

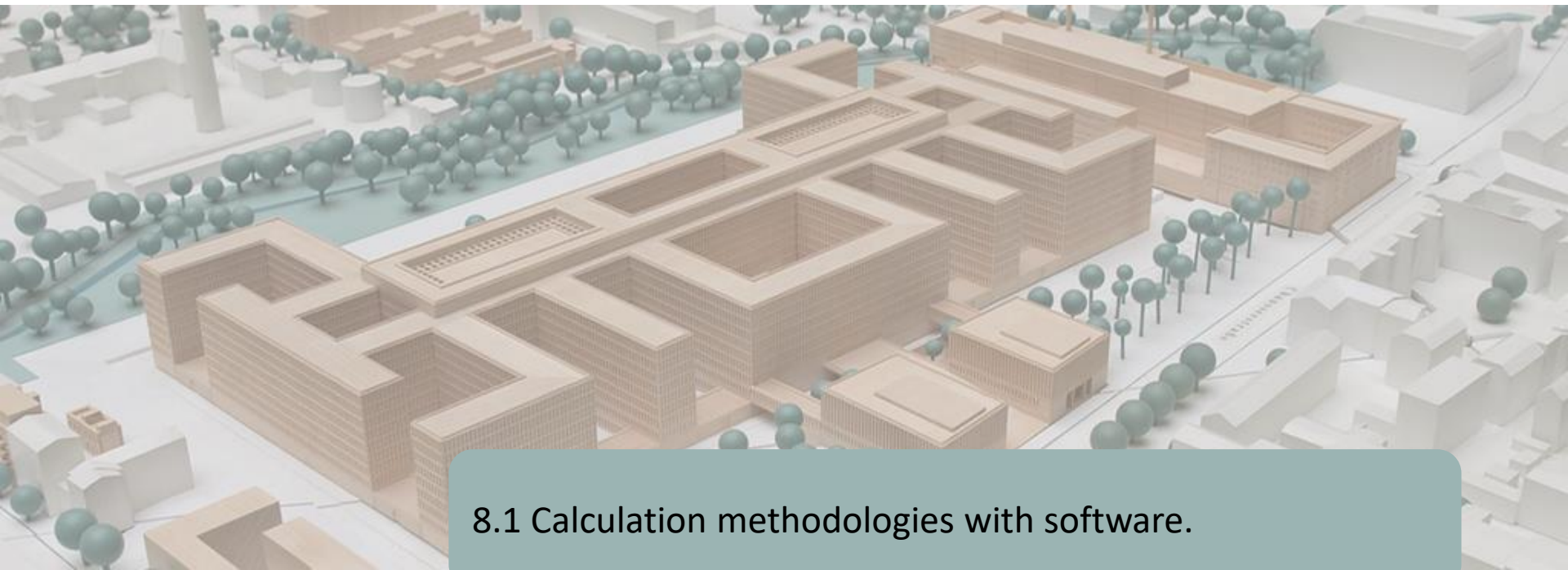
A 3D architectural rendering of a modern building complex with multiple interconnected rectangular volumes, surrounded by greenery and trees.

ADAPTED SENIOR TRAINING PROGRAM ON BIM METHODOLOGIES FOR THE INTEGRATION OF EPD IN SUSTAINABLE CONSTRUCTION STRATEGIES

2020-1-ES01-KA204-083128

Module 08

Methodologies for calculating environmental impact from BIM objects with LOD600 development level.



8.1 Calculation methodologies with software.

8.2 BIMclay

8.3 BIMstone



8.1 Calculation methodologies with software.

BASED ON SOFTWARE-INTEGRATED DATABASES

BASED ON DATA INTEGRATION IN BIM LOD600 OBJECTS



BASED ON SOFTWARE-INTEGRATED DATABASES

As we have already seen, there are currently several BIM software for sustainable building modelling, as we saw in section 5.4, where some of them were highlighted:

- COCON-BIM
- ONE CLICK LCA with BIM
- TALLY
- CYPE module IA-ACV
- CYPE and CSTB: ElodieBIM



BASED ON SOFTWARE-INTEGRATED DATABASES

In module 9 we will also see examples of 3 other projects that are also based on this database methodology (either integrated in the software or a plug-in/complement or a database that can be imported into the software):

- BIMhealthy
- UrbanBIM
- CircularBIM



BASED ON SOFTWARE-INTEGRATED DATABASES

In module 9 we will also see examples of 3 other projects that are also based on this database methodology (either integrated in the software or a plug-in/complement or a database that can be imported into the software):

- BIMhealthy
- UrbanBIM
- CircularBIM

EXPLANATORY NOTE

In computing, an add-on or plug-in is an application (or software) that relates to another application to add a new and usually very specific function to it. This additional application is executed by the main application and they interact through the application programming interface.

It is also known as a plug-in or add-on, and as a connector or extension.



BASED ON SOFTWARE-INTEGRATED DATABASES

These software products are based on databases that may be integrated in the software or where import is possible. They are therefore not based on BIM objects with environmental information contained in them, but on the linking of the elements of a BIM model with the environmental data of a unit of work contained in these databases.

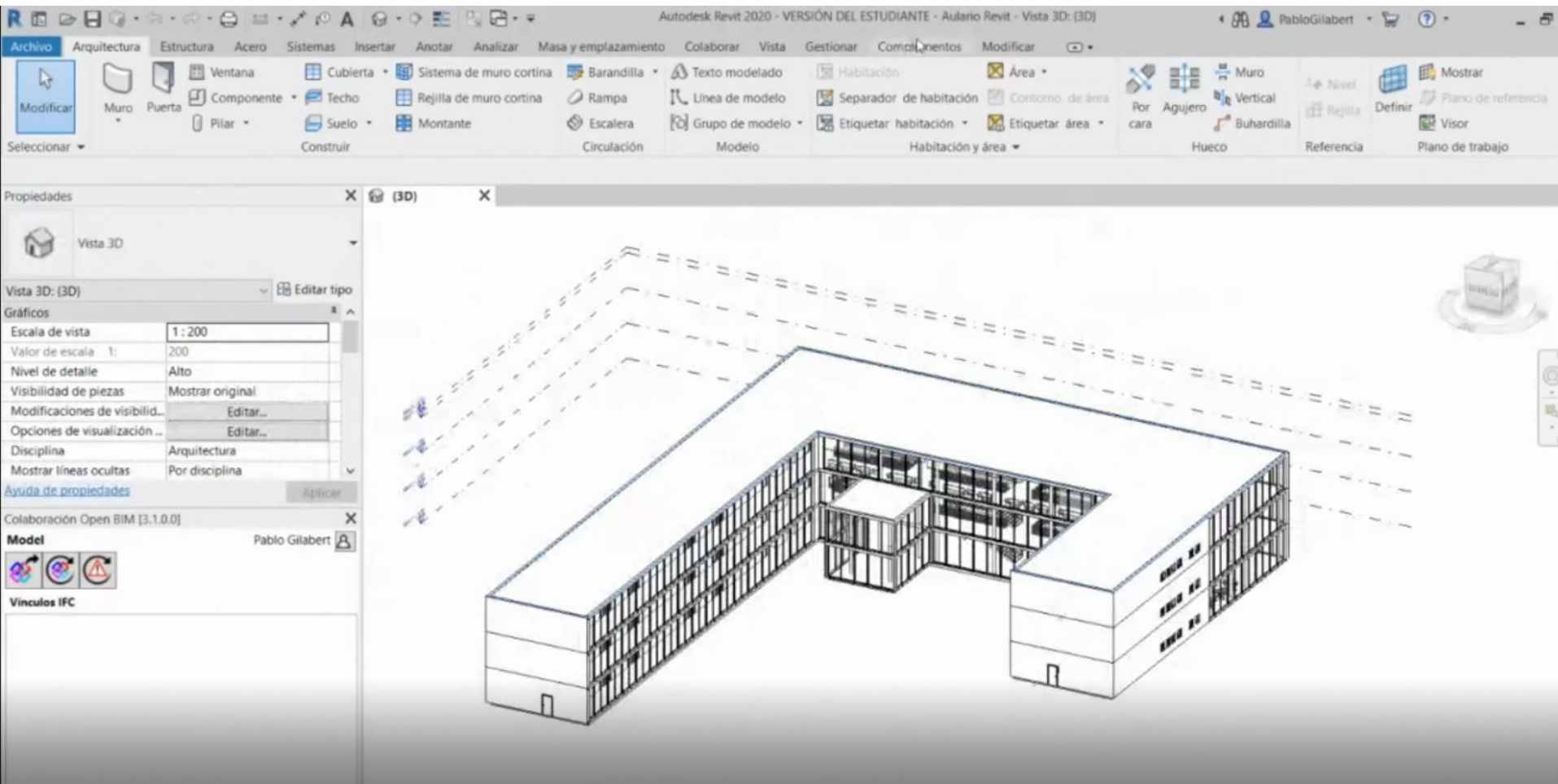
In this respect, we will show two examples of how this linking of BIM models in IFC formats to software with these environmental databases works:

- CYPE module IA-ACV
- CYPE and CSTB: ElodieBIM



BASED ON SOFTWARE-INTEGRATED DATABASES

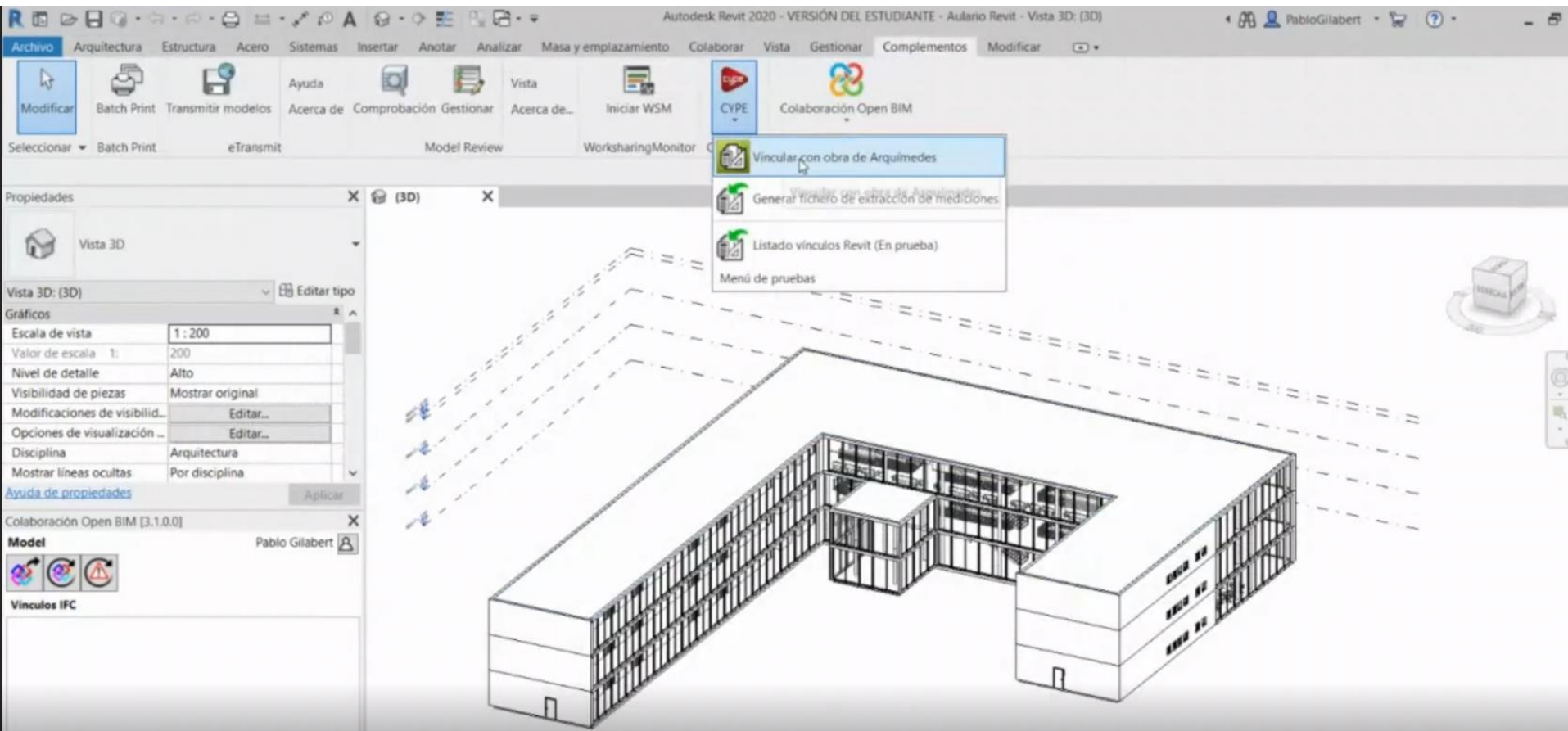
CYPE module IA-ACV: From Revit to CYPE Arquímedes





BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: From Revit to CYPE Arquímedes





BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: From Revit to CYPE Arquímedes

From Revit or from a BIM model in IFC format it is possible to link with the work units present in Archimedes. It is also possible to automate this process if the "Key Note" of a model from Revit is properly linked to the Arquímedes database.

The screenshot displays the CYPE Arquímedes software interface, divided into two main panels. The left panel, titled 'Proyecto Unifamiliar - Presup...', shows a project summary table with columns for 'Código', 'Ud', 'Resumen', and 'Coste'. The right panel, titled 'Nombre de proyecto', shows a list of 'Tipos de Barandillas (OST_StairsRailing) (2)' with columns for 'Id', 'Nombre', 'Marca de ...', 'Altura', 'Nota clave', and 'Cype_C'.

Red boxes highlight specific data points in both panels, and red arrows indicate the linking process between them.

Código	Ud	Resumen	Coste
ADL005	m²	Desbroce y limpieza del terreno, con me...	1,11
ADE005	m³	Excavación de sótanos de hasta 2 m de...	5,97
ADE010	m³	Excavación de zanjas para cimentación...	26,01
ADE010b	m³	Excavación de zanjas para instalacione...	22,88
ADE010c	m³	Excavación de pozos para cimentacione...	24,07
ADR010	m³	Relleno envolvente y principal de zanjas...	23,83
ADR030	m³	Base de pavimento realizada mediante ...	23,95

Id	Nombre	Marca de ...	Altura	Nota clave	Cype_C
16790	Barandilla	Barotes	0,9000	B.2.1	
16787	Barandilla	Con cabl...	0,9000	B.3.1	



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: From Revit to CYPE Arquímedes

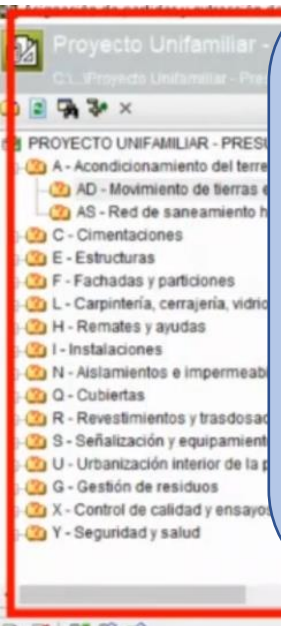
From Revit or from a BIM model in IFC format it is possible to link with the work units present in Archimedes. It is also possible to automate this process if the "Key Note" of a model from Revit is properly linked to the Arquímedes database.

EXPLANATORY NOTE

Essentially a key note is a type parameter that is included in all families, and is originally intended to generate code legends.

These material keynotes can be used to link to the material and work unit codes in Archimedes.

More information in the tutorial "EJERCICIO 1 CYPE Y REVIT Arquímedes y notas clave de Revit". <https://www.youtube.com/watch?v=HgjwkHFlv5Q>

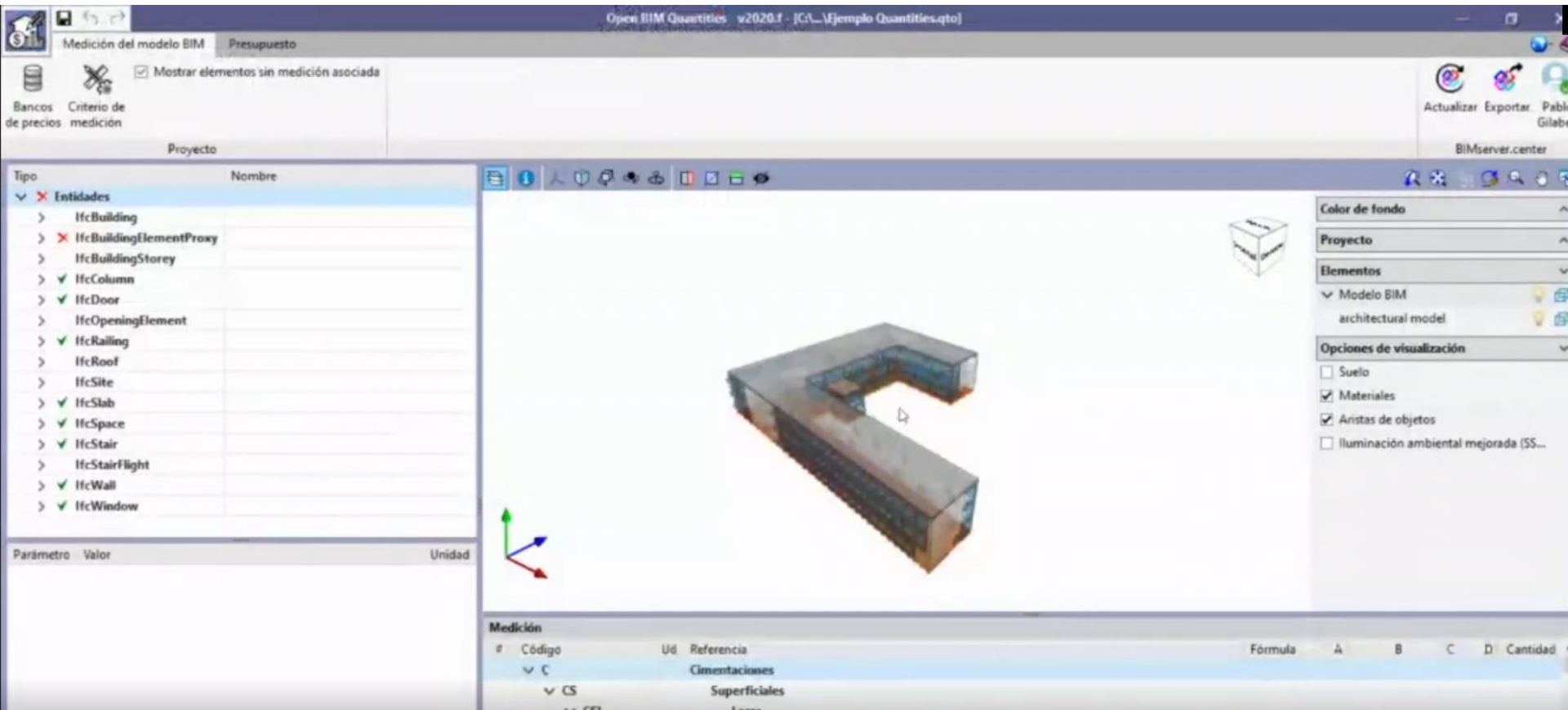




BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE IA-ACV module: From Open BIM Quantities to CYPE Arquímedes

It is also possible, for example, to carry out this process from Open BIM Quantities.





BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE IA-ACV module: From Open BIM Quantities to CYPE Arquímedes

The screenshot displays the Open BIM Quantities software interface. The main window shows a 3D model of a building structure. On the left, there is a tree view of entities and a list of quantities. The bottom panel shows a table of measurements.

Entity List:

Tipo	Nombre
Entidades	
IfcBuilding	
IfcBuildingElementProxy	
IfcBuildingStorey	
IfcColumn	
300	Hormigón-Redondo-Pilar:300:281637
300	Hormigón-Redondo-Pilar:300:281639
300	Hormigón-Redondo-Pilar:300:281641
300	Hormigón-Redondo-Pilar:300:281643
300	Hormigón-Redondo-Pilar:300:281645
300	Hormigón-Redondo-Pilar:300:281647
300	Hormigón-Redondo-Pilar:300:281649
300	Hormigón-Redondo-Pilar:300:281651
300	Hormigón-Redondo-Pilar:300:281653
300	Hormigón-Redondo-Pilar:300:281655
300	Hormigón-Redondo-Pilar:300:281657
300	Hormigón-Redondo-Pilar:300:281659

Properties Table:

Parámetro	Valor	Unidad
Entity	IfcColumn	
Type Name	300	
PredefinedType	NOTDEFINED	
Name	Hormigón-Redon...	
GlobalId	2yufY30Nf3nOLD...	

Measurement Table:

#	Código	Ud	Referencia	Fórmula	A	B	C	D	Cantidad
13	EHS011	m³	Pilar de sección circular de hormigón armado, de 30 cm de diámetro medio, realizado con hormigón...		1.00	0.27			0.27



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: Arquímedes Price Generator

- Embodied energy. Expressed in MJ
- Global Warming Potential (GWP). Expressed in kg CO₂ equivalent
- Stratospheric Ozone Depletion Potential (ODP). Expressed in CFC 11 equivalent
- Soil and Water Acidification Potential (AP). Expressed in kg SO₂ equivalent
- Eutrophication Potential (EP). Expressed in kg of (PO₄)₃-equivalent
- Tropospheric Ozone Formation Potential (TOPP). Expressed in kg ethylene equivalent
- Abiotic Resource Depletion Potential for non-fossil resources (ADPE). Expressed in kg Sb equivalent
- Abiotic Resource Depletion Potential for Fossil Resources (ADFP). Exposed in MJ
- Net water use (FW). Expressed in m³

The screenshot displays the CYPE module IA-ACV software interface. On the left, a tree view lists various environmental impact categories. The main window on the right shows a detailed data table for the selected category, 'Embodied energy'.

Impact Category	Unit	Value	Weight	Score	Weighted Score
Embodied energy	MJ	10000	1	10000	10000
Global Warming Potential (GWP)	kg CO ₂ equivalent	1000	1	1000	1000
Stratospheric Ozone Depletion Potential (ODP)	CFC 11 equivalent	100	1	100	100
Soil and Water Acidification Potential (AP)	kg SO ₂ equivalent	100	1	100	100
Eutrophication Potential (EP)	kg of (PO ₄) ₃ -equivalent	100	1	100	100
Tropospheric Ozone Formation Potential (TOPP)	kg ethylene equivalent	100	1	100	100
Abiotic Resource Depletion Potential for non-fossil resources (ADPE)	kg Sb equivalent	100	1	100	100
Abiotic Resource Depletion Potential for Fossil Resources (ADFP)	MJ	10000	1	10000	10000
Net water use (FW)	m ³	1000	1	1000	1000



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: Arquímedes Price Generator

Generador de precios. Última actualización: Mayo de 2020

Casa comercial

KNAUF

Documentación

- KNAUF Sistemas Aquapanel.
- KNAUF WM.es. Tablones de fachada. Sistema con Aquapanel Outdoor. Hoja técnica.
- KNAUF Sistema WM111C.es. Documento de adaptación al uso (DAU).

Sistema

Tipo de perfiles

Preco descompuesto. Pliego de condiciones. Reciprocación de materiales. Residuos generados. Indicadores de impacto ambiental. Seguridad y salud

Competir. Exportar. Vista preliminar. Debug

FAN010 m² Hoja principal de fachada ventilada, de entramado autoportante. Sistema Aquapanel "KNAUF". 107,67€

Hoja principal de fachada ventilada, de entramado autoportante. Sistema Aquapanel WM111C.es (12,5+75+12,5+15)400 "KNAUF" con DAU nº 09051 F formado por ESTRUCTURA: estructura metálica de acero Z2 (Z275) galvanizado normal de canales horizontales de 75x40/0,7 mm GRC 0,70 y montantes verticales de 75x50/2 mm GRC 2 con una modulación de 400 mm y disposición normal "H". AISLAMIENTO: panel rígido de lana mineral según UNE-EN 13162, no revestido de doble densidad, de 70 mm de espesor: resistencia térmica 2,05 m²K/W, conductividad térmica 0,034 W/mK, colocado entre los montantes de la estructura portante; PLACAS INTERIORES: dos placas de yeso laminado (una placa tipo Standard (A) de 12,5 mm de espesor y una placa tipo Standard - Aluminio (BV) de 15 mm de espesor); IMPERMEABILIZACIÓN: lámina altamente transpirable, impermeable al agua de lluvia, Tyvek Stucco Wrap, fijada a los montantes de la estructura metálica por la cara exterior; PLACA EXTERIOR: placa de cemento Portland Aquapanel Outdoor "KNAUF" de 12,5x1200x2400 mm, revestida con una capa de fibra de vidrio embebida en ambas caras. Incluso banda acústica: fornidera para la fijación de las placas, fijaciones para el anclaje de los perfiles, pasta de agarre Perifix, para el sellado de encuentros perimetrales, pasta Jostifiler 24H "KNAUF", cinta "KNAUF" y mortero Aquapanel Outdoor "KNAUF" para el tratamiento de juntas y cinta adhesiva de doble cara para la fijación de la lámina altamente transpirable.

Etapa del ciclo de vida	Indicadores de impacto ambiental								
	Energía incorporada	GWP	ODP	AP	EP	POCP	ADPE	ADFP	FW
	(MJ)	CO ₂ eq. (kg)	CFC 11 eq. (kg)	SO ₂ eq. (kg)	(PO ₄) ³⁻ eq. (kg)	etileno eq. (kg)	Sb eq. (kg)	(MJ)	(m³)
Total A1-A2-A3	842,830	36,429	1,33e-08	0,100	0,021	0,008	8,30e-04	360,101	0,287
A4	15,251	1,132	0,001	0,079	0,016	0,004	6,79e-04	124,470	0,238
A5	0,267	0,032	8,65e-08	5,79e-04	5,58e-04	4,95e-05	4,94e-06	1,092	0,053
Total A4-A5	15,518	1,164	0,001	0,080	0,016	0,004	6,84e-04	125,562	0,290
Energía total y emisiones	858,349	37,593	0,001	0,180	0,037	0,012	9,03e-04	585,663	0,577

A1: Suministro de materias primas
A2: Extracción de materias primas
A3: Transformación de materias primas
A4: Transporte de materias primas
A5: Transporte de materias primas

09051: Presencia de contaminantes orgánicos
09052: Presencia de contaminantes orgánicos volátiles
09053: Presencia de contaminantes orgánicos volátiles

09054: Presencia de contaminantes orgánicos volátiles
09055: Presencia de contaminantes orgánicos volátiles
09056: Presencia de contaminantes orgánicos volátiles

09057: Presencia de contaminantes orgánicos volátiles
09058: Presencia de contaminantes orgánicos volátiles
09059: Presencia de contaminantes orgánicos volátiles

09060: Presencia de contaminantes orgánicos volátiles
09061: Presencia de contaminantes orgánicos volátiles
09062: Presencia de contaminantes orgánicos volátiles

09063: Presencia de contaminantes orgánicos volátiles
09064: Presencia de contaminantes orgánicos volátiles
09065: Presencia de contaminantes orgánicos volátiles

09066: Presencia de contaminantes orgánicos volátiles
09067: Presencia de contaminantes orgánicos volátiles
09068: Presencia de contaminantes orgánicos volátiles

09069: Presencia de contaminantes orgánicos volátiles
09070: Presencia de contaminantes orgánicos volátiles
09071: Presencia de contaminantes orgánicos volátiles

09072: Presencia de contaminantes orgánicos volátiles
09073: Presencia de contaminantes orgánicos volátiles
09074: Presencia de contaminantes orgánicos volátiles

09075: Presencia de contaminantes orgánicos volátiles
09076: Presencia de contaminantes orgánicos volátiles
09077: Presencia de contaminantes orgánicos volátiles

09078: Presencia de contaminantes orgánicos volátiles
09079: Presencia de contaminantes orgánicos volátiles
09080: Presencia de contaminantes orgánicos volátiles

09081: Presencia de contaminantes orgánicos volátiles
09082: Presencia de contaminantes orgánicos volátiles
09083: Presencia de contaminantes orgánicos volátiles

09084: Presencia de contaminantes orgánicos volátiles
09085: Presencia de contaminantes orgánicos volátiles
09086: Presencia de contaminantes orgánicos volátiles

09087: Presencia de contaminantes orgánicos volátiles
09088: Presencia de contaminantes orgánicos volátiles
09089: Presencia de contaminantes orgánicos volátiles

09090: Presencia de contaminantes orgánicos volátiles
09091: Presencia de contaminantes orgánicos volátiles
09092: Presencia de contaminantes orgánicos volátiles

09093: Presencia de contaminantes orgánicos volátiles
09094: Presencia de contaminantes orgánicos volátiles
09095: Presencia de contaminantes orgánicos volátiles

09096: Presencia de contaminantes orgánicos volátiles
09097: Presencia de contaminantes orgánicos volátiles
09098: Presencia de contaminantes orgánicos volátiles

09099: Presencia de contaminantes orgánicos volátiles
09100: Presencia de contaminantes orgánicos volátiles
09101: Presencia de contaminantes orgánicos volátiles

09102: Presencia de contaminantes orgánicos volátiles
09103: Presencia de contaminantes orgánicos volátiles
09104: Presencia de contaminantes orgánicos volátiles

09105: Presencia de contaminantes orgánicos volátiles
09106: Presencia de contaminantes orgánicos volátiles
09107: Presencia de contaminantes orgánicos volátiles

09108: Presencia de contaminantes orgánicos volátiles
09109: Presencia de contaminantes orgánicos volátiles
09110: Presencia de contaminantes orgánicos volátiles

09111: Presencia de contaminantes orgánicos volátiles
09112: Presencia de contaminantes orgánicos volátiles
09113: Presencia de contaminantes orgánicos volátiles

09114: Presencia de contaminantes orgánicos volátiles
09115: Presencia de contaminantes orgánicos volátiles
09116: Presencia de contaminantes orgánicos volátiles

09117: Presencia de contaminantes orgánicos volátiles
09118: Presencia de contaminantes orgánicos volátiles
09119: Presencia de contaminantes orgánicos volátiles

09120: Presencia de contaminantes orgánicos volátiles
09121: Presencia de contaminantes orgánicos volátiles
09122: Presencia de contaminantes orgánicos volátiles

09123: Presencia de contaminantes orgánicos volátiles
09124: Presencia de contaminantes orgánicos volátiles
09125: Presencia de contaminantes orgánicos volátiles

09126: Presencia de contaminantes orgánicos volátiles
09127: Presencia de contaminantes orgánicos volátiles
09128: Presencia de contaminantes orgánicos volátiles

09129: Presencia de contaminantes orgánicos volátiles
09130: Presencia de contaminantes orgánicos volátiles
09131: Presencia de contaminantes orgánicos volátiles

09132: Presencia de contaminantes orgánicos volátiles
09133: Presencia de contaminantes orgánicos volátiles
09134: Presencia de contaminantes orgánicos volátiles

09135: Presencia de contaminantes orgánicos volátiles
09136: Presencia de contaminantes orgánicos volátiles
09137: Presencia de contaminantes orgánicos volátiles

09138: Presencia de contaminantes orgánicos volátiles
09139: Presencia de contaminantes orgánicos volátiles
09140: Presencia de contaminantes orgánicos volátiles

09141: Presencia de contaminantes orgánicos volátiles
09142: Presencia de contaminantes orgánicos volátiles
09143: Presencia de contaminantes orgánicos volátiles

09144: Presencia de contaminantes orgánicos volátiles
09145: Presencia de contaminantes orgánicos volátiles
09146: Presencia de contaminantes orgánicos volátiles

09147: Presencia de contaminantes orgánicos volátiles
09148: Presencia de contaminantes orgánicos volátiles
09149: Presencia de contaminantes orgánicos volátiles

09150: Presencia de contaminantes orgánicos volátiles
09151: Presencia de contaminantes orgánicos volátiles
09152: Presencia de contaminantes orgánicos volátiles

09153: Presencia de contaminantes orgánicos volátiles
09154: Presencia de contaminantes orgánicos volátiles
09155: Presencia de contaminantes orgánicos volátiles

09156: Presencia de contaminantes orgánicos volátiles
09157: Presencia de contaminantes orgánicos volátiles
09158: Presencia de contaminantes orgánicos volátiles

09159: Presencia de contaminantes orgánicos volátiles
09160: Presencia de contaminantes orgánicos volátiles
09161: Presencia de contaminantes orgánicos volátiles

09162: Presencia de contaminantes orgánicos volátiles
09163: Presencia de contaminantes orgánicos volátiles
09164: Presencia de contaminantes orgánicos volátiles

09165: Presencia de contaminantes orgánicos volátiles
09166: Presencia de contaminantes orgánicos volátiles
09167: Presencia de contaminantes orgánicos volátiles

09168: Presencia de contaminantes orgánicos volátiles
09169: Presencia de contaminantes orgánicos volátiles
09170: Presencia de contaminantes orgánicos volátiles

09171: Presencia de contaminantes orgánicos volátiles
09172: Presencia de contaminantes orgánicos volátiles
09173: Presencia de contaminantes orgánicos volátiles

09174: Presencia de contaminantes orgánicos volátiles
09175: Presencia de contaminantes orgánicos volátiles
09176: Presencia de contaminantes orgánicos volátiles

09177: Presencia de contaminantes orgánicos volátiles
09178: Presencia de contaminantes orgánicos volátiles
09179: Presencia de contaminantes orgánicos volátiles

09180: Presencia de contaminantes orgánicos volátiles
09181: Presencia de contaminantes orgánicos volátiles
09182: Presencia de contaminantes orgánicos volátiles

09183: Presencia de contaminantes orgánicos volátiles
09184: Presencia de contaminantes orgánicos volátiles
09185: Presencia de contaminantes orgánicos volátiles

09186: Presencia de contaminantes orgánicos volátiles
09187: Presencia de contaminantes orgánicos volátiles
09188: Presencia de contaminantes orgánicos volátiles

09189: Presencia de contaminantes orgánicos volátiles
09190: Presencia de contaminantes orgánicos volátiles
09191: Presencia de contaminantes orgánicos volátiles

09192: Presencia de contaminantes orgánicos volátiles
09193: Presencia de contaminantes orgánicos volátiles
09194: Presencia de contaminantes orgánicos volátiles

09195: Presencia de contaminantes orgánicos volátiles
09196: Presencia de contaminantes orgánicos volátiles
09197: Presencia de contaminantes orgánicos volátiles

09198: Presencia de contaminantes orgánicos volátiles
09199: Presencia de contaminantes orgánicos volátiles
09200: Presencia de contaminantes orgánicos volátiles



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: Arquímedes Price Generator

Generador de precios. Última actualización: Junio de 2020

Proyecto: Obra nueva, España
Emplazamiento: Alacant/Alicante (Alicante)
Normativa

Precios descompuestos

- 0 Actuaciones previas
- D Demoliciones
- A Acondicionamiento del terreno
- C Cimentaciones
- E Estructuras
- F Fachadas y particiones**
 - FA Fachadas ventiladas
 - FS Fachadas ETICS
 - FV Fachadas ETICS con aislamiento térmico de origen vegetal
- FF Fábrica no estructural**
 - FFX Hoja exterior cara vista en fachada de dos hojas
 - FFP Hoja cara vista en partición
 - FFF Fachada de una hoja para revestir
 - FFI Medianera de una hoja para revestir
 - FFZ Hoja exterior para revestir en fachada de dos hojas**
 - m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir, con cámara de aire ligeramente ventilada.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de bloque de hormigón para revestir.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de bloque de hormigón para revestir, con cámara de aire ligeramente ventilada.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de bloque cerámico aligerado para revestir.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de bloque cerámico aligerado para revestir, con cámara de aire ligeramente ventilada.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de hormigón para revestir.
 - m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de hormigón para revestir, con cámara de aire ligeramente ventilada.
 - m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir. Sistema GHAS "GEO-HIDROL".
 - m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir, con cámara de aire ligeramente ventilada.
 - m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de bloque de hormigón para revestir. Sistema GHAS "GEO-HIDROL".
 - m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de bloque de hormigón para revestir.

FFZ Hoja exterior para revestir en fachada de dos hojas

m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir.

23,44€

Hoja exterior Frente de forjado Dinteles

☒ Ladrillo cerámico hueco ☐ Ladrillo cerámico perforado ☐ Ladrillo cerámico macizo

Huecos ☒ Horizontales ☐ Verticales

Merma y roturas de piezas (%) 50

☒ Convencional ☐ De gran formato

Precio descompuesto Pliego de condiciones Recepción de materiales Residuos generados Indicadores de impacto ambiental Seguridad y salud

Vista preliminar Configuración Imprimir Buscar

Compartir Exportar Ampliar ventana

FFZ010 m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir.

Hoja exterior de fachada de dos hojas, de 11 cm de espesor, de fábrica de ladrillo cerámico hueco triple, para revestir, 33x16x11 cm, con juntas horizontales y verticales de 10 mm de espesor, recibida con mortero de cemento industrial, color gris, M-5, suministrado a granel. Revestimiento de los frentes de forjado con piezas cerámicas y de los frentes de pilares con ladrillos cortados, colocados con el mismo mortero utilizado en el recibido de la fábrica. Dintel de fábrica armada de ladrillos cortados para revestir, montaje y desmontaje de apeo.

Etapa del ciclo de vida	Indicadores de impacto ambiental					Uso de recursos				
	GWP	ODP	AP	EP	POCP	ADPE	ADFP	PERT	PERNRT	FW
	CO ₂ eq. (kg)	CFC 11 eq. (kg)	SO ₂ eq. (kg)	(PO ₄) ³⁻ eq. (kg)	etileno eq. (kg)	Sb eq. (kg)	(MJ)	(MJ)	(MJ)	(m³)
Total A1-A2-A3	21.660	3.51e-07	0.088	0.010	0.007	0.004	250,071	258,513	244,009	3.939
A4	0.410	5.33e-04	0.029	0.006	0.002	2.46e-04	45.077		5.538	0.086
A5	0.057	4.88e-05	0.003	8.67e-04	1.55e-04	2.32e-05	4.397		0.638	0.046
Total A4-A5	0.466	5.82e-04	0.031	0.007	0.002	2.69e-04	49.474		6.176	0.132
Energía total y emisiones	22.126	5.82e-04	0.120	0.017	0.009	0.005	299,545	258,513	250,185	4,071

A1: Suministro de materias primas
A2: Transporte de materias primas
A3: Fabricación del producto
A4: Transporte del producto
A5: Proceso de instalación del producto y construcción

GWP: Potencial de calentamiento global
ODP: Potencial de agotamiento de la capa de ozono estratosférico
AP: Potencial de acidificación del suelo y de los recursos de agua
EP: Potencial de eutrofización
POCP: Potencial de formación de ozono troposférico
ADPE: Potencial de agotamiento de recursos abióticos para recursos no fósiles
ADFP: Potencial de agotamiento de recursos abióticos para recursos fósiles
PERT: Uso total de energía primaria renovable
PERNRT: Uso total de energía primaria no renovable
FW: Uso neto de recursos de agua corriente



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: Arquímedes Price Generator

Once the BIM model has been integrated into Arquímedes, the environmental impact data can be accessed and a complete report from phases A1 to A5 can be obtained.

Generador de precios. Última actualización: Junio de 2020

Proyecto: Obra nueva, España
Emplazamiento: Alacant/Alicante (Alicante)
Normativa
Precios descompuestos
0 Actuaciones previas
0 Demoliciones

Hoja exterior Frente de forjado Dinteles

Ladrillo cerámico hueco
Ladrillo cerámico perforado
Ladrillo cerámico macizo

Huecos
Horizontales
Verticales

Membras y roturas de piezas (%) 50

¿Qué son estos precios?

Vista preliminar Configuración Imprimir Buscar

Compartir Exportar Ampliar ver

FFZ010 m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir. 23,44€

Hoja exterior de fachada de dos hojas, de 11 cm de espesor, de fábrica de ladrillo cerámico hueco triple, para revestir, 33x16x11 cm, con juntas horizontales y verticales de 10 mm de espesor, recibida con mortero de cemento industrial, color gris, M-5, suministrado a granel. Revestimiento de los frentes de forjado con piezas cerámicas y de los frentes de pilares con ladrillos cortados, colocados con el mismo mortero utilizado en el recibo de la fábrica. Dintel de fábrica armada de ladrillos cortados para revestir, montaje y desmontaje de apeo.

Etapa del ciclo de vida	Indicadores de impacto ambiental					Uso de recursos				
	GWP	ODP	AP	EP	POCP	ADPE	ADFP	PERT	PERNRT	FW
	CO ₂ eq. (kg)	CFC 11 eq. (kg)	SO ₂ eq. (kg)	(PO ₄) ³⁻ eq. (kg)	etileno eq. (kg)	Sb eq. (kg)	(MJ)	(MJ)	(MJ)	(m³)
Total A1-A2-A3:	21.660	3,51e-07	0,088	0,010	0,007	0,004	250,071	258,513	244,009	3,939
A4	0,410	5,33e-04	0,029	0,006	0,002	2,46e-04	45,077		5,538	0,086
A5	0,057	4,88e-05	0,003	8,67e-04	1,55e-04	2,32e-05	4,397		0,638	0,046
Total A4-A5:	0,466	5,82e-04	0,031	0,007	0,002	2,69e-04	49,474		6,176	0,132
Energía total y emisiones:	22,126	5,82e-04	0,120	0,017	0,009	0,005	299,545	258,513	250,185	4,071

m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de homónigo para revestir, con cámara de aire ligeramente ventilada.
 m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir. Sistema GHAS "GEO-HIDROL".
 m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir.

Total A4-A5: 0,466 5,82e-04 0,031 0,007 0,002 2,69e-04 49,474 6,176 0,132
 Energía total y emisiones: 22,126 5,82e-04 0,120 0,017 0,009 0,005 299,545 258,513 250,185 4,071

A1: Suministro de materias primas
 A2: Transporte de materias primas
 A3: Fabricación del producto
 A4: Transporte del producto
 A5: Proceso de instalación del producto y construcción

GWP: Potencial de calentamiento global
 ODP: Potencial de agotamiento de la capa de ozono estratosférico
 AP: Potencial de acidificación del suelo y de los recursos de agua
 EP: Potencial de eutrofización
 POCP: Potencial de formación de ozono troposférico
 ADPE: Potencial de agotamiento de recursos abióticos para recursos no fósiles



BASED

CYPE modu

Once the B
impact data
be obtained

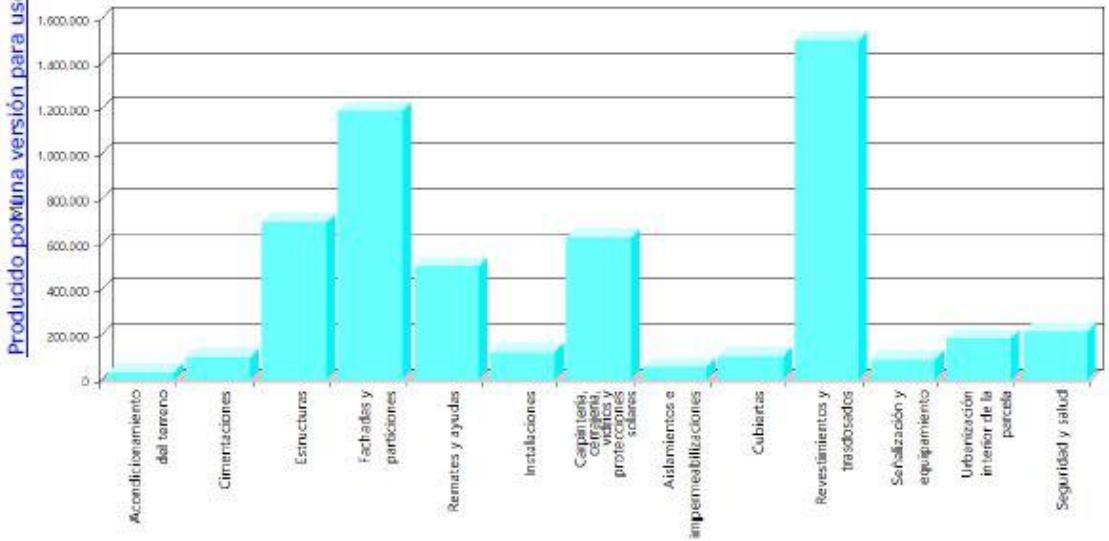


Proyecto:
Situación:
Promotor:

8.8. Uso total de energía primaria renovable. - PERT (MJ)

USO TOTAL DE ENERGÍA PRIMARIA RENOVABLE. (MJ)				
Capítulos	A1-A2-A3 PRODUCTO	A4 TRANSPORTE	A5 CONSTRUCCIÓN	TOTAL
Acondicionamiento del terreno	33.552,93	0,00	0,00	33.552,93
Cimentaciones	99.650,49	0,00	0,00	99.650,49
Estructuras	695.653,37	0,00	0,00	695.653,37
Fachadas y particiones	1.189.485,33	0,00	0,00	1.189.485,33
Remates y ayudas	503.887,22	0,00	0,00	503.887,22
Instalaciones	122.844,74	0,00	0,00	122.844,74
Carpintería, cerrajería, vidrios y protecciones solares	630.304,83	0,00	0,00	630.304,83
Aislamientos e impermeabilizaciones	56.161,00	0,00	0,00	56.161,00
Cubiertas	102.189,60	0,00	0,00	102.189,60
Revestimientos y trasdosados	1.503.016,21	0,00	0,00	1.503.016,21
Señalización y equipamiento	89.989,66	0,00	0,00	89.989,66
Urbanización interior de la parcela	185.750,44	0,00	0,00	185.750,44
Seguridad y salud	213.197,63	0,00	0,00	213.197,63
Total	5.425.683,45	0,00	0,00	5.425.683,45

USO TOTAL DE ENERGÍA PRIMARIA RENOVABLE.



Generador de precios. Última actualización: Junio de 2020

Proyecto: Obra nueva, España
Emplazamiento: Alacant/Alicante (Alicante)
Normativa

Precios descompuestos

- Actuaciones previas
- Demoliciones

Precio descompuesto | Pliego de condiciones | Recepción

Vista preliminar | Configuración | Imprimir

FFZ010 m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de hormigón para revestir, con cámara de aire ligeramente ventilada.

Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de hormigón para revestir, con cámara de aire ligeramente ventilada. Revestimiento de ladrillo cerámico para revestir, montaje y desmontaje de ape

Etapa del ciclo de vida

Total A1-A2-A3

Total A4-A5

Energía total y emisiones

m² Hoja exterior de fachada de dos hojas, de fábrica de ladrillo de hormigón para revestir, con cámara de aire ligeramente ventilada.

m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir. Sistema GHAS "GEO-HIDROL".

m² Hoja exterior, autoportante y pasante, de fachada de dos hojas, de fábrica de ladrillo cerámico para revestir.

mental
5 can

¿Qué son estos precios?

Exportar | Ampliar ver

23,44€

mento industrial, color gris, M-5, la armada de ladrillos cortados

Uso de recursos		
	PERNRT (MJ)	FW (m³)
513	244,009	3,939
	5,538	0,086
	0,638	0,046
	6,176	0,132
513	250,185	4,071
	6,176	0,132
513	250,185	4,071



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE module IA-ACV: Arquímedes Price Generator

Recommended video:

Environmental assessment of buildings with the CYPE Price Generator.
Torroja Institute TV.

<https://www.youtube.com/watch?v=TYoeJjFYhp8>

Management I. Arquimedes and Price Generator. CYPE Software.

<https://www.youtube.com/watch?v=8xcSaJGv98E>

Open BIM add-on for Revit. CYPE Software.

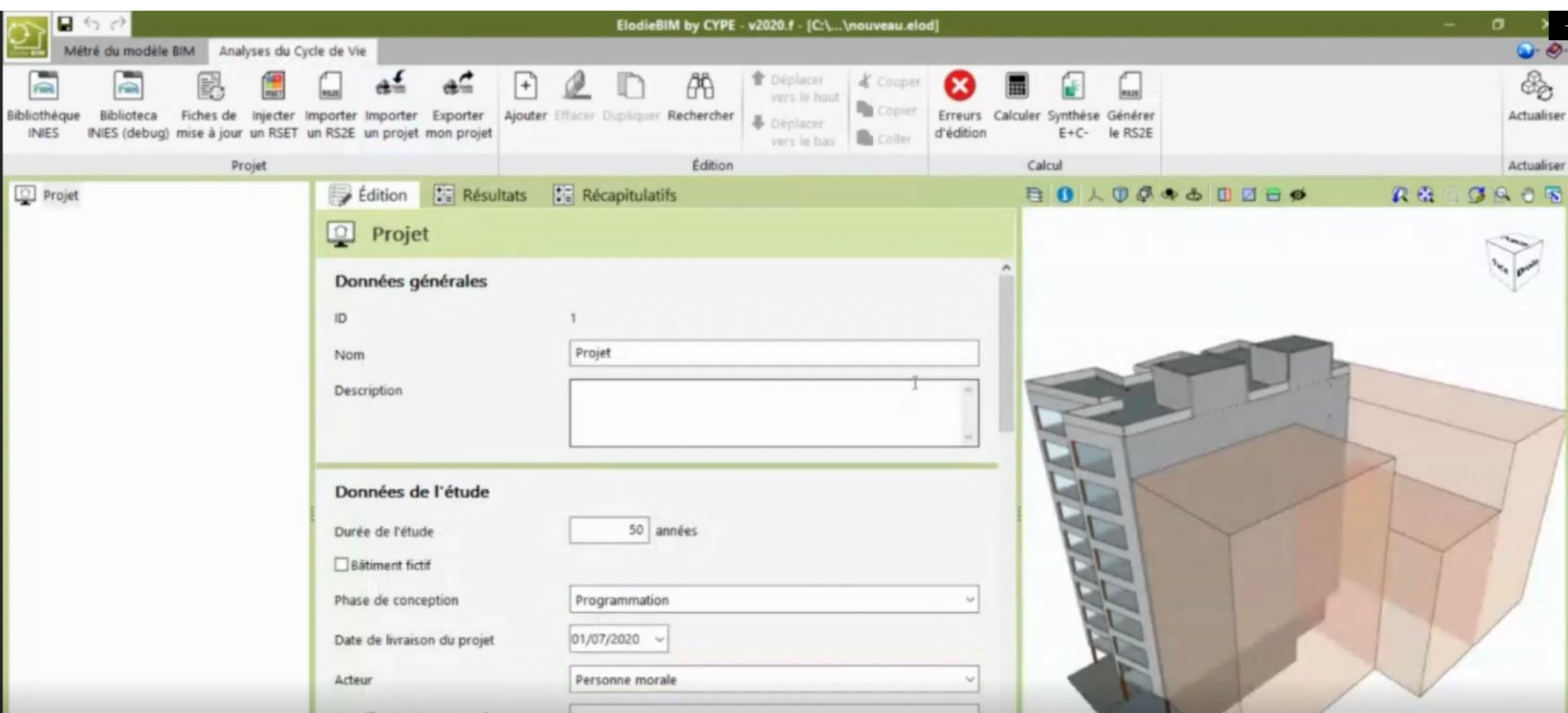
<https://www.youtube.com/watch?v=p3 ti0sO C4>



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

This software can also import a model into IFC to link its BIM objects to the environmental database contained in the programme.

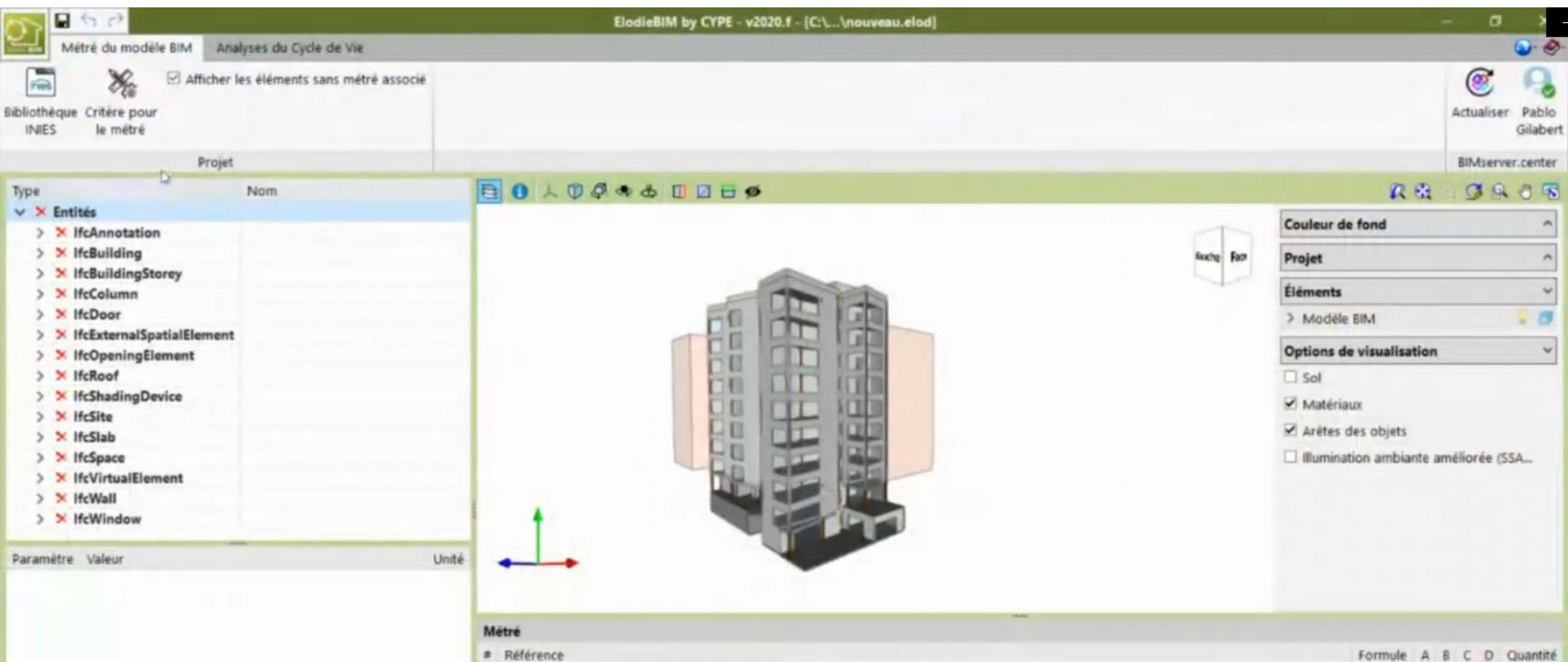




BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

It allows the Life Cycle Assessment of a building to be calculated in France in response to the needs of professionals who will be obliged to submit a technical report on the life cycle of buildings from 1 January 2021.





BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

Création de critères pour le mètre

SFSD

Structure des chapitres

Règles de mét

Importer

Unité d'ouvrage

Données	
ID	6446 (INIES)
Nom de la fiche	Verrière en Zinc - DONNEE ENVIRONNEMENTALE PAR DEFAULT
Famille de produit	Zinc
Norme environnementale	EN 15804
Type de donnée	Donnée par défaut
État de vérification	Non vérifié
Quantité	1 m ²

Nom: Verrière en Zinc - DONNEE ENVIRONNEMENTALE PAR DEFAULT

Durée de vie estimée (DVE): 30.00 années

Nomenclature E+C-: None

Chapitre:

Métré

Formule:

A Unités

B Ensemble Paramètre

C Ensemble Paramètre

D Ensemble Paramètre

Accepter Annuler



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

ElodieBIM by Cype - v2020.beta.f - [D:\...\EpCm.elod]

Métré du modèle BIM | Analyses du Cycle de Vie

☒ Afficher les éléments sans métré associé

Bibliothèque INIES | Critère pour le métré

Projet

Actualiser | Victor Díez Montenegro | BIMserver.center

Type | Nom

- Entités
 - IfcBuilding
 - IfcBuildingElementProxy
 - IfcBuildingStorey
 - IfcColumn
 - IfcDoor
 - IfcExternalSpatialElement
 - IfcOpeningElement
 - IfcRailing
 - IfcRoof
 - IfcSite
 - IfcSlab
 - IfcSpace
 - IfcStair
 - IfcStairFlight
 - IfcWall
 - Basic Wall:Default - 10 cm
 - Basic Wall:Default - 10 cm
 - Basic Wall:Default - 10 cm
 - Basic Wall:Default - 10 cm
 - Basic Wall:Default - 10 cm
 - Basic Wall:Default - 10 cm

Paramètre | Valeur | Unité

Propriétés

BaseProperties

Entity	IfcWall
Type Name	Basic Wall:Default - 10 cm
PredefinedType	NOTDEFINED
Name	Basic Wall:Default - 10 cm:172803
GlobalId	3zWxDTWGj4V0svlgGlrrp1

Pset_EnvironmentalImpactIndicators

Pset_ReinforcementBarPitchOfWall

Pset_WallCommon

Quantités

Qto_WallBaseQuantities

Height	3.5	m
Length	8.15575	m
Width	0.1	m
GrossFootprintArea	0.815575	m²
NetSideArea	28.5451	m²

Métré

#	Référence	Formule	A	B	C	D	Quantité
2	Placomarine® premium BA13 13 mm - Basic Wall:Default - 10 cm	2*B	1.00	28.55			57.09
2	ACOUSTISHED Mural A 80 mm - Basic Wall:Default - 10 cm		1.00	28.55			28.55

3D visualization of a building structure (wireframe) with a highlighted orange wall element.



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

ElodieBIM by Cype - v2020.beta.f - [D:\...\EpCm.elod]

Métré du modèle BIM | Analyses du Cycle de Vie

Bibliothèque INIES | Fiches de mise à jour | Injecter un RSET | Importer un RS2E | Importer un projet | Exporter mon projet

Ajouter | Effacer | Dupliquer | Rechercher

Déplacer vers le haut | Couper | Erreurs d'édition | Calculer | Synthèse E+C- | Générer le RS2E

Déplacer vers le bas | Copier | Coller

Projet | Édition | Résultats | Récapitulatifs

Composant

Impacts environnementaux	Consommation des ressources		Déchets	Flux sortants		✓ Afficher les phases optionnelles
	Étape de production	Étape du processus de construction		Étape d'utilisation	Étape de fin de vie	Total cycle de vie
Réchauffement climatique (kg CO2 eq.)	4.64e+003	7.55e+002		0.00e+000	5.87e+001	5.46e+003
Appauvrissement de la couche d'ozone (kg CFC-11 eq.)	5.79e-004	2.66e-004		0.00e+000	4.25e-005	8.78e-004
Acidification des sols et de l'eau (kg SO2 eq.)	1.62e+001	2.88e+000		0.00e+000	2.69e-001	1.95e+001
Eutrophisation (kg (PO4)3- eq.)	3.82e+000	6.78e-001		0.00e+000	1.67e+000	6.18e+000
Formation d'ozone photochimique (kg C2H4 eq.)	1.07e+000	3.24e-001		0.00e+000	4.20e-002	1.43e+000
Épuisement des ressources abiotiques - éléments (kg Sb eq.)	3.02e-003	2.33e-004		0.00e+000	3.65e-008	3.24e-003
Épuisement des ressources abiotiques - combustibles fossiles (MJ)	8.34e+004	1.18e+004		0.00e+000	7.52e+002	9.61e+004
Pollution de l'air (m³ d'air)	1.51e+003	2.77e+002		0.00e+000	1.81e+003	3.60e+003
Pollution de l'eau (m³ d'eau)	1.92e+005	3.51e+004		0.00e+000	2.64e+003	2.30e+005

Projet

Zonas térmicas

Zona 1

Produits de construction et équipements

1. VRD (Voirie et Réseaux Divers)

2. Fondations et infrastructure

3. Superstructure - Maçonnerie

4. Couverture - Étanchéité - Charpente

5. Cloisonnement - Doublage - Plafond

6. Façades et menuiseries extérieures

6.1 Revêtement, isolation et doublage

ACOUSTISHED Mural A 40 mm

PREGYPLAC AIR BA13

6.2 Portes, fenêtres, fermetures, etc.

6.3 Habillages et ossatures

7. Revêtements des sols, murs et plafonds

8. CVC (Chauffage - Ventilation - Refroidissement)

9. Installations sanitaires

10. Réseaux d'énergie (courant fort)

11. Réseaux de communication (courant faible)

12. Appareils élévateurs et autres équipements

13. Equipement de production locale

14. Fluides frigorigènes

Consommations d'énergie

Consommations et rejets d'eau

Chantier

Zona 2

Produits de construction et équipements

Consommations d'énergie

Consommations et rejets d'eau

Chantier



BASED ON SOFTWARE-INTEGRATED DATABASES

CYPE and CSTB: ElodieBIM

ElodieBIM by Cype - v2020.beta.f - [D:\...\EpCm.elod]

Métré du modèle BIM | Analyses du Cycle de Vie

Projet

Zonas térmicas

Zona 1

Produits de construction et équipements

1. VRD (Voirie et Réseaux Divers)
2. Fondations et infrastructure
3. Superstructure - Maçonnerie
4. Couverture - Etanchéité - Charpente
5. Cloisonnement - Doublage - Plafond
6. Façades et menuiseries extérieures
 - 6.1 Revêtement, isolation et doublage
 - ACOUSTISHED Mural A 40 mm
 - PREGYPLAC AIR BA13**
 - 6.2 Portes, fenêtres, fermetures, etc.
 - 6.3 Habillages et ossatures
7. Revêtements des sols, murs et plafonds
8. CVC (Chauffage - Ventilation - Refroidissement)
9. Installations sanitaires
10. Réseaux d'énergie (courant fort)
11. Réseaux de communication (courant faible)
12. Appareils élévateurs et autres équipements

Édition | Résultats | Récapitulatifs

Composant

Impacts environnementaux	Consommation des ressources	Déchets	Flux sortants	✓ Afficher les phases optionnelles	
	Étape de production	Étape du processus de construction	Étape d'utilisation	Étape de fin de vie	Total cycle de vie
Réchauffement climatique (kg CO ₂ eq.)	4.64e+003	7.55e+002	0.00e+000	5.87e+001	5.46e+003
Appauvrissement de la couche d'ozone (kg CFC-11 eq.)	5.79e-004	2.66e-004	0.00e+000	4.25e-005	8.78e-004
Acidification des sols et de l'eau (kg SO ₂ eq.)	1.62e+001	2.88e+000	0.00e+000	2.69e-001	1.95e+001
Eutrophisation (kg (PO ₄) ₃ - eq.)	3.82e+000	6.78e-001	0.00e+000	1.67e+000	6.18e+000
Formation d'ozone photochimique (kg C ₂ H ₄ eq.)	1.07e+000	3.24e-001	0.00e+000	4.20e-002	1.43e+000
Epuisement des ressources abiotiques - éléments (kg Sb eq.)	3.02e-003	2.33e-004	0.00e+000	3.65e-008	3.24e-003
Epuisement des ressources abiotiques - combustibles fossiles (MJ)	8.34e+004	1.18e+004	0.00e+000	7.52e+002	9.61e+004
Pollution de l'air (m ³ d'air)	1.51e+003	2.77e+002	0.00e+000	1.81e+003	3.60e+003
Pollution de l'eau (m ³ d'eau)	1.92e+005	3.51e+004	0.00e+000	2.64e+003	2.30e+005

Consommations et rejets d'eau

Chantier



BASED ON DATA INTEGRATION IN BIM LOD600 OBJECTS

On the other hand, in models of calculation methodologies with software that start with the environmental information contained in BIM objects, would require the development of LOD600, as well as the parameterisation of these BIM objects and their development at LOD400 and LOD500 levels.

Current calculation software based on databases and not on information contained in BIM objects, usually do not allow as much specificity as could be achieved from the customisation of a BIM object, which belongs to a specific manufacturer. These options can be implemented in BIM objects, but it is not something that is currently standardised.

An example of data integration in a BIM object is shown below.



BASED ON DATA INTEGRATION IN BIM LOD600

Propiedades de tipo

Familia: Familia de sistema: Muro básico

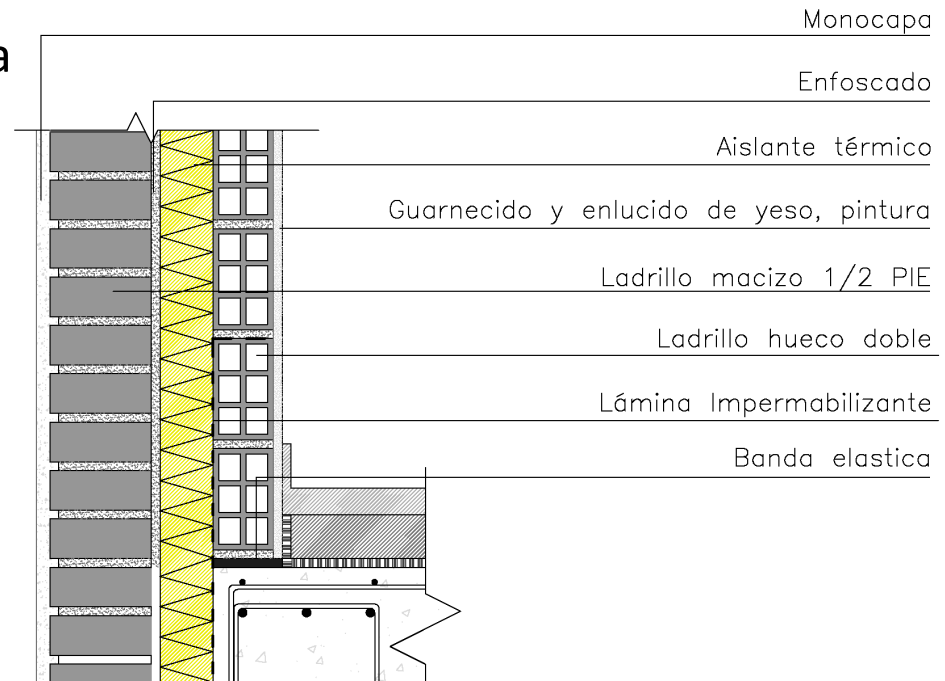
Tipo: Fachada monocapa con cámara de aire

Parámetros de tipo

Parámetro	Valor
Construcción	
Estructura	Editar...
Envolvente en inserciones	Sin envolvente
Envolvente en extremos	Ninguno
Anchura	0.2850
Función	Exterior
Gráficos	
Patrón de relleno de detalle bajo	
Color de relleno de detalle bajo	Negro
Materiales y acabados	
Material estructural	Ladrillo cerámico perforado
Propiedades analíticas	
Coeficiente de transferencia de calor (U)	0.8333 W/(m²·K)
Resistencia térmica (R)	1.2000 (m²·K)/W
Masa térmica	0.00 kJ/K
Absortancia	0.700000
Aspecto	
Emisiones de CO ₂ eq (Fases A1-A5)	
Emisiones de CO ₂ eq (Fases B1-B5)	
Emisiones de CO ₂ eq (Fases C1-C4)	
Reciclabilidad	
Reusabilidad	
Datos de identidad	
Imagen de tipo	
Nota clave	
Modelo	
Fabricante	
Comentarios de tipo	
URL	

<< Vista previa Aceptar Cancelar Aplicar

a



Construction diagram of the façade.



BASED ON DATA INTEGRATION IN BIM LOD600 OBJECTS

Based on these BIM object development methodologies we will see in this module those implemented in the projects co-financed by the Erasmus+ programme of the European Union:

- BIMclay.
- BIMstone.



8.2 BIMclay

DEFINITION OF THE PROJECT

OBJECTIVES

CONSORTIUM AND IMPACT

INTELLECTUAL OUTPUTS

BIMclay RESULTS



Co-funded by the
Erasmus+ Programme
of the European Union



"The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."⁹



DEFINITION OF THE PROJECT

IMPROVEMENT OF THE ACV SKILLS AND QUALIFICATIONS OF PROFESSIONALS IN THE CERAMICS SECTOR WITH THE SUPPORT OF BIM APPLICATIONS.

- The European associations of the ceramic sector, aimed at solving the demands of their associated companies, put on the table the need to establish common criteria in the placement of their products, as well as to control the environmental impacts derived, due to the great influence of the sector in the construction, providing the product with an added value with the inclusion of information on the impact on the environment.
- The nature of the BIMclay project is the production and development of multimedia materials based on BIM, considering the challenges to be addressed in terms of LCA of clay products, to be used as training material for both vocational training students and professionals in the ceramics sector.



OBJECTIVES

- To investigate the most suitable and sustainable tile installation methods for the main ceramic products used throughout Europe, analysing the results and selecting the best practices.
- To make available the information gathered on the most appropriate tile installation methodologies for ceramic products on site, differentiated according to product type, use and installation method.
- To develop an interactive BIM tool with an integrated database of the tile installation methods compiled in the research, as well as the different product typologies, uses and main environmental characteristics to be highlighted.
- To promote those tile installation methods that extend the life cycle of ceramic products, especially those that allow a second use according to environmental sustainability criteria.
- To provide a tool to the user for the LCA analysis of ceramic products with the intention of promoting their sustainability.



CONSORTIUM AND IMPACT

- Associacao Portuguesa da Industria Ceramica – Portugal.
- Centro Tecnologico da Ceramica e do Vidrio – Portugal.
- Hispalyt, Asociación Española de Fabricantes de Ladrillos y Tejas de Arcilla Cocida Spain.
- Asociación Empresarial y de Investigación Centro Tecnológico del Mármol. Piedra y Materiales – Spain.
- Institute of Entrepreneurship and Development – Greece.



HISPALYT
CERÁMICA PARA CONSTRUIR



institute of
Entrepreneurship
Development

- Development of a BIM educational tool that promotes a change of mentality and behaviour in the ceramics sector, replicable to other professional sectors, which encourages addressing the environmental challenges demanded by society in the construction sector.



INTELLECTUAL OUTPUTS

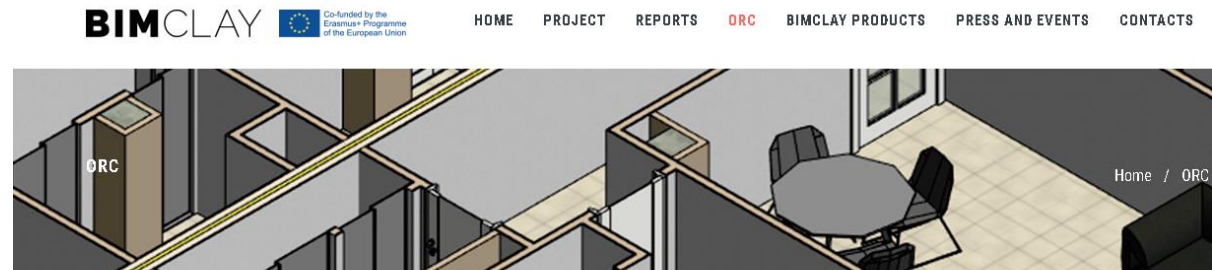
- Establishment of a common Study Plan on methodologies for laying ceramic products, Life Cycle Analysis and current legislation.
- Development of BIMclay Multimedia Materials. New interactive BIM learning methods.
- BIMclay 3D animations.
- Interactive BIM tool.
- BIMclay Online Resource Centre.



INTELLECTUAL OUTPUTS

O3. OPEN EDUCATIONAL RESOURCE (OER).

The project has a platform for accessing project information.



www.bimclay.eu

Here, you can access all the information collected during and beyond the end of the project.

DIRECT ACCESS

PRIVATE AREA

INFO

> Documents

> Reports



Erasmus+

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



INTELLECTUAL OUTPUTS

O1. Establishment of common learning outcomes on fired clay installation methods, life cycle assessment (LCA) and related regulations.

O1/A1. Study on the regulations for the installation of fired clay products.

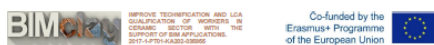


TABLE A1.1. COMPILATION ON THE PORTUGUESE NORMATIVE FOR PLACING OF CLAY PRODUCTS AND ENVIRONMENT.

PORTUGUESE REGULATION REGARDING CLAY PLACING METHODS

NP EN 15037-3:2009/A1:2013. Produtos prefabricados em betão. Sistemas de pisos com vigas e lajes. Parte 3: Alçobaixas cerâmicas	EN 15037-3:2010/A1:2011. Precast concrete products - Beam-and-slab floor systems - Part 3: Clay blocks
NP EN 1304:2007. Telhas cerâmicas e acessórios - Definições e especificações dos produtos	EN 1304:2013. Clay roofing tiles and fittings - Product definitions and specifications
NP EN 771-1:2011/A1:2016. Especificações para unidades de alvenaria. Parte 1: Unidades cerâmicas (tijolos cerâmicos)	EN 771-1:2011/A1:2015. Specification for masonry units - Part 1: Clay masonry units
-	EN 845-1:2013/A1:2015. Specification for ancillary components for masonry - Part 1: Wall ties, tension straps, hangers and brackets
NP EN 1344:2015. Bocas cerâmicas para pavimento. Especificações e métodos de ensaio	EN 1344:2013/A1:2015. Clay pavers - Requirements and test methods
NP EN 14411:2016. Delineamento e desenvolvimento cerâmicos. Definição, classificação, caracterização, avaliação da conformidade e marcação	EN 14411:2016. Ceramic tiles - Definition, classification, characterization, assessment and verification of constancy of performance, classification and marking
-	EN 14411:2016. Ceramic tiles - Definition, classification, characterization, assessment and verification of constancy of performance, classification and marking
NP EN 12004-1:2017. Coisas para ladrilhos. Parte 1: Requisitos, avaliação e verificação da regularidade do desempenho, classificação e marcação	EN 12004-1:2017. Tiles for floorings. Part 1: Requirements, assessment and verification of constancy of performance, classification and marking
-	EN 12004-2:2017. Tiles for floorings. Part 2: Test methods
NP EN 998-1:2013. Especificação de argamassas para alvenaria. Parte 1: Argamassas para interiores interiores e exteriores	EN 998-1:2016. Specification for mortar for masonry - Part 1: Mortar for interior and exterior
NP EN 998-2:2017. Especificação de argamassas para alvenaria. Parte 2: Argamassas para interiores interiores e exteriores	EN 998-2:2016. Specification for mortar for masonry - Part 2: Mortar for interior and exterior

Constituintes membros: Associação Portuguesa do Instituto de Cerâmica (APICER), Centro Tecnológico de Cerâmica e do Vidro (CTCV), Associação Empresarial de Investigação Centro Tecnológico do Vidro, Plásticos e Materiais (CTM), Associação Europeia de Fabricantes (Eupafab), Instituto de Empreendedorismo Development (IED).

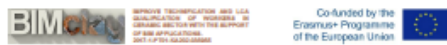


TABLE A1.1. COMPILATION ON THE SPANISH NORMATIVE FOR PLACING OF CLAY PRODUCTS AND ENVIRONMENT.

SPANISH REGULATION REGARDING CLAY PLACING METHODS

REAL DECRETO 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación	ROYAL DECREE 314/2006, of March 17, which approves the Technical Building Code
UNE-EN 15037-3:2010/A1:2011. Productos prefabricados de hormigón. Sistemas de forjado de vigas y bovedillas. Parte 3: Bovedillas de arcilla cocida	UNE-EN 15037-3:2010/A1:2011. Precast concrete products - Beam-and-slab floor systems - Part 3: Clay blocks
UNE 67041:1988. Tableros cerámicos de arcilla cocida para cubiertas. Designación y especificaciones técnicas	UNE 67041:1988. Ceramic slabs of burned clay for covering. Designation and technical characteristics
UNE-EN 1304:2014. Tejas y piezas auxiliares de arcilla cocida. Definiciones y especificaciones de productos	UNE-EN 1304:2014. Clay roofing tiles and fittings - Product definitions and specifications
UNE-EN 771-1:2011/A1:2016. Especificaciones de piezas para alvenaría de arcilla cocida. Parte 1: Piezas de arcilla cocida	UNE-EN 771-1:2011/A1:2016. Specification for masonry units - Part 1: Clay masonry units
UNE-EN 845-1:2014. Especificación de componentes auxiliares para alvenaría de arcilla cocida. Parte 1: Llaveros, tirantes, anclajes y abrazaderas	UNE-EN 845-1:2014. Specification for ancillary components for masonry - Part 1: Wall ties, tension straps, hangers and brackets
UNE-EN 1344:2015. Bocas cerámicas para pavimento. Especificaciones y métodos de ensayo	UNE-EN 1344:2015. Clay pavers - Requirements and test methods
UNE-EN 14411:2016. Ladrillos cerámicos. Definiciones, clasificación, caracterización, evaluación de la conformidad y marcado	UNE-EN 14411:2016. Ceramic tiles - Definition, classification, characterization, evaluation of conformity and marking
UNE-EN 14411:2016. Ladrillos cerámicos. Definiciones, clasificación, caracterización, evaluación y verificación de la constancia de las prestaciones y marcado	UNE-EN 14411:2016. Ceramic tiles - Definition, classification, characterization, assessment and verification of constancy of performance and marking
UNE 13400:2004. Tejas cerámicas. Código de práctica para el diseño y el montaje de cubiertas con tejas cerámicas	UNE 13400:2004. Clay roofing tiles. Code of practice for the design and fitting of roofs with clay roofing tiles

Constituintes membros: Associação Portuguesa do Instituto de Cerâmica (APICER), Centro Tecnológico de Cerâmica e do Vidro (CTCV), Associação Empresarial de Investigação Centro Tecnológico do Vidro, Plásticos e Materiais (CTM), Associação Europeia de Fabricantes (Eupafab), Instituto de Empreendedorismo Development (IED).

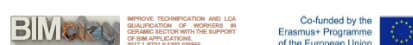


TABLE A1.1. COMPILATION ON THE GREEK NORMATIVE FOR PLACING OF CLAY PRODUCTS AND ENVIRONMENT.

GREEK REGULATION REGARDING CLAY PLACING METHODS

ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-03-02-02-00-2009. Τεμάχια αμοιβαία	ETEP ELOT TP 1501-03-02-02-00-2009. Clay bricks masonry
ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-03-05-01-00. Επισκευαστικά στοιχεία	ETEP ELOT TP 1501-03-05-01-00. Roof coverings with clay roofing tiles
ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-03-06-02-03. Επισκευαστικά υαλοπροστατευτικά στοιχεία	ETEP ELOT TP 1501-03-06-02-03. Thermal insulation of clay roofing tiles
ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-08-05-03-01. Υποδομικά στοιχεία επενδύσεων λυσιδέσεων και κΥΤΑ από σπινθήρι υλικά	ETEP ELOT TP 1501-08-05-03-01. Clay barrier liners for ponds and landfills
ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-03-07-02-03. Επεξεργασμένα κεραμικά πλακάκια, εσωτερικά και εξωτερικά	ETEP ELOT TP 1501-03-07-02-03. Ceramic tiles covering of indoor and outdoor surfaces
ΑΤΕΝ ΕΛΟΤ ΤΡ 1501-08-05-02-04. Στερεοίτοιχοι κελύφες κελύφους από σπινθήρι με δοκίμια δομικής αντοχής	ETEP ELOT TP 1501-08-05-02-04. Concrete structures joint sealing using asphaltic mastics
ΕΛΟΤ EN 772-1. Μέθοδος δοκιμής σθεναρότητας τσιμεντοκονίας - Μέρος 1: Προσδιορισμός της αντοχής σε θλίψη	ELOT EN 772-1. Methods of test for masonry units - Part 1: Determination of compressive strength
ΕΛΟΤ EN 998-1. Προδιαγραφή κονιαμάτων τσιμεντοκονίας - Μέρος 1: Κονιάματα ενσωματωμένα	ELOT EN 998-1. Specification for mortar for masonry - Part 1: Rendering and plastering mortar
ΕΛΟΤ EN 998-2. Προδιαγραφή κονιαμάτων τσιμεντοκονίας - Μέρος 2: Κονιάματα τσιμεντοκονίας	ELOT EN 998-2. Specification for mortar for masonry - Part 2: Masonry mortar
ΕΛΟΤ EN 1053-3. Προδιαγραφή κονιαμάτων τσιμεντοκονίας - Μέρος 3: Προσδιορισμός της αρχικής αντοχής σε διάτρηση	ELOT EN 1053-3. Methods of test for masonry - Part 3: Determination of initial shear strength
ΕΛΟΤ EN 1015-11. Μέθοδος δοκιμής κρουστικού τσιμεντοκονίας - Μέρος 11: Προσδιορισμός της αντοχής σε κρούση και θλίψη εκτελούμενη κρουστικού	ELOT EN 1015-11. Methods of test for mortar for masonry - Part 11: Determination of flexural and compressive strength of hardened mortar

Constituintes membros: Associação Portuguesa do Instituto de Cerâmica (APICER), Centro Tecnológico de Cerâmica e do Vidro (CTCV), Associação Empresarial de Investigação Centro Tecnológico do Vidro, Plásticos e Materiais (CTM), Associação Europeia de Fabricantes (Eupafab), Instituto de Empreendedorismo Development (IED).

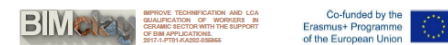


TABLE A1.1. COMPILATION ON THE EUROPEAN NORMATIVE FOR PLACING OF CLAY PRODUCTS AND ENVIRONMENT.

DIRECTIVE 2011/92/UE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 13 December 2011 on the assessment of the effects of certain public and private projects on the environment	DIRETTIVA 2011/92/UE DO PARLAMENTO EUROPEU E DO CONSELHO DE 13 de dezembro de 2011 relativa à avaliação dos efeitos de determinados projectos públicos e privados no ambiente	ΟΔΗΓΙΑ 2011/92/ΕΕ ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΠΑΡΛΑΜΕΝΤΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ ΤΗΣ 13ης Δεκεμβρίου 2011 για την εκτίμηση των επιπτώσεων περιβαλλοντικών στοιχείων στα περιβάλλοντα	DIRETTIVA 2011/92/UE DO PARLAMENTO EUROPEU E DO CONSELHO DE 13 de dezembro de 2011 relativa à avaliação dos efeitos de determinados projectos públicos e privados no ambiente
REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC	REGULAMENTO (UE) N.º 305/2011 DO PARLAMENTO EUROPEU E DO CONSELHO DE 9 de Março de 2011 que estabelece condições harmonizadas para a comercialização dos produtos de construção e que revoga a Directiva 89/106/CEE do Conselho	ΚΑΝΟΝΙΣΜΟΣ (ΕΕ) αριθ. 305/2011 ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΠΑΡΛΑΜΕΝΤΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ ΤΗΣ 9ης Μαρτίου 2011 για τη θέσπιση των κανόνων για την ελεύθερη κυκλοφορία των προϊόντων της αλληλεξάρτησης	REGULAMENTO (UE) N.º 305/2011 DO PARLAMENTO EUROPEU E DO CONSELHO DE 9 de Março de 2011 que estabelece condições harmonizadas para a comercialização dos produtos de construção e que revoga a Directiva 89/106/CEE do Conselho
DIRECTIVE (EU) 2016/2284 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC	DIRETTIVA (UE) 2016/2284 DO PARLAMENTO EUROPEU E DO CONSELHO DE 14 de dezembro de 2016 relativa à redução das emissões nacionais de certos poluentes atmosféricos, que altera a Diretiva 2003/35/CE e revoga a Diretiva 2001/81/CE	ΟΔΗΓΙΑ (ΕΕ) 2016/2284 ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΠΑΡΛΑΜΕΝΤΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ ΤΗΣ 14ης Δεκεμβρίου 2016 σχετικά με τη μείωση των εθνικών εκπομπών αερίων ρυπαντών ατμοσφαιρικών, που αλλάζει τη Διευθύνση 2003/35/ΕΚ και καταργεί τη Διευθύνση 2001/81/ΕΚ	DIRETTIVA (UE) 2016/2284 DO PARLAMENTO EUROPEU E DO CONSELHO DE 14 de dezembro de 2016 relativa à redução das emissões nacionais de certos poluentes atmosféricos, que altera a Diretiva 2003/35/CE e revoga a Diretiva 2001/81/CE
REGULATION (EU) No 343/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 21 May 2013 on a	REGULAMENTO (UE) N.º 343/2013 DO PARLAMENTO EUROPEU E DO CONSELHO DE 21 de maio de 2013 relativo à criação de um	ΚΑΝΟΝΙΣΜΟΣ (ΕΕ) αριθ. 343/2013 ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΠΑΡΛΑΜΕΝΤΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ ΤΗΣ 21ης	REGULAMENTO (UE) N.º 343/2013 DO PARLAMENTO EUROPEU E DO CONSELHO DE 21 de maio de 2013 relativo à criação de um

Constituintes membros: Associação Portuguesa do Instituto de Cerâmica (APICER), Centro Tecnológico de Cerâmica e do Vidro (CTCV), Associação Empresarial de Investigação Centro Tecnológico do Vidro, Plásticos e Materiais (CTM), Associação Europeia de Fabricantes (Eupafab), Instituto de Empreendedorismo Development (IED).



INTELLECTUAL OUTPUTS

O1. Establishment of common learning outcomes on fired clay installation methods, life cycle assessment (LCA) and related regulations.

O1/A3. Comparative study on Life Cycle Assessment (LCA) of fired clay products in the participating countries.



TASK 01.A3. COMPARATIVE STUDY ON LIFE CYCLE ANALYSIS (LCA) OF CLAY PRODUCTS.

TASK 01.A3.

COMPARATIVE STUDY ON LIFE CYCLE ASSESSMENT (LCA) OF CLAY PRODUCTS



TASK 01.A3. COMPARATIVE STUDY ON LIFE CYCLE ANALYSIS (LCA) OF CLAY PRODUCTS.

INTRODUCTION

"Growing concern and environmental regulation, coupled with the increasing importance and pressure of public opinion, progressively raise the question of the energy and environmental performance of buildings, increasingly on the agenda of building construction, as well as the materials used in their construction and their Relation with the surrounding space" (CTCV, 2012).

In this tasks O1.A3, a comparative study report about the existing Life Cycle Analysis related to clay products, as well as placing these products in construction sites in the partner countries and EU has been developed.

This comparative study is focused on Environmental Product Declarations (EPD) of construction of the participant countries. Currently, there are products with its environmental declaration, i.e. a document which reports on environmental impacts, such as kilograms of CO2 equivalents generated in the manufacturing process of the products of ceramic sector. This document covers all phases through which passes a product, from extraction of the raw material with which it is manufactured until the product is completely finished.

In summary, this task will compile the EPDs of the previous materials used in the multimedia materials of the project and analyse the basic data that will be used in the interactive tool (IO3) (CO2 emissions, ecological and carbon footprint, etc.). All partners of the BIMclay project have participated in this report.

The results of this comparative study will be collected focused on its implementation in the BIMclay Multimedia Cards.

1. ENVIRONMENTAL PRODUCT DECLARATION (EPD)

The ecolabel allows for affirming the positive environmental performance of a product. Therefore, these ecolabels are awarded to products with lower environmental impact accounting for their life cycle. There are three types: ecolabel type I, environmental self-declarations (type II) and environmental product declarations (III). The first ecolabels are voluntary schemes that affirm the least environmental impact of a product, the next, the manufacturer performs it with or without certification of a competent authority, and the latest are verified and they establish the environmental behaviour of the product.

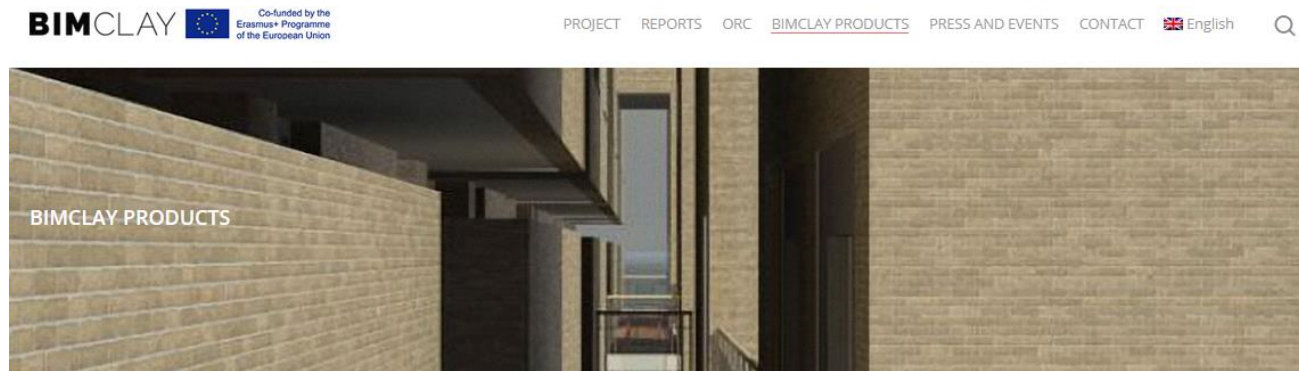
In general, the ecolabels assess such aspects as: extraction and selection of raw material, production process (power consumption, water usage and



BIMclay RESULTS

BIM OBJECTS, 3D ANIMATIONS AND CALCULATION TOOLS

www.bimclay.eu



Here you can find multimedia graphic material on how to place the most common clay and ceramic products in a sustainable way.

- Interactive BIM Tool

The BIMclay families are available with the characteristics of LCA (Life Cycle Assessment) in the sustainable constructive selected during the project execution. Furthermore, the Tool can be checked it in the following [link](#).

- BIMclay Multimedia Cards

Now you can see the 3D animations of the methods of placement of the most commonly used clay and ceramic products.

MULTIMEDIA CARD AND BIM OBJECT 01. Roof dry tiling process.





BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

1. First of all we proceeded to select the work units to be represented

PRODUCT	APPLICATION SYSTEM
Ceramic roofing tiles	1. Roof tiles flat or curved (dry application) 2. Roof tiles mixed: Placing with mortar
Brick	3. Construction of walls of small format bricks and prefabricated ceramic and plaster panel 4. Construction of large format hollow brick walls and prefabricated ceramic and plaster panel
Facing brick	5. Ventilated facades 6. Non-ventilated facades
Ceramic tiles	7. Floor tiling 8. Renovation floor tiling 9. Floating floor 10. Mosaic 11. External walls tiling (ventilated)
Paver	12. Pavers on sand bed.



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

2. Their classification within the BIM categories was identified.

BIM CLASSIFICATION (FAMILIES)	PRODUCT	APPLICATION SYSTEM
ROOF	Ceramic roofing tiles	1. Roof tiles flat or curved (dry application). 2. Roof tiles mixed: Placing with mortar.
ARCHITECTURAL WALLS	Brick	3. Construction of walls of small format bricks and prefabricated ceramic and plaster panel. 4. Construction of large format hollow brick walls and prefabricated ceramic and plaster panel.
	Facing brick	5. Ventilated facades (Facing bricks) 6. Non-ventilated facades (Facing bricks)
	Ceramic tiles	10. Mosaic. 11. External walls tiling (ventilated. Ceramic).
ARCHITECTURAL FLOORS	Ceramic tiles	7. Floor tiling. 8. Renovation floor tiling. 9. Floating floor.
	Paver	12. Pavers on sand bed.

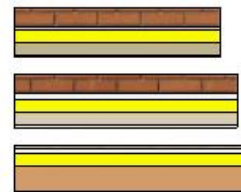
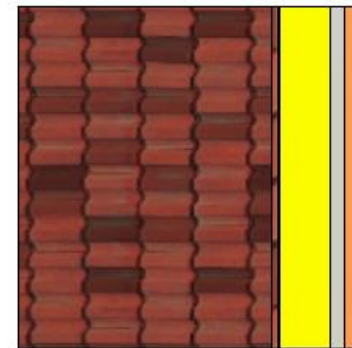
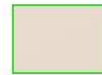


BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

3. The graphic representation shown in this sheet corresponds to the objects finally developed.

Specifically, Revit was used.





BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

4. A comprehensive search was carried out among partners for different DAPs and scientific articles on the subject.

Almeida, M. I., Dias, A. C., Demertzi, M., Arroja, L. Contribution to the development of product category rules for ceramic bricks. Journal of Cleaner Production 92: 206-215, (2015).

Almeida, M. I., Dias, A. C., Arroja, L. Environmental Product Declaration – New challenges, new impact categories. Case study applied to ceramic floor tiles. Congress of Innovation on Sustainable Construction CINCOS'16 (2016).

Almeida, M. I., Dias, A. C., Arroja, L. Environmental Product Declaration – New challenges, new impact categories. Case study applied to ceramic floor tiles. Congress of Innovation on Sustainable Construction CINCOS'16 (2016).

Almeida, M.I., Dias, A.C., Demertzi, M., Arroja, L. Environmental profile of ceramic tiles and their potential for improvement. Journal of Cleaner Production 131: 583-593, (2016).

Revigrés. Environmental Product Declaration - Tech Porcelain Tiles, (2017).

Almeida, M.I., Dias, A.C., Arroja, L. Declaração ambiental de produto - Caso de estudo de fundamentação de impactes na telha cerâmica. Congress of Innovation on Sustainable Construction CINCOS'14 (2014).

Almeida, M.I., Dias, A.C., Arroja, L. Influência de variáveis da tecnologia de fabrico na determinação de impactes ambientais da telha cerâmica. Conferência Internacional de Ambiente em Língua Portuguesa (CIALP).

Pavigrés Cerâmicas, S.A.. Declaração Ambiental de Produto - Grés porcelânico, (2019). Sistema DAPHabitat. https://daphabitat.pt/pt_PT/dap/dap-registadas/

Revigrés. Environmental Product Declaration - Glazed and Unglazed Porcelain Tiles, (2017). Sistema DAPHabitat. https://daphabitat.pt/pt_PT/dap/dap-registadas/

Pavigrés Cerâmicas, S.A.. Declaração Ambiental de Produto - Monoporosa, (2019). Sistema DAPHabitat. https://daphabitat.pt/pt_PT/dap/dap-registadas/

GlobalEPD_002_041_ESP. Datos promediados de los parámetros del ACV. El principal uso recomendado para este producto es como revestimiento de paredes en el sector de la construcción. https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_002_041_ESP.PDF

https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_002_042_ESP.PDF

https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_002_013_ren1_ESP.pdf



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

5. A comparative study was carried out in order to homogenise all the data and to find out the common phases calculated between the EPDs and scientific articles finally selected.

Roof																
Almeida, M.I., Dias, A.C., Arroja, L. Declaração ambiental de produto - Caso de estudo de fundamentação de impactes na telha cerâmica. Congress of Innovation on Sustainable Construction CINCOS'14 (2014).																
Ceramic tile (2007)		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP [kg CO2 eq]	GWP [μg CO2 eq]		1,07E+01													
ODP [kg CFC-11 eq]	ODP [μg CFC-11 eq]		1,33E-06													
AP [kg SO2 eq]	AP [μg SO2 eq]		7,66E-02													
EP [kg (PO4)3- eq]	EP [μg (PO4)3- eq]		1,37E-02													
POCP [kg etileno eq]	POCP [μg etileno eq]		2,23E-03													
ADPE [kg Sb eq]	ADPE [μg Sb eq]		4,50E-06													
ADPF [MJ]	ADPF [MJ]		1,69E+02													
Ceramic tile (2013)		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP [kg CO2 eq]	GWP [μg CO2 eq]		8,97E+00													
ODP [kg CFC-11 eq]	ODP [μg CFC-11 eq]		1,10E-06													
AP [kg SO2 eq]	AP [μg SO2 eq]		5,73E-02													
EP [kg (PO4)3- eq]	EP [μg (PO4)3- eq]		8,83E-03													
POCP [kg etileno eq]	POCP [μg etileno eq]		1,85E-03													
ADPE [kg Sb eq]	ADPE [μg Sb eq]		4,71E-06													
ADPF [MJ]	ADPF [MJ]		1,42E+02													
Ceramic tile. Stages:																
Almeida, M.I., Dias, A.C., Arroja, L. Influência de variáveis da tecnologia de fabrico na determinação de impactes ambientais da telha cerâmica. Conferência Internacional de Ambiente em Língua Portuguesa (CIALP).																
T1. Without refractory furniture (2014):		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP [kg CO2 eq]	GWP [μg CO2 eq]															1,12E+01
ODP [kg CFC-11 eq]	ODP [μg CFC-11 eq]															1,85E-06
AP [kg SO2 eq]	AP [μg SO2 eq]															5,40E-02
EP [kg (PO4)3- eq]	EP [μg (PO4)3- eq]															4,40E-03
POCP [kg etileno eq]	POCP [μg etileno eq]															2,20E-03
ADPE [kg Sb eq]	ADPE [μg Sb eq]															3,31E-07
ADPF [MJ]	ADPF [MJ]															1,75E+02
T2. With refractory furniture (2014):		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP [kg CO2 eq]	GWP [μg CO2 eq]															1,50E+01
ODP [kg CFC-11 eq]	ODP [μg CFC-11 eq]															2,49E-06
AP [kg SO2 eq]	AP [μg SO2 eq]															5,00E-02
EP [kg (PO4)3- eq]	EP [μg (PO4)3- eq]															5,50E-03
POCP [kg etileno eq]	POCP [μg etileno eq]															2,10E-03



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

5. The data to be integrated were selected and the units were changed (so that they could be included in the BIM model software) and the conversion factor from T to m² was applied in the case of the EPD products from the PCR 002 sectoral panel of Global EPD.

1. GWP (kg CO ₂ eq)/m ²		1. GWP (kg CO ₂ eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [1. \text{ GWP (kg CO}_2 \text{ eq)/m}^2]$		1. GWP (kg CO ₂ eq)
2. ODP (µg CFC-11 eq)/m ²		2. ODP (µg CFC-11 eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [2. \text{ ODP (µg CFC-11 eq)/m}^2]$		2. ODP (kg CFC-11 eq)
3. AP (kg SO ₂ eq)/m ²		3. AP (kg SO ₂ eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [3. \text{ AP (kg SO}_2 \text{ eq)/m}^2]$		3. AP (kg SO ₂ eq)
4. EP (kg (PO ₄) ₃ - eq)/m ²		4. EP (kg (PO ₄) ₃ - eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [4. \text{ EP (kg (PO}_4\text{)}_3\text{- eq)/m}^2]$		4. EP (kg (PO ₄) ₃ - eq)
5. POCP (kg etileno eq)/m ²		5. POCP (kg etileno eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [5. \text{ POCP (kg etileno eq)/m}^2]$		5. POCP (kg etileno eq)
6. ADPE (µg Sb eq)/m ²		6. ADPE (µg Sb eq)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [6. \text{ ADPE (µg Sb eq)/m}^2]$		6. ADPE (kg Sb eq)
7. ADPF (MJ)/m ²		7. ADPF (MJ)	$(\text{Área} * 1 / (1 \text{ m}^2)) * [7. \text{ ADPF (MJ)/m}^2]$		7. ADPF (MJ)
ORC BIMclay					
Source (link of the EPD)					
Youtube BIMclay					
Phases of the EPD					



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

5. The data to be integrated were selected and the units were changed (so that they could be included in the BIM model software) and the conversion factor from T to m2 was applied in the case of the EPD products from the PCR 002 sectoral panel of Global EPD.

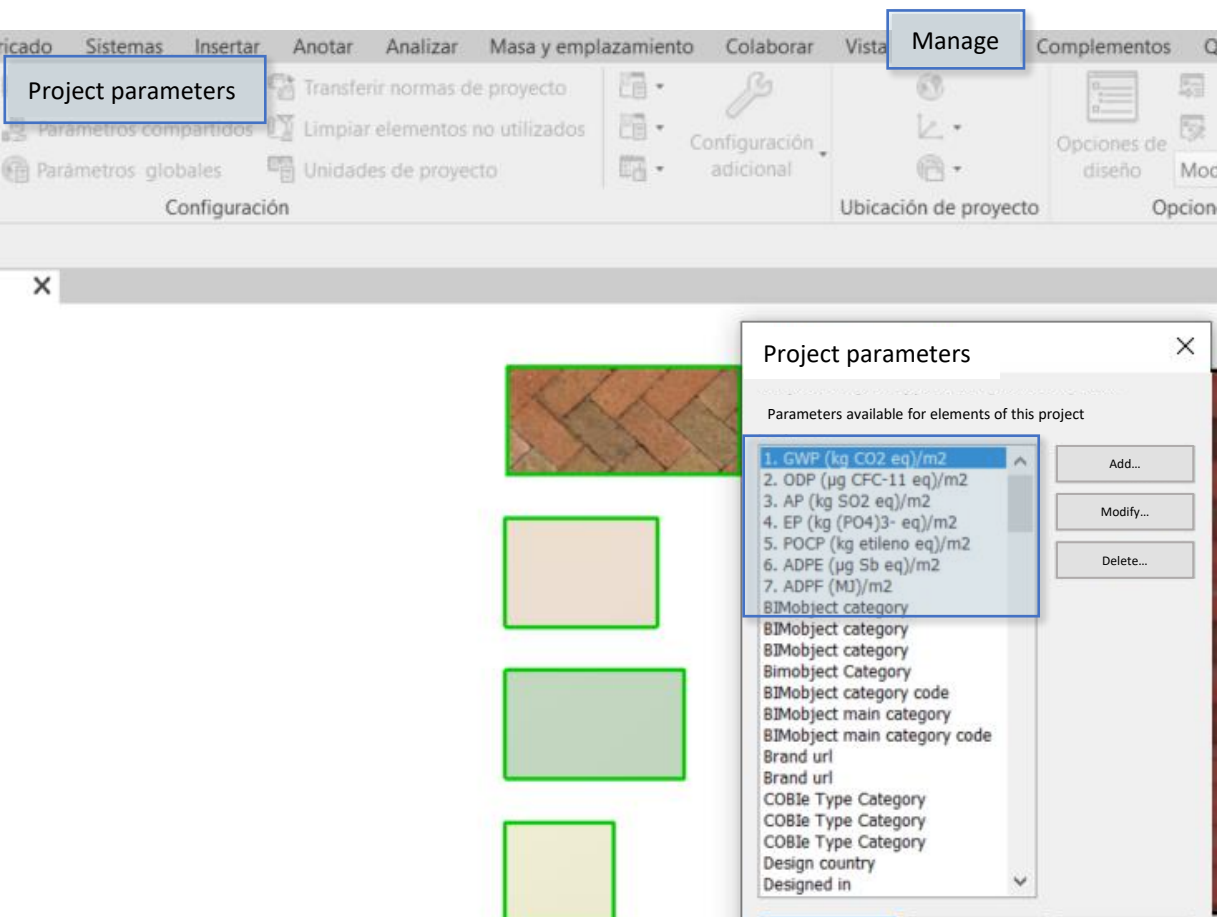
Ceramic roof tiles according to Standard UNE-EN 1304	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		kg/m2	kg/m2 y µg/m2		
GWP [kg CO2 eq]	GWP [µg CO2 eq]	199	16,7	1,9	0	0	0	0	0	0	0	3,85	1,21	8,67	0	231,33	9,2372221	9,2372221 GWP [kg CO2 eq]/m2		
ODP [kg CFC-11 eq]	ODP [µg CFC-11 eq]	8,78E-08	4,21E-11	1,09E-09	0	0	0	0	0	0	0	9,72E-12	1,26E-11	9,62E-11	0	8,9051E-08	3,5559E-09	0,00355587 ODP [µg CFC-11 eq]/m2		
AP [kg SO2 eq]	AP [µg SO2 eq]	0,729	0,0412	0,00146	0	0	0	0	0	0	0	0,00916	0,00836	0,052	0	0,84118	0,0335891	0,0335891 AP [kg SO2 eq]/m2		
EP [kg (PO4)3- eq]	EP [µg (PO4)3- eq]	0,0795	0,0101	0,000347	0	0	0	0	0	0	0	0,00225	0,00202	0,00707	0	0,101287	0,00404448	0,00404448 EP [kg (PO4)3- eq]/m2		
POCP [kg etileno eq]	POCP [µg etileno eq]	0,0785	-0,0127	0,000346	0	0	0	0	0	0	0	-0,00274	0,00122	0,005	0	0,069626	0,00278023	POCP [kg etileno eq]/m2		
ADPE [kg Sb eq]	ADPE [µg Sb eq]	0,000027	0,0000013	-1,05E-07	0	0	0	0	0	0	0	2,99E-07	0,00000215	0,00000299	0	3,3634E-05	1,343E-06	1,34303691 ADPE [µg Sb eq]/m2		
ADPF [MJ]	ADPF [MJ]	3340	227	3,57	0	0	0	0	0	0	0	52,5	22,9	113	0	3758,97	150,099169	ADPF [MJ]/m2		



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

6. Project parameters were created according to the defined impacts.



D		kg/m2	kg/m2 y µg/m2	
8,67	0	231,33	9,2372221	GWP [kg CO2 eq]/m2
52E-11	0	8,9051E-08	3,5559E-09	0,00355587 ODP [µg CFC-11 eq]/m2
0,052	0	0,84118	0,0335891	AP [kg SO2 eq]/m2
00707	0	0,101287	0,00404448	EP [kg (PO4)3- eq]/m2
0,005	0	0,069626	0,00278023	POCP [kg etileno eq]/m2
000299	0	3,3634E-05	1,343E-06	1,34303691 ADPE [µg Sb eq]/m2
113	0	3758,97	150,099169	ADPF [MJ]/m2

LCA for BIM f: C:\ProgramData\Autodesk\Revit

1. GWP (kg CO2 eq)/m2

2. ODP (µg CFC-11 eq)/m2

3. AP (kg SO2 eq)/m2

4. EP (kg (PO4)3- eq)/m2

5. POCP (kg etileno eq)/m2

6. ADPE (µg Sb eq)/m2

7. ADPF (MJ)/m2

ORC BIMclay <https://bimclay.eu/oer/oer-direct-a>

Source (link c <https://www.aenor.com/Productos>)

Youtube BIM <https://www.youtube.com/watch?>

Phases of the A1-A5; C2-C4



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

7. These parameters were configured for inclusion in Walls, Floors and Roofs.

Parameter properties

Type of parameter

☐ Project parameter
(Puede aparecer en tablas de planificación pero no en etiquetas)

☒ Shared parameter
(Puede compartirse en varios proyectos y familias, exportarse a CDE y aparecer en tablas de planificación y etiquetas)

Selecionar... Export...

Date of parameter

Nombre: 1. GWP (kg CO2 eq)/m2

Disciplina: Común

Tipo de parámetro: Número

Agrupar parámetro en: Otros

Descripción de información de

<Sin descripción de información de herramientas. Puede editar este parámetro para escribir su información de herramientas personalizada, con una limitación de 250 caracteres.>

Category

Lista de filtros: <varios>

☐ Ocultar categorías sin marcar

☒ Covers

☐ Dispositivos de alarma de incendio

☐ Dispositivos de comunicación

☐ Dispositivos de datos

☐ Dispositivos de iluminación

☐ Dispositivos de seguridad

☐ Dispositivos telefónicos

☐ Elementos de detalle

☒ Emplazamiento

☐ Entorno

☐ Equipos eléctricos

☐ Equipos especializados

☐ Equipos mecánicos

☐ Escaleras

☐ Forma de armadura

☐ Grupos de modelo

☐ Luminarias

☐ Malla de refuerzo estructural

☐ Marcadores de posición de construcción

☐ Marcadores de posición de tubería

☐ Masa

☐ Mobiliario

☐ Modelos genéricos

☐ Montajes

☐ Montajes de muro cortina

☐ Montajes de techo

☒ Walls

☐ Niveles

☐ Paneles de muro cortina

☐ Pilares

☐ Pilares estructurales

☐ Puertas

☐ Rampas

☐ Red de conductos de fabricación

☐ Refuerzo de área estructural

☐ Refuerzo estructural por camión

☐ Rejillas

☐ Rigidizadores estructurales

☐ Rociadores

☐ Sistemas de conductos

☐ Sistemas de mobiliario

☐ Sistemas de muro cortina

☐ Sistemas de tuberías

☐ Sistemas de vigas estructurales

☒ Floors

☐ Techos



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

8. Environmental information was completed for each BIM object.

Type properties

Family: System family: floor
Type: AC01 + LCA Outdoor flexible paving system of clay pavers. CA+AC

Type parameters

Parameter	Value
OmniClass Description	
UNSPSC Code	
General	
Brand url	http://www.hispalyt.es
Design country	Spain
Nominal height	
Manufacturer country	Spain
Manufacturer name	Asociación Hispalyt
Product family	Outdoor flooring
Product group	AC01
Weight Net (Kg)	
Nominal width	
Nominal height	
NominalHeight	
NominalWidth	
Weight Net (Kg)	
Nominal width	
Designed in	
Weight Net (Kg)	
Nominal height	
Weight Net (Kg)	
Nominal width	
Data	
HISP_Descripcion	Pavimento Exterior Flexible AC01 (CA-Act)
HISP_Espesor	0,08 (m)
HISP_BOPCEditionNumber	2
HISP_Clase_resbaladicidad	Suelo seguro
Others	
1. GWP (kg CO2 eq)/m2	34.683800
2. ODP (µg CFC-11 eq)/m2	0.018943
3. AP (kg SO2 eq)/m2	0.107068
4. EP (kg (PO4)3- eq)/m2	0.012990
5. POCP (kg etileno eq)/m2	0.007213
6. ADPE (µg Sb eq)/m2	566.286788
7. ADPF (MJ)/m2	461.175000
ORC BIMclay	https://bimclay.eu/oer/oer-direct-access/technical-documents/
Phases of the EPD	A1-A5; C2-C4
Source (link of the EPD)	https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_008_003_E
Youtube BIMclay	https://www.youtube.com/watch?v=2kEaDVAyIMo&list=PL_ozop



BIMclay RESULTS

BIM OBJECTS WITH REALISED ENVIRONMENTAL INFORMATION

9. Finally, in order to obtain the global environmental impact data of the project for the ceramic and fired clay products defined, a quantification table linked to these new project parameters was created:

<Wall planning table>								
A	B	C	D	E	F	G	H	I
Familia y tipo	Área	1. GWP (kg CO2 eq)	2. ODP (µg)	3. AP (kg)	4. EP (kg)	5. POCP (kg)	6. ADPE (µg)	7. ADPF (MJ)
Muro básico: FC23-P-bgf + LCA Double skin clay facing brick façade with v	5.20 m²	73.091429	0.037612	0.453128	0.045521	0.03419	534.532887	1573.800353
Muro básico: FC01-P-b + LCA Double skin clay facing brick façade. LPcv1	4.80 m²	67.469011	0.034718	0.418272	0.042019	0.03156	493.414973	1452.738787
Muro básico: FC25-B1 + LCA Single skin clay block façade with ventilated	5.60 m²	57.474116	10.886792	0.499509	0.041541	0.037733	25.261919	932.1704
Muro básico: Mosaic-30X30	6.40 m²	75.1936	0.3776	0.118765	0.019872	0.01056	165.05728	1009.216
Muro básico: PV03-bgf + LCA Silensis Type 2A internal party wall. ENL+L	6.80 m²	12.693859	0.011125	0.641934	0.052557	0.051646	10.626748	1938.123957



8.3 BIMstone

DEFINITION OF THE PROJECT

OBJECTIVES

CONSORTIUM AND IMPACT

INTELLECTUAL OUTPUTS

BIMstone PLUG-IN



Co-funded by the
Erasmus+ Programme
of the European Union



*"The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."*⁴⁹



DEFINITION OF THE PROJECT

BIM LEARNING APPLICATION FOCUSED ON LCA QUALIFICATION AND TECHNIFICATION OF WORKERS IN NATURAL STONE SECTOR

Coordinator: Deutscher Naturwerkstein-Verband E.V.

Call: Erasmus+ 2018. Strategic Partnerships for Vocational Education and Training (KA202)

Action: Cooperation for innovation and exchange of good practice

Referencia: 2018-1-DE02-KA202-005146

Start date: 01-09-2018

End date: 31-08-2020

Funded by: European Union



OBJECTIVES

The overall objective of the BIMstone project is to increase the competences of workers in the field of stone product placement, through the production and development of multimedia materials based on BIM and taking into account the challenges related to the life cycle assessment of stone products, to be used as training material for both vocational students and professionals in the sector, in order to give more merit to academic promotion.



CONSORTIUM AND IMPACT

Deutscher Naturwerkstein-Verband E.V (DNV). Germany www.natursteinverband.de



Colegio Oficial de Arquitectos de la Región de Murcia (COAMU). Spain
www.coamu.es



Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM) . Spain www.ctmarmol.es



Klesarska skola, Pučišća (KLESARSKA). Croatia www.ss-klesarska-pucisca.skole.hr



Asociatia Romania Green Building Council (RoGBC). Romania www.rogbc.org





INTELLECTUAL OUTPUTS

- O1. Establishment of common learning outcomes on stone-laying methods, Life Cycle Assessment and related regulations.
- O2. BIMstone multimedia materials. New interactive BIM learning methods.
- O3. BIMstone Open Educational Resource (OER).



INTELLECTUAL OUTPUTS

O1. Establishment of common learning outcomes on stone-laying methods, Life Cycle Assessment and related regulations.

O1/A1. Comparative study of the regulations for the laying of stone products.

O1/A2. Sustainable construction methods and procedures for the installation of stone products.

O1/A3. Comparative study on life cycle assessment (LCA) of stone products in the participating countries.

O1/A4. Report on the results of the First International Seminar in Murcia (Spain).

O1/A5. BIMstone course curriculum based on ecological challenges and BIM technologies.



INTELLECTUAL OUTPUTS

O2. BIMstone multimedia materials. New interactive BIM learning methods.

O2/A1. Computer production of BIMstone Multimedia Cards.

O2/A2. Interactive BIM tool.

O2/A3. Pedagogical test and implementation of software improvements of BIMstone Multimedia Cards.

O2/A4. Technical test and implementation of IT improvements of the BIMstone Multimedia Cards.

O2/A5. Report on the results of the Workshop in Bucharest (Romania) on new methods of interactive BIM-learning applied to the stone products sector.



INTELLECTUAL OUTPUTS

O3. BIMstone Open Educational Resource (OER).

O3/A1. Computer production of Open Education Resource.

O3/A2. Implementation of the BIMstone Pilot Course: environment testing and technical improvement.

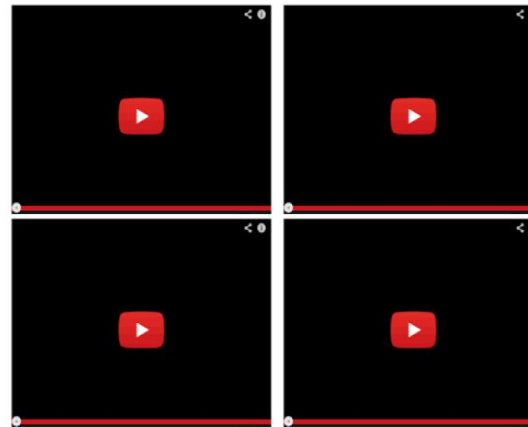
O3/A3. Report on the results of the International BIMstone Seminar in Würzburg (Germany).



INTELLECTUAL OUTPUTS

BIMstone MULTIMEDIA CARDS

They consist of 10 3D animations explaining the most sustainable construction processes used in natural stone works.



Co-funded by the
Erasmus+ Programme
of the European Union



This project has been funded with support from the European Commission.
This publication reflects the views only of the author, and the
Commission cannot be held responsible for any use which may be made of the information contained therein.





BIMstone PLUG-IN

A BIM-based Interactive Tool was developed in this project for the integration of the technical documentation developed in the project (execution manuals, 3D animations, DAP of the natural stone, etc.). This task was divided into two sub-tasks:

A. Production of BIMstone families in common BIM format.

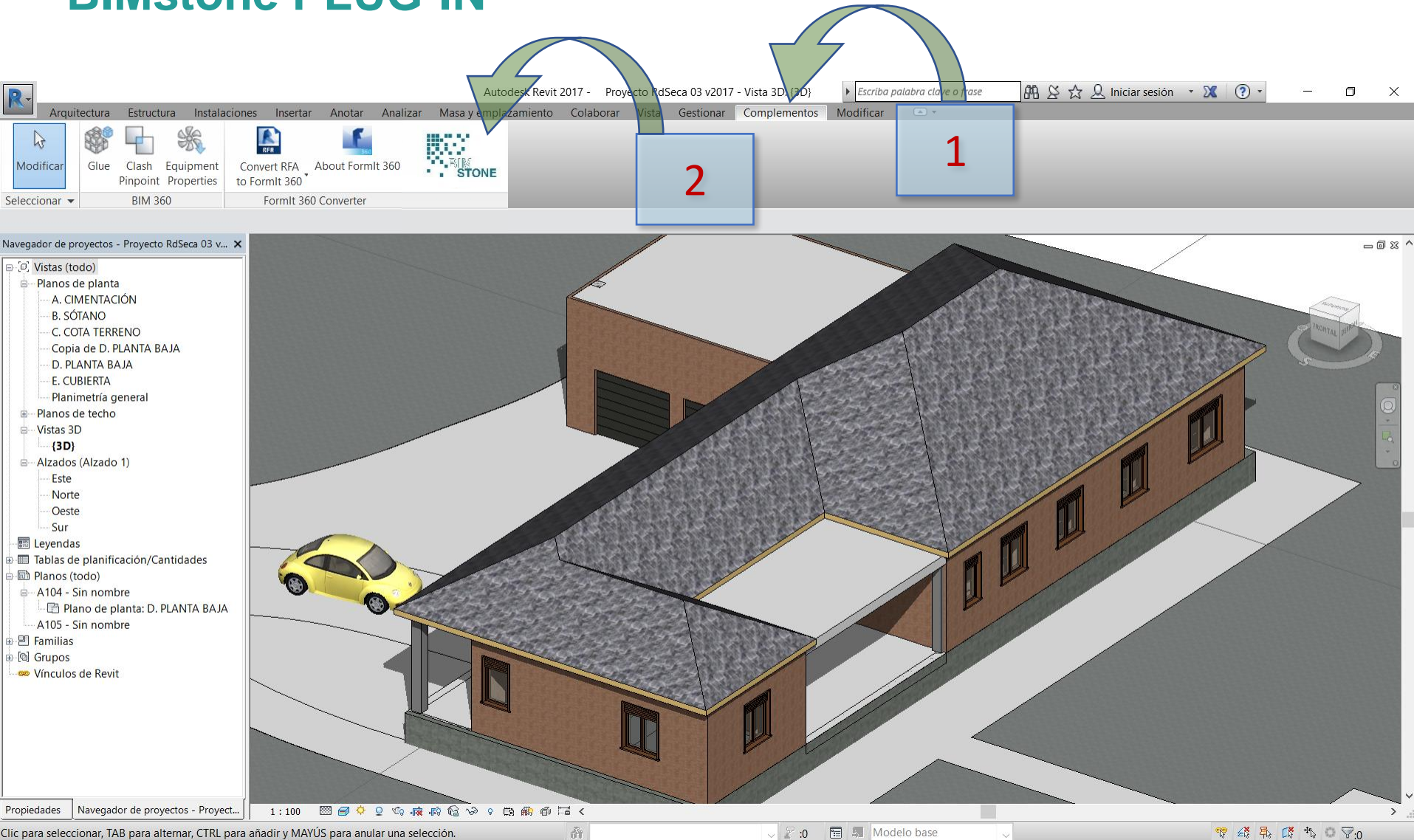
BIM objects were produced with the characteristics of the LCA of natural stone and sustainable construction methods, of the different construction materials selected in the project, i.e. of the most used construction elements, with direct links to the OER (Open Educational Resource) of the project for students, teachers and professionals of the sector.

B. Integration of the BIMstone training materials in a plug-in.

A plug-in for a professional BIM software was developed with the aim of linking the project's training materials with the most common tools in the educational and professional field. Therefore, both the "BIMstone families" and the "BIMstone Multimedia Cards" (3D animations of construction processes) were integrated into these plug-ins and interfaced with the project's OER.

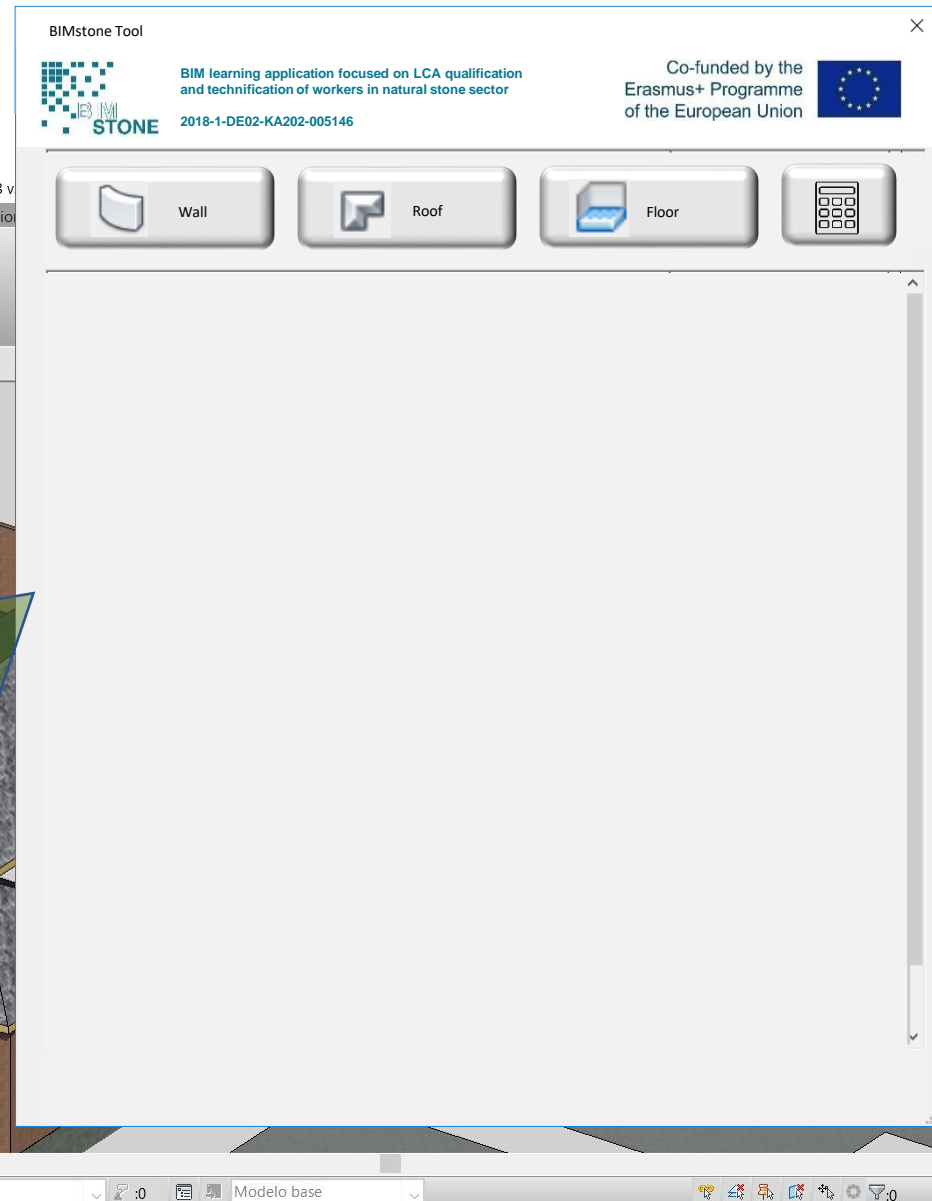
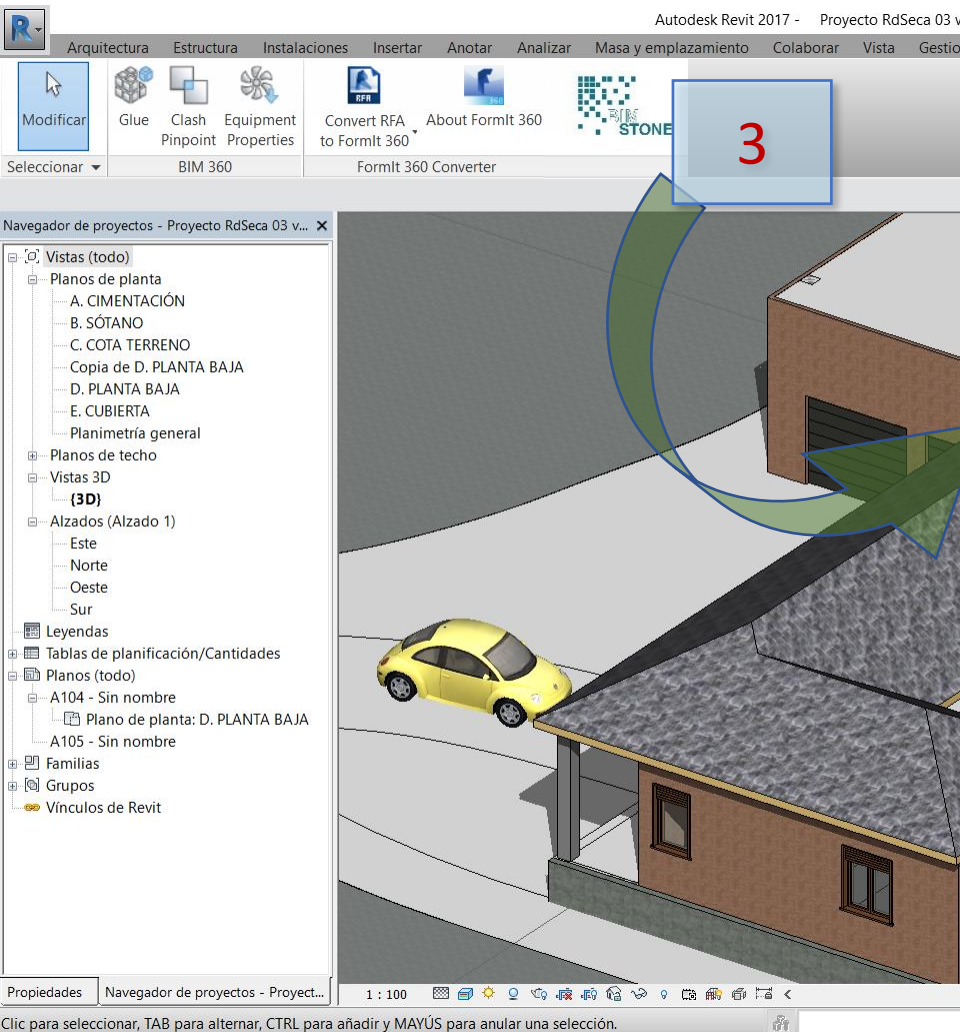


BIMstone PLUG-IN



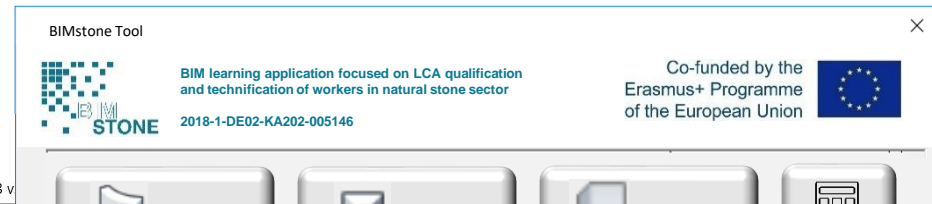


BIMstone PLUG-IN





BIMstone PLUG-IN



BIMstone tool



BIM learning application focused on LCA qualification
and technification of workers in natural stone sector

2018-1-DE02-KA202-005146

Co-funded by the
Erasmus+ Programme
of the European Union



Wall



Roof



Floor





BIMstone PLUG-IN

The screenshot shows the Autodesk Revit 2017 interface with the BIMStone Tool window open. The BIMStone Tool window is titled "BIMStone Tool" and contains the following text:

- BIM learning application focused on LCA qualification and technification of workers in natural stone sector
- 2018-1-DE02-KA202-005146
- Co-funded by the Erasmus+ Programme of the European Union

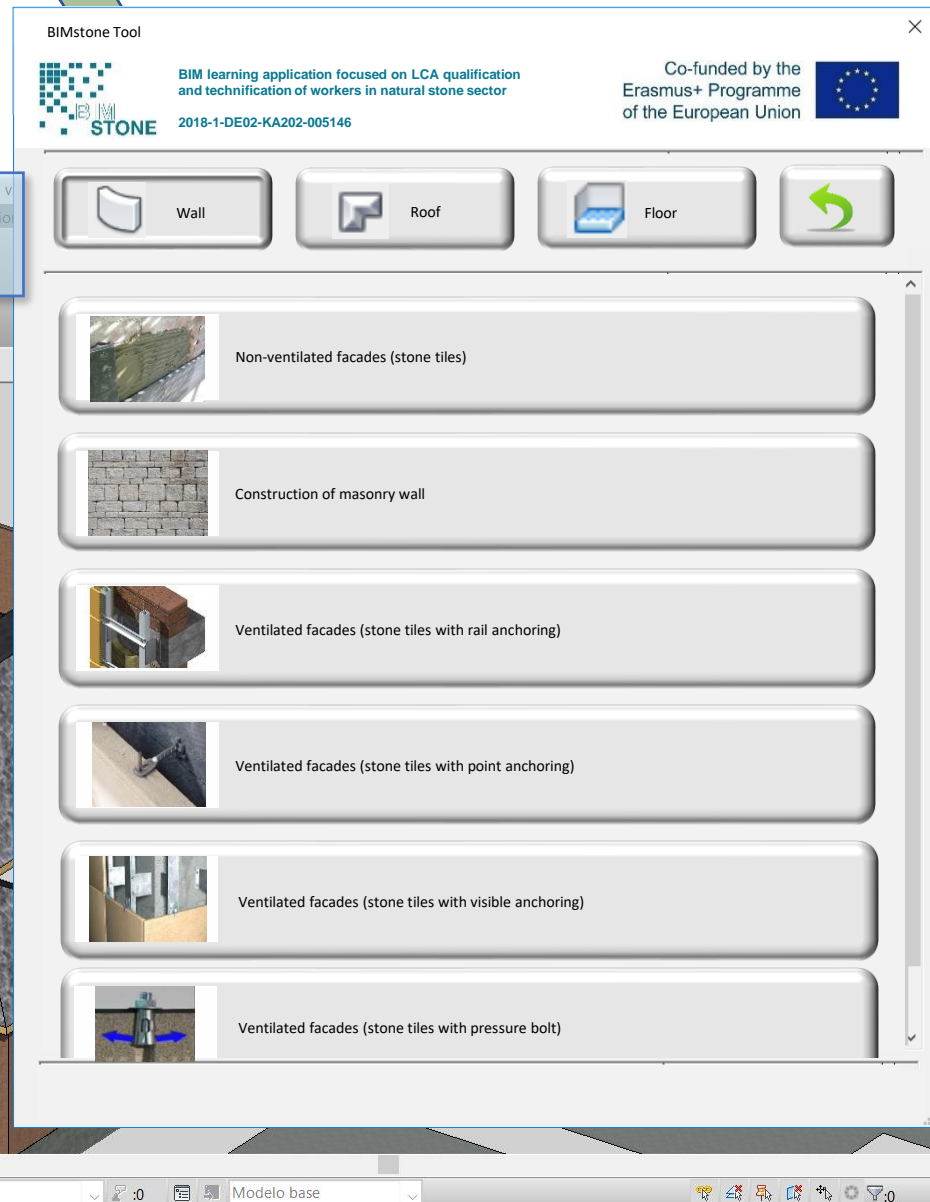
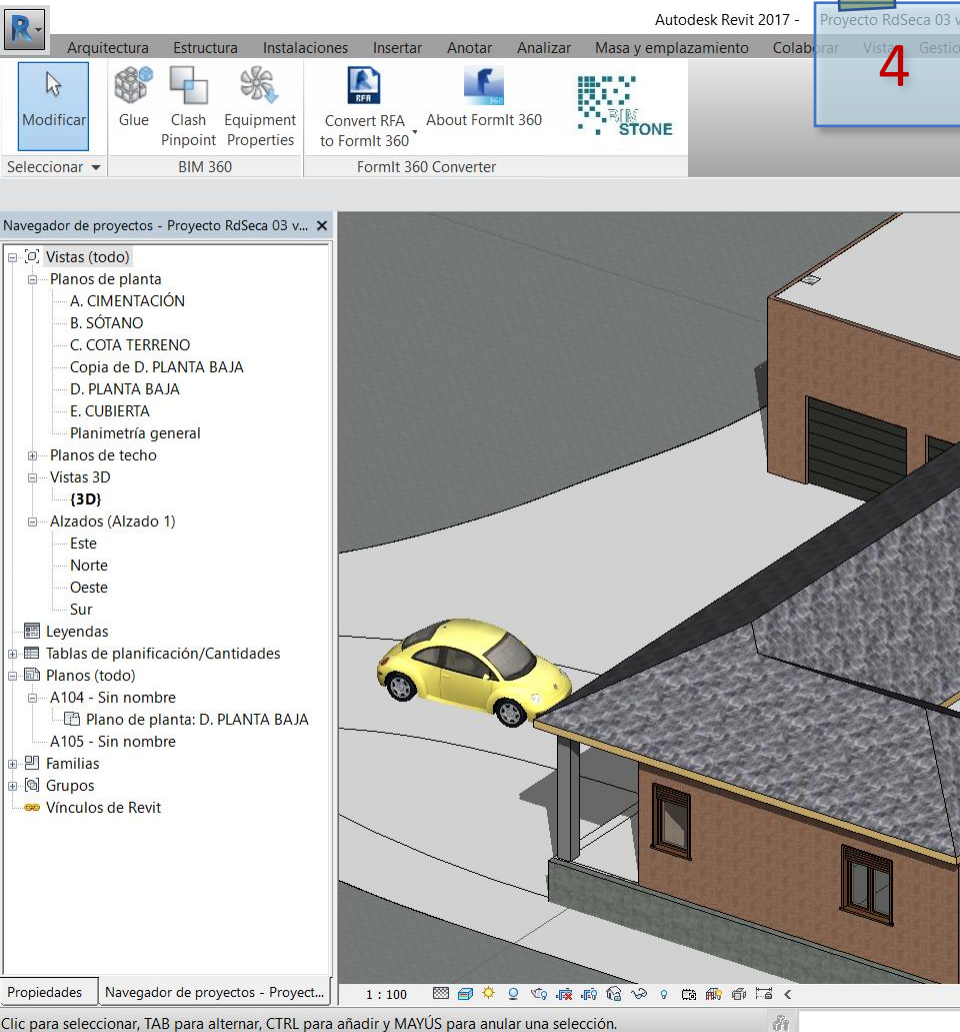
The Revit ribbon shows the "Vistas" button highlighted with a blue box containing the number "4". The BIMStone logo is also visible in the ribbon. The main view shows a 3D model of a building with a yellow car parked in front. The left sidebar shows the project browser with the following structure:

- Vistas (todo)
- Planos de planta
 - A. CIMENTACIÓN
 - B. SÓTANO
 - C. COTA TERRENO
 - Copia de D. PLANTA BAJA
 - D. PLANTA BAJA
 - E. CUBIERTA
 - Planimetría general
- Planos de techo
- Vistas 3D
 - (3D)
- Alzados (Alzado 1)
 - Este
 - Norte
 - Oeste
 - Sur
- Leyendas
- Tablas de planificación/Cantidades
- Planos (todo)
 - A104 - Sin nombre
 - Plano de planta: D. PLANTA BAJA
 - A105 - Sin nombre
- Familias
- Grupos
- Vínculos de Revit

The bottom status bar shows the scale "1 : 100" and the model name "Modelo base".

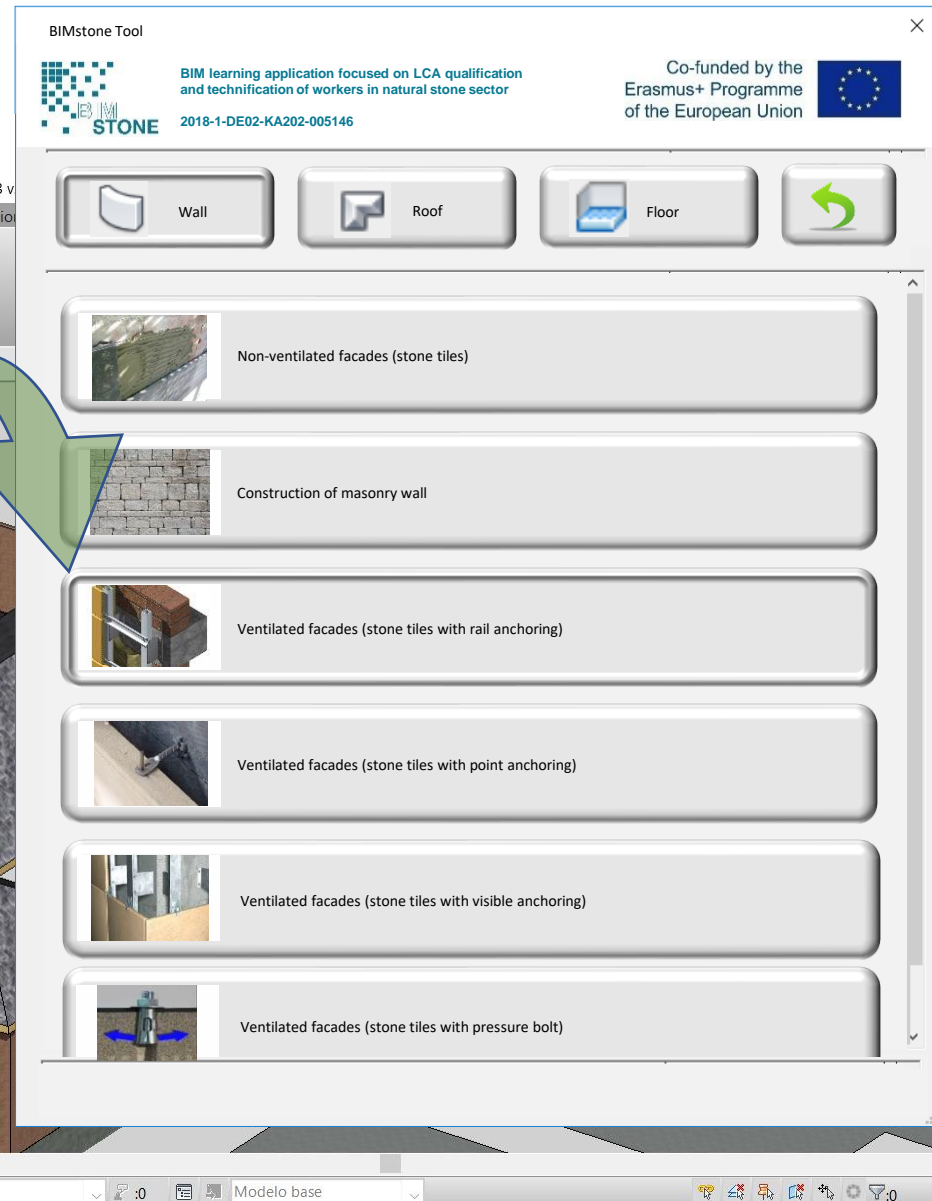
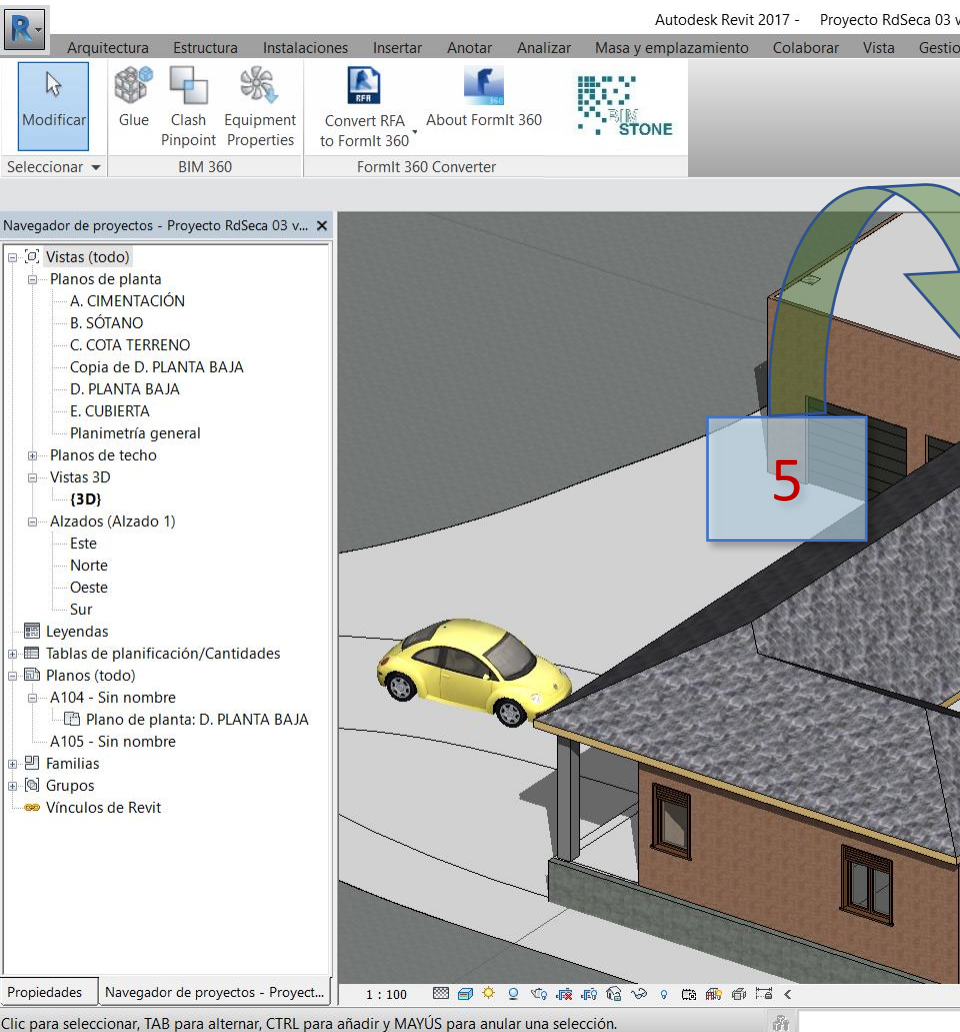


BIMstone PLUG-IN





BIMStone PLUG-IN





BIMStone Pl

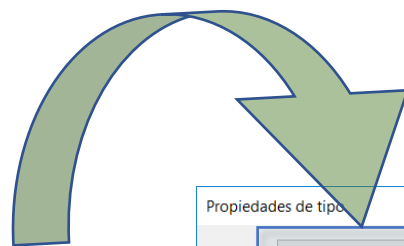
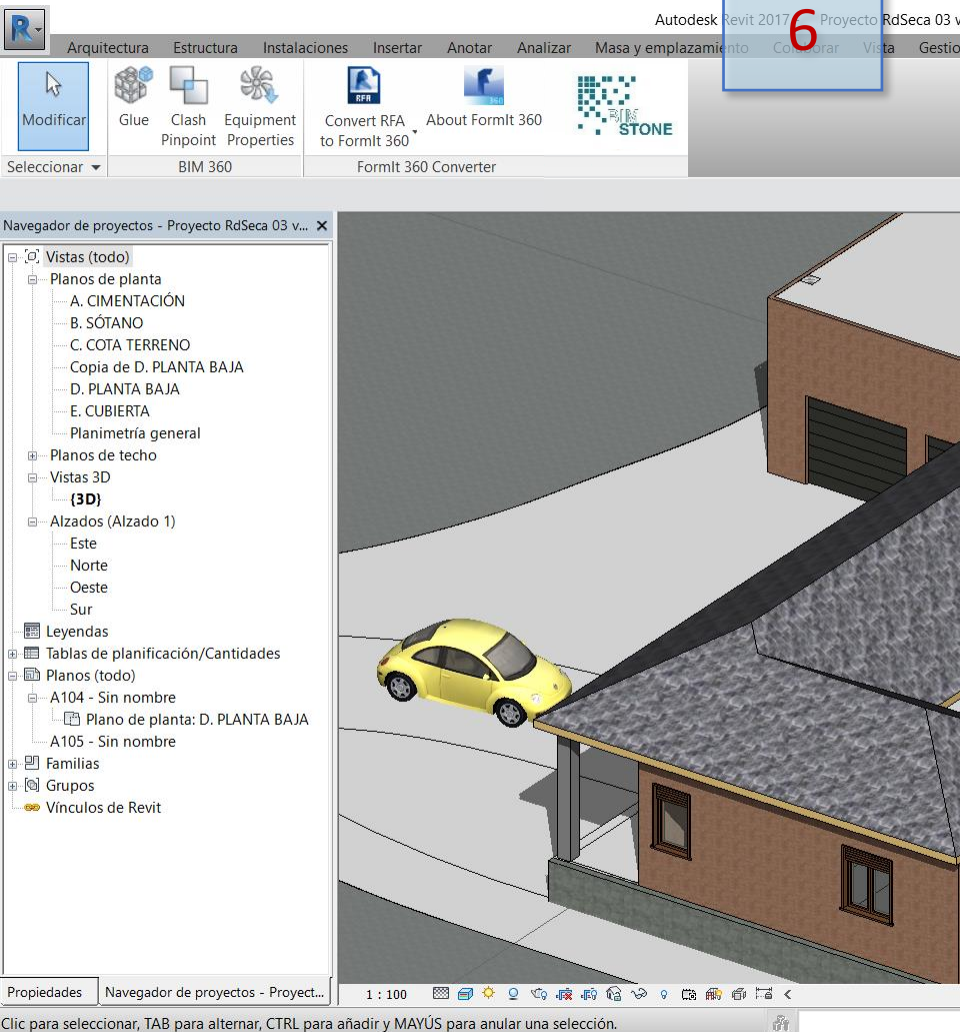
The screenshot displays the BIMStone software interface. On the left, the 'Navegador de proyectos' (Project Browser) shows a tree structure for 'Proyecto RdSeca 03 v...'. The tree includes 'Vistas (todo)', 'Planos de planta' (with sub-items A. CIMENTACIÓN, B. SÓTANO, C. COTA TERRENO, D. PLANTA BAJA, E. CUBIERTA, and Planimetría general), 'Planos de techo', 'Vistas 3D', '(3D)', 'Alzados (Alzado 1)' (with sub-items Este, Norte, Oeste, Sur), 'Leyendas', 'Tablas de planificación/Cantidades', 'Planos (todo)', 'A104 - Sin nombre', 'Plano de planta: D. PLANTA BAJA', 'A105 - Sin nombre', 'Familias', 'Grupos', and 'Vínculos de Revit'. The main area shows a 3D model of a building facade with a yellow car parked in front. On the right, a panel titled 'BIMStone Pl' lists five facade options, each with a thumbnail image and a description:

- Wall
- Roof
- Floor
- Non-ventilated facades (stone tiles)
- Construction of masonry wall
- Ventilated facades (stone tiles with rail anchoring)
- Ventilated facades (stone tiles with point anchoring)

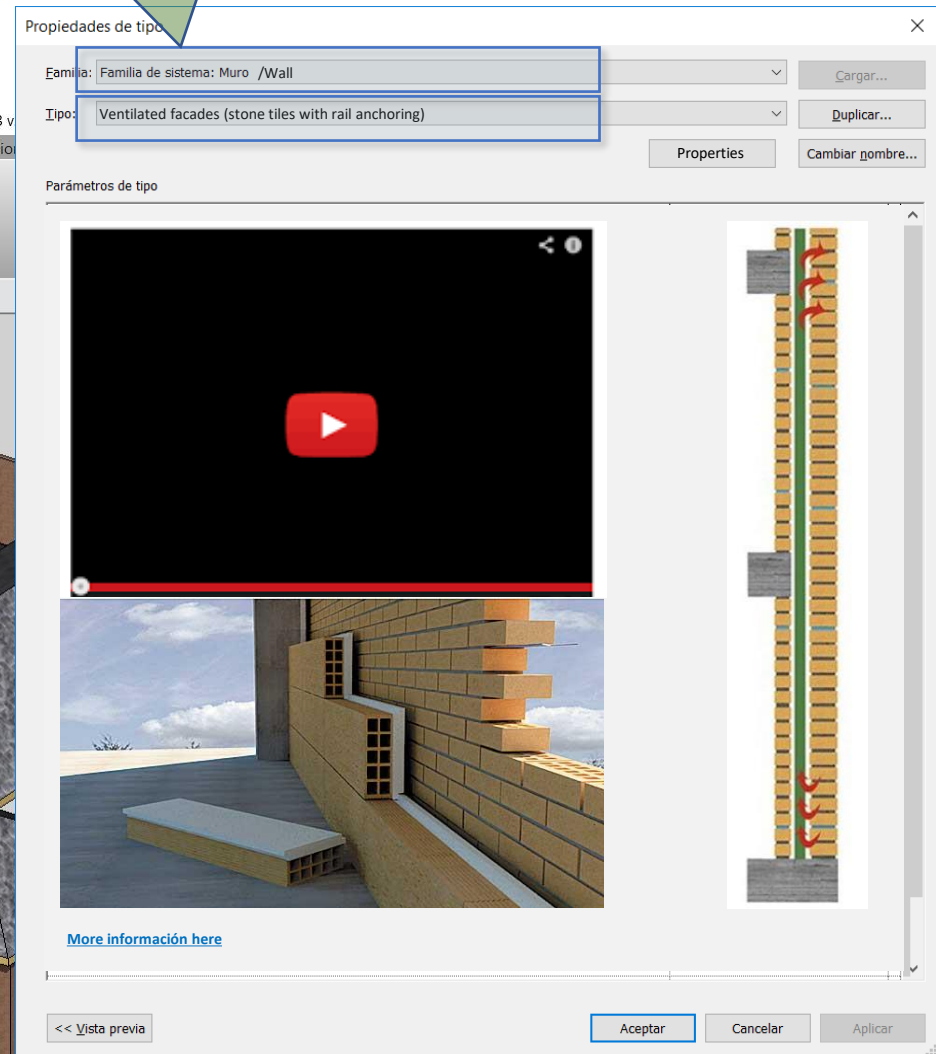
The bottom status bar indicates '1 : 100' and 'Modelo base'.



BIMstone PLUG-IN



6





BIMStone PLUG-IN

The image displays the BIMStone website and its integration with Autodesk Revit. The website, titled "BIMStone", features a navigation bar with links: HOME, PROJECT, REPORTS, ORC, PRODUCTS, PRESS AND EVENTS, and CONTACTS. The main content area includes a header image, a paragraph stating "Here, you can access all the information collected during and beyond the end of the project.", and two buttons: "DIRECT ACCESS" and "PRIVATE AREA". An "INFO" section lists "Documents" and "Reports". The footer includes the Erasmus+ logo and the text "Erasmus+".

The Revit interface shows a 3D model of a building with a yellow car. A red number "7" is overlaid on the roof. A green arrow points from the website's "DIRECT ACCESS" button to the Revit model, indicating the flow of information. A text box on the Revit model states: "DIRECTLY TO THE INFORMATION HOSTED IN THE OER OF THE WEBSITE (p.e., technical documents in pdf, other videos, etc.)".

The "Propiedades de tipo" (Type Properties) dialog box is open, showing the family "Familia de sistema: Muro /Wall" and the type "Ventilated facades (stone tiles with rail anchoring)". The "Parámetros de tipo" (Type Parameters) section includes a video player with a red play button and a vertical cross-section diagram of the wall system. A blue box with the text "More información here" is positioned below the video player. The dialog box has buttons for "Aceptar" (Accept), "Cancelar" (Cancel), and "Aplicar" (Apply).



BIMstone PLUG-IN

8

Autodesk Revit 2017 - Proyecto RdSeca 03 v...

Arquitectura Estructura Instalaciones Insertar Anotar Analizar Masa y emplazamiento Colaborar Vista Gestión

Modificar Glue Clash Equipment Pinpoint Properties Convert RFA to FormIt 360 About FormIt 360 BIMSTONE

3D animation to visualise directly to link to BIMstone's Youtube channel.

Navegador de proyectos - Proyecto RdSeca 03 v...

- Vistas (todo)
- Planos de planta
 - A. CIMENTACIÓN
 - B. SÓTANO
 - C. COTA TERRENO
 - Copia de D. PLANTA BAJA
 - D. PLANTA BAJA
 - E. CUBIERTA
 - Planimetría general
- Planos de techo
- Vistas 3D
 - (3D)
- Alzados (Alzado 1)
 - Este
 - Norte
 - Oeste
 - Sur
- Legendas
- Tablas de planificación/Cantidades
- Planos (todo)
 - A104 - Sin nombre
 - Plano de planta: D. PLANTA BAJA
 - A105 - Sin nombre
- Familias
- Grupos
- Vínculos de Revit

Propiedades de tipo

Familia: Familia de sistemas Muro /Wall

Tipo: Ventilated facades (stone tiles with rail anchoring)

Parámetros de tipo

3D animation to visualise directly to link to BIMstone's Youtube channel.

More información here

<< Vista previa

Aceptar Cancelar Aplicar

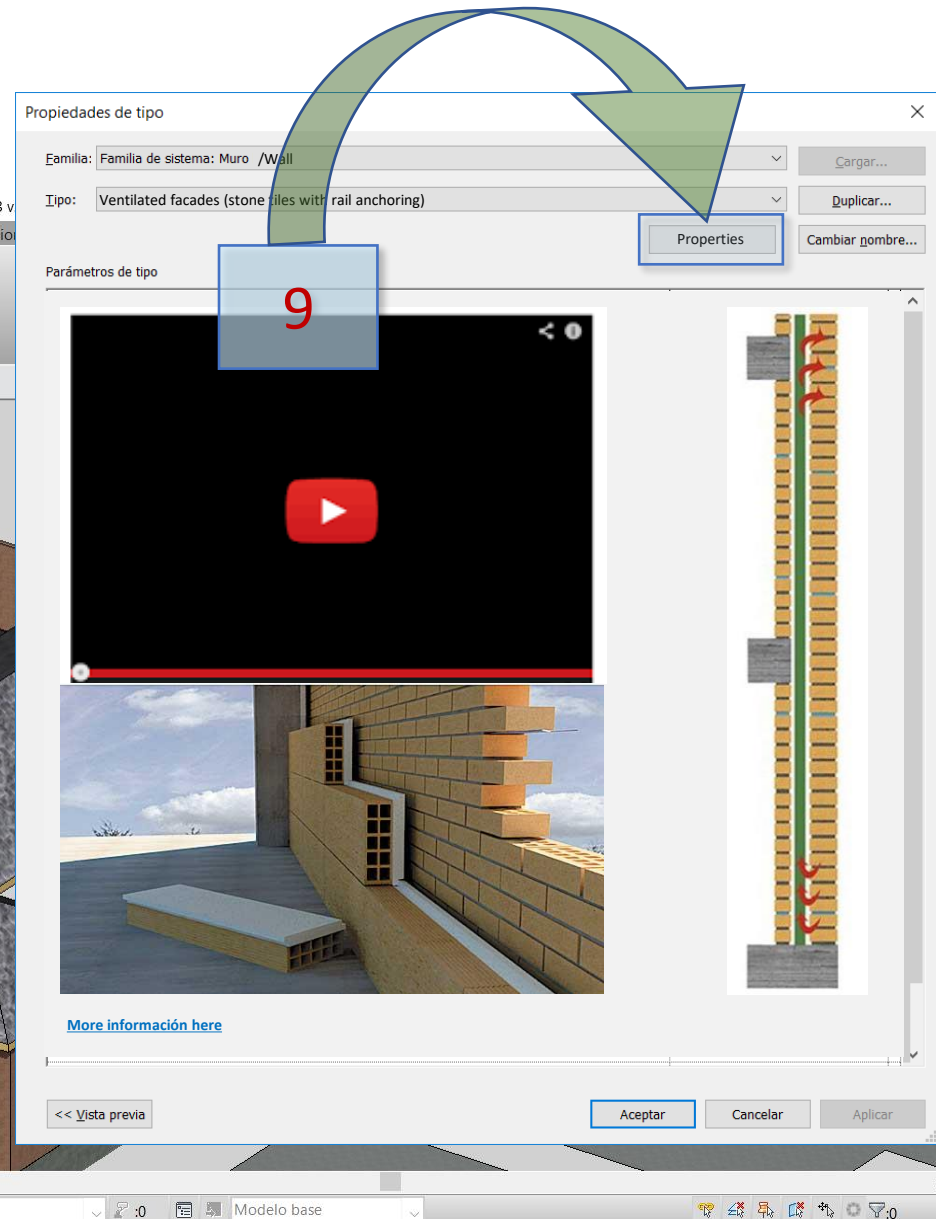
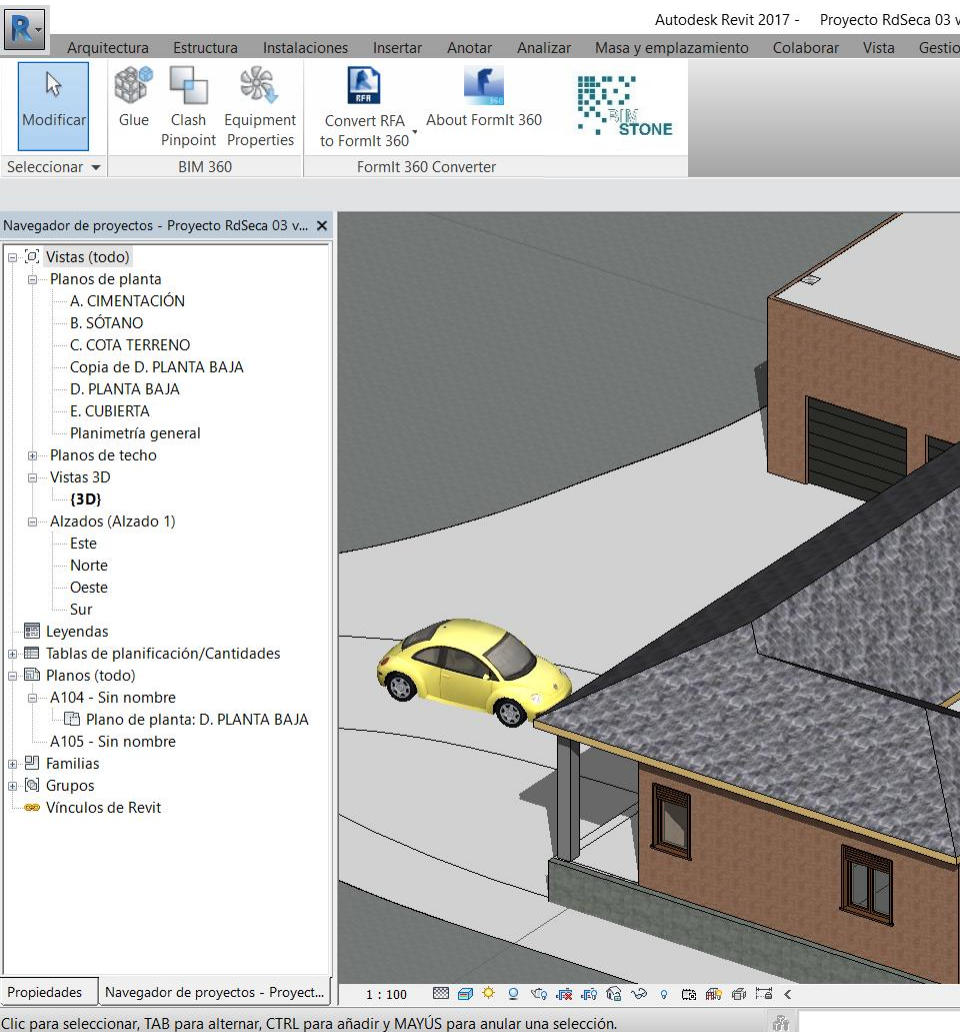
1 : 100

Clic para seleccionar, TAB para alternar, CTRL para añadir y MAYÚS para anular una selección.

Modelo base



BIMStone PLUG-IN





BIMStone PLUG-IN

Analytical properties

Heat transfer coefficient (U)	0.8333 W/(m ² ·K)
Thermal resistance (R)	1.2000 (m ² ·K)/W
Termic mass	0.00 kJ/K
Absorbance	0.700000
Roughness	3

ENVIRONMENTAL IMPACT OF NATURAL STONE ELEMENTS

GWP Global Warming Potential (Phase A to Phase D)	NUMBER kg CO2 eq
ODP Stratospheric Ozone Depletion Potential (Phase A to Phase D)	NUMBER kg CFC-11 eq
AP Acidification potential of soil and water resources (Phase A to Phase D)	NUMBER kg SO2 eq
EP Eutrophication Potential (Phase A to Phase D)	NUMBER kg (PO4)3- eq
POCP Tropospheric Ozone Formation Potential (Phase A to Phase D)	NUMBER kg etileno eq
ADPE Depletion potential (...) non-fossil resources (elements) (Phase A to F.D)	NUMBER kg Sb eq
ADPF Depletion potential (...) fossil resources (fossil fuels) (F.A to F.D)	NUMBER MJ

Identity data

Type image	
Key note	CODE
Model	
Manufacturer	
Comments of type	
URL	www.bimstoneproject.eu/ EXAMPLE

<< Preview

Accept

Cancel

Apply

Aceptar

Cancelar

Aplicar

Properties

Cargar...

Duplicar...

Cambiar nombre...





BIMStone PLUG-IN

Analytical properties

Heat transfer coefficient (U)	0.8333 W/(m ² ·K)
Thermal resistance (R)	1.2000 (m ² ·K)/W
Thermic mass	0.00 kJ/K
Absorbance	0.700000
Roughness	3

ENVIRONMENTAL IMPACT OF NATURAL STONE ELEMENTS

GWP Global Warming Potential (Phase A to Phase D)	NUMBER kg CO2 eq
ODP Stratospheric Ozone Depletion Potential (Phase A to Phase D)	NUMBER kg CFC-11 eq
AP Acidification potential of soil and water resources (Phase A to Phase D)	NUMBER kg SO2 eq
EP Eutrophication Potential (Phase A to Phase D)	NUMBER kg (PO4)3- eq
POCP Tropospheric Ozone Formation Potential (Phase A to Phase D)	NUMBER kg etileno eq
ADPE Depletion potential (...) non-fossil resources (elements) (Phase A to F.D)	NUMBER kg Sb eq
ADPF Depletion potential (...) fossil resources (fossil fuels) (F.A to F.D)	NUMBER MJ

Identity data

Type image	
Key note	CODE
Model	
Manufacturer	
Comments of type	
URL	www.bimstoneproject.eu/ EXAMPLE

<< Preview

Accept

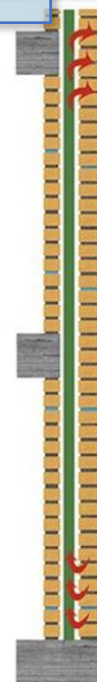
Cancel

Apply

Aceptar

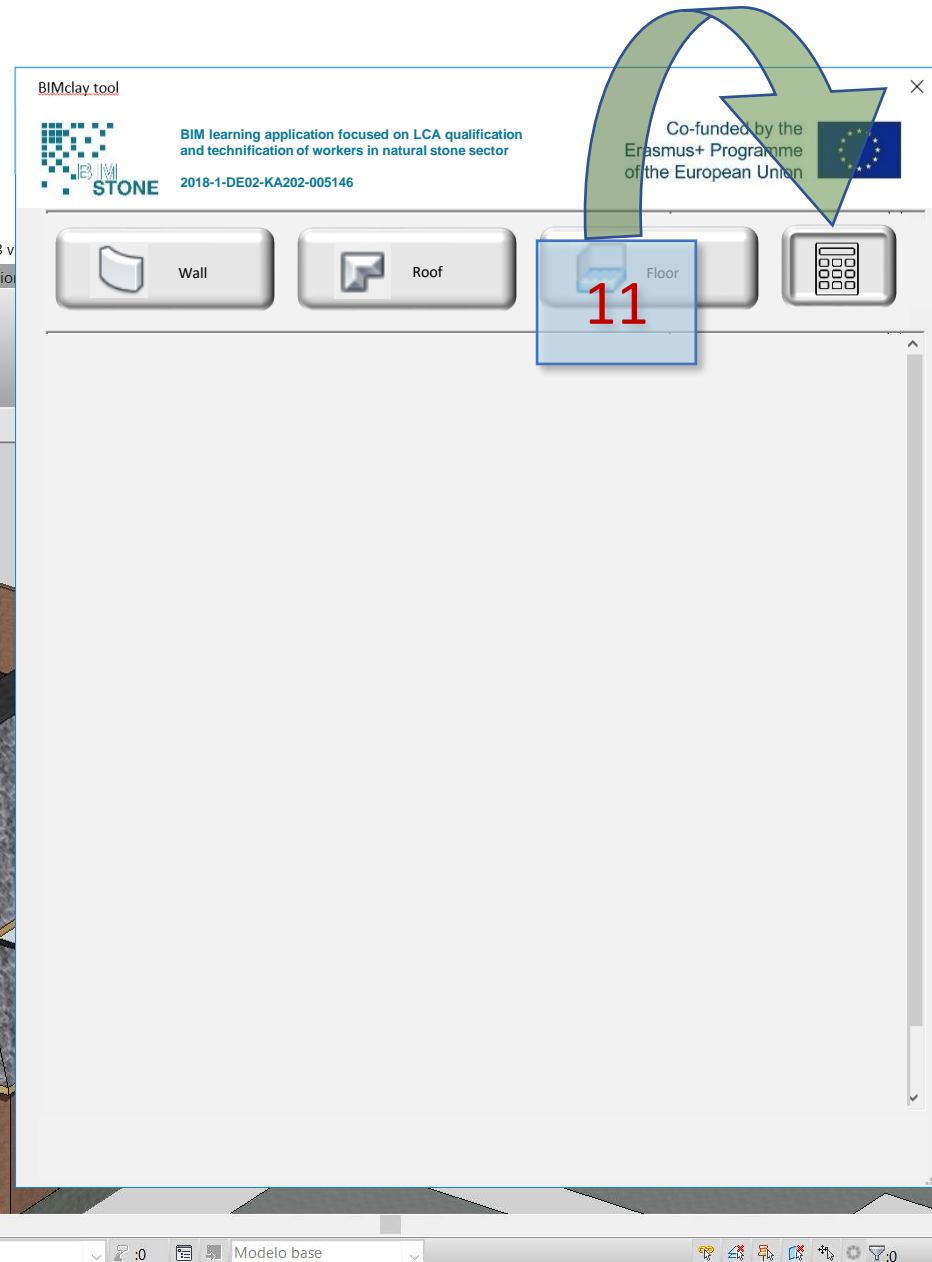
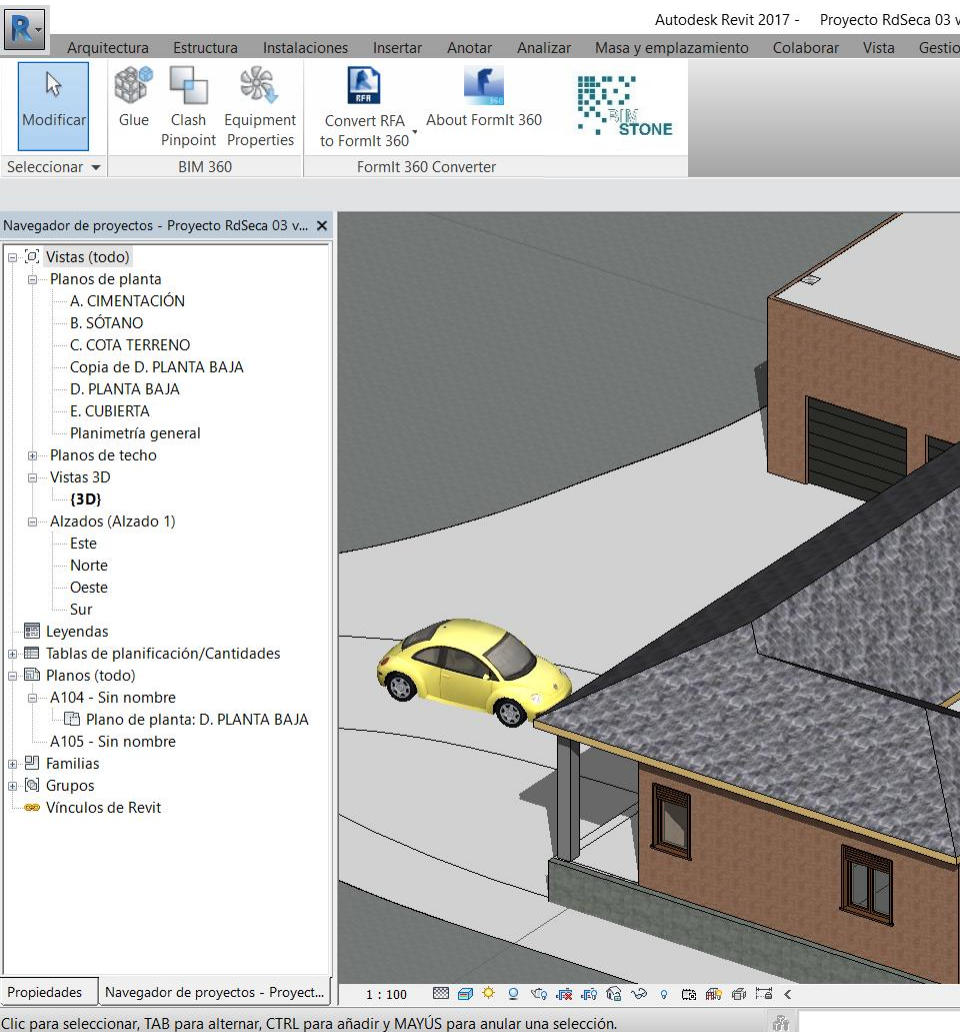
Cancelar

Aplicar

Properties
10



BIMstone PLUG-IN



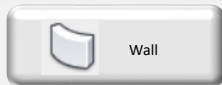


BIMStone Tool

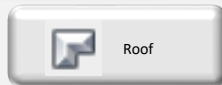


BIM learning application focused on LCA qualification
and technification of workers in natural stone sector
2018-1-DE02-KA202-005146

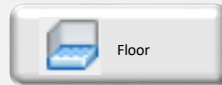
Co-funded by the
Erasmus+ Programme
of the European Union



Wall



Roof



Floor



BIM OBJECTS USED IN THE PROJECT*

FAMILY	NAME	L* m	H* m	M* kg	**Conversion factor to m2	m2 IN THE PROJECT	GWP	ODP	AP	EP	POCP	ADPE	ADPF	MF
Wall	Ventilated facades (stone tiles with rail anchoring). A-D Phases													
	Stone tiles (wall)	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	
	Rail anchoring	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
Floor	Flooring. Stone tiles. A-D Phases (Another EXAMPLE)													
	Stone tiles (floor)	***	***	***	***	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	
	TOTAL A-D Phases						Σ GWP	Σ ODP	Σ AP	Σ EP	Σ POCP	Σ ADPE	Σ ADPF	

*L: Dimension of the length of the piece in metres; H: dimension of the height of the piece in metres; M: mass of the piece in kg.

** Formula of the Conversion factor in the following EPD:

Información EPD Stone tiles on walls: [link to AENOR or ECOplatform](#)

Información EPD Stone tiles on floors: [link to AENOR or ECOplatform](#)

...others links of EPDs...

** It is not necessary for the calculation

***Estimation for 50 years

EXPORT DATA IN EXCEL OR PDF



BIMStone Tool

BIM learning application focused on LCA qualification and technification of workers in natural stone sector
2018-1-DE02-KA202-005146

Co-funded by the Erasmus+ Programme of the European Union

12

Wall Roof Floor Calculator

BIM OBJECTS USED IN THE PROJECT*

FAMILY	NAME	L* m	H* m	M* kg	**Conversion factor to m2	m2 IN THE PROJECT	GWP	ODP	AP	EP	POCP	ADPE	ADPF	MFR
Wall	Ventilated facades (stone tiles with rail anchoring). A-D Phases													
	Stone tiles (wall)	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
	Rail anchoring	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
Floor	Flooring. Stone tiles. A-D Phases (Another EXAMPLE)													
	Stone tiles (floor)	***	***	***	***	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
	TOTAL A-D Phases						Σ GWP	Σ ODP	Σ AP	Σ EP	Σ POCP	Σ ADPE	Σ ADPF	Σ MFR

*L: Dimension of the length of the piece in metres; H: dimension of the height of the piece in metres; M: mass of the piece in kg.
 ** Formula of the Conversion factor in the following EPD:
 Información EPD Stone tiles on walls: [link to AENOR or ECOplatform](#)
 Información EPD Stone tiles on floors: [link to AENOR or ECOplatform](#)

...others links of EPDs...

** It is not necessary for the calculation
 ***Estimation for 50 years

EXPORT DATA IN EXCEL OR PDF



BIMStone Tool



BIM learning application focused on LCA qualification
and technification of workers in natural stone sector
2018-1-DE02-KA202-005146

12

Co-funded by the
Erasmus+ Programme
of the European Union



BIM OBJECTS USED IN THE PROJECT*

NAME	L* m	H* m	M* kg	**Conversion factor to m2	m2 IN THE PROJECT	GWP	ODP
Ventilated facades (stone tiles with rail anchoring). A-D							
Phases							
Stone tiles (wall)	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2
Rail anchoring	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2
Flooring. Stone tiles. A-D Phases (Another EXAMPLE)							
Stone tiles (floor)	***	***	***	***	m2 drawn in the project	GWP/m2	ODP/m2
TOTAL. A-D Phases						Σ GWP	Σ ODP

*L: Dimension of the length of the piece in metres; H: dimension of the height of the piece in metres; M: mass of the piece in kg.

** Formula of the Conversion factor in the following EPD:

Información EPD Stone tiles on walls: [link to AENOR or ECOplatform](#)

Información EPD Stone tiles on floors: [link to AENOR or ECOplatform](#)

...others links of EPDs...



BIMstone PLUG-IN

BIMstone Tool

BIM learning application focused on LCA qualification and technification of workers in natural stone sector
2018-1-DE02-KA202-005146

Co-funded by the Erasmus+ Programme of the European Union

Wall
 Roof
 Floor

BIM OBJECTS USED IN THE PROJECT*

FAMILY	NAME	L* m	H* m	M* kg	**Conversion factor to m2	m2 IN THE PROJECT	GWP	ODP	AP	EP	POCP	ADPE	ADPF	MFR
Wall	Ventilated facades (stone tiles with rail anchoring). A-D Phases													
	Stone tiles (wall)	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
	Rail anchoring	m	m	kg	Result of the formula**	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
Floor	Flooring. Stone tiles. A-D Phases (Another EXAMPLE)													
	Stone tiles (floor)	***	***	***	***	m2 drawn in the project	GWP/m2	ODP/m2	AP/m2	EP/m2	POCP/m2	ADPE/m2	ADPF/m2	MFR/m2
	TOTAL. A-D Phases						Σ GWP	Σ ODP	Σ AP	Σ EP	Σ POCP	Σ ADPE	Σ ADPF	Σ MFR

*L: Dimension of the length of the piece in metres; H: dimension of the height of the piece in metres; M: mass of the piece in kg.
 ** Formula of the Conversion factor in the following EPD:
 Información EPD Stone tiles on walls: [link to AENOR or ECOplatform](#)
 Información EPD Stone tiles on floors: [link to AENOR or ECOplatform](#)

...others links of EPDs...

** It is not necessary for the calculation
 *** Estimation for 50 years

EXPORT DATA IN EXCEL OR PDF



BIMstone OER

An Open Educational Resource (OER) was designed and produced to support the implementation of the BIMstone Pilot Courses and the BIMstone Multimedia Cards produced.

It was made freely available on the project website to be used as didactic support material in the numerous architecture, construction and heritage courses distributed in the stone products sector.



BIMstone OER

OER



In this open-access platform, you can access all the information collected during and beyond the end of the project. The platform provides more information for self-learning educational.

[DIRECT ACCESS](#)

[PRIVATE AREA](#)





SOURCES

Alonso-Madrid, J. (2015), "Nivel de desarrollo LOD. Definiciones, innovaciones y adaptación a España", *Building Smart*. https://www.researchgate.net/figure/Figura-24-Evolucion-de-Niveles-de-Desarrollo-Fuente-propia_fig17_283570424

Caparrós Pérez, D. (2017), "Viabilidad para generar territorios sostenibles. Aplicación ecoeficiente de materiales y sistemas constructivos en los desarrollos y rehabilitaciones urbanísticos", UCAM. <http://repositorio.ucam.edu/bitstream/handle/10952/2436/Tesis.pdf?sequence=1&isAllowed=y>

CYPE. Arquímedes. <http://arquimedes.cype.es/>

CYPE. Generador de precios. <http://generadorprecios.cype.es/>

Elodie BIM. https://bimserver.center/es/store/156/elodie_by_cype

Norma EN-ISO 14040. Gestión ambiental. Análisis del ciclo de vida. Principios y marco de referencia. <https://envira.es/es/iso-14040-principios-relacionados-gestion-ambiental/>

Norma UNE-EN 15804:2008 Sustainability of construction Works – Environmental product declarations – Core rules for the Product Category of Construction Products. <https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma?c=N0052571>

Norma UNE-EN 15978:2012. Definición y exposición de las fases de un ACV aplicado al edificio. <https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma/?c=N0049397>

Website del proyecto BIMclay. www.bimclay.eu/

Website del proyecto BIMstone. <http://www.bimstoneproject.eu/>

