



LAHTI
PRECISION

100 years of experience

Solutions for the glass industry



Lahti Precision

your partner in raw materials technologies

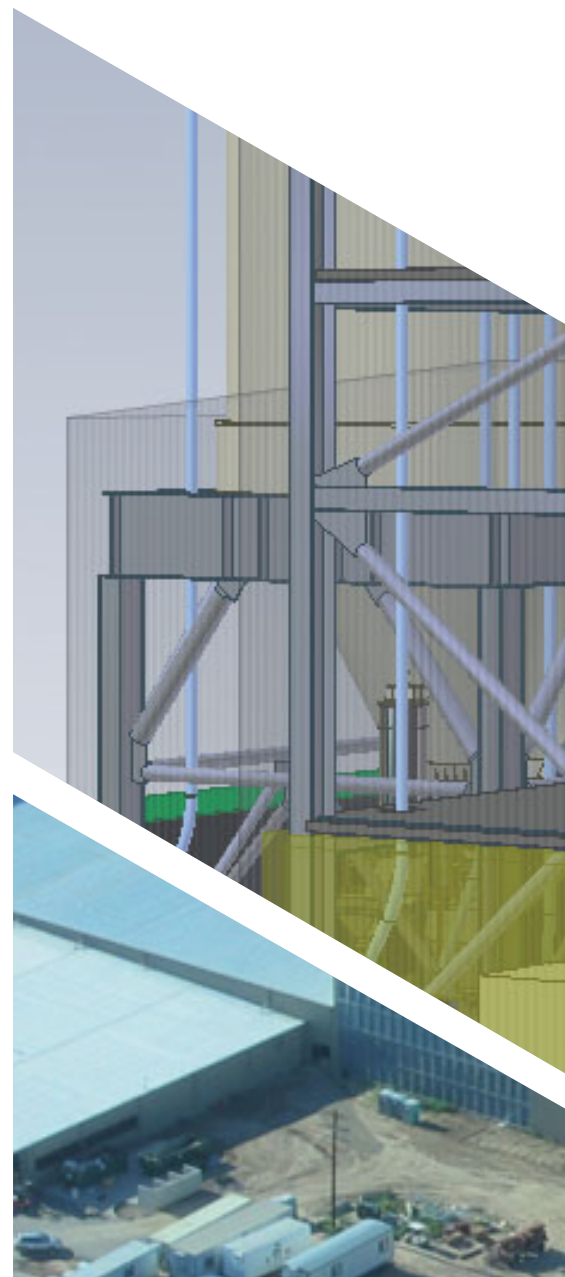
Companies of all sizes all over the world have selected Lahti Precision as their supplier of batch plants, cullet recycling systems, waste fiber glass recycling systems, engineering studies, and plant modernizations. With over 200 references, everyday more than 50 000 tons of raw materials are processed with the aid of Lahti Precision's technology to be melted to the highest quality standards required for float glass, bottles, strong reinforcement fibers, warm insulation wool, flat TVs, LCD panels, bright tableware, and various other glass products.

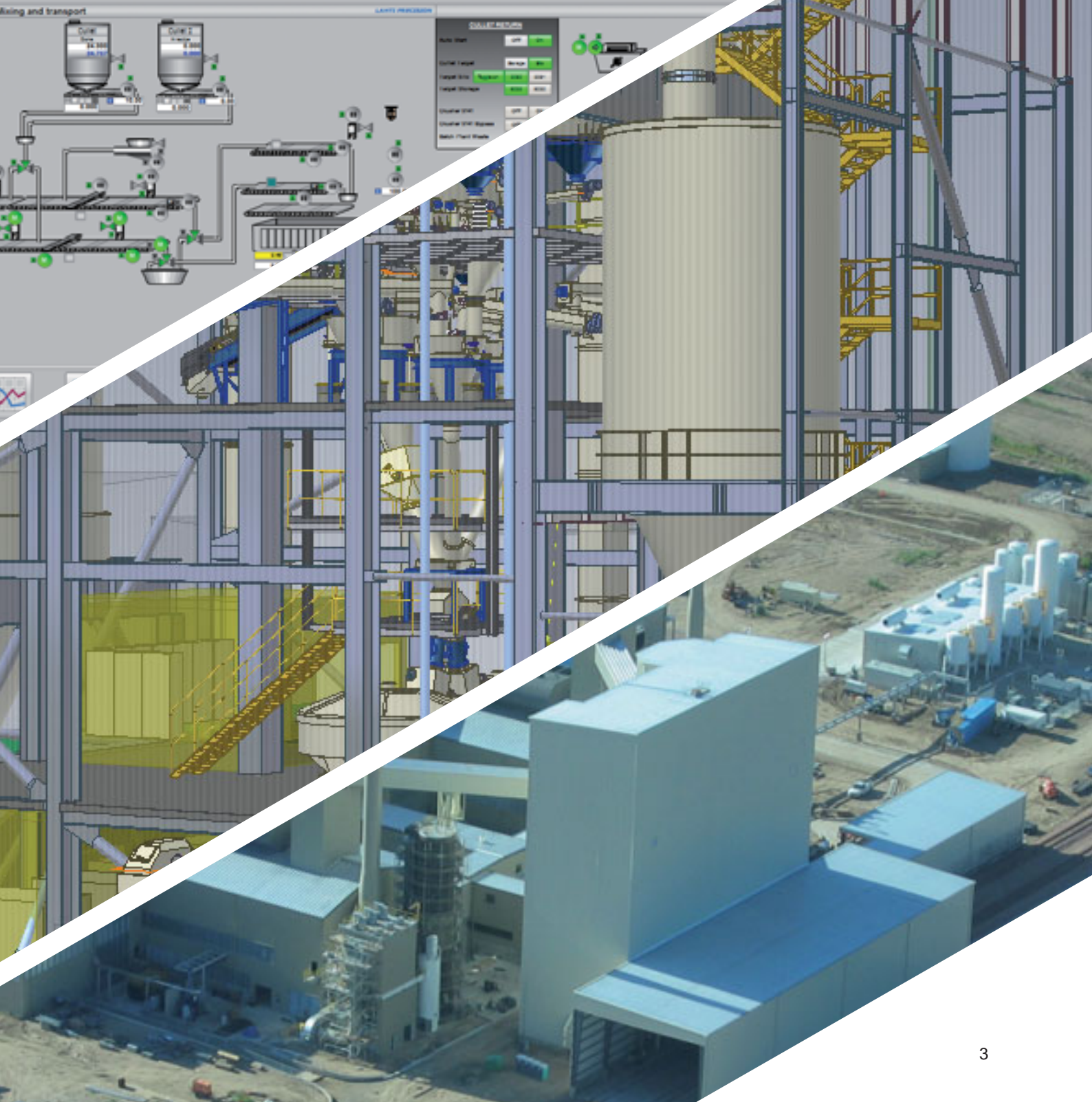
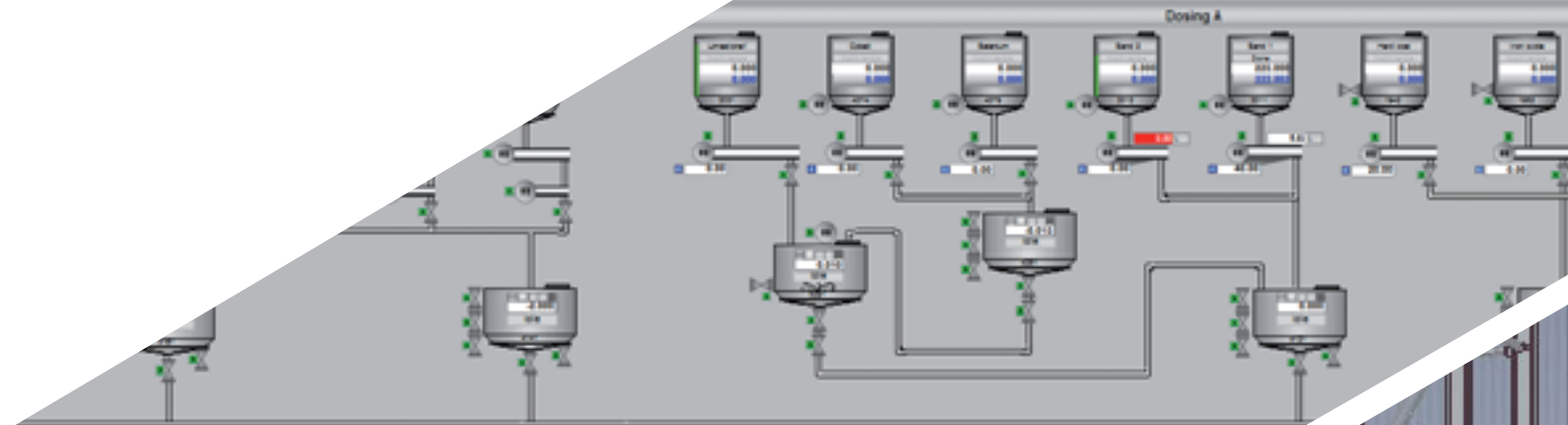
RAW MATERIALS SOLUTIONS FOR THE GLASS INDUSTRY

The production of high quality glass begins in the batch plant, where the raw materials are precisely dosed and mixed to form homogeneous batches. Lahti Precision's compact and reliable batch plants incorporate field proven machinery and the latest technology and automation solutions, thus allowing for ease of maintenance, and overall low operating costs.

WORLD-CLASS OFFERING

- Complete deliveries of batch plants and cullet systems
- Dosing and weighing systems and components
- Control systems and components
- Cullet processing and cullet return systems
- Waste fiber glass recycling systems
- Batch plant modernizations and control system upgrades
- Energy efficiency improvements
- Wide range of services





Process expertise enabled



1 Material intake

Material intake systems available to meet customer requirements, for example:

- Train wagon discharge downwards to drive on hopper
- Bulk truck discharge with effective dust receiving units
- Big bag unloading unit connected to daily hopper or pneumatic transport unit
- Dust free breaking and discharging of small bags in protective cabinet
- Effective vibratory feeders or screw feeders for receiving hopper discharge
- Robust bucket elevators for lifting raw materials to the silo top
- Specially lined chutes and diverter gates as well as rotating distributors for transfer on silo top to silos
- Controlled security operations to guarantee correct material discharge to each silo

2 Raw material storage

Optimized silo dimensioning based on customer requirements

- Silo volumes to meet daily storage needs taking into account powder flow properties
- Steel or concrete construction
- In-line or tower type construction
- Application of the most suitable silo discharging techniques to enable mass flow in the silo

3 Dosing and weighing

Application of the most suitable dosing equipment and scales for different materials to obtain the best dosing accuracy for each raw material

- Bin activator or fluidization elements to enable even and steady silo discharge
- Screw feeders, vibrating feeders, belt feeders, double dosing flaps and fluidization hoses for dosing depending on raw material properties
- Application of hopper scales with or without auto test silos equipped with load cells
- Application of cup scales for minor ingredient weighing
- Application of belt scales for cullet dosing

by proven technologies

4 Mixing

Homogeneous mixing result secured with dedicated glass batch mixers

- Lahti MBV – series mixer
 - Specifically designed for glass batch mixing
 - Excellent batch homogeneity
 - Easy maintenance due to simple construction
 - Low wear rate of mixing tools and liners
 - Low energy consumption
 - Water and steam injection gears for wetting and heating batch

Ability to integrate other mixer brands according to client's preference. Lahti Pneumatic Blender/transporter for fiber and special glass production.

5 Batch and cullet transport

Transport systems for secure batch and cullet transport to the furnace

- Mechanical conveying systems comprising of belt conveyors and/or bucket elevators
- Magnets, metal detection and rejection of contamination to protect the furnace
- Chutes and diverters with liners designed for low wear and even flow
- Pneumatic batch transfer alternative for dry batch to furnace hopper
- Cullet dosing applications integrated to the transfer line that enable all time cullet feed

6 Furnace hopper systems and furnace charging

Consistent and reliable furnace charging

- Level controlled shuttle conveyor for float furnace hopper filling
- Daily hoppers mounted on load cell for accurate level control
- Engineered hopper discharge prevents blockages
- Merkle-Lahti furnace chargers
- Special furnace chargers applying loss-in-weight technology
- Emergency charging systems





7 Factory cullet return and external cullet handling

Robust cullet handling systems for the most reliable operation

- Internal cullet return
- In-line breakers and receiving hoppers
- Secondary breakers to enable correct cullet size
- Oil, heat, wear resistant belt conveyor depending on application
- Water cooling scraper conveyors for hot end
- Bottle and cullet crushers for internal and external cullet depending on application
- All cullet contacting surfaces wear protected with nickel free liners

8 Dust suppression

Complete system expertise to yield the cleanest environment

- Individual dust filters or centralized dust evacuation depending on application
- Correctly sized and balanced dust suction ductwork and filtering area
- Burnley baffles, conveyor skirt boards, dust hoods, winnowing towers, dust seals and precisely designed details comprising a complete package to reach dust free environment

9 Control system

Reliable, safe and easy to use plant automation

- Field instrumentation to secure safe operation and adequate signalization
- Hardware based on worldwide brands to follow customers' preference
- Software developed to satisfy the most demanding reporting needs; Batch Information Management System (BIMS)
- Connectivity to enterprise resource planning (ERP), like SAP
- Unbeatable dosing controller WA-951 with advanced connectivity, speed and accuracy
- Operator interface with comprehensive graphics and user intervention in several operation modes
- Advanced security features and interlocks to prevent human error
- Remote and wireless access thru VPN connectivity

Plant modernizations

Lahti Precision has extensive experience in the modernization of batch plants of all types. Its systematic approach to auditing production facilities and understanding client needs enable it to modernize batch plants supplied by Lahti Precision as well as other third parties. Typical client needs include capacity increases, changes in raw material logistics, product changes, new colorants and raw materials, dust control, control system changes, reporting, communication between IT systems, certification, and many others.

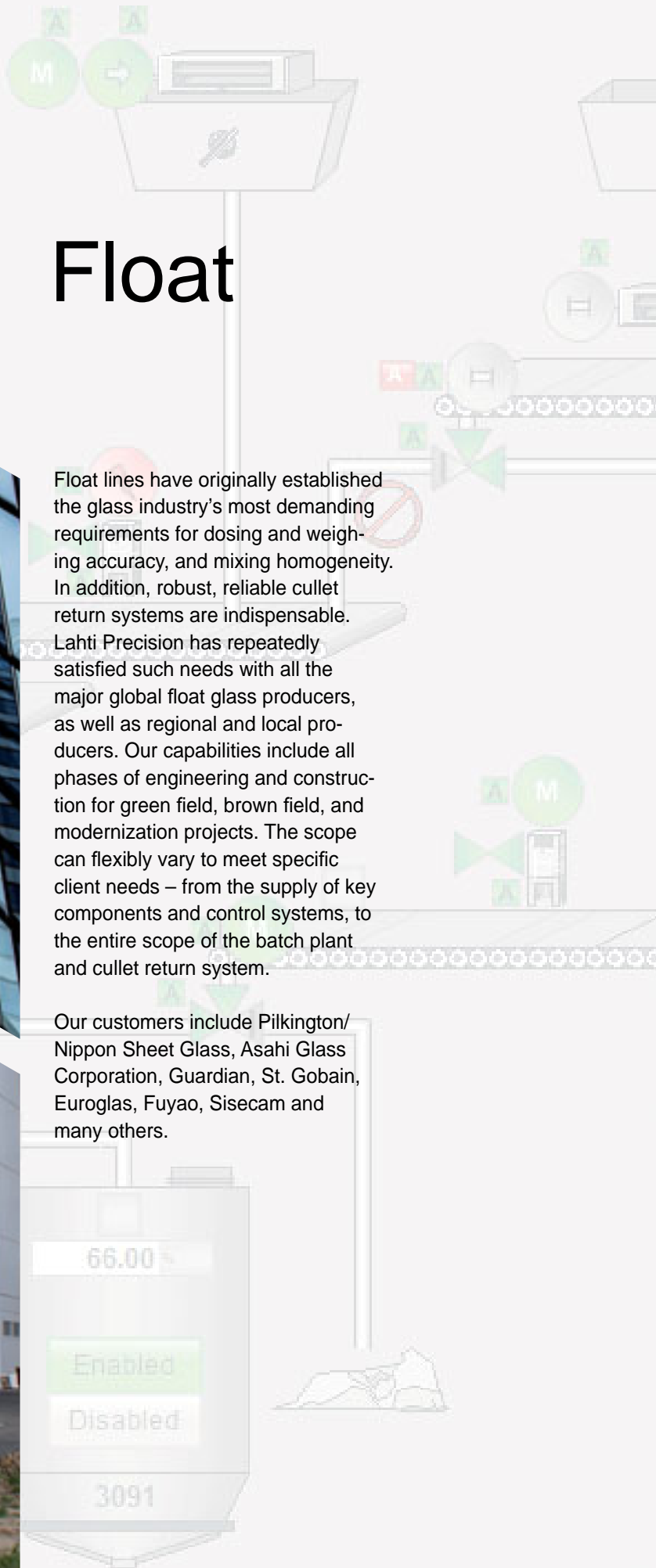




Float

Float lines have originally established the glass industry's most demanding requirements for dosing and weighing accuracy, and mixing homogeneity. In addition, robust, reliable cullet return systems are indispensable. Lahti Precision has repeatedly satisfied such needs with all the major global float glass producers, as well as regional and local producers. Our capabilities include all phases of engineering and construction for green field, brown field, and modernization projects. The scope can flexibly vary to meet specific client needs – from the supply of key components and control systems, to the entire scope of the batch plant and cullet return system.

Our customers include Pilkington/Nippon Sheet Glass, Asahi Glass Corporation, Guardian, St. Gobain, Euroglas, Fuyao, Sisecam and many others.



Container

The production of light weight bottles has led to demanding batch quality requirements similar to those of float glass producers. Lahti Precision batch houses allow for reliable, clean, and safe operation. Handling systems for additives are easy and safe to operate. Cullet handling systems are robustly built to meet the demands of modern container plants. Our capabilities include all phases of engineering and construction for green field, brown field, and modernization projects.

Our customers include Owens-Illinois, SiseCam, Mulia Glass, JSC Russtek, Parkcam, Pol-Am-Pack and many others.



Fiber

Lahti Precision has developed unique, completely pneumatic batch plant technologies for reinforced fiber glass production. The know-how is based on our patented fluidization technology originally used in plaster and mortar dry mix batch plants.

Traditional screw feeders are replaced with air slides and double dosing valves. The only moving part is the dosing valve. Mixing takes place in a unique pulsating pneumatic blender, after which the batch is transported pneumatically to the furnace silo. The unique technology allows for simpler layouts, easier maintenance, and reduced operating costs.

Through cooperation with a key client, Lahti Precision originally pioneered an innovative system to recycle fiber forming waste. The unique process does not require energy-intensive grinding and incorporates simple transport systems – thus yielding low operating costs, high yield and availability, and very quick payback times.

Our capabilities include all phases of engineering and construction for green field, brown field, and modernization projects. The scope can flexibly vary to meet specific client needs – from the supply of key components and control systems, to the entire scope of the batch plant and related fiber recycling systems.

Our customers included Owens Corning, PPG, St. Gobain, China Southern Glass, Taiwan Glass, and many others.



Tableware

Several additives for bright colors and ultraclear glass are commonly needed in tableware production. Precise minor ingredient dosing can be secured by using Lahti Precision's solutions, which can form an automatic or semi-automatic premix system or direct addition of the additives to the batch mixer. Through careful design, contamination due to wear or material leakages is minimized.

Our customers include Mulia Glass, Noritazeh Glass, Kaveh, Krosno and many others.

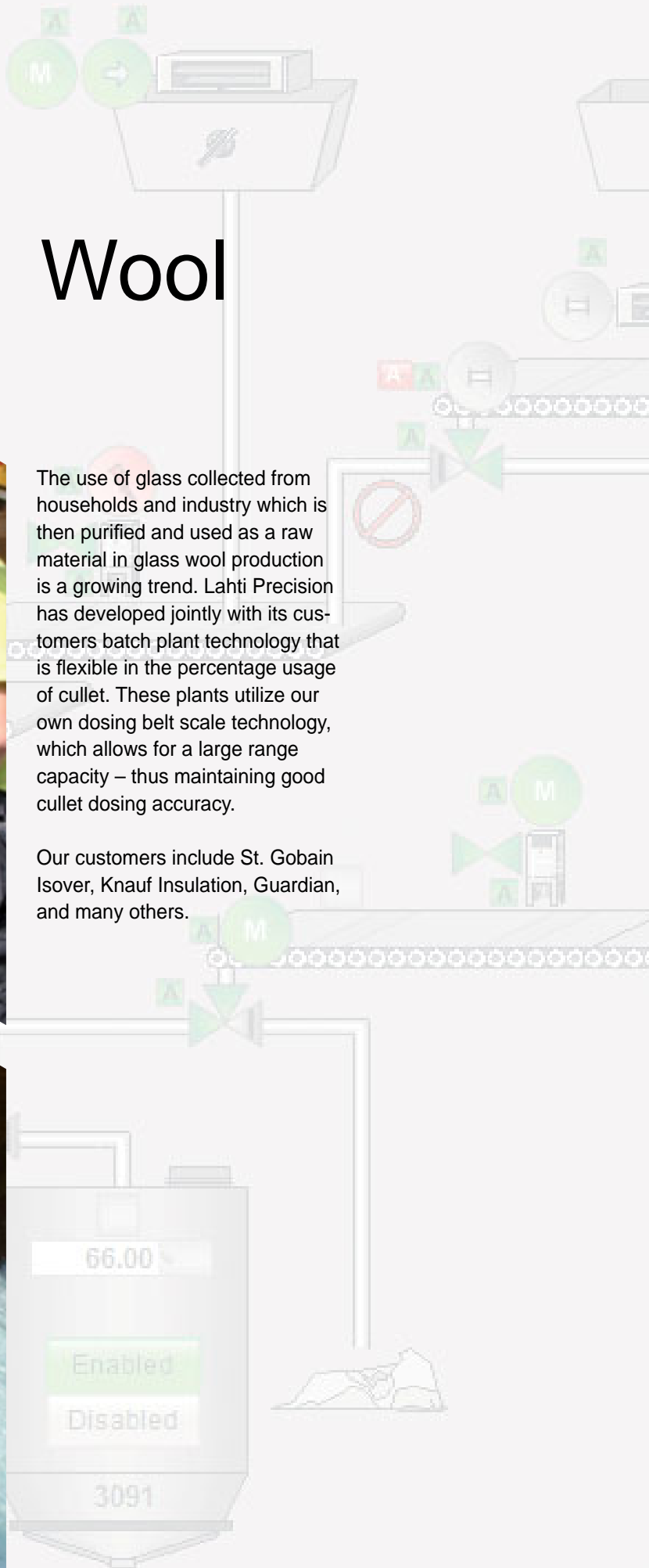




Wool

The use of glass collected from households and industry which is then purified and used as a raw material in glass wool production is a growing trend. Lahti Precision has developed jointly with its customers batch plant technology that is flexible in the percentage usage of cullet. These plants utilize our own dosing belt scale technology, which allows for a large range capacity – thus maintaining good cullet dosing accuracy.

Our customers include St. Gobain Isover, Knauf Insulation, Guardian, and many others.



Special glass

LOW IRON GLASS

In solar applications very high transparency is one of the most critical requirements. Special attention for iron contamination, which reduces transparency, in raw materials should be taken care of in a Batch Plant dedicated for low iron glass production. Lahti has a special design for material flow, special materials for contacting surfaces and raw material purification fulfilling such requirements. Also modification of an existing batch plant is possible for low iron production. Please contact us for additional information.

ULTRA THIN GLASS

Glass production for smart phones, tablets, flat TV sets and other electronic devices requires special technology. That starts from the batch plant, which has special features compared to a standard plant. Valuable raw materials and ingredients are exclusively protected against contamination. Segregation of the batch is avoided by automatic batch container transfer replacing conventional batch transport. References are available upon request.

BOROSILICATE, TECHNICAL AND ART GLASS

Lahti Precision's expertise in batch plants covers also technical glass production; sodium silicate glass, borosilicate glass, foam glass and funnel glass. For art and decoration glass Lahti Precision has also references. So practically all kinds of glass production and their special requirements are familiar to us.



Experience that weighs



Lahti Precision started manufacturing scales in 1914. Today our company is an expert in dosing, weighing and mixing applications supplying batch plants for the glass industry, drymix plants and services globally. Our vast experience in core technology guarantees



excellent dosing accuracy and consistent mixing quality. We help our customers to succeed in their own production by working closely together, finding the best solutions for the actual need. This ensures our customers the lowest cost of ownership.



Experts at your service

to improve your production performance and reliability

WIDE RANGE OF SERVICES FOR THE GLASS INDUSTRY

Engineering

- Plant layout design
- Static calculation and load data
- Basic and detailed design of silos and building
- Assembly and installation drawings and part lists
- Electrification and control system
- Process control software

Supervision and coordination

- Project and site operations
- Mechanical erection of the plant and machinery
- Control system and electrification

Start-up

- Process machinery
- Testing and calibration
- Setting up and testing of the control system and instrumentation

Training

- Maintenance and service personnel as well as operators

Spare parts

- Spare part recommendations, supplies and support

Upgrading and modernisation

- Upgrading of control systems in flight
- Major upgrading during cold repair of the furnace
- Extension and capacity increase of the batch plant

Pre-inspection service

- Regular inspection of all batch plant machinery to improve production performance and reliability
- Detailed inspection report with recommendations for instant repairs and spare parts



Lahti Precision Oy
Ahjokatu 4 A, P.O.B. 22
FI-15801 Lahti, Finland
Tel. +358 3 829 21
Fax +358 3 829 4100
general@lahtiprecision.com
www.lahtiprecision.com