CASTLE FORMS
INSULATED CONSTRUCTION SYSTEMS

www.castleforms.com

# RAFT THERM
ADVANCED RAFT STRUCTURES

## What is Raft Therm?

**Raft Therm is an NSAI certified insulated foundation system used in the construction of residential homes and commercial buildings. Exceptional ground floor U values (as low as 0.1 W/m²K) are achieved and cold bridging eliminated by wrapping the entire concrete sub-structure with Raft Therm's Expanded Polystyrene (EPS) components.**

Raft Therm is a cost effective system that permits simplified design with high insulating values and long term durability. The combination of high density polystyrene and reinforced concrete delivers an engineered foundation and ground floor sub-structure with excellent thermal performance capable of achieving a passive standard. Raft-Therm is lightweight, easy to assemble, compatible with underfloor heating systems and is suitable for use in most ground conditions.

## Where can Raft Therm be used?

**The Raft Therm system may be used as a replacement for traditional strip and concrete raft foundations in buildings up to two storeys in height subject to final structural design.**

Raft Therm is compatible with all wall types such as traditional masonry, timber frame, SIP panels, light gauge steel and ICF.

The components are factory prepared to suit each project's unique engineering specification and target U-value. On-site the components are easy to handle with no special lifting equipment required for their assembly.

NSAI Cerfified - Irish Agrement Board Certificate Number 23/0434

CASTLE FORMS
INSULATED CONSTRUCTION SYSTEMS

# How does Raft Therm work?

**The Raft Therm system combines the strength of reinforced concrete with the insulating benefits of expanded polystyrene to deliver long-term thermal benefits to the building user.**

The loadbearing components of the Raft Therm system are moulded from EPS 300, a high density expanded polystyrene that achieves a compressive strength of 300 Kn/m² @ 10% compression as per EN13163:2012. The compressive strength of EPS 300 at 1% compression is typically 120Kn/m², a standard two storey dwelling built from concrete blocks will typically generate a loading of between 75 and 95 kn/m²* which is comfortably inside the carrying capacity of EPS 300 used in the Raft Therm system.

Medium density EPS 100 insulation is fitted under the non-load-bearing ground floor slab.

** Indicative figures only and advice should be taken from a suitably qualified engineer.*

# Design, Site Prep & Assembly

The Raft Therm system must be designed by a suitably qualified engineer. The ground conditions, loads generated by the building and distribution of loads through the walls must be considered when specifying and designing the Raft Therm system. Once a design has been finalised the Raft Therm foundation and floor components are moulded and cut to exact dimensions in the factory. Straight perimeter L section components aretypically supplied in 1.3m or 2m lengths, while floor insulation is supplied in 2m or 2.4m long sheets.

After an initial ground investigation survey on-site, the footprint of the building + 1m is excavated down to good natural ground. Graded stone fill (typically T3 blinding on T2 permeable on T3 structural) is placed and compacted with services installed as per the project engineer's instructions. The radon membrane is fitted on top of the T3 blinding prior to assembly of the insulated raft, at a later stage the membrane is dressed up the outside of the insulated raft.

Because of the lightweight nature of the components the Raft Therm system is quickly assembled without the need for any lifting equipment. L shaped EPS 300 components are placed around the perimeter and secured together using steel combs, once in position the L section's create a shuttering profile for the concrete perimeter edge beam.

EPS 300 flat sheets are next carefully fitted underneath internal loadbearing walls as specified by the project engineer where the concrete slab is usually thickened. " EPS 100 floor insulation sheets are then fitted in alternating layers and secured in position using plastic pins.

Once the EPS components have been assembled, steel reinforcement as specified by the project engineer and service pipework are fitted and readymix concrete carefully placed and finished.

RAFT THERM
ADVANCED RAFT STRUCTURES

# Benefits

## Raft Therm:

1. Fully insulated foundation system that can achieve ground floor U values to meet passive house standards.
2. Efficient solution that delivers build programs on time. Concrete foundations and floors are poured simultaneously while masonry rising walls are eliminated.
3. Suitable for use in conjunction with various wall types including masonry, timber frame, light gauge steel and ICF.
4. Components are pre-formed in our factory, requiring minimal preparation on site.
5. Comparable in price to traditional foundations offering exceptional value with superior thermal performance.
6. Utilises the thermal mass of concrete by absorbing and retaining heat when the building is warm then releasing this heat back into the building as it cools, thereby maintaining a more constant temperature.
7. High scoring Psi value reduces risk of condensation occurring at floor/wall junction.
8. Suitable for use with underfloor heating systems.
9. A permanent and sustainable insulation solution that requires no maintenance.
10. Effective at conserving energy by drastically reducing heat loss through the floor and cold bridging through traditional masonry rising walls.
11. Suitable for residential and commercial applications.
12. CE marked - Manufactured to harmonised technical specification EN 13163:2012+A1:2015.
13. Lightweight and easy to handle with no specialised lifting equipment required for assembly.

# Thermal Performance

**A building with a well-balanced U value, good air tightness and carefully designed junction details will deliver a high thermal performance and require less energy to heat.**

## Buildings typically lose heat through the ground floor in two ways:

### 1. Through the fabric of the floor

Measuring the rate at which heat passes through one square metre of the ground floor make up is referred to as the U value (W/m²K).

Subject to final design, the Raft Therm system can achieve a passive ground floor U values of 0.1W/m²K which significantly contributes to:

- achieving regulatory compliance
- low energy housing
- enhance Passive standard detailing.

### 2. By cold bridging through traditional masonry rising walls

Measuring the thermal transfer or conductivity of heat for every linear meter at a building junction is referred to as the psi value (W/mK). The psi value measures the extra heat flow through the linear metre over and above that of the adjoining elements (floor and wall). The psi values for any given junction are multiplied by the lengths of those junctions to give the total HTB (Heat Thermal Bridge) which is then divided by the total m² of the envelope (walls, floor, roof) to calculate the buildings Y value.

Part L-TGD & DEAP applies a default value to all junctions if no specific thermal models or ACD's are available. The CastleForms Raft-Therm system has been assessed by an NSAI registered Thermal Modeller, certified Psi values are therefore available which may be used in the calculation method as per TGD Part L and DEAP to determine the y-value for buildings using specific Raft Therm details.

Subject to final design, the Raft Therm system can deliver lower Psi values when compared to ACDs which contributes to:

- energy efficient building junctions
- a higher internal surface temperature to avoid surface condensation at building junctions.
- an improved Y value within BER calculations (project specific)

# Summary

The Raft Therm system provides multiple benefits to the developer, builder and home owner. It's flexibility in design, ease of construction and performance over the life of the building all demonstrate the value inherent within this innovative foundation system.