

## Row houses 505 Alphenlaan in Roosendaal NL

### PROJECT SUMMARY

134 single family houses built in 1965. Renovations to Passive House in occupied condition. New timber frame facades + roofs; and innovative heating + solar dhw

### SPECIAL FEATURES

Prefabricated Passive House timber frame elements, compact HVAC

### ARCHITECT + ENERGY CONCEPT

Architectenwerkgroep - design  
Trecodome - passive house advice

### OWNER

Aramis Alleewonen, Roosendaal  
[www.alleewonen.nl](http://www.alleewonen.nl)



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation





## BACKGROUND

Kroeven, Roosendaal is the first large scale passive renovation project in The Netherlands.

After 40 years only gradual improvements and normal maintenance, Allee Wonen decided to upgrade the area. The tenants had expressed interest in an energy efficient renovation.

Whereas Allee Wonen had learned about the passive house concept as part of her involvement in the European Treco network for social housing providers ([www.treco-housing.org](http://www.treco-housing.org)) Allee Wonen and the tenants developed a shared interest in low energy renovation.

The full upgrade of Kroeven consists of 370 single family houses, of which 246 will be renovated and 124 units will be newly constructed, replacing about 90 existing houses.

**In block 505 134 houses will be renovated to Passive Houses and 116 newly constructed as Passive Houses in six building types.**

**In block 506 112 houses will be renovated and 8 will be newly constructed.**

Before



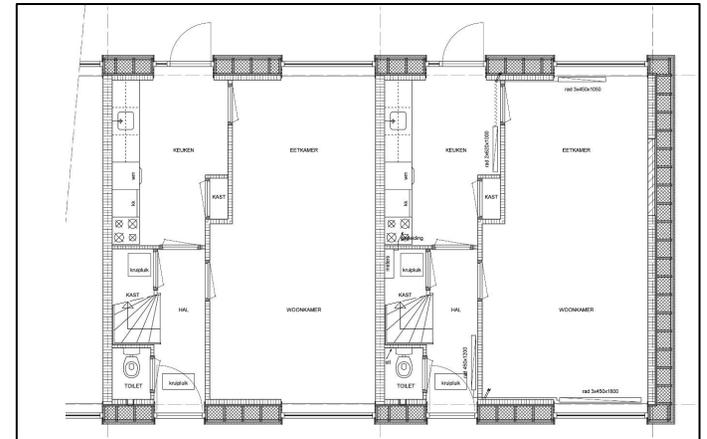
After

## BACKGROUND

In block 505 a completed demonstration house shows the insulation system with prefab timber elements and other modifications to achieve very the Passive House Standard. From 2010 to 2012 this approach will be implemented in 134 houses.

## SUMMARY OF THE RENOVATION

- 350 mm timber frame element with cellulose insulation.
- triple glazed passive house window frames and prefabricated timber roof elements, filled with 350 mm insulation.
- Airtightness to PH Standard: of 0.6 at 50 Pa.
- External facade cladding in natural slate.
- New compact heating, heat recovery ventilation and hot water systems, connected to solar collectors.



Ground floor



Prefabricated elements are placed after demolition of external layer of the cavity wall.

## CONSTRUCTION

### Roof construction *U-value: 0.11 W/(m<sup>2</sup>·K)*

(interior to exterior)

OSB	25 mm
Cellulose fibre insulation	350 mm
OSB	25 mm
<u>PVC roofing</u>	<u>2 mm</u>
Total	400 mm

### Wall construction *U-value: 0.107 W/(m<sup>2</sup>·K)*

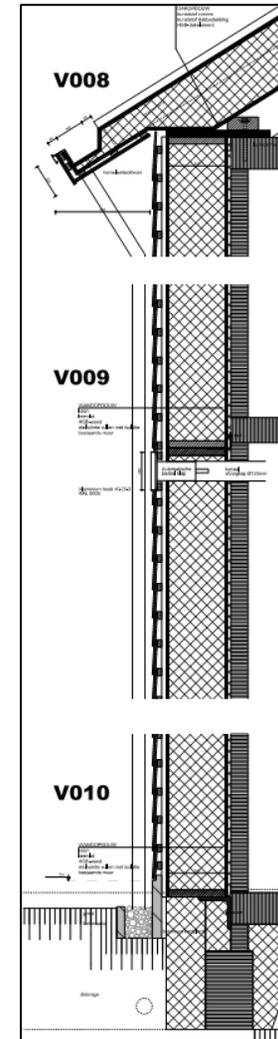
(interior to exterior)

Existing brickwork	100 mm
OSB	15 mm
Cellulose fibre insulation	350 mm
Dampopen MDF	15 mm
cavity	30 mm
<u>Natural slates</u>	<u>10 mm</u>
Total	520 mm

### Ventilated floor *U-value: 0.20 W/(m<sup>2</sup>·K)*

(top down)

Screed (existing)	30 mm
Concrete floor (existing)	200 mm
<u>Spray PUR</u>	<u>120 mm</u>
Total	350 mm



Section prefabricated elements-in situ



Existing gas boiler

New compact system



### Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Attic floor	0.42	0.11
Walls	0.59	0.11
Floor	2.0	0.20
Windows	3.6	0.6
U window incl. frame		0.75

### BUILDING SERVICES

The heating, ventilation and domestic hot water systems will be upgraded using new compact systems, which include per house a mechanical heat recovery system, a 200 liter storage tank, connected to a solar collector array, with a backup by a small condensing gas boiler. The number of existing radiators will be reduced.

### RENEWABLE ENERGY USE

There are 5.4 m<sup>2</sup> of solar collectors covering about 55% of energy needed for domestic hot water.

### ENERGY PERFORMANCE

Space + water heating (primary energy)\*

Before: 220 kWh/m<sup>2</sup>

After: 40 kWh/m<sup>2</sup>

Reduction: 82%

\*PHPP2007 energy calculations:

### INFORMATION SOURCES

Boonstra, J.M., A. van Reekum, R. van Rede.

Treco project information

[www.treco-housing.org](http://www.treco-housing.org)

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