

CLASSIFICATION REPORT
2015-A-003 – Rev. 1
in relation to the fire resistance
leading to a specific field of application

SPONSOR

SAINT-GOBAIN EUROCOUSTIC
Place Victor Hugo 1
92411 COURBEVOIE CEDEX
FRANCE

SUBJECT

Evaluation of the stability in case of fire of a suspended ceiling and the fire resistance of a floor/ceiling construction.

Self-supporting straight ceiling tiles of the A type (thickness: 25 mm and 40 mm; maximum dimensions: 1200 x 600 mm).

This document has been drawn up in the framework of an analysis of test results as described in § 2.1 -2° -a) 4) of the RD of 13/06/2007

1. TEST REPORTS

1.1 Reports

Name of the laboratory	Number of the test report	Date of the test report	Owner of the test report	Test standard
Laboratorium voor Aanwending der Brandstoffen en Wamte-overdracht	5367	12/05/1986	s.a. ALPHACOUSTIC	NBN 713.020 (1968)
	5802	27/04/1988	EUROCOUSTIC	
CTICM	03-H-317	24/11/2003	EUROCOUSTIC	EN 1363-1 (1999) prENV 13381-1 (2001)
	05-U-269	16/11/2005	PLAFOMETAL – BELGIUM SAINT-GOBAIN EUROCOUSTIC	

At your request, we have examined the above-referenced test reports (present owner: Saint-Gobain Eurocoustic).

1.2 Description of the tested elements

Test report No. 5367 gives the description and the results of an orientating fire resistance test carried out according to the Belgian standard NBN 713.020 (edition 1968) on a loadbearing timber floor, protected from below by means of a suspended ceiling (dimensions: 4000 x 2000 mm), composed of a metal framework of the CMC 850 type (c/c distance main supporting profiles: 1200 mm; c/c distance transversal profiles: 600 mm; section supporting profiles: 38 x 24 mm) and self-supporting straight ceiling tiles out of rock wool of the **TONGA** type (dimensions: approx. 1200 x 600 mm; thickness: 40 mm; density: approx. 100 kg/m³). The ceiling tiles have been fixed by means of two fixing clips per tile in the metal framework. During the test, a uniform load of approx. 300 kg/m² has been applied on the test specimen.

Test report No. 5802 gives the description and the results of a orientating fire resistance test carried out according to the Belgian standard NBN 713.020 (edition 1968) on a loadbearing timber floor, protected from below by means of a suspended ceiling (dimensions: 4000 x 2000 mm), composed of a metal framework of the DONN Eurosystem type (c/c distance main supporting profiles: 1200 mm; c/c distance transversal profiles: 600 mm; section supporting profiles: 38 x 24 mm) and self-supporting straight ceiling tiles out of rock wool of the **TONGA** type (dimensions: approx. 1200 x 600 mm; thickness: 25 mm; density: approx. 120 kg/m³). During the test, a uniform load of approx. 300 kg/m² has been applied on the test specimen.

Test report No. 03-H-317 gives the description and the results of a fire resistance test carried out according to a French-Belgian method conform to the European standard EN 1363-1 (edition 1999) and the European draft standard prENV 13381-1 (edition 2001) on a loadbearing floor, composed of aerated concrete slabs (thickness: 100 mm), placed on steel supporting beams (IPE 160; span: 4900 mm; c/c distance: 600 mm), and protected from below by means of a suspended ceiling (dimensions: 4600 x 3100 mm). The suspended ceiling has been composed of a metal framework of the PLAFOMETAL type (c/c distance main supporting profiles: 600 mm; c/c distance transversal profiles: 600 mm; section supporting profiles: 38 x 24 mm) and self-supporting straight ceiling tiles of the **ALIZE** type (thickness: 25 mm; nominal dimensions: 600 x 600 mm; density: approx. 100 kg/m³). The ceiling tiles have been fixed by means of four pins per tile in the metal framework. One layer of rock wool insulation of the EUROLENE 603 type (thickness: 160 mm; density: approx. 30 kg/m³) has been applied on the suspended ceiling. During the test, a load has been applied on the test specimen in order to obtain a bending moment corresponding to 60 % of the plastic moment of the steel supporting beams.

Test report No. 05-U-269 gives the description and the results of a fire resistance test carried out according to the European standard EN 1363-1 (edition 1999) and the European draft standard prENV 13381-1 (edition 2001) on a loadbearing floor, composed of aerated concrete slabs (thickness: 125 mm), placed on steel supporting beams (IPE 160; span: 4900 mm; c/c distance: 600 mm), and protected from below by means of a suspended ceiling (dimensions: 4600 x 3100 mm). The suspended ceiling has been composed of a metal framework of the PLAFOMETAL type (c/c distance main supporting profiles: 600 mm; c/c distance transversal profiles: 600 mm; section supporting profiles: 38 x 24 mm) and self-supporting straight ceiling tiles of the **TONGA** type (thickness: 25 mm; nominal dimensions: 600 x 600 mm; density: approx. 100 kg/m³). The ceiling tiles have been fixed by means of four pins per tile in the metal framework. During the test, a load has been applied on the test specimen in order to obtain a bending moment corresponding to 60 % of the plastic moment of the steel supporting beams.

2. RESULTS

The results obtained for the suspended ceiling and the floor/ceiling construction during the above-mentioned tests are given in the table below:

Test report No.	5367	5802	03-H-317	05-U-269
C/c distance main supporting profiles	1200 mm	1200 mm	600 mm	600 mm
Type of ceiling tiles	TONGA	TONGA	ALIZE	TONGA
Thickness of the ceiling tiles	40 mm	25 mm	25 mm	25 mm
Dimensions of the ceiling tiles	1200 x 600 mm	1200 x 600 mm	600 x 600 mm	600 x 600 mm
Fixing clips	Yes	No	Yes	Yes
Rock wool insulation	-	-	160 mm	-
Floor composition	Timber	Timber	Aerated concrete	Aerated concrete
Plenum height	290 mm	350 mm	300 mm	300 mm
Characteristic plenum temperature after 30 minutes	approx. 235 °C	approx. 360 °C	approx. 220 °C	approx. 355 °C
Characteristic plenum temperature after 60 minutes	approx. 800 °C	-	approx. 625 °C	approx. 575 °C
Criteria	Time in minutes			
Suspended ceiling (according to the criteria of the Belgian standard NBN 713.020 (edition 1968))				
Falling of the first ceiling element	55	40	17	64
Stability of the ceiling	CONFORM	CONFORM	CONFORM ^(*)	CONFORM
Floor/ceiling construction (according to the criteria of the European standard EN 13501-2:2007+A1:2009)				
Thermal insulation (I)	Not applicable	Not applicable	≥ 75	≥ 68
Integrity (E)	Not applicable	Not applicable	≥ 75	≥ 68
Loadbearing capacity (R)	Not applicable	Not applicable	≥ 75	≥ 68
Test duration	61	42	75	68
^(*) The dimensions (and the surface weight) of the falling pieces are inferior to the allowed dimensions (and the surface weight) according to § 4 of the document 1394 SN "Stability in case of fire of lowered ceilings", approved by the Hoge Raad voor Beveiliging tegen Brand en Ontploffing during their meeting on 15 September 2011.				

The height of the plenum is defined as the distance between the bottom side of the floor and the upper side of the ceiling tiles (or the insulation, if applicable).

3. REFERENCE DOCUMENTS

NBN 713.020 (edition 1968).

Document 1392 SN “Stability in case of fire of lowered ceilings”, approved by the Hoge Raad voor Beveiliging tegen Brand en Ontploffing during their meeting on 15 September 2011.

Technical Assessment 2014-A-033 concerning the stability in case of fire of a suspended ceiling and the fire resistance of a floor/ceiling construction – Self-supporting straight ceiling tiles of the A type (thickness: 22 mm; maximum dimensions: 1200 x 600 mm).

4. FIELD OF APPLICATION

4.1 Stability in case of fire of a suspended ceiling

Based on the above-mentioned results and the reference documents described in § 3, we are of the opinion that **the stability in case of fire** of a suspended ceiling, composed as described below, will not be inferior to **30 minutes** according to the Belgian standard NBN 713.020 (edition 1968).

4.1.1 Floor

The suspended ceiling is applied underneath one of the following floor types, placed or not on the supporting beams mentioned in the table below. The plenum height, i.e. the distance between the bottom side of the floor and the upper side of the ceiling tiles or the insulation, if applicable, is 300 mm at the least.

Type of supporting beams	Type of floor				
	Aerated concrete	Gravel concrete	Steel/concrete composite	Timber	Steeldeck
Gravel concrete	X	X	X	-	X**
Hot rolled steel	X	X	X	-	X**
Cold formed steel	X	X	X	-	X**
Timber	-	-	-	X*	-
No supporting beams	X	X	X	-	X**

* Only allowed if one of the following conditions is satisfied:

- a rock wool insulation of the EUROLENE type (thickness: 160 mm; density: approx. 30 kg/m³) is applied on the metal framework of the suspended ceiling taking into account the restrictions mentioned in § 4.1.2.4.2;
- the loadbearing capacity of the timber floor construction is not inferior to R 30 according to the European standard EN 13501-2:2007+A1:2009.

** Only allowed if a rock wool insulation of the EUROLENE type (thickness: 160 mm; density: approx. 30 kg/m³) is applied on the metal framework of the suspended ceiling taking into account the restrictions mentioned in § 4.1.2.4.2.

4.1.2 Suspended ceiling

4.1.2.1 Metal framework

4.1.2.1.1 Metal framework of the Quick Lock Hook-On type

- edge profiles of one of the following types, applied around the full perimeter of the ceiling and fixed every 300 mm at the most by means of ceiling nails of the Fischer FDN type (min. \varnothing 6 x 35 mm) to a supporting construction out of stony materials (e.g. concrete, aerated concrete, masonry...):
 - steel L-profile of the 87924 type (dimensions: 24 x 24 mm; steel thickness: 0.5 mm);
 - steel U-profile of the 87926 type (dimensions: 19 x 40 x 19 mm; steel thickness: 0.5 mm);
- a metal framework of the Quick Lock Hook-On type, composed as follows:
 - main supporting profiles of the 86282 type (steel T-profile; dimensions: 38 x 24 mm; steel thickness: 0.35 mm; c/c distance: max. 1200 mm), equipped with a firebreak and suspended as described in § 4.1.2.2.1. The distance between the main supporting profiles and the edge of the ceiling is 350 mm at the most. The extremities of the main supporting profiles rest on/in the edge profiles;
 - primary transversal profiles of the 86281 type (steel T-profile; dimensions: 32 x 24 mm; steel thickness: 0.35 mm; length: 1200 mm; c/c distance: max. 600 mm), applied perpendicularly between the main supporting profiles. The distance between the primary transversal profiles and the edge of the ceiling is 350 mm at the most. The extremities of the primary transversal profiles at the edge of the ceiling rest on/in the edge profiles;
 - secondary transversal profiles of the 87835 type (steel T-profile; dimensions: 32 x 24 mm; steel thickness: 0.35 mm; length: 600 mm), applied perpendicularly between the primary transversal profiles in case of self-supporting straight ceiling tiles with dimensions 600 x 600 mm. The extremities of the secondary transversal profiles at the edge of the ceiling rest on/in the edge profiles.

4.1.2.1.2 Metal framework of the Quick Lock Clip-On type

- edge profiles as described in § 4.1.2.1.1;
- a metal framework of the Quick Lock Clip-On type, composed as follows:
 - main supporting profiles of the 66413 type (steel T-profile; dimensions: 38 x 24 mm; steel thickness: 0.35 mm; c/c distance: max. 1200 mm), equipped with a firebreak and suspended as described in § 4.1.2.2.2. The distance between the main supporting profiles and the edge of the ceiling is 350 mm at the most. The extremities of the main supporting profiles rest on/in the edge profiles;
 - primary transversal profiles of the 66415 type (steel T-profile; dimensions: 32 x 24 mm; steel thickness: 0.35 mm; length: 1200 mm; c/c distance: max. 600 mm), applied perpendicularly between the main supporting profiles. The distance between the primary transversal profiles and the edge of the ceiling is 540 mm at the most. The extremities of the primary transversal profiles at the edge of the ceiling rest on/in the edge profiles;

transversal profiles of the 66414 type (steel T-profile; dimensions: 25 x 24 mm; steel thickness: 0.3 mm; length: 600 mm), applied perpendicularly between the primary transversal profiles in case of self-supporting straight ceiling tiles with dimensions 600 x 600 mm. The extremities of the secondary transversal profiles at the edge of the ceiling rest on/in the edge profiles.

4.1.2.2 Suspension

4.1.2.2.1 Suspension of the metal framework of the Quick Lock Hook-On type

- the main supporting profiles of the 86282 type, described in § 4.1.2.1.1 are suspended every 900 mm at the most by means of quick suspension hangers of the 87559 type ($\varnothing_{\text{wire}}$: 3.8 mm) or the 87560 type ($\varnothing_{\text{wire}}$: 4.0 mm);
- the distance between the suspension hangers and the edge of the ceiling is 400 mm at the most;
- the stability in case of fire of the fixing of the suspended ceiling to the overlying floor construction has to be at least 30 minutes.

4.1.2.2.2 Suspension of the metal framework of the Quick Lock Clip-On type

- the main supporting profiles of the 66413 type, described in § 4.1.2.1.2 are suspended every 900 mm at the most by means of quick suspension hangers of the 87565 type ($\varnothing_{\text{wire}}$: 4.0 mm);
- the distance between the suspension hangers and the edge of the ceiling is 300 mm at the most;
- the stability in case of fire of the fixing of the suspended ceiling to the overlying floor construction has to be at least 30 minutes.

4.1.2.3 Ceiling tiles

4.1.2.3.1 Type of ceiling tiles

The following self-supporting straight ceiling tiles of the A type (manufacturer: Eurocoustic; nominal dimensions: 1200 x 600 mm or 600 x 600 mm; thickness: 25 mm and 40 mm, see table below; density: see table below) are placed in one of the metal frameworks described in § 4.1.2.1:

Type	Thickness	Nominal density
Tonga [®] , Athena, Vega, Atoll, Coral, Altès [®] , Atrium, Neptune, Alizé [®] , Samoa A, Clini' Safe [®] A, Clini' Clean [®] , Acoustichoc [®]	25 mm	90 kg/m ³
Tonga [®] , Alizé [®] , Acoustished [®] CV 40, Acoustichoc [®] , Acoustisport [®] , Orchestra [®] , Tonga [®] Ultra Clean A 40	40 mm	105 kg/m ³

The ceiling tiles can be finished by means of a white, decorative or coloured finishing layer on the apparent side.

4.1.2.3.2 Restrictions

In case of 40 mm thick ceiling tiles, the c/c distance between the main supporting profiles is 600 mm at the most. In this case, the primary transversal profiles are omitted and the secondary transversal profiles (c/c distance: max. 1200 mm) are applied perpendicularly between the main supporting profiles.

4.1.2.4 Insulation

4.1.2.4.1 Insulation type

A layer of rock wool or glass wool insulation (surface weight: max. 5.5 kg/m² in case of 25 mm thick ceiling tiles and max. 3.55 kg/m² in case of 40 mm thick ceiling tiles) can be applied or not on the metal framework of the suspended ceiling.

4.1.2.4.2 Restrictions

In any case, a layer of rock wool insulation may only be applied provided that the c/c distance between the main supporting profiles is 600 mm at the most and that the nominal dimensions of the self-supporting straight ceiling tiles, mentioned in § 4.1.2.2, are limited to 600 x 600 mm at the most. In this case, the primary transversal profiles are omitted and the secondary transversal profiles are applied perpendicularly between the main supporting profiles.

4.1.2.5 Accessories in the suspended ceiling

It is not permitted to apply accessories in the suspended ceiling.

4.1.3 Accessories above the suspended ceiling

It is possible to apply accessories above the suspended ceiling, provided the prescriptions mentioned below are respected:

- the accessories are installed independently from the suspended ceiling, i.e. the accessories are not a part of the suspended ceiling;
- the stability in case of fire of the accessories and the fixing of these accessories to the overlying construction is at least 30 minutes.

4.2 Fire resistance of a floor/ceiling construction

4.2.1 Fire resistance 30 minutes

Based on the above-mentioned results, we are of the opinion that **the fire resistance** of a floor/ceiling construction, composed as described below, will not be inferior to **REI 30** according to the European standard EN 13501-2:2007+A1:2009.

4.2.1.1 Floor

The floor is chosen from one of the following floor types, placed or not on the supporting beams mentioned in the table below. The plenum height, i.e. the distance between the bottom side of the floor and the upper side of the ceiling tiles or the insulation, if applicable, is 300 mm at the least.

Type of supporting beams	Type of floor			
	Aerated concrete ¹	Gravel concrete ²	Steel/concrete composite ³	Timber ⁴
Gravel concrete	X	X	X	-
Hot rolled steel	X	X	X	-
Cold formed steel	X	X	X	-
Timber	-	-	-	X*
No supporting beams	X	X	X	-

¹ thickness: min. 100 mm; density: min. 650 kg/m³

² thickness: min. 60 mm; density: min. 2300 kg/m³

³ composed of profiled steel plates (thickness: min. 0.75 mm) and concrete (density: min. 2300 kg/m³; concrete cover: min. 20 mm) with a thickness superior to 60 mm at the least on top of the upper steel waves

⁴ composed of wood particle boards (thickness: min. 21 mm; density: min. 600 kg/m³; with tongue and groove), fixed perpendicularly to the supporting beams

* Only allowed if a rock wool insulation of the EUROLENE type (thickness: 160 mm; density: approx. 30 kg/m³) is applied on the metal framework of the suspended ceiling taking into account the restrictions mentioned in § 4.1.2.4.2.

4.2.1.2 Suspended ceiling

The suspended ceiling is composed as described in § 4.1.2.

4.2.2 Fire resistance 60 minutes

Based on the above-mentioned results, we are of the opinion that **the fire resistance** of a floor/ceiling construction, composed as described below, will not be inferior to **REI 60** according to the European standard EN 13501-2:2007+A1:2009.

4.2.2.1 Floor

A concrete floor construction, composed as described below:

- either a aerated concrete floor (thickness: min. 125 mm; density: min. 650 kg/m³), placed or not on steel or concrete beams;
- either a gravel concrete floor (thickness: min. 80 mm; density: min. 2300 kg/m³; concrete cover: min. 20 mm), placed or not on steel or concrete beams.

The concrete floor construction has to satisfy to the following conditions as well:

- the stability of the concrete floor construction is guaranteed under normal conditions;
- in case of steel beams, the loadbearing capacity of the floor construction may not be inferior to R 60 according to the European standard EN 13501-2:2007+A1:2009;
- the plenum height, i.e. the distance between the bottom side of the concrete floor and the upper side of the ceiling tiles or the insulation, if applicable, is 300 mm at the least.

4.2.2.2 Suspended ceiling

The suspended ceiling is composed as described in § 4.1.2, except for the nominal dimensions of the self-supporting straight ceiling tiles mentioned in § 4.1.2.2. These are limited to 600 x 600 mm at the most. The stability in case of fire of the fixing of the suspended ceiling to the overlying floor construction is at least 60 minutes.

5. CONDITIONS FOR THE USE OF THE PRESENT CLASSIFICATION REPORT

This classification report is only valid if the stability of the constructions, composed as described in § 4, is guaranteed under normal conditions according to the standards in force.

This classification report is only valid as far as the composition of the ceiling components is identical to that of the components subjected to the above-referenced tests.

This classification report is only valid when accompanied by the above-referenced test reports.

This classification report cannot be combined with another classification report, except when mentioned explicitly.

This classification report is issued on the basis of test data and information handed over at the time of the demand by the sponsor. If contradictory evidence becomes available afterwards, the assessment will be unconditionally withdrawn and the sponsor will be notified on this.

The duration of validity of the present classification report is limited to 5 years starting from the issuing date of this classification report and may be extended after a favourable exam.

The sponsor also confirms that he has not been informed about any non-public information which could influence this assessment, and in consequence the obtained conclusions.

If the sponsor is informed afterwards about such information, he agrees to withdraw the assessment above and its use for regulated purposes – if applicable.

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Drawn up by



ir. Pieter Poppe

Head of the Division Consultancy

Reviewed by



ir. Edwin Van Wesemael

Technical Director ISIB