LEADING THE PRECAST INDUSTRY SINCE 1919

PRECAST CONCRETE FLOORING
This Bison precast concrete flooring document is a comprehensive product and technical guide designed for Structural Engineers, Civil Engineers, Specifiers and Contractors.

It provides a range of products and solutions to choose from and is supported by technical details, specifications and design guidelines/considerations for Part A, Part E and Part L.
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FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
BISON
LEADING THE PRECAST INDUSTRY SINCE 1919

Excellent customer service, investment in research and development and an unrivalled understanding of market needs are just some of the reasons we have been ahead of the field for so long.

RESOURCES AND CAPACITY
The largest production capacity across four manufacturing plants throughout the UK, with Certificates of Assessed Capability, awarded by the British Standards Institution.

INNOVATION
Over the last seven years, Bison has invested £50 million to ensure that our customers continue to benefit from innovative approaches to production, installation and service.
We can boast a number of unique developments such as mechanically inserted Lifting Hooks and the Trailasafe® fall arrest system.
SUSTAINABILITY
With Bison products, you can be certain that all materials have been produced in conditions designed to have as little impact on the environment as possible. Swadlincote is the most environmentally friendly factory of its kind in the world.

CUSTOMER DRIVEN
Our investment is focused on meeting and exceeding customer expectations. Bison customers in all the sectors we serve know that they can rely on us for outstanding technical support, reliability and the highest quality product.

CUSTOMER SERVICE
The Bison service team provide comprehensive support, from estimating to production and a contract team who install the products on site. Wherever you are in the UK, Bison’s nationwide coverage ensures that support is never far away.

DESIGN SUPPORT
Bison’s in-house team represents the very best in the industry and is on hand to give design advice for any project, large or small. They can help identify the optimal solution for your project, whether this means using one of our many precision-made steel moulds, or taking the bespoke approach with a custom-made casting.

Designs are produced in our centralised production planning department and downloaded to the factory machines by wireless link.

The Bison Precast Floor Designer software can assist with the design of many Bison products including Hollow Core slab units, Composite Hollowcore slab units and Solid Composite slab units.
Bison Concrete Floors are prestressed precast concrete slabs used in all building types

Bison Concrete Floors are manufactured using a long line casting technique with automatic casting equipment which places high strength, low water/cement ratio concrete under a high degree of vibration and compaction.

**BISON HOLLOW CORE & SOLID FLOORS**

Widely used in masonry, steel and concrete structures for domestic, commercial and industrial buildings. The most economic flooring solution for the widest variety of situations, providing the maximum benefits of speed of construction.

**BISON HOLLOW COMPOSITE FLOORS**

A combination of the Bison Hollow Core Slab with a structural concrete topping. This type of floor gives the benefit of an increased structural performance with an enhanced lateral load distribution where necessary for heavy point loads. The floor may be designed in the unpropped or partially propped condition to suit particular requirements.
BISON CONCRETE FLOOR TYPES

BISON SOLID COMPOSITE FLOORS
Combines the advantages of a precast, prestressed element acting compositely with an in-situ concrete structural topping to form a solid slab. The prestressed element, whilst eliminating the need for conventional shuttering, provides a structural performance far superior to normally reinforced concrete.

LIFTING HOOKS
All Bison Precast Concrete Floors are available with inserted lifting hooks. For more information see section ‘Related Products’, pages 62 & 63.

INSULATED HOLLOW CORE GROUND FLOORS
The system consists of expanded polystyrene (EPS) bonded to the soffit of Hollow Core units and formed to provide special end and side bearing support where required.

THE BISON SOUND SLAB
The Bison Sound Slab has been specially developed to provide an economic and structurally efficient means of satisfying the requirements of Part E Sound Regulations.

FLOOR HEATING AND COOLING SYSTEMS
As the conservation of energy continues to be a major issue surrounding the environment, Bison has entered into a strategic partnership with velta UK. With over 35 years’ experience, velta have been responsible for some of the industry’s most important innovations in floor heating and cooling systems and now offers the widest range of solutions specifically designed to meet the requirements of each individual project. Bison and velta have joined forces to provide an innovative, sustainable and cost effective floor heating and cooling system which is precast into Bison flooring products providing off site manufacturing benefits.
Bison has a prolonged proven track record within commercial/industrial markets and produces a range of products and solutions for many different floor applications. This encompasses shops, shopping precincts, multi-storey car parks, office developments, factories and warehouses.

However, the types of constructional components used in these buildings are also often specified for large public developments such as schools and hospitals.
In traditional single-occupancy housing, individual Bison products can solve particular problems for the designer, arising from site conditions, constructional constraints or the Building Regulations, including Part E, Part A and Part L.

Similarly for multiple-occupancy housing, individual Bison products can solve particular problems.

Bison has a sustained track record and reputation within the multiple occupancy market. A range of floor solutions and products provide the architect and the structural engineer with flexibility in design as well as satisfying the Building Regulations, particularly with reference to sound attenuations (Part E), Thermal Performance (Part L) and Structural Robustness (Part A).
## Hollow Core Floors

### The Benefits

#### Design

**Structural Efficiency**
A Hollow Core slab offers the ideal structural section by reducing deadweight while providing the maximum structural efficiency within the slab depth.

**Flexibility of Design Approach**
Precast floors are available with a variety of factory-formed notches, slots and reinforcement arrangements which offer various design approaches.

### Manufacturing

**Factory Produced to Rigorous Quality Standards**
Because precast floors are factory produced, they are manufactured in an environment which is more readily controlled than a building site. Quality control systems are properly implemented and are independently examined on a regular basis under the British Standards Institution Quality Assurance Scheme, BS EN ISO 9001 approved.

**Fire Resistance**
Standard precast floors can be supplied with a fire resistance of up to two hours. Periods in excess of this can be provided with modified sections if required.

**Finished Soffits**
Precast floors are manufactured on high quality steel beds and, in appropriate cases, are suitable for direct decoration. Exposed soffits can easily be accommodated.

### Construction

**Minimum In-Situ Concrete**
With a precast floor, a lot of the work is done off site. This eliminates what can be complex, time-consuming and weather-affected site work.

**Speed of Erection**
Time-consuming activities such as propping, shuttering and concrete-pouring are virtually eliminated.

**Immediate Unpropped Working Platform**
Once a precast floor is erected, it is immediately available as a working platform. In comparison, steel deck systems can present problems in achieving level surfaces while concrete is being poured, and in enabling access while in the propped condition.
HOLLOW CORE FLOORS

CASE STUDIES

COMMERCIAL BUILDINGS AND CAR PARKS

The office block shown is the British Gas offices in Solihull, West Midlands. This is a typical commercial application where the structural form consists of a steel frame with 7.5 x 8.7m bays and 200mm precast Hollow Core units spanning 7.5m. A total of 9,100m² of precast units were used and 40m³ of precast stair.

Multi storey car park in Nuneaton where 10,000m² of 150mm deep Hollow Core floor units and 67m³ of precast stair units was used to provide excellent durability and performance in a busy, robust car park environment.

RETAIL DEVELOPMENTS

The IKEA outlet in Manchester is constructed using a steel frame with precast unit floors. Over 40,000m² of 200mm deep Hollow Core precast floor units were used in the construction. The grid reflected the use of car park, retail and offices on different floors.

Drake Circus Shopping Centre located in Plymouth used 19,000m² across a combination of Hollow Core floor profiles from 200mm up to 450mm deep.

HOSPITAL & STADIA DEVELOPMENTS

Pictured is a hospital in Exeter constructed using a steel frame structure with 200mm and 300mm deep Hollow Core units used to span up to 9m. This provided flexibility in span lengths and optimised design for the applied loads over 4,250m² floor area throughout.

Millennium Stadium in Cardiff used over 48,000m² of precast Hollow Core floor units and over 380 precast stair units.
HOLLOW CORE FLOORS
UNIT PROFILES

- 150mm Sound Slab unit profile
- 75mm unit profile
- 100mm unit profile
- 150mm unit profile
- 200mm unit profile
- 250mm unit profile
- 260mm unit profile
- 300mm unit profile
- 350mm unit profile
- 400mm unit profile
- 450mm unit profile

1200mm Nominal Width
HOLLOW CORE FLOORS
LOAD/SPAN TABLE

Largely because of fast on-site construction, Bison Hollow Core Floors are one of the most economic flooring solutions for the widest variety of situations including masonry, steel and concrete structures for retail, commercial and industrial buildings.

<table>
<thead>
<tr>
<th>Overall structural depth mm</th>
<th>Characteristic service loads kN/m²</th>
<th>Effective span in metres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.75</td>
<td>1.5</td>
</tr>
<tr>
<td>100*</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>150*</td>
<td>7.5</td>
<td>7.5</td>
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<tr>
<td>200</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>12.3</td>
<td>11.5</td>
</tr>
<tr>
<td>300</td>
<td>15</td>
<td>14.9</td>
</tr>
<tr>
<td>350</td>
<td>17.4</td>
<td>16.5</td>
</tr>
<tr>
<td>400</td>
<td>18.5</td>
<td>17.6</td>
</tr>
<tr>
<td>450</td>
<td>19.9</td>
<td>19</td>
</tr>
</tbody>
</table>

Spans indicated below allow for characteristic service load (live load) plus self weight plus 1.5 kN/m² for finishes.

The table is given as a guide only. When using maximum spans, consideration must be given to the effect of camber and deflection on partitions or finishes. Further advice is available on request. * 35mm screed required for 2 hour fire resistance.
HOLLOW CORE FLOORS

BEARING DETAILS

BEARING ON SHELF ANGLES

25 mm clearance is required to allow unit to be dropped into position past the flange of the supporting U.B.

Finishes

Structural concrete infill

Nominal bearing 75
Minimum bearing 50

Projection of angle beyond extremity of flange 50 mm. Greater where U.C. sections are used. Refer to Bison for assistance.

25 mm clearance

FOR EXTENSIVE TECHNICAL DETAILS PLEASE VISIT OUR WEBSITE: www.bison.co.uk
HOLLOW CORE FLOORS
BEARING DETAILS

BEARING ON MASONRY

Nominal bearing $t/2 - 10$ mm
Wall thickness $t > 190$

SIDE BEARING

Where required by Building Regulations for sound insulation.
Continuous wet mortar by builder to take up camber

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HOLLOW CORE FLOORS

BEARING DETAILS

NARROW WALL BEARING

- **Finishes**
- **Nominal bearing**: $t/2 - 10$ mm (Min. 65 mm)
- **Wall thickness**: $t < 190$ mm (Min. 140 mm)

(NB. In order to satisfy the tolerances in this situation, this detail is only recommended where a full bearing is available at the other end of the slab)

NARROW BEARING ON STEELWORK

- **Finishes**
- **Nominal bearing**: $t / 2 - 10$ mm
- **Wall thickness**: $t \leq 150$ mm (Min. 140 mm)

- **Tie reinforcement at 400 c/c in joints and troughs provided in 1200 wide units**
HOLLOW CORE FLOORS

BEARING DETAILS

END SLOTS IN UNITS

Slots may be provided in slab ends for the purpose of tying into the structure for nominal continuity.

TRIMMING OPENINGS

M.S.Trimmer. Fire protection, where necessary by General Contractor.

The recommendations for bearings of precast units are set out in Clause 5.2.3 of B.S. 8110:1997. These vary according to the type of floor construction and the type of support material and building tolerances. In general nominal bearings of 100 mm on masonry or 75 mm on steelwork are recommended but may be reduced dependent upon circumstances and subject to the above clause.
HOLLOW COMPOSITE FLOORS
UNIT PROFILES

200 to 225mm overall composite depth
comprising 150mm unit with 50 or 75mm structural topping

250 to 275mm overall composite depth
comprising 200mm unit with 50 or 75mm structural topping

300 to 325mm overall composite depth
comprising 250mm unit with 50 or 75mm structural topping

335mm overall composite depth
comprising 260mm unit with 75mm structural topping

375mm overall composite depth
comprising 300mm unit with 75mm structural topping

425mm overall composite depth
comprising 350mm unit with 75mm structural topping

475mm overall composite depth
comprising 400mm unit with 75mm structural topping

525mm overall composite depth
comprising 450mm unit with 75mm composite material

For extensive technical details please visit our website: www.bison.co.uk
A Bison Hollow Composite Floor is a Bison Hollow Core Slab with a structural concrete topping. This combination delivers increased structural performance overall, with an improved lateral load distribution where necessary for heavy point loads. The floor may be designed in the unpropped or partially propped condition to suit particular requirements. It is particularly suitable for industrial buildings, high buildings, car parks or other structures where additional longitudinal and transverse tying is required.

The above data is based upon 50 or 75mm structural topping of C30 concrete which should be regarded as a minimum. Other topping depths may be recommended in some circumstances. Design data for alternative combinations are available from Bison design offices. In relation to the overall structural concept of the building it is also important also to consider topping reinforcement, daywork and movement joints.

<table>
<thead>
<tr>
<th>Overall structural depth mm</th>
<th>Spans indicated below allow for characteristic service load (live load) plus self weight plus 1.5 kN/m² for finishes</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Characteristic service loads kN/m²</td>
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<td>525</td>
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</table>
SOLID COMPOSITE FLOORS
UNIT PROFILES

Bison Solid Composite Floors consist of a precast, prestressed element acting compositely with an in-situ concrete structural topping to form a solid slab. This combination of elements delivers the benefits of both, such as a structural performance far superior to normally-reinforced concrete, reduced construction depths, no shuttering, minimal propping, built-in fire resistance, fast erection, and increased flexibility of architectural and engineering design, such as the scope to incorporate all the details normally associated with in-situ design, such as the tying in of balconies, trimming of openings, maximum load distribution and minimum structural depth.

- 75mm unit with 50mm structural topping
- 75mm unit with 75mm structural topping
- 75mm unit with 100mm structural topping
- 75mm unit with 125mm structural topping
- 100mm unit with 50mm structural topping
- 100mm unit with 100mm structural topping
- 100mm unit with 150mm structural topping
- 100mm unit with 200mm structural topping

1200mm Nominal Width
SOLID COMPOSITE FLOORS

LOAD/SPAN TABLE

A Bison Hollow Composite Floor is a Bison Hollow Core Slab with a structural concrete topping. This combination delivers increased structural performance overall, with an improved lateral load distribution where necessary for heavy point loads. The floor may be designed in the unpropped or partially propped condition to suit particular requirements. It is particularly suitable for industrial buildings, high buildings, car parks or other structures where additional longitudinal and transverse tying is required.

<table>
<thead>
<tr>
<th>Fire Resistance</th>
<th>Unit depth</th>
<th>Overall structural depth mm</th>
<th>Self Wt kn / m²</th>
<th>Spans indicated below allow for characteristic service load (live load) plus self weight plus 1.5 kn / m² for finishes</th>
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<td>Propped or Unpropped</td>
<td>Characteristic service loads kn / m²</td>
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<td>75</td>
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<td>7.07</td>
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</tbody>
</table>

*Enhancement of the stated fire period may be achieved by applied soffit finishes.*

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SOLID COMPOSITE FLOORS

BEARING DETAILS

SIMPLE BEARINGS ON TOP FLANGE OF STEELWORK

Nominal support reinforcement and/or daywork joints determined by general layout and site operation.

40 mm
Min. bearing

SLAB COMPOSITE WITH SUPPORTING BEAM

Flange reinforcement and shear studs as required by steelwork design

40 mm
Min. bearing

BEARINGS ON SHELF ANGLES

Minimum 25 mm cover to top of steel beam flange

Minimum 50 mm clearance
Nominal 50 mm bearing

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SOLID COMPOSITE FLOORS

BEARING DETAILS

CANTILEVER CONSTRUCTION

In-situ structural topping on precast element

Precast balcony element

For IsoPro balcony requirements refer to Bison for assistance.

IN-SITU CONSTRUCTION CENTRED

Solid composite floors may be placed on in-situ beam downstands or supported on shutters before pouring site concrete

Nominal 50 mm bearing for precast elements

IN-SITU CONSTRUCTION SIDE

Beam depths and widths to suit specific requirements

Nominal 50 mm bearing for precast elements

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HOLLOW CORE FLOORS

THE BENEFITS

USER BENEFITS

SOUND RESISTANCE
The single most common complaint in relation to housing is noise nuisance. Timber floors have little sound resistance and most people will be familiar with the problems and the inconvenience of sound transmission, particularly from upstairs to downstairs. Precast concrete floors provide an extremely efficient sound barrier between separate living areas.

MAINTENANCE
Precast concrete is an inert material. It does not shrink and warp like timber and does not produce the cracking of plasterwork and other finishes which result in an ongoing and costly maintenance problem. Concrete is not subject to damage from rot or insect attack.

SQUEAKY FLOORS
Another problem associated with the shrinkage of timber materials is the squeaking between boards and joists when walked upon. This is extremely irritating and very expensive to rectify. This problem does not exist with a concrete floor.

FIRE
Adequate fire resistance is an important design feature of any modern building. It has long been recognised that floors between flats in multi-occupancy housing should have a high level of fire resistance. Consequently, these are almost always constructed in concrete in order to satisfy the Building Regulations. It seems reasonable that a similar level of protection should be afforded to those living in houses. Concrete is, of course, a non-combustible material and it also acts as a solid barrier which will contain not only the fire but the smoke, which is the primary cause of most fatalities in fire accidents.

FACTORY PRODUCED TO RIGOROUS QUALITY STANDARDS
Because precast floors are factory produced, they are manufactured in an environment which is more readily controlled than a building site. Quality control systems in Bison factories are properly implemented and are independently examined on a regular basis under The British Standards Institution Quality Management System defined in BS EN ISO 9001.

CONSTRUCTION BENEFITS

DESIGN FLEXIBILITY
Unlike timber, a precast concrete floor provides a structural platform which gives the house designer greater freedom in supporting upper floor wall partitions to virtually any layout. Furthermore with a concrete upper floor the partitions can be built in blockwork with its greater sound resistance, instead of timber stud.

SPEED OF ERECTION
Typically a single precast floor slab is up to 10 square metres in area and can be laid in minutes. Dependent upon site conditions and house sizes, the floors to several houses can normally be completed in one day.

PREFORMED SERVICE PROVISION
Precast concrete floors can be provided with factory-formed service holes to accommodate all the necessary service routes with ease.

STRUCTURAL EFFICIENCY
A Hollow Core slab offers the ideal structural section by reducing the deadweight whilst providing the maximum structural efficiency with the minimum slab depth. This offers the design benefit of longer spans, thus reducing the lengths of internal loadbearing walls and foundations.

SITE SAFETY
Once a precast concrete floor is erected it is immediately available as a working platform. Combined with Trailasafe® synthetic mesh for trailer deck fall arrest, and the Bison Air Mat for roll-off fall protection, this creates the safest possible environment for site workers.
HOLLOW CORE FLOORS
CASE STUDIES

TERRACED SINGLE OCCUPANCY
HOUSING DEVELOPMENTS

Pictured is part of a large housing development based in London. Over 578m² of 150mm Hollow Core floor units were used throughout for 1st and 2nd floor applications across varying design type houses, typically from town type, 2 floor houses, to traditional 1st floor houses.

Hollow Core floors have been installed by many housebuilders, both large and small, for terraced developments.

DETACHED HOUSING
DEVELOPMENTS

Pictured is a detached housing development based in Warwick. The development was a mix of three, four and five bedroom detached houses, where 250m² of 150mm Hollow Core units were used throughout the plot for all first floor applications.

Further detached developments using Hollow Core floors have been constructed across the country, from Sterling in Scotland to Portsmouth in England.

LARGE ESTATE HOUSING
DEVELOPMENTS

Pictured is an estate type housing, consisting of 8 bedrooms, 24 rooms and 3 outbuildings based in Oxshott.

496m² of Hollow Core floor units were used throughout the house.
HOUSING PRODUCTS SINGLE OCCUPANCY

HOLLOW CORE FLOORS
GROUND/UPPER FLOOR SLAB PROFILES

The most suitable and widely used precast unit for single occupancy housing is a 1200mm wide Hollow Core slab with a depth of either 150 or 200mm.

150mm unit profile

200mm unit profile

CONSTRUCTION DETAILS

TYPICAL HOUSE LAYOUTS

FOR EXTENSIVE TECHNICAL DETAILS PLEASE VISIT OUR WEBSITE: www.bison.co.uk
HOLLOW CORE FLOORS
ALTERNATIVE BATTEN ARRANGEMENTS TO SOFFITS

Short firing is not recommended. Various site-drilled anchors are available and, used in accordance with the manufacturers instructions, are a simple and economic fixing method.

To view load span tables please go to page 13

A SUSTAINABLE CHOICE...

The use of Bison Hollow Core flooring can significantly cut the carbon dioxide emissions of a project by up to one fifth; a CO₂ reduction and material saving of 23% can be achieved in the construction of an office block.*

*based on a 2600m² office block development
HOLLOW CORE FLOORS

BEARING DETAILS

TYPICAL DUAL BEARING

190 mm Block Wall

Where required by Building Regulations for sound insulation.

Finishes

Continuous wet mortar by builder to take up camber

SIDE BEARING

100 mm Block Wall

TRIMMING OPENINGS

M.S.Trimmer. Fire protection, where necessary by General Contractor.

TYPICAL SINGLE BEARING

FOR EXTENSIVE TECHNICAL DETAILS PLEASE VISIT OUR WEBSITE: www.bison.co.uk
The Building Regulations Part L1A, L2A 2006 ‘Conservation of fuel and power’ require that a building is airtight and pressure testing for this is covered by regulation 54. The regulations no longer allow the elemental method and a building needs to be considered as a whole to satisfy the requirements of the regulations. Bison can provide an insulated slab to give a thermal ‘U’ value of 0.22W/m² for the floor and greater if required.
HOLLOW CORE FLOORS

THE BENEFITS

SPEED OF ERECTION
Time consuming activities such as propping, shuttering and concrete pouring are virtually eliminated.

LIFTING HOOKS
Bison can supply Hollow Core units with cast-in lifting hooks that speed up the installation and bring associated Health & Safety benefits.

IMMEDIATE UNPROPPED WORKING PLATFORM
Propping is generally not required with Hollow Core floors. Once a precast floor is erected it is immediately available as a working platform. In comparison, steel deck systems can present problems in achieving level surfaces while concrete is poured, and in enabling access while in the propped condition.

MINIMUM IN-SITU CONCRETE
With a precast floor a lot of the work is done off-site. This eliminates on-site work that can be complex, time-consuming and weather affected.

EXTRA LONG SPANS
Factory-made prestressed units offer the design advantage of long span units for given depths. This can avoid the need for intermediate supports.

DIAPHRAGM ACTION
Precast floor slabs, when structurally grouted, provide a floor with full diaphragm action to the building. A structural concrete topping is not required.

FLEXIBILITY OF DESIGN APPROACH
Precast floors can provide the technical solution for the requirements of Part A of the Building Regulations 2004 for Disproportionate Collapse.

COMPOSITE STEEL BEAM DESIGN
Composite Steel Beam Design incorporating either Hollow Core or solid slabs provides a structural and cost efficient solution for steel frames. It reduces total tonnage of steel beams by up to 40% and also reduces the number of components to be erected.

SOUND REQUIREMENTS BUILDING REGULATIONS PART E
In new-build attached dwellings a developer may choose between Pre-Completion Testing (PCT) or, if available, a Robust Detail (RD). Bison Concrete Products have developed a series of solutions to cover the use of precast concrete units in association with masonry buildings and steel and concrete frames. Solutions have been developed and testing is in the process of being completed prior to an application for Robust Detail status.

PREFORMED SITE SERVICES
Precast floors can be provided with factory formed service holes, thus avoiding laborious setting out and shuttering on-site.

STRUCTURAL EFFICIENCY
A Hollow Core slab offers the ideal structural section by reducing the deadweight whilst providing the maximum structural efficiency within the slab depth.

FACTORY-PRODUCED TO RIGOROUS QUALITY STANDARDS
Because precast floors are factory-produced, they are manufactured in an environment which is more controlled than a building site. Quality control systems are properly implemented and are independently examined on a regular basis, under the British Standards Institution Quality Management Scheme defined in BS EN ISO 9001:2000.
HOLLOW CORE FLOORS

TRACK RECORD

MULTI-STOREY HOUSING

The three block housing development in Windsor consisted of 1st, 2nd, 3rd and roof with the other two blocks being 1st, 2nd and roof. All three blocks used 200mm deep Hollow Core sound slab flooring with 3897m² used throughout the scheme and 30m³ of concrete precast stairs.

The housing development in Worcester, which used 1,700m² of 200mm deep Hollow Core sound slab flooring and 10m³ of precast concrete stairs. This included one three storey block and one 4 storey block.

MULTI-STOREY RESIDENTIAL DEVELOPMENTS

This multi-storey residential development used precast Hollow Core floors within a steel frame structure. The development is in Walsall, Birmingham, and used 1500m² of 200mm deep Hollow Core sound slab flooring, plus 29m³ of precast stair units.

A flat, uninterrupted soffit was achieved with the Hollow Core units, spanning 6.1m between downstand beams, which were at separating wall positions.
HOLLOW CORE FLOORS
UNIT PROFILES

150mm Sound Slab unit profile

150mm unit profile

200mm unit profile

250mm unit profile

260mm unit profile

300mm unit profile

1200 mm Nominal Width

To view load span tables please go to page 13
HOLLOW CORE COMPOSITE FLOORS

UNIT PROFILES

250 to 225mm overall composite depth
comprising 150mm unit with 50 or 75mm structural topping

250 to 275mm overall composite depth
comprising 200mm unit with 50 or 75mm structural topping

300 to 325mm overall composite depth
comprising 250mm unit with 50 or 75mm structural topping

335mm overall composite depth
comprising 260mm unit with 75mm structural topping

375mm overall composite depth
comprising 300mm unit with 75mm structural topping

A SUSTAINABLE PROCESS...

Bison precast floors are produced under sustainable conditions at our flagship production plant at Swadlincote, Derbyshire. The state of the art Hollow Core plant is the most technically advanced and sustainable of its kind in the world: all waste water from the factory is recycled; the fully automated process is energy efficient, taking only 12 hours; and the manufacturing process maximizes efficiency, which prevents material wastage.

To view load span tables please go to page 13
HOLLOW CORE FLOORS

BEARING DETAILS

The recommendations for bearings of precast units are set out in Clause 5.2.3 of B.S. 8110:1997. These vary according to the type of floor construction and the type of support material and building tolerances. In general, nominal bearings of 100mm on masonry or 75mm on steelwork are recommended but may be reduced dependent upon circumstances and subject to the above clause.

BEARINGS ON SHELF ANGLES

25 mm clearance is required to allow unit to be dropped into position past the flange of the supporting U.B.
HOLLOW CORE FLOORS
BEARING DETAILS

BEARINGS ON MASONRY

Nominal bearing
\( t / 2 - 10 \text{ mm} \)

Wall thickness
\( t \geq 190 \)

Where required by Building Regulations for sound insulation.

Continuous wet mortar by builder to take up camber

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
HOLLOW CORE FLOORS

BEARING DETAILS

NARROW WALL BEARING

Narrow Wall Bearing

Nominal bearing \( t/2 - 10 \text{ mm} \) (Min. 65 mm)

Wall thickness \( t < 190 \) (Min. 140 mm)

Tie reinforcement at 400 c/c in joints and troughs provided in 1200 wide units

Structural concrete infill

N.B. In order to satisfy the tolerances in this situation, this detail is only recommended where a full bearing is available at the other end of the slab.

NARROW BEARING ON STEELWORK

Narrow Bearing on Steelwork

Nominal bearing \( t/2 - 10 \text{ mm} \)

Wall thickness \( t \leq 150 \) (Min. 140 mm)

Tie reinforcement at 400 c/c in joints and troughs provided in 1200 wide units

Structural concrete infill
HOLLOW CORE FLOORS
BEARING DETAILS

END SLOTS IN UNITS

Slots may be provided in slab ends for the purpose of tying into the structure for nominal continuity or disproportionate collapse.

TRIMMING OPENINGS

M.S.Trimmer. Fire protection, where necessary by General Contractor.
SOLID COMPOSITE FLOORS
UNIT PROFILES

Solid composite construction utilises the advantages of a prestressed precast element acting compositely with an in-situ structural topping, combining the benefits of precast and in-situ construction.

These benefits are:
• Reduced Construction Depths
• Speed of Erection
• Elimination of Shuttering
• Minimal Propping
• Fire Resistance
• Flexibility of Architectural and Engineering design

75mm unit with 50, 75, 100 or 125mm composite material

100mm unit with 50, 100, 150 or 200mm composite material

1200mm Nominal Width

To view load span tables please go to page 21

A SUSTAINABLE FUTURE...

The inherent thermal mass properties of concrete can help to regulate temperature fluctuations, ensuring that indoor environments are comfortable without the use of air conditioning, providing the user with a significant cost and energy saving. Compared to air conditioning, the active Fabric Energy Storage (FES) of concrete reduces carbon dioxide emissions by up to 50%.
SOLID COMPOSITE FLOORS
BEARING DETAILS

SIMPLE BEARING ON TOP FLANGE OF STEELWORK

Nominal support reinforcement and/or daywork joints determined by general layout and site operation.

SLAB COMPOSITE WITH SUPPORTING BEAM

Flange reinforcement and shear studs as required by steelwork design.

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
Composite steel beam design incorporating Hollow Core or solid slabs provides a structural and cost efficient solution for steel frames. It reduces total tonnage of steel beams by up to 40% and also reduces the number of components to be erected.

**DEFINITION**
Composite steel beam design is the use of Hollow Core or solid slabs together with in-situ infill in conjunction with welded studs onto steel beams. This enables the slabs and beams to act compositely together, enhancing the load capacity of the steel beams.

**DESIGN CONSIDERATIONS**

1. **SHEAR STUD CAPACITY**

   \[ P_{sh} = 0.8 f_u \left( \pi d^2 / 4 \right) / \gamma_v \]
   
or
   \[ P_{sh} = 0.29 \alpha \beta \delta \left( f_{cp} E_{cp} \right) / \gamma_v \]

   Whichever is the lesser.

   \[ \alpha = 0.2 \left( h/d + 1 \right) \]
   
   \[ d = \text{the diameter of the shank of the stud.} \]
   
   \[ f_u = \text{the specified ultimate tensile strength of the material of the stud but not greater than 500 N/mm}^2. \]
   
   \[ \beta = \text{a factor which takes into account the gap width g (mm) and is given as 0.5 (g/70 + 1) if g \leq 30mm}. \]
   
   \[ \epsilon = \text{a factor which takes into account the diameter } \delta \text{ of transverse high tensile tie steel (grade 460) and is given by 0.5 (} \delta / 20 + 1) \text{ if } \delta \geq 8mm. \]
   
   \[ \omega = \text{transverse joint factor = 0.5 (w / 600 + 1), w = width of hollow core unit.} \]
   
   \[ f_{cp} = \text{average concrete cylinder strength = 0.8 x average cube strength of the in-situ and precast concrete.} \]
   
   \[ E_{cp} = \text{average value of elastic modulus of the in-situ and precast concrete.} \]
   
   \[ \gamma_v = \text{partial safety factor for shear stud.} \]

2. **EFFECTIVE WIDTH OF COMPRESSION AREA**

   \[ B_{eff} = \left[ \left[ \frac{18}{16} \right] \left[ \frac{f_{cu}}{460} \right] \left[ \frac{300}{s} \right] \left[ \frac{140}{f_y} \right] \right]^{0.5} \times 1000 + 2.5g \]

   \[ \delta = \text{transverse reinforcement diameter} \]
   
   \[ f_{cu} = \text{concrete strength} \]
   
   \[ s = \text{bar spacing} \]
   
   \[ f_y = \text{reinforcement strength} \]
   
   \[ g = \text{gap} \]
DESIGN CONSIDERATIONS

\[ R_c = 0.45 \times f_{cu} \]

beff x D slab

Py

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
The Building Regulations Part A December 2004 introduced a system of classification of buildings to reflect the risk of disproportionate collapse probabilities. The following solutions give guidance as to the details required for each of the main frame options related to Hollow Core slabs.

**CLASS 1 AND 2A BUILDINGS**
Flats, apartments and other residential buildings not exceeding 4 storeys. Provision of effective anchorage to satisfy Building Regulations from ‘building in’ of Hollow Core units.

**CLASS 2B BUILDINGS (Horizontal Ties only + notional removal)**
Flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys. All design and details for horizontal tying in accordance with BS5628 Part 1 and BS8110 Part 1.

**DETAILS FOR TYPE 1 & 2A**

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**EXTERNAL LOAD BEARING CAVITY WALL DETAIL**

- Bison precast concrete Hollow Core slab unit
- Solid block wall
- 100 mm min.

**EXTERNAL NON-LOAD BEARING CAVITY WALL DETAIL**

- Bison precast concrete Hollow Core slab unit
- Continuous wet mortar, by builder, to take up camber
- Solid block wall
- 100 mm min.
PART A MASONRY BUILDINGS
CONSTRUCTION SOLUTIONS

CLASS 2B BUILDINGS (Horizontal and Vertical Ties)
Flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys. All design and details for horizontal and vertical tying in accordance with BS5628 Part 1 and BS8110 Part 1 for Class 2B and Class 3 Buildings.

CLASS 3 BUILDINGS (Horizontal and Vertical Ties + Risk Assessment)
All buildings defined above as Class 2A and 2B that exceed the limits on area and/or number of storeys.
All design and details for horizontal and vertical tying in accordance with BS5628 Part 1 and BS8110 Part 1 for Class 2B and Class 3 Buildings.

EXTERNAL LOAD BEARING CAVITY WALL DETAIL

EXTERNAL NON-LOAD BEARING CAVITY WALL DETAIL

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
PART A CONCRETE FRAMED BUILDINGS
CONSTRUCTION SOLUTIONS

CLASS 2B BUILDINGS (Horizontal and Vertical Ties)
Flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys.

CLASS 3 BUILDINGS + (Risk Assessment)
All buildings defined above as Class 2A and 2B that exceed the limits on area and/or number of storeys. All design and details for horizontal and vertical tying in accordance with BS8810 Part 1 for Class 2B and Class 3 Buildings.
PART A CONCRETE FRAMED BUILDINGS
CONSTRUCTION SOLUTIONS

**TYPICAL SECTION**
INTERNAL WALL (NON-LOAD BEARING)

- Grout joint
- In-situ concrete infill
- Bison precast concrete Hollow Core slab
- Reinforcement to suit Structural Engineer’s design
- 175 mm

**TYPICAL SECTION**
EXTERNAL WALL (NON-LOAD BEARING)

- Grout joint
- In-situ concrete infill
- Wire loop connections
- Bison precast concrete Hollow Core slab
- Reinforcement to suit Structural Engineer’s design
- 150 mm wide perforated pocket along the edge of slab unit at 1200 mm centre with 10 mm dia. ‘U’ bar per socket
- 150 mm

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
PART A STEEL FRAMED BUILDINGS
CONSTRUCTION SOLUTIONS

CLASS 1 AND 2A BUILDINGS
Apartments and other residential buildings not exceeding 4 storeys. This type of building uses the friction and built-in
details to achieve tying requirements.

TYPICAL SECTION EXTERNAL STEELWORK DETAILS

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FOR EXTENSIVE TECHNICAL DETAILS PLEASE VISIT OUR WEBSITE: www.bison.co.uk
PART A STEEL FRAMED BUILDINGS  
CONSTRUCTION SOLUTIONS

CLASS 2B BUILDINGS (Horizontal and Vertical Ties)
Flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys.

CLASS 3 BUILDINGS (Horizontal and Vertical Ties + Risk Assessment)
All buildings defined above as Class 2A and 2B that exceed the limits on area and/or number of storeys.

These types of buildings require horizontal and vertical ties which are provided by the steel frame. Additionally the floors must be tied to the steelwork at the perimeter and to each other for internal supports. Additional internal tying of the floor to the steelwork is required where the frame is used for bracing.

TYPICAL SECTION EXTERNAL STEELWORK DETAILS

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
PART E
CONSTRUCTION SOLUTIONS

The Building Regulations Part E:2003 and the subsequent amendment May 2004 give guidance to the requirements for the resistance to the passage of sound. For new build attached dwellings, two approaches may be made. Part E allows the developer to choose between Pre Completion Testing (PCT) or, if available, a Robust Detail (RD) may be used by registering plots with Robust Details Ltd. The Pre Completion Testing (PCT) and the Robust Detail (RD) requirements are given below.

### Building Regulations Approved Document Part E

<table>
<thead>
<tr>
<th>Airborne sound:</th>
<th>New Build</th>
<th>Change of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>min 45dB</td>
<td>min 43dB</td>
</tr>
<tr>
<td>Floors</td>
<td>min 45 dB</td>
<td>min 43dB termed $D_{nT,w} + C_{tr}$</td>
</tr>
</tbody>
</table>

Impact sound:
- Floors: max 62 dB max 64 dB termed $L_{nT,w}$

### Robust Detail requirements (new build attached dwellings only)

<table>
<thead>
<tr>
<th>Airborne sound:</th>
<th>Min/Max</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>min 47dB</td>
<td>min 50dB</td>
</tr>
<tr>
<td>Floors</td>
<td>min 47 dB</td>
<td>termed $D_{nT,w} + C_{tr}$</td>
</tr>
</tbody>
</table>

Impact sound:
- Floors: max 60 dB max 57 dB termed $L_{nT,w}$
TYPICAL SOUND ATTENUATION DETAIL

Yelofon E-strip acoustic edge strip
65mm thick sand/cement screed or 40mm thick proprietary screed, nominal 80kg/m² mass per unit area
10mm Yelofon HD10+

Min. 100mm thick blockwork medium density (1350-1600kg/m³)
Nominal 8mm thick parget coat
Flexible cavity closer
200mm deep Bison Hollow Core slab units (300kg/m²)
Gypsum-based board (nominal 8kg/m²) mounted on dabs on cement/sand render (nominal 8mm) with scratch finish
PART E MASONRY BUILDINGS
CONSTRUCTION SOLUTIONS

ROBUST DETAILS SEPARATING FLOOR - CONCRETE E-FC-1

1. FLOATING FLOOR See section 4 (Robust Details Handbook) for suitable floating floor treatment.

2. SCREED 40mm (min) screed directly applied to Hollow Core floor slabs - sand/cement or proprietary screed nominal 80 kg/m² mass per unit area, see Appendix A (Robust Details Handbook).

3. STRUCTURAL FLOOR 150mm (min) precast concrete Hollow Core floor slab - 300kg/m² mass per unit area.

4. CEILING See section 3 (Robust Details Handbook) for suitable ceiling treatment.

ROBUST DETAILS SEPARATING FLOOR - CONCRETE E-FC-4

1. SCREED 65mm (min) sand/cement screed, or 40mm (min) proprietary screed, nominal 80kg/m² mass per unit area.

2. RESILIENT LAYER 6mm IsoRubber layer with IsoEdge flanking strip.

3. STRUCTURAL FLOOR 150mm (min) precast concrete Hollow Core floor slab - 300kg/m² mass per unit area.

4. CEILING See section 3 (Robust Details Handbook) for suitable ceiling treatment which is dependent on floorplank depth and supporting wall density.

The requirements for a robust detail are taken from the Robust Details Part E Handbook. The latest requirements should always be sought from Robust Details Ltd.
**ROBUST DETAILS** SEPARATING FLOOR - CONCRETE E-FC-5

1. **SCREED** 65mm (min) sand/cement screed, or 40mm (min) proprietary screed, nominal 80kg/m² mass per unit area.

2. **RESILIENT LAYER** YELOfon HD10+ with E-strip perimeter edging and J-strip tape for jointing.

3. **STRUCTURAL FLOOR** 150mm (min) precast concrete Hollow Core floor slab - 300kg/m² mass per unit area.

4. **CEILING** See section 3 (Robust Details Handbook) for suitable ceiling treatment which is dependent on floorplank depth and supporting wall density.
1 Yelofon E-strip acoustic edge strip (by Cellecta).
2 Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
3 Minimum 10mm Yelofon HD 10+ (by Cellecta).
4 Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling board (min. 8kg/m²) suspended from a proprietary support system.
5 Acoustic quilt (by Rockwool).
6 Soft joint.
7 Compressible filler board.
8 Proprietary sliding brick anchor system.
9 Min. 100mm thick blockwork (medium density) 1800 -2300g/m³.

10 Nominal 8mm thick parget coat (by Lafarge).
11 12.5mm thick Echeck wallboard (by Lafarge).
12 Skirting board.
13 Yelofon J-strip acoustic jointing tape (by Cellecta).
14 150 or 200mm min. deep ‘Bison Hollow Core floor units’ (300kg/m³).
15 Grouted void between P.C. units.
16 12.5mm thick Echeck wallboard (by Lafarge) encasement to steelwork. Restrained via proprietary framing system.
17 12.5mm thick Echeck wallboard (by Lafarge) tacken up to u/side of floor providing 1.0 hour fire protection to steelwork.
1 Yelofon E-strip acoustic edge strip (by Cellecta).
2 Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
3 Yelofon J-strip acoustic jointing tape (by Cellecta).
4 Flexible cavity closer.
5 Acoustic quilt (by Rockwool).
6 Compressible filler board.
7 Soft joint.
8 External leaf.
9 Proprietary sliding brick anchor system.
10 Proprietary wall ties in accordance with approved document ‘E’ (2003), section 2.
11 Nominal 8mm thick parge coat (by Lafarge).
12 12.5mm thick Echeck wallboard (by Lafarge).
13 Skirting board.
14 Min. 10mm Yelofon HD10+ (by Cellecta).
15 Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling board (min. 8kg/m²) suspended from a proprietary support system.
16 150 or 200mm min. deep ‘Bison Hollow Core floor units’ (300kg/m³).
17 2 No. layers of Echeck wallboard (by Lafarge) encasement to steelwork. Restrained via proprietary framing system.
18 12.5mm thick Echeck wallboard (by Lafarge) taken up to u/side of floor providing 1.0 hour fire protection to steelwork.
19 Min. 100mm thick blockwork (medium density) 1800 -2300g/m³.
1 Yelofon E-strip acoustic edge strip (by Collecta).
2 Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
3 Minimum 10mm Yelofon HD 10+ (by Collecta).
4 10mm Aerofoil isolation layer.
5 Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling board (min. 8kg/m²) suspended from a proprietary support system.
6 Acoustic quilt.
7 Deflection Tolerance.
8 RSP 38 modified Lafarge stud system.

9 RSP 38 modified Lafarge stud system studs.
   Two 50mm C studs at 600mm centres.
   Facings.
   2 layers Lafarge 15mm dBcheck wallboard both sides.
   Insulation.
   50mm glass mineral wool density 19.5 kg/m³.
10 Timber sole plate.
11 Yelofon J-strip acoustic jointing tape (by Collecta).
12 150 or 200mm min. deep Bison Hollow Core floor units (300kg/m²).
13 Grouted void between PC. units.
14 12.5mm thick Echeck wallboard (by Lafarge) encasement to steelwork. Restrained via proprietary framing system.
15 Deflection head detail.
1 Tyvek breather membrane 12.5 moisture resistant wallboard and 36mm polyfoam plus.
2 Yelofon E-strip acoustic edge strip (by Cellecta).
3 Yelofon J-strip acoustic jointing tape (by Cellecta).
4 Timber sole plate.
5 10mm Aerofoil isolation layer.
6 Flexible cavity closer.
7 Acoustic quilt (by Rockwool).
8 External cladding 102mm brick or 100mm block + 16mm render.
9 Lafarge stud system studs.
   CS90/Y Lafarge C studs at 600mm centres.
   Facings.
   1 layer Lafarge 12.5mm firecheck wallboard
   on 1 layer 12.5mm vapourcheck wallboard.
   Insulation.
   90mm rockwool flex.
10 Skirting board.
11 Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
12 Minimum 10mm Yelofon HD 10+ (by Cellecta).
13 150 or 200mm min. deep Bison Hollow Core floor units (300kg/m²).
14 Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling board (min. 8kg/m²) suspended from a proprietary support system.
15 2No. layers of Echeck wallboard (by Lafarge) encasement to steelwork. Restrained via proprietary framing system.
16 Deflection tolerance.
17 Deflection head detail.
18 Lafarge stud system (see above).
**PART E CONCRETE WALLS**

**CONSTRUCTION SOLUTIONS**

**TYPICAL DETAIL SECTION**

**A TYPICAL INTERNAL SEPARATING WALL**

1. Yelofon E-strip acoustic edge strip (by Cellecta).
2. Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
3. Minimum 10mm Yelofon HD 10+ (by Cellecta).
4. Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling board (min. 8kg/m²) suspended from a proprietary support system.
5. Acoustic sealant.
6. 175mm thick concrete wall.
7. 3mm Plaster skim on 15mm Lafarge wallboard
   12mm Metal furring channel on dabs
   35mm cavity with 25mm mineral fibre.

8. Dry pack mortar.
10. Yelofon J-strip acoustic jointing tape (by Cellecta).
11. 150 or 200mm min. deep ‘Bison Hollow Core floor units (300kg/m²).
12. In-situ concrete infill.
13. 3mm Plaster skim on
   15mm Lafarge wallboard
   12mm Metal furring channel on dabs
   35mm cavity with 25mm mineral fibre.
PART E CONCRETE WALLS
CONSTRUCTION SOLUTIONS

TYPICAL DETAIL SECTION
THROUGH A TYPICAL EXTERNAL WALL

1 Yelofon E-strip acoustic edge strip (by Cellecta).
2 Yelofon J-strip acoustic jointing tape (by Cellecta).
3 Dry pack mortar.
4 Flexible cavity closer.
5 In-situ concrete infill.
6 150mm concrete wall.
7 3mm Plaster skim on 15mm Lafarge wallboard
   12mm Metal furring channel on dabs
   35mm cavity with 25mm mineral fibre.

8 3mm Plaster skim on 15mm Lafarge wallboard
   12mm Metal furring channel on dabs
   35mm cavity with 25mm mineral fibre.
9 Skirting board.
10 Minimum 40mm thick ‘Gyvlon’ Screed (by Lafarge).
11 Minimum 10mm Yelofon HD 10+ (by Cellecta).
12 150 or 200mm min. deep Bison Hollow Core
   floor units (300kg/m²).
13 Min. 12.5mm thick ‘Lafarge’ Gypsum based ceiling
   board (min. 8kg/m²) suspended from a proprietary
   support system.
14 Acoustic sealant.
BISON PRECAST FLOORING

SPECIFICATIONS

MANUFACTURE

1.1 Bison floors are manufactured by the long line prestressed method using slip form or extrusion techniques. The units are cast on heated steel beds within an enclosed factory environment.

1.2 The materials used in the manufacture of Bison floors comply with the relevant British Standard for that material.

1.3 An air entraining agent complying with BS EN 934-2-2001 is included in the concrete mix to improve workability.

1.4 Reinforcement is generally 5mm diameter high tensile wire or 12.5mm diameter strand complying with the requirements of B.S.5896:1980.

1.5 Bison units are sawn to length on the manufacturing bed and are supplied as standard with plain sawn ends with open cores.

DIMENSIONS

2.1 Bison units are manufactured in nominal sizes as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>75mm</td>
</tr>
<tr>
<td></td>
<td>100mm</td>
</tr>
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<td>Hollow</td>
<td>150mm</td>
</tr>
<tr>
<td></td>
<td>200mm</td>
</tr>
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<td></td>
<td>260mm</td>
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<td>300mm</td>
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<tr>
<td></td>
<td>350mm</td>
</tr>
<tr>
<td></td>
<td>400mm</td>
</tr>
</tbody>
</table>

2.2 Cross-sectional tolerances are within the limits set out in clause 6.2.8.3. of B.S. 8110:1997. Length tolerances are ± 20 mm.

2.3 Bison units will have an upward camber due to pre-stressing as described in clause 6.2.8.4. of B.S.8110:1997.

2.4 Edges are shaped to form a grout joint giving a shear key to distribute load to adjacent units. Where non-standard widths are provided the edge will be rough cut from a standard unit.

FINISHES

3.1 Concrete surface finish to soffit is Type A finish as described in clause 6.2.7.3. of B.S.8110:1997.

The soffit is suitable for the direct application of a textured paint finish where this is applied in accordance with the manufacturers instructions.

Where a plaster finish is intended it may be necessary to use a bonding agent in accordance with the instructions of the plaster manufacturer. Plaster finishes are not recommended on longer spans.

3.2 Sides and top surfaces are ‘as extruded’ as described in Table 5.5 of B.S.8110:1997.

3.3 Units may accumulate water within the cores due to exposure during the construction programme. The General Contractor should drill weep holes as necessary, or keep them clear where they are provided during manufacture.
BISON PRECAST FLOORING
SPECIFICATIONS

DESIGN

4.1 The design of Bison units is in accordance with the requirements and recommendations of B.S.8110:1997 “The Structural Use of Concrete.”

4.2 LOAD/SPAN CAPACITY: The reinforcement pattern within a Bison section will vary according to the design loading specified.

4.3 EXPOSURE CONDITION: The standard Bison section is suitable for a XCI exposure classification as defined in Table 3.2 of BS 8500:2002. Other exposure classes can be adopted subject to design approval from Bison Technical Department.

4.4 FIRE RESISTANCE: Fire resistance is based upon the tabulated data contained within B.S. 8110 Part 2 Section 4. Sections are available for fire periods of 1 hour or 2 hours, without the addition of further finishes. These periods of fire resistance may be further enhanced by the application of appropriate finishes.

4.5 SERVICEABILITY: The standard Bison section is designed to meet the criteria of Class 3 as set out in clause 4.1.3 of B.S.8110.1997 Designs to Class 1 and Class 2 are available if required.

4.6 SOUND INSULATION: The requirements of The Building Regulations are that a floor construction incorporating the use of precast concrete units should have a minimum mass which is dependent upon whether the finishes to the top surface are directly applied or are on a separating layer. The mass of Bison unit sections are given in the technical data and are net weights of standard hollow sections.

4.7 HORIZONTAL & VERTICAL TIES: Ties necessary to satisfy the requirements for accidental damage should be specified by the Engineer with responsibility for the design of the overall structure in accordance with the Code of Practice.

4.8 BEARINGS: Level and structurally adequate bearings for Bison precast units should be provided by other contractors. These should generally be 100 mm for masonry or 75 mm for concrete or steelwork, but may be reduced in accordance with clause 5.2.3 of B.S.8110:1997.

4.9 HOLES: Small holes up to 60 mm diameter may be drilled on site through the Hollow Cores, care being taken to avoid damage to the reinforced ribs. Larger holes may be cut subject to the design capacity of the slab.

4.10 GROUTING: Joints between units should be grouted with a 30 N/mm² concrete using a 6 mm nominal aggregate size.

4.11 PROPPING: Where the slab design requires site propping, this should be carried out in strict accordance with the Bison drawings.
BISON PRECAST FLOORING

QUALITY ASSURANCE

Bison operates a Quality Management System which complies with the requirements of ISO 9001: 2000 for the following scope: design, manufacture and erection of ancillary cube products (including reinforced and normally reinforced concrete). Prestressed floor units are subject to end product testing. Prestressed and ancillary concrete is subject to full design approval, traceable to current codes of practice statutory/regulatory requirements.

All Bison U.K. factories have been assessed by the British Standards Institution (B.S.I.) and awarded Certificates of Assessed Capability under the scheme covering Quality Assurance for the manufacture of precast concrete floors.

As a customer, you can be sure that all aspects of our production, design detailing and quality control have been independently inspected and have achieved the high level of competence and quality required by the British Standards Institution.

The company maintains a policy of continuous development, and reserves the right to change specification and details without prior notice.

This information must be read in conjunction with:

- Health, Safety & Welfare Attendances (supply & erect only).
- Unit weight table.
- Information sheet: Lifters & Chains, supplier hire or purchase.
- Technical Information Sheet, Handling & Fixing Instructions for:
  - Sheet No. TI/304/10 Hollow Core
  - Sheet No. TI/304/11 Solid Composite Precast Elements
  - Sheet No. TI/304/12 Prestressed Housebeam & Deepbeam
  - Sheet No. TI/304/13 Bison Precast Stairs & Landings
  - Sheet No. TI/304/15 Floor products with cast-in lifters
  - Sheet No. TI/304/16 Trailasafe®

The Bison website www.bison.co.uk contains detailed information and data sheets on all products. Alternatively call the Health & Safety Department at our Burton office Tel 01283 495000.
SAFETY DO’S & DON’TS
The do’s & don’ts listed below are by no means fully exhaustive—you should also refer to the current issue of the Precast Flooring Federation Code of Practice available on Tel 0116 253 6161.

- Do not alter the product without written permission from Bison Design Office, altering the product may compromise its structural integrity and lead to failure. This includes notching, hole forming, shortening, narrowing the unit etc.
- Do not alter the product in-situ, any permissible alterations must be completed on a flat stable platform, i.e. on the ground or floor area.
- Do not allow anyone to walk or work beneath the product whilst it is being hoisted or suspended.
- Do not work in areas without the appropriate perimeter edge protection, handrails, guardrails, platforms or stages.
- Do not access working areas without properly constructed, maintained, secured and illuminated, stairways, ramps, ladders or the like.
- Where lifting hooks are specified within a contract, do hoist the units by crane using ALL the lifting points in the top surface provided for that purpose. Prior to lifting safety chains must be loosely slung around the underside of the unit. The safety chains may only be released immediately before the slab is placed in its final position.
- For insurance purposes, Bison do not supply or hire lifters or chain sets. Please refer to our information sheets for details of supplier hire or purchase.
- Do not run plant or store equipment on the precast floor before it is grouted and cured. Once cured do not exceed the loads specified by the engineer.
- Do use a passive fall protection system wherever reasonably practicable considering all heights where the potential fall distance could result in an injury.
- Do ensure that perimeter edge scaffolding is positioned no more than 900mm below the bearing level particularly on masonry construction.
- Do ensure all voids created whilst placing units are adequately protected during and after erection.
- Do ensure all brickwork, blockwork or concrete is adequately cured, stable and fit to receive precast concrete units, and that steelwork is stable.
- Do ensure the stability of support beams, lintels etc. is considered, particularly the rotation of support member due to unequal loading.
- Do ensure you include allowance for site handling by referring to the unit weight table.
- Do ensure that all lifting equipment is supplied, used and inspected in accordance with current legislation.
- Do ensure all lifting operations are completed and in accordance with current legislation.
- Do wear adequate personal protective equipment (PPE) whilst handling or cutting concrete.

NOTE: Due to the principle constituents of cement, the liquid released whilst drilling drainage points etc is likely to have a caustic effect on the eyes and skin. For further information or to obtain the latest issue COSHH data sheet for cement call our Health & Safety Department at our Burton office Tel 01283 495000.
BISON LIFTING HOOKS
This is a unique system from Bison, available with our Hollow Core flooring. The hooks are machine inserted during the production process, for which Bison holds the European patent. The hooks enable faster, safer and more accurate erection. They also offer cost savings by minimising damage to soffit and blockwork bearings.

HEATED AND COOLED SLABS
Bison and velta have joined forces to provide an innovative, sustainable and cost effective floor heating and cooling system which is precast in to Bison flooring products.

DESIGN
The system utilises low temperature water for heating and high temperature water for cooling to condition a building, which provides the opportunity to use renewable energy sources.
A sustainable alternative, which can significantly reduce CO₂ emissions over the life of the building.
Substantial savings in investment, maintenance and operational costs, compared to conventional air-conditioning systems.
The requirements for flexible space utilisation and variable partitioning are easily met.
Clear benefits to occupants, no noise and no draughts, producing a comfortable and productive environment.

MANUFACTURING
Precast concrete elements are designed and constructed in the factory with a velta PE-Xa pipe matrix cast directly into the precast slab or Hollow Core unit to offer a combined heating and cooling solution.
This service covers the design, off-site manufacture and installation of precast, pre-stressed Hollow Core flooring, precast multi-storey wall panel structures and other bespoke solutions with an in built heating and cooling capability.

CONSTRUCTION
Off-site production reduces construction programmes and improves quality control.
Elimination of suspended ceilings can reduce building height and lower construction costs.
HEALTH AND SAFETY PRODUCTS

Health and Safety is a major concern for Bison, and we have developed a range of methods and systems which help to ensure that anyone using Bison products can do so with minimal risk to themselves or others.

TRAILASAFE®

Trailasafe® is designed to prevent or mitigate injuries resulting from falls from trailer decks. Comprising synthetic mesh suspended from a series of brackets housing support arms, the system arrests the fall of personnel, absorbing the energy of their descent and ensuring their safety. Fully demountable, the system can be stored within the vehicle or at the unloading point.

THE BISON AIR MAT

The Bison Air Mat system has been tested by the BRE and approved by the HSE. The Bison Air Mat system comprises a series of interconnected and interlinked mats available in a wide range of standard sizes. Using a combination of modules they will accommodate almost any floor area. Where the edges of an area to be protected are open, or have large vertical voids that may pose the hazard of “roll-off” fall to a lower area, special parapet and corner mats can be provided.

HOLE COVERS

Voids such as service holes, formed in precast floor units are trip hazards and have the potential to cause serious injuries. Bison’s solution is the Hole Filler: a strong yet slimlined product which is suitable for most holes. The yellow, anti-slip cover is fully reusable and comes in two sizes, 250mm or 350mm square. Each may be either screwed down or fitted without the need for power tools, by spreading the unit legs, locking it into position.
For further information on Bison Precast Concrete Flooring and the full range of Bison products and services, visit www.bison.co.uk or call the Bison sales team on 01283 495000
FLOORS

HOLLOW CORE FLOORS

HOLLOW CORE COMPOSITE FLOORS

SOLID COMPOSITE FLOORS

BEAM AND BLOCK FLOORS

COMPOSITE STEEL BEAM DESIGN

HOLLOW CORE INSULATED FLOORS

FRAMES

STADIA

STAIRS

HEALTH AND SAFETY

LIFTING HOOKS

TRAILASAFE®

AIR MATS

FOR FURTHER HELP AND INFORMATION PLEASE CALL OUR TECHNICAL HELP LINE: 01283 495334
BISON CONCRETE PRODUCTS Ltd

Millennium Court, First Avenue, Centrum 100, Burton-Upon-Trent DE14 2WR

Telephone: 01283 495000
Facsimile: 01283 544900

Email: concrete@bison.co.uk
Web: www.bison.co.uk

OTHER BROCHURES AVAILABLE

• Staircases
• Stadia Products
• Crosswalls
• Lattice Flooring
• Beam & Block Flooring
• Safety Systems

Printed on 100% recyclable paper using vegetable based inks

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