comparison of the capacities determined using both of these codes of practice for a range of section sizes for examination by BRE Certification. That comparison showed that the use of the Australian code was conservative in comparison with the UK code.

1.2.3.4 The outer leaf masonry walls shall be fixed back to the exterior wall frame steel framework with suitable stainless steel wall ties, leaving a minimum 50mm clear drained cavity. The structural design and spacing of this wall tie and channel system including connections has not been assessed by BRE Certification but shall be specified by an appropriately qualified structural engineer.

1.2.3.5 The foundations, which are individual to site specific requirements and therefore outside the scope of this certificate, shall be designed by a suitably-qualified and experienced engineer in accordance with BS 8004 *Code of practice for foundations* to support loads determined in a similar manner to those in the previous clause.

1.2.4 Thermal Performance

1.2.4.1 Depending on the location of the insulation material the steel frames are classified as either hybrid or warm frame. When used with appropriate components supplied by others and outside scope of this certificate (e.g. lining and sheathing boards, insulation, roof membranes and covering, ground floor, windows and doors) the resulting building can be designed to comply with relevant thermal regulations.

1.2.4.2 Thermal assessments shall be site and project specific. BRE Certification has examined U-value calculations submitted for typical building elements in the SCS submitted designs. Summary details of those elements and the U-values obtained are given in Table 2 below. Compliance with regulations requires appropriate U values together with other relevant building performance parameters to determine emission targets using approved software such as SAP 2005 or SBEM.

Building element	Calculated U-value (W/m^2K)
External Wall:-single skin brick clad, cavity, 22mm Bitrock sheathing board, 140 mm C section steel studs 0.75mm thick, 140mm Isowool Frame Batt HP 32, Polythene vapour barrier, 12.5mm Lafarge Firecheck wallboard	0.32
External Wall:-single skin brick clad, cavity, 40mm Kingspan TW55 insulation, 90 mm C section steel studs 0.75mm thick, 50mm mineral wool insulation, Polythene vapour barrier, 12.5mm Lafarge Firecheck wallboard	0.34
Ceiling/Cold roof: 2 layers of 90 mm Rockwool Flexi insulation; 12.5mm thick Lafarge Firecheck wallboard	0.24
External Wall:-single skin brick clad, cavity, 22mm Bitrock sheathing board, 140 mm C section steel studs 1.0mm thick, 140mm Isowool Frame Batt HP 32, Polythene vapour barrier, 12.5 mm layer of Lafarge Standard wallboard 12.5mm Lafarge Firecheck wallboard	0.34

Table 2 -Calculated U-values

1.2.4.3 The wall constructions in Table 2 pass the criteria in BS EN ISO 13788: *Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods;* for assessing the risk of interstitial condensation.

1.2.4.4 Reference shall be made to BS 5250 *Code of practice for control of condensation in buildings* and to BR 262 *Thermal insulation -avoiding risks* to verify the adequacy of the weather and moisture protection to be provided by the external cladding and roof designs for each project.

1.2.5 Acoustic Performance

1.2.5.1 BRE Certification examined the illustrative wall frame elements in the SCS submitted designs. These are based on industry generic solutions, following either a Robust Details approach or constructions identified in England & Wales Approved Document E. Separating Walls followed the E-WS-1 detail in the Robust Details Handbook. Internal walls were Type B steel walls as in Section 5 of Approved Document E, which are stated to meet the laboratory sound insulation values set out earlier in that document.

1.2.5.2 Measurements of the airborne and impact sound insulation on the typical example of the joisted floor construction outlined in Section 1.1.15 were carried out at an UKAS accredited laboratory.

Sound Insulation Performance	Result
Airborne Weighted Sound Reduction Index (R_w)	61 dB
Weighted Normalised Impact Sound Pressure Level ($L_{n,w}$),	54 dB

Table 3: Laboratory Acoustic Insulation Test Results

1.2.5.3 These results surpass the requirements for dwellings but it should be noted that these parameters are properties of the test specimen alone. When the test specimen is part of an enclosure, the sound insulation obtained, both airborne and impact, will depend on additional factors such as the relative surface areas involved and the nature and acoustic characteristics of the receiving space. Also, in buildings the transmission of sound via alternative paths may not be negligible in comparison with transmission through the test specimen alone, particularly when the sound insulation of the test specimen is high. Such indirect sound transmission would result in lower effective insulation. The acoustic performance of specific buildings is not covered by this certificate. It is a requirement in England and Wales that the necessary pre-completion sound testing is carried out on all developments.

1.2.6 Fire Performance

1.2.6.1 BRE Certification examined the illustrative wall and floor frame elements in the SCS submitted designs which are required to have fire resistance periods for loadbearing capacity, integrity and insulation of 30 or 60 minutes, as appropriate, depending on location. These are based on industry generic solutions for internal linings, floor coverings and under joist ceilings. In the case of walls the lining is either one or two layers of 12.5mm thick fire resistant plasterboard, whilst for floors the upper surface is 18mm T&G and either one, or two layers of 12.5mm fire resistant boarding to the under joist ceiling.

1.2.6.2 The internal lining materials shall have a national reaction to fire classification of Class 0/low-risk.

1.2.7 Durability

1.2.7.1 Provided that the requirements of this certificate and the Certificate holder's installation instructions are complied with, the cold-formed galvanised steel sections of the SCS when clad with a conventional masonry external skin and concrete roof tiles, as shown in the submitted designs, are considered capable of achieving a minimum design life of 60 years, subject to routine inspection and maintenance of the masonry cladding.

1.2.8 Services

1.2.8.1 Building services (electrical, plumbing etc) are outside the scope of this certificate, but shall comply with the relevant standards and legislation. Their design and installation shall avoid risk of corrosion damage to the structural steel frame, for example, by the use of grommets in the pre-punched holes in the studs and avoiding local earth connections to the steel frame.

2. BUILDING REGULATIONS

2.1 General

Buildings utilising the Scottsdale Construction System when designed and constructed in accordance with the requirements and limitations of this certificate can contribute towards satisfying the building regulations listed in the following sections:

Building Regulations (England & Wales) 2000 (as amended) (E & W)
The Building (Scotland) Regulations 2004 (S) The Building
Regulations (Northern Ireland) 2000 (NI)

2.2 Structure

2.2.1 Loading

Country	Req	Opinion
E & W	A1/2	The SCS design methodology has been examined when applied to a two storey house and a four storey apartment building. Provided that the structural design is carried out by a competent and experienced engineer, appropriately detailed structures, designed and constructed using the SCS in accordance with the requirements of this certificate, can safely sustain and transmit the combined dead, imposed and wind loads into the foundation structure without causing undue deflection or deformation of any part of the building.
S	1.1	
N I	D1	

2.2.2 Structure: Disproportionate collapse

Country	Req	Opinion
E & W	A3	BRE Certification has assessed the SCS for use in the construction of residential buildings not exceeding four storeys. According to Table 11 of Approved Document A, the classification of such buildings is 2A and the
S	1.2	
N I	D2	

2.3 Fire

2.3.1 Fire: Internal fire spread (Linings)

Country	Req	Opinion
E & W	B2	Internal lining materials used with the SCS system shall have a national
S	2.5	
N I	E3	

2.3.2 Fire: Stability in a fire

Country	Req.	Opinion
E & W	B3	Appropriately detailed structural elements supporting the structure, designed
S	2.3	
N I	E4(1)	

2.3.3 Fire: Internal fire spread (structure)

Country	Req.	Opinion
E & W	B2, B3	Appropriately detailed floors/ceilings and walls, designed and constructed using this building system in accordance with the requirements of this
S	2.2	
N I	E4(2)	

2.3.4 Fire: Internal fire spread (cavities)

Country	Req	Opinion
E & W	B3	Floor /ceilings and walls constructed in accordance with the requirements of this
S	2.4	
N I	E4	

2.3.5 Fire: External fire spread

Country	Req.	Opinion
E & W	B4	The external cladding will adequately resist the spread of fire over the external walls and roof. Reference shall also be made to Sections 8 and 9 of Approved Document B volume 1 or Sections 12 and 13 of Approved Document B volume 2 supporting these requirements, and to BR 187 *External fire spread -building separation and boundary distances*, to verify that there are no further limitations. However, for external walls situated within 1m of a relevant boundary, the fire resistance performance shall be determined by a suitable fire test or assessment carried out by BRE or a similar independent body. Reference shall also be made to Tables A1 and A2 of Appendix A of Approved Documents B volume 1 or B volume 2 supporting these Regulations
S	2.6, 2.7	The masonry wall cladding used in conjunction with the SCS exterior wall construction can achieve short (30 minutes) and medium (60 minutes) fire resistance periods. The location of the external wall from the boundary is therefore dependent on the amount of unprotected area required by the regulations. The masonry exterior cladding used on this system is classed as non-combustible and therefore complies with the requirements of this standard.
NI	E5	The masonry wall cladding and the conventional tile roof covering can comply with these Regulations.

2.4 Environment, Health & Hygiene

Country	Req.	Opinion
E & W	C2	External walls, above over site DPC level, formed with this system in accordance with the requirements of this certificate, will contribute towards the resistance to the passage of moisture from the atmosphere into the dwelling. The masonry cladding with a ventilated cavity above over site DPC level, and
S	3.4, 3.10, 3.15	
N I	C4, C5	

2.5 Noise

Country	Req.	Opinion
E & W	E1, E2, E3	Appropriately detailed walls and floors formed using this building system in accordance with the requirements of this certificate, can be designed and constructed to provide adequate resistance to the passage of sound. It is a
S	5.1	
N I	G2	

2.6 Energy

Country	Req.	Opinion
E & W	L1	Calculated U values for ceilings and typical masonry clad external walls (see
S	6.2	
N I	F2	

2.7 Durability, Materials and workmanship

	Req.	Opinion
E & W	Regulation 7	The SCS is manufactured from materials considered to be adequately safe and acceptable for the intended application and to
S	Regulation 8 (1)	
N I	B2, B3, B5	

2.8 CDM Regulations

Construction (Design and Management) Regulations 2007 Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended) The Certificate should form part of the information used by client, planning supervisor, designer and contractors to discharge their responsibilities under these Regulations

3. INSTALLATION/PRACTICAL APPLICATION

3.1 General

3.1.1 An appropriately qualified Structural Engineer, competent in lightweight steel frame design, appointed by a Licensed User or their approved installer shall assess that any proposed design utilises the Scottsdale design methodology as examined and assessed by BRE Certification.

3.1.2 Each frame within the system is assigned a unique code, which is shown on all Gcad printouts and written on both the inside and outside of the bottom track of each frame. That code includes a letter, indicating the type of frame e.g. W for walls, R for Roofs, J for joists, and a number (e.g. W01). This facilitates correct erection.

3.1.3 The SCS is to be installed only by Scottsdale Construction System Ltd's Licensed Users and their approved installers to ensure correct use of components and installation of the product. Site Installation Instructions are detailed in the SCS Technical Manual which shall be available on each site. The SCS Installation Manager on each site is responsible for ensuring that each installation and use of components is carried out correctly and for producing and retaining quality control records. These details are retained by the approved installers.

3.2 Storage and Handling

3.2.1 The SCS is transported to site as uniquely numbered and pre manufactured individual frames and sections. Each frame shall be firmly secured in special stillages and adequately protected against the weather in transit and whilst stored on site. Frames may only be transported by Scottsdale Construction System Ltd's Licensed Users and their approved installers operating in accordance with the provisions of the Technical Manual.

3.2.2 Care shall be taken in storing and handling the frames and sections. They shall not, for example, be dropped or allowed to rest on projecting objects, be stored over damp ground or be subjected to local pressure spots. They shall be stored vertically in stillages, with suitable packing to prevent distortion. The use of protective gloves whilst handling the frames is required. The steelwork shall be kept out of contact with deleterious materials including dry cement, lime and plaster.

3.2.3 Care shall be taken to prevent any frames from becoming wet during the on-site storage or erection process or puncturing of insulation boards (if fitted) during handling and lifting. The use of temporary covers or tarpaulins may be required depending on individual site circumstances.

3.2.4 Any materials that are damaged upon arrival on site or during construction shall be reported to the SCS Approved User and for a decision on repair or replacement.

4. TECHNICAL APPRAISAL

4.1 Performance Tests

4.1.1 A site inspection during construction has been carried out and the procedures and practicality of installation assessed. Assessment, tests and investigations have been undertaken to determine the properties of the Scottsdale Construction System as follows:

-weathering and ground moisture protection (section 1.2.2) -a review of typical structural calculations for a 2 storey and a 4 storey multi- occupied buildings (section 1.2.3)
- thermal insulation performance and condensation risk (section 1.2.4)
-acoustic performance (section 1.2.5) -fire performance (section 1.2.6)
-durability (section 1.2.7)

4.2 Quality Control

4.2.1 The specifications of the materials, the quality plan and the controls of manufacture and the design procedure are each suitable for the product.

4.2.2 The SCS technology Licensed User shall retain overall control of each agreed building specification and permit no deviation from it by any of their partners or subcontractors. They undertake and maintain frequent checks both of the specification and throughout the on-site assembly processes to ensure that the quality of Scottsdale Construction System is maintained within the product specification.

4.2.3 The quality control procedures for the product include visual checks on materials as received, factory component inspections, the checking of all in-house drawings and on-site stage monitoring. The latter shall be undertaken by the SCS Licensed User's installer staff, during the erection to ensure conformity with the specifications.

4.3 Standards

The following British, European and International Standards and Codes of Practice have been referred to for this assessment:-

BS 476: Part 6:1989 for	Fire tests on building materials and structures. Method of test fire propagation for products
BS 476:Part 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 1230: Part 1:1985	Gypsum plasterboard. Specification for plasterboard excluding materials submitted to secondary operations.
BS 5250:2002	Code of practice for control of condensation in buildings.
BS 5534:2003	Code of practice for slating and tiling (including shingles)
BS 5628: Part 3:1985	Code of practice for use of masonry: materials and components, design and workmanship.
BS 5950: Part 5:1998	Structural use of steelwork in building: code of practice for design of cold formed thin gauge sections.
BS 6399: Part 1:1996	Loading for buildings: code of practice for dead and imposed loads.

BS 6399: Part 2:1997	Loading for buildings: code of practice for wind loads.
BS 6399: Part 3:1988	Loading for buildings: code of practice for imposed roof loads.
BS 8000: Part 4:1989	Workmanship on building sites: code of practice for waterproofing.
BS 8004:1986	Code of practice for foundations.
BS 8102:1990	Code of practice for protection of structures against water from t he ground.
BS 8215:1991	Code of practice for design and installation of damp-proof courses in masonry construction.
BS 8233:1999	Code of practice for sound insulation and noise reduction for buildings.
BS EN 1364:Part 1:1999	Fire resistance tests for non loadbearing elements. Part 1. Walls.
BS EN 1365: Part 2:2000	Fire resistance tests for loadbearing elements. Part 2. Floors and roofs.
BS EN 13501: Part 1:2007	Fire classification of construction products and building elements. Part 1. Classification using test data from reaction to fire tests.
BS EN 13501: Part 2:2003	Fire classification of construction products and building elements. Part 2. Classification using data from fire resistance tests, excluding ventilation services.
BS EN 10326: 2004	Continuously hot-dip coated strip and sheet of structural steels. Technical delivery conditions.
BS EN ISO 140 Part 3:1995	Acoustics. Measurements of sound insulation in buildings and of building elements. Part 3. Laboratory measurements of airborne sound insulation of building elements.
BS EN ISO 140: Part 6:1998	Acoustics. Measurement of sound insulation in buildings and of building elements. Part 6. Laboratory measurements of impact sound insulation of floors
BS EN ISO 717:Part 1:1997	Acoustics. Rating of sound insulation in buildings and of building elements. Part 1. Airborne sound insulation.
BS EN ISO 717:Part 2:1997	Acoustics. Rating of sound insulation in buildings and of building elements. Part 2. Impact sound insulation.
BS EN ISO 6946:1997	Building components and building elements. Thermal resistance and thermal transmittance. Calculation method

BS EN ISO 9001:2003 Quality Management Systems

BS EN ISO 13788:2002 Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods

5. CONDITIONS OF CERTIFICATE ISSUE

5.1 Validity

This certificate will be valid for a period of three years. It will remain valid in so far as:-

a) The materials and methods of manufacture are unchanged or BRE Certification has assessed any changes and found them to be satisfactory.

b) The designs and specifications are unaltered from those examined by BRE Certification.

c) Scottsdale Construction System Ltd. continues to have the products checked by BRE Certification.

5.2 Health and Safety

This certificate and the recommendations herein do not purport in any way to restate the requirements of the Health and Safety at Work Act 1974 or any statutory or common law duty of care which exists now or in future; nor is compliance with these recommendations to be assumed as satisfying the requirements of the said Act or any existing or future statutory or common law duty of care.

5.3 Reference to other Documentation

Where reference is made in this certificate to any Act of Parliament, Regulation, Code of Practice, British or other Standard or other publications, it shall be construed as reference to such publication in the form in which it is in force at the date of the certificate.

5.4 Patents

BRE Certification makes no representational warranty that any patent or similar industrial property right is valid or that the manufacture, use, sale, lease or any other dealing or disposition of the products in whole or in part is not an infringement of any patent or industrial property right not owned by Scottsdale Construction System Ltd

Confirmation that the certificate is current may be obtained from the BRE Certification website (www.redbooklive.com).