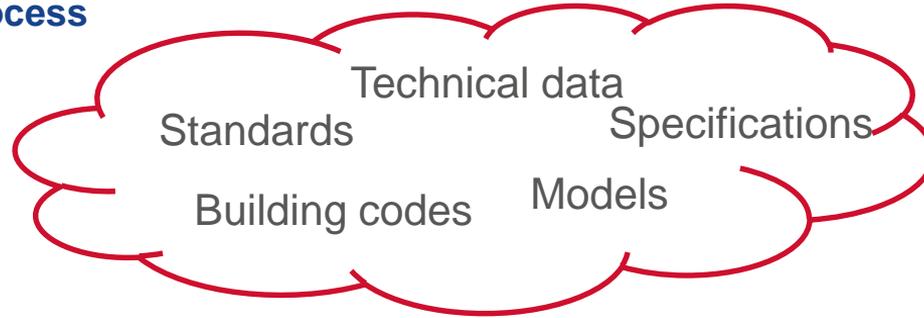




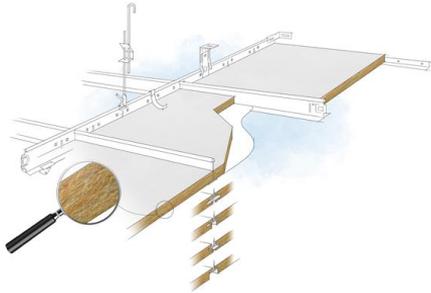
**BIM OCH BRANDSKYDD
PRODUCENTPERSPEKTIVET & BIM**

**TORBJÖRN PERSSON
PIERRE CHIGOT**

The building process



Components
Products
Systems



Safe, healthy, functional
and sustainable buildings

The building code – BBR. Obvious or...

5:522 Väggar och tak i utrymningsvägar

I utrymningsvägar ska väggar och tak utformas så att en brands utveckling i lokalen inte får nämnvärt bidrag från takens och väggarnas ytskikt.

Allmänt råd

I byggnader i klass Br1 och Br2 bör takytor och väggytor i utrymningsvägar ha ytskikt av lägst brandteknisk klass B-s1,d0. Ytskiktet bör fästas på material i brandteknisk klass A2-s1,d0 eller på beklädnad i lägst brandteknisk klass K₂10/B-s1,d0.

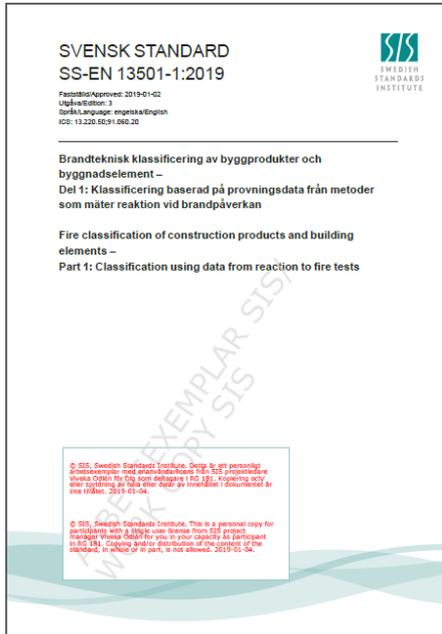
I byggnader i klass Br3 bör takytor och väggytor ha ytskikt enligt följande:

- a) Utrymningsvägar i verksamhetsklass 4 och 5A bör ha ytskikt av klass B-s1,d0 på takytor och lägst klass C-s2,d0 på väggytor. Ytskikten bör fästas på material av A2-s1,d0 eller på beklädnad i klass K₂10/B-s1,d0.
- b) Utrymningsvägar som är gemensamma för två eller flera bostads- eller kontorslägenheter bör ha ytskikt av klass B-s1,d0 på takytor och av lägst klass C-s2,d0 på väggytor.
- c) Utrymningsvägar från lokaler i verksamhetsklass 6 bör ha tak- och väggytor med ytskikt av klass B-s1,d0 fäst på material av A2-s1,d0 eller på beklädnad i klass K₂10/B-s1,d0.

(BFS 2013:14).



What we do as a producer of construction products



1 Scope

This document provides the reaction to fire classification procedure for all construction products, including products incorporated within building elements with the exception of power, control and communication cables which are covered by EN 13501-6.

Products are considered in relation to their **end use application**.

This document applies to three categories, which are treated separately in this document:

- construction products, excluding floorings and linear pipe thermal insulation products;
- floorings;
- linear pipe thermal insulation products.

The format of the reaction to fire classification for construction products excluding floorings and linear pipe thermal insulation products is:

Fire behaviour	Smoke production			Flaming droplets	
<i>A1 to F (as applicable)</i>	-	s	<i>1, 2 or 3 (as applicable)</i>	d	<i>0, 1 or 2 (as applicable)</i>

i.e. *A1 to F (as applicable) - s1, 2 or 3 (as applicable), d0, 1 or 2 (as applicable)*



What we do as a producer of construction products

B.4.3 Field of application

This classification is valid for the following product parameters (e.g. thickness, density...):

<i>product property 1</i>	Variation in <i>product property 1</i>
<i>product property 2</i>	Variation in <i>product property 2</i>
<i>product property 3</i>	Variation in <i>product property 3</i>
<i>product property 4</i>	Variation in <i>product property 4</i>
<i>product property x etc.</i>	Variation in <i>product property x etc.</i>

(include reference to the reference document + date used for undertaking this)

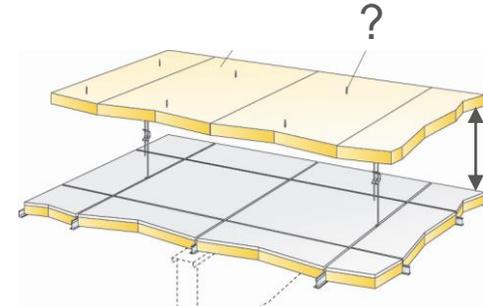
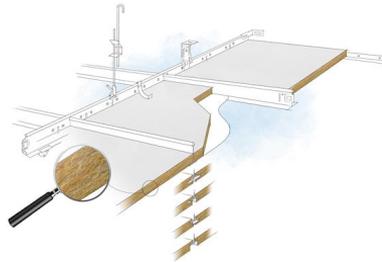
The classification is valid for the following **end use applications:**

Details of **substrates and/or air gaps**

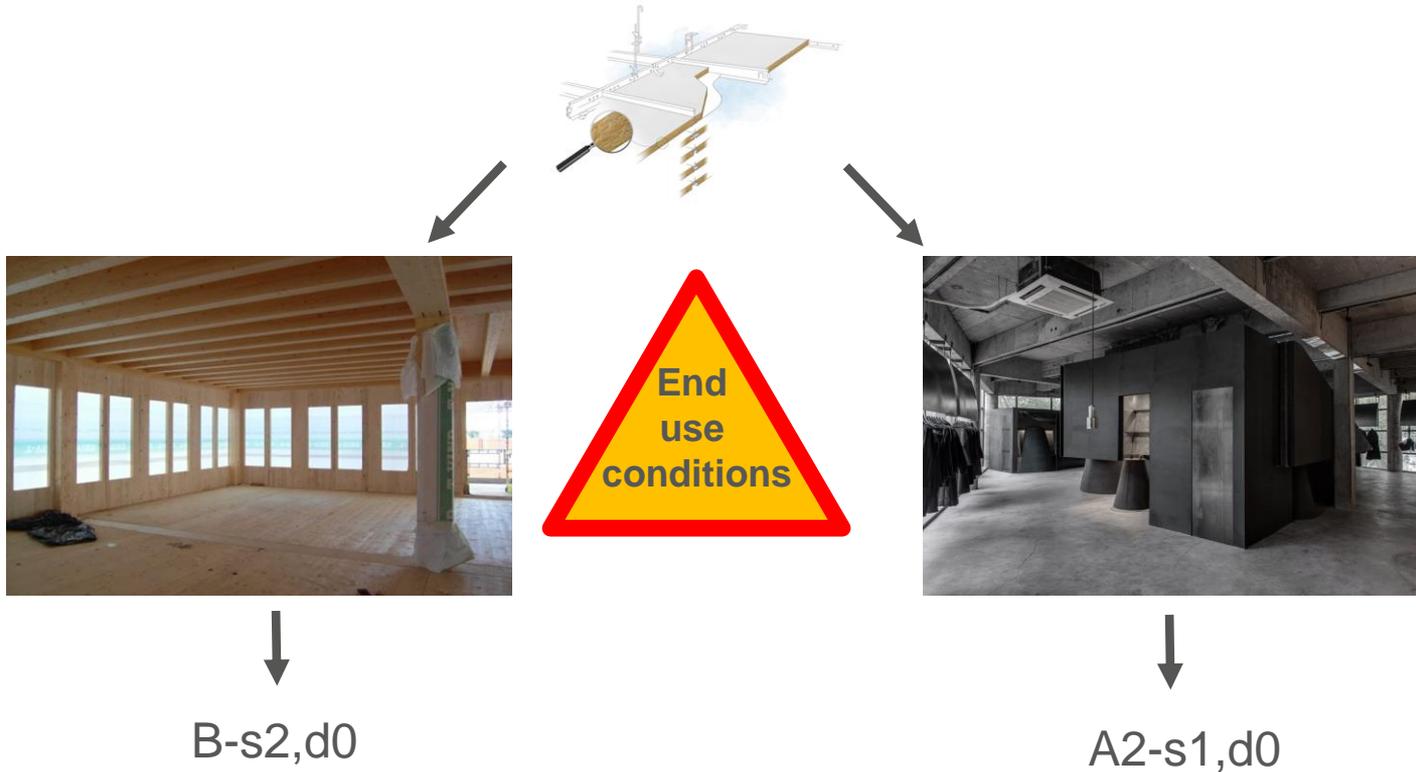
Details of **methods and means of fixing**

Details of **joints**

Details of **other aspects of end use conditions**



Same product / system – different classification



Classification report

Field of application:

This classification is valid for the following end use conditions:

Orientation:

The classification is valid for both faces. The product may be mounted in a horizontal or vertical orientation.

Mounting:

The tiles can be loosely placed or mechanically fixed to a metal framework that is suspended from a ceiling, i.e. **mounted with a void**. Alternatively the tiles can be mechanically **fixed or glued directly** with an acoustic cement glue (0.5 l/m^2) to a substrate either in a wall or ceiling configuration.

Substrates:

For each of the mounting configurations mentioned above the following substrates can be used:

Wood based substrates at least 12 mm thick having a density $\geq 630 \text{ kg/m}^3$.

Substrate of spruce at least 12 mm thick having a density $\geq 460 \text{ kg/m}^3$.

Substrates of Euroclass A1 and A2 at least 6 mm thick having a density $\geq 630 \text{ kg/m}^3$.

TYVEK® FIRECURB® HOUSEWRAP

HOME

INFORMATION &
RESOURCES

PRODUCTS &
SOLUTIONS

Search



- CE Marking

Key Properties of DuPont™ Tyvek® FireCurb® Housewrap

- **Style Name:** 2066B
- **Roll size:** 1.5 x 50m
- **Roll weight:** 5.5kg

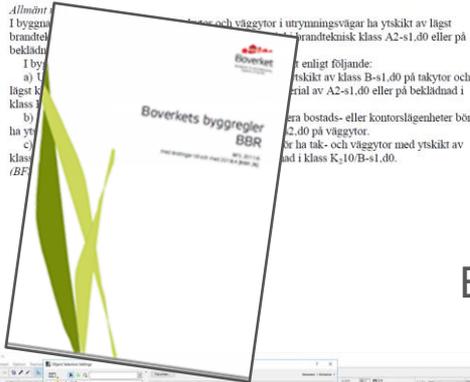
- **Reaction to fire:** according to EN 13501-1 (on mineral wool, free-hanging or on cementitious boarding--> B-s1,d0 , if installed onto wood --> D-s2,d2)

- **Water vapour transmission (Sd):** 0.014m
- **Mass per unit area:** 68g/m²

BIM - a key to quality assurance and right decisions

5:522 Väggar och tak i utrymningsvägar

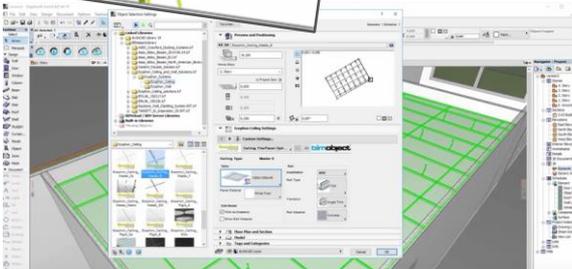
I utrymningsvägar ska väggar och tak utformas så att en brands utveckling i lokalen inte får nämnvärt bidrag från takens och väggarnas ytskikt.



Almänna
I byggnads-
brändteknisk
beklädnad
I byggnads-
a) Utrymnings-
lägst klass
klass B-s1,
b) Utrymnings-
ha ytskikt
c) Utrymnings-
klass B-s1,
(BF)

... och väggytor i utrymningsvägar ha ytskikt av lägst brandteknisk klass A2-s1,d0 eller på ytskikt enligt följande:
ytskikt av klass B-s1,d0 på taktytor och väggtytor av A2-s1,d0 eller på beklädnad i klass B-s1,d0 på väggtytor.
I bostads- eller kontorslägenheter bör tak- och väggytor ha ytskikt av klass K₁₀-B-s1,d0.

B-s1,d0



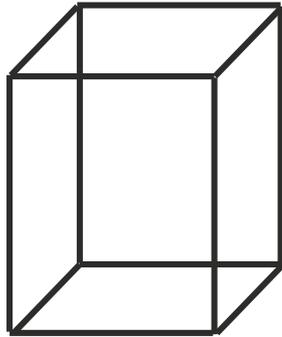
No! Cannot be done, no classification for combination with specified underlying material

Yes! Without restrictions

Yes! But $ods \geq 100$ mm otherwise C-s2,d0



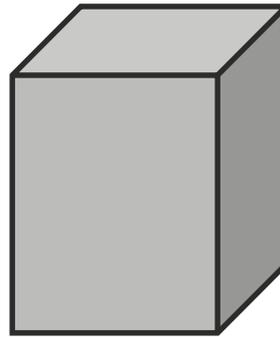
MILESTONES IN ARCHITECTURAL DESIGN SOFTWARES



Lines

- Intersections
- Planes

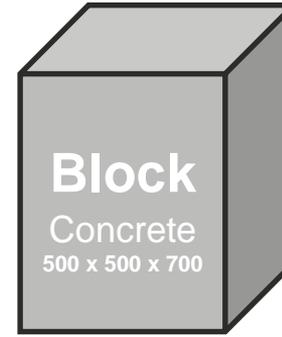
- Ex: AutoCAD, 1982



Solid

- Geometric entity
- Polygones

- Ex: ArchiCAD, 1986



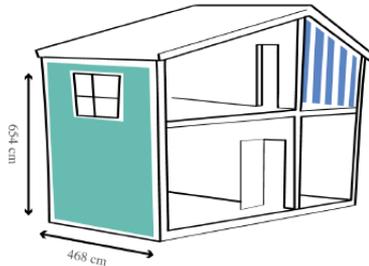
BIM object

- Building element
- Associated information
- Parametric

BIM IS GEOMETRY AND INFORMATION

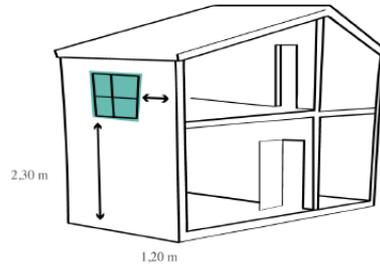
Geometry

Information



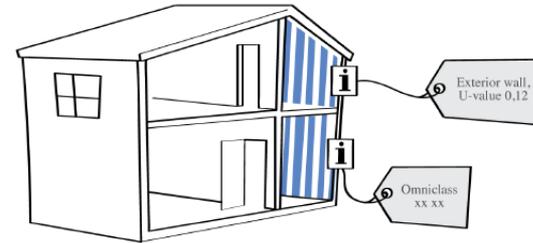
1. Building parts dimension

(ex. wall, window, column, cable, ceiling)



2. Building parts location and relations

(ex: plenum height)



3. Building parts properties (provided through classification or type code)

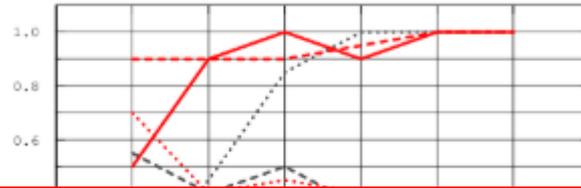
(ex: economy, time, compliances, fire class, absorption class etc)

PRODUCT INFORMATION: SOUND ABSORPTION

Sound Absorption

Test results according to EN ISO 354. Classification according to EN ISO 11654, and the single value ratings for Noise Reduction Coefficient, NRC and Sound Absorption Average, SAA according to ASTM C 423.

α_{pr} , Practical sound absorption coefficient



	THK _{SEP} mm	o.d.s. mm	α_{pr} , Practical sound absorption coefficient						α_w	Sound absorption class
			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz		
-	20	50	0.10	0.45	0.85	1.00	1.00	1.00	0.75	C
-	20	200	0.50	0.90	1.00	0.90	1.00	1.00	1.00	A

--- Focus A gamma 20 mm + Extra Bass 50 mm, 200 mm o.d.s.

o.d.s = overall depth of system

	THK _{SEP} mm	o.d.s. mm	α_{pr} , Practical sound absorption coefficient						α_w	Sound absorption class
			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz		
-	20	50	0.10	0.45	0.85	1.00	1.00	1.00	0.75	C
-	20	200	0.50	0.90	1.00	0.90	1.00	1.00	1.00	A
+ Extra Bass,	70	200	0.90	0.90	0.90	0.95	1.00	1.00	0.95	A
gamma	20	200	0.55	0.40	0.50	0.35	0.20	0.25	0.30	D
---	---	---	---	---	---	---	---	---	---	---

PRODUCT INFORMATION: FIRE SAFETY


[Products](#)
[Inspiration](#)
[Acoustic Solutions](#)
[Sustainability](#)
[About Ecophon](#)
Kg CO₂ equiv/m²

2,97



Fire safety

The glass wool core of the tiles is tested and classified as non-combustible according to EN ISO 1182. The systems are classified as fire protective covering according to NT FIRE 003.

Country

Europe

Standard

EN 13501-1

Class

A2-s1,d0

[Read more](#)


Mechanical properties

See table about Max. live load and Min. live load bearing capacity and Functional demands - Mechanical

BIM: INHERENT VS CONTEXTUAL INFORMATION

Ex: Ecophon Focus A 600 x 600

The screenshot displays the 'Type Properties' dialog for the product 'Ecophon Focus A 600x600 Akutex FT'. The 'Type Parameters' table lists various attributes, with the 'Other' section highlighted by a red box. This section contains the following data:

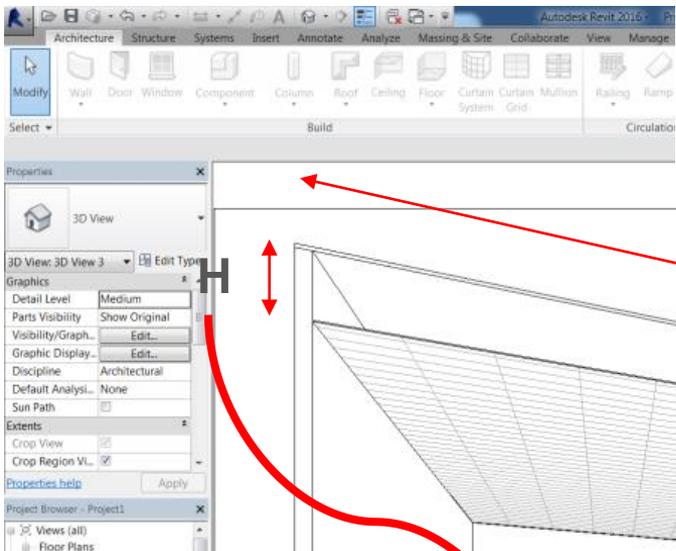
Parameter	Value
Manufacturer url	http://www.ecophon.com/
Technical description	http://www.ecophon.com/PI
Installation instructions	http://www.ecophon.com/PI
Product Guid	f4164744-3349-4754-b831-7c
IFC Parameters	
Uniclass 2.0 Description	Ceiling And Soffit Systems
Other	
CO2 from EPD in conformity with ISO 14025 / EN 15804	2,59 Kg CO ₂ equiv/m ²
Reaction to fire (EN 13501-1)	A2-s1,d0
Sound absorption class (EN ISO 11654)	A, o.d.s. >200 mm
Sound absorption, α _w (EN ISO 11654)	1,0

Below the highlighted section, another table lists additional parameters:

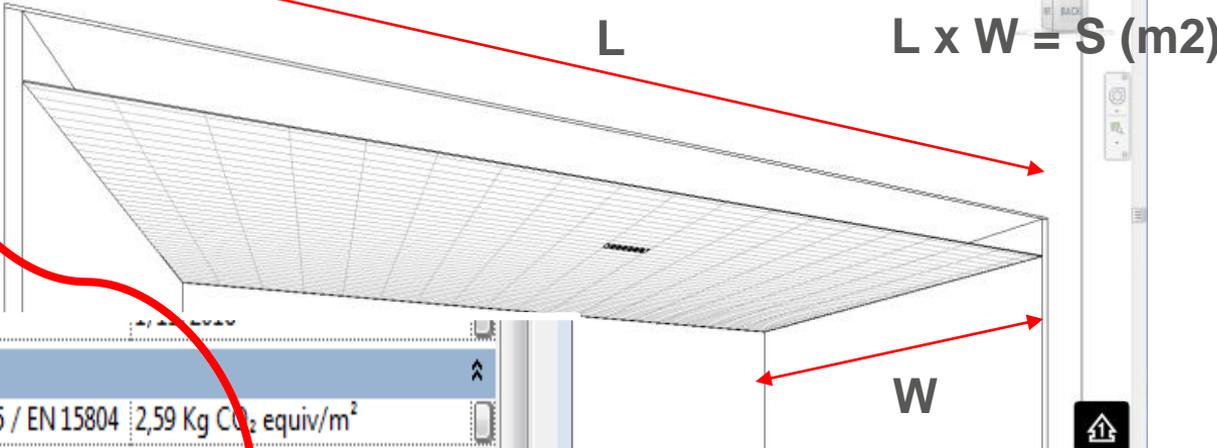
QR code	http://bimobject.com/ecophon
Product group	Focus
Product family	Modular ceilings
Product SKU	eco_foc_a
Nominal width	0
Nominal height	0
Manufacturer name	Ecophon
Manufacturer country	
Edition number	4
Design country	

The 'Other' section is also visible in a smaller window at the bottom of the screenshot, showing the same data as the main window.

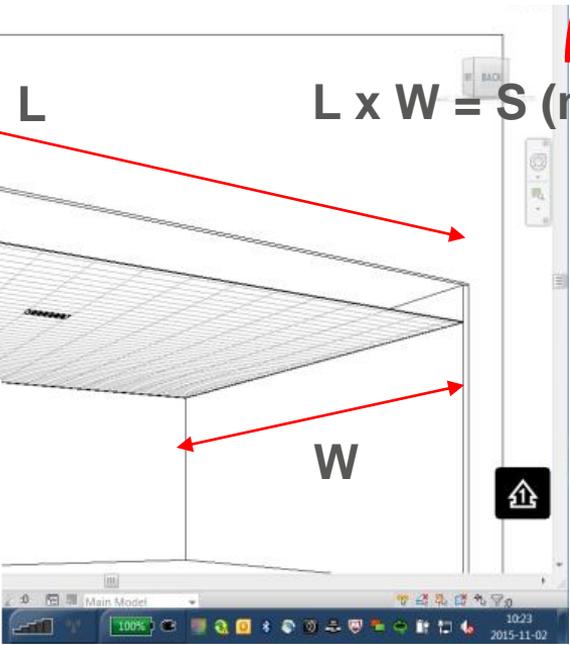
CONTEXTUAL / PROJECT DEF



Other	
CO2 from EPD in conformity with ISO 14025 / EN 15804	2,59 Kg CO ₂ equiv/m ²
Reaction to fire (EN 13501-1)	A2-s1,d0
Sound absorption class (EN ISO 11654)	A _s o.d.s. >200 mm
Sound absorption, α _w (EN ISO 11654)	1,0



Other	
CO2 from EPD in conformity with ISO 14025 / EN 15804	2,59 Kg CO ₂ equiv/m ²
Reaction to fire (EN 13501-1)	A2-s1,d0
Sound absorption class (EN ISO 11654)	A _s o.d.s. >200 mm
Sound absorption, α _w (EN ISO 11654)	1,0



MODERN BIM SOFTWARES / BIM WORKFLOWS

Parametric Components

- ❖ Families
- ❖ Parametric object without any programming

Material Takeoff

- ❖ Schedules, filtering, extractions
- ❖ Calculation of objects & materials

Generality of law

- ❖ One change anywhere is a change everywhere
- ❖ All information are stored in the model

Specific visualization

- ❖ Photo realistic renderings (architect)
- ❖ Flowchart diagram (planner)
- ❖ Gant chart (site manager)

Simplified handling of special requests

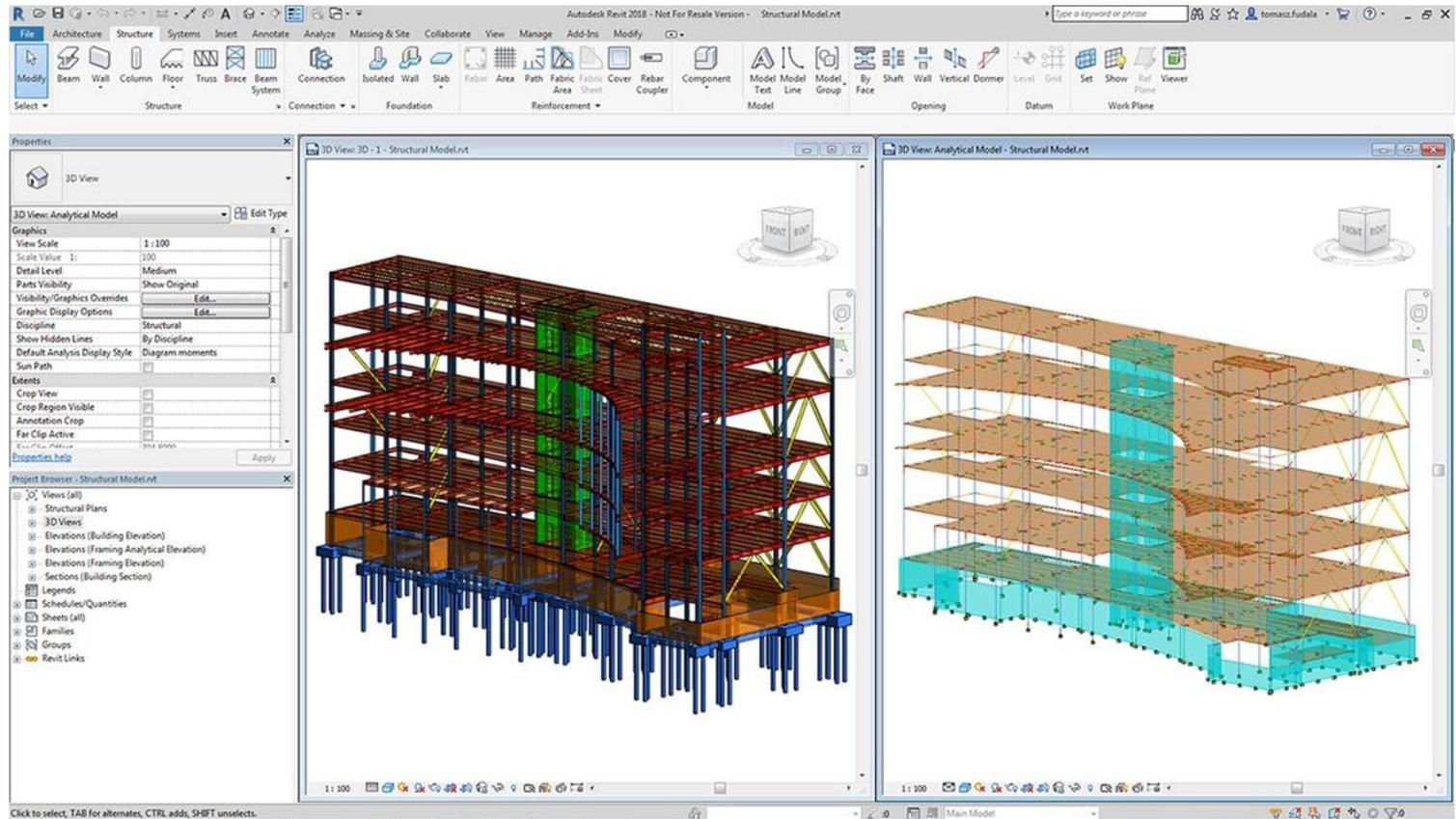
Specification, Price calculation, BOM

Design optimization (until late)

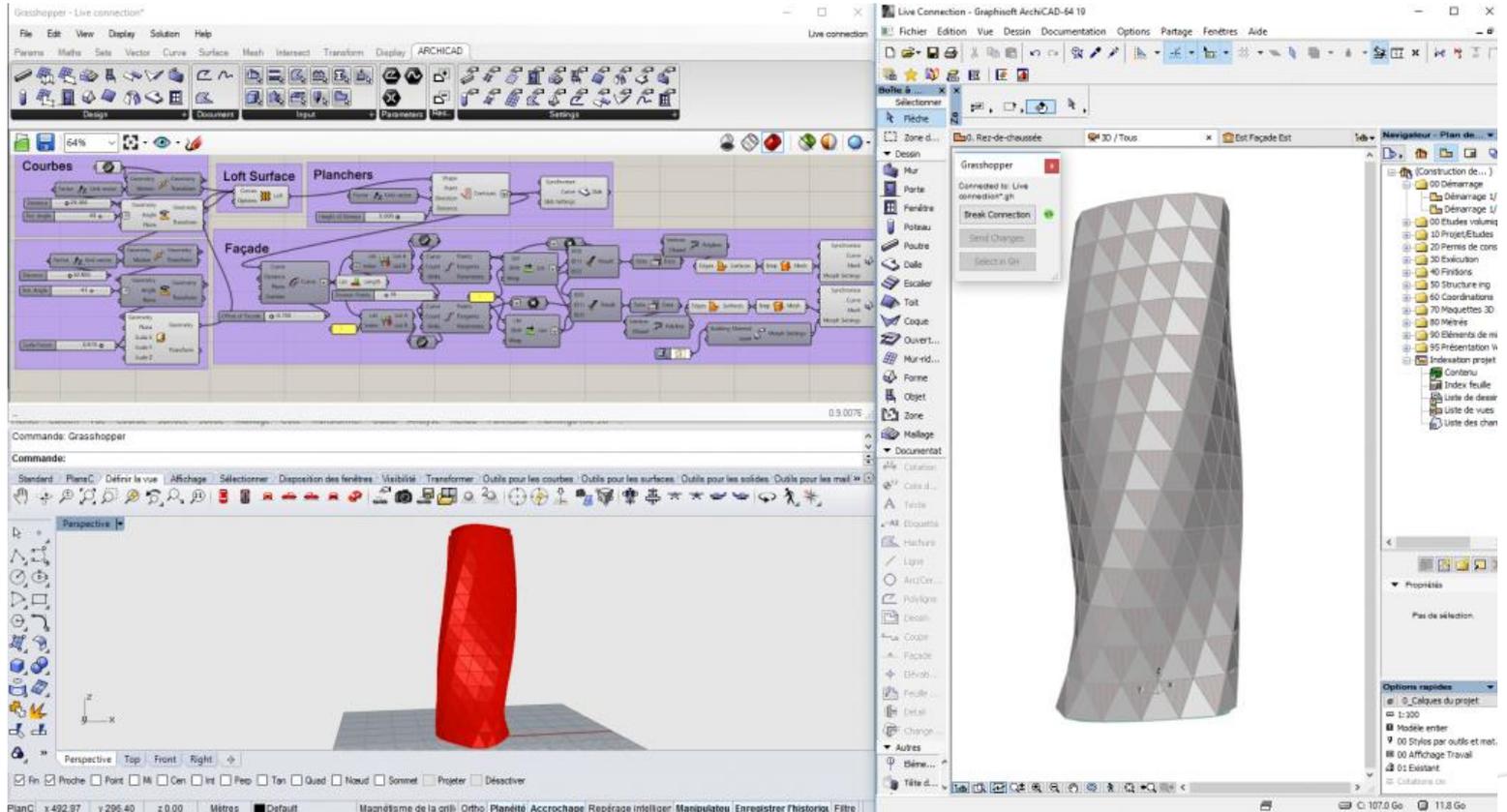
**Specification, design validation,
installation planning**

BIM and fire safety from a product producer perspective

STRUCTURE (EX: AUTODESK REVIT STRUCTURAL ANALYSIS)



ENVELOPE OPTIMIZATION (EX: ARCHICAD + RHINO-GRASSHOPPER)



SOLAR PERFORMANCE (EX: INES, FR)

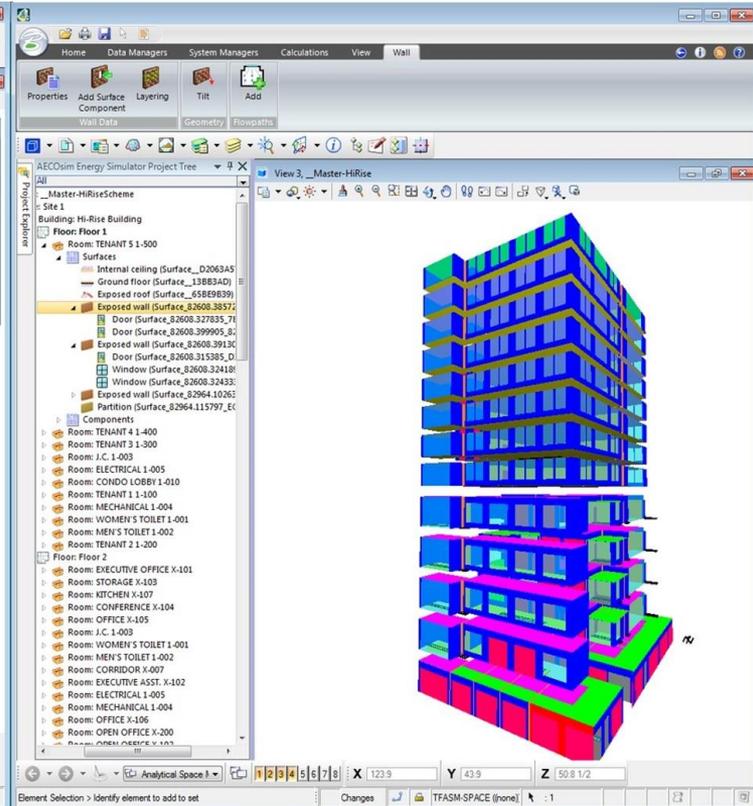
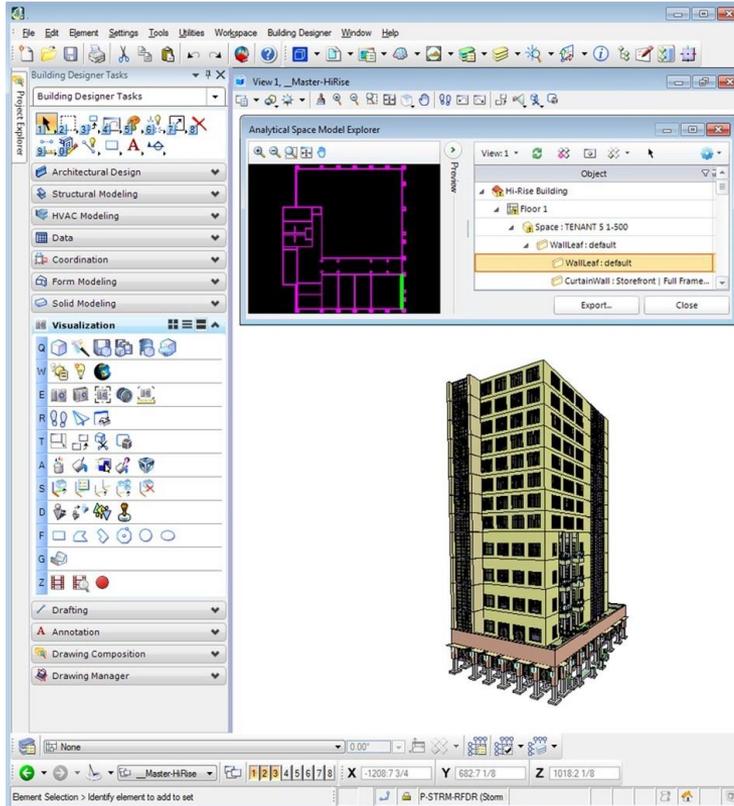
The screenshot displays the eveBIM software interface. The central 3D model shows a building with solar panels on the roof. The left sidebar contains a tree view of the project structure, including 'CSTB Sophia Antipolis' and various levels and components. The bottom-left panel shows the 'Propriétés IFC' (IFC Properties) for a selected object, with a table of attributes and values.

Nom	Valeur
Informations Racine	
Type IFC	Dalle
Identifiant Unique	3Ga938MbzoeffWkaIpc_UP
Identifiant	83939
Nom	Toit de base:Toit terrasse - 200 mm:356807
Description	
Historique des actions sur l'objet	
Type d'Objet	Toit de base:Toit terrasse - 200 mm
Étiquette de l'élément	356807
Associations	
Ensemble de couches de matériaux	Toit de base:Toit terrasse - 200 mm
Relations	
Décompositions	1
Ensembles de propriétés	
Pset_Stat:Common	3
Quantités de base	4
eveBIM PSet	1
Positionnement local	
Relatif à	Toit de base:Toit terrasse - 200 mm:356807
Relatif	3D
Représentation	
Nom	
Description	
Représentations	1
Dalle	
Type prédéfini	ROOF

The top-right graph plots 'Densité de température [K]' (Temperature density [K]) against time, showing two curves (red and purple) that peak around 17:00. The bottom-right panel shows options for generating files and simulation parameters.

ENERGY PERFORMANCE (EX: BENTLEY)

BIM and fire safety from a product producer perspective



INFORMATION IS KEY!

	A	B	C	D	E
1					
2		Property	Value	Unit	Contextual rule (dependency)
3					
4		Absorption Factor	A		> 200 m
5		Fire Class	A2, S1, d0		
6		...			
7					

FIRE SAFETY (SAVAL, NL)

The screenshot displays the 'Saval Brandveiligheid Assistent' software interface. The main window shows a 2D architectural plan of a building with a wall assembly highlighted. A 'Type Properties' dialog box is open, showing the following details:

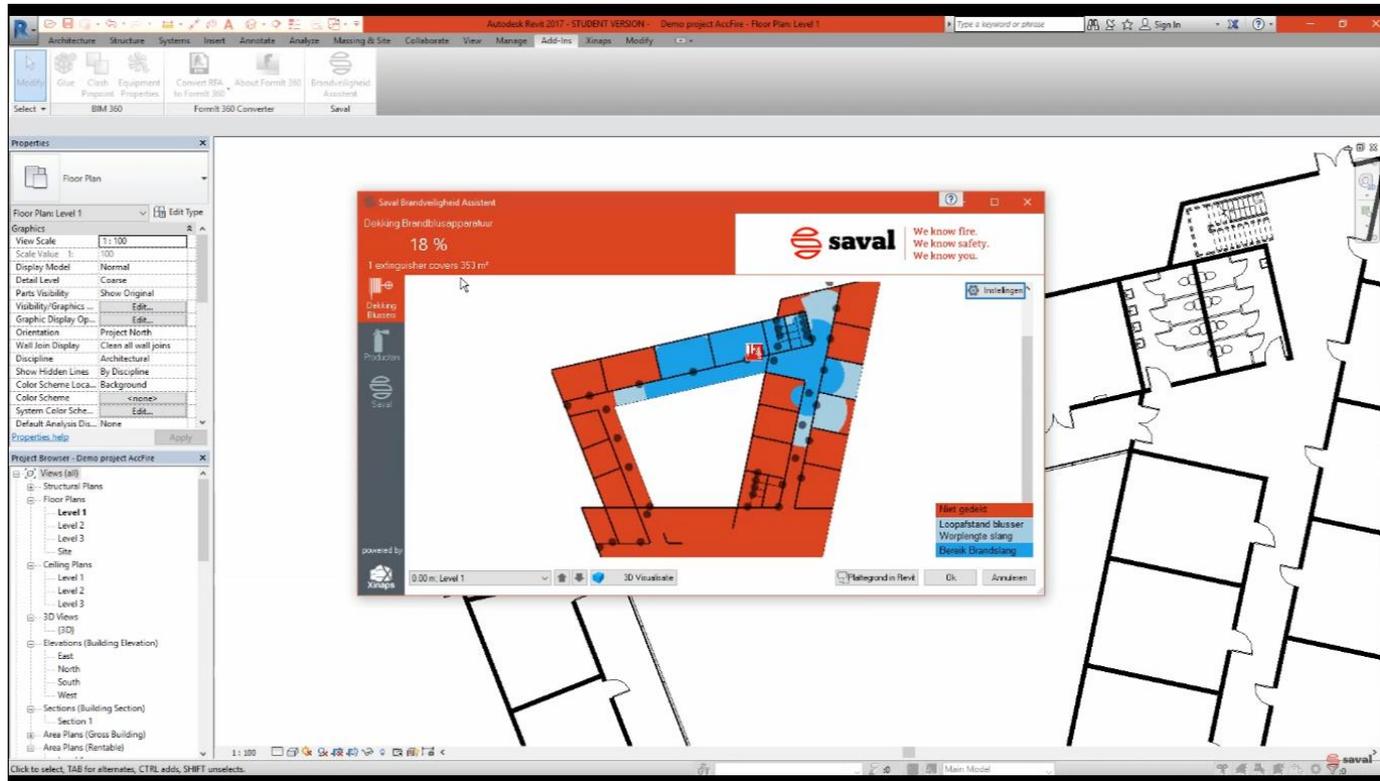
- Family:** System Family: Basic Wall
- Type:** Generic - 200mm 60 mm

The 'Type Parameters' table is as follows:

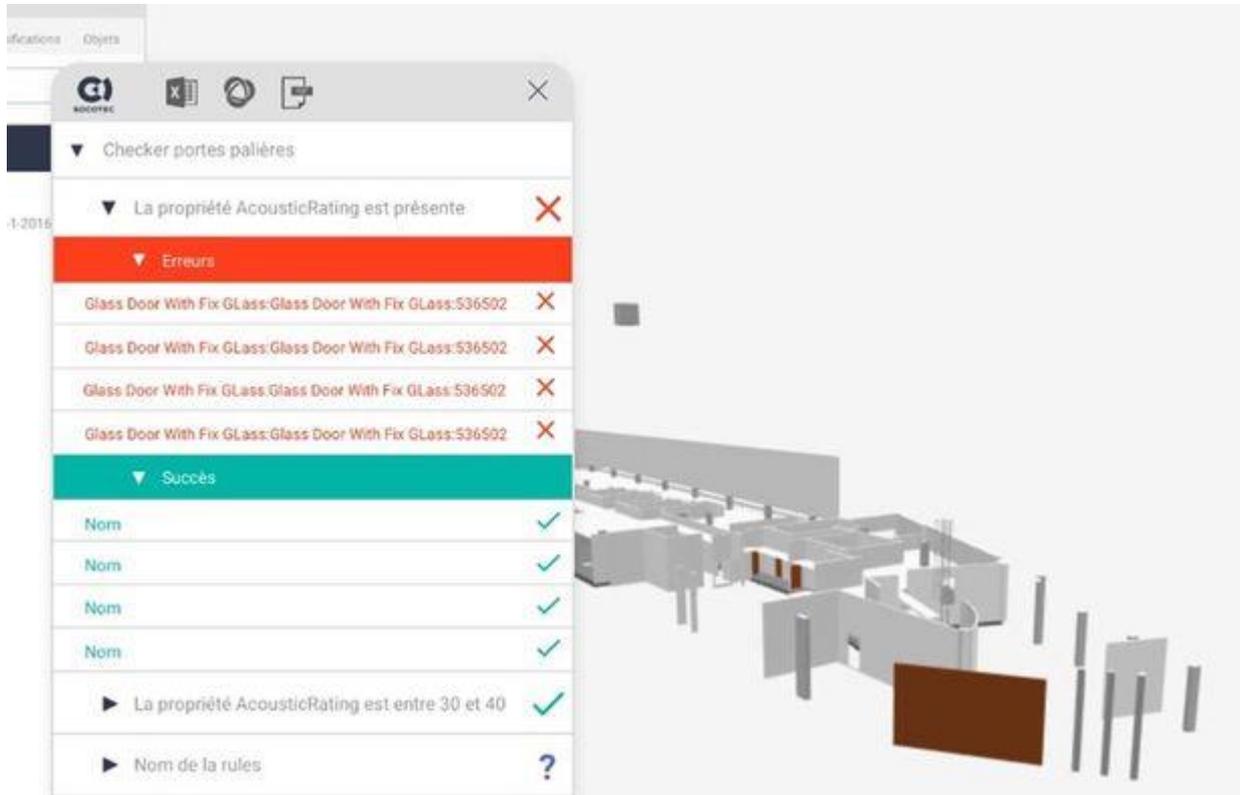
Parameter	Value
Construction	
Structure	Do not wrap
Wrapping at Inserts	None
Wrapping at Ends	None
Width	0.2000 m
Function	Exterior
Graphics	
Coarse Scale Fill Pattern	Solid fill
Coarse Scale Fill Color	Black
Materials and Finishes	
Structural Material	Gypsum Wall Board
Analytical Properties	
Heat Transfer Coefficient (U)	0.5000 W/(m ² ·K)
Thermal Resistance (R)	0.1538 (m ² ·K)/W
Thermal mass	0.58 kJ/K
Absorptance	0.700000
Roughness	3
Identity Data	
Type Image	
Keynote	
Model	
Manufacturer	
Type Comments	
URL	
Description	
Assembly Description	
Assembly Code	
Type Mark	
Fire Rating	
Cost	

The interface also includes a 'Properties' panel on the left with various constraints and offsets, and a 'Project Browser' on the bottom left showing the project hierarchy.

FIRE SAFETY (SAVAL, NL)



TECHNICAL CONTROL - FIRE (SOCOTEC, FR)



TECHNICAL CONTROL – ACOUSTICS (SOCOTEC, FR)

The screenshot displays a BIM software interface with a top toolbar containing icons for 'Edition', 'Coupe', 'Mesure', 'Caméra', 'SOCOTEC', 'Arborescence', 'Propriétés', 'Commentaires', and 'Plein écran'. The main workspace shows a 3D model of a building with a red translucent overlay indicating acoustic analysis. A left-hand navigation pane shows a tree structure for 'Unnamed Building' with '1st Floor' selected. A right-hand properties panel is open, displaying the following data:

▼ Propriétés	
▼ Identification	
Nom	103
Objet	Local
UUID	3DqaVQ6kHD00xL53K19wo7
▼ Quantités	
Hauteur	2.85 m
▼ Propriétés	
Catégorie	Pièces
Charge d'éclairage basse sur	

At the bottom of the interface, a status bar shows 'Checker Acoustique' and 'Traitement en cours...'.

TAKE AWAYS

- BIM is geometry AND information, both inherent and contextual
- BIM allows inherent information to be completed with contextual information
- Prerequisite: make information accessible (inherent information + contextual rules)
- Secure extraction and workability of contextual information (formula)
- Beyond design, innovative implementation of technical control solved in BIM workflows
- BIM opens new opportunities for fire safety!