



SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 3, 15-27, Horndean Road
Emsworth, Hampshire

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 20/03/2021

EXCELLENCE
IN ENERGY
ASSESSMENT

CODE FOR SUSTAINABLE HOMES

Calculation Type: New Build (As Designed)



Property Reference	000041	Issued on Date	20/03/2021
Assessment Reference	001	Prop Type Ref	New Dwelling
Property	Plot 3, 15-27, Horndean Road, Emsworth, Hampshire		

SAP Rating	87 B	DER	14.58	TER	18.61
Environmental	89 B	% DER<TER	21.65		
CO ₂ Emissions (t/year)	0.88	DFEE	47.07	TFEE	53.36
General Requirements Compliance	Pass	% DFEE<TFEE	11.80		

Assessor Details	Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk	Assessor ID	A320-0001
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Client	Vivid Design Studio, Vivid Design Studio
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ENE 1 - Dwelling Emission Rate calculation

Total floor area	82.7	m ²	
DER	14.58	kgCO ₂ /yr/m ²	
TER	18.61	kgCO ₂ /yr/m ²	
CO ₂ emissions offset from additional allowable electricity generation	0.00	kgCO ₂ /yr/m ²	(ZC7)
Residual CO ₂ emissions offset from biofuel CHP	0.00	kgCO ₂ /yr/m ²	(ZC5)
Total CO ₂ emissions offset from SAP Section 16 allowances	0.00	kgCO ₂ /yr/m ²	
DER accounting for SAP Section 16 allowances	14.58	kgCO ₂ /yr/m ²	
Reduction DER/TER	21.65	%	
CfSH ENE1 credits achieved	3.2		
CfSH ENE1 level achieved	4		

ENE 2 – Fabric Energy Efficiency calculation

Dwelling type	House, Semi-Detached
Fabric energy efficiency (F.E.E.)	47.07 kWh/m ² /yr
CfSH ENE2 credits achieved	6.6
CfSH ENE1 and 2 overall level achieved	4

ENE 7 – Low and Zero Carbon Technologies calculation

Standard case CO₂ emissions

Total floor area	82.7	m ²	
DER	19.40	kgCO ₂ /yr/m ²	
CO ₂ emissions from electrical appliances	16.12	kgCO ₂ /yr/m ²	(ZC2)
CO ₂ emissions from cooking	2.17	kgCO ₂ /yr/m ²	(ZC3)
Standard case total CO ₂ emissions	37.69	kgCO ₂ /yr/m ²	(ZC4)
Net Standard case CO ₂ emissions	37.69	kgCO ₂ /yr/m ²	(ZC8)

Actual case CO₂ emissions

DER	16.34	kgCO ₂ /yr/m ²	
CO ₂ emissions from electrical appliances	16.12	kgCO ₂ /yr/m ²	(ZC2)
CO ₂ emissions from cooking	2.17	kgCO ₂ /yr/m ²	(ZC3)
Actual case total CO ₂ emissions	34.63	kgCO ₂ /yr/m ²	(ZC4)
CO ₂ emissions from Biomass	0.00	kgCO ₂ /yr/m ²	(ZC5)
CO ₂ reduction from additional allowable electricity generation	0.00	kgCO ₂ /yr/m ²	(ZC7)
Net Actual case CO ₂ emissions	34.63	kgCO ₂ /yr/m ²	(ZC8)
Improvement in net actual/net standard case CO ₂ emissions	8	%	

CODE FOR SUSTAINABLE HOMES
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ENE7 credits achieved

0

PREDICTED ENERGY ASSESSMENT



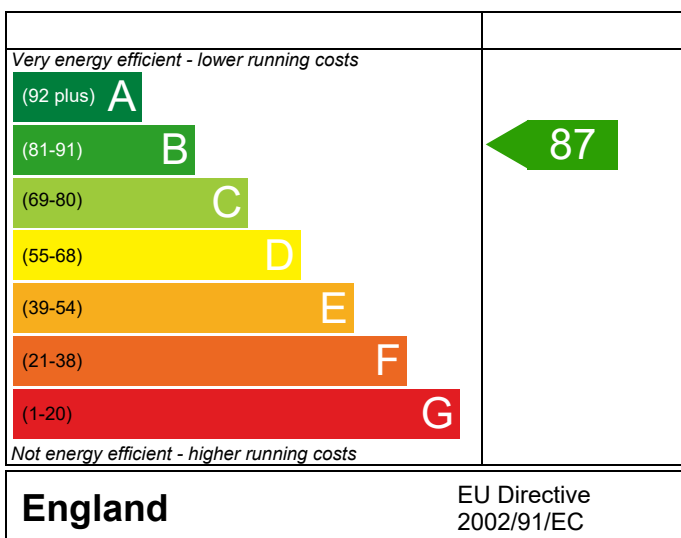
Plot 3, 15-27, Horndean Road,
Emsworth,
Hampshire

Dwelling type: House, Semi-Detached
Date of assessment: 20/03/2021
Produced by: Surecalc Limited
Total floor area: 82.7 m²
DRRN: 3300-2007-2694

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

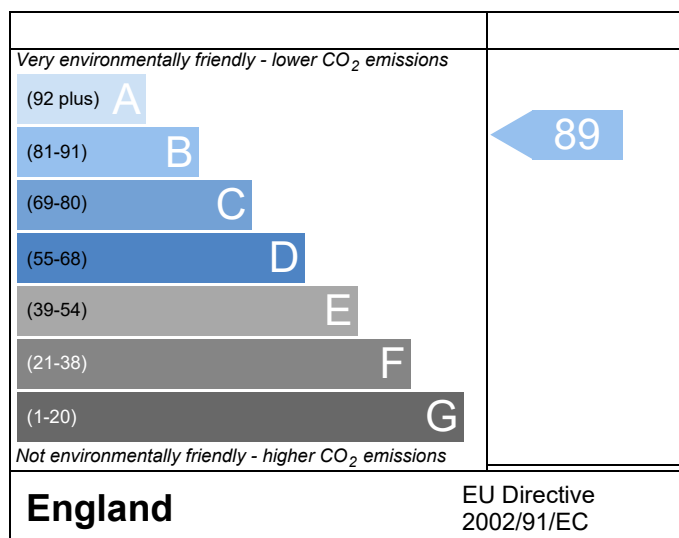
The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has been produced by an accredited Elmhurst member whose work is subject to quality assurance audits. The data used to produce the report has been verified by the Elmhurst members' portal.



BUILDING REGULATION COMPLIANCE

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SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.61	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.58	kgCO ₂ /m ²	Pass
	-4.03 (-21.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.36	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.07	kWh/m ² /yr	
	-6.3 (-11.8%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Alpha Evoke 28
Combi boiler
Efficiency: 88.9% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.2000 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

7.42 m², No overhang

Windows facing South East

1.96 m², No overhang

Windows facing South West

3.16 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

m³/(h.m²) @ 50 Pa

Maximum

10.0

m³/(h.m²) @ 50 Pa

Pass

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BUILDING REGULATION COMPLIANCE

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10 Key features

Party wall U-value	0.00	W/m ² K
Roof U-value	0.11	W/m ² K
Thermal bridging ψ -value	0.036	W/m ² K
Photovoltaic array	0.90	kW

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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	18.20 m	41.35 m ²	2.39 m
	1st Storey:	18.20 m	41.35 m ²	2.76 m

7.0 Living Area	21.27	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Medium	
Thermal Mass	250.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall	Cavity Wall	0.25	93.73	79.18

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall	Filled Cavity with Edge Sealing	0.00	46.56

10.0 External Roofs		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Roof	External Plane Roof	0.11	41.35	41.35

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Ground Floor	Ground Floor - Solid	0.14	41.35

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Dwelling DG Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.71		0.70	1.40
New Dwelling DG Window	Manufacturer	Window	Double Low-E Soft 0.05			0.71		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front SW Door	Half Glazed Door	[1] External Wall	South West							2.01	
Front SW Windows	Window	[1] External Wall	South West	None	0.00					3.16	
Side SE Window	Window	[1] External Wall	South East	None	0.00					1.96	
Rear NE Windows	Window	[1] External Wall	North East	None	0.00					7.42	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported	Reference:
Independently assessed	E2 Other lintels (including other steel lintels)	10.56	0.050	No	IG Hi Therm Lintels
Independently assessed	E3 Sill	9.60	0.027	No	LABC Construction Detail
Independently assessed	E4 Jamb	23.10	0.029	No	LABC Construction Detail
Independently assessed	E5 Ground floor (normal)	18.20	0.048	No	LABC Construction Detail
Independently assessed	E6 Intermediate floor within a dwelling	18.20	0.003	No	LABC Construction Detail
Independently assessed	E10 Eaves (insulation at ceiling level)	9.16	0.083	No	LABC Construction Detail
Independently assessed	E12 Gable (insulation at ceiling level)	9.04	0.054	No	LABC Construction Detail
Independently assessed	E16 Corner (normal)	10.30	0.050	No	LABC Construction Detail
Independently assessed	E18 Party wall between dwellings	10.30	0.044	No	LABC Construction Detail
Independently assessed	P1 Party wall - Ground floor	9.04	0.160	No	LABC Construction Detail
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	9.04	0.000	No	
Independently assessed	P4 Party wall - Roof (insulation at ceiling level)	9.04	0.036	No	LABC Construction Detail

Y-value	0.036	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	5.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows half open
Cross ventilation possible	Yes
Night Ventilation	Yes
Air change rate	4.00

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Mechanical extract ventilation - decentralised
MV Reference Number	500230

SUMMARY FOR INPUT DATA

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Duct Type

Flexible

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.20	In Room Fan Kitchen	1
0.18	In Room Fan Other Wet Room	2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	24	
Total number of L.E.L. fittings	24	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

Database		
Description	Gas Boiler	
Percentage of Heat	100	%
Database Ref. No.	18157	
Fuel Type	Mains gas	
Main Heating	BGW	
SAP Code	104	
In Winter	89.8	
In Summer	88.2	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



Community Heating	None			
28.0 Water Heating	HWP From main heating 1			
Water Heating	Main Heating 1			
Flue Gas Heat Recovery System	No			
Waste Water Heat Recovery Instantaneous System 1	No			
Waste Water Heat Recovery Instantaneous System 2	No			
Waste Water Heat Recovery Storage System	No			
Solar Panel	No			
Water use <= 125 litres/person/day	Yes			
SAP Code	901			
29.0 Hot Water Cylinder	None			
32.0 Photovoltaic Unit	One Dwelling			
PV Cells kWp	Orientation	Elevation	Overshading	Connected to Dwelling
0.90	North East	45°	None Or Little	Yes

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£29	B 88	

U-VALUE CALCULATOR REPORT



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Building Elements

Roof 000002 - Pitched Roof Insulated Ceiling Vivid

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Loft Space				
	Main construction	0	0.0600	0.0600	100.00
Layer 2	Mineral wool				
	Main construction	250	0.0440	5.6818	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	Mineral wool quilt				
	Main construction	150	0.0440	3.4091	91.67
	Main construction	150	0.1300	1.1538	8.33
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 4	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1000	

Total resistance: Upper limit = 9.109 m² K/W Lower limit = 8.873 m² K/W Average = 8.991 m² K/W
Total correction = 0.0030 m² K/W U-value (unrounded) = 0.11 W/m² K

Unheated space: None

Total thickness: 413 mm

U-value: 0.11 W/m² K

Kappa: n/a

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Building Elements

Wall 000001 - Vivid 100 Cavity Wall Knauf Supafil

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Brick, outer leaf				
	Main construction	102	0.7700	0.1325	82.81
	Main construction	102	0.9407	0.1084	17.19
Layer 2	Knauf Supafil 34 blown Cavity Fill				
	Main construction	100	0.0340	2.9412	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Celcon Standard - Normal - Trad joint 10mm				
	Main construction	100	0.1500	0.6667	93.18
	Main construction	100	0.8803	0.1136	6.82
Layer 4	airspace/plaster dabs				
	Main construction	15	0.1000	0.1500	80.00
	Main construction	15	0.0882	0.1700	20.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1300	

Total resistance: Upper limit = 4.077 m² K/W Lower limit = 3.952 m² K/W Average = 4.015 m² K/W
Total correction = 0.0054 m² K/W U-value (unrounded) = 0.25 W/m² K

Unheated space: None

Total thickness: 330 mm

U-value: 0.25 W/m² K

Kappa: n/a

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Building Elements

Floor 000003 - Vivid GF Beam & Block

Floor Type: Suspended Floor

Area = 41.35 m², Perimeter = 18.20 m, Wall thickness = 300.00 mm, Soil: Clay

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.000 m

U-value of walls above ground: U_w = 1.500 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R_g = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	Celcon Flooring -				
	Main construction	100	0.1500	0.6667	90.91
	Main construction	100	1.0000	0.1000	9.09
Layer 2	VITA Kay-Cel EPS70 Superplus				
	Main construction	150	0.0320	4.6875	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Screed				
	Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.694 m² K/W Lower limit = 5.524 m² K/W Average = 5.609 m² K/W

Total correction = 0.0070 m² K/W

U-value (unrounded) = 0.14 W/m² K

Unheated space: None

Total thickness: 315 mm

U-value: 0.14 W/m² K

Kappa: n/a

THERMAL BRIDGING

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	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Independently assessed	0.050	10.56	0.53	IG Hi Therm Lintels
External wall	E3 Sill	Independently assessed	0.027	9.60	0.26	LABC Construction Detail
External wall	E4 Jamb	Independently assessed	0.029	23.10	0.67	LABC Construction Detail
External wall	E5 Ground floor (normal)	Independently assessed	0.048	18.20	0.87	LABC Construction Detail
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.003	18.20	0.05	LABC Construction Detail
External wall	E10 Eaves (insulation at ceiling level)	Independently assessed	0.083	9.16	0.76	LABC Construction Detail
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.054	9.04	0.49	LABC Construction Detail
External wall	E16 Corner (normal)	Independently assessed	0.050	10.30	0.52	LABC Construction Detail
External wall	E18 Party wall between dwellings	Independently assessed	0.044	10.30	0.45	LABC Construction Detail
Party wall	P1 Party wall - Ground floor	Independently assessed	0.160	9.04	1.45	LABC Construction Detail
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	9.04	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.036	9.04	0.33	LABC Construction Detail

Total: **6.37** W/mK:
Y-Value: **0.036** W/m²K: