MAKRON

Industrial Circular Economy Solutions

RECYCLED CELLULOSE INSULATION TECHNOLOGY

MAKRON

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1.1. RECYCLED CELLULOSE FIBER INSULATION PRODUCTION

MAKRON
A Promise to Complete.

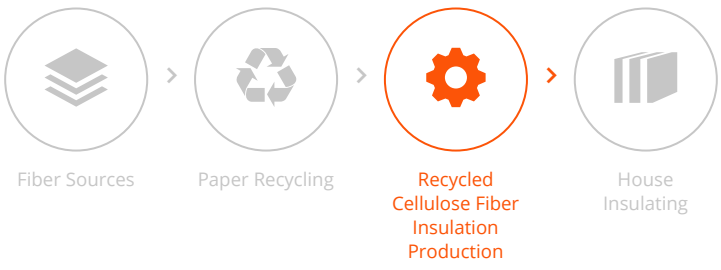
RECYCLED CELLULOSE INSULATION TECHNOLOGY

Recycled cellulose fiber insulation is ecological and healthy.

Recycled cellulose fiber is an ecological and economical thermal and acoustic insulation material, for both new and renovated buildings. It is a green material manufactured from recycled paper. The usual methods of installing cellulose insulation are blowing and spraying, and no cutting of the insulation material is needed. The result is seamless insulation that perfectly fills the entire cavity. These installation methods ensure that the adhesion of the insulation to the insulated structure remains unchanged over the years. Makron has the technology to produce sustainable cellulose fiber thermal insulation from recycled raw material.

Process stages

Excess paper is collected from various sources, for example from print houses and households. The recycled paper is transported to a cellulose fiber insulation production plant. Makron Fibretec production line takes care of the whole cellulose insulation manufacturing process, from receiving the raw material to crushing it, to adding the chemicals and processing the material at different stages, to producing and packing the finished product. The recycled cellulose fiber is then used as thermal insulation in new and renovated buildings by prefabricated house or log house manufacturers, builders and insulation companies.



BENEFITS

GREEN SOLUTION

The embodied energy of recycled cellulose fiber is significantly lower than that of fiberglass or rockwool insulation.

BREATHING MATERIAL

Cellulose insulation evens out the moisture in structures.

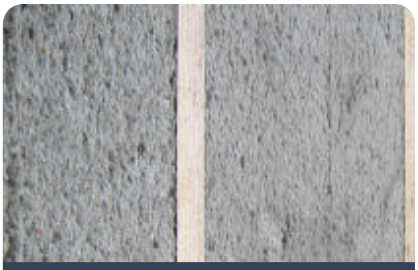
HEALTHY MATERIAL

Cellulose insulation resists rot, fungi growth and pests.

FEATURES

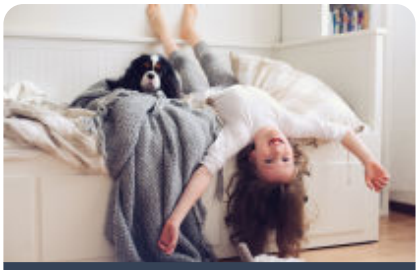
USER-FRIENDLY INSTALLATION

Installing cellulose insulation is easy and safe, and it produces no waste.



SEAMLESS INSULATION

Because of the installation method - blowing or spraying - the cavity is filled perfectly and unwanted air leaks are minimized.



EXCELLENT THERMAL INSULATION VALUES

The thermal conductivity of recycled cellulose fiber is ~0,040 W/mK.

PROCESS STAGES

We deliver complete production lines for recycled cellulose fiber insulation manufacturing.

RECYCLED CELLULOSE FIBER INSULATION PRODUCTION

Makron offers the technology to produce sustainable cellulose fiber from recycled raw material. Our technology makes your production more efficient and delivers a high-quality product. We offer you complete Makron Fibretec production lines according to your volume needs and deliver them with intelligent automation included. We cover every aspect of the project from engineering design to commissioning and staff training. Cellulose fiber is also an excellent additive for asphalt. Our technology enables you to produce both thermal insulation and cellulose fiber additives for asphalt with the same production line. Learn more here.

CONTACT

Contact our experts for more information.

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RECYCLED CELLULOSE FIBER INSULATION PRODUCTION

Makron Fibretec is a complete production line for manufacturing recycled cellulose fiber thermal insulation.

Makron offers the technology to produce sustainable cellulose fiber from recycled raw material. Our technology makes your production more efficient and delivers a high-quality product. We offer you complete Makron Fibretec production lines according to your volume needs and deliver them with intelligent automation included. We cover every aspect of the project from engineering design to commissioning and staff training. Cellulose fiber is also an excellent additive for asphalt. Our technology enables you to produce both thermal insulation and cellulose fiber additives for asphalt with the same production line. Learn more here.

BENEFITS

ALL THE ESSENTIAL FEATURES

Makron Fibretec lines are designed to manufacture recycled cellulose fiber insulation. Our production lines come with all the essential features, including equipment to remove dust and impurities.

THE LINE YOU NEED

All our production line combinations are designed for your needs. Whether your plans are for small or massive production volumes we have the production line you need.

30 YEARS OF EXPERIENCE

We delivered our first recycled cellulose fiber production lines over 30 years ago. And today, we continue to deliver and develop some of the world's most effective cellulose insulation production lines.

EXAMPLES

CELLULOSE INSULATION PRODUCTION LINE

The Makron Fibretec 2000 provides the highest level of technology available in the recycled cellulose fiber insulation manufacturing industry. This production line is optimized for a capacity of at least 2,000 kg/hour.

FEATURES

COMPLETE PRODUCTION LINES

All stages of production can be covered with one complete line. You can choose from three different sizes of production line.

TWO PRODUCTS FROM ONE LINE

With Makron technology you can actually use one line to manufacture both recycled cellulose fiber insulation and cellulose fiber additives for asphalt.

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PROCESS STAGES

Our production lines take care of all the process stages in manufacturing recycled cellulose fiber insulation.

PAPER FEEDING

In the first step of cellulose insulation production the raw material, paper, is fed evenly onto the pre-handling table from where it is moved to the conveyor. On small capacity lines, the impurities are separated manually. On large capacity lines, the raw material has already been purified and baled, and the paper bales are fed onto the conveyor.

WHAT MAKRON DOES

The Makron pre-handling table is designed for manual sorting of loose paper. For larger capacities, Makron delivers automated paper feeding systems for paper bales.

MATERIAL CRUSHING

The raw material is conveyed to the hammer mill or shredder where it is crushed into small pieces for refining. This stage includes a fiber surge bin for intermediate storage. From here the paper pieces are sorted for further processing.

WHAT MAKRON DOES

The Makron Hammer Mill is designed especially for crushing loose paper. Makron also delivers paper shredders for loose or baled paper material.

TECHNICAL DATA

Hammer Mill:

Power	45–75 kW

Shredder:

Power	90 kW

TRASH SEPARATION

After crushing, the material is moved to trash separation where all remaining metal and heavy particles are separated.

WHAT MAKRON DOES

After pre-crushing, metal and heavy particles are removed using a magnet and Makron's heavy particle separator.

DUST FILTERING

Dust filters remove all the dust from the process. Air and dust is extracted at all stages of the process through the filters.

WHAT MAKRON DOES

Makron delivers a whole dust filtering system designed especially for the process. Our filter units operate continuously and they can be cleaned without stopping production. The system automatically cleans itself by closing one section of the filter tubes at a time.

TECHNICAL DATA

Air flow	8,000–13,500 m^3/h
Dimensions	approx. 5,000 x 3,500 x 7,000 mm

CHEMICAL DOSING

At this stage, chemicals are dosed into the recycled cellulose fiber. To produce a better quality product, chemicals can be added to protect against mold and fire. For example, borax and boric acid can be used. The dosing is very accurate and ensures that the right percentage of chemicals is added to the mix.

WHAT MAKRON DOES

Makron delivers chemical feeding devices which are specifically designed for the recycled cellulose production process on the Makron Fibretec line.

TECHNICAL DATA

Motor power	2.2 kW
Screw capacity	240 kg boric acid/hour
Range of adjustment	20–240 kg boric acid/hour
Photo cell observing	

REFINING

The raw material is refined into fibers by the refiner and then stored in the fiber surge bin. Chemicals are also added to the fibers in the refining stage.

WHAT MAKRON DOES

Makron offers refiners for different capacities ranging from 1,000 to 2,000 kg/hour. An alternative solution is the Makron Fine Crusher Hammer Mill.

TECHNICAL DATA

Refiners:

Capacity	1,000–2,000 kg/h
Motor power	100–200 kW; 1,480 r/min
Vibration sensor	

Fine Crusher Hammer Mill:

Rotation speed	2,800 rpm (50 Hz)
Throughput capacity	approx. 1,500 kg/hour
Motor power	110 kW
Required air flow	min. 5,000 m³/h

MATERIAL CONVEYING

Our complete production lines include belt conveyors for paper raw material. After pre-crushing, the material is conveyed by pipe. Our pipelines also include blowers and cyclones.

WHAT MAKRON DOES

Makron delivers special belt conveyors for paper raw material and final product packages. Makron also delivers pipes, cyclones, blowers and air filters for the conveyor system.

PACKING

The finished material, recycled cellulose fiber insulation, can be packed using different packaging technologies depending on your production capacity and needs. Makron's packaging process packs the fiber into paper or plastic bags and presses all the air out to make the package compact and ready to transport.

WHAT MAKRON DOES

Makron's packing systems include surge bins and packing machines, and the cellulose insulation products can be packed in either paper or plastic bags. The plastic packages can be made from either plastic bags or plastic foils.

TECHNICAL DATA

Automated packing into plastic bags

Capacity	approx. 2–3 bags/minute
Bag size	approx. 800 x 400 x 325 mm
Density	approx. 150 kg/m^3
Weight	13–15 kg (adjustable)

Manual packing into plastic or paper sacks

Package dimensions	approx. 100 x 50 x 25 cm
Diameter of the inlet	130 mm
Density	approx. 120 kg/m^3
Weight	13–15 kg

TECHNICAL DATA

Technical data of Makron Fibretec recycled cellulose insulation production lines

	Makron Fibretec 1000 Basic economical system	Makron Fibretec 1500 Automated system	Makron Fibretec 2000 Advanced & automated system
Effective capacity	1,000–1,200 kg/h, 70–80 bags/h	1,500–1,800 kg/h, 100–120 bags/h	2,000 kg/h, 135 bags/h
Required space	~400 m^2 + ~300 m^2 for storing the raw material and final product	~400 m^2 + ~400 m^2 for storing the raw material and final product	~450 m^2 + ~600 m^2 for storing the raw material and final product
Free height of the hall	Min. 8,000 mm	Min. 9,000 mm	Min. 9,000 mm
Power supply	400/230 V, 50 Hz; connected power ~365 kW (without optional items)	400/230 V, 50 Hz; connected power ~465 kW (without optional items)	400/230 V, 50 Hz; connected power ~485 kW (without optional items)
Compressed air supply	0.6–0.7 MPa, ~600 l/min	0.6–0.7 MPa, ~600 l/min	0.6–0.7 MPa, ~600 l/min
Water supply	0.2–0.6 MPa (only with optional spark detection system)	0.2–0.6 MPa (only with optional spark detection system)	0.2–0.6 MPa (only with optional spark detection system)
Operators	4–5 persons/shift	2–3 persons/shift	2 persons/shift
Auxiliary equipment	1 forklift, 1–2 hand pallet trucks	1 forklift, 1–2 hand pallet trucks	1 forklift, 1–2 hand pallet trucks

CONTACT

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MAKRON

Makron is a trusted partner to modernize industrial production processes. We support industrial companies to develop their business – from R&D and piloting to modernizations and boosting production efficiency. We improve productivity through automation and digitalization and build sustainable production and intralogistics solutions that adapt to future needs.

Makron is a 50-year-old family-owned company. With headquarters and electrical control cabinet manufacturing in Lahti, Finland, and machine manufacturing in Estonia, Makron has a revenue of 19 MEUR (2024), and we employ over 100 professionals.

Makron – Completely industrial.

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