

# StoTherm manual



**Legal notes:**

It should be noted that the details, illustrations, general technical information, and drawings contained in this brochure are only general proposals and details which describe the functions. They are not dimensionally accurate. The applicator/customer is independently responsible for determining their suitability and completeness for the construction project in question. Neighbouring works are only described schematically. All specifications and information must be adjusted or agreed in the light of local conditions and do not constitute work, detail or installation plans. The technical specifications and information on the products contained in the Technical Data Sheets and system descriptions/approvals must be observed.





# Contents





## Sustainability in construction

### The European Green Deal

The European Green Deal is a European Commission **action plan** which **aims** to make the European Union **climate-neutral** by 2050. Climate-neutral means that the EU will only emit unavoidable greenhouse gases and will fully offset the remaining emissions.

Linked with the Green Deal are the following priorities with regard to **sustainability in construction**:

- Ensuring that the EU budget includes financial resources for climate protection
- Doubling of the annual renovation rate (**surge in renovation**)
- “European Bauhaus”: bringing together aesthetic appeal and sustainability
- Facilitating the circular economy
- Increasing the use of bio-based building materials
- Expanding the use of renewable energy
- Reducing CO<sub>2</sub> emissions over the entire life cycle of buildings by 2050





## Potential savings of StoTherm systems

### Potential savings in Germany

There are 18.7 million residential buildings in Germany. Of these, 14.2 million buildings are more than 30 years old. (Source: dena building report 2016)

#### Assumption:

Buildings more than 30 years old have increased energy consumption.

#### Calculation bases:

- 1) Potential savings 1–6 RU = 25 %
- 2) Potential savings >7 RU = 40 %
- 3) Consumption values according to German heating survey 2020, increased consumption ([www.heizspiegel.de](http://www.heizspiegel.de))

**18.7 million residential buildings in Germany**

**14.2 million with increased consumption**

**Potential savings per year:  
23 billion litres of heating oil  
69 million tonnes of CO<sub>2</sub>e**

#### By way of comparison:

Banning all domestic flights within Germany would save approx. 2 million tonnes of CO<sub>2</sub>e (source: quarks.de).





## Our solutions

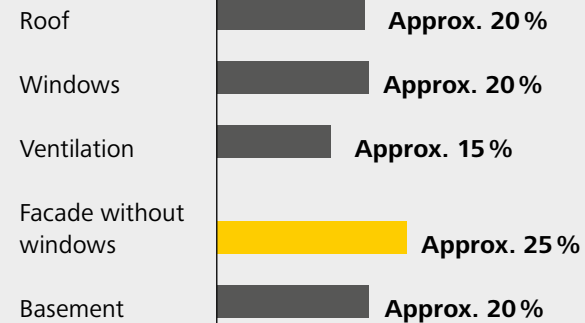
### External wall insulation systems for reducing heat losses

External wall insulation systems reduce heat loss via facades by 25–40 % depending on the cubature.

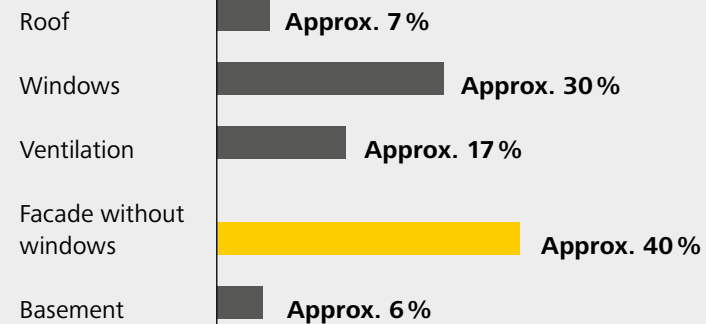
Our 9 external wall insulation systems from the StoTherm system family also meet project-specific requirements.

#### Potential savings for heat losses in buildings

##### Small buildings



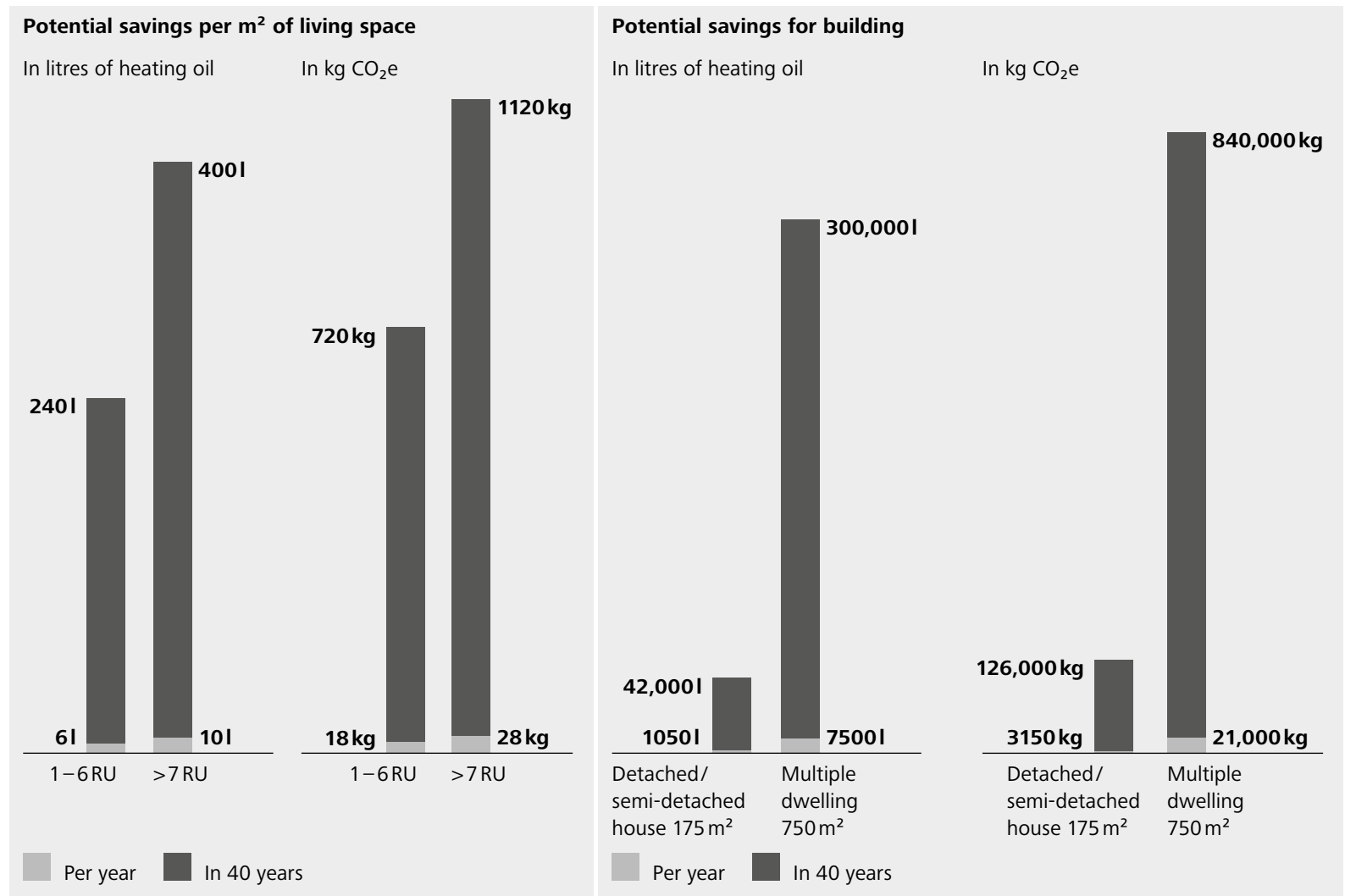
##### Large buildings





## Potential savings of StoTherm systems

### Heating oil/CO<sub>2</sub>



#### Calculation bases:

- 1) Potential savings 1-6 RU = 25 %
- 2) Potential savings >7 RU = 40 %
- 3) Consumption values according to German heating survey 2020, increased consumption ([www.heizspiegel.de](http://www.heizspiegel.de))





## Potential savings of StoTherm systems

### Saving effects of CO<sub>2</sub> pricing system

- Since 1 January 2021, heating oil has been taxed at 25 EUR/t CO<sub>2</sub>
- This works out as a EUR0.08 CO<sub>2</sub> tax per litre of heating oil
- By 2025, an increase to EUR0.17 per litre of heating oil will be stipulated by law (55 EUR/t CO<sub>2</sub>)
- Further increases after 2025 still pending

**Assuming a service life of 40 years, there are different scenarios for the saving effects of an EWIS.**

#### Calculation bases:

- 1) Potential savings 1–6 RU = 25 %
- 2) Potential savings > 7 RU = 40 %
- 3) Consumption values according to German heating survey 2020, increased consumption ([www.heizspiegel.de](http://www.heizspiegel.de))
- 4) Potential savings

#### Forecast: savings on the CO<sub>2</sub> tax with a 40-year working life

##### 1–2 RU

Average living space: 175 m<sup>2</sup>  
Saving in CO<sub>2</sub>e/m<sup>2</sup>: 18 kg



- Continuous increase in line with inflation (1%) from 2025
- With an increase to 100 EUR/t by 2030
- With an increase to 195 EUR/t by 2030

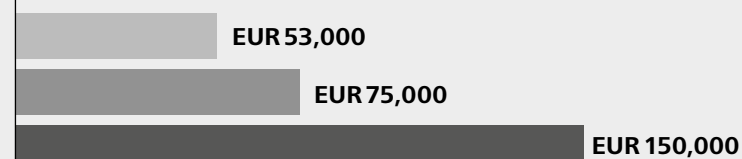
##### 3–6 RU

Average living space: 375 m<sup>2</sup>  
Saving in CO<sub>2</sub>e/m<sup>2</sup>: 18 kg



##### 7–12 RU

Average living space: 750 m<sup>2</sup>  
Saving in CO<sub>2</sub>e/m<sup>2</sup>: 28 kg



##### > 12 RU

Average living space: 1500 m<sup>2</sup>  
Saving in CO<sub>2</sub>e/m<sup>2</sup>: 28 kg





## Use of resources for insulants

### Production vs. 40 years of use

1) Every insulant saves many times the amount of CO<sub>2</sub> and energy used for its production.

2) The right insulant depends on the construction job and its requirements.

#### Calculation bases:

1) Assumed insulating target for determining the insulant thickness:

· Thermal transmittance before:

1.4 W/m<sup>2</sup> K

· Thermal transmittance after:

0.2 W/m<sup>2</sup> K

2) Values from the EPDs of the reference products in question,

phase A1 – A3 (= cradle to gate)

3) Potential savings 1 – 6 RU = 25 %

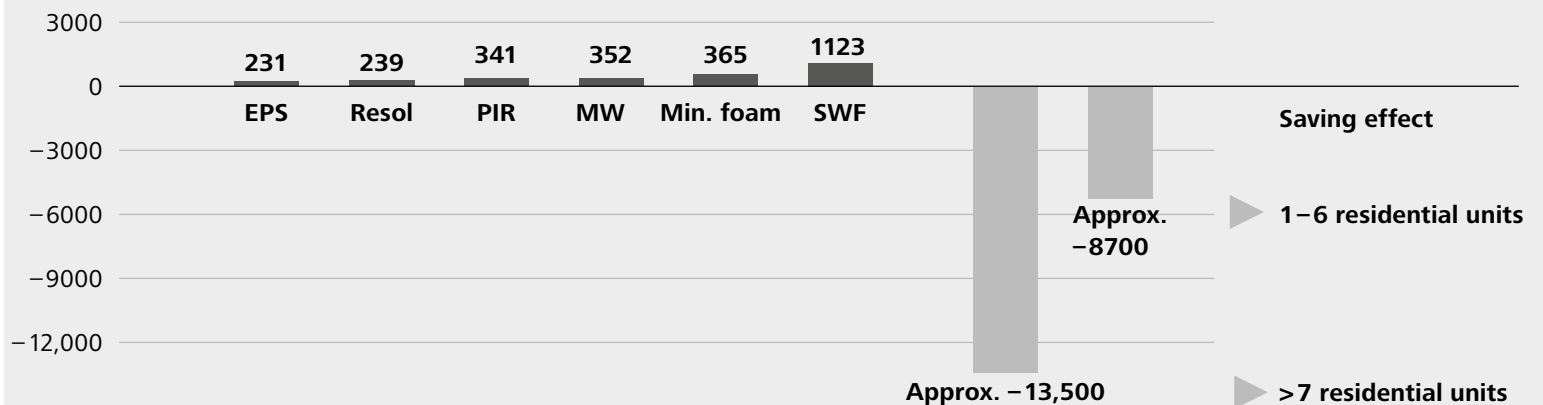
4) Potential savings > 7 RU = 40 %

5) Consumption values according to German heating survey 2020,

increased consumption

(www.heizspiegel.de)

Primary energy consumption – production vs. saving effect (in MJ/m<sup>2</sup>, service life 40 years)



CO<sub>2</sub> emissions vs. saving effect (in kg/m<sup>2</sup>, service life 40 years)





## Use of resources for StoTherm systems

### CO<sub>2</sub>e in kg/m<sup>2</sup>

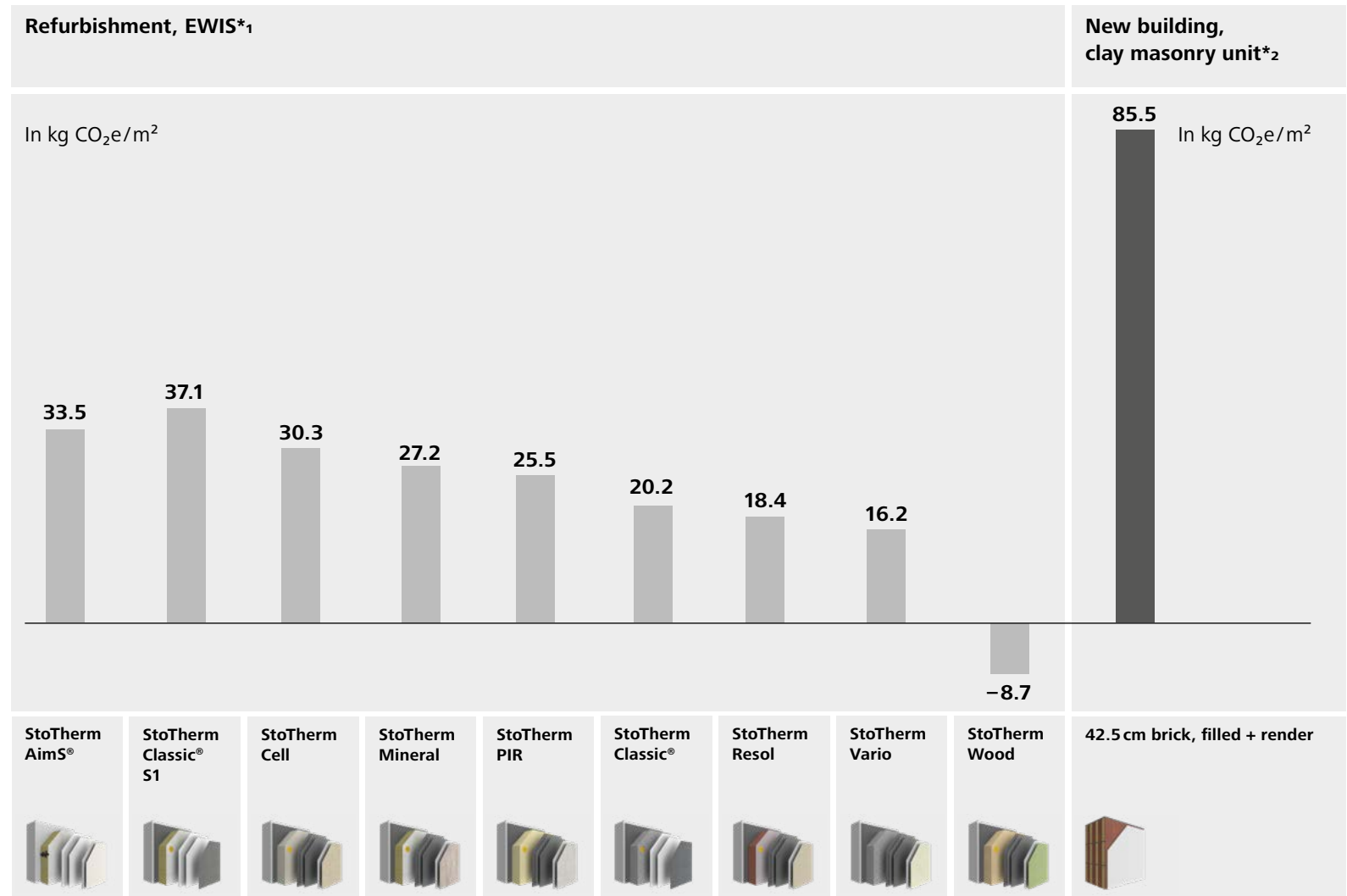
#### StoTherm Wood with negative carbon footprint

Background: with the soft wood fibre insulant, the fact that wood as a raw material stores CO<sub>2</sub> during its growth phase is factored in.

When you consider the CO<sub>2</sub> emissions, the alternative of demolishing and then erecting a new building is much worse than refurbishing it (the expense required for disposal and for the additional trades is not taken into account).

#### Calculation bases:

- Assumed insulating target for determining the insulant thickness:
  - Thermal transmittance before: 1.4 W/m<sup>2</sup> K
  - Thermal transmittance after: 0.2 W/m<sup>2</sup> K
- Values from the EPDs of the reference products in question, phase A1 – A3 (= cradle to gate)



\*<sub>1</sub> CO<sub>2</sub> emissions during production in accordance with system with white finishing render K3 without paint coat and fire strip

\*<sub>2</sub> CO<sub>2</sub> emissions during production in new building with white finishing render K3 without paint coat (two paint coats = 1 kg CO<sub>2</sub>e/m<sup>2</sup>; fire strip = 1 kg CO<sub>2</sub>e/m<sup>2</sup>)





# Our solutions

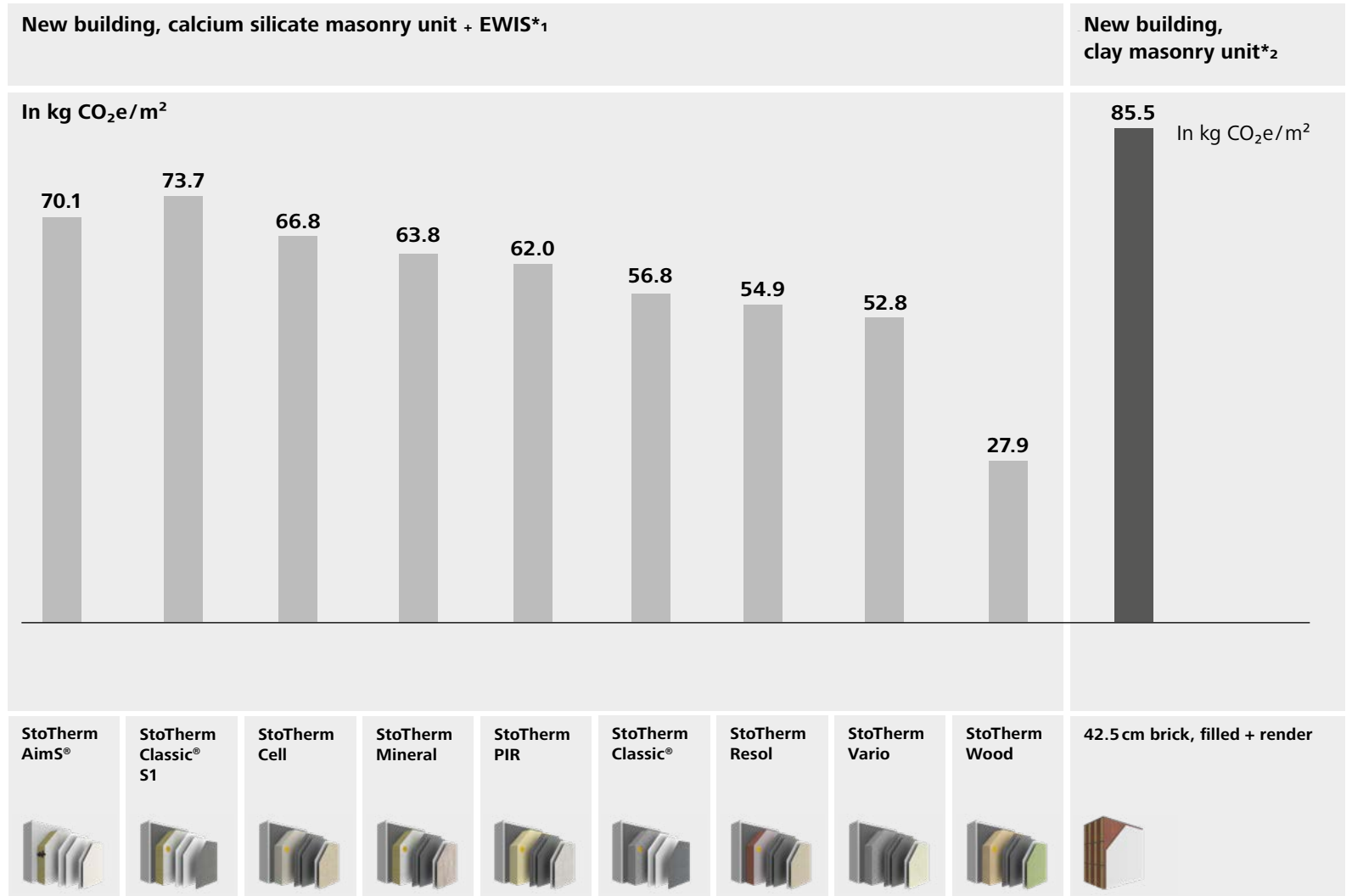
## EWIS for reducing the ecological footprint

With new buildings, a key decision needs to be made from the outset to achieve the thermal protection targets:  
 Option 1: monolithic construction type (e.g. brick, mostly filled)  
 Option 2: multilayer construction type (e.g. calcium silicate masonry unit/concrete + EWIS)

**When it comes to making this decision, the ecological footprint of the materials used in the new building is becoming more and more relevant. Sto offers 9 insulation systems to provide the right solution for your construction job while reducing your footprint at the same time.**

### Calculation bases:

- 1) Assumed insulating target for determining the insulant thickness:  
 · Thermal transmittance:  $0.2 \text{ W/m}^2 \text{ K}$
- 2) Values from the EPDs of the reference products in question, phase A1 – A3 (= cradle to gate)



\*1 CO<sub>2</sub> emissions during production in accordance with system with white finishing render K3 without paint coat and fire strip  
 \*2 CO<sub>2</sub> emissions during production in new building with white finishing render K3 without paint coat (two paint coats = 1 kg CO<sub>2</sub>e/m<sup>2</sup>; fire strip = 1 kg CO<sub>2</sub>e/m<sup>2</sup>)



## EWIS in new buildings

### Multilayer construction type = division of labour

#### Tasks of the wall structure:

- Structural engineering
- Sound insulation

#### Tasks of the insulating layer:

- Thermal protection
- Compensating for small building shell tolerances

#### Tasks of the reinforcing layer:

- Levelling minor unevenness
- Absorbing tensile stress

#### Tasks of the material layer:

- Weatherproofing
- Visual design

**Conclusion: all multilayer types of masonry have properties that set them apart from monolithic, highly insulating variants in a positive way. Using several building materials makes it possible to distribute the requirements across different components, each of which is specially designed for the task in question.**

#### Calcium silicate masonry unit + EWIS



**Resol**  
54.9 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**EPS**  
From 52.8 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**MW**  
From 63.8 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**SWF**  
27.9 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**Total incl. render system:  
From 29 cm**

Wall thickness of the supporting wall:  
17.5 cm  
Insulation thickness:  
Resol 10 cm  
EPS 16 cm  
MW 18 cm  
SWF 20 cm

#### Concrete + EWIS



**Resol**  
50.4 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**EPS**  
From 48.3 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**MW**  
From 59.3 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**SWF**  
23.4 kg  
CO<sub>2</sub>e/m<sup>2</sup>

**Total incl. render system:  
From 29.5 cm**

Wall thickness of the supporting wall:  
18 cm  
Insulation thickness:  
Resol 10 cm  
EPS 16 cm  
MW 18 cm  
SWF 20 cm

#### Filled brick



85.5 kg CO<sub>2</sub>e/m<sup>2</sup>

**Total incl. render system:  
44 cm**

Wall thickness of the supporting wall:  
42.5 cm (filled brick, mineral wool insulating material)

## Use of renewable raw materials

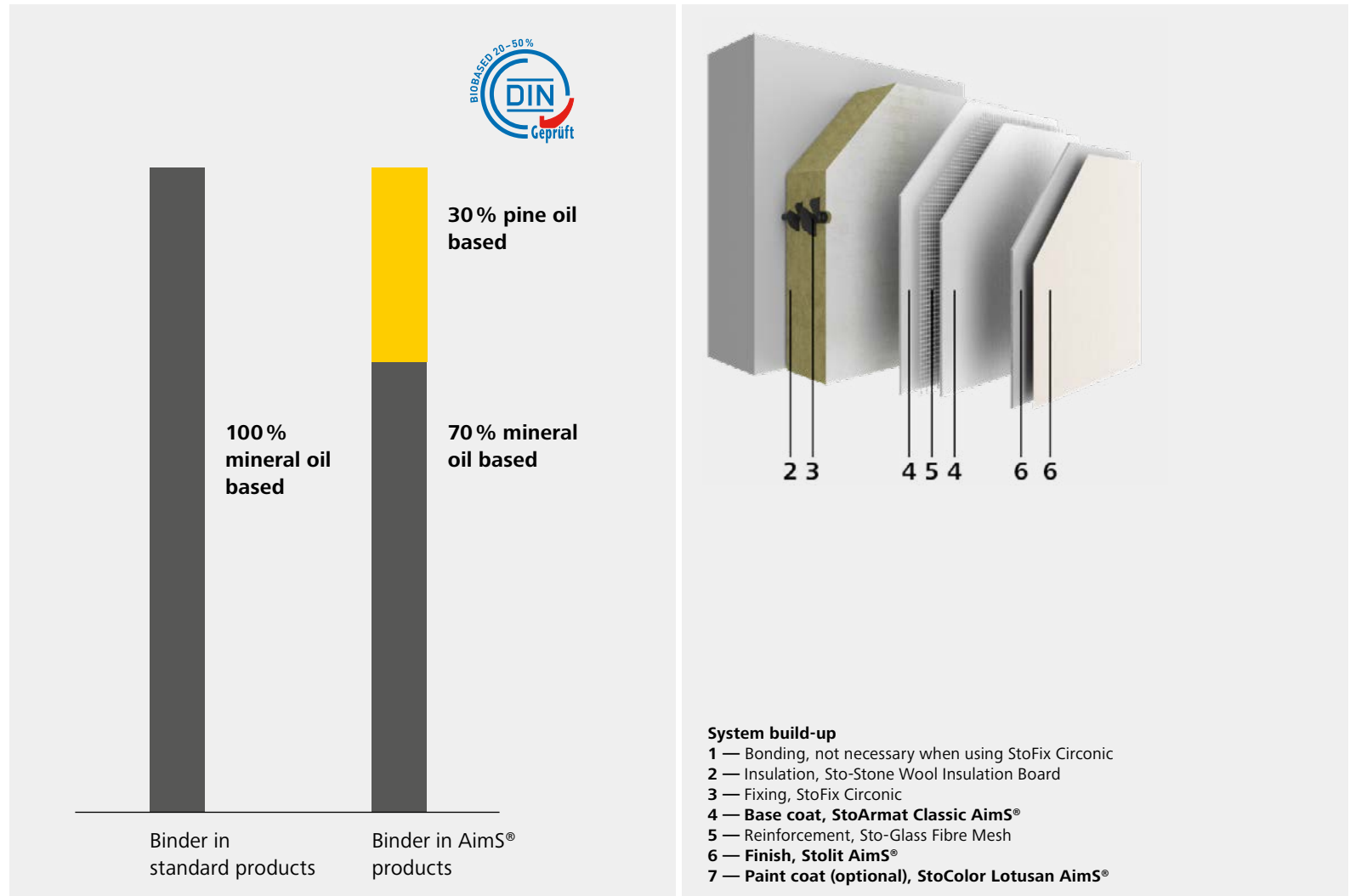
### New AimS® product line

With our new AimS® product line, we are helping to establish a firm footing for environmentally friendly products and materials in the field of construction.

The first three products to come out of this development process form an external wall insulation system which demonstrates its eco-friendly credentials right from the manufacturing stage by reducing the use of mineral oil.

We have replaced 30% of the mineral-oil-based binder with a substitute material made from resource-conserving pine oil.

The proportion of the substitute material made from pine oil is checked in line with DIN guidelines.


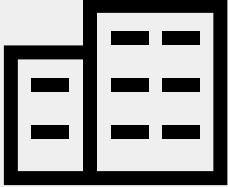






## Use of renewable raw materials

### The savings with specific examples

Mineral oil saving when using AimS® products in comparison with corresponding standard product

	 <b>Example:</b> Detached house 200 m <sup>2</sup> facade surface	 <b>Example:</b> Multiple dwelling 800 m <sup>2</sup> facade surface
<b>StoArmat Classic AimS®</b>	<b>27 litres</b>	<b>109 litres</b>
<b>Stolit AimS®</b>	<b>14 litres</b>	<b>57 litres</b>
<b>StoColor Lotusan AimS®</b> 2 coats	<b>2 litres</b>	<b>7 litres</b>
<b>StoTherm AimS®</b> Saving = total for all layers	<b>43 litres</b> 	<b>173 litres</b> 





## Use of renewable raw materials

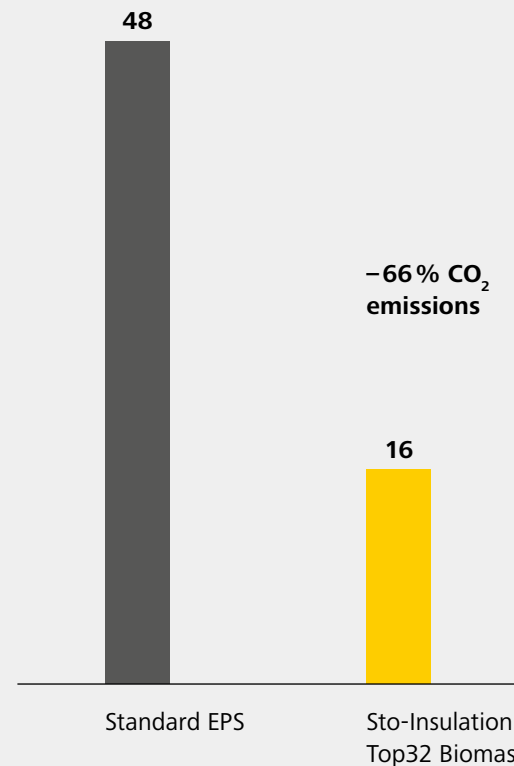
### Sto-Insulation Board Top32 Biomass

The certified biomass balance method allows fossil raw materials that are required for the production of EPS to be replaced with renewable materials. This production method saves valuable resources and also reduces CO<sub>2</sub> emissions.

#### Properties

- Sustainable insulation board made of expanded polystyrene foam in accordance with EN 13163
- Made of 100 % renewable raw materials (according to the biomass balance method)
- Eco-certified (REDcert)
- Reduction of 66 % CO<sub>2</sub>e in production (A1–A3 = cradle to gate) in comparison to Sto-Insulation Board Top32
- CO<sub>2</sub>e reduction counts towards sustainability certifications (e.g. DGNB, BREEAM, LEED)
- Design thermal conductivity: 0.032 W/(m\* K)

#### Carbon footprint (per m<sup>3</sup>) reduced by more than two thirds

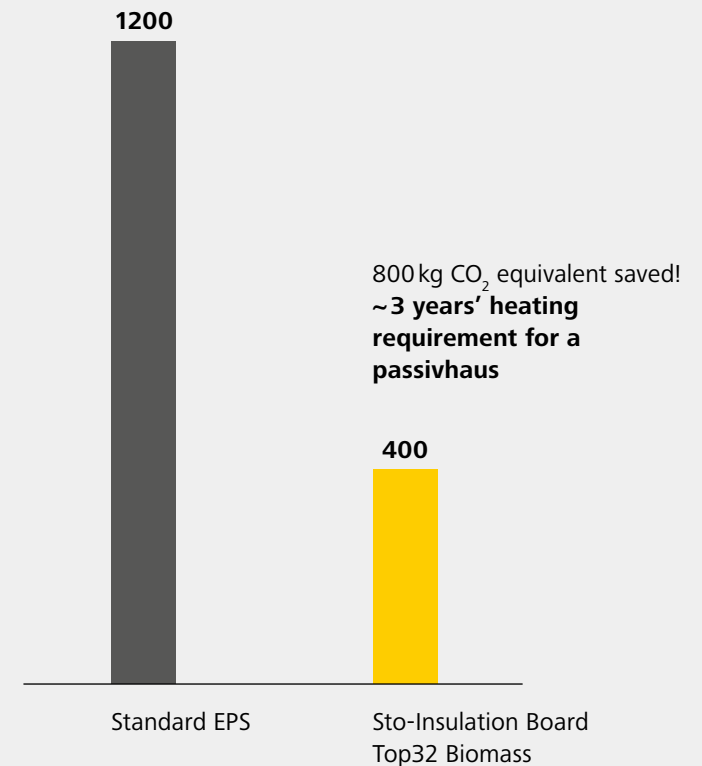


Carbon footprint based on the production process for one board (A1–A3), calculation in accordance with EN 15804 for a ~15 kg/m<sup>3</sup> product, unit: kg CO<sub>2</sub> eq/m<sup>3</sup>

Source: BASF SE

#### CO<sub>2</sub> saving for a detached house in refurbishment

~100 m<sup>2</sup>, two floors, ~125 m<sup>2</sup> facade to be insulated, 20 cm EPS



Carbon footprint based on the production process for one board (A1–A3), calculation in accordance with EN 15804 for a ~15 kg/m<sup>3</sup> product, unit: kg CO<sub>2</sub> eq/m<sup>3</sup>

Source: BASF SE



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