



High Performance Flooring System

- **O eco-Friendly Alternative to Concrete Blocks**
- O Supplied in Plot Specific Quantities
- **O** Super Low U-values Achievable
- **O** Third Party Accredited



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Why CELLECTA?

CELLECTA is the UK's leading innovator, manufacturer and supplier of environmentally friendly, high performance thermal and acoustic insulation products and systems.

For over 25 years our products have been successfully installed in a myriad of residential, commercial, educational, health and industrial buildings.

CELLECTA's team of experienced staff are able to offer unrivalled customer support, from delivering RIBA certified CPDs, assisting in selecting the most suitable product that satisfies current legislation, arranging delivery of the right materials direct to site on time, to providing after sales installation instructions to ensure customer satisfaction.



FREE services offered by **CELLECTA**:

- Technical and installation advice
- Architectural drawings and NBS specs
- U-value and imposed load calculations
- Site surveys and take-off service
- Deliver installation training
- Present RIBA certified CPDs

For on the go access to information, including installation videos & technical data, download the **CELLECTA app** for smart phones and tablet devices.







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Building Regulations and Standards

When carrying out building work, either on new build or refurbishment projects all plans submitted for Building Control approval in England, Wales and Scotland are required to comply with each country's Regulations or Standards. Each document stipulates the levels of thermal insulation needed to be achieved (see tables below). The required U-value will depend on the location of the project (England, Wales or Scotland), type of building (dwelling or non-dwelling) and the application (floor, wall, roof).

This technical manual details how CELLECTA's TETRIS high performance flooring system can provide low U-values, address areas of thermal bridging with low Y (psi) - value constructions, ensuring the floor is energy efficient, reducing running costs and helping to protect the environment for future generations.

The Building Regulations 2010										
Conservation of fuel and power		DWELLINGS		BUILDING	S OTHER THAN D	WELLINGS				
APPROVED DOCUMENT	NEW BUILD		BUILDINGS	NEW BUILD	EXISTING BUILDINGS					
	L1A Best starting point	L1B		L2A Best starting point	L2B					
2016 Edition	(fabric only)	Extension	Refurbishment	(fabric only)	Extension	Refurbishment				
FLOOR	0.11	0.22	0.25	0.18	0.22	0.25				
WALL	0.16	0.28	0.30 / 0.55 ⁽¹⁾	0.22	0.28	0.30 / 0.55(1)				
PITCH ROOF (ceiling level)	0.11	0.16	0.16	0.14	0.16	0.16				
PITCH ROOF (rafter level)	0.11	0.18	0.18	0.14	0.18	0.18				
FLAT ROOF	0.11	0.18	0.18	0.14	0.18	0.18				

⁽¹⁾ A U-value of 0.55W/m²K is used for cavity wall insulation and 0.30W/m²K for internal or external wall insulation.

WALES - Recommended U-values (W/m ² K)											
Conservation of fuel and power		DWELLINGS		BUIL	DINGS OTHER	THAN DWELLI	OWELLINGS				
Approved Document	NEW BUILD	EXISTING E	BUILDINGS	NEW BUILD	EXISTING BUILDINGS						
	L1A	L1	B	L2A							
Effective from July 2014	Best starting point (fabric only)	Extension	Refurbishment	Best starting point (fabric only)	Extension (dom- estic in character)	Extension (other buildings)	Refurb				
FLOOR	0.11	0.18	0.25	0.18	0.18	0.18	0.25				
WALL	0.16	0.21	0.30 / 0.55 ⁽¹⁾	0.22	0.21	0.21	0.30 / 0.55 ⁽¹⁾				
PITCH ROOF (ceiling level)	0.11	0.15	0.16	0.14	0.15	0.15	0.16				
PITCH ROOF (rafter level)	0.11	0.15	0.18	0.14	0.15	0.15	0.18				
FLAT ROOF	0.11	0.15	0.18	0.14	0.15	0.15	0.18				

⁽¹⁾ A U-value of 0.55W/m²K is used for cavity wall insulation and 0.30W/m²K for internal or external wall insulation.

 $\mathbf{\times}$

SCOTLAND- Recommended U-values (W/m²K)



	Government										
	BUILDING STANDARDS		DOM	ESTIC		NON-DOMESTIC	2				
	ENERGY	NEW BUILD	EXI	STING BUILDIN	IGS	NEW BUILD	EXISTING B	UILDINGS			
		Best starting point	Extension & Re	efurbishment ⁽²⁾	Conversion of	Best starting point	Refurb, extensions & conversion of	Conversion of			
		(fabric only)	А	В	heated buildings	(fabric only)	unheated buildings	heated buildings			
FLO	OR	0.13	0.15	0.18	0.18	0.15	0.20	0.25			
WA	LL	0.15	0.17	0.22	0.22	0.18	0.25	0.30			
PIT	CH ROOF (ceiling level)	0.10	0.11	0.15	0.14	0.14	0.15	0.25			
PIT	CH ROOF (rafter level)	0.10	0.13	0.18	0.14	0.14	0.15	0.25			
FLA	T ROOF	0.10	0.13	0.18	0.14	0.14	0.15	0.25			

(2) A is for extensions where the existing dwelling's walls and roof U-values are worse than 0.70W/m²K in the walls and worse than 0.25W/m²K in the ceiling.

B is for the other extensions, upgrading existing elements, non-exempt conservatories and conversions of unheated spaces.



Calculations Required

To comply with the legislative requirements each floor's thermal performance needs to be assessed individually in accordance with EN ISO 13370: 2017 In addition, a Standard Assessment Procedure (SAP) needs to be established for the linear thermal transmittance of the external wall to ground floor junction, either by adopting the value from an accredited construction detail or by calculating the Y (psi) value of the specific detail to be constructed in accordance with ISO 10211: 2017.

Determining the U-value of the Floor

- Calculate the internal perimeter in metres of the external walls (P)
- 2. Calculate the internal area in metres of the floor (A)
- 3. Calculate the P/A ratio

4. Use the table below to select the thickness and type of **TETRIS** required to achieve the desired U-value

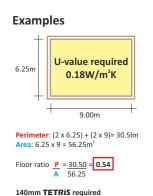
Typical Thickness of Insulation Required

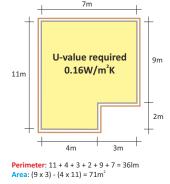
P/A ratio	TETRIS (mm)										
0.7	90	120	140	90	90	90	140				
0.6	90	100	140	90	90	90	100				
0.5	90	90	140	90	90	90	100				
0.4	90	90	120	160	90	90	90				
0.3	90	90	100	140	160	90	90				
	0.22	0.20	0.18	0.16	0.15	0.14	0.13				

TETRIS TETRIS "T" block + layer of 75mm TETRIS flat panel

Any U-value can be achieved, for lower than 0.13W/m²K speak to our technical team. Participante de la construction innovation

Linear thermal transmittance effect when incorporating TETRIS





Floor ratio: $\frac{P}{A} = \frac{36}{71} = 0.50$

1010

90mm **TETRIS** + layer of 75mm **TETRIS** flat panel

U-value (W/m²K) Calculated in accordance with ISO 13370

Typical Y value achieved using **TETRIS**:

90mm - 0.055 W/mK (external wall 0.025 & ground floor 0.022 W/m²K) 120mm - 0.066 W/mK (external wall 0.025 & ground floor 0.019 W/m²K)



- What is a suspended ground floor
- Types of suspended ground floor: benefits and disadvantages of each
- How to comply with Part L and Section 6
- On site practicalities



TETRIS eco Friendly Insulation Block & Beam

TETRIS high performance insulation blocks replace the concrete blocks in a beam and block floor, to produce a structural ground floor in a fraction of the time, with a super low U-value. The blocks are made from ultra high compressive strength extruded polystyrene. They are lightweight, robust and able to withstand foot traffic during the build process. The block's have a 75mm upper section that sits on the beams, providing a constant design level and a variable lower section that drops between the beams.



Features & Benefits

- Outstanding thermal performance
- C Lightweight (2.60 8.16kg), large (1.5m²) easily to handle blocks
- O Insulation integrity guaranteed sits on and fits between standard concrete beams
- High compressive strength, able to withstand foot traffic during construction process
- O Ultra low psi (y) value achievable
- O Easily incorporates underfloor heating
- 2013 Part L solution
- O Q-Mark third party accredited system
- O Manufactured under ISO 9001:2015

		TETRIS® T600 ⁽¹⁾ Blocks						
Block thickness (mm)		90	100	120	140	160		
Weight	kg/board kg/m²	4.59 3.06	5.10 3.40	6.12 4.08	7.14 4.76	8.16 5.44		
Block size	e (mm)			600 x 2500				

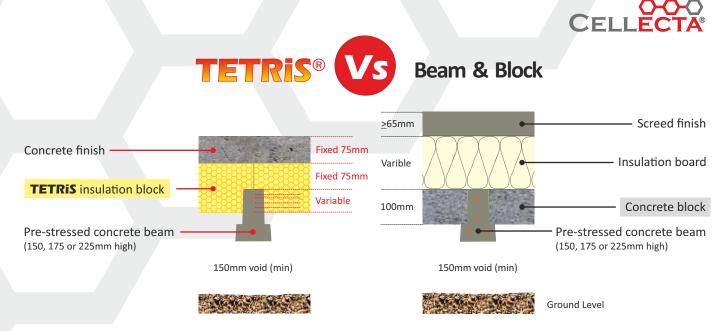
(1) **T300** blocks are half the size and weight

Watch the Online Installation Video

Watch a step-by-step installation video online at www.cellecta.co.uk or via your smartphone by downloading the FREE **CELLECTA** app. For additional technical advice for your project contact the technical team on 01634 29-66-77 or email tetris@cellecta.co.uk







O Lighter, quicker and less blocks to install

		TETRIS [®] insulation blocks ⁽¹⁾ 100mm concrete blocks ⁽²⁾						
Building type	Floor size	Qty of blocks (600 x 2500mm)	Weight of each block	Total weight of blocks	Qty of blocks (215 x 440mm)	Weight of each block	Total weight of blocks	Difference
Small house	60m²	40	8.16kg	326kg	601	17.97kg	10,800kg	551 more blocks 10,474g heavier
Pair of semi-detached houses	100m²	67	8.16kg	546kg	983	17.97kg	17,664kg	916 more blocks 17,118kg heavier
Block of flats	450m²	300	8.16kg	2448kg	4084	17.97kg	73,389kg	3784 more blocks 70,941kg heavier

Note. Quantities stated are typical. ⁽¹⁾Based on 160mm thick T600 blocks.⁽²⁾1900kg/m³ block. Weight of the insulation board required needs to be added.

- Fixes floor height above beams at 150mm (75mm insulation & 75mm concrete finish)
- O Supplied to site in plot/floor specific quantities, controlling costs
- O Reduces the number of beams required, reducing foundation costs
- O Produces a floor with zero cold bridging
- O Eliminates the need for a Screeder

Quotation and Order Process

The **TETRIS** flooring system is supplied in plot specific quantities and is quick and easy to order:

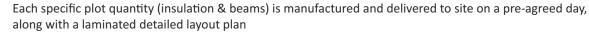


Email the foundation/ground floor plans along with the U-value required to tetris@cellecta.co.uk

One of CELLECTA's technicians will provide a beam layout to suit the foundation plan & U-value required

An email quotation will be issued for the **TETRIS** insulation components (**T-blocks**, **Gap strips** and **Vertical edge strips**), along with a costs for the pre-stressed concrete beams, closer blocks and slip bricks

Should the quotation be acceptable, our technical team will email the beam layout design for final approval





Accredited





Process

Withstand Foot Traffic During Installation

7



System Components

Items supplied by **CELLECTA**

TETRIS ultra high compressive strength insulation blocks to provide outstanding thermal performance and form work for the structural topping.

 T600 & T300 "T" profiled blocks used to span 600/300mm beam spacings. 75mm sits on and the balance fits between the concrete beams.

Gap Strip (75mm thick) used to bridge spans that do not suit 600mm or 300mm beam spacings.

Vertical Edge Strip placed around the floors external perimeter to eliminate cold bridging.

2 Pre-stressed concrete beams

Supplied in different heights and lengths to suit each specific floor design.

Concrete closer blocks & slips bricks

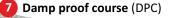
Closer blocks cast in a "T" shape to suit 600mm and 300mm beam spacing, used to close beam ends. Slip bricks used to build up the wall.

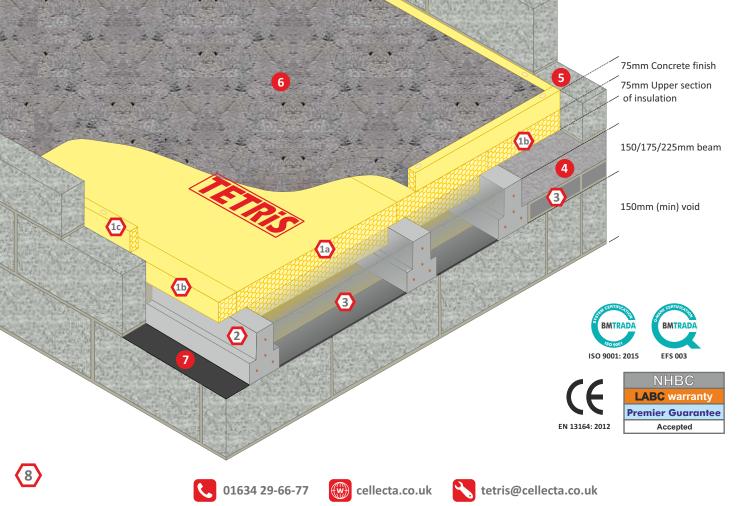
Addition items required (supplied by other)

4 **Concrete/aircrete blocks** used to bridge areas that do not suit 600/300mm beam spacings and build wall.

5 Coursing blocks (140mm high).

- 6 Structural floor finish to give the floor its structural integrity, TETRIS blocks can be covered with one of the following concrete toppings:
 - RC20/25 concrete with steel reinforcement -75mm (min) concrete complying with BS 8500 Part 1, 2: 2002 and BS 206-1 with a maximum aggregate size of 10mm, poured over a minimum A142 steel reinforcement mesh to BS 4483 & EN 10080: 2005. Reinforcement should be supported on spacers to BS 7973-1.
 - RC25/30 concrete with fibre reinforcement -75mm (min) RC30 concrete complying with BS 8500 Part 1: 2002, with a maximum aggregate size of 10mm, combined with polypropylene monofilament fibres at a rate of 900 g/m³.
 - RC28/35 concrete -75mm(min) RC35 concrete with a CEM1 Slump Class 3 to BS 8500 Part 1 & 2: 2002, with a maximum aggregate size of 10mm*.
 - Tarmac Topflow Horizontal 75mm (min) proprietary self-compacting concrete, containing admixtures to BS EN 934, mortar and grout.



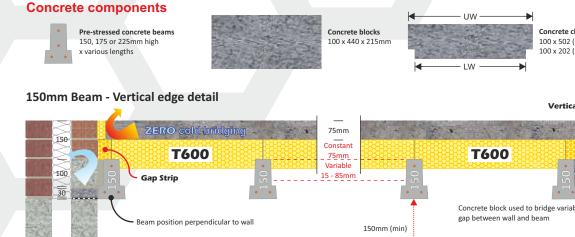


Construction details

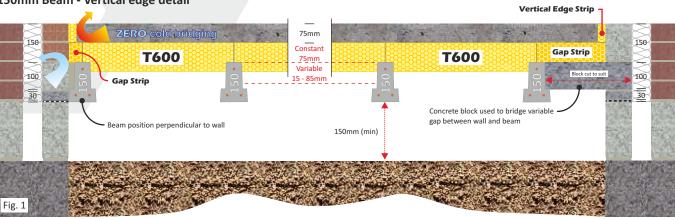


TETRIS insulation components Vertical Edge Strip (VES) Gap Strip (TGS) 75mm (high) x 30mm x 2500mm 75mm x various widths x 2500mm

T Blocks: T600 / T300 90, 100, 120, 140, 160 x 600/300 x 2500mm

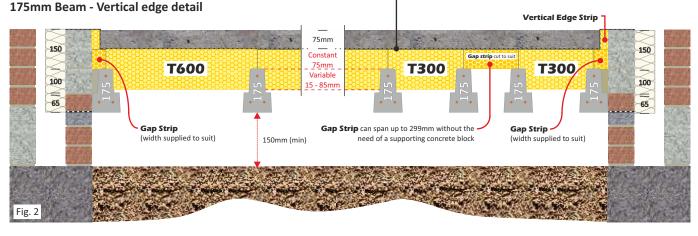


Concrete closer blocks 100 x 502 (UW) x 448(LW) x 138mm 100 x 202 (UW) x 148(LW) x 138mm



Optional gas membrane (supplied by other)

If required, a gas membrane can be easily incorporated as TETRIS produces a smooth, level surface for the membrane to be draped over and built into the course work accordingly



150mm Beam - Vertical edge detail with additional layer of 75mm insulation

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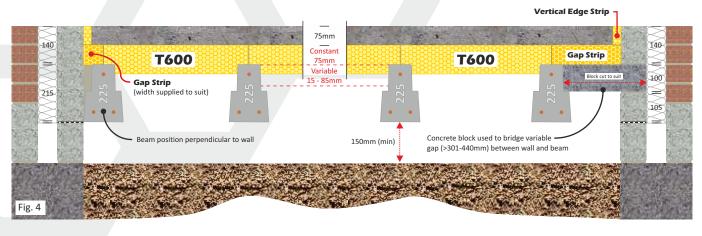
Vertical Edge Strip 75mm 1 75mm 225 225 Flat panel Flat panel Constant Gap Strip **T600 T600** _75mm Variable 100 100 15 - 85mm Gap Strip 30 30 Concrete block used to bridge variable Beam position perpendicular to wall gap between wall and beam 150mm (min) Fig. 3



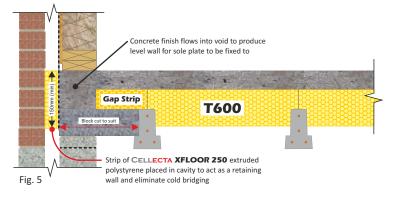
Construction details



225mm Beam - Vertical edge detail



Vertical edge options - Timber frame buildings

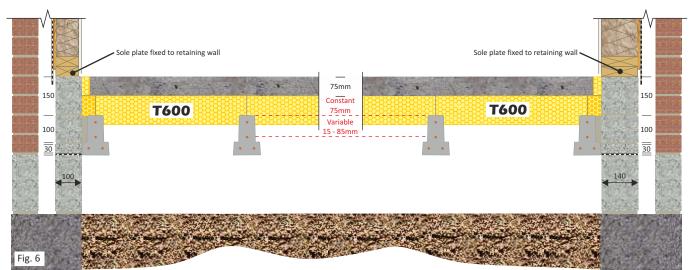


ON SITE?

Download the **FREE Cellecta app** or watch the installation video on YouTube

90mm Timber Frame

140mm Timber Frame

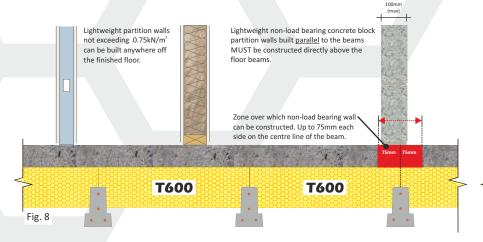




Construction details



Non-Load Bearing Partitions

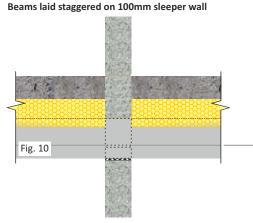


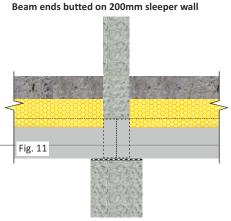
Lightweight non-load bearing concrete block partition walls can be positioned anywhere when built <u>perpendicular</u> to the beams. 100mm (max) thick x 2.4m high wall, constructed from concrete blocks with a maximum density of 1400kg/m³, exerting a maximum load of 4.40kN/m run. Heavier partitions may need to be built directly off the concrete beam, a concrete block or sacrificial wall.

Fig. 9



Load Bearing Partitions









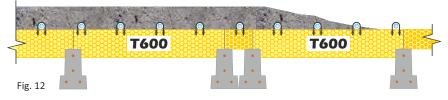


Underfloor Heating Systems (Supplied By Other)

An underfloor heating system can easily be integrated into the floor prior to applying the structural concrete floor finish.

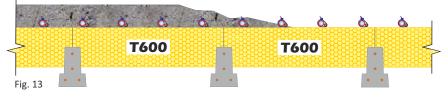
Option 1

Secure the underfloor heating pipes to the **TETRIS** blocks with '**U**' clips at the desired centres and cover with the structural concrete topping. Install the heating manifold at a later stage.



Option 2

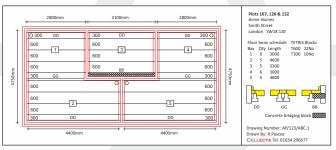
Cover the **TETRIS** blocks with a D49 steel mesh. Cable-tie the underfloor heating pipes to the mesh at the desired centres and cover with the structural concrete. Install the heating manifold at a later stage.



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Installation process



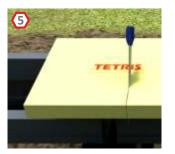


An approved beam layout drawing is supplied to suit each specific floor.

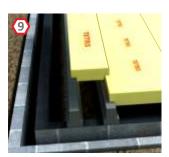
4



Build up the foundation walls to the desired height & install a suitable damp proof course



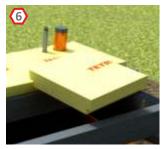
TETRIS blocks can be cut to size with a hand saw



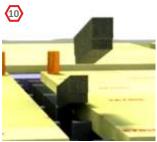
Where required, install T300 boards



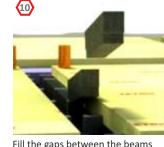
Using the beam layout provided, carefully place the beams across the floor at the specified centres



Use the cut off from the previous row to start the next one



Fill the gaps between the beams with concrete closer blocks and slip bricks



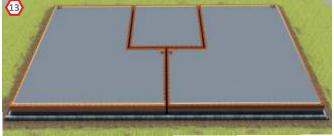




Cut holes for services with a hand saw

TETRIS blocks are strong enough to withstand foot traffic during the installation process

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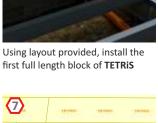


Carefully pour the desired concrete topping to a minimum depth of 75mm. Power float the concrete to produce a floor with outstanding thermal performance and structural integrity

Watch the Online Installation Video

Watch a step-by-step installation video online at www.cellecta.co.uk or via your smart phone by downloading the FREE CELLECTA app. For additional technical advice for your project contact CELLECTA on 01634 29-66-77 or email tetris@cellecta.co.uk

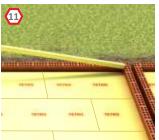




3



Install the TETRIS boards in a staggered formation



Install the TETRiS Vertical Edge Strips around the external perimeter of the floor

TETRIS technical data

CEL

TETRIS

High Performance Insulation Floor System



Product Information

TETRIS low emissivity foil facing insulation blocks are manufactured to the highest possible specification. Their physical properties are determined under strictly controlled laboratory conditions in accordance with the harmonised European Standards.

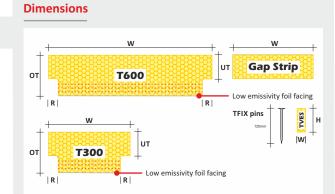
Product Benefits

- Excellent thermal performance
- Very high compressive strength able to withstand foot traffic
- Very low water absorption
- Supplied in plot specific quantities

Technical Information

	TETRIS®						
	T600	тзоо	Gap Strip*	TVES			
Thermal Conductivity≤75mmEN 12667 (W/mK)≥90mm	- 0.034	- 0.034	0.033	0.033			
Strength at 10% compression EN 826 (kPa)	300	300	300	250			
Strength at 2% compression EN 1606 (kPa)	125	125	125	80			
Long term water absorption by immersion EN 12087	0.7%	0.7%	0.7%	0.7%			
Temperature range (°C)	-50/+75	-50/+75	-50/+75	-50/+75			
Block length (mm)	2500	2500	2500	2500			
W - width (mm)	600	300	600 (& supplied cut to suit specific details)	30			
UT - Upper Thickness (mm)	75	75	75	-			
OT - Overall thickness' (mm)	90, 100 120, 140 160	90, 100 120, 140 160	75	-			
H - Height (mm)	-	-	-	75			
R - Rebate (mm)	30-50	30-50	30-50	N/A			

me technical data for TETRIS Flat panels



Loadings

TETRIS blocks have a very high compressive strength and their structural integrity have been rigorously tested by LUCIDEON Laboratories. The blocks can withstand a working uniform distributed load (UDL) of 4kN/m² and a concentrated imposed load of 2.7kN (over an area of 0.05m^2).

Specification Assistance





Standards & Codes of Practice

HM Building Regulations - Approved Document L1A & L1B: Conservation of Fuel and Power in Dwellings

HM Building Regulations - Approved Document L2A & L2B: Conservation of Fuel and Power in Buildings Other Than Dwellings

HM Building Regulations 2003 - Approved Document E: 2010 Edition: Resistance to the Passage of Sound

Welsh Government Building Regulations - Approved Document L1A & L1B: Conservation of Fuel and Power in Dwellings

Welsh Government Building Regulations - Approved Document L2A & L2B: Conservation of Fuel and Power in Buildings Other Than Dwelling

Welsh Government Building Regulations 2003 - Approved Document E: Resistance to the Passage of Sound

Scottish Building Standards - Section 5: Noise

Scottish Building Standards - Section 6: Energy

Building Research Establishment Document BR 262: 2002 Thermal Insulation: Avoiding Risks

CIBSE Guide A: Environmental Design, Section A3: Thermal Properties of Building Structures

DEFRA DTLR - Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings

BS EN ISO 13370: 2017 - Thermal performance of buildings: heat transfer via the ground: Calculation Methods

BS 5250: 2011+A1: 2016 - Code of practice for control of condensation in buildings

BS 8215: 1991 - Code of practice for design and installation of damp proof courses in masonry construction

BS EN 12667: 2001 - Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods: Products of high and medium thermal resistance

BS EN 13164: 2012+A1:2015 - Thermal insulation products for buildings. Factory made extruded polystyrene foam (XPS) specification

BS EN 826: 2013 - Thermal insulating products for building applications: Determination of compression behaviour

BS EN 12087: 2013 - Thermal insulating products for building applications. Determination of long-term water absorption by immersion

BS EN 12088: 2013 - Thermal insulating products for building applications. Determination of long-term water absorption by diffusion

BS EN ISO 11925-2: 2010 - Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Single-flame source test

BS EN 13501-1:2007+A1: 2009 - Fire classification of construction products and building elements. Classification using test data from reaction to fire tests

Glossary

Thermal conductivity (Lambda value -I): This is a measure of the rate at which a material will pass heat and is expressed in units of Watts per metre per degree of temperature difference (W/mK)

U-value: This is a measure of how much heat will pass through a square metre of a structure when the air temperatures on either side differ by one degree. U-values are expressed in units of Watts per square metre per degree of temperature difference (**W/m²K**)

Thermal bridging is a thermally conductive material which penetrates or bypasses an insulation system; such as a metal fastener, concrete beam, slab or column. Heat will flow along the easiest path from the heated space to the outside - the path with the least resistance. This will not necessarily be the path perpendicular to the surfaces. Frequently heat will "short circuit" through an element which has a much higher conductivity than surrounding material, which can be described as a thermal bridge

Typical effect of thermal bridges are:

- Decreased interior surface temperatures, in the worst case this can result in condensation problems, particularly at corners
- Significantly increased heat losses and cold areas in buildings

Psi values (y **)**: The measure of the thermal transmittance of a thermal bridge

Y-Values: The heat loss through the non-repeating thermal bridging areas of a building





Further Information

CELLECTA and The Environment



CELLECTA operates a progressive, sustainable environmental policy, with all our insulation products manufactured under **ISO 9001** & **14001** management controls. **TETRIS** boards are made from XPS and are fully recyclable.

Architectural Drawings

Architects and designers can quickly and easily insert **TETRIS** into their drawings by either downloading the specific detail from www.cellecta.co.uk or contacting **CELLECTA**'s technical team who will email the relevant **FASTRACK**

Specification Clauses

Architects, designers and specifiers can quickly and easily insert **TETRIS** into their specification document, by either downloading the specific NBS clause from **CELLECTA**'s website, contacting the technical team on Tel. 01634 29-66-77 or email tetris@cellecta.co.uk, who will email the relevant clause.

Installation Instructions

For detailed installation instructions and advice contact **CELLECTA**'s technical team on Tel. 01634 29-66-77 or email tetris@cellecta.co.uk

Fire Classification

Where possible **CELLECTA**'s insulation boards contain fire retardant additives to inhibit accidental ignition. However, plastic foams are combustible and may burn rapidly if exposed to intense fire. **TETRIS** - Euroclass **E***

CE Marking



TETRIS insulation boards are manufactured in accordance with European CE legislation

Third Party Certification

TETRIS is BM Trada Q-Mark third party certified



Packaging

CELLECTA thermal insulation products are packed in recyclable polythene bags or film.



On-site Handling & Storage

When storing **TETRIS** boards on site, it is important to protect them from long-term exposure to direct sunlight, otherwise surface degradation may occur. To reduce this, packs should be covered with a light-coloured sheeting. **TETRIS** blocks are resistant to attack by mould and microbial growth.

Health and Safety

Copies of COSHH data for all **CELLECTA** products are available upon request.

Notes

CELLECTA reserves the right to amend product specifications without prior notice. Colours shown are for illustration purposes. Product technical data stated is typical. The information included in this technical manual is based on **CELLECTA**'s experience and is believed to be reliable. Values quoted and applications illustrated are typical and should not be taken as a basis for design.

CELLECTA, as the manufacturer, has no control over the installation of its products. The purchaser should evaluate the product's suitability and is responsible for adhering to any laws or regulations in this respect, making the purchaser also liable for observing any third party rights.



CELLECTA's extensive range of high performance thermal and acoustic insulation products are supported by a technical advice line staffed by experienced consultants who can provide a number of useful services:

- U-value, condensation risk or imposed load calculations
- Floor designs
- Supply detailed fixing instructions
- Arrange site surveys
- Write specifications





01634 22-66-30



technical@cellecta.co.uk



cellecta.co.uk

Other products available from CELLECTA









Routed UFH Boards

High Compressive Strength Insulation



ScreedBoard High Density Interlocking Floorboards



HICYP









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