Luwa

Part of the Nederman Group

Spinning Applications

Textile Air Engineering

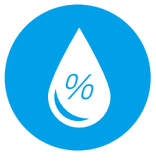
luwa.com

Take control of your Textile Air Engineering

Connected. Clean Air. Performance.

High-performance textile mills have great demands on room climate and process air.
Air engineering plays a vital role in controlling these conditions and providing the necessary climate for machines and processes.

Air engineering requirements:



Humidity

Temperature

Machine Exhaust

Room Cleanliness

Efficient air engineering is paramount for cost-efficient production. Using highest efficiency components in the air conditioning and humidification plant in combination with digital controls, ensure a future proof mill.

Luwa provides Textile Air Engineering for:

- A/C Plant
- Humidification Plant
- Fibre Depositing Plant
- Dust Collection
- Bale Press
- Monitoring and Control
- Overhead Travelling Cleaner
- Ceiling Cleaner Circulaire
- TexGuard Spark Protection
- Vacuum System

Luwa serves the entire textile value chain from the fibre to the textile and related industries.
Air engineering products from Luwa are used in:

- Synthetic Fibre Spinning
- Synthetic Filament Spinning
- Staple Fibre Preparation – Sliver / Web formation
- Ringspinning
- Open End Spinning
- Airjet Spinning
- Textile Lab Air Conditioning
- Yarn and Filament Conversion
- Weaving Preparation
- Weaving, Rapier – Airjet – Waterjet
- Knitting
- Nonwovens Fibre consolidation
- Diaper and Feminine Hygiene Products
- Tyre Cord
- Tyre Building
- Tissue Paper
- Other applications

Key Factors in Textile & Industrial Air Conditioning

Humidity

Maintaining the correct humidity level is essential for smooth machine operation. Moisture reduces electrostatic charges, especially on synthetic fibres. But higher humidity increases lapping and reduces the effectiveness of disentangling and alignment. Also, breaking forces and elongation are directly influenced by the ambient humidity in the department. Optimum values vary depending on the use of the raw material and its mixture. A higher relative humidity will result in a lower room temperature during the evaporative cooling mode.

Temperature

Not all industrial processes are equally sensitive to temperature fluctuations.
For example, quenching air processes are highly sensitive and must be controlled within a narrow range. Other processes such as weaving are more accepting of daily temperature fluctuations.
However, all processes prefer a constant temperature, as most fibres and yarns are hydrophilic and the moisture sorption capacity changes with temperature. In addition to reducing count variation, temperature control has a positive effect on

- reduced fibre fly in the mill,
- fewer electronic failures of the machine control system and
- a better working environment for the employees.

Daily room temperature fluctuations can be minimized by using refrigerant cooling instead of evaporative cooling, especially during the summer months and monsoon rains.

Machine Exhaust - Fibre Recovery and Disposal

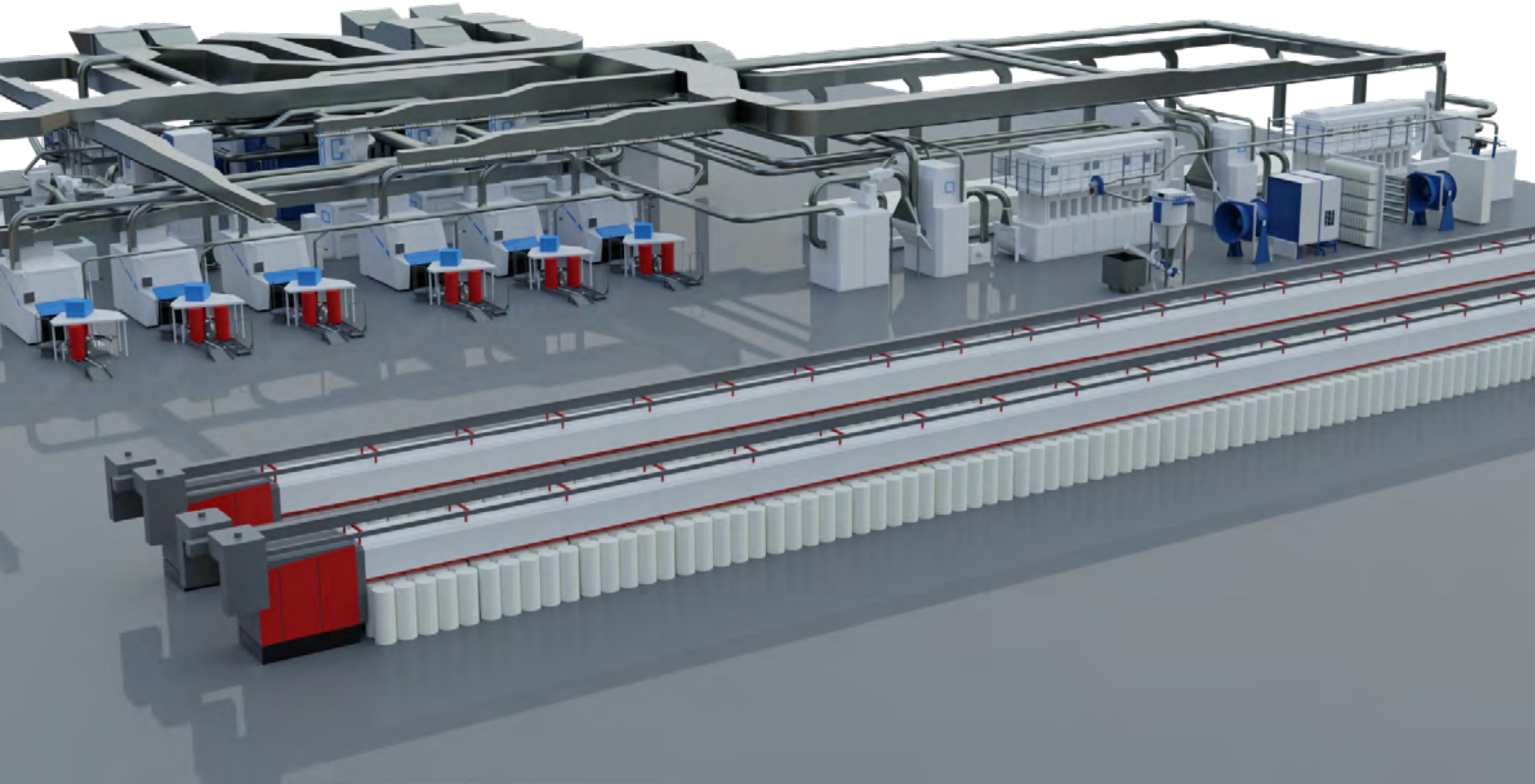
Most spinning preparation machines have integrated suction points that can be incorporated into a fibre deposit system. The fibre separation and dust filtration plant must be designed in such a way that it can handle the required air volume and also the amount of waste fibre.
Depending on the raw fibres used in the plant, several fibre separators can be installed to separate the different materials from each other.
Modern fibre depositing plants are integrated with bailing press systems to automatically store and bale different qualities of waste fibres. This reduces personnel costs and increases the efficiency of the bale press.
The dependency on the fibre depositing system is essential for the operation of the mill. A standstill of either the fibre depositing plant or the bailing system leads to an immediate shutdown of the entire spinning mill.

Room Cleanliness - Fibre Fly / Dust Contamination

In order to prevent unwanted infiltration of dust from the outside, the mill is kept at constant over-pressure. Depending on the outside air contamination, fresh air filters and, depending on the process requirements, supply air filters are required. Local regulations may set Permissible Exposure Limits (PEL) to protect textile workers from byssinosis. Sufficient air changes throughout the mill are required to dilute the dust levels and keep the departments clean and free of fly liberated from the machines.

A balanced air engineering concept offers optimal conditions for the efficient operation of spinning plants.

SCAN ME
to watch an animation
of a spinning plant



Process Air Engineering in Synthetic Fibre & Filament Spinning

Importance of Air Engineering

Tight controls for temperature and pressure at the quench box are a prerequisite for stable operation and a constant yarn/fibre quality. Depending on the application, control of temperature/humidity in the winding area is essential. In addition, efficient air washing and a high capacity of supply air filtration are a necessity. Optionally, an exhaust air quenching or exhaust air filtration can be added and complemented with an enthalpy control for energy-saving.

Economy

- Air Flow from 20,000m³/h to 600,000m3/h per AHU
- Filtration efficiency up to HEPA 13
- Variable air flow automatic control
- Equipment selected and designed for continues operation withremote maintenance

Flexibility

- Designs for indoor and outdoor installation
- Prefabricated air handling units taylor-made in modular design
- Components according to process requirement

Luwa Process Support

- Temperature
- Humidity
- Quench Air Pressure
- Supply Air Filtration

Main System Components

- Radial and Axial Flow Fans
- Air Washer
- Cooling Coil
- Static Air Filters

Textile Air Engineering in Staple Fibre Preparation – Sliver / Web formation

Importance of Air Engineering

Fibre Depositing Plants for blowroom, carding and combing machines are essential. Machine under-pressure is required in order to clean the machines efficiently. The integration of filters in central bale press systems with fibre separation increases the efficiency and redundancy of the systems. Humidity control is essential from opening throughout the sliver and process. Runnability, cleaning efficiency and disengagement difficulties are directly related to excessive humidity levels. Dry fibres, on the other hand, lead to static charges. Temperature control is often neglected in staple fibre preparation. Fibres and sliver weight are influenced by the moisture pressure of the ambient air or the absolute moisture content. To maintain count variation at minimum level, it is important to maintain temperature as well as humidity within a narrow range at each process step.

Economy

- Filter plant sizes up to 200,000m³/h
- Air conditioning & humidification plants up to 800,000m³/h
- Variable air flow control for supply and return air
- Pressure control for machine exhaust
- Equipment selected and designed for continues operation with remote maintenance

Flexibility

- Filter plant designs to handle multiple raw fibre materials
- Up to four independent control zones per air handling unit

Luwa Process Support

- Machine exhaust and fibre recovery
- Temperature
- Humidity

Main System Components

- Radial and Axial Flow Fans
- Air Washer
- Automatic Air Fine Filter
- Air Pre-Filter
- Fibre Separator
- Bale Press System

Process Air Engineering in Ringspinning

Importance of Air Engineering

Ringspinning is the most demanding staple fibre textile process. With department floor areas often exceeding the size of a football field, the air distribution must be carefully planned. It requires a high degree of filtration and air conditioning, as a large amount of fine micro dust and fly is released during spinning. In addition, the spinning machines generate excessive heat. Constant humidity across the entire spinning department is desired, to keep the spindles running beyond 20,000rpm. Lower department temperature reduces the fly liberation and increases the production output accordingly. Enthalpy control combined with adjustable air change optimizes energy consumption.

Economy

- Air Flow from 40,000m³/h to 1,200,000m³/h per AHU
- Enthalpy control
- Evaporative cooling / refrigeration cooling change control
- Optional variable air flow control

Flexibility

- Humidification plant design
- Refrigeration air handling unit design
- Supply / return air ducts engineering

Luwa Process Support

- Air Changes / permissible exposure limits
- Temperature
- Humidity
- Uniform supply air diffusion to all spindles

Main System Components

- Axial Flow Fans
- Air Washer
- Rotary Air Filter
- Air Control Dampers
- Overhead Travelling Cleaner

Process Air Engineering in Open-End Spinning

Importance of Air Engineering

Open-end spinning machines are largely covered. The release of fly and fluff is considerably lower compared to ringspinning, the degree of humidity in the supply air, however, is slightly higher. Accordingly, the air change requirement is reduced and the inverted flow concept rotorsphere for energy saving can be applied for many fibre materials.
Fully automatic OE machines have higher environmental requirements than their semi-automatic peers. Temperature control is preferable for fully automatic OE machines, as machine and robot efficiencies are dropping at temperatures above 28-30°C. Separate machine exhaust filtration is used for enthalpy control during preferred months.

Economy

- Air Flow from 20,000m³/h to 600,000m³/h per AHU
- Enthalpy control
- Evaporative cooling / refrigeration cooling change control
- Rotorsphere for energy saving

Flexibility

- Humidification plant design
- Refrigeration air handling unit design
- Supply / return air ducts engineering

Luwa Process Support

- Humidity
- Rotorsphere
- Uniform supply air diffusion to all rotors

Main System Components

- Axial Flow Fans
- Air Washer
- Rotary Air Filter
- Air Control Dampers

Process Air Engineering in Airjet Spinning

Importance of Air Engineering

Similar to open-end spinning, airjet spinning has limited fly liberation and is ideal for rotorsphere airflow design. Temperature control is required as efficiencies are dropping with higher temperatures. Machine exhaust can be combined with room return air to optimize the filter plant design.

Economy

- Air Flow from 20,000m³/h to 600,000m³/h per AHU
- Enthalpy control
- Evaporative cooling / refrigeration cooling change control
- Rotorsphere for energy saving

Flexibility

- Humidification plant design
- Refrigeration air handling unit design

Luwa Process Support

- Temperature
- Humidity
- Rotorsphere

Main System Components

- Axial Flow Fans
- Air Washer
- Rotary Air Filter
- Air Control Dampers

Process Air Engineering in Yarn / Filament Conversion

Importance of Air Engineering

The environmental requirements during yarn conversion is not as stringent as they are in other textile processes. Typically ventilation or humidification plants are sufficient.
High heat loads on TFO's and tyre-cord cablers require air handling solutions. A rotorsphere design without / with limited return air trenches is the technical standard.

Economy

- Air Flow from 20,000m³/h to 600,000m³/h per AHU
- Variable air flow control

Flexibility

- Designs for indoor and outdoor installation
- Air handling unit in modular design
- Components according to process requirement

Luwa Process Support

- Humidity
- Heat extraction

Main System Components

- Axial Flow Fans
- Air Washer
- Rotary Air Filter
- Air Control Dampers

Fibre Depositing Plant and Dust Collecting System

Importance of proper waste collection

A centralized waste collection system is essential to optimize the operation of a spinning mill. This means that by correctly separating the quality type of waste according to the spinning process, the higher quality fibres can be recycled. The fibers collected at the Luwa plant can either be sent to the baling press or directly to a reprocessing line. This adds value and improves efficiency in a spinning mill. The entire spinning process generates enormous amounts of dust and fluff, which are filtered either by our Rotary Air Filter or Multi Cell Filter. All of this material can be collected locally in bags, or it can be centralized and collected at a single point through a dust separator.

Process Waste Qualities

- Blowing (continuous, intermittent)
- Carding (card, licker-in)
- Drawing frames
- Combing noils
- Combing laps
- Bobbin Cleaner
- Filter Box Spinning

Raw Material Waste Qualities

- Cotton
- Synthetic fibres
- Cellulose / wool / flax
- Blends
- Recycled fibers
- Colours

Waste Removal Plant

- Masonry construction
- TexPac Compact Filter Unit
- Fibre Separator
- Waste Separator
- Rotary Pre-Filter
- Rotary Air Filter
- MultiCell filter for space saving

Dust Collection

- Through simple dust collectors in bags
- Through a cyclone dust collector
- Centralized trough a dust separator
- Compacted trough a screw compactor

Baling Press System

Importance of optimizing waste management

Luwa's fully automatic bale press system manages the collection of waste and its compaction into bales. Separation of waste qualities allows you to maximize your recoveries from waste bales. The high density of the bales reduces transportation costs. Thanks to the integrated control system, everything is done automatically. Sensors detect which silo has enough material for a complete bale. This allows the process to run continuously, never stopping due to simultaneous filling of silos.

Components

Fibre Separator / Waste Separator

The final component of the conventional waste collection system that feeds each individual silo with process waste.

Spark Detection System - TexGuard ™

The spark detector detects the spark immediately, long before a fire can start. It then initiates the diversion of the spark into a quenching box, gets it extinguished, and triggers the shutdown of the machinery.

Silo with discharge unit

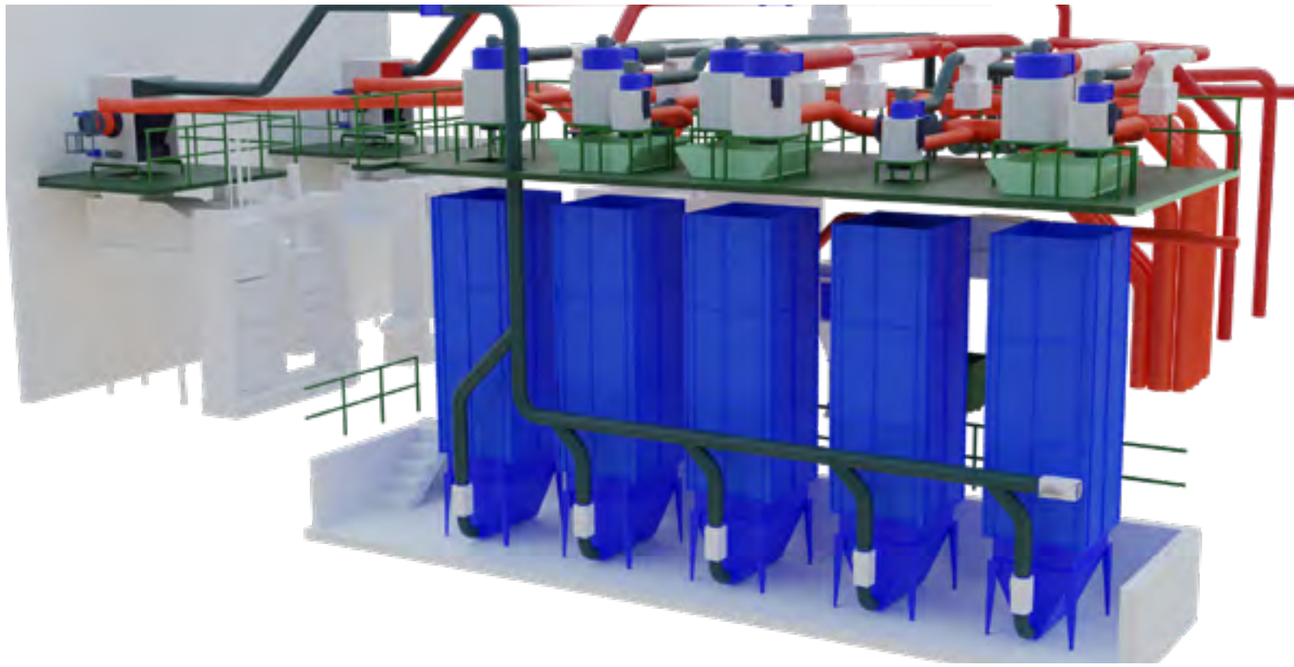
A separate silo with discharge unit is provided for each waste quality. The large silo capacity is designed to store fibres for a complete bale and still have enough redundant storage capacity to avoid over-supply.

Bale Press

Vertical or horizontal bale presses, depending on the application. Quality hydraulic parts for low maintenance. Dense bales.

Plant control

The control system Luwa Digi Control, allows to adjust various parameters to optimize the waste handling process with a real time monitoring.



Luwa Air Engineering, founded in Switzerland in 1935, is a global market leader in textile air engineering and a quality and performance leader with a global brand in the fibre and textile industry. Luwa has been part of the Nederman Group since 2018. The Luwa Group's activities include the design and engineering of single components and whole systems as well as manufacturing, assembly, installation and after sales services. With subsidiaries in China, India, Singapore, US and Turkey, the group has a significant global installed base that is the source of Luwa's deep understanding of the technical demands as well as the local requirements of customers.

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