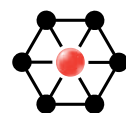




HAMBRO[®]

COMPOSITE FLOOR SYSTEM



CANAM
BUILDINGS

OUR EXPERTISE AT YOUR SERVICE

Canam has been offering owners, real estate developers, architects, engineers and contractors an array of construction solutions since 1970. Our products include the Hambro D500™ and MD2000 composite floor systems, a composite girder and a transfer slab system, all of which can be combined in order to design multi-residential buildings that are both better adapted and more functional.

Hambro products can be used on their own or interfaced with other Canam components in order to form the entire building envelope. Canam also offers a full range of complementary services, including virtual design and construction, building information modeling (BIM) and technical drafting.

Over the years, Canam has redefined the way buildings are designed and built. Its approach is safer, faster and leaner, allowing you to shorten your structural erection schedule by up to 20%.

HAMBRO COMPOSITE FLOOR SYSTEM

The Hambro composite steel joist system is primarily designed for residential and multi-residential projects, and is an advanced up-to-date answer for the elevated floor construction challenges. Spans [up to 43 ft. (13,1 m)] and large web openings that enable passage of various mechanical systems such as HVAC, electrical and plumbing components, thus allowing for higher ceilings and large uninterrupted spans.

D500

The D500 floor system utilizes reusable plywood forms, to be reused on the multiple stories, and require stripping. The speed of installation of this system, mainly used on load-bearing wall construction allows it to be quickly accessible for other trades. It is strongly recommended by builders.

MD2000

The MD2000 floor system utilizes steel deck as a permanent form that does not require stripping, allowing it to be quickly available for other trades. This system is ideal for multi-story buildings consisting of conventional structural steel frame (beams and columns) as it enables the concrete pouring of more than one floor at a time. It is highly recommended by steel erectors.

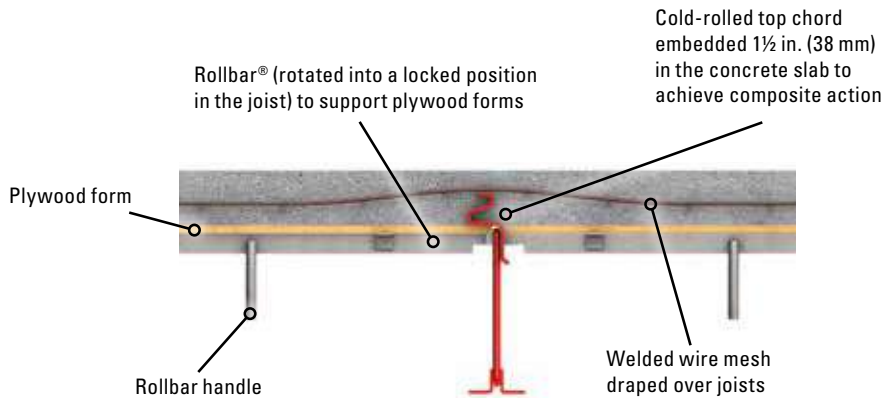
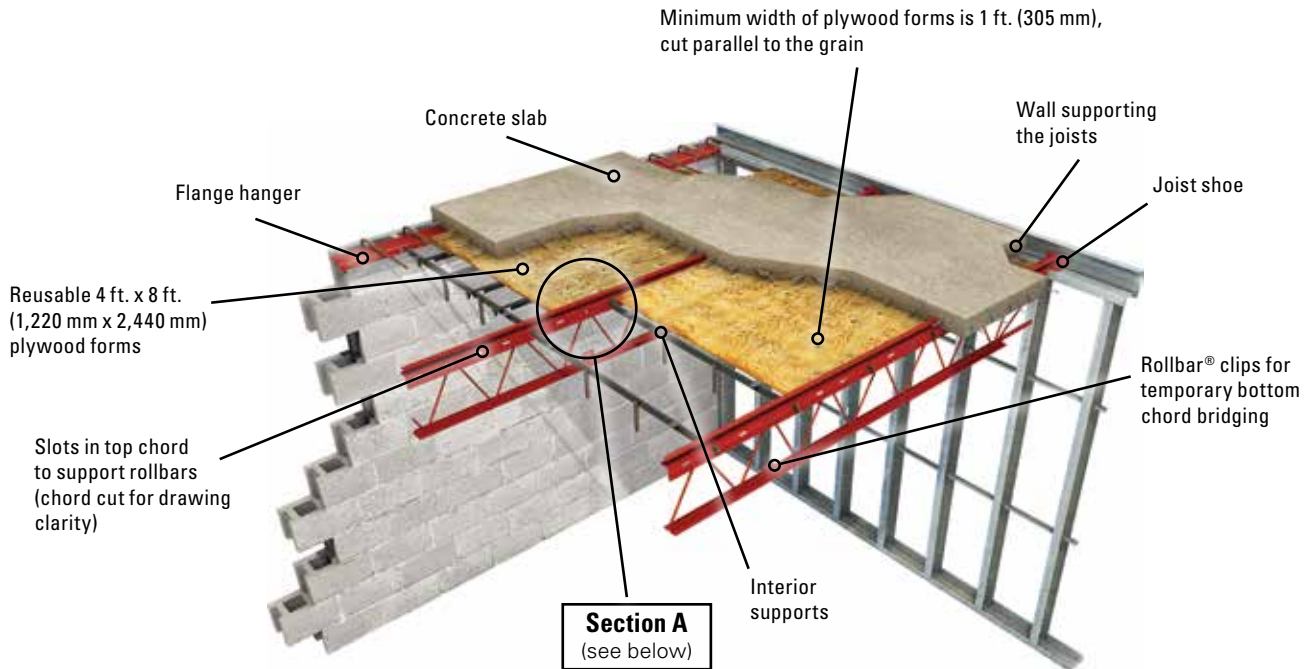
BENEFITS

Fire resistance	The Hambro system complies with UL/ULC/cUL standards.	Maximum duct opening	Facilitates the integration of mechanical systems.
Long spans	Hambro joists can span up to 43 ft. (13.1 m) without shoring.	Rigidity and strength	Enhanced strength due to composite action between the steel and concrete.
Acoustical properties	STC up to 57 / IIC up to 30	Versatility	Applicable to all types of framing.
Economical	Requires less concrete and steel reinforcement than conventional slabs, which cuts costs and overall construction time.	Service	Design assistance, value engineering and fast delivery.
Custom design	Products are designed according to the specific load requirements of each project.	Simplicity	Fast and simple to install.

THE HAMBRO D500 COMPOSITE SYSTEM

IDEAL ON LOAD-BEARING WALLS

The Hambro D500 composite floor system can be successfully combined with load-bearing walls made of light gauge steel, wood, concrete blocks and masonry as well as with structural steel. Ideal for the construction of multi-residential, mixed-use, commercial buildings and single-family homes. Your satisfaction with this versatile product is assured.



Section A

Note: Plywood forms are removed after rotating and removing the rollbars.

By combining Hambro steel joists with the poured concrete, the system forms composite T-beams that are integrated in the transversally reinforced continuous slab. The bottom chord acts as a tension member during the concreting process while the web systems, which are made from bent rods, serve to resist vertical shear. The top chord withstands compressive action during the non-composite stage and subsequently functions as a continuous shear connector between the steel and concrete through adhesion and friction. The slab is reinforced with welded wire mesh.

The reinforced concrete slab also contributes to the transfer of horizontal loads (wind, seismic activity) and acts to stiffen multi-story buildings.

FAST AND ECONOMICAL INSTALLATION



1- Positioning of joists

The joists are placed on the walls or beams and positioned in compliance with the drawings issued for construction by Canam. The joist connection methods are also shown on the Canam drawings.



2- Rollbars

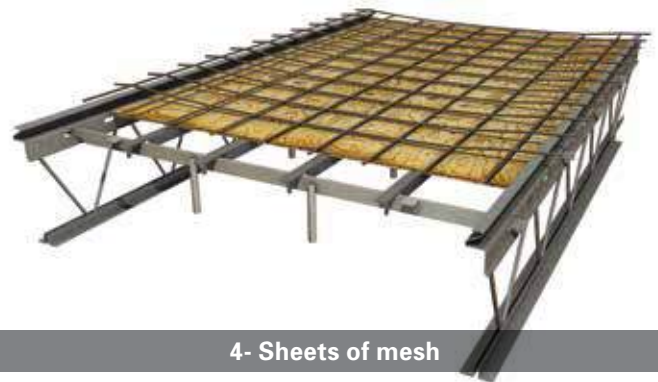
The rollbars are designed to support the plywood forms and concrete construction load. When rotated and locked into the notches in the top chord, the rollbars lock the joists in place while providing lateral and torsional stability to the joists. Bottom chords are fabricated with clips to accommodate rollbars if temporary bridging is needed during the pouring process. Generally, no permanent bridging or shoring is required unless specifically noted.



3- Plywood forms

Together, the plywood and the rollbars form a rigid diaphragm during construction, providing a safe platform for workers. The Hambro system uses standard 4 ft. x 8 ft. x 1/2 in.* (1,200 mm x 2,400 mm x 13 mm*) plywood sheets.

* Subject to change; refer to erection drawings.



4- Sheets of mesh

Welded wire mesh serves as the standard catenary for the slab. Standard 8 ft. x 20 ft. (2,400 mm x 6,100 mm) sheets of mesh are easily placed over the top chords of the Hambro joists. The top chord acts as a high chair.



5- Concrete pouring and finishing

When pouring and finishing a Hambro slab, it is not necessary to complete the entire deck in a single pour. In the event that the pour is interrupted parallel to the joists, the joint should be midway between the joists, but never less than 6 in. (152 mm) from the top chord in order to ensure composite action.



6- Removal of plywood forms

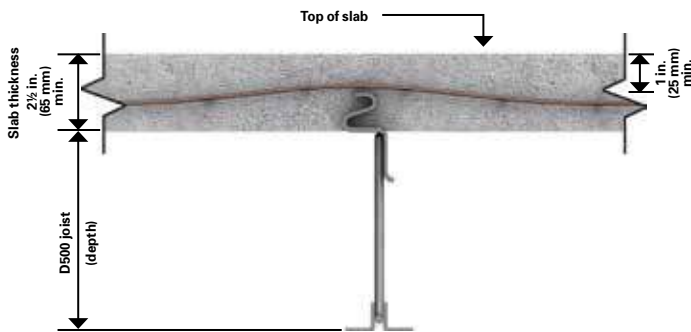
When the concrete attains a cylinder strength of 500 psi (3.5 MPa), the rollbars and plywood forms can be removed. When the concrete attains a cylinder strength of 1,000 psi (7 MPa), the floor is ready but care must be taken not to surpass the admissible loads for the specified capacity.

TECHNICAL DETAILS D500

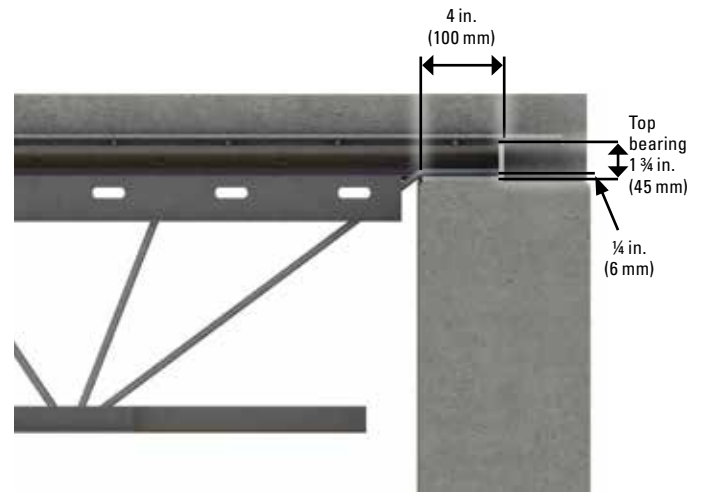
D500 Clear Span Table

Residential and light commercial applications	
Slab thickness	3 to 4 in. (75 to 100 mm)
Typical load	DL = 67 to 78 psf (3.2 to 3.7 kPa) LL = 40 and 50 psf (1.9 and 2.4 kPa)
Minimum depth	Maximum span
8 in. (200 mm)	20 ft. (6,100 mm)
10 in. (250 mm)	25 ft. (7,600 mm)
12 in. (300 mm)	30 ft. (9,100 mm)
14 in. (350 mm)	35 ft. (10,668 mm)
16 in. (400 mm)	38 ft. (11,582 mm)
18 in. (450 mm)	40 ft. (12,192 mm)
20 in. (500 mm)	43 ft. (13,100 mm)
22 in. (550 mm)	43 ft. (13,100 mm)
24 in. (600 mm)	43 ft. (13,100 mm)

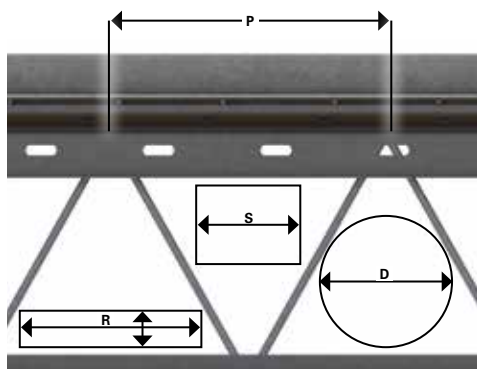
Note: Please contact us for any commercial applications where the loads exceed those presented in the table above.



Typical Bearing Detail



Maximum Duct Openings



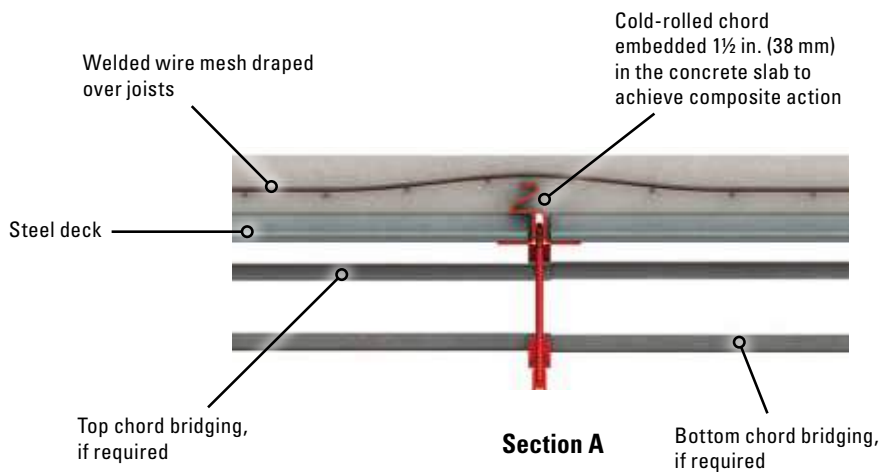
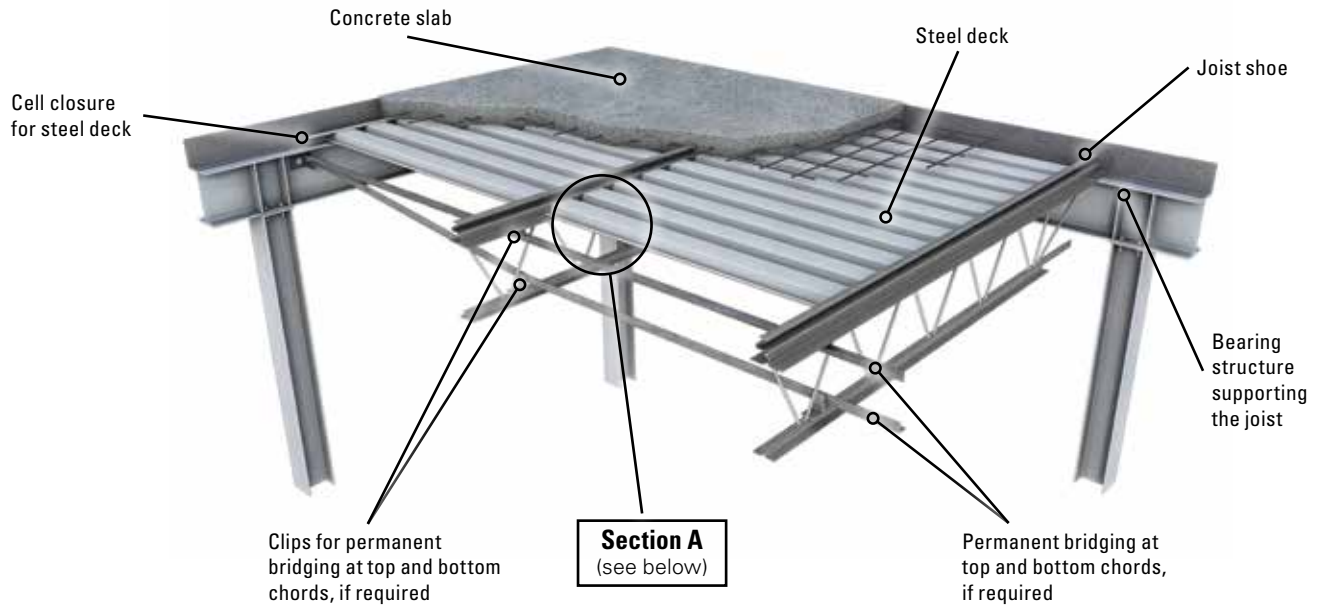
Note: The information provided herewith is for general information about Hambro products and is subject to change without notice following updates and improvements. Canam does not accept responsibility for improper use of this information.

Joist depth		P		D		S		R	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
8	200	20	508	3 1/2	90	3 1/2	90	6 x 2 1/2	150 x 60
10	250	20	508	5 1/2	140	4 1/2	115	7 x 3 1/4	180 x 80
12	300	24	610	7 1/4	185	5 3/4	145	9 x 4 1/4	230 x 110
14	350	24	610	8 1/2	215	6 3/4	170	9 1/2 x 5 1/4 11 x 4 1/4	240 x 130 280 x 110
16	400	24	610	9 1/2	240	7 1/2	190	10 1/2 x 5 1/2 13 x 4	265 x 140 330 x 100
18	450	24	610	10 1/4	260	8 1/4	210	11 x 6 1/4 12 1/2 x 5	280 x 160 315 x 130
20	500	24	610	11	280	9	225	12 x 6 1/4 13 x 5 1/2	305 x 160 330 x 140
22	550	24	610	12	305	9 3/8	240	12 x 7 1/2 14 x 5 1/2	305 x 190 355 x 140
24	600	24	610	12 3/4	315	10	255	13 x 7 14 x 6	330 x 180 355 x 150

THE HAMBRO MD2000 COMPOSITE SYSTEM

IDEAL ON CONVENTIONAL STRUCTURAL STEEL FRAMING

With its all-steel design, the MD2000 composite floor system is a solution to elevated floor construction challenges. It's ideal for buildings having a conventional structural steel (beams and columns) frame and it can also be installed on different structures. It is used for the construction of multi-residential, mixed-use and commercial buildings.



By combining Hambro steel joists with the poured concrete, the system forms composite T-beams that are integrated in the transversally reinforced continuous slab. The bottom chord acts as a tension member during the concreting process while the web systems, which are made from bent rods, serve to resist vertical shear. The top chord withstands compressive action during the non-composite stage and subsequently functions as a continuous shear connector between the steel and concrete through adhesion and friction. The slab is reinforced with welded wire mesh.

The reinforced concrete slab also contributes to the transfer of horizontal loads (wind, seismic activity) and acts to stiffen multi-story buildings.

FAST AND ECONOMICAL INSTALLATION



1- Positioning of joists

The joists are placed on the walls or beams and positioned in compliance with the drawings issued for construction by Canam. The joist connection methods are also shown on the Canam drawings.



2- Permanent bridging bolted

Permanent bridging is designed to support steel deck, concrete and construction load. When bolted in the top and bottom chords, bridgings lock joists in place while providing lateral and torsional stability to the joist. Top and bottom chords are fabricated with clips to accommodate bridging, if needed during the pouring process. Generally, no shoring is required unless specifically noted.



3- Steel deck

Together, the steel deck and bridging form a rigid diaphragm during construction, providing a safe platform for workers. The MD2000 system uses steel deck P-3606 which is delivered in a bundle to help with the installation.



4- Sheets of mesh

Welded wire mesh serves as the standard catenary for the slab. Standard 8 ft. x 20 ft. (2,400 mm x 6,100 mm) sheets of mesh are easily placed over the top chords of the Hambro joists. The top chord acts as a high chair.



5- Concrete pouring and finishing

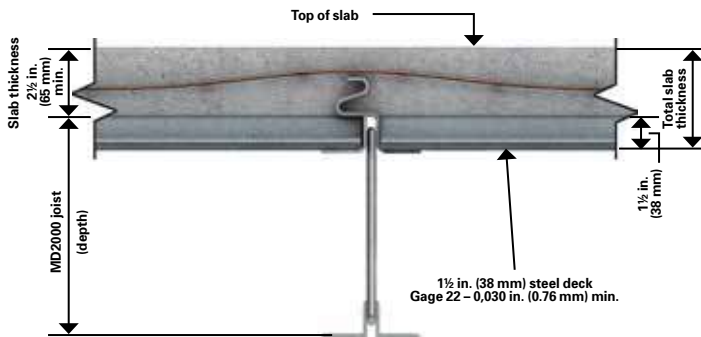
When pouring and finishing a Hambro slab, it is not necessary to complete the entire deck in a single pour. In the event that the pour is interrupted parallel to the joists, the joint should be midway between the joists, but never less than 6 in. (152 mm) from the top chord in order to ensure composite action.

TECHNICAL DETAILS MD2000

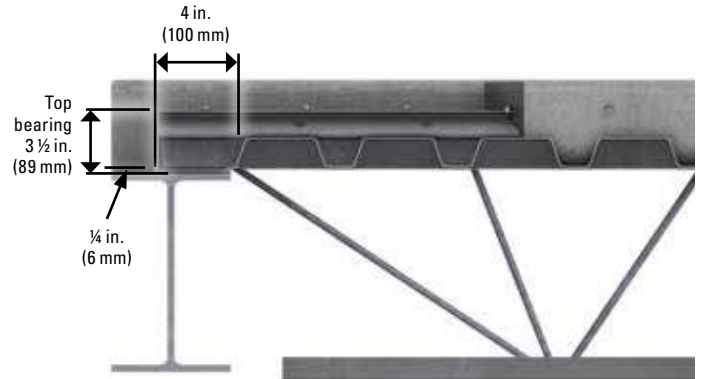
MD2000 Clear Span Table

Residential and light commercial applications	
Slab thickness above steel deck	3 to 4 in. (75 to 100 mm)
Typical load	DL = 67 to 78 psf (3.2 to 3.7 kPa) LL = 40 and 50 psf (1.9 and 2.4 kPa)
Minimum depth	Maximum span
8 in. (200 mm)	20 ft. (6,100 mm)
10 in. (250 mm)	25 ft. (7,600 mm)
12 in. (300 mm)	30 ft. (9,100 mm)
14 in. (350 mm)	35 ft. (10,668 mm)
16 in. (400 mm)	38 ft. (11,582 mm)
18 in. (450 mm)	40 ft. (12,192 mm)
20 in. (500 mm)	43 ft. (13,100 mm)
22 in. (550 mm)	43 ft. (13,100 mm)
24 in. (600 mm)	43 ft. (13,100 mm)

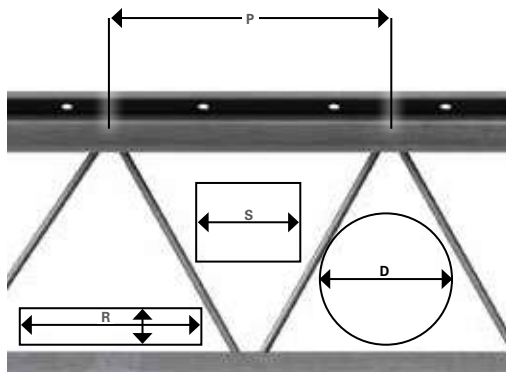
Note: Please contact us for any different loads or applications showed in the table above.



Typical Bearing Detail



Maximum Duct Openings



Joist depth		P		D		S		R	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
8	200	20	508	4	100	4	100	6 x 3	150 x 75
10	250	20	508	6	150	5	125	7 x 4	175 x 100
12	300	24	610	8	200	6	150	9 x 5	225 x 125
14	350	24	610	9	225	7	175	9 1/2 x 6	240 x 150
16	400	24	610	10	250	8	200	10 1/2 x 6 1/2	265 x 165
18	450	24	610	11	280	8 1/2	216	11 x 7	280 x 175
20	500	24	610	11 1/2	292	9	225	12 x 7	310 x 175
22	550	24	610	12	300	9 1/2	240	12 x 8	310 x 200
24	600	24	610	12 1/2	315	10	250	13 x 8	330 x 200

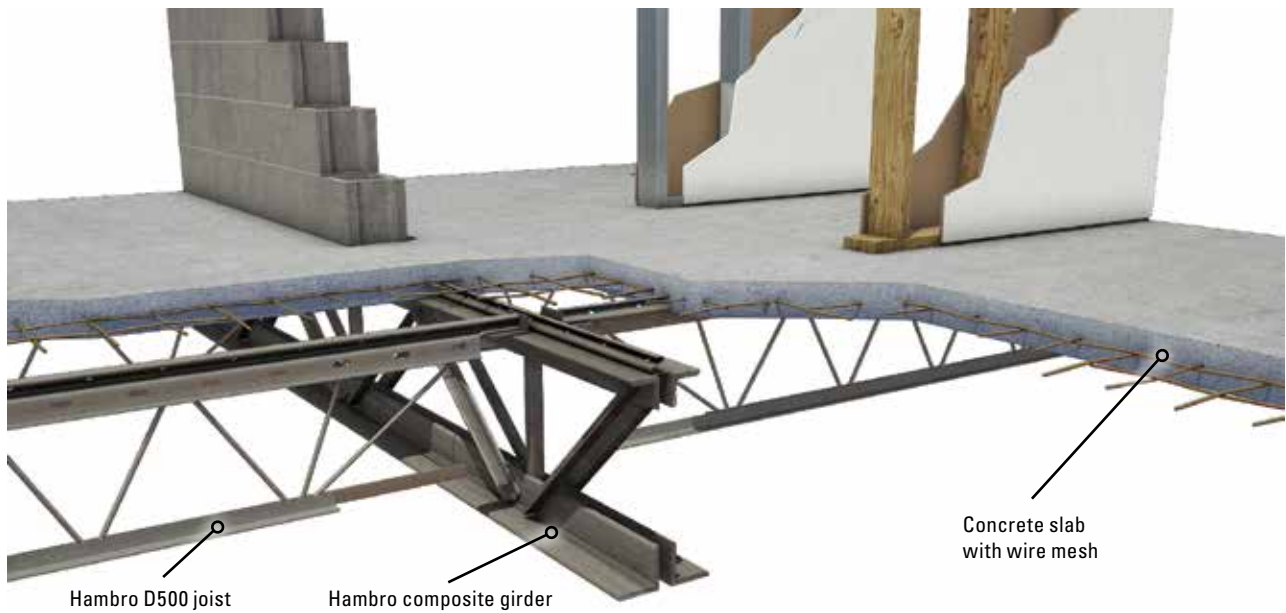
* Valid for bottom chord depth of 1 1/2 in. (38 mm) maximum.

Note: The information provided herewith is for general information about Hambro products and is subject to change without notice following updates and improvements. Canam does not accept responsibility for improper use of this information.

THE HAMBRO TRANSFER SLAB

ALTERNATIVE TO REINFORCED CONCRETE SLABS

The Hambro transfer slab is a floor system that transfers the loads of the superstructure – located above the slab – to the columns and walls beneath it. Designed by Canam, the Hambro transfer slab is composed of Hambro joists and girders that are in composite action with the concrete slab, making it an efficient and economical floor system, both fast and easy to install. This particular system is ideal for use atop underground parking levels and commercial spaces built in the scope of multi-residential or mixed-use projects. The transfer slab can be designed to support the load of multiple floors and also requires less concrete and steel reinforcement than a reinforced concrete slab, thus reducing costs as well as construction time given the absence of shoring.



LOAD DISTRIBUTION



Bearing wall-to-girder



Girder-to-girder

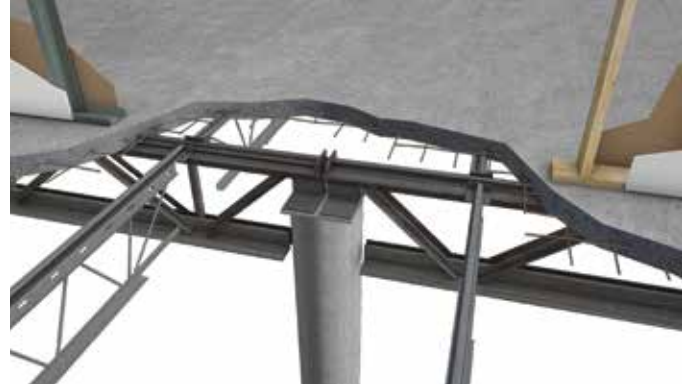


Girder-to-concrete wall

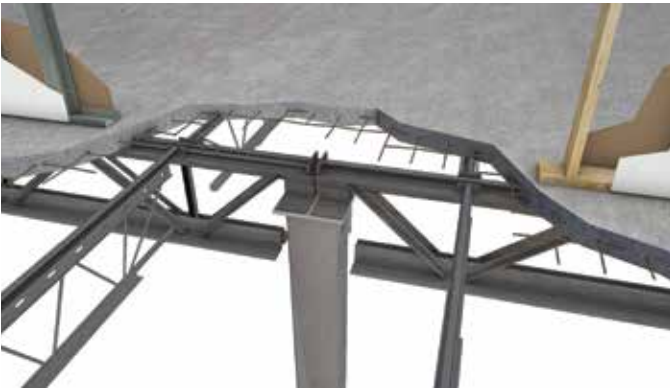
CONNECTION DETAILS



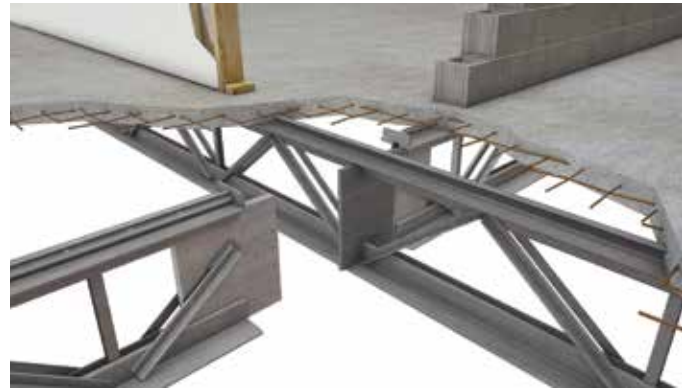
D500 joist and girder-to-wall connection



D500 joist and girder-to-composite column connection



D500 joist and girder-to-steel column connection



Girder-to-girder connection



ACOUSTICAL PROPERTIES

STC: The Hambro assemblies have a Sound Transmission Class up to 57*. STC is a rating that assigns a numerical value to the sound insulation provided by a partition separating rooms or areas. The rating is designed to match subjective impressions of the sound insulation provided against the sounds of speech, music, television, office machines and similar sources of airborne noise that are characteristic of offices and dwellings.

IIC: The Hambro assemblies have an Impact Insulation Class up to 30*. IIC is a rating designed to measure the impact sound insulation provided by floor/ceiling construction. The IIC of any assembly is strongly affected by and dependent upon the type of floor finish for its resistance to impact noise transmission.

* All results are based on laboratory tests with a drywall ceiling.

Note: Laboratory tests were performed on a Hambro assembly consisting of a concrete slab, Hambro joists, metal furring channels and a drywall ceiling. Please consult your design team in order to determine the overall requirements of your project and the methods by which they will be achieved.

FIRE-RESISTANCE RATING UP TO 3 HOURS

Assemblies composed of the Hambro floor system and drywall ceilings were tested by independent laboratories. These assemblies were assigned the following ratings by Underwriters Laboratories Inc. (UL) and by Underwriters Laboratories of Canada (ULC) for gypsum board, suspended ceilings and sprayed protection systems. All references to these published ratings must mention the type of ceiling. See the updates made to these ratings in the ULC/UL fire-resistance directory.



Underwriters
Laboratories
of Canada
www.ulc.ca



Underwriters
Laboratories
Inc.®
www.ul.com

UL/ULC/ cUL design no.	Rating (hour)	Slab thickness		Ceiling	Beam rating (hour)
		(in.)	(mm)		
1506	2	2 ½	65	½ in. (12.7 mm) gypsum board	-
	2	3 ½	90	½ in. (12.7 mm) gypsum board	-
1518	1 ½	2 ½	65	½ in. (12.7 mm) gypsum board	2
	2	2 ¼ - 3	70 - 75	½ in. (12.7 mm) gypsum board	2
1800	1 - 1 ½ - 2	2 ½ - 2 ¾	65 - 70 76 - 89	Sprayed	1
G003	2	2 ½	65	Suspended or panel	-
G213	2	3	75	Suspended or panel	2
	3	4	100	Suspended or panel	3
G227	2	2 ½	65	Suspended or panel	3
G228	2	3 ¼	83	Suspended or panel	2
G229	2	3	75	Suspended or panel	2
	3	4	100	Suspended or panel	3
G243	1 ½	2 ¾	70	Suspended or panel	1 ½
	2	3 ¼	83	Suspended or panel	2
G401	4	2 ½	65	Plaster	-
G524	1 - 2	2 ½*	65*	½ in. (12.7 mm) gypsum board	2
	3	3 ½*	90*	½ in. (12.7 mm) gypsum board	3
G525	3	3 ¼	83	¾ in. (15.9 mm) gypsum board	3
G702	1 - 2 - 3	Varies*	Varies*	Sprayed	-
G802	1 - 2 - 3	Varies*	Varies*	Sprayed	-

* Normal and lightweight concrete



Furring channels are attached to the bottom chord of the Hambro joists. Fire-rated gypsum board completes the assembly, providing an attractive continuous ceiling.



BUILD DIFFERENTLY

For more than 50 years, Canam has developed a fast, reliable construction method adapting to all your commercial, industrial, institutional or multi-residential projects. Whether you are building structures, floors, walls or steel building envelopes, our construction solutions are simple and straightforward. No surprises.



1-866-466-8769
canam-construction.com/hambro

Hambro products are sold in Canada by Canam Buildings and Structures Inc. and in the United States by Canam Steel Corporation or through their respective agents, distributors or representatives in those countries. Canam, Hambro, Murox, as well as all logos identifying the activities of Canam Buildings and Structures Inc., are trademarks of Canam Buildings and Structures Inc.

© Canam Buildings and Structures Inc., 2007-2018
Last modified 08/2018
Printed in Canada