SVENSKA TERMOTRÄ® AB

INFORMATION ABOUT

THE COMPANY,

OUR PRODUKT

AND

REFERENCES

How it all began

The company was founded in 1984 by Reidar Berglund, a constructional heating and ventilating engineer with many years of experience as an energy adviser. His job was to develop energy saving systems for the industry as well as for small houses and blocks of flats.
In connection with the rehabilitation of old houses Reidar Berglund constantly came across the old method of using saw dust for insulation. He was highly impressed by this material, as the houses insulated with sawdust were not damaged by mould. In spite of simple ventilating systems and with no plastic sheeting the indoor climate was good, contrary to then valid methods.
According to all he had learnt, these insulation and construction methods could not possibly work. But they certainly did. Among these houses Reidar Berglund did not find any sick building. However, the sawdust had certain drawbacks. In the course of years the sawdust sank, causing cavities in the walls. The consequence was a deminished insulation capacity.

Development work

Due to his background, Reidar Berglund started the development of a thermal insulation material that would make use of the advantages of the natural wooden raw material and avoid the disadvantages.
He examined the insulating properties of various natural products - not only wood - and of various shaping. He thereby found that sawdust gave an optimal insulating result when made lighter and with more finely divided fibers.
Then the problem with sinking was examined. This was done partly by means of a shaking test exposing the fibers to vibrations ten times as strong as is realistic for town buildings. Reidar Berglund then developed a dry insulating method enabling the inspection and control of the insulation before the inside wall is covered.
Parallel with this development the fire-resistance of the product was examined and improved to the very good properties of today.
Svenska Termoträ AB, together with its retailers and contractors, has drawn up and finally stipulated exact guidelines for the installation of this material.
Many years' work on the technical development of the material has resulted in the first-rate product offered today under the name Termoträ.

Customer and institute comments

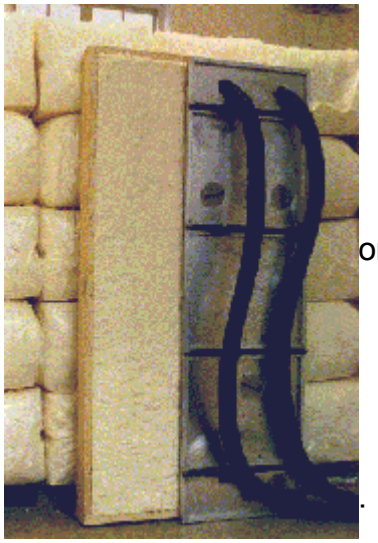
Having finished its own development work, Svenska Termoträ AB assigned the testing of the product to independent institutes. The tests, performed by the National Institute for Materials Testing, Trätek, The National Board of Housing, Building and Planning and the Clinic for Environmental and Occupational Medicine, all confirm the test results obtained by Termoträ. This is an objective confirmation that Termoträ has chosen the right, environmentally friendly way for the past twelve years.
This is further confirmed by the customers expressing their satisfaction of having achieved very good insulating results as well as a better indoor climate.

The thermal insulation with TERMOTRÄ® should not only be considered as a technical solution.

This natural material produces a pleasant atmosphere impossible to describe correctly in a pamphlet. We therefore suggest you to contact the nearest retailer and/or contractor for a visit in order for you to form your own opinion if we will be your right partner when choosing your insulation material.

A personal visit will also provide you with more verbal as well as written information about TERMOTRÄ®.

Walls



Inspectable insulation process with the RP-2001-method
With the RP-2001 insulating form the loose-fill insulation could be installed in vertical frames of varying width and height without problems and with no risk of sinking. The frame is covered only on one side. On the other the form temporarily acts as covering. When the cavity is filled, by blowing with one or two hoses, the form is removed. The result can be inspected immediately and this dry method enables the erection of the covering without delay. Field of application: New production.

Advantages:
· a guaranteed 100% adhesion to tubing, nogging pieces, covering sheets, electric installations
cheaper wall constructions – no extra laths on the inside wall against blowing pressure
· no making of holes in the sheets
· no open capping plate
· no risk for sagging sheets
· standard approval certificate

The wet-spray method
This is a supplement to the form blowing method suitable for rough walls, with many inlets where it is difficult or even impossible to find enough free space for the hose. This method is also utilized for walls needing an insulation of no more than 15 cm. The method has one drawback. The added moisture must be carefully dried before the inside covering is erected. As many external circumstances affect the drying procedure it is impossible to specify the exact time. A moisture ratio of maximally 20% is an adequate upper limit before covering. Field of application: old buildings, new buildings, rebuilding.
Advantages
· Especially when rebuilding. With an existing, insulated wall in need of supplementary insulation. When several air discharge pipes etceteras are installed in the supplementary insulation
Drawbacks:
· cannot be installed in outside walls during wintertime
· drying by heating fans is necessary
· the cycle of drying cannot be specified
· has no standard approval certificate

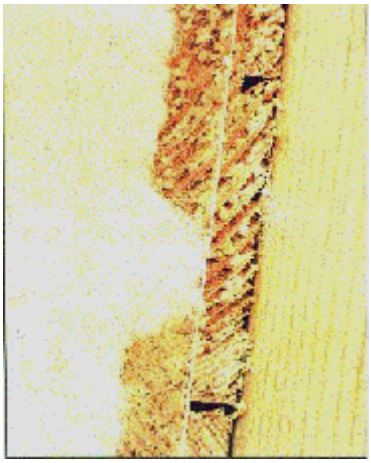
Roofs and walls

Closed spaces
The insulation of closed spaces requires a wide-ranged experience, as the result of this installation cannot be inspected with the naked eye. The same insulating method is used as for form blowing. The hoses are placed at the bottom of the frame and the insulating is effected from the bottom and upwards.
Field of application: Old buildings, new building, rebuilding, prefabricated houses.

Advantages:
· a faster installation procedure than with insulating form

Drawbacks:
· more expensive constructions owing to reinforced construction against pressure when spraying the material.

APPLICATION AND ADAPTATION



Open joists

The open spraying procedure is utilized at easy accessible or open joists in old buildings as well as for new construction. This working method is very common as the cost for heating insulation is repaid quickly by lower energy costs. Field of application: Old buildings, new construction, and reconstruction.

TERMOTRÄ RESULT GUARANTEE

A legally binding guarantee.

TERMOTRÄ FIRE RESISTANCE CLASS

This implies that Termoträ is suitable for the insulation of schools, day-care centers, offices and other buildings where partition walls against fire are required.

LOOSE-FILL INSULATION OR SHEETS

Rough, irregular surfaces are a common problem when insulating. The advantage of loose-fill insulation is obvious. The cellulose fibres adapt themselves to the rough surface and leave no gaps towards covering or crossbars.

SVENSKA
TERMOTRÄ® AB

KVARNGÅRDEN - Three stories wooden house

Project

Kvarngården is situated in Ingelsta in the municipality of Växjö. In a way this is a historical building as the production of new wooden residential houses with more than two stories was forbidden for about 100 years. The reason for this was two devastating fires in the Norrland towns Sundsvall and Umeå in the year of 1988, when these towns were almost totally destroyed.

In the year 1993/94 the Swedish stipulations concerning fire resistance were changed. Nowadays no distinction is made between so called combustible or non-combustible materials. Instead the decisive factor is that the framework must resist the impact of fire during a certain time, e.g. 60 minutes for a four-store building.

Kvarngården is a three-store house with a wooden framework containing flats adapted to old-age housing. The corridors typical for this kind of buildings, and unfortunately rather common, have been broadened and furnished. The windows are placed low enough also to enable those confined to bed to look out. The kitchens are adapted for disabled persons and the bathrooms are commodious. A beautiful as well as harmonious color scheme has been chosen.

The joists and walls of this building have been insulated with Termoträ and this project has also been evaluated by the Lund Institute of Technology, e.g. regarding moisture.

THE LAGGABERG SCHOOL - The school of the future

PROJECT

The Laggarberg school is one of two environment schools in the municipality of Timrå. Both schools are insulated with Termoträ. In addition to traditional knowledge the children in these schools will study the cycle of nature. They are also taught collective responsibility for everyday duties such as cleaning, the running of the compost and the greenhouse, food preparation and serving. The motto of this school is responsibility and consideration.

MODERN TECHNOLOGY

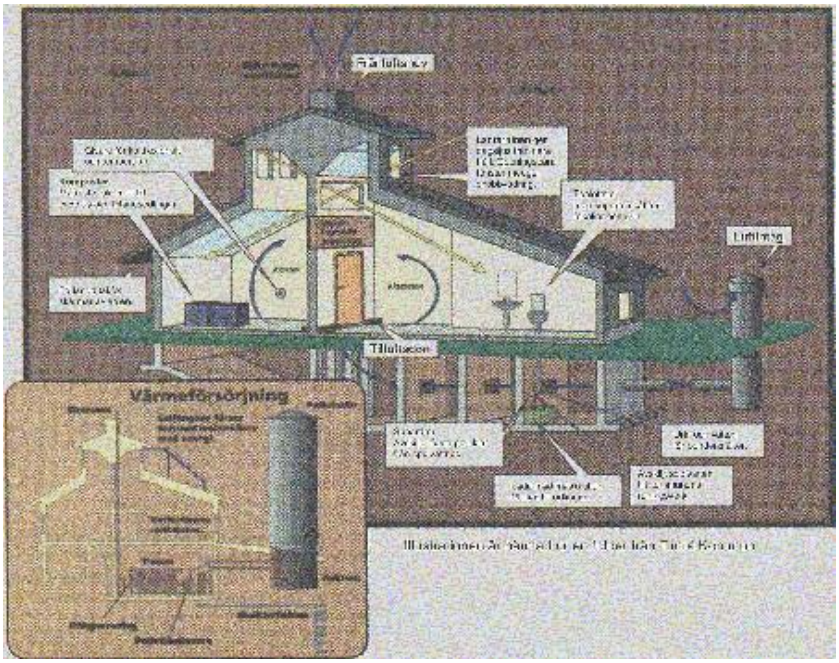
Computers are used as a natural aid for learning and also for internal as well as external communications, maintenance and service. Each computer is connected to the school computer network of Timrå and also to Internet. The pupils have access to portable computers for their homework as well as communication. In this school each child gets acquainted with renewable energy sources, solar collectors and pellets.

BUILDING CONSTRUCTION

This school, run by the local authorities, has been constructed with good building methods. The architecture of the school is adapted to the existing ground and also to the old school on the premises. Thoroughly done construction solutions are characteristic for heating and ventilation.

The walls and roofs are designed according to the Termoträ-concept and the insulation of the walls has been made with the insulation form RP-2001, which means open and totally inspectable walls with no binder after the installation. Among other items wall cavities of up to 7 meter have been insulated.

Laggarberg is only one among many schools, nursery schools and day-care centres that have been insulated with Termoträ.



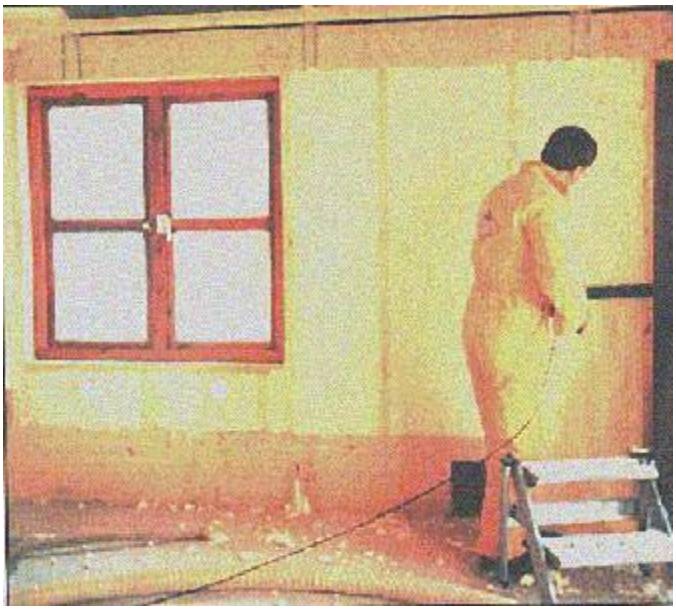
HOTEL LISEBERG HEDEN

Project

Hotel Liseberg Heden is situated on the well-known Heden in Gothenburg. At a comfortable distance to many of the attractions and great events of this town. Here the emphasis is on combining the old way of building with the technique of today. As far as possible the idea of recycling is considered. Only materials harmless to the environment when manufactured and also harmless to the tenants' health have been used. These materials will be possible to recycle.

BUILDING CONSTRUCTION

Windows and doors are recycled. Energy saving is gained by water-saving armatures and automatically on the electric light. Termoträ insulation has been used for the additional building extension. In order to achieve the best possible environmental protection a program covering 37 items has been established.
This project has been awarded an environmental prize from the West Swedish Chamber of Commerce, among others.
For the additional building extension finished during the spring 1996 highly fire-resistant products are demanded. Based on test results and with a Swedish Standard Approval Certificate Termoträ complies with these demands.



After installation in the wall the Termoträ insulation is completely visible and possible to inspect thanks to the new method for dry installation.

THE TUNABERG HOUSING COMMUNITY

Senior dwellings for old people previously active in anthroposophic schools or homes for pedagogical healing.

Project

The Tunaberg housing community in Järna is a block of flats for old people with an anthroposophic background. The upper floor contains eight apartments for healthy old people whereas the bottom floor has a group dwelling for eight persons suffering from senile dementia. In this house people with the same interests and characters live together in their old age.

BUILDING CONSTRUCTION

This building has a concrete body. The wooden infill walls are insulated with Termoträ cellulose insulation - without plastic sheeting - to facilitate moisture movements through the walls, thus creating a more favourable indoor climate.

The roof insulation is Termoträ. Termoträ insulation has also been used for the outside concrete cast gable walls. The concrete reinforcement is grounded to reduce the electric and magnetic fields in the house. The house area is 2x700 m^2.

NATURAL MATERIALS

Natural materials have been chosen all through the house; wooden floors for most rooms, clinker for the wet rooms and linoleum for the remaining floors. The walls are covered with cellulose fabric painted with casein paint and glazed with beeswax glazing. Triple-glazed windows in wooden casements are used. The outside walls are painted with a gray limewash, a mixture of flour, water, ferric sulphate and pigment. All outside joinery parts are painted with linseed oil based paint, blue-green around the windows and red for the remaining parts. Outside plaster as well as inside concrete ceilings are painted with water-glass paint.

When building it was most important to keep the house as dry as possible to avoid built-in moisture. During the summer the concrete was dried and finally became much drier than is demanded for cast-in-situ concrete. The insulation was blown into the walls from the inside. Optimized thermal resistance value was achieved as there was no tubing in the outside walls. As no electrical installations were made in the outside walls there is no closed electricity circle around the apartments.

SILENT VENTILATION

The constructional engineer and professor P-O Nylund has designed a silent ventilating system which has been highly appreciated by the tenants. For the community rooms air intake is placed 3 m above the ground in a shaft. The air falls down to an air chamber in the basement. There the air is warmed to about 21° C. By its own thermal power it then rises up through the house. During the summer season fans on the roof help evacuating the air.

The common extracts are made of stucco (reinforced plaster) to reduce vibration and noise from the fans. All the apartments have their own ventilating systems. The air enters below the windows behind a radiator where it is warmed. It then passes the apartment to disappear through the bathroom or the kitchen.

In the course of the years we have had many spontaneous comments from the tenants as well as from the personnel and even the architect himself.

Comments such as

- what a wonderful house
- the house has a very special, positive atmosphere
- what a nice indoor climate

certainly warms the hearts of all those involved in this project from the start and among these is Termoträ.

SINGLE FAMILY HOUSE in Brandenburg, Germany

In Borkwalde, about 5 km south-west of Berlin, Termoträ has insulated a demonstration house for the Swedish house builder Sjödalshus, among other projects. This house was prepared for the use of rainwater as well as solar collectors and the ecological aspects were considered in particular.

Further facts concerning the above mentioned building:

Builder:	Sjödalshus Inter GmbH, Borkwalde
Place:	In Borkwalde, Elsa Beskow Weg 19
Built:	In 1996
Type of house:	A single-family house of 172,3 m^2 dwelling space plus the basement of 75,0 m^2. Only natural construction materials were used and all PVC-materials were avoided.
Framework:	Wood panelling, wooden framework, TERMOTRÄ insulation, natural plaster.
Roof:	Tiled roof from natural materials.
Inside:	Paints with natural solvent, wallpaper and glue from cellulose.
Heating:	Natural gas and heat pump.

THE BRISTOL HOUSE - From seaside hotel to offices

PROJECT

This house was built in 1889 to serve the industries of the town of Södertälje, among them Astra. In 1995 it became a renovation object. For many years the hotel offered accommodation for the night to working guests in this town. The municipality of Södertälje has now converted this old seaside hotel to an office building. With the utmost care the old style has been preserved in a new form.

BUILDING CONSTRUCTION

The house was renovated with great caution architecturally as well as technically. The original materials in this house have been recycled when possible. Old building techniques and materials have been utilised. Termoträ has been used for the additional insulating of walls and roof. During the course of the renovation various tests have been performed on the installed insulation. These test results have all been excellent. As this is a renovation object many special constructional solutions have been carried through.

Northern Sweden

The municipality of Timrå +46 60- 16 31 00	The Laggarberg school	Attic, wall and acoustic insulation of inside walls	1 500 m^2
The municipality of Timrå +46 60- 16 31 00	The Söråker school	Attic, wall and acoustic insulation of inside walls	2 000 m^2
The municipality of Sundsvall +46 60-19 10 00	The Vallen school	Wall, Roof	2 000 m^2
The diocese of Uppsala +46 278-470 47	The Undersvik diocesan center	Total insulation	500 m^2
The municipality of Strömsund +46 670-161 00	Nursing home in Hoting	Wall, Attic	1 300 m^2
The flower fund foundation +46 63- 12 30 70	New construction of dwellings in Östersund	Wall, Attic	750 m^2

Central Sweden

The municipality of Sandviken +46 26-24 00 00	The school of Jernvallen	Wall, Attic	500 m^2
The municipality of Sandviken +46 26-24 00 00	Åsgårdens old people's home	Wall, Attic, roof	600 m^2
The municipality of Gävle +46 26-17 80 00	The Åbyggeby school	Wall, Attic	500 m^2
The municipality of Gävle +46 26-17 80 00	The Ytterharnäs School	Wall, roof	700 m^2
AB Gavlegårdarna +46 26- 17 27 00	Block flats	Attic joist floor	50 000 m^2
The municipality of Tierps +46 293-180 00	The Vallskoga day care centre	Wall, Roof	500 m^2
The Orienteering club	The Gagnef Orienteering	Total insulation	500 m^2

house in Mockfjärd +46 241-205 28 Stig Lund	Club house in Mockfjärd		
The municipality of Smedjebacken +46 240-66 00 00	The Hagge School	Total insulation	1 000 m^2
The City of Västerås +46 21-16 00 00	The Dingtuna church school	Total insulation	940 m^2
T:F. Bygg Fagersta +46 223-540 89	Shared residential accommodations	Wall, Attic	340 m^2
The Pytagoras Foundation Norrtälje +46 176-100 49 Fred Andersson	Ancient protected building used as foreman dwelling	Total insulation	120 m^2
The municipality of Norrtälje +46 176-710 00	Nursing home at Länna school	Wall, Roof	400 m^2
The municipality of Södertälje **AB Täljebostäder** +46 8-550 297 00	The Bristol cultural building	Walls, roof, pitched roof	1 800 m^2
The housing community of the Tunaberg foundation +46 8-33 69 00 Birger Wärm	Nursing home and home for elderly people	Attic, Walls	700 m^2

Southern Sweden

The Vadstena Properties +46 143-137 20 Sören Nicklasson	The sea district of Vadstena, part I and II	Attic, Pitched roof	
The municipality of Ulricehamns **+**46 321-270 00	The Tvärred school	Total insulation	800 m^2
Hotel Liseberg Heden, Göteborg +46 31-20 02 80	Hotel	Total insulation	500 m^2
Värendshus, Växjö +46 470-304 25	Kvarngården in Ingelsta New construction of home for elderly people, three-store wooden building	Total insulation	1 800 m^2
VÖFAB, Växjö +46 470-410 00	New cunstriction of day-care centre and multi cultural nursery, in Gustavslund	Total insulation	550 m^2
The National swedish Environment protection board, Stockholm +46 8-689 10 00 Anders Bergqvist	New construction, Nature room Ottenby, Öland	Total insulation	470 m^2
Jonas Lönnroth, Öland +46 485-551 10	The cape of Ispe	Insulation of four buildings with materials typical for the 19th century	
The municipality of Malmö **School Buildings** **+46 40-34 10 00**	The Riseberga school	Pitched roof	
We also refer to:	About 180 other wooden buildings.		