

Apartment Building in Brogården, Alingsås SE

PROJECT SUMMARY

Between 1963 – 1973 about one million apartments were built in Sweden, “the million-programme”. Now 30-40 years later, they are in great need of renovation. In Alingsås, 300 of these apartments will be renovated to passive house standard.

SPECIAL FEATURES

Balconies moved to hang outside facades to decrease thermal bridges

ARCHITECT

efem architects
www.efemarkitektkontor.se

OWNER

Alingsåshem



IEA SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Before



Planned design after renovation
(Picture: Helena Westholm, efem architects)

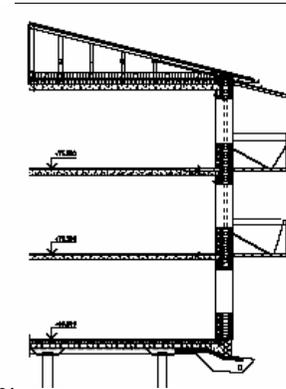
BACKGROUND

The Brogård housing estate with 300 apartments built 1970 is in great need of renovation. The tenants complain about draughts and cold apartments and the facade exterior has mouldered away. The apartments are not suitable for elderly or disabled persons. Renovation is needed in any case and energy aspects are to be included. Initially, one building with 18 apartments will be renovated and serve as a demonstration project. Renovations following this demonstration phase will profit from the experience gained. The project will be monitored after completion of the renovation.

RENOVATION MEASURES

- Added insulation (ground floor, exterior walls and roof)
- New facade material
- New windows
- Increased air-tightness of the building envelope
- New balconies relocated to outside the facade
- New build entrance vestibules
- New ventilation system with heat exchanger
- New energy-efficient household appliances
- Solar collectors for domestic hot water

Section
(new construction)



Ground floor
(existing)





Existing facade with thermal bridges



Worn out facade material

IMPROVED CONSTRUCTION

Floor construction *U-value: 0.26 W/(m²·K)*

(interior to exterior)	
Particle board	22 mm
Expanded polystyrene EPS	110 mm
Moisture barrier	5 mm
Concrete (existing)	180 mm
Plastic foil (existing)	
Gravel (existing)	150 mm
Total	467 mm

Wall construction *U-value: 0.12 W/(m²·K)*

(interior to exterior)	
Interior plaster (existing)	13 mm
Wooden beams + mineral wool (existing)	100 mm
Insulation board	80 mm
Steel beams + mineral wool	195 mm
Steel beams + mineral wool	45 mm
Insulation board	50 mm
Exterior facade material (not yet decided)	
Total	483 mm

Top floor ceiling/Attic floor

U-value: 0.10 W/(m²·K)

(top down)	
Concrete (existing)	160 mm
Mineral wool (existing)	150 + 30 mm
Loose wool insulation	200 mm
Total	540 mm



Improvements of the outdoor area



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

	Before	After
Attic floor	0.21	0.10
Walls	0.32	0.11
Ground construction	0.44	0.26
Windows *	2.0	0.85

*Including frame

BUILDING SERVICES

Each apartment has its own air-to-air heat exchanger with 85% heat recovery efficiency. Heat is delivered to the apartments by the air system with an air to air heat exchanger. Heat for space heating and domestic hot water is supplied by solar collectors and district heating.

RENEWABLE ENERGY USE

No final decision taken regarding solar thermal system.

ENERGY PERFORMANCE

Space + water heating

Before: 145 kWh/m²a

After: 55 kWh/m²a

Reduction: 62%

INFORMATION SOURCES

Janson, U., February 2008, *Passive Houses in Sweden*, Lund University (English)

http://www.ebd.lth.se/forskning/passivhus_demonstrationsprojekt/

Brochure author

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