

The Luwa logo consists of the word "Luwa" in a white, bold, sans-serif font, centered within a solid blue rectangular background.

**Luwa**

*Part of the Nederman Group*

The background of the entire page is a photograph of a factory production line. It shows rows of white, ribbed nonwoven fabric rolls being processed. A diagonal white line divides the image into two sections: a teal-colored upper-left section and a white lower-right section. The teal section contains the word "Nonwovens" in white text, and the white section contains the words "Process Air Engineering" in teal text.

Nonwovens

Process Air Engineering

luwa.com



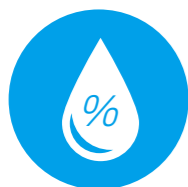


# Take control of your Process Air Engineering

## Connected. Clean Air. Performance.

High-performance nonwoven processes 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 process.

Luwa provides Air Engineering Solutions:

- Filtration System
- Air Handling Plant
- Trim Waste System
- Dust Collection System
- Bale Press
- Monitoring and Controls
- Ceiling Cleaner – Circulaire
- Hi – Vac (Vacuum) System
- Briquetter for Micro Duct
- Texguard – Spark Protection

Luwa serves most of the Global Nonwoven and Soft Disposables from web forming and bonding, to converting.

### Web Forming

- Card Feeding / Carding
- Wet Laid
- Spunlace
- Meltblown
- Spunbond

### Converting

- Baby & Adult Diapers
- Sanitary Pads
- Medical Textiles
- Wipes
- Tissues

### Bonding

- Needle Punch
- Hydro Entanglement
- Stitch Bond



# Key Factors in Web Forming / Bonding & Converting Process



## 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. However, all processes prefer a constant temperature, as most nonwoven raw material are hydrophilic and the moisture absorption capacity changes with temperature. In addition to reducing quality variation, temperature control has a positive effect on:

- reduced fibre fly in the process,
- 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 Nonwoven Process 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 the Bailing Press systems and Briquetter to efficiently handle the dust collected at different sources of the Nonwoven Process and Converting lines.

The dependency on the fibre depositing system is essential for the operation of the process. A standstill of either the fibre depositing plant or the bailing system leads to an immediate shutdown of the entire process machine.

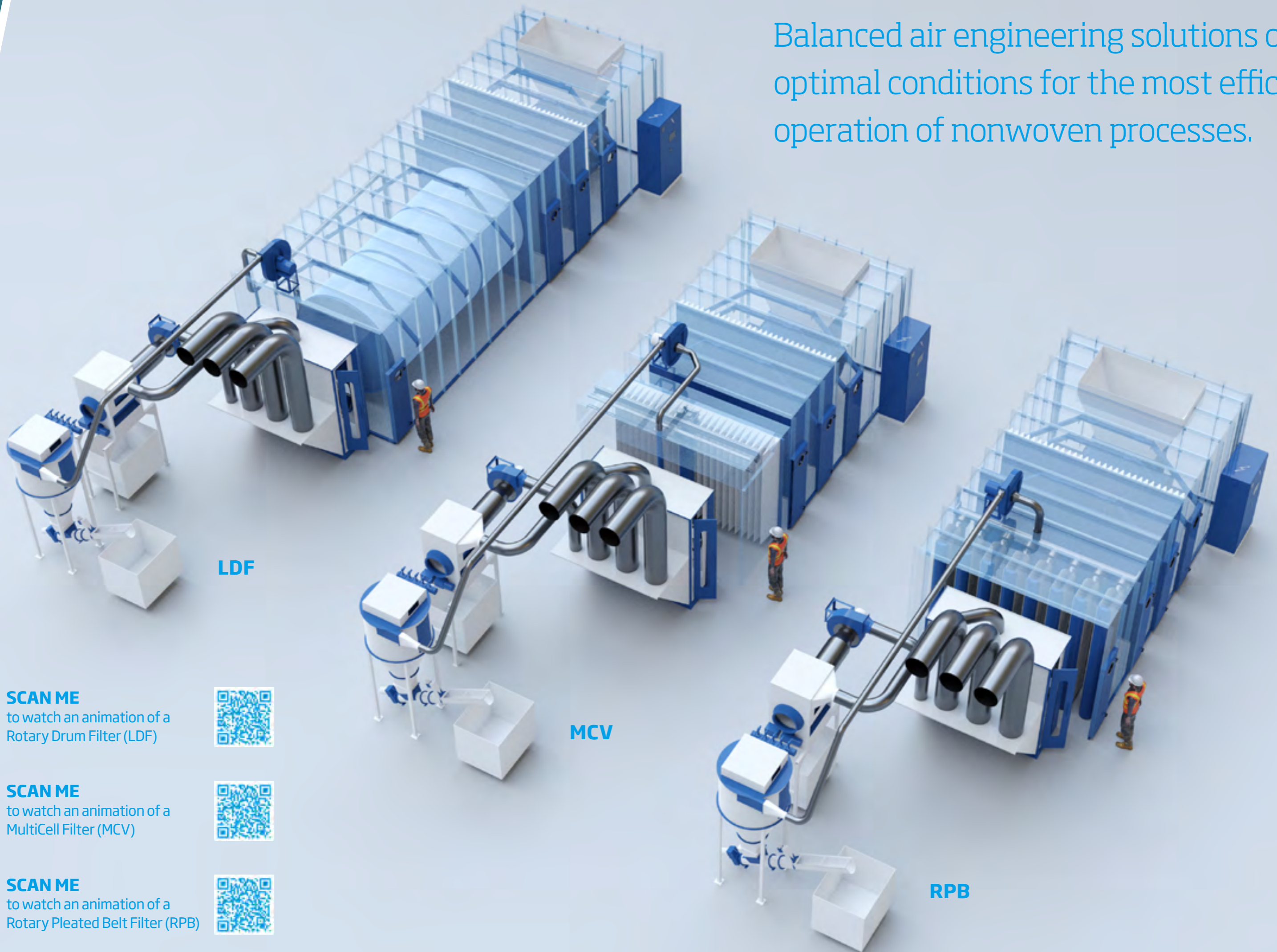


## Room Cleanliness - Fibre Fly / Dust Contamination

In order to prevent unwanted infiltration of dust from the outside, the process is kept at constant overpressure. 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 nonwoven workers from byssinosis. Sufficient air changes throughout the process are required to dilute the dust levels and keep the departments clean and free of fly liberated from the machines.



Balanced air engineering solutions offer optimal conditions for the most efficient operation of nonwoven processes.



**LDF**

**SCAN ME**

to watch an animation of a Rotary Drum Filter (LDF)



**SCAN ME**

to watch an animation of a MultiCell Filter (MCV)



**SCAN ME**

to watch an animation of a Rotary Pleated Belt Filter (RPB)



**MCV**

**RPB**





## Web Forming and Bonding

Nonwovens manufacturing starts by the arrangement of fibres in a sheet or web.

These fibres can be staple fibres or filaments extruded from molten polymer granules.

### Web Forming

- Dry Laid Carding
- Short Fibre Air Laid
- Wet Laid
- Spun Laid
- Melt Blown
- Submicron Spinning

### Web Bonding

Webs have a limited initial strength right after the web formation, depending on various bonding mechanisms. Therefore, the web needs to be consolidated in one way or another. The choice of the web consolidation method strongly depends on functional properties that are needed, as well as on the type of fibres used.

There are three basic types of Bonding:

- Thermal Bonding
- Mechanical Bonding
- Chemical Bonding

## Converting: Soft Disposables

Our proven system has decades of experience providing reliable temperature, humidity, and dust control.

Luwa provides a unique approach to the filtration and air conditioning solution for disposable diaper and feminine hygiene product manufacturing. The applications require the ability to capture both dust and fibers and the unique properties of Super Absorbent Polymer (SAP) used in these products require special care. The Luwa system provides better dust removal technique using a high efficiency filter that requires 1/3 the floor space of conventional rotary drum filters. And it can be combined with integral air conditioning components for the most economical upfront and operating cost. Suction is provided to the production line machinery at the required points. Smooth metal duct conveys the dust and fiber laden air to the Luwa unit. Fiber is filtered out first by a rotary prefilter screen followed by the unique Rotary Pleated Belt filter. The air is either cooled with water coils or humidified with TexFog fogging sprays. Finally, it is supplied back to the manufacturing hall with a combination of metal and fabric ducts. Waste material is collected through the stripper vacuum system, including smooth metal duct, small high pressure fans, and a cylindrical pulse jet final filter. Waste fiber can be baled or reclaimed to the process and waste can be briquetted.

### Features and Benefits

- High efficiency Pleated Belt Filter collects SAP at high efficiency and eliminates the need for multiple stages of static filters downstream, hence saving space
- Reduces operating system pressure drop and therefore energy consumed
- Reduces maintenance cost for replacement of the static filters
- Reduces landfill waste volume. Air exiting the filter is cleaned and sent directly to an A/C coil and humidification section
- Integration with air conditioning modules simplifies ducting reducing up front capital expense and operating energy cost
- Allows individual production lines to operate completely independently if desired for increased overall plant reliability
- Air conditioning module is completely hygienic using Reverse Osmosis (RO) filtered water in fogging spray for humidification - no stagnant or recycled water for hygiene application



## Compact Filter Unit (CFU-MCV)

### Two stage filtration for machine exhaust air

The MultiCell filter is integrated in a compact filter unit made of galvanized sheet steel. The CFU-MCF is a plug and play product and is placed on a finished floor without any construction work.

- Low maintenance requirements
- High efficiency direct drive main fan
- Frequency inverter controlled for energy saving
- Lowest space requirement for CFU available in the market
- Optional needle felt filter media for high performance filtration



Compact Filter Unit CFU-MCV

Technical Data					
Type	CFU	MCV 1-9	MCV 1-11	MCV 1-13	MCV 1-15
Suction Robot		1	1	1	1
Maximum Air Capacity <sup>1)</sup>	m <sup>3</sup> /h	35'000	55'000	75'000	100'000
Prefilter Size		1'520	1'824	2'128	2'432
Width Complete CFU	mm	2'700	3'000	3'300	3'600
Height Complete CFU	mm	3'600			
Depth Complete CFU	mm	6'800	7'000	7'200	7'500

<sup>1)</sup> Depending on filtration application air capacity is reduced

## Rotary Drum Filter (LDF)

### Fine dust filter for exhaust air with a high concentration of dust and fibres – efficient, economic, easy to maintain

The rotary air filter is a well proven fine dust filter forexhaust air with a high concentration of dust and fibers in spinning and weaving mills. The high efficiency of this filter guarantees that the MAC rescriptions for exhaust air are adhered to. It is an economic solution for applications where sufficient space is available.

### Characteristics

- Controlling of the cleaning process by differential pressure guards
- Application with pre-fabricated housing or in a walled room
- Automatic cleaning of the filter drum with a suction device fitted on the side
- One filter mat per drum segment shortens the maintenance time
- Thanks to the suction device fitted externally, maintenance is also possible during operation

### Options

- Pre-fabricated housing
- Dust disposal with dust collector or dust separator
- Centralized disposal for filters by vacuum plant

### Advantages

- Excellent cleaning effect
- Short installation time
- Easy maintenance



Traditional Drum Filter





# MultiCell Filter (MCV)

## Filtration for room return air

The MultiCell filter is built up as a filter wall in air conditioning stations for the filtration of return air, which is contaminated with dust and fibers. The special design with bottom entry filter cells prevents clogging of the filter with fibrous material:

- Smaller service bay
- Shorter A/C stations
- Fast and easy change of filter medium
- Increased filter surface for energy saving
- Only 1/3 of the space required compared to rotary filters
- Simple and sturdy 2-axis movement drive of suction nozzle



MultiCell Filter MCV

Technical Data							
Type		MCV 1-7	MCV 1-13	MCV 1-17	MCV 1-21	MCV 2-26	MCV 2-34
Suction Robot		1	1	1	1	2	2
Recommended Air Capacity <sup>1)</sup>	m <sup>3</sup> /h	51'000	94'700	123'900	153'000	189'400	247'700
Width MCV Filter	mm	1'216	2'128	2'736	3'648	4'256	5'168
Height MCV Filter	mm	3'600					
Depth MCV Filter	mm	2'000					

<sup>1)</sup> Recommended air capacity for energy saving operation with lower face velocity

## Advanced technology, space and energy saving – for all automatic air filtration applications

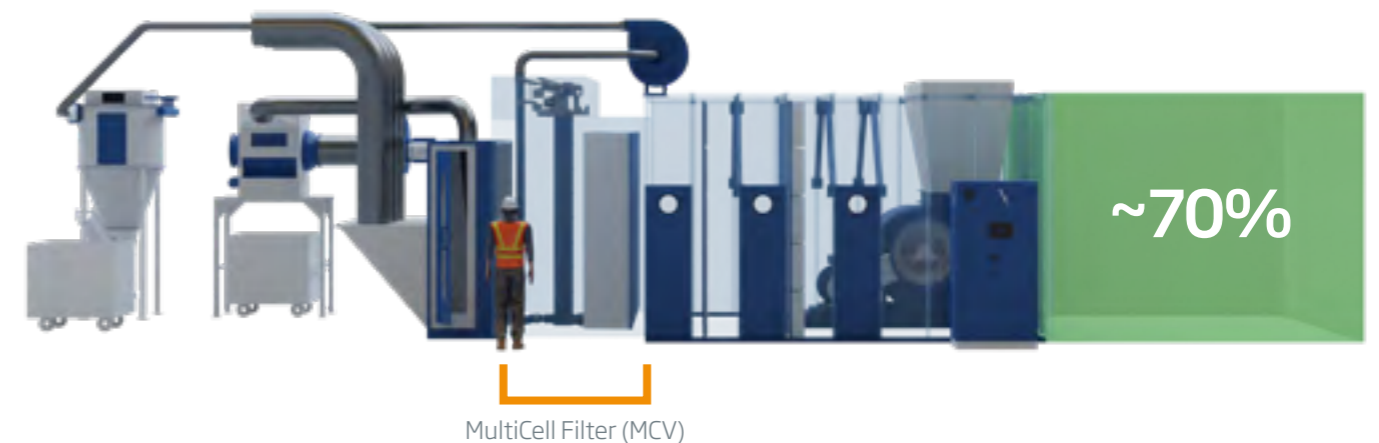
For decades the rotary air filter has been proven to be the best fit for all kinds of filtration applications in the textile industry. Its sturdy and simple design facilitated outstanding performance. The disadvantage of rotary air filters is their big space requirement, which leads to higher initial cost. In today's competitive business the economical utilization of building space is a substantial factor in overall investment costs.

Luwa has developed the next generation of automatic air filters for a wide range of applications in the textile industry, with three main objectives: Simple and robust design, small footprint and reduced power consumption.

The new MultiCell Filter MCV is build up on these three objectives:

- Simple static and slim filter wall in V-Shape for maximum filtration surface area
- Simplified 2-axis suction robot with only two gear motors
- Large filter surface area for reduced power consumption

Traditional drum filters are approximately 11mm. The MCV filter is 3.5mm in size, providing ~70% space savings over traditional drum filters with the same efficiency.



MultiCell Filter (MCV)





# Rotary Pleated Belt Filter (RPB)

## A Breakthrough in Filtration Technology

The Rotary Pleated Belt (RPB) Filter is patented, revolutionary design that combines high capacity pleated media with high efficiency suction cleaning. The result is a high efficiency self-cleaning filter, offering more capacity for its size than any filter in the market.

Unlike other filters that rely on building a fiber mat to retain small dust particles, the RPB Filter does not. And unlike felt bag or cartridge filters, it doesn't blow or pulse dust back into the air stream.

## Features and Benefits

- High filtration efficiency. The media is optimized for fibrous dust filtration. Better than 99% removal at normal operating pressure drop.
- High media cleaning efficiency. Fiber, dust and SuperAbsorbent Polymers are suctioned away out of the air stream.
- Compact size – 40% less footprint compared to the common rotary drum filters of similar capacity.
- Saves money - In many cases, the RPB Filter does the job of two rotary drum filters in series. Also, cleaner air requires less air turnover and improves air conditioning system efficiency.
- Installation is simple, quick, and economical – The RPB Filter is preassembled on a steel base and prewired, including controls. It does not require a smooth floor or elaborative leveling.



Rotary Pleated Belt (RPB) Filter



The result is a high efficiency self-cleaning filter

## Modular Component System

The RPB Filter is one member of Luwa's modular preassembled and prewired air filtration components. Modules can be bolted directly to one another as needed to suit your application. Each module is skidded to allow easy relocation, if needed.

This illustration shows how modules can be assembled to form a compact filtration system.

The system includes:

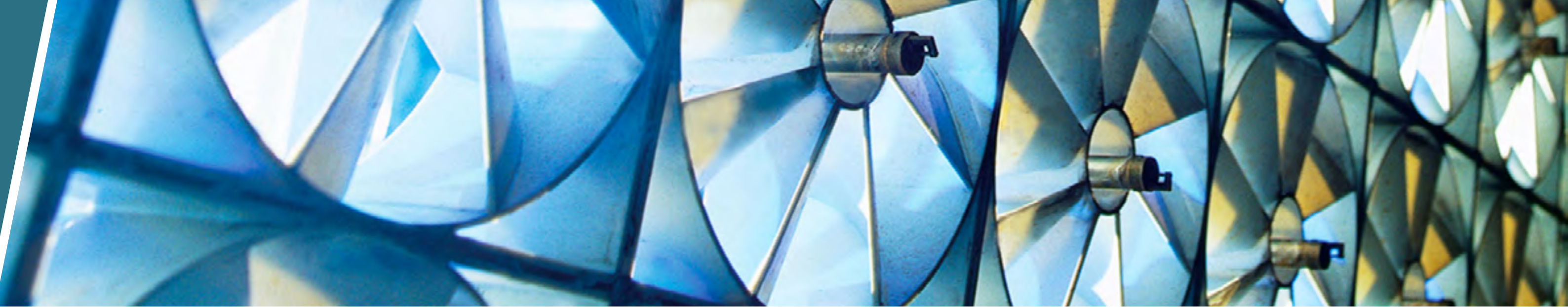
- Rotary Self-Cleaning Prefilter for removing larger fibers from the air stream
- Inlet Plenum
- RPB Filter Module
- Final Filter Module
- Fan Module

Traditional drum filters are approximately 11m. The RPB filter provides ~70% space savings over traditional drum filters with the same efficiency (*US only*).



Rotary Pleated Belt Filter (RPB)





# TexFog

## Efficient, Hygienic, High Performance Humidifying System

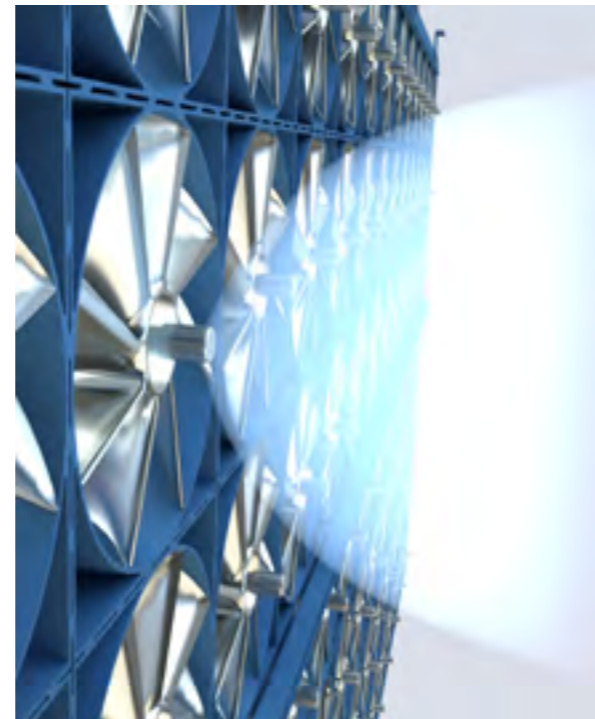
Luwa's TexFog is a high pressure humidification plant for special treatments in non-woven and textiles industries. The intended purpose of this system is to control exactly the humidity level of your air flow, using partial saturation via pumps, controlled by frequency inverters. High efficiency factors and a generally low consumption are reached by a fine atomization of water. Even the energy consumption of all used pumps is reduced to a minimum. The use of fresh tap water and the instant disposal of waste water ensure a high level of hygiene inside the TexFog.

## Applications

- Nonwovens
- Food industry
- Manufacturing of hygiene products
- Textile industry (ex. weaving, twisting, etc.)

## Benefits

- No water tank necessary
- Lower power consumption
- Hygienically safe (VDI 6022)
- Small amounts of spray water
- Maintenance and service-friendly
- Complete stainless steel enclosure
- Minimum pump tower requirement
- High degree of humidification and evaporation



## Functions

The TexFog is located directly after a filter, classified as M5-M7. The nozzles work at high pressure, so water gets atomized as fine as possible to maximise the surface of each drop. A high efficiency level is the result.

The use of fresh tap water and the instant disposal of waste water ensure a high level of hygiene inside the TexFog. Additionally, compared with a standard airwasher, using a closed, revolving water cycle, the power consumption can be reduced, as well.

## Option

Water treatment plant (softening / reverse osmosis)

Technical Data		
Type	TexFog	Unit
Air Flow	18600 – 130000	cfm
Nozzle Pressure	145 – 1450	psi
Pump Rating	0.75 – 7.5	HP
Pressure Tap Water	43.5 – 87	psi
Length	83"	in
Width	5'0" – 18'0"	ft
Height	58", 74", 90"	in





# TexPac, Centralized Air Handling System

## For Nonwoven Applications

The compact TexPac centralized air handling system is manufactured of profiled galvanized sheet steel elements. Thanks to its modular design, it can be adapted to user-specific performance and space requirements. TexPac is foreseen for installation inside buildings and convinces by its compact construction.

## Features

- High stability and excellent acoustic insulation
- Self-supporting housing structure of 2 mm galvanized steel panels, extremely easy to assemble
- Modular design of standardized construction elements, components and air engineering elements
- Double bends along the sides and single bends along the ends, which, depending on the pressure level, are either bolted together directly or reinforced by connecting sections inserted laterally

## Option

Possibility of installation directly in the production room / on a platform supplied by the customer.

Technical Data	
Standard Sizes	10
Width B (mm)	1520 – 5548
Height H (mm)	2736
Length L (mm)	According to User's Requirements

## Advantages

- Short assembly time and minimum space requirement
- Multiple use of individual elements, simplification and increased flexibility in conceptual design due to modular structure, expandable at any time
- TexPac centralized air handling systems are re-usable; they can be completely disassembled and reassembled in a new location
- Easy to combine and install with Luwa components (Rotary Pre-Filter Unit, Automatic Panel Filter, Air Washer, high-pressure humidification system and airtight steel doors)



TexPac - Centralized Air Handling System

Performance Data	
Air Flow Rate (m <sup>3</sup> /h)	40,000 – 250,000
Static Positive/Negative Pressure (Pa)	1520 – 5548
Mean Sound Attenuation Value	28





# Uniluwa

## Compact Air Handling Unit with TexFog technology

UNILUWA® is a stand-alone unit and has been designed for small air volumes and high heat loads. It is the perfect addition to our Compact Filter Unit (CFU) when space is limited. It is also ideal for temporary applications.

### Features

UNILUWA® features a modular, inline layout with self-supporting, double panel construction housing and the well-established TexFog high pressure humidifier. Luwa proprietary components are used.

Technical Data				
	Saturation		Supersaturation	
	No Return Air	With Return Air	No Return Air	With Return Air
Air volume (max.) [m <sup>3</sup> /h]	40,000	40,000	40,000	40,000
Spray water flow (max.) [l/h]	390	390	780	780
Total differential pressure [Pa]	800	800	800	800
Rated power [kW]	17	32	18	33
Cross section B x H [mm]	1525 x 1525	1525 x 1525	1525 x 1525	1525 x 1525
Unit length L [mm]	5200	6600	4000	5400
Thermal and acoustic insulation [mm]	50	50	50	50
Noise level [dB(A)] approx.	< 69 at 3m distance	< 69 at 3m distance	< 69 at 3m distance	< 69 at 3m distance



Uniluwa - Compact Air Handling Unit with TexFog



Uniluwa - Compact Air Handling Unit with TexFog

### Benefits

- Plug and operate
- Short installation time
- Very low energy consumption
- Flexible arrangement on the floor, ceiling, etc.

### Options

- Water treatment plant
- Various arrangements (e.g. outdoor installation) on demand
- Combination with various automatic filters for specific applications
- External air filter F5 for hygienic requirements according to VDI 6022





## Flowmaster

### Displacement air outlet for air-conditioning of work stations in the industry

The design and especially the low induction and low turbulence flow of the supply air make Luwa displacement air outlets ideal components for the air conditioning of manufacturing workplaces with uneven or localized heat distribution.

### Application

The Luwa industrial displacement air outlet series FlowMaster FM-R, FM-HR and FM-P are used for airconditioning rooms where a constant temperature level over the whole room height is not required and where dust or noxious substances are released.

Due to the different designs, shapes and sizes, they can be used for practically any application. Depending on the design and size, the volume flow rates range from 1'000 to 26'000 m<sup>3</sup>/h.

### Construction Form

Apart from the construction size, the outlet construction form is also of crucial importance for the input and distribution of the supply air. The Luwa portfolio consists of several construction forms, which are built in different sizes.

In special cases the outlet form can be adapted to the requirements. Standard constructions: different diameters resp. widths each with 3 heights 1'000 / 1'500 / 2'000 mm.



Flowmaster - Displacement Air Outlet

### Function

The displacement air outlets belong to the group "low impulse outlets". Contrary to the inductive blended air systems, here the supply air exits the outlets at low velocity and covers the floor with low induction and low turbulence. The admitted air is warmed by the heat sources such as machines and people. The warmed air rises and leaves the room via the extract air openings.

## Circulaire® Fan

### The efficient cleaning fan for Nonwoven & industrial applications

Due to cyclic blowing, Luwa's Circulaire prevents permanent dust deposits on pipes, cable trunks and construction frames of the building, hard to reach in industrial halls. Labor-intensive, dangerous and costly cleanings, which have to be carried out under increased safety requirements on ceilings or overhead beams, are no longer necessary.

### Advantages

- Eliminates manual overhead cleaning, especially where access is difficult
- No accumulation and dropping of dust deposits in the production area
- Save costs and improves working conditions
- Reduces fire hazard (lower insurance premium)
- Easy and quick assembling

### Applications

- Spinning and weaving plants with exposed ceiling construction
- Warehouses, especially with crane runway
- Commercial laundries and textile service
- Nonwoven and technical textiles
- Paper converting

### Function

Cyclically blowing keeps ceiling and machine structures dust-free. Due to the oscillatory rotational motion of the Circulaire® with a horizontal rotation of 360° and an 80° vertical oscillation, a cleaning area with a radius up to 32 ft will be achieved. Depending on the dust, the Circulaire® can operate continuously or by the hour.



Luwa's Circulaire®



Dust Deposits in Ceiling



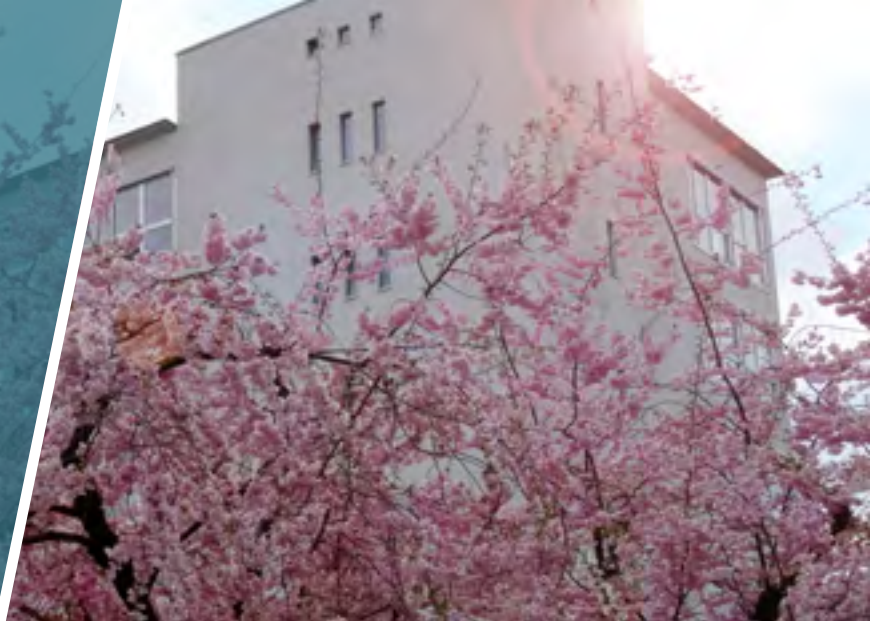
Tissue Process



## Disclaimer:

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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.

### Luwa Air Engineering AG

Weiherallee 11a  
8610 Uster  
Switzerland  
P: +41-44-943 1100  
E: info@luwa.com

### Luwa India Pvt. Ltd.

# 3P-5P, Gangadharanapalya  
Kasaba Hobli, Off Tumkur Road  
Nelamangala, Bangalore North  
562 123 India  
P: +91-80-2951 1930/31/32  
E: info@luwa.in

### Luwa Air Engineering (Shanghai) Co., Ltd.

310 Shenxia Lu  
Jiading District, Shanghai 201 818  
P.R. China  
P: +86-21-5990 0187  
E: info@luwa.com.cn

### Luwa Engineering (Pte) Ltd.

1 Scotts Road #26-09  
Shaw Centre Singapore  
228 208 Singapore  
P: +65-6737 5033  
E: les@luwa.com

### Luwa America, Inc.

4433 Chesapeake Drive  
Charlotte, NC 28216  
USA  
P: +1-704-286-1092  
E: info@luwa.us

### Luwa Havalandırma Teknikleri San. ve Tic. Ltd. Şti.

Küçükbakkalköy Mah. Dereboyu Cad.  
Brandium AVM R5 Blok K:11 D:70  
Ataşehir/Istanbul  
Turkey  
P: +90 216 313 50 61  
E: info@luwa.com.tr

