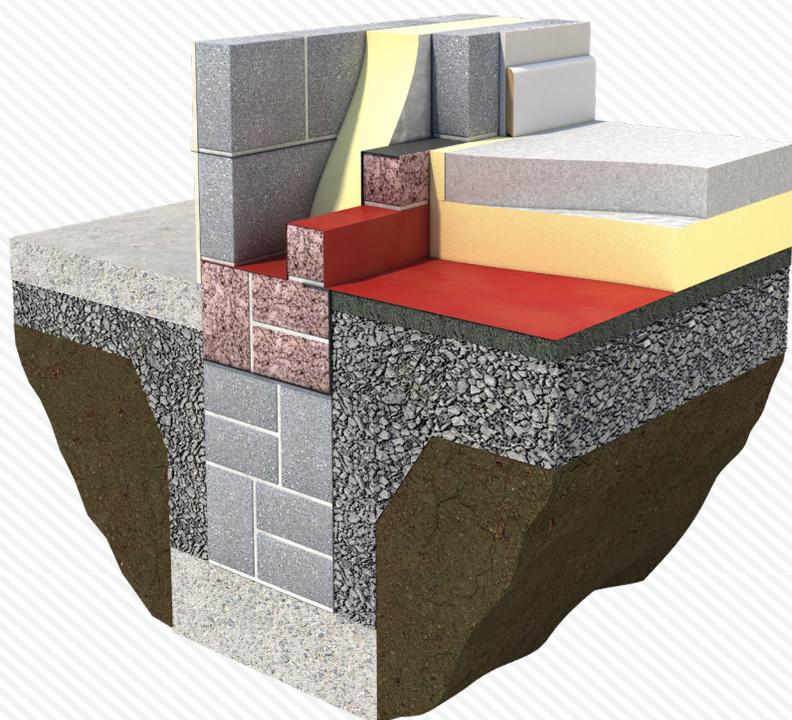




Roadstone
Thermal Liteblock System



thermal
Liteblock



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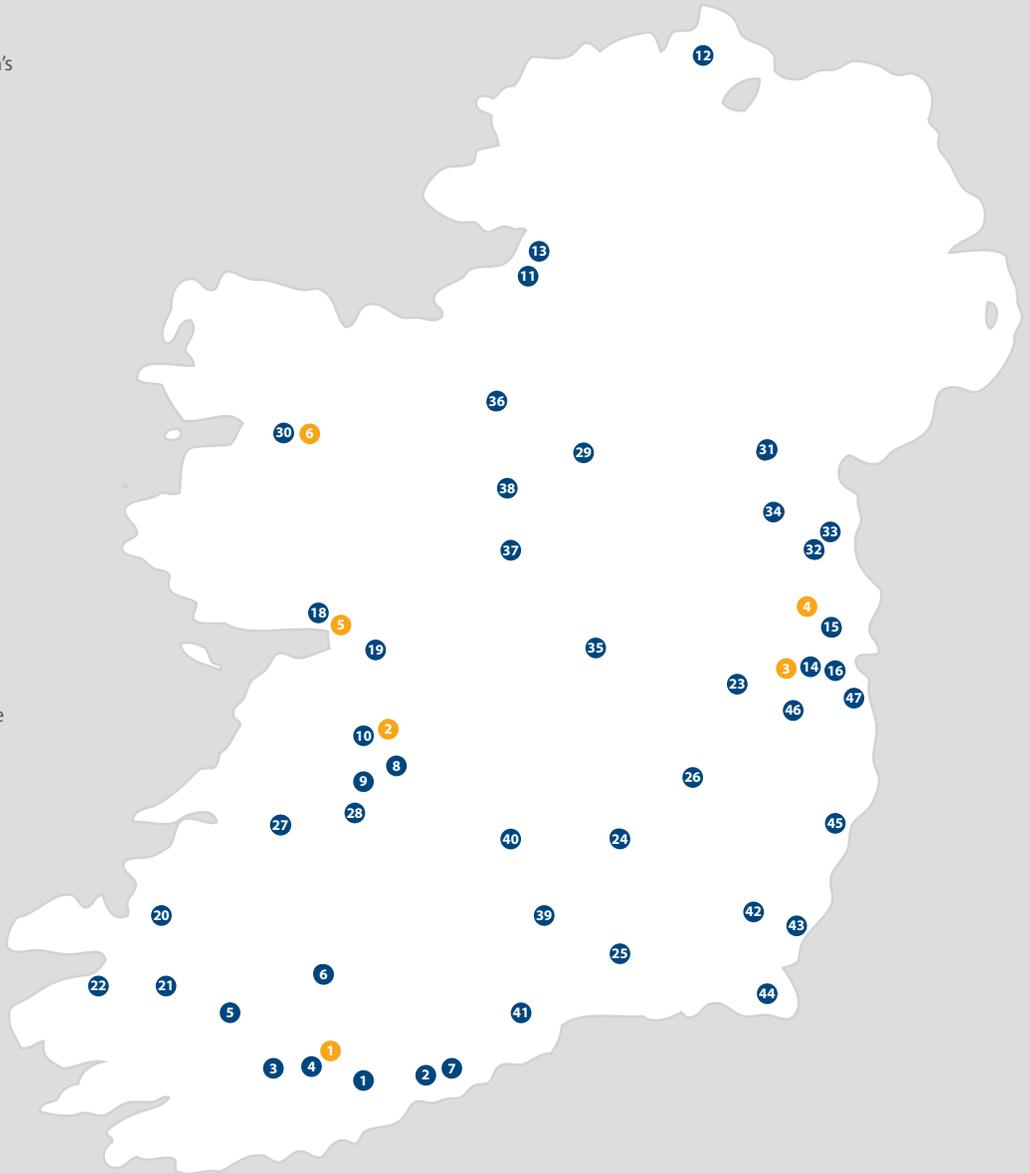
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LOCATIONS

LOCATIONS

- | | |
|--|---|
| <p>Cork</p> <ol style="list-style-type: none"> Ballygarvan Carrigtwohill Castlemore Classis Keim Mallow Midleton <p>Clare</p> <ol style="list-style-type: none"> Ballyquinn Bunratty Ryan's of Ennis <p>Donegal</p> <ol style="list-style-type: none"> Ballintra Carndonagh Laghey <p>Dublin</p> <ol style="list-style-type: none"> Belgard Central
Dispatch / Belgard
Weighbridge Huntstown Finglas Head Office,
Tallaght Swords, Feltrim <p>Galway</p> <ol style="list-style-type: none"> Two-Mile-Ditch Kilchreest <p>Kerry</p> <ol style="list-style-type: none"> Ballyegan Killarney Killorglin <p>Kildare</p> <ol style="list-style-type: none"> Allen, Naas <p>Kilkenny</p> <ol style="list-style-type: none"> Bennettsbridge Kilmacow | <p>Laois</p> <ol style="list-style-type: none"> Ballyadams <p>Limerick</p> <ol style="list-style-type: none"> Joseph Hogan's Gooig <p>Longford</p> <ol style="list-style-type: none"> Moyne <p>Mayo</p> <ol style="list-style-type: none"> Castlebar <p>Meath</p> <ol style="list-style-type: none"> Barley Hill Duleek Mullaghcrone Slane <p>Offaly</p> <ol style="list-style-type: none"> Tullamore <p>Roscommon</p> <ol style="list-style-type: none"> Boyle Cam Castlemine <p>Tipperary</p> <ol style="list-style-type: none"> Ballyknockane Killough <p>Waterford</p> <ol style="list-style-type: none"> Cappagh <p>Wexford</p> <ol style="list-style-type: none"> Brownswood,
Enniscorthy. Kilmuckridge Killinick <p>Wicklow</p> <ol style="list-style-type: none"> Arklow Dorans Pit Fassaroe, Bray |
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- Locations
- Retail Outlet Locations



RETAIL OUTLET LOCATIONS

- | | |
|--|--|
| <p>Cork</p> <ol style="list-style-type: none"> Classis <p>Clare</p> <ol style="list-style-type: none"> Ryan's of Ennis <p>Dublin</p> <ol style="list-style-type: none"> Belgard Feltrim, Swords | <p>Galway</p> <ol style="list-style-type: none"> Two-Mile-Ditch <p>Mayo</p> <ol style="list-style-type: none"> Castlebar |
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INTRODUCTION

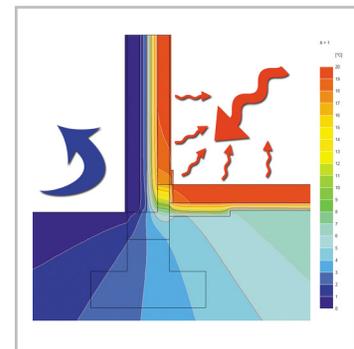
Thermal bridging is one of the key factors which need to be addressed to improve energy efficiency in the design and construction of new buildings. All thermal bridges must be minimised to reduce heat loss through cold bridging. All major junctions between building elements (floors, walls, roofs, windows and doors) must be built in compliance with the Acceptable Construction Details (ACDs).

The *Roadstone Thermal Liteblock* system combines the Roadstone Thermal Liteblock with the Roadstone concrete block range, which when used in accordance with the Acceptable Construction Details (ACDs), achieves psi values equal to or better than the standards set out in Technical Guidance Document (TGD) Part L 2019.

Roadstone has thermally modelled all relevant details in appendix D of TGD L 2019. From this extensive research Roadstone are now in a position to provide detail solutions that comply fully with psi value requirements outlined in TGD L 2019- Appendix D.

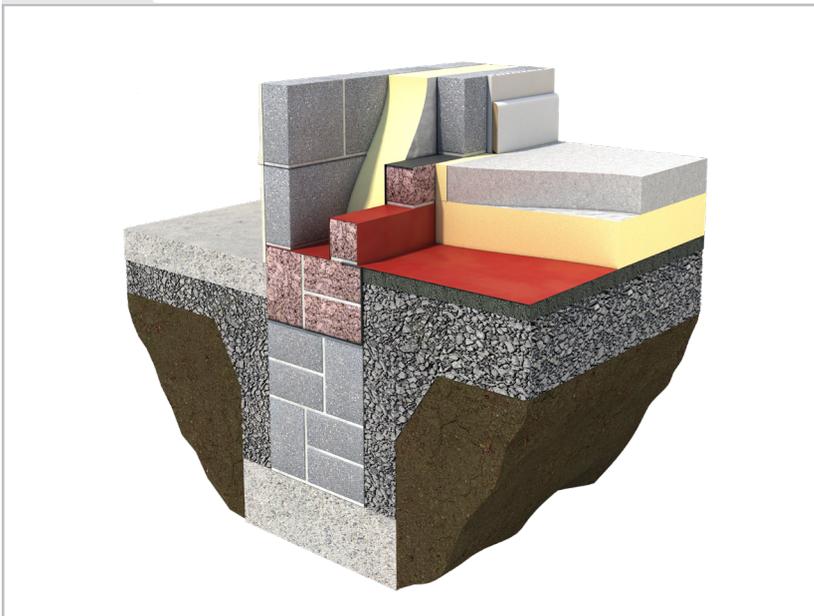
The following construction types have been examined and thermally modelled:

- ▶ Cavity wall - full fill insulation (Table D1)
- ▶ Cavity Wall - partial fill insulation (Table D1)
- ▶ External Insulation on to masonry walls (Table D2)
- ▶ Internal insulation with twin-pot cavity block (Table D6)



Retain the heat with Roadstone Thermal Liteblock

Fig. 1



Ground floor to external wall junction using Roadstone Thermal Liteblock

NEARLY ZERO ENERGY BUILDINGS(NZEB)

2

Definition Of Nearly Zero Energy Buildings Directive 2010/31/EU Energy Performance Of Buildings:

“nearly zero energy building’ building’ means a building that has a very high energy performance, as determined in accordance with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produces on site or nearby”

The NZEB standard as set out in TGD L 2017 *Buildings other than dwellings* applies to works from 1st January 2019 (subject to transitional arrangements). For Public Sector bodies, NZEB applies from 31st December 2018.

Impacts of NZEB

TGD L 2019 Dwellings includes numerical indicators for NZEB which apply to works from 1st November 2019 (subject to transitional arrangements). The numerical indicators provide Maximum Permitted Energy Performance Coefficient (MPEPC) of 0.30 and Maximum Permitted Carbon Performance Coefficient (MPCPC) of 0.35. Note: These indicators are relevant to both Part L 2011 (with 2017 amendments) and Part L 2019.

Renewable Energy Requirement

Renewable Energy Ratio (RER) is the ratio of the primary energy from renewable energy technologies to total primary energy as defined and calculated in DEAP. An RER of 0.2 represents 20% of the primary energy from renewable energy technologies to total primary energy as defined and calculated in DEAP.

The nearly zero or very low amount of energy must be covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on site or nearby.

In order to achieve NZEB compliance, it means that buildings will require:

- **Improved Fabric Efficiency:** This will result in a larger footprint due to increased insulation thickness within external wall in order to achieve the same internal floor area. It will also mean that deeper dig levels will be required to facilitate extra floor insulation. In addition, windows with reduced U Values, in certain cases triple glazed windows, will be required to achieve NZEB compliance. Low values of air permeability should also be targeted.
- **Advanced Services and Lighting Specification:** Heat sources e.g. Air Source Heat Pumps with improved efficiencies will be a key element as well as 100% energy efficient lighting. Mechanical ventilation with high heat recovery efficiency may be needed in certain cases to achieve NZEB compliance
- **Renewable Energy Ratio of 20%:** Increasing the number of highly efficient PV panels will also be a key element in achieving compliance.

Benefits of Roadstone Thermal Liteblock regarding NZEB

- There is a significant benefit in targeting a γ value (Thermal Bridging Factor) of 0.05 W/m²K and avoiding the use of the penalising default γ value of 0.15 W/m²K, or 0.08 W/m²K where all details are as per ACDs
- If details are bespoke, a γ value of 0.15 W/m²K must be used: To avoid this penalty, bespoke details should be thermally modelled by an approved NSAI Thermal Modeller. This needs to be part of the energy strategy at design
- Typical ACD's, as well as a suite of bespoke junctions have been modelled with Roadstone Thermal Liteblocks (both 7.5N and 13N) and enhanced psi values over TGDL 2017 have been achieved.
- These psi values, when inputted into a manual γ value calculation, typically result in improved γ values/Thermal Bridging Factor (TBF) outputs. Using the calculated γ value means that relaxing the U Values of building elements and windows, and even reducing the efficiency of services and number of PV panels may be possible while still achieving NZEB compliance.

What is the ROADSTONE THERMAL LITEBLOCK?

Roadstone Thermal Liteblock is manufactured in Ireland, achieving thermal conductivity (Lambda λ) values as low as 0.33W/mK, using a special mix which includes light weight aggregates. This mix produces a concrete block with excellent insulation properties, while maintaining structural strength and allowing for traditional construction methods to be used.

Energy efficient design begins with a Fabric First Approach, whereby the buildings shape, orientation and thermal mass, with proper detailing, will save energy. This ensures that the majority of the energy saving work is done by the building by having a high performance fabric rather than relying completely on the addition of mechanical renewable energy systems. The Roadstone Thermal Liteblock plays a key role in achieving good thermal efficiency in the building fabric by providing a highly cost effective solution to achieve improved thermal bridging performance, thus reducing cold bridging and allowing designers more flexibility when generating a Part L compliant specification.

Key features and benefits of the Roadstone Thermal Liteblock System

- ▶ The Roadstone Thermal Liteblock is required only in key locations in conjunction with the Roadstone Concrete Block range.
- ▶ The thermal mass integrity of the building is maintained when using Roadstone Thermal Liteblock in conjunction with the Roadstone Concrete Block range.
- ▶ The Roadstone Thermal Liteblock system is a very cost effective solution and can result in significant savings in the overall build cost.
- ▶ Robust and durable concrete block available in both 7.5 N/mm² and 13N/mm².
- ▶ Roadstone can provide Standard Construction Details* which are proven to comply with the psi value requirements and facilitates ease of compliance with TGD L 2019.
- ▶ Roadstone Thermal Liteblock is unique in colour to enable traceability on site. Photographic recording of the Thermal Liteblock built on site can then form evidence of compliance for the Assigned Certifier, Architects, Engineers and BER assessors.
- ▶ Reduced Thermal Bridging resulting in reduced heat loss, and lower heating bills.
- ▶ Excellent thermal conductivity (Lambda λ) value of 0.33 W/mK for 7.5N, 0.35 W/mK for 13N, which is a 300% improvement when compared to standard blocks.
- ▶ CE marked– manufactured to the requirements of I.S. EN 771-3 to System 2+.
- ▶ Suits traditional construction methods familiar to Irish and UK designers and builders.
- ▶ Roadstone Thermal Liteblock is a concrete block and provides excellent adhesive properties with traditional mortars and renders.
- ▶ Improved (y) factor calculations are achieved when using the Roadstone Thermal Liteblock system.
- ▶ When a full building specific (y) factor calculation is carried out using the psi values incorporating the Roadstone Thermal Liteblock, improved (y) factor as low as .03 can be achieved.
- ▶ Compliant U values are achieved without having to provide a cavity in excess of 150mm.

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What are the benefits to using the Roadstone Thermal Liteblock System in a low energy building, and what is the impact on the Building Energy Rating (BER) results?

To demonstrate the benefits, we need to be clear on what thermal bridging is, and the difference between U value, thermal conductivity (Lambda λ) value, psi (ψ) values and how psi (ψ) values are used to calculate the overall (γ) factor for a building. All of these parameters are used in the Dwelling Energy Assessment Procedure (DEAP) in Ireland, to calculate the overall heat loss through the building fabric.

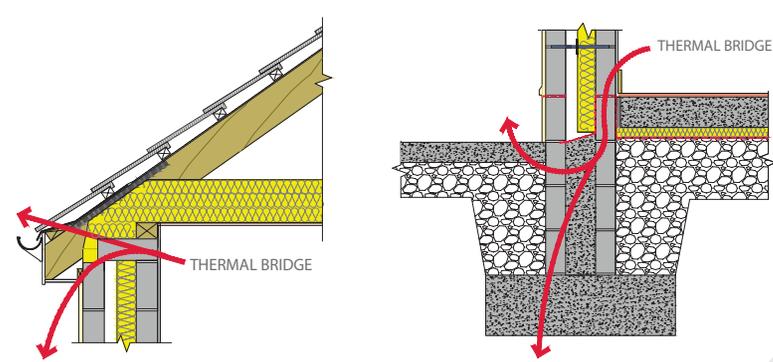
What is Thermal Bridging?

Thermal bridging is a localised area of the building envelope where the heat flow is increased in comparison with that of adjacent areas, due to junctions where insulation is not continuous. Thermal bridges are weaknesses in the building envelope where thermal energy is transferred at an increased rate compared to the surrounding area. Thermal Bridging is first measured by calculating the psi (ψ) value of each junction (see below explanation for psi (ψ) value. The sum of the psi (ψ) values are then multiplied by the lengths of the bridged junctions, these figures are then used to calculate the overall Thermal Bridging Factor (γ value) for any given building.

Thermal bridging occurs in 3 different ways:

1. Repeating (e.g. timber studs with insulation between, at fixed distance centres):
Because this type of bridging is constant, the effects of a repeating thermal bridge can be accounted for in a U value calculation.
2. Random (e.g. one off cold bridge due to penetration of the insulation layer, such as a balcony support bracket, metre box etc).
3. Non-repeating (e.g. Junctions between floors and walls, walls and roofs, window jambs and heads). Cold bridging at these junctions occurs where the insulation layer is interrupted by non-insulating materials, and heat loss in these areas can lead to reduced surface temperatures causing interstitial and surface condensation to occur.

Fig. 2



The first diagram shows a non-compliant eaves detail where the cavity is closed by a concrete block, bridging the inner and outer leaves. This leads to cold surfaces at the top of the inner leaf and can lead to surface condensation. The second diagram shows a typical floor and external walls junction, where the inner leaf is bridging between the floor insulation and the cavity wall insulation. The use of regular blocks in this location can lead to cold surface temperatures, surface condensation above and behind the skirting board area.

Fig 2 – Thermal Bridging heat flow diagram

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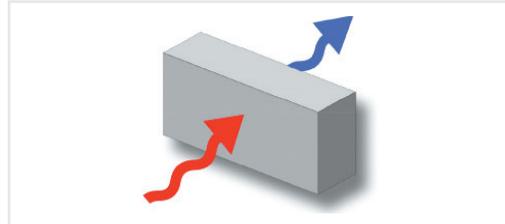
What is a Lambda (λ) value? THERMAL CONDUCTIVITY (W/mK)

A Lambda value (λ) is a measure of the rate of heat flow through a material (fig 3). It will vary with density, porosity, moisture content and temperature of the material. The units of Thermal Conductivity are expressed in watts per metre of thickness per degree Kelvin of temperature difference from one side of the material to the other. The lower the number, the less heat passes through the material.

For example:

Standard Concrete block:	$\lambda = 1.33$ (W/mk)
Roadstone 7.5 N Thermal Liteblock:	$\lambda = 0.33$ (W/mk)
Roadstone 13N Thermal Liteblock:	$\lambda = 0.35$ (W/mk)

Fig. 3

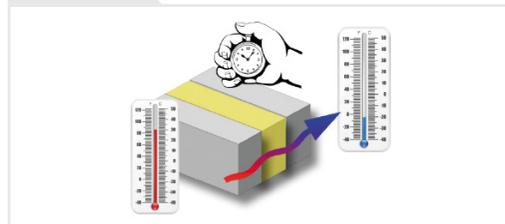


Lambda = heat flow through material

What is a U value? (W/(m²K))

The Thermal Transmittance (U value) relates to a building plane element (wall, roof, floor), and is a measure of the rate at which heat passes through one square metre of all of the components combined to make up that structure (fig. 5). The U value is measured in W/m²K (Watts per square metre Kelvin), where Kelvin (K) is the unit of temperature difference across the elements from inside to outside. A U value = 1 divided by the sum of all the thermal resistances of each component in the structure combined, i.e. $1 / \Sigma (R) = U$.

Fig. 5

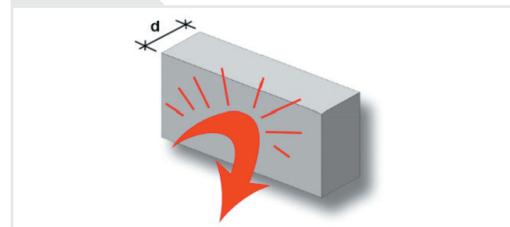


U value = Watts (W) of heat flow per m² x temperature difference (K)

What is an R Value? THERMAL RESISTANCE (m² K/W)

The R-Value is a measure of the resistance to heat flow of a given thickness of a material (fig 4) or combination of materials, i.e. building plane elements such as a wall, roof or floor. To calculate the Thermal Resistance (R) of a material, divide the thickness (d) of material by its lambda value (λ). $d / \lambda = R$.

Fig. 4

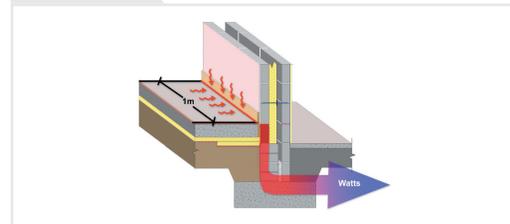


Resistance = material's ability to resist heat flow.

What is a psi value? (W/mK)

The psi value (ψ) is the amount of heat (Watts) lost at a thermal bridge, for every linear metre (m) of that bridge, multiplied by the temperature difference between outside and inside (degrees Kelvin (K)). The psi value represents the extra heat flow through the linear thermal bridge over and above that through the adjoining plane elements. The psi value figures for any given junction are multiplied by the lengths of those Junctions to calculate the buildings y factor. A psi value for a junction is calculated using 2D and 3D thermal modelling, in accordance with various standards such as BR497, BRE IP 1/06, I.S. EN ISO 6946 I.S. EN ISO 10211, I.S. EN ISO 13370 depending on the junction type.

Fig. 6



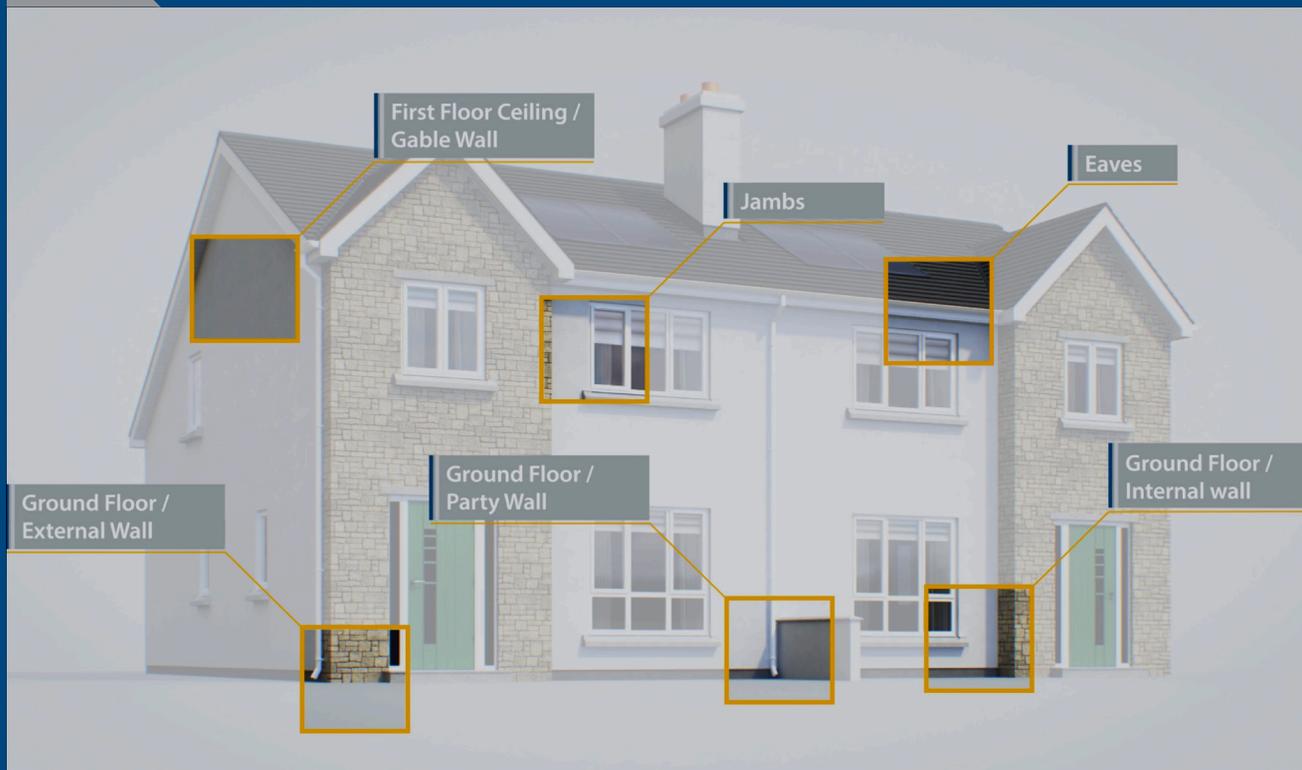
Psi = Heat flow (Watts) per metre (m) x Temperature Difference (K)



What is a (y) factor?

The DEAP calculation accounts for thermal bridging at junctions between elements and around openings using a (y) factor. When linear thermal transmittance ψ (ψ) values are available for element junctions, the ψ values can be multiplied by the lengths (l) of their respective junctions ($\psi \times l$), and the sum of all the ($\psi \times l$) figure is then divided by the total area of building envelope containing thermal bridging, to calculate the (y). Roadstone can now provide details* and corresponding ψ values, in line with Paragraph 3 of Appendix K of the DEAP Manual below:

Fig. 7



DEAP MANUAL EXTRACT:

A default value of $y = 0.15 \text{ W/m}^2\text{K}$ applies for all dwellings except for the following:

Paragraph 1

$y = 0.08 \text{ W/m}^2\text{K}$: for new dwellings whose details conform with "Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details" (www.enviro.ie) as referenced in Building Regulations 2008 and 2011 TGD L. This requires that the relevant drawings be signed off by the developer, builder, site engineer or architect. The BER Assessor must retain the relevant drawings, such as those from the Acceptable Construction Details and associated sign off in support of thermal bridging factor entered.

Paragraph 3

Alternatively values of (ψ) can be determined from the results of numerical modelling, or they can be derived from measurement. If the junction detail is as recommended in Acceptable Construction Details (ACDs), the ψ -value associated with that junction can be taken from TGD L 2011 Appendix D or from Introduction Document for Acceptable Construction Details or other certified ψ values.

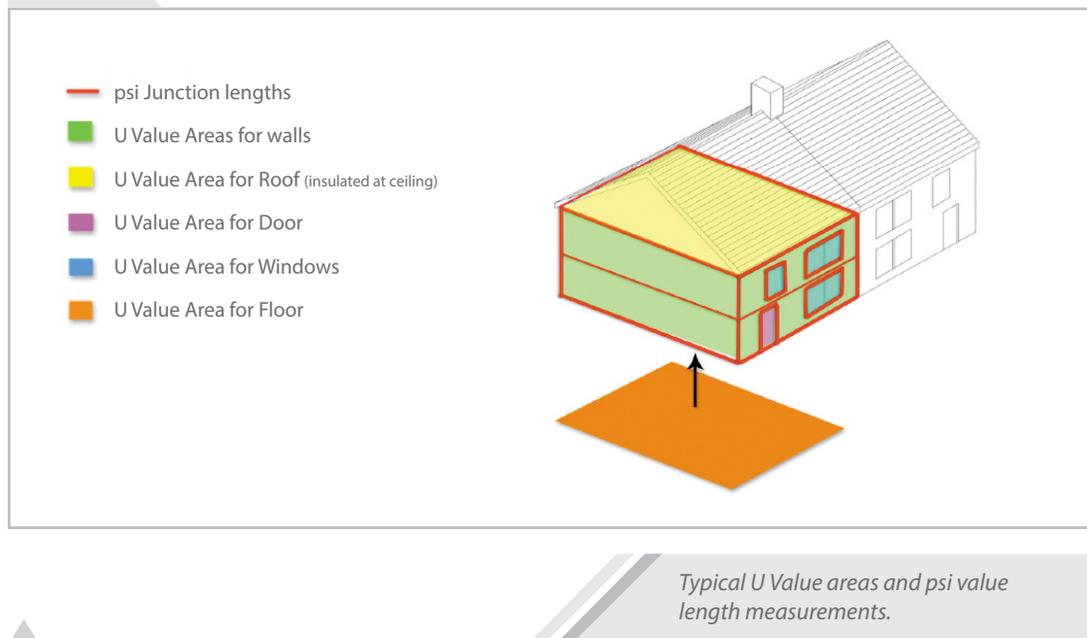
What happens with U values and Y values in DEAP? (*Dwelling Energy Assessment Procedure*)

When entering the dimensions of a building into DEAP the assessor measures and enters the areas and U values for each plane element. DEAP calculates the total building fabric heat loss by multiplying the area of each element by their U value, adding these all together to get the total heat loss via plane elements.

The assessor then uses a (y) factor to account for the heat losses via thermal bridging. The (y) factor is a fraction or percentage of the overall heat lost through the fabric, and takes into account the total envelope area containing thermal bridges. See figure 8 showing areas for U values, and lengths for psi values.

The total heat loss envelope area, heat loss through plane elements and cold bridging are all combined to determine the total heat loss through the building fabric. The fabric heat loss figure, along with all other parameters, are used to determine the overall energy efficiency of the building.

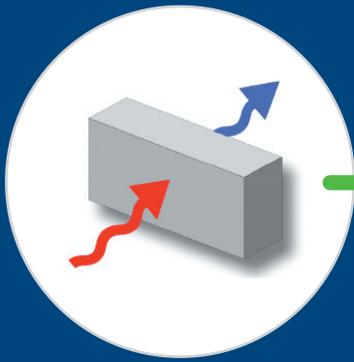
Fig. 8



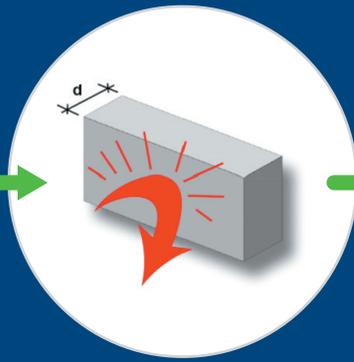
Include all external walls, windows, doors and floors. (Rear walls and windows not shown above). All measurements to be taken in accordance with SEAI BER Assessor Methods, using internal dimensions to measure lengths and areas.

What is the Energy Performance Coefficient (EPC)?

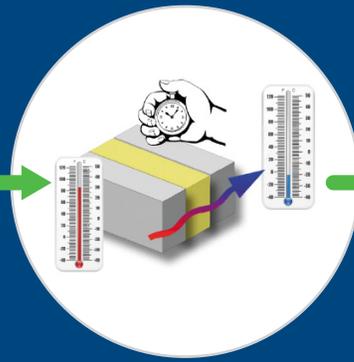
DEAP calculates the Energy Performance of a building and measures it against a notional compliant version of the same building simultaneously. DEAP then calculates and compares the dwelling's Energy Performance Coefficient (EPC) and Carbon Performance Coefficient (CPC) to the Maximum Permitted Energy Performance Coefficient (MPEPC) and Maximum Permitted Carbon Performance Coefficient (MPCPC) for Building Regulations TGD L 2019, currently set at MPEPC of 0.3 and MPCPC of 0.35.



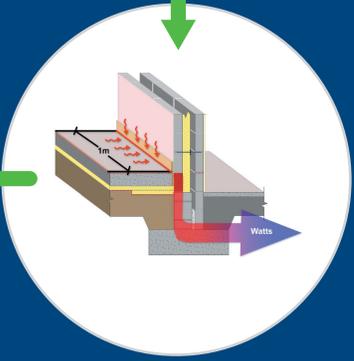
Lambda
Thermal conductivity



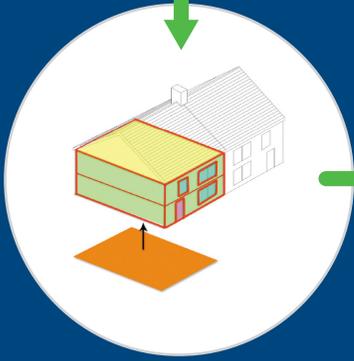
Resistance
Thickness divided by lambda value



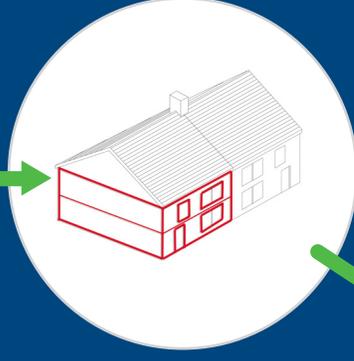
U value
1 over sum of all resistance



psi value



U values x areas



Y value calculation



D.E.A.P.

Dwelling Energy Assessment Procedure

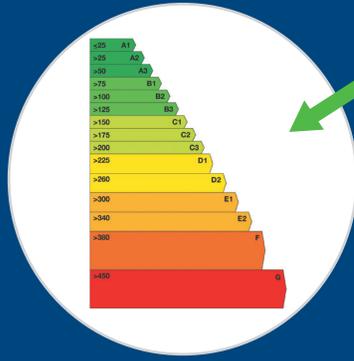


Fig 9 – Flow Diagram of a BER calculation

How do U values & Thermal Bridging affect the Energy Performance of a building?

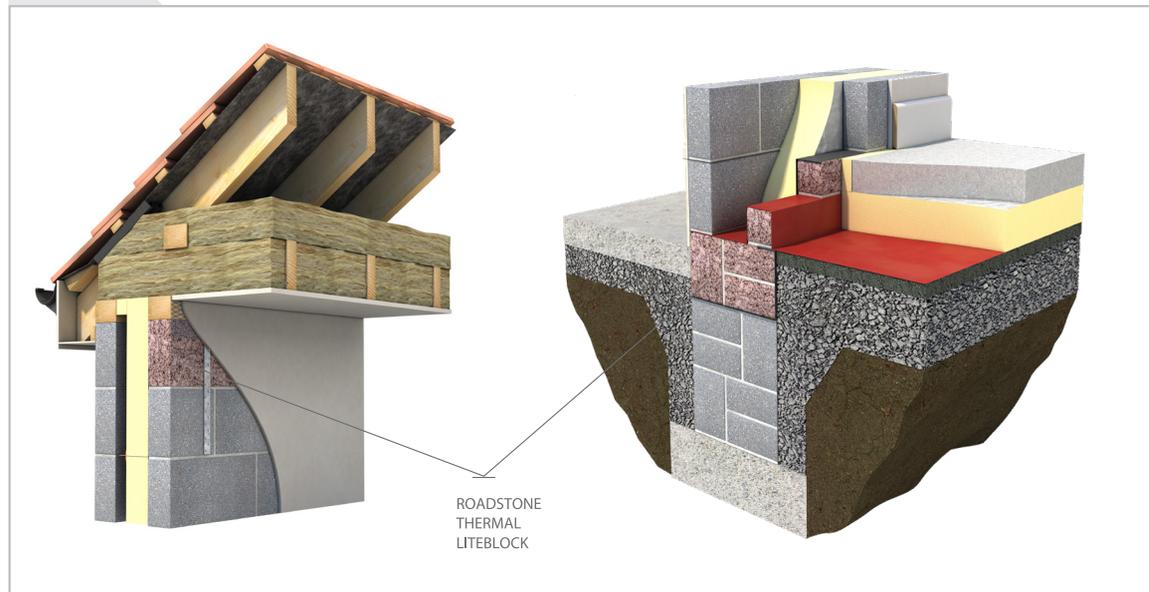
As outlined earlier, DEAP uses the areas of building elements (roofs, walls, floors) and their corresponding U values to calculate how much heat will be lost through the fabric of a building. **The lower the U value, the less heat loss through that particular element.**

The building heat loss through thermal bridging is then accounted for by entering a factor for thermal bridging (ψ) into DEAP. A lower (ψ) factor will result in a better BER result.

It is important to note that the higher the thermal performance of the building's plane elements, the higher the risk of condensation occurring at cold bridged junctions. As U values are lowered (improved), correct detailing becomes extremely critical to avoid surface condensation occurring.

By using Roadstone Thermal Liteblock Standard Details*, you can claim a default (ψ) factor of 0.08 as described in paragraph (3) of the DEAP manual extract . (See Page 6)

Fig. 10



The ψ values associated with the Roadstone Thermal Liteblock can be used to significantly reduce the (ψ) factor of a building and improve the BER results when an overall (ψ) calculation is carried out.

Roadstone recommend that to get the full cost benefit saving to the overall build cost of a building type, a full detailed (ψ) value calculation is carried out. Roadstone can provide this service through their nominated thermal modelling technical support teams.

The solution to comfortably complying with Part L for Architects, Engineers, Assigned Certifiers and Building Contractors

Roadstone has thermally modelled each critical junction detail, ACD's as listed in TGD L 2019 appendix D1, D2, D4 and D6 and has calculated the ψ value for each junction. This means we can provide a validated (ψ) factor calculation to our customers when using the Roadstone Thermal Liteblock system and the improved benefits of this will be evident in the improved BER results for your building. By using the Roadstone Thermal Liteblock System you can comfortably comply with TGD Part L 2019 thermal bridging requirements.

The Roadstone Thermal Liteblock System provides the following benefits:

- ▶ Certified construction details that comply with TGD L 2019.
- ▶ Roadstone Thermal Liteblock is heather in colour for ease of identification during construction
- ▶ Fabric first approach with reduced thermal conductivity at cold bridges.
- ▶ Full certified (y) factor and thermal modelling service is available. **
- ▶ An improved BER rating for your building providing added value and additional energy cost savings

Contact a member of our technical team for further guidance

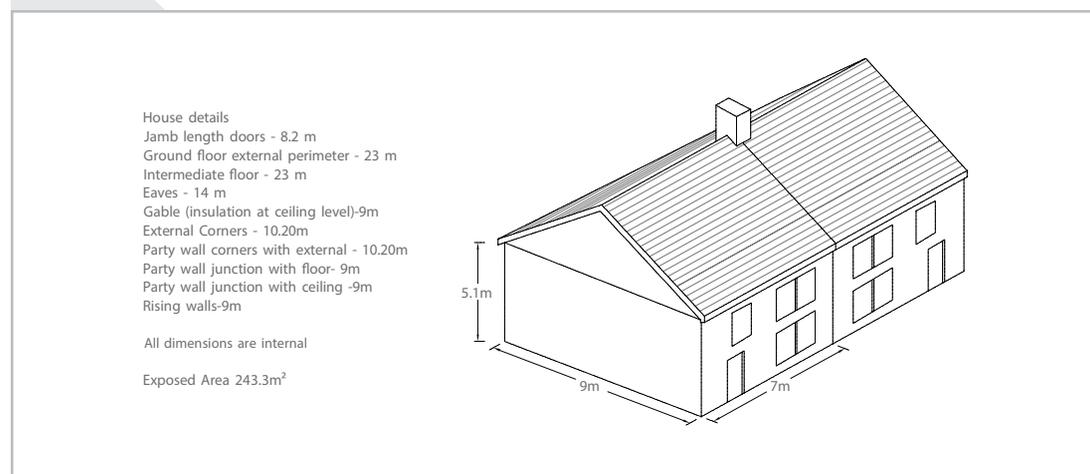
The effects of Thermal Bridging (y) factors on the BER of a typical semi-detached house:

We have taken a typical 126m² semi-detached sample house used to demonstrate compliance with Part L of the Building Regulations, with the following fabric U values:

Walls 0.18, Roof 0.13, Floor 0.16, i.e. within the range set out in Table D1 of TGD L 2019.

Other construction types can be used as per Table D2, D4 and D6 of TGD L 2019.

Fig. 11



This sample house has an Air to Water Heat pump providing hot water and space heating, no solar, no heat recovery ventilation, with a wood burning stove as the secondary heating, with 1 flue and passive vents.

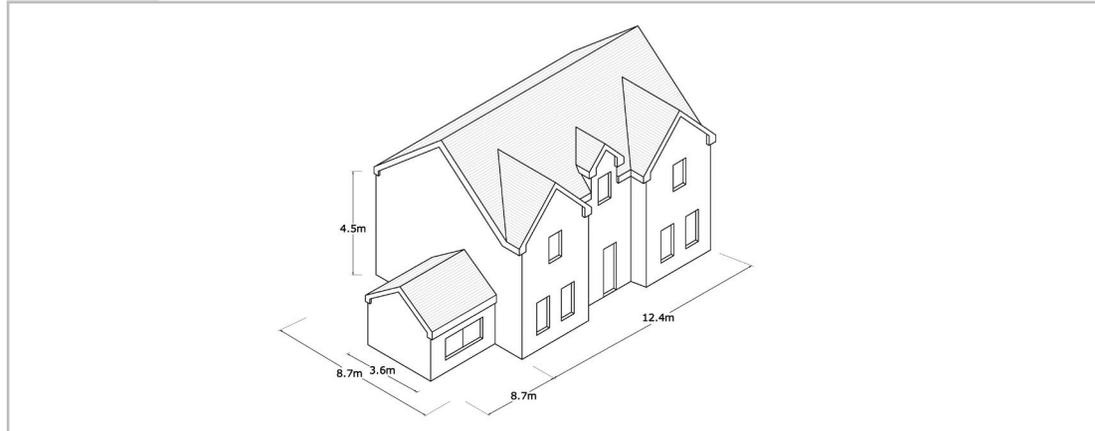
When we calculate the (y) factor for this house using the Roadstone Thermal Liteblock System's thermal bridging psi values, the (y) factor improves to 0.0266 W/m²K. This results in a BER of A2 @ 49.99 kwh/m²/yr. This lower thermal bridging factor has a very significant effect on the BER. This (y) factor calculation and BER result is based on traditional build cavity wall details using Roadstone Thermal Liteblock psi values in lieu of defaults from Table D1 of TGD L 2019. Roadstone modelled psi values are also available for twin-pot cavity blocks, solid masonry block with external insulation and frame construction types.

See table 1 for summary specification and BER results.

The effects of Thermal Bridging (y) factors on the BER of a large detached house:

To examine the effects of improved (y) factors further, we have carried out the same exercise on a larger detached house. See table 1 for summary specification and BER results, which demonstrates clearly the benefit of using the Roadstone Thermal Liteblock in key locations, achieving lower (y) factors, resulting in reduced energy values, lower heating bills and better BER results.

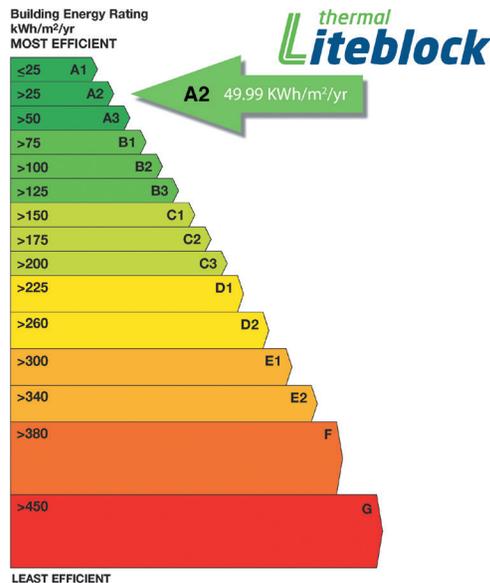
Fig. 12



This larger sample house also has an Air to Water Heat Pump providing all Domestic Hot Water, passive ventilation, a wood burning stove as the secondary heating system with 1 flue and no solar thermal panels.

By implementing the Roadstone Thermal Liteblock and using the psi values from the Roadstone Thermal Modelling research, the (y) factor is calculated to be .05 W/m²K, and the BER result is an A2 Rating at 46.84 kWh/m²/yr.

Semi Detached House BER Improvement



Detached House BER Improvement

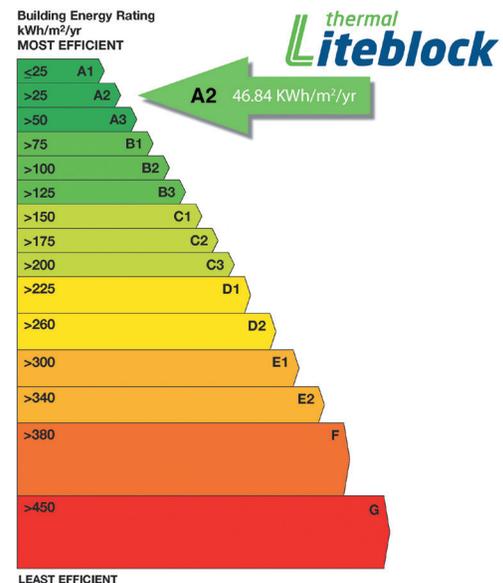


Table 1: Comparison of specifications and BER results between Semi D and Larger Detached house

	Semi Detached House	Large Detached House
Area	126m ²	229m ²
Volume	321.3 m ³	606.29 m ³
Primary Heating System	Air to Water Heat Pump 449% Efficient	Air to Water Heat Pump 449% Efficient
Secondary Heating System	Wood burning Stove with flue	Wood burning Stove with flue
Solar Hot Water	None	None
Passive Vents	Yes	Yes
Air Tightness Level	0.25 ac/h (5m ³ /m ² /hr @ 50 Pa)	0.25 ac/h (5m ³ /m ² /hr @ 50 Pa)
Heating Distribution	Fully zoned with time and temperature controls	Fully zoned with time and temperature controls
Domestic Hot Water	From Heat Pump, into 200ltr insulated cylinder.	From Heat Pump, into 200ltr insulated cylinder.

U Values

Walls	0.18	0.18
Floors	0.16	0.16
Roofs	0.13	0.13 insulated at level ceilings 0.16 insulated at pitched ceilings

BER Results

BER with Roadstone Thermal Liteblock details applied and calculated (y) factor	(y) = 0.0266 W/m ² K A2 @ 49.99 kWh/m ² /yr	(y) = 0.05 W/m ² K A2 @ 46.84 kWh/m ² /yr
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Reducing the risk of Mould growth and surface condensation

The improved γ values that the Roadstone Thermal Liteblock system provides, offers reduced thermal bridging and limits the risk of surface condensation and mould growth.

Surface condensation can occur on the surfaces of walls, windows, ceilings and floors and may result in mould and mildew. Condensation in buildings occurs whenever warm moist air meets surfaces that are at or below the dew point of that air. The key factor used in assessing the risk of mould growth or surface condensation in the vicinity of thermal bridges is the temperature factor (fRsi).

The temperature factor (fRsi) is defined as follows:

$$fRsi = (T_{si} - T_e) / (T_i - T_e)$$

where:

T_{si} = minimum internal surface temperature,

T_e = external temperature, and

T_i = internal temperature.

For dwellings, the value of fRsi should be greater than or equal to 0.75, so as to avoid the risk of mould growth and surface condensation. Full checks should be performed on the likelihood of surface and interstitial condensation of a construction detail in accordance with I.S. EN ISO 13788 and the 2019 Building Regulations. The Roadstone Thermal Liteblock System provides improved ψ values equal to or better than the standards set out in TGD Part L, 2019 and lower subsequent γ values that limit the risk of surface condensation. The risk of surface condensation and subsequent mould growth is significantly reduced for junctions with lower linear thermal transmittance (ψ values).

Roadstone Thermal Liteblock Characteristics

Roadstone Thermal Liteblock is a durable lightweight concrete block that has been developed for use with traditional masonry wall construction. Roadstone Thermal Liteblock is CE marked to system 2+ in accordance with the requirements of I.S. EN771-3: Specification for masonry units- Part 3: Aggregate concrete masonry units (dense and light-weight concrete).

Table 2: Roadstone Thermal Liteblock: Typical characteristics

Characteristic	Declared Performance	Technical Standard
Block Dimensions	L 440mm H 215mm W 100mm	IS EN 772-16
Weight (dry)	11.2kg	IS EN 772-13
Density	1200kg/m ³	IS EN 772-13
Strength	7.5N/mm ² 13N/mm ²	IS EN 772-1
Thermal Conductivity	7.5 N = 0.33W/mk, 13N = 0.35W/mk	IS EN 1745
Fire Resistance Classification	2 hours	IS EN 1996-1-2
Moisture Movement	0.6mm/m	I.S. EN 772-14
Shear Bond Strength	0.15N/mm ²	IS EN 998-2
Colour	Heather	N/A

ROADSTONE 13N THERMAL LITEBLOCK: DURABILITY & S.R. 325

The Roadstone Thermal Liteblock is now available in 13N. This increased strength Roadstone Thermal Liteblock is ideal for use in commercial and high-rise residential buildings which have greater structural requirements as well as locations below or near ground level requiring increased durability against freeze/thaw attack. The Roadstone 13N Thermal Liteblock has been rigorously tested for freeze/thaw resistance and satisfies all the durability requirements of S.R. 325 Table 14(A). The Roadstone 13N Thermal Liteblock is a CE marked product, manufactured in our state-of-the-art plant under a registered Quality Management System to I.S. EN ISO 9001 and certified by the NSAI.

I.S. EN COMPLIANCE

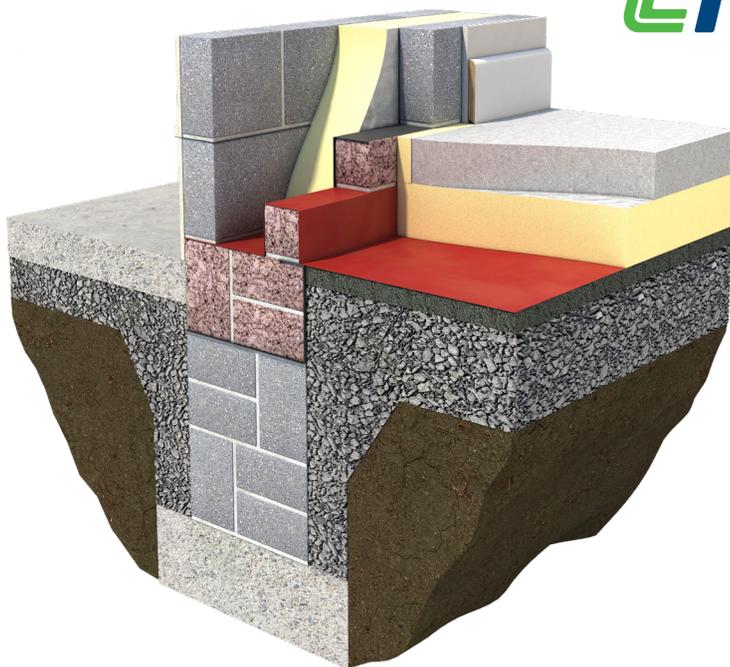
Concrete blocks in Ireland are produced to I.S. EN 771-3 'Specification for masonry units – Part 3: Aggregate concrete masonry units (Dense and lightweight aggregates)'. The standard states that when a suitable layer of render is applied which provides a "complete protection against water penetration no reference to freeze/thaw resistance is required". For this reason there is no concrete block

freeze/thaw resistance EN in place. The standard also states that when relevant "the manufacturer shall evaluate and declare the freeze/thaw resistance of the units by reference to the provisions valid in the intended place of use". This means it is up to the manufacturer to decide on a suitable freeze/thaw resistance test procedure.

S.R. 325 COMPLIANCE

S.R. 325 Table 14 sets out the durability requirements for clay and aggregate concrete masonry units for given exposure conditions. For work below or near external ground level where there is a high risk of saturation with freezing a 13N aggregate concrete block is specified. A minimum block density is also indicated. This combination of higher strength and density satisfies the freeze/thaw durability requirements without the need for costly freeze/thaw resistance testing. To confirm its suitability for use in these severe exposure conditions the Roadstone 13N Thermal Liteblock has undergone freeze/thaw resistance testing as outlined below.

**thermal
Liteblock**



FREEZE/THAW RESISTANCE

The Roadstone 13N Thermal Liteblock has been tested for freeze/thaw resistance using an in-house method based on I.S. EN 772-22 'Determination of freeze/thaw resistance of clay masonry units'. Clay masonry units are typically unrendered and exposed to the elements and therefore require a higher level of freeze/thaw resistance. The test takes 12 days to complete and subjects a saturated masonry panel to 100 cycles of freezing to -15°C and thawing to +10°C, while spraying with water at regular intervals throughout. This is a severe and robust test method and far exceeds the typical freeze/thaw durability requirements of masonry units in Ireland. The Roadstone 13N Thermal Liteblock proved to be exceptionally durable to freeze/thaw attack. Based on the criteria outlined in I.S. EN 772-22 the Roadstone 13N Thermal Liteblock can be classified as Freeze/Thaw Resistance Category F2 (suitable for use in severe exposure conditions) and therefore satisfies the freeze/thaw durability requirements of S.R. 325 Table 14(A).

ADVANTAGES

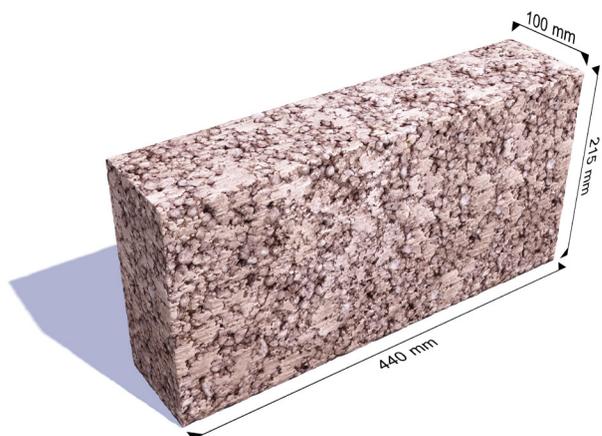
- Traditional concrete block
- Light weight
- Reduced thermal bridging
- $\lambda < 0.35\text{W/mK}$
- High strength
- Freeze/thaw resistance tested
- S.R. 325 Table 14(A) durability compliant
- Retains strength when wet
- Accepts standard block fixings

For more information on the Roadstone Thermal Liteblock, including a full range of Part L compliant thermally modelled technical drawings and AutoCAD details, see www.roadstone.ie



BLOCK RANGE

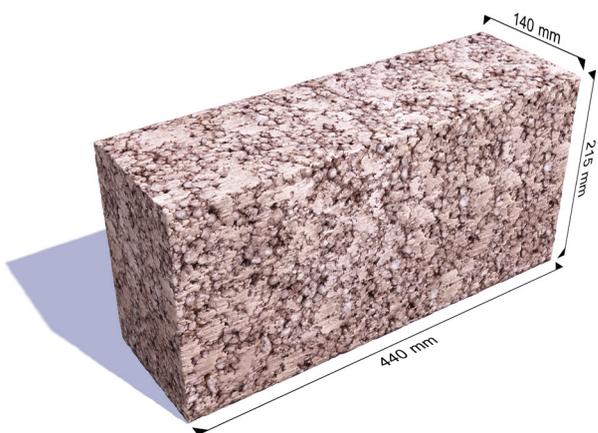
7.5 N/mm² and 13 N/mm²



100mm SOLID



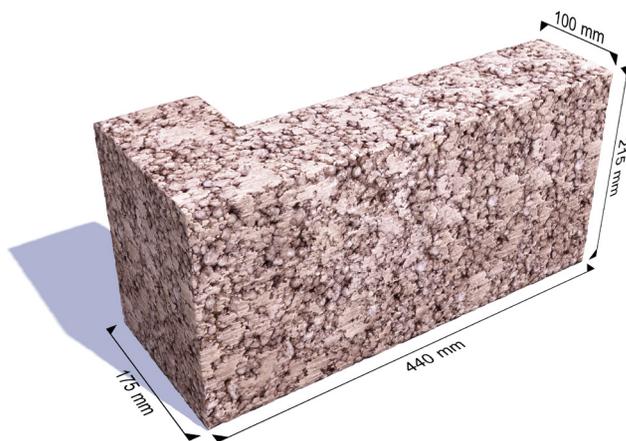
100mm SOAP BAR



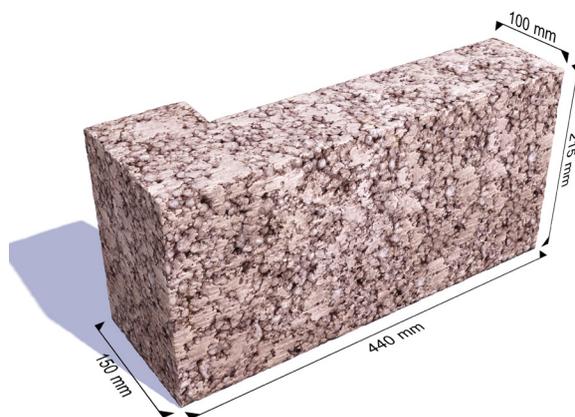
140mm SOLID



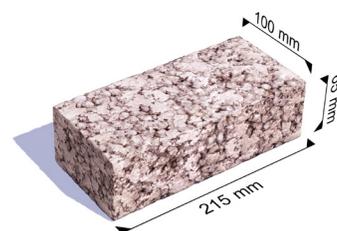
140mm SOAP BAR



CAVITY CLOSER



CAVITY CLOSER



STOCK BRICK

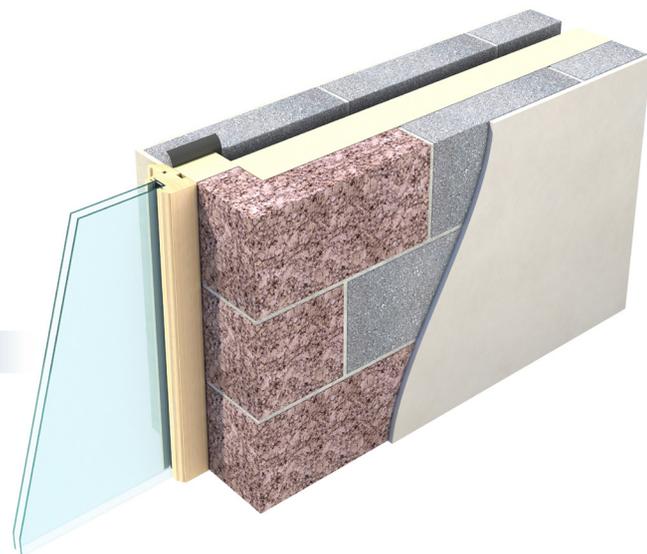




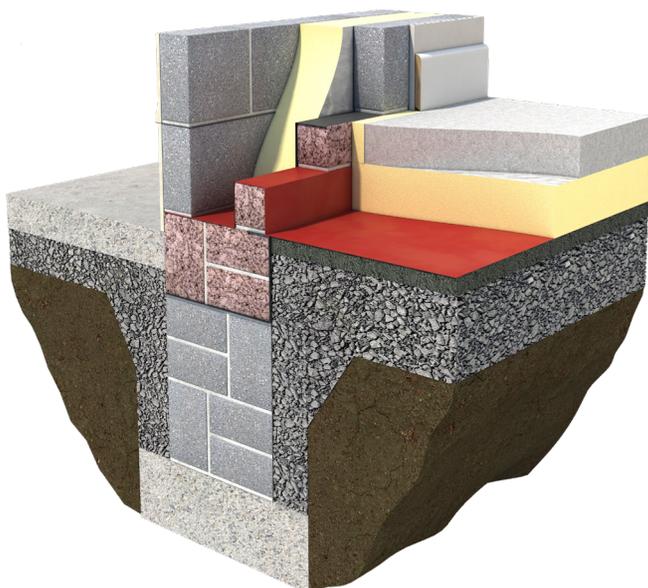
3D DETAILS INDICATE WHERE THERMAL LITEBLOCKS CAN BE USED



EAVES



JAMB

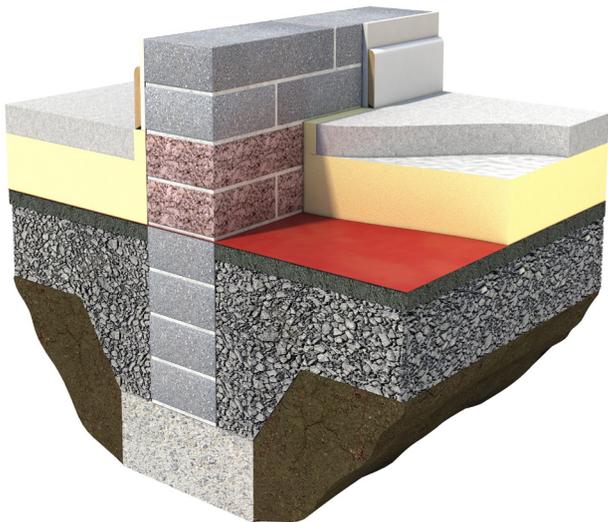


BELOW SLAB

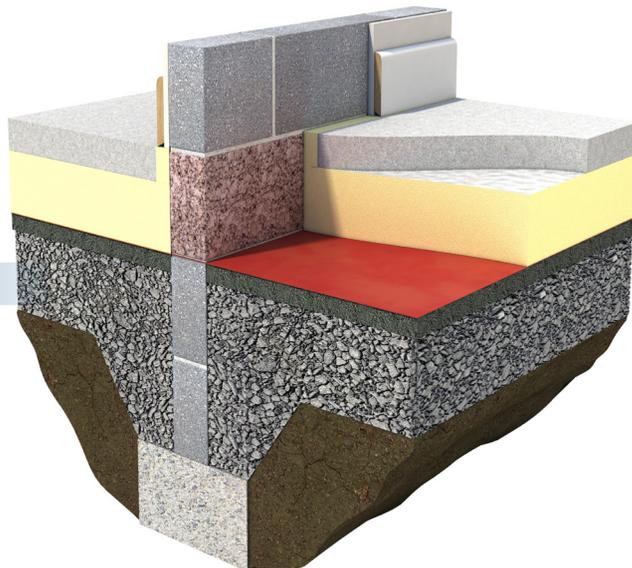




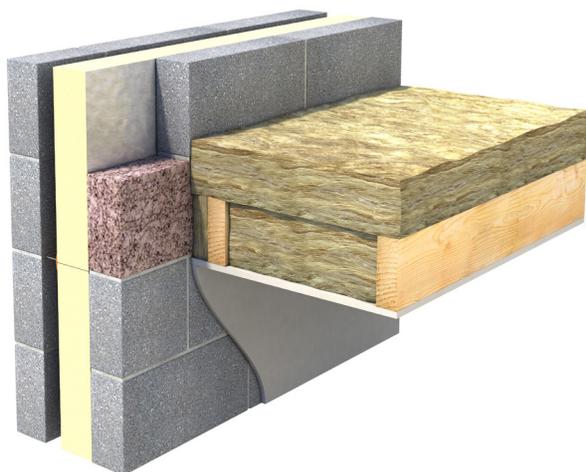
SEPERATING WALL A



SEPERATING WALL B



SEPERATING WALL C



GABLE



Sample Thermal Bridging Details

Download the full range of Technical Drawings from www.roadstone.ie/thermal-liteblock.

440 x 215 x 100 Roadstone Standard Blocks
 440 x 215 x 100 Roadstone Thermal Liteblock
 DPC
 DPM / Radon Barrier

Cavity Wall U-Values vary, see appendix D of TGD part L 2011.

All Blocks (Including Thermal Liteblocks) to be minimum 7.5N in accordance with section 1.1.3.5 TGD Part A 2012)

Ensure wall insulation is installed at least 225mm below top of floor insulation

Floor U Value varies, must be within Ranges set out in Table D1 of Appendix D of TGD part L 2011 for Psi values to be applicable.

See configuration options A and B below, depending on y value requirements.

Floor insulation to tightly abut blockwork wall

Install perimeter insulation with min. R value of 2.27m²/K/W or greater (example 50mm of PIR λ 0.022 = R2.27)

X and Y are to Engineer's Specification

DPM / Radon Barrier

Annex E of SK 21 Material

thermal Liteblock

Roadstone Custom Psi values

U Value Range (W/m ² K)	Part L (Ψ)	Roadstone TLB Psi (Ψ) Value	
		Option A	Option B
0.18	0.080	0.036	0.042
0.15	0.042	0.033	0.040

as modelled by NSAI registered Thermal Modellers:

Andrew Dunne
 Evolution Innovation Ltd.
 Registration Number IAB/TM/07
NSAI Approved Thermal Modeller

Diarmuid Hynes
 Evolution Innovation Ltd.
 Registration Number IAB/TM/04
NSAI Approved Thermal Modeller

All options pass fRsi assessment, no surface condensation predicted

Options A and B in the 0.15 and 0.21 W/m² K U Value ranges surpass default Psi values and therefore a default y-value of 0.06 can be assumed using these options without a y-value calculation, provided all other details in the building comply with the published ACDs / Roadstone details.

Note: Alternative Configuration Depending on Y Value Requirements

OPTION B

Can be single block or two soapbars

OPTION A

440 x 215 x 100

Use Roadstone Thermal Liteblock configuration A or B as advised by Y-Value calculation and Roadstone Technical Support

The diagrams, drawings and details included in this brochure are for indicative purposes only. They do not constitute nor should they be relied upon as giving/providing any design detail. They focus on the issues of thermal performance only. Insulation thicknesses of the main building elements have not been provided, as these are dependent on the thermal properties of the materials chosen, as well as on the desired U value. These diagrams, drawings and details illustrate good practice for the design and construction of interfaces solely in connection with thermal performance. The product should be used with due regard to all other requirements imposed by the Building Regulations and advice should be sought from a design professional in connection with the use of this product where required.

REVISION: B

SCALE: NTS

DWG. NO.: DETAIL RS 1.01 b FF

JUNCTION: FULL FILL CAVITY WALL/ INSULATION ABOVE SLAB

DATE: May 2019

TO BE READ IN CONJUNCTION WITH Y-VALUE CALCULATION

440 x 215 x 100 Roadstone Standard Blocks
 440 x 215 x 100 Roadstone Thermal Liteblock
 Partial fill Cavity Wall
 U-Values vary, see appendix D of TGD part L 2011.

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thermal Liteblock

Roadstone Custom Psi values

U Value Range (W/m ² K)	Part L (Ψ)	Roadstone TLB Psi (Ψ) Value
0.18	0.045	0.042

As modelled by NSAI registered Thermal Modellers:

NSAI
Agreement

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Evolution Innovation Ltd.
Registration Number IAB/TM/07
NSAI Approved Thermal Modeller

NSAI
Agreement

Diarmuid Hynes
Evolution Innovation Ltd.
Registration Number IAB/TM/04
NSAI Approved Thermal Modeller

All options pass fRsi assessment, no surface condensation predicted

*Note:
In the 0.21 U_{min} Range the model surpasses the default Psi value and therefore a y-value of 0.08 can be assumed using this option without a y-value calculation, provided all other details in the building comply with the published ACDs and/or Roadstone modelled details.

REVISION: B

SCALE: NTS

DWG. NO.: DETAIL RS 1.06.1

JUNCTION: PARTIAL FILL CAVITY WALL/ PARTY WALL PLAN DETAIL

DATE: May 2019

TO BE READ IN CONJUNCTION WITH Y-VALUE CALCULATION

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440 x 215 x 100 Roadstone Standard Blocks
 440 x 215 x 100 Roadstone Thermal Liteblock
 Continue cavity wall insulation to top of gable
OR
 270mm above bottom of ceiling tie and insert cavity tray
Roof buildup:
 Varies, to achieve U values within the wall 0.21 or 0.15 Range (refer to Appendix D of TGD part L 2011)

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thermal Liteblock

Roadstone Custom Psi values

U Value Range (W/m ² K)	Part L (Ψ)	Roadstone TLB Psi (Ψ) Value
0.18	0.272	0.173
0.15	0.152	0.129

As modelled by NSAI registered Thermal Modellers:

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NSAI
Agreement

Diarmuid Hynes
Evolution Innovation Ltd.
Registration Number IAB/TM/04
NSAI Approved Thermal Modeller

All options pass fRsi assessment, no surface condensation predicted

*Note:
Both the 0.21 U Value Range and the 0.15 U Value range models surpass the default Psi values and therefore a y-value of 0.08 can be assumed using this option without a y-value calculation, provided all other details in the building comply with the published ACDs and/or Roadstone modelled details.

REVISION: B

SCALE: NTS

DWG. NO.: DETAIL RS 1.15

JUNCTION: PARTIAL FILL GABLE CAVITY WALL/ VENTILATED ROOF - INSULATED AT ATTIC FLOOR LEVEL

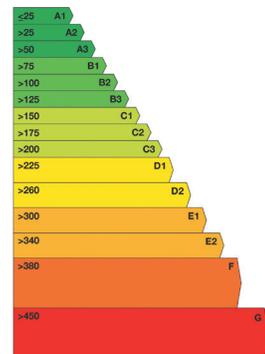
DATE: May 2019

TO BE READ IN CONJUNCTION WITH Y-VALUE CALCULATION

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Files are compatible with Autocad 2013 and newer.

thermal Liteblock



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