CCMC CANADIAN CODE COMPLIANCE EVALUATION

CCMC EVALUATION

CCMC 06292-R

CCMC Canadian code compliance evaluation

CCMC number:	06292-R
Status:	Active
Issue date:	1984-02-25
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Evaluation holder:	**Canam Buildings - Hambro** Canam Inc. 270, chemin du Tremblay Boucherville QC J4B 5X9 Canada Website: www.groupecanam.com/en Telephone: 450-641-4000 Email: information@canamgroupinc.com
Product name:	Hambro Floor-Ceiling Assembly
Compliance:	NBC 2015
Criteria:	CCMC-TG-053113.01-15, "CCMC Technical Guide for Fire and Sound Systems"

In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.
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Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as a fire- and sound-rated floor-ceiling assembly in accordance with the conditions and limitations stated in this evaluation, complies with the following code:

National Building Code of Canada 2015

Code provision	Solution type
3.1.7. Fire-Resistance Ratings	Acceptable
3.1.8. Fire Separations and Closures	Acceptable
3.1.9. Penetrations in Fire Separations and Fire-Rated Assemblies	Acceptable
3.3.4.6. Sound Transmission	Acceptable
5.8.1.1. Required Protection	Acceptable
5.8.1.2. Determination of Sound Transmission Ratings	Acceptable
5.8.1.3. Compliance with Required Ratings	Acceptable
9.10.8. Fire Resistance and Combustibility in Relation to Occupancy,Height and Supported Elements	Acceptable
9.11.1.1. Required Protection	Acceptable

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

Hambro Floor-Ceiling Assembly

Product description

Hambro Floor-Ceiling Assembly is a floor-ceiling assembly composed of a concrete slab, steel joists, furring channels and gypsum boards. The concrete slab is, at minimum, 65 mm thick and minimally reinforced with an embedded 4.2 mm diameter wire mesh that is 150 mm × 150 mm. The minimum strength of the concrete at 28 days must be at least 20 MPa.

The steel joists are Hambro D500 open-web with temporary plywood deck (Figure 1 and Figure 3), Hambro D510 solid web (Figure 2), and Hambro MD2000 steel deck (Figure 4) with composite joists spaced typically at 1 260 mm on centre (o.c.). They may be spaced up to 1 830 mm (refer to the G524 fire test). The top chord is embedded 38 mm into the concrete slab. Galvanized steel furring channels that are 0.45 mm thick, 67 mm wide and 22 mm deep are secured to each joist with 1.2 mm diameter galvanized steel wire. The furring channels are installed perpendicular to the joists at 400 mm or 600 mm o.c., depending on the drywall (refer to the G524 fire test). Type C gypsum boards that are 12.7 mm or 15.9 mm thick are then fastened to the furring channels.

As an alternative to metal furring and gypsum wallboard, some designs use suspended ceilings with steel framing members and various types of lay-in panels as detailed in ULC publications and cUL listings.

For complete drawings, refer to the Underwriters' Laboratories of Canada Floor and Ceiling Construction Design Nos. I506, I518 and I800 published in their "List of Equipment and Materials," Volume II. For cUL Design No. G524, refer to the UL "Fire Resistance Directory" for Canada. For more information see Figure 1 and Figure 2.

Manufacturing plants

This evaluation is limited to products produced at the following plants:

Product name	Manufacturing plants	
	Calgary, AB, CA	St-Gédéon, QC, CA
Hambro Floor-Ceiling Assembly	⊘	⊘

⊘ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The product is permitted for use in construction where a fire-resistance rating is required for a floor assembly. Such a rating must be determined in conformance with CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials."
- The product is also permitted for use where a sound transmission class rating is required for floor construction. The sound transmission class rating provided in this report is for information only. The ASTC (apparent sound transmission class), STC (sound transmission class), FSTC (field sound transmission class) and IIC (impact insulation class) or AIIC (apparent impact insulation class) published in the report indicate that a proposed system may be able to achieve these results. To obtain the sound transmission class rating between units in buildings it must be determined in accordance with ASTM E 336-11, "Measurement of Airborne Sound Attenuation between Rooms in Buildings" or calculation carried out in accordance with Article 5.8.1.4., Detailed Method for Calculating ASTC, or Article 5.8.1.5., Simplified Method for Calculating ASTC, of Division B of the NBC 2015.
- The product must be installed by qualified installers.
- The product must be supported by a structure designed by a professional engineer skilled in structural design and licensed to practise under the appropriate provincial or territorial legislation.
- The product may be used in combustible or noncombustible construction where a fire-resistance rating is required only if the system has a ULC or cUL listing.
- Openings in the product must comply with limitations allowed by the G524 fire test.
- The product drawings and documents, which are related to span and spacing, must bear the authorized professional seal and signature of an engineer skilled in structural design and licensed to practise under the appropriate provincial or territorial legislation. The cUL G524, as published in the UL "Fire Resistance Directory" of Canada, must also bear the same authorized professional seal and signature of an engineer.
- The flanking wall assemblies shall be constructed in accordance with Article 9.11.1.4., Adjoining Constructions, of Division B of the NBC 2015. Table A-9.11.1.4.-C presents compliance options for the construction of vertically adjoining spaces.

Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-053113.01-15	CCMC Technical Guide for Fire and Sound Systems

The evaluation holder has submitted technical documentation for the CCMC's evaluation. Testing was conducted at laboratories recognized by the CCMC. The corresponding technical evidence for this product is summarized below.

Fire endurance testing was conducted by the Underwriters' Laboratories of Canada (ULC). Sound transmission class ratings were determined by laboratories recognized by the CCMC and from results obtained in the field.

ULC fire rated assembly designs

Design I506

Table 1. Fire-resistance rating and field sound transmission classification (FSTC) of the Hambro Floor-Ceiling Assembly designated by ULC or cUL Listing as Design No. I506 (unrestrained assembly rating)

Design I506	Concrete slab thickness (mm)	Fire-resistance rating (1) (h)	Field sound transmission class (FSTC)
H Series joist (2)	65	2	53
	90	3	53
LH Series joists (2)	75	2	53
	120	3	53

Notes:

1 All installations must be carried out in strict accordance with the appropriate listing Design No. I506 in the "Fire Resistance Directory" published by Underwriters' Laboratories of Canada and/or Underwriters' Laboratories Inc.

2 H Series joists and LH Series joists (2 top chords) are equivalent to D500 and D510 products.

Design I518

Table 2. Fire-resistance rating and field sound transmission classification (FSTC) of the Hambro Floor-Ceiling Assembly designated by ULC or cUL Listing as Design No. I518 (unrestrained assembly rating)

Design I518	Concrete slab thickness (mm)	Fire-resistance rating (1) (h)	Field sound transmission class (FSTC)
H Series joist (2)	65	1.5	53
	70	2	53
	75	2	53

Design I518	Concrete slab thickness (mm)	Fire-resistance rating [(1)] (h)	Field sound transmission class (FSTC)
LH Series joists [(2)]	75	1.5	53
	80	2	53
	85	2	53

Notes:

1 All installations must be carried out in strict accordance with the appropriate listing Design No. I518 in the “Fire Resistance Directory” published by Underwriters’ Laboratories of Canada and/or Underwriters’ Laboratories Inc.

2 H Series joists and LH Series joists (2 top chords) are equivalent to D500 and D510 products.

Design I800

Table 3. Fire-resistance rating and field sound transmission classification (FSTC) of the Hambro Floor-Ceiling Assembly designated by ULC as Design No. I800 (restrained and unrestrained assembly rating)

Restrained assembly rating [(1)] (h)	Unrestrained assembly rating [(1)] (h)	Thickness of sprayed fibre on D510 joist (mm)	Thickness of sprayed fibre on D500 joist (mm)	Concrete slab thickness (mm)	Field sound transmission class (FSTC)
2	-	32	29	63	53
1.5	-	32	29	70	53
-	1.5	-	38	76	53
1	1	32	29	89	53

Note:

1 All installations must be carried out in strict accordance with the appropriate listing Design No. I800 in the “Fire Resistance Directory” published by Underwriters’ Laboratories of Canada and/or Underwriters’ Laboratories Inc.

Design G524

Table 4. Fire-resistance rating and field sound transmission classification (FSTC) of the Hambro Floor-Ceiling Assembly designated by UL as cUL Design No. G524 (restrained and unrestrained assembly rating)

Design	Concrete slab thickness (mm)	Height of truss (mm)	Fire-resistance rating [(1)] (mm)	Field sound transmission class
D500 and MD2000 truss	65	150	1 and 1.5	53
	70	200	1.5 and 2	53
	75	150	2	53

Design	Concrete slab thickness (mm)	Height of truss (mm)	Fire-resistance rating [1] (mm)	Field sound transmission class
	65	250	2	53
	95	200	3	53
	90	250	3	53
D510 truss	80	200	1 and 1.5	53
	70	200	1.5	53
	70	200	2	53

Note:

1 All installations must be carried out in strict accordance with the appropriate listing Design No. G524 in the “Fire Resistance Directory” published by Underwriters’ Laboratories of Canada and/or Underwriters’ Laboratories Inc.

Sound transmission class ratings

MD2000 and D500

Table 5. Field sound transmission classification (FSTC) of the Hambro Floor-Ceiling Assembly designated as MD2000 and D500 tested in accordance with ASTM E90-04 and classification in accordance with ASTM E413-04

Design	Concrete slab thickness (mm)	Height of truss (mm) and deck	Furring channel	Gypsum board	Field sound transmission class (FSTC)
MD2000 truss	101.6 reinforced	203.2 with steel deck	406 mm on centre	12.7 mm Type C	52
D500 truss	63.5 reinforced	203.2 with plywood deck	406 mm on centre, isolated with 12.7 mm felt pad	12.7 mm Type C	54
	101.6 reinforced	203.2 with plywood and 165 mm fibreglass insulation	406 mm on centre	2 layers 12.7 mm Type C	63

Images and examples

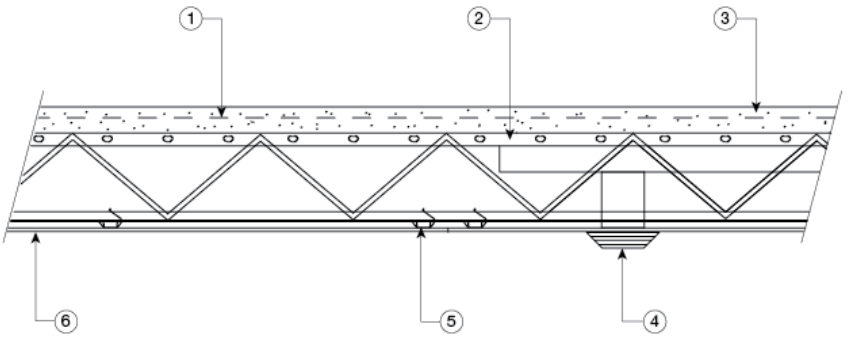

Figure 1. Example of Hambro Floor-Ceiling Assembly

1. Wire fabric
2. Steel joist D500 open-web (plywood temporary form) or MD2000 open-web (steel deck)
3. Concrete
4. Air duct
5. Furring channel
6. Gypsum wallboard Type C

Note: Refer to ULC or cUL drawings for complete details regarding fire-rated systems.

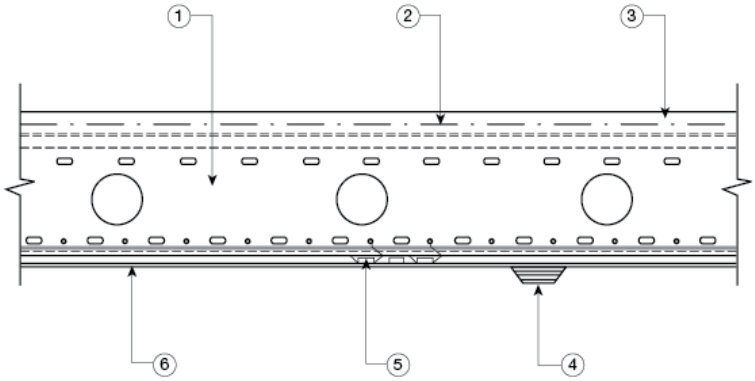

Figure 2. Example of Hambro Floor-Ceiling Assembly

1. Steel joist D510 solid web
2. Wire fabric
3. Concrete
4. Air duct
5. Furring channel
6. Gypsum wallboard Type C

Note: Refer to ULC or cUL drawings for complete details regarding fire-rated systems.

Figure 3. Hambro D500 open-web joist with temporary plywood deck

Figure 4. Hambro MD 2000 with steel deck

Administrative information

Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire CCMC Registry of Product Assessments, any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the Canada Consumer Product Safety Act, the Canadian Environmental Protection Act, etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the CCMC Registry of Product Assessments.

Disclaimer

The National Research Council of Canada (NRC) has evaluated only the characteristics of the specific product described herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (such as authorities having jurisdiction, design professionals and specifiers). This evaluation is valid when the product is used as part of permitted construction, respecting all conditions and limitations stated in the evaluation, and in accordance with applicable building codes and by-laws.

This evaluation is provided without representation, warranty or guarantee of any kind, expressed or implied, and the NRC provides no endorsement for any evaluated product. The NRC accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained herein or the use of any evaluated product. The NRC is not undertaking to render professional or other services on behalf of any person or entity nor to perform any duty owed by any person or entity to another person or entity.

Language

Une version française de ce document est disponible.
In the case of any discrepancy between the English and French version of this document, the English version shall prevail.

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CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

> Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

CCMC assessments are recognized by construction authorities across Canada:

Alliance of Canadian Building Official Associations (ACBOA)	(Alliance of Canadian Building Official Associations (ACBOA))
First Nations National Building Officers Association (FNNBOA)	(First Nations National Building Officers Association (FNNBOA))
Canadian Home Builders' Association (CHBA)	(Canadian Home Builders' Association (CHBA))
Alberta Building Officials Association (ABOA)	(Alberta Building Officials Associations (ABOA))
Saskatchewan Building Officials Association (SBOA)	(Saskatchewan Building Officials Association (SBOA))
Manitoba Building Officials Association (MBOA)	(Manitoba Building Officials Association (MBOA))
Ontario Building Officials Association (OBOA)	(Ontario Building Officials Association (OBOA))
New Brunswick Building Officials Association (NBBOA)	(New Brunswick Building Officials Association (NBBOA))
Nova Scotia Building Officials Association (NSBOA)	(Nova Scotia Building Officials Association (NSBOA))

> The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. Learn more about how the CCMC provides a unique service for Canada.

For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

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Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

> If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.
>
> — **National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)**

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

> Where a design differs from the acceptable solutions in Division B, then it should be treated as an "**alternative solution**." A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”
>
> — **National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)**

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

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