



# Building Information Modelling

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**KNAUF**INSULATION



What do these projects have in common?

Berlin Brandenburg airport



6x overbudget  
6 years late

Apple's new HQ



\$ 2bil over budget  
2 years late

Sydney Opera House



15x over budget  
10 years late

Philharmonic concert hall

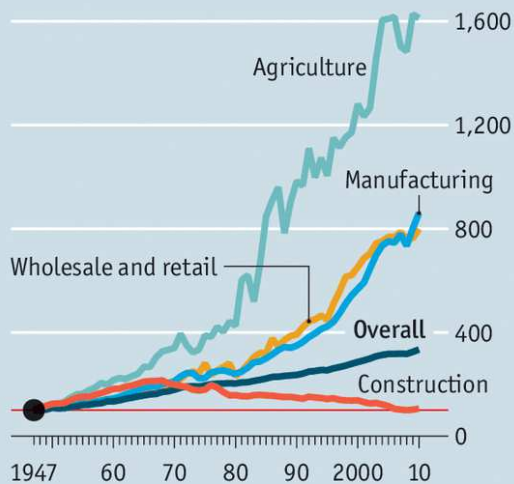


10x over budget  
7 years late

## Poor planning - Poor productivity

### Unlearning by doing

United States, gross value-added\*  
Per hour worked, 1947=100



Source: McKinsey Global Institute \*At constant prices

Economist.com

### Construction failed to consolidate

- In Europe 3.3m workers with an average of just 4 workers
- Designs of most projects differ

### Same errors are repeated over and over

- A builder from 1960s would find little has changed on building sites today

### Construction is becoming more capital intensive

- Labor cost is increasing and people are substituted by machine

### The result is increased prices for clients

- Industry ignores tools that might improve productivity

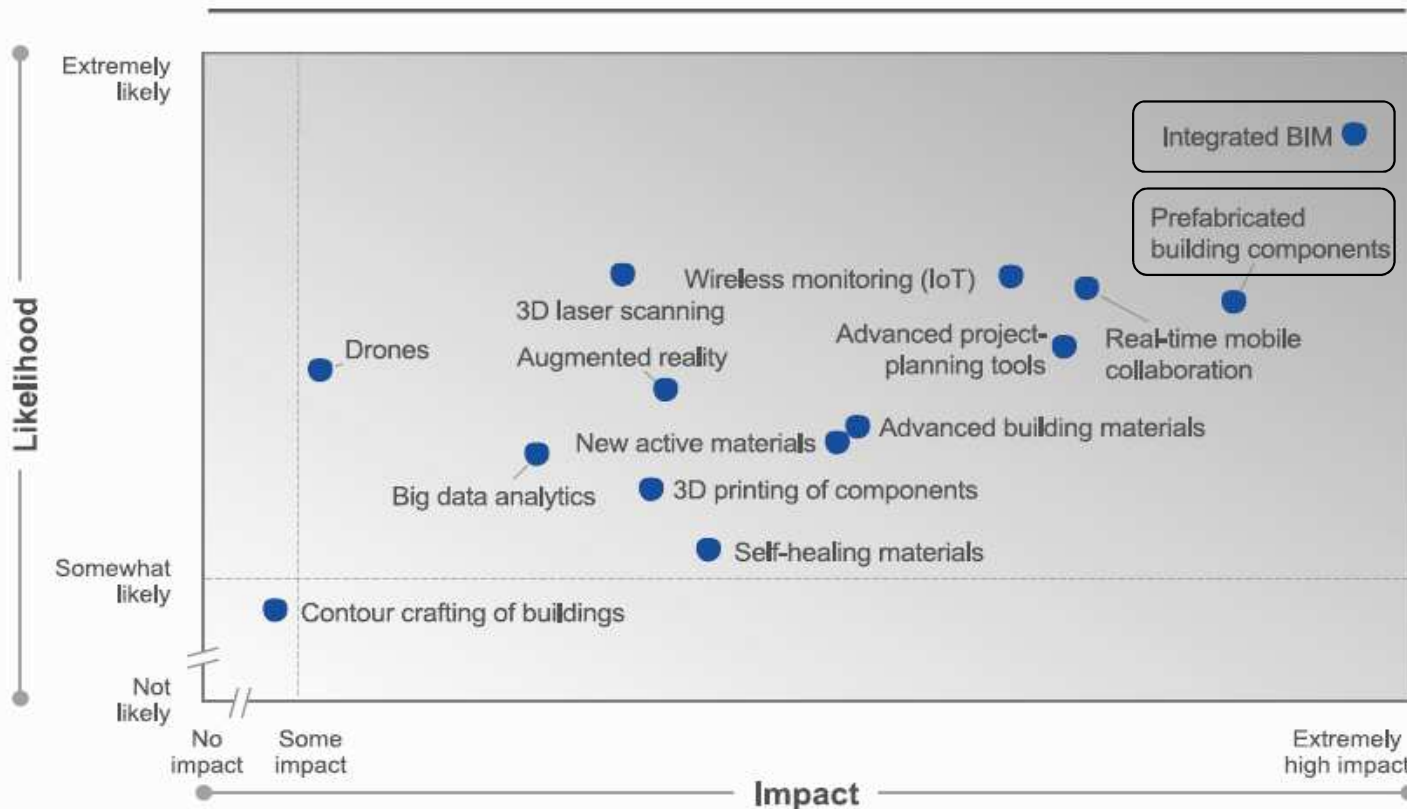


Even if it seems the same, every house is different



**BIM is here to stay!**

**Impact-likelihood matrix of new technologies**



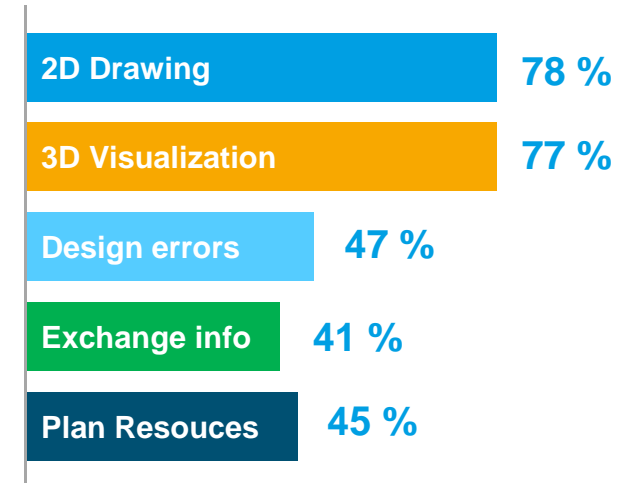
**Construction productivity gain is centered on BIM by:**

- Integrating 3D model with
- Project management and
- Visualization

# How Architects see it

<p><b>Time &amp; complexity</b> is the biggest limitation why not use BIM But Manufactures can help</p>	<p><b>Exchangeability Collaborative working Efficiency</b> Are the success factors of BIM</p>	<p>45% or turnover coming from BIM projects</p>
<p>Architects using BIM collaborate most with <b>construction &amp; installation companies</b></p>	<p>Architects believe that manufactures play important role in the integration of BIM in projects</p>	<p>Reasons to start BIM <b>Future expectations</b> <b>Forced by market</b> <b>Better own business process</b></p>

## Features Used



BIM user 2017	38	21	37	26	16	63	31	22
BIM user 2015	35	15	20	20	13	56	12	16

# Better construction planning for better project delivery

## Traditional vs. BIM

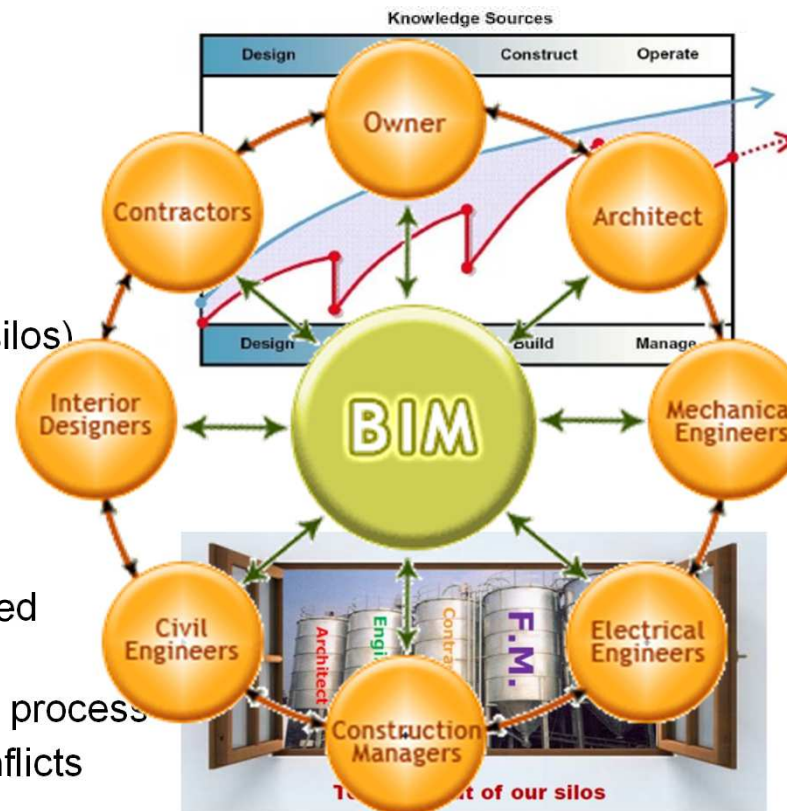
### Planning is the issue

- Too many uncertainties
- Each and every building is different
- Lack of interoperability (working in silos)

### Building information modelling

### Solution is information sharing

- Access to all the information included in the BIM model
- Virtual schedule of the construction process
- Anticipating and fixing potential conflicts

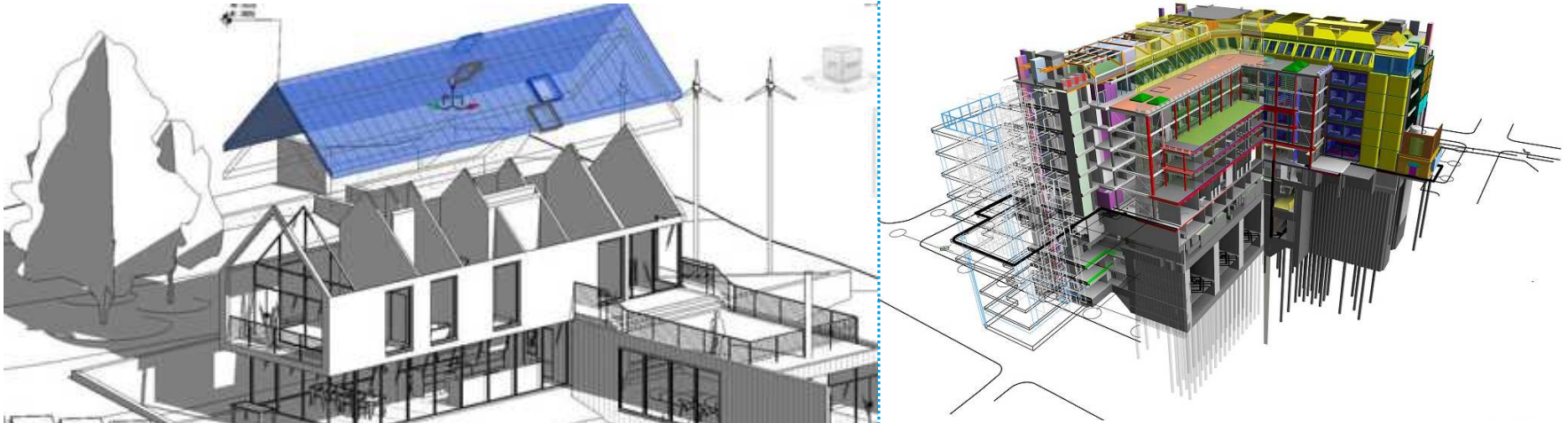


Traditional construction process results in loss of data

BIM enables working together from a shared project model that has the latest developed information

By silo breaking, 15% - 20% productivity gain can be achieved.

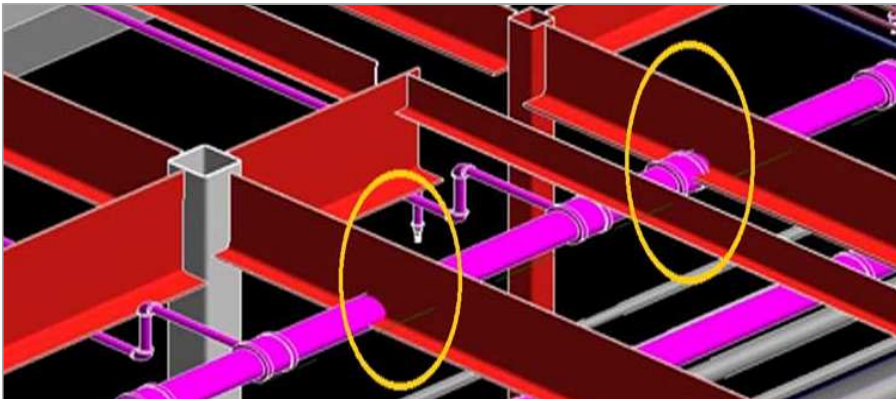
BIM is useful for small projects, but it's invaluable for handling the complexity of large buildings.



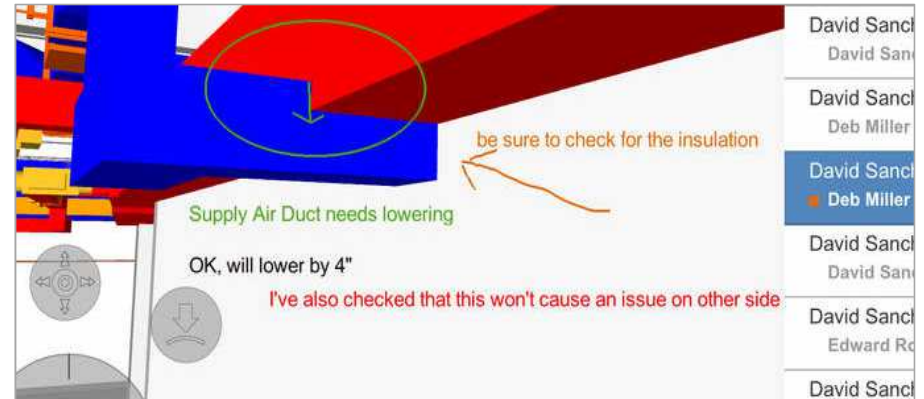


# Example of information exchange

Early detection of expensive errors

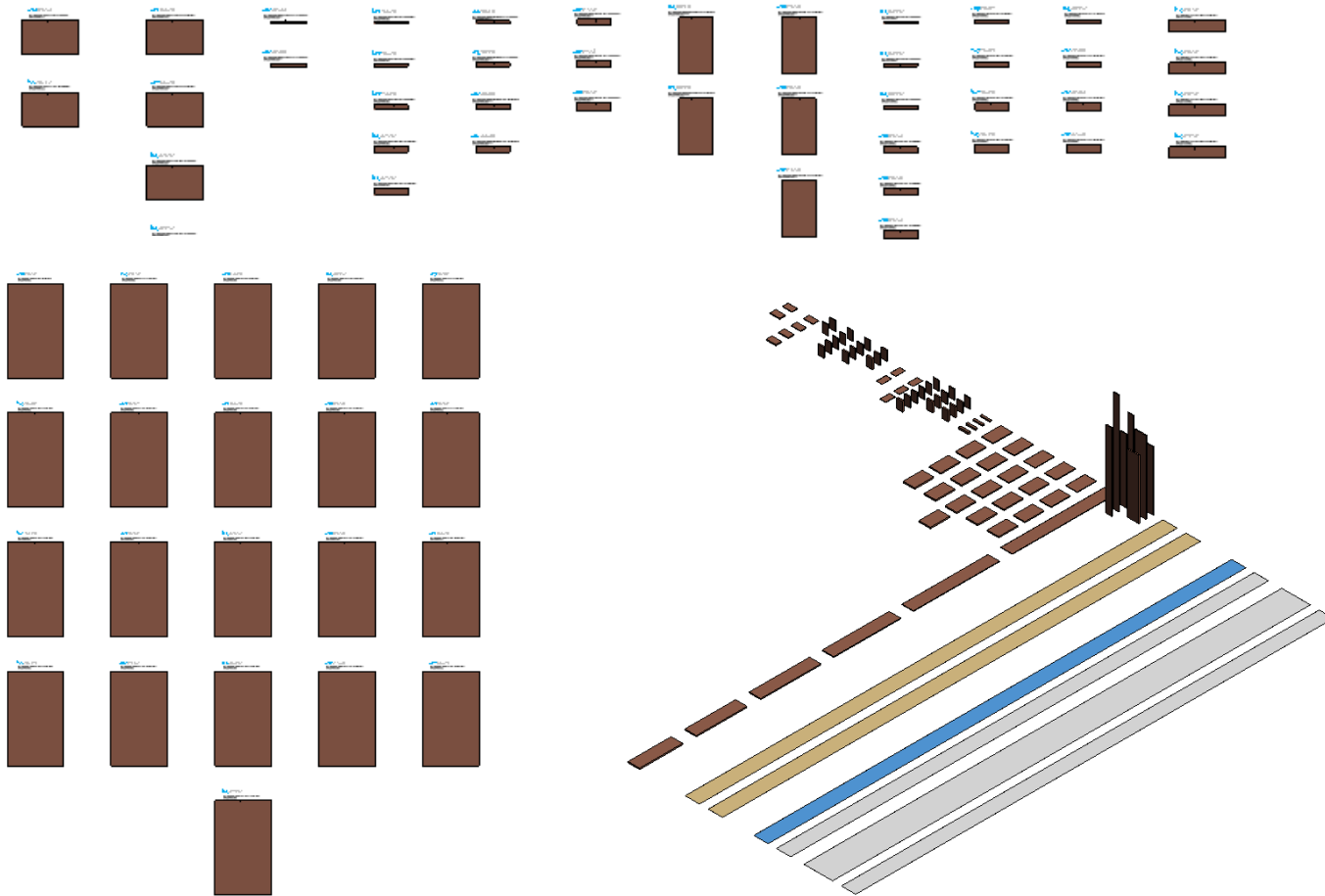


Better communication among different professions





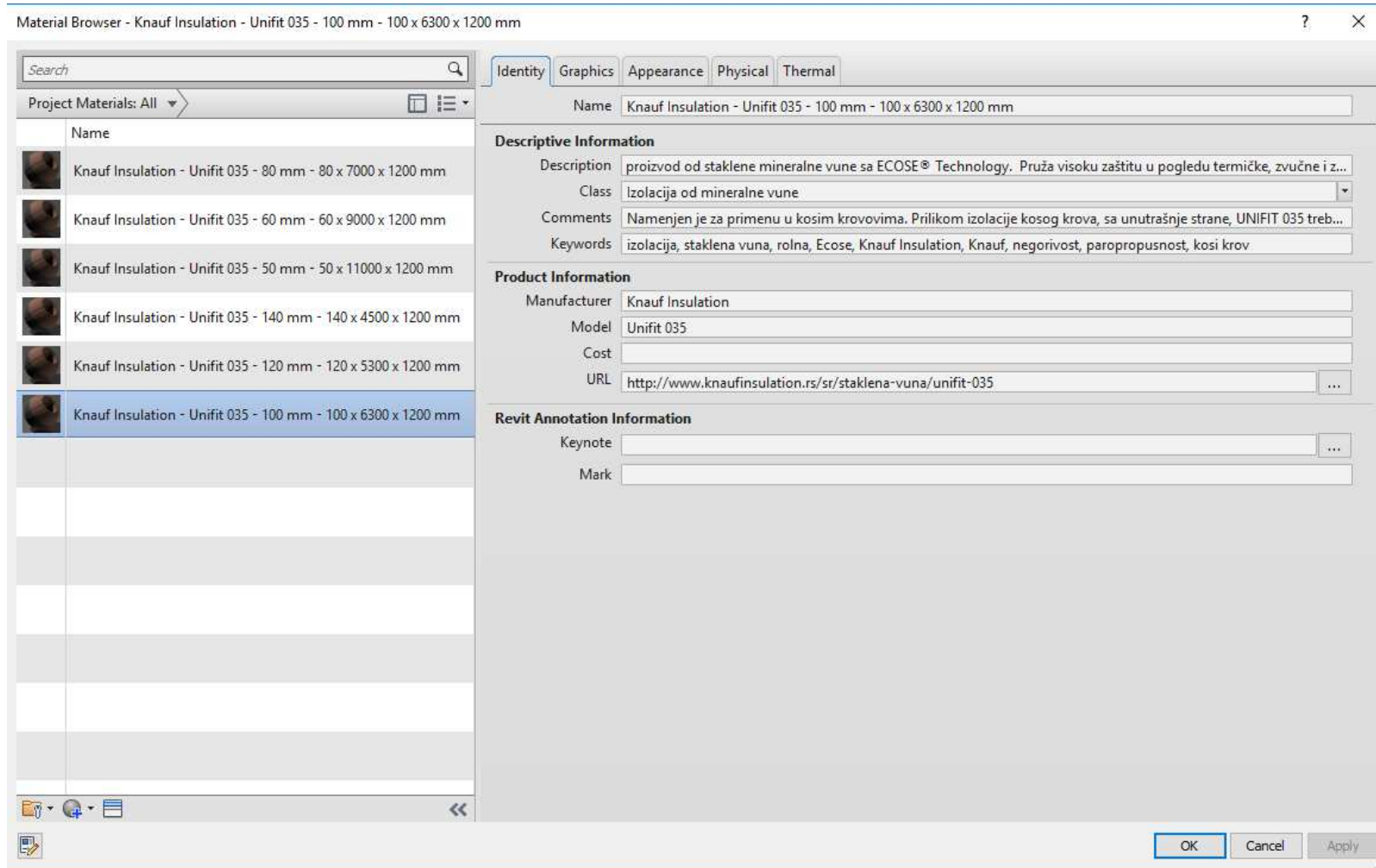
# Local BIM content - 1



Project Materials: All	
Name	
	Knauf Insulation - CLT C1 Thermal - 100 mm - 100 x 1000 x 200 mm
	Knauf Insulation - CLT C1 Thermal - 120 mm - 120 x 1000 x 200 mm
	Knauf Insulation - CLT C1 Thermal - 150 mm - 150 x 1000 x 200 mm
	Knauf Insulation - CLT C1 Thermal - 200 mm - 200 x 1000 x 200 mm
	Knauf Insulation - Decibel - 100 mm - 100 x 8000 x 625 mm
	Knauf Insulation - Decibel - 50 mm - 50 x 8000 x 625 mm
	Knauf Insulation - Decibel - 60 mm - 60 x 6700 x 625 mm
	Knauf Insulation - Decibel - 75 mm - 75 x 10600 x 625 mm
	Knauf Insulation - FKD-N Thermal - 100 mm - 100 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal - 120 mm - 120 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal - 150 mm - 150 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal - 80 mm - 80 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal 2 - 100 mm - 100 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal 2 - 120 mm - 120 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal 2 - 150 mm - 150 x 1000 x 600 mm
	Knauf Insulation - FKD-N Thermal 2 - 80 mm - 80 x 1000 x 600 mm
	Knauf Insulation - FKD-S Thermal - 100 mm - 100 x 1000 x 600 mm
	Knauf Insulation - FKD-S Thermal - 120 mm - 120 x 1000 x 600 mm
	Knauf Insulation - FKD-S Thermal - 150 mm - 150 x 1000 x 600 mm
	Knauf Insulation - FKD-S Thermal - 30 mm - 30 x 1000 x 600 mm



## Local BIM content - 2



## Local BIM content - 2

- 100 x 6300 x 1200 mm

Identity Graphics Appearance Physical Thermal

5 Knauf Insulation - Unifit 035

**Information**

Name: Knauf Insulation - Unifit 035

Description: proizvod od staklene mineralne vune sa ECOSE® Technology. Pruža visoku zaštitu ...

Keywords: izolacija, staklena vuna, rolna, Ecose, Knauf Insulation, Knauf, negorivost, paroprop...

Type: Basic

Subclass: Izolacija od mineralne vune

- 100 x 6300 x 1200 mm

Identity Graphics Appearance Physical Thermal

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Keywords: izolacija, staklena vuna, rolna, Ecose, Knauf Insulation, Knauf, negorivost...

Type: Solid

Subclass: Izolacija od mineralne vune

Source: Knauf Insulation

Source URL: <http://www.knaufinsulation.rs/sr/staklena-vuna/unifit-035>

**Properties**

Transmits Light

Behavior: Isotropic

Thermal Conductivity: 0,0350 W/(m·K)

Specific Heat: 0,7100 J/(g·°C)

**BIM Urbanscape system - green roof**

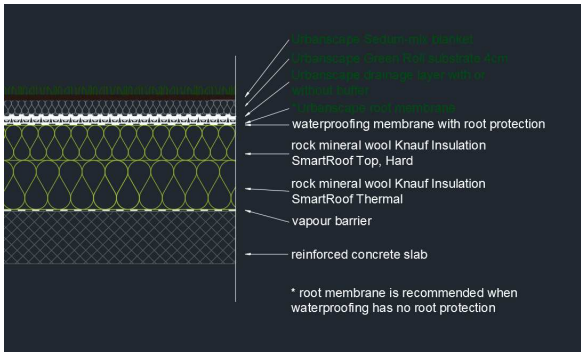
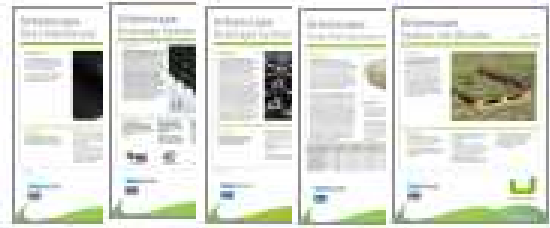




# Urbanscape system - green roof

Traditional documentation for specifier / designer: **3 different formats!**

- Technical datasheets [PDF]
- CAD details [dwg/PDF]
- Specification texts [Excel]



\* root membrane is recommended when waterproofing has no root protection



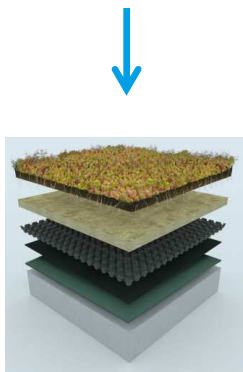
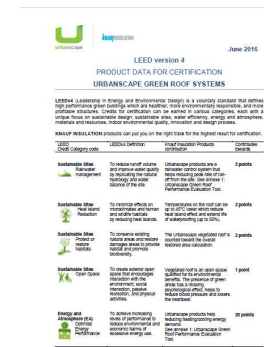
SLOJI	Začetna karakteristika						Prilagodljive dolgočasne karakteristike (10 letni povprečni podatki)					
	Teža suhega materiala (kg/m <sup>2</sup> )	Teža z vodo nasičenega materiala (kg/m <sup>2</sup> )	Kapaciteta nasičenja vode (l)	Min. vlažna vlna (cm)	Max. vlažna vlna (cm)	Max. delovna voda v sistemu (%)	Teža suhega materiala (kg/m <sup>2</sup> )	Teža z vodo nasičenega materiala (kg/m <sup>2</sup> )	Kapaciteta nasičenja vode (l)	Min. vlažna vlna (cm)	Max. vlažna vlna (cm)	Max. delovna voda v sistemu (%)
Urbanscape vegetacijska prepoga Sedum/mix	19,0	21,5	1,0	3,0	4,1	19,0	21,5	1,0	3,0	4,1	19,0	21,5
Urbanscape substrat Green Roof 2cm	2,2	19,2	11,0	2,0	2,3	2,2	14,1	11,9	1,4	1,4	2,2	14,1
Urbanscape substrat Green Roof 4cm	4,4	17,4	20,0	4,0	4,0	4,4	24,1	20,3	2,8	2,8	4,4	24,1
Urbanscape drenažni sistem brez vodnega zalogovalnika	0,6	3,3	2,7	1,3	1,3	0,6	3,3	2,7	1,3	1,3	0,6	3,3
Urbanscape drenažni sistem s vodnim zalogovalnikom	1,4	11,8	10,2	2,8	2,8	1,4	11,8	10,4	2,2	2,2	1,4	11,8
SISTEMI URBANSCAPE ZELENE STREHE												
	Teža suhega materiala (kg/m <sup>2</sup> )	Teža z vodo nasičenega materiala (kg/m <sup>2</sup> )	Kapaciteta nasičenja vode (l)	Min. vlažna vlna (cm)	Max. vlažna vlna (cm)	Max. delovna voda v sistemu (%)	Teža suhega materiala (kg/m <sup>2</sup> )	Teža z vodo nasičenega materiala (kg/m <sup>2</sup> )	Kapaciteta nasičenja vode (l)	Min. vlažna vlna (cm)	Max. vlažna vlna (cm)	Max. delovna voda v sistemu (%)
Urbanscape Green Roof Sistem 2 cm, brez zalogovalnika	17,8	40,7	27,7	5,3	7,4	38%	17,8	40,4	20,2	4,1	5,5	37%
Urbanscape Green Roof Sistem 2 cm, z zalogovalnikom	19,6	34,9	25,4	6,5	9,1	42%	19,6	48,9	27,9	5,3	6,7	42%
Urbanscape Green Roof Sistem 4 cm, brez zalogovalnika	20,0	59,7	39,7	7,3	9,3	43%	20,0	51,0	28,0	5,5	6,9	42%
Urbanscape Green Roof Sistem 4 cm, z zalogovalnikom	20,8	58,2	47,4	8,5	10,7	45%	20,8	59,5	35,3	6,7	8,1	45%

Stran 1

# Urbanscape system - green roof

## Additional documentation for specifiers / designers:

- Fire and sound test report [PDF]
- EPD, other sustainability datasheet [PDF]
- Pricelist [PDF, Excel]
- Pictures – product photomaterial [JPEG, PNG, ...]
- ...

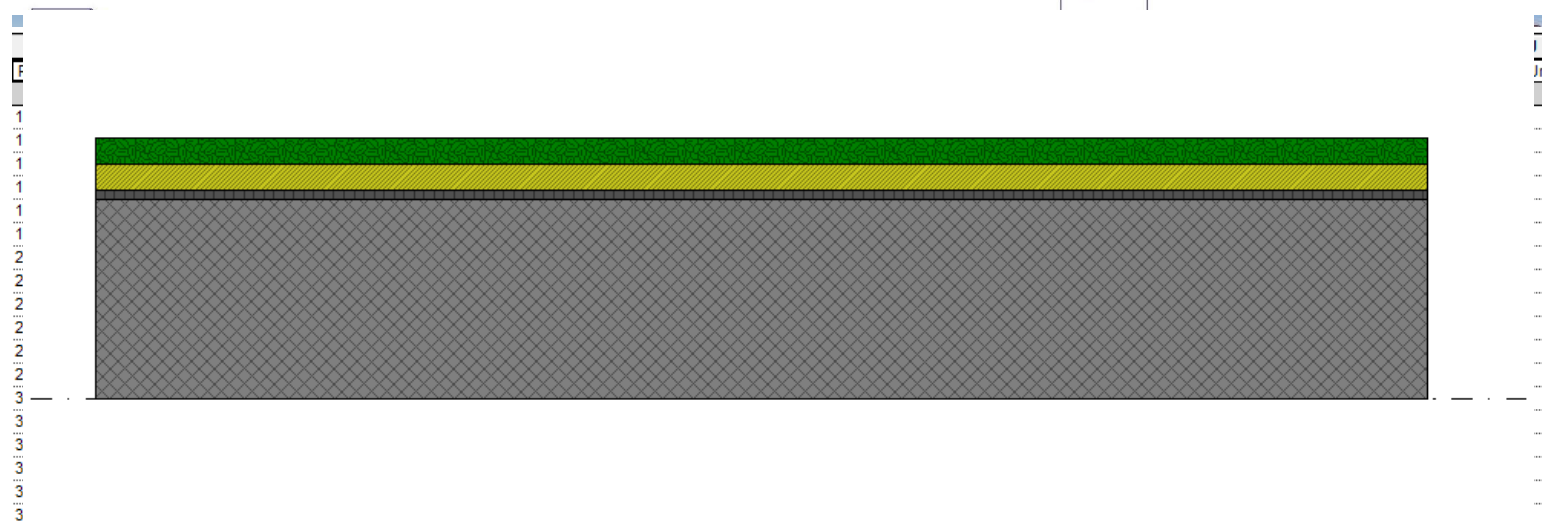


# BIM object Urbanscape system - green roof

■ BIM object: **1 file, 1 format**, option to export to other formats if needed



- Pictures
- Technical datasheets
- CAD details
- Specification texts
- ...



C	D
Model	Description
Ultra Lightweight extensive green roof system	Ultra Lightweight extensive green roof system with long-term stable water re-absorption and high initial (25 l/m <sup>2</sup> ) and long-term (17 l/m <sup>2</sup> ) water retention capacity.
Lightweight extensive green roof system	Lightweight extensive green roof system with long-term stable water re-absorption and high initial (35 l/m <sup>2</sup> ) and long-term (27 l/m <sup>2</sup> ) water retention capacity.
Lightweight extensive green roof system	Lightweight extensive green roof system with long-term stable water re-absorption and high initial (37 l/m <sup>2</sup> ) and long-term (26 l/m <sup>2</sup> ) water retention capacity.
Extensive green roof system with extra water storage capacity	Extensive green roof system with extra water storage capacity: with long-term stable water re-absorption and high initial (47 l/m <sup>2</sup> ) and long-term (36 l/m <sup>2</sup> ) water retention capacity.

