

Cellcore HX Data Sheet



Cellcore HX is Cordek's fourth generation collapsible void former and has been designed to protect foundations from the effects of ground heave.

The product consists of a cellular construction of expanded polystyrene which has been designed, moulded and tested to tight tolerances to achieve the specified performance characteristics.

The standard range of products are available in a variety of depths and grades to suit most commonly encountered combinations of soil heave potential and concrete depth. If a suitable product for your requirements is not listed below please contact our sales support desk for further assistance.

In addition to the standard Cellcore HX range, variations of the product are available:

- Cellcore HX with EPS insulation incorporated
- Cellform HX with integral formwork for ground beams
- Cellvent which includes protection against VOC's and ground gases
- Cellcore HG suitable for providing ground heave protection where concrete depths exceed the capacity of the standard Cellcore HX range

For further information on the full range of Cordek's Ground Heave Solutions, please contact the Cordek technical team on 01403 799600, techsupport@cordek.com or consult our website at www.cordek.com.

Key Features

- It reduces the upward force transmitted to the structure
- Wide range of profiles and grades to suit most applications
- BBA certified
- Meets the NHBC's Technical Standards
- Moulded production for enhanced and consistent performance
- Available with integral EPS insulation, permanent formwork for ground beams or voids for gases to vent

Installation

The procedure for installing Cellcore panels is straightforward, but the following points should be adhered to:

- Please ensure that Cellcore panels are placed upon a suitable firm and level surface. Typically a layer of concrete blinding beneath the panels is recommended.
- The lightweight but durable panels can be easily laid by one person. Where they are required to be cut this can be carried out using a fine tooth saw or hot wire cutter (available for hire from Cordek – please contact our sales team on 01403 799600).



- When installing Cellcore adjacent to piles, we suggest that the use of Heaveguard pile collars is considered – please see the Cordek Heaveguard data sheet for further information.
- Individual panels should be butted together, with taping of the joints using the formwork tape to avoid any grout loss between the panels.
- Reinforcement spacers can be positioned directly upon the Cellcore panels, the top surface of the panels can be reinforced with a layer of concrete blinding to spread the spacer loads if a very heavy reinforcement cage has been specified.

Due to the relatively light nature of the product, all packs of Cellcore should be weighted down or secured should they be stored outside prior to installation. No further storage requirements are needed as the product is unaffected by both UV light and water.

Product Sizes

Standard Panel: 2400mm x 1200mm

Beams Widths: 2400mm x 1200mm to 300mm (in 25mm increments)

Storage & Handling

All products are delivered in a polythene wrapping and are clearly labelled. Both packs of Cellcore and individual panels can be manually handled and offloaded upon delivery, taking in to account any site specific manual handling regulations.

Product specification

Firstly the depth of the Cellcore HX panel should be determined by the heave potential of the soil, as detailed in table one below:

Table One

Results of Soil Analysis	NHBC Category	Predicted Ground Movement or BRE/ NHBC requirement	Depth of Cellcore HX required to achieve 'Equivalent Void'	
Plasticity Index	Shrinkage Category	Void Dimensions (mm)	HX S (mm)	HX B (mm)
10 - 20	Low	50	90	85
20 - 40	Medium	100	160	155
40 - 60*	High	150	225	220

* When the analysis exceeds 60 or a deeper void is required, please consult our Technical Services team.

Secondly, the grade of the product is determined by the depth of the concrete to be cast on the Cellcore, as detailed in table two below:

Table Two

Grade*	Safe Load (kN/m ²)	Fail Load (kN/m ²)	Maximum Concrete Depth** (mm)
7/10	7	10	220
9/13	9	13	300
13/18	13	18	460
18/24	18	24	660
24/32	24	32	900
32/42	32	42	1220

* For easy identification the panel labels are coloured as shown.

** Based on the Eurocode and a live load allowance of 1.5kN/m².

For concrete thicknesses between 1220mm and 2000mm, further grades of Cellcore are available. For further advice please contact the Cordek technical team on 01403 799600.

Design Notes

- Each Cellcore grade is designed to support a given thickness of concrete plus a live load allowance of 1.5 kN/m² with negligible creep compression during a 16 hour curing period; this is known as the **SAFE LOAD**.
- At the pre-determined load the polystyrene legs of the Cordek panels will buckle and collapse due to the upward

movement of the ground beneath; this is known as the **FAIL LOAD**.

- The slab, beam or pile cap must be designed to accept the difference between its self-weight and the fail load (please see design examples on next page).



Design Examples

Design Example 1



Lightweight Slab (220mm thick)

- Assume the soil survey showed a plasticity index of 15.
- Table 2 shows the potential for ground movement is low.
- BRE/NHBC data recommends a clear Void of 50mm.

1. Total deadweight/downward load is:

Self weight of 220mm concrete slab:

$$\begin{aligned}
 0.22 \times 25\text{kN/m}^3 &= 5.5\text{kN/m}^2 \\
 \text{Live load allowance} &= 1.5\text{kN/m}^2 \\
 \textbf{TOTAL LOAD} &= \textbf{7.0kN/m}^2
 \end{aligned}$$

2. Table 1 shows the next SAFE LOAD value is 7kN/m²
(Fail Load of 10kN/m²)

The appropriate Cellcore HX S grade = 7/10

3. A maximum 50mm of ground movement is predicted and Table 2 shows that,

The Cellcore HX S depth to accommodate this = 90mm

So, the full product specification =

Cellcore HX S 90mm 7/10

As stated above, this Cellcore HG S grade has a
FAIL LOAD of 10 kN/m²

The slab must be suitably designed to accommodate the transmitted load and two possible modes of failure should be considered:

- i) The Slab being lifted off the foundation.
- ii) Failure of the Slab in bending or shear due to the uplift.

Design Example 2



Beam (600mm deep)

- Assume the soil survey showed a plasticity index of 30.
- Table 2 shows the potential for ground movement is medium.
- BRE/NHBC data recommends a clear Void of 100mm.

1. Total deadweight/downward load is:

Self weight of 600mm concrete beam:

$$\begin{aligned}
 0.60 \times 25\text{kN/m}^3 &= 15.0\text{kN/m}^2 \\
 \text{Live load allowance} &= 1.5\text{kN/m}^2 \\
 \textbf{TOTAL LOAD} &= \textbf{16.5kN/m}^2
 \end{aligned}$$

2. Table 1 shows the next SAFE LOAD value is 18kN/m²
(Fail Load of 24kN/m²)

The appropriate Cellcore HX B grade = 18/24

3. A maximum 100mm of ground movement is predicted and Table 2 shows that,

The Cellcore HX B depth to accommodate this = 155mm

So, the full product specification =

Cellcore HX B 155mm 18/24

As stated above, this Cellcore HG B grade has a
FAIL LOAD of 24 kN/m²

The beam must be suitably designed to accommodate the transmitted load and two possible modes of failure should be considered:

- i) The Beam being lifted off the top of the piles.
- ii) Failure of the Beam in bending or shear due to the uplift.



Additional Cellcore Products

Cellcore HX Plus

In cases where insulation is also required beneath the slab, the Cellcore HX Plus range can be utilised to provide combined ground movement protection and insulation from a single product.

The thermal resistance of the Cellcore HX Plus is based upon the thickness of insulation incorporated within the panels, as outlined in the table below. Please contact the Cordek technical team on 01403 799600 for further assistance with determining the most appropriate Cellcore HG Plus specification.

Thickness (mm)	Thermal Resistance m ² c/w
50 (Standard)	1.39
75	2.08
100	2.78
125	3.47
150	4.17

Cellform HX

Cellform HX combines the benefits of Cellcore HX with an economical and simple to install permanent formwork system.

Each Cellform HX panel is supplied to the required beam width and depth. The principle is that the hinged side panels are supported off the reinforcement cage by concrete spacers, this then allows the excavation to be backfilled. The backfill then supports the formwork against the concrete pressure whilst the beam is cast and thereby avoids the need for fixing and striking traditional formwork.

Cellvent

Cellvent HX protects a building from both ground heave and hazardous soil gases and is designed for use under suitably reinforced concrete floor slabs.

For further details and design examples please refer to our Cellvent HX data sheet which is available to download from www.cordek.com.

Cellcore HG

The range of products are available in a variety of depths and grades to suit the most commonly encountered combinations of soil heave potential and concrete depths that exceed the capacity of the standard Cellcore HX range.

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