

OVERVIEW

GALILEO - DF1, DFR1, LW3, CM7
DRAW FRAMES
COMBING SECTION



Marzoli

Complete spinning line,
components and digitalized
solutions for the best performance
of the spinning process



THE ONE SOURCE FOR A FULLY-AUTOMATED AND DIGITALIZED SPINNING MILL

Marzoli, one of the major brands of the textile sector worldwide, is a unique European manufacturer of the complete line of machines for the opening, preparation and spinning of short-staple fiber. From the bale opener to the ring spinning frame, Marzoli offers the most advanced technology for a completely-automated spinning mill. Through its global sales and service network, its expertise on each type of fiber and application and the competence on the entire process, Marzoli represents a competent and reliable partner. And through its experience, know-how and commitment, it provides its customers with:

- Advanced spinning solutions through a careful activity of textile engineering. Marzoli assists its customers from the study of the spinning plan, throughout sourcing, erection and commissioning, up to maintenance of the resulting turnkey spinning plant, which can comprise Marzoli but also third-party machinery. The customer can rely on the competence and capability of a unique partner, responsible for the quality and productivity of the entire spinning mill.
- The advantages of smart spinning. No matter what the brand(s) of the machinery is, Marzoli can install its software platforms, YarNet and MRM, its hardware applications for gathering data on waste percentages and its composition, quality values, productivity indexes and other kpi data to let the customer build on the potential of Industry 4.0, optimize the entire spinning process through well-informed decisions and reach the highest performance in production operations.

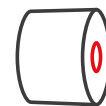
OVER
160 YEARS
OF SUCCESSES

OVER
70 COUNTRIES
WITH ACTIVE CLIENTS



OPENING SECTION

- Openers & Cleaners
- Mixers & Blenders
- Card



COMBING SECTION

- Draw Frames
- Lap Winder
- Comber
- Lap Transport



SPINNING SECTION

- Roving Frame
- Ring Spinning Frame
- Bobbin Transport System

DRAW FRAMES

DF1-DFR1

KEY POINTS

- HIGH PRODUCTIVITY WITH LOW OPERATIONAL COSTS
- INNOVATIVE PNEUMATIC DRAFTING HEAD
- PRODUCTION SETUP AND CONTROL BY TOUCH SCREEN
- EXCELLENT PERFORMANCE WITH GREAT FLEXIBILITY
- PRODUCTION UP TO 1,000 m/min



The draw frame is one of the most critical machines in a spinning mill. The draw frame plays a fundamental role in ensuring yarn quality and it must run at very high production speeds in order to ensure a fast return on investment.

The vast expertise and the continuous improvements on its machine have allowed Marzoli to offer a draw frame that excels on both aspects: the DF1 draw frame. This high performance Draw Frame has been designed in order to guarantee production volumes up to 1,000 m/min with lower CV%. Easy to operate, outstanding reliability, high flexibility and low operational costs are Marzoli's draw frames' main features.

A complete range for all market requests: 18", 20", 24" and 40" can size, up to 8 doublings, powered creel with or without autoleveller:

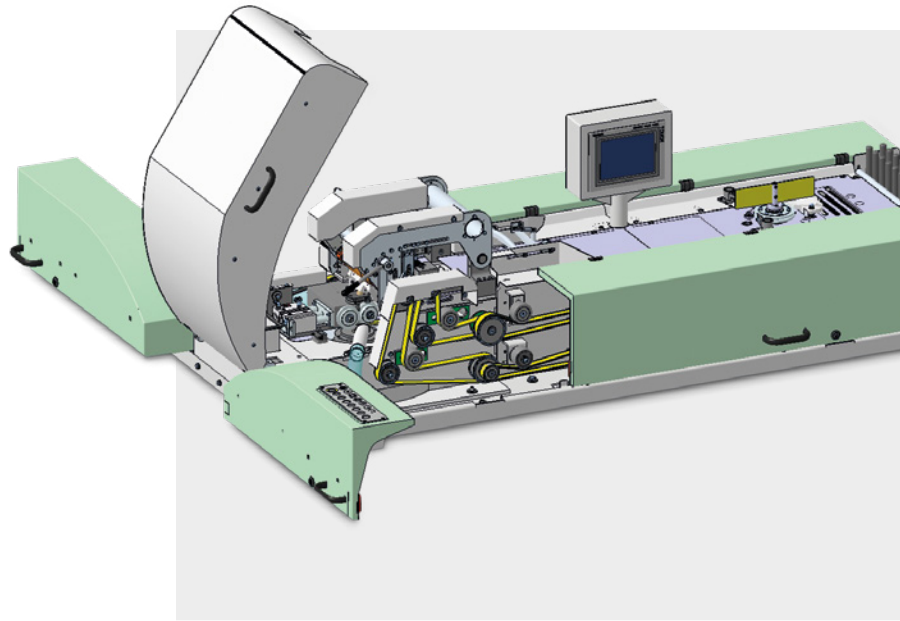
- DF1: single delivery;
- DFR1: single delivery with autoleveller.

Technological parameters are set directly on the touch screen; all the programs are stored and recalled at any time, saving time during lot changes. The draft value on the DFR1 is easily set and is conveyed by servomotors: no need of replacement of pulleys; these drives are coordinated by the central computer.

■ INNOVATIVE GEOMETRY OF THE DRAFTING SYSTEM

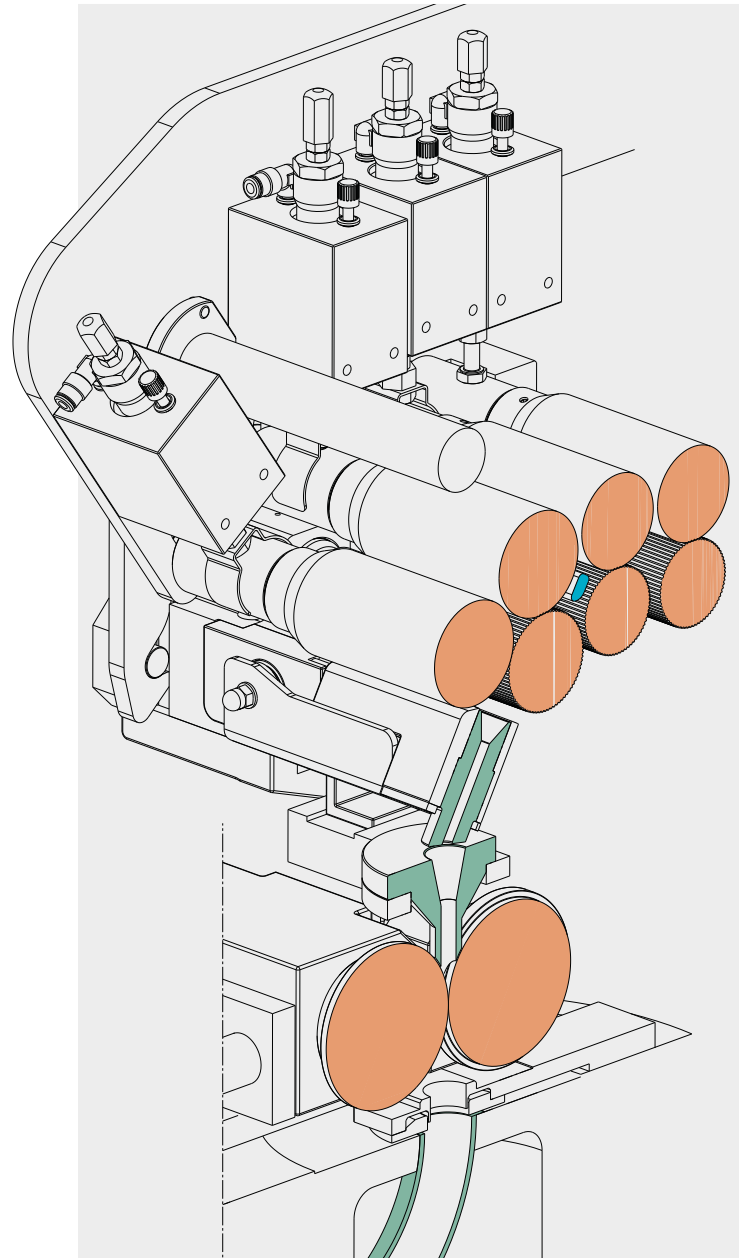
Outcomes of the innovative geometry of the drafting system

- lower production costs;
- better fibers control in the drafting area;
- high quality of the sliver;
- Great reliability
- High production volumes (up to 1,000 m/min)



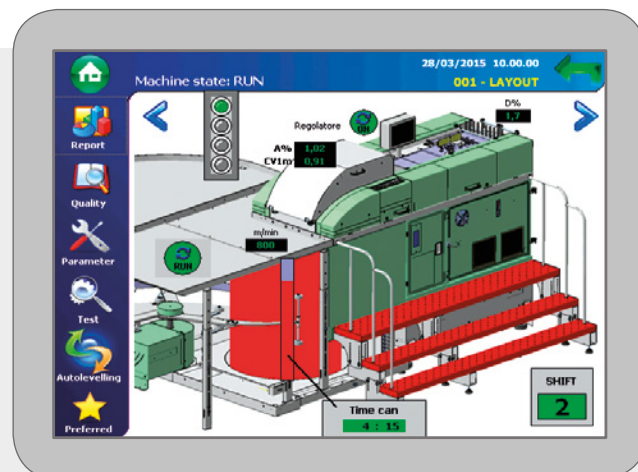
Innovative features of the drafting unit

- High productivity and reduced sliver breakages during operation;
- in addition to new 3-over-3 drafting system, there is one guidance roller which minimizes the uncontrolled distance, run by the sliver, from the drafting delivery to the condenser unit before the coiler;
- pneumatic pressure of the top rollers individually adjustable;
- when the machine stops the top rollers are automatically relieved from air pressure to protect the rubber surface;
- scrapers in contact with the top rollers assure high cleaning and avoid roller lapping.
- when the drafting head is open for inspection, the input top roller stays over the bottom steel cylinder, preventing the movement of the slivers out of the drafting head.



USER-FRIENDLY INTERFACE

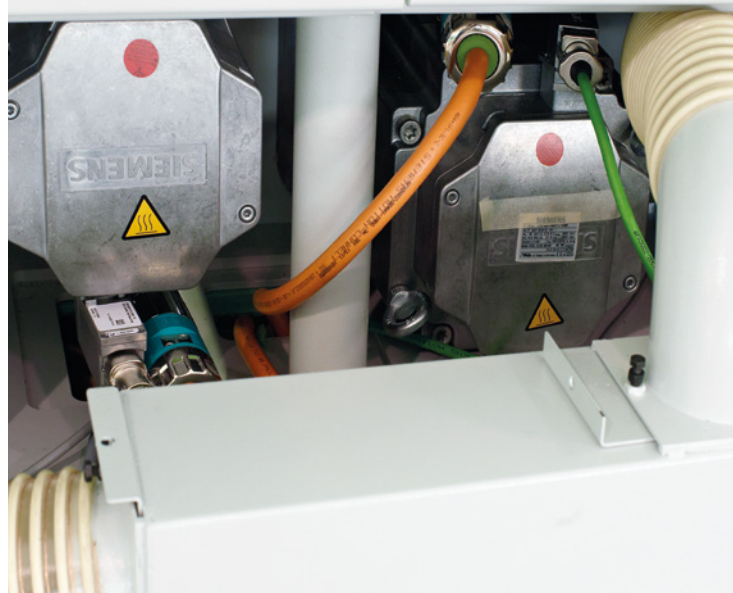
The Draw Frames DF1 and DFR1 are managed by a modern PC micro-processor: all the production data and the working parameters are controlled and saved during the production cycle; the multi-language touch screen is user-friendly and permits a simple use with clear diagrams, detailed monitoring pages and step-by-step trouble-shooting procedures.



HIGH EFFICIENCY SERVOMOTORS

The latest inverter model guarantees an excellent level of performance; the elaboration of the electronic signals keeps the tension applied to the drafting rollers at a constant level even at the highest speed.

The inverters have a special dissipation unit for internal cooling; all the motors are working at low temperature.



ELECTRONIC DRAFTING SYSTEM FOR DFR1

- The draft ratio is set on the touch screen and then electronically controlled through independent motors;
- the toothed belts ensure more efficient power transmission, with reduction of energy consumption, noise and maintenance activity;
- all mechanical parts can be easily accessed during maintenance and cleaning operations thus assuring a high level of performance over a long period of time.

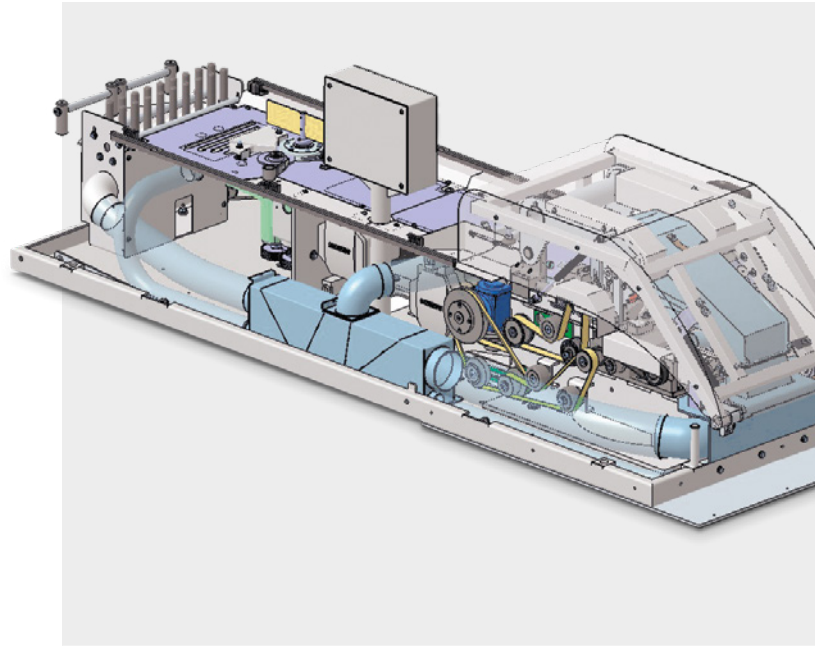


Simple and reliable Toothed Belts Drive System.

■ SUCTION SYSTEM

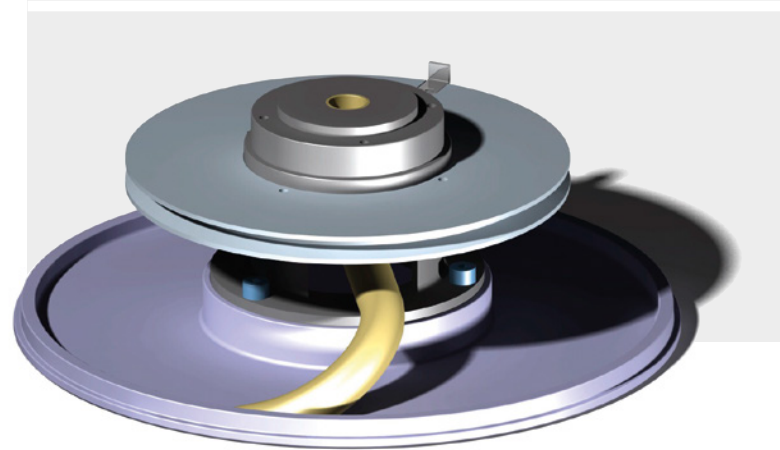
The suction system has been designed for high drafting performance: excellent dust removal from the sliver is obtained with a suction unit which is completely adapted to the geometry of the drafting system. Purposely designed suction elements clean the T&G unit (at the feeding side) and the drafting rollers (at the delivery side).

There is a connection with the centralized suction station to guarantee a regular and constant cleaning of the machine; as optional it is suggested a self cleaning filter box.



■ COILER

- The rotating plate is given a surface treatment to avoid electrostatic charges and thus allowing high speed;
- special Marzoli design to avoid dust and fibers accumulation inside the tube;
- automatic blow to help the insertion of the sliver into the coiler;
- the rotating can table is driven by an independent motor which can be set from the touch-screen interface in order to modify the number of coils in the can and optimize the number of meters of sliver;



- positioned stop of the coiler controlled by sensor, for a correct cutting of the sliver. Optional a sliver cut system for hard fibers.



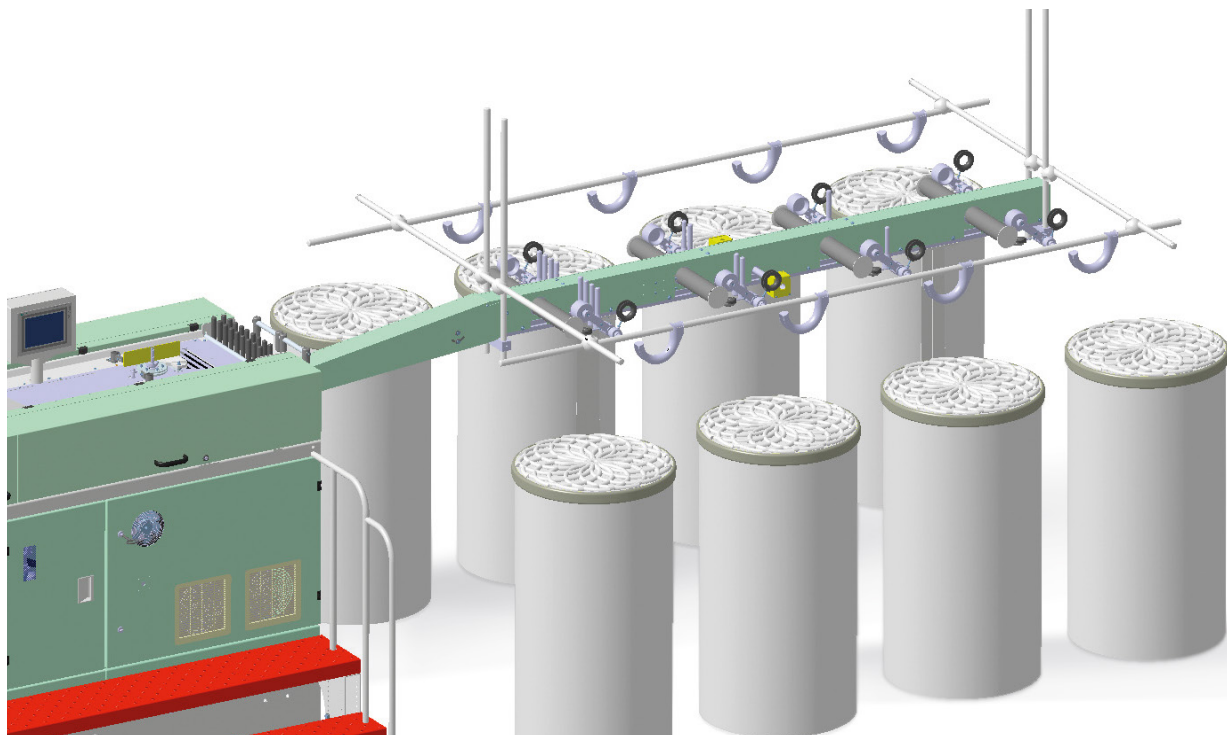
■ AUTOMATIC DOFFING CAN CHANGER

- The Draw Frames DF1 and DFR1 are equipped with a reliable and fast automatic can change system driven by gearmotor;
- the delivery area is pre-arranged for the connection to an automatic transport system of the cans.



■ POSITIVE POWERED CREEL

- Sensors to detect sliver breakages;
- the feeding creel has up to 8 cans of 20", 24" or 40". The positively driven creel (driven rollers and calenders), made of resistant stainless steel bars with round shape, prevents false drafts on the sliver;
- a ground contact sensor is able to properly detect breakages of the sliver and, in that case, to immediately stop the machine;
- a sliver control system, Marzoli patented, is positioned before the T&G and assures the stop of the machine in case of a sliver breakage between the creel and the machine. A light ball is put on each sliver before the T&G. When the sliver breaks, the ball falls down and a sensor stops the machine.

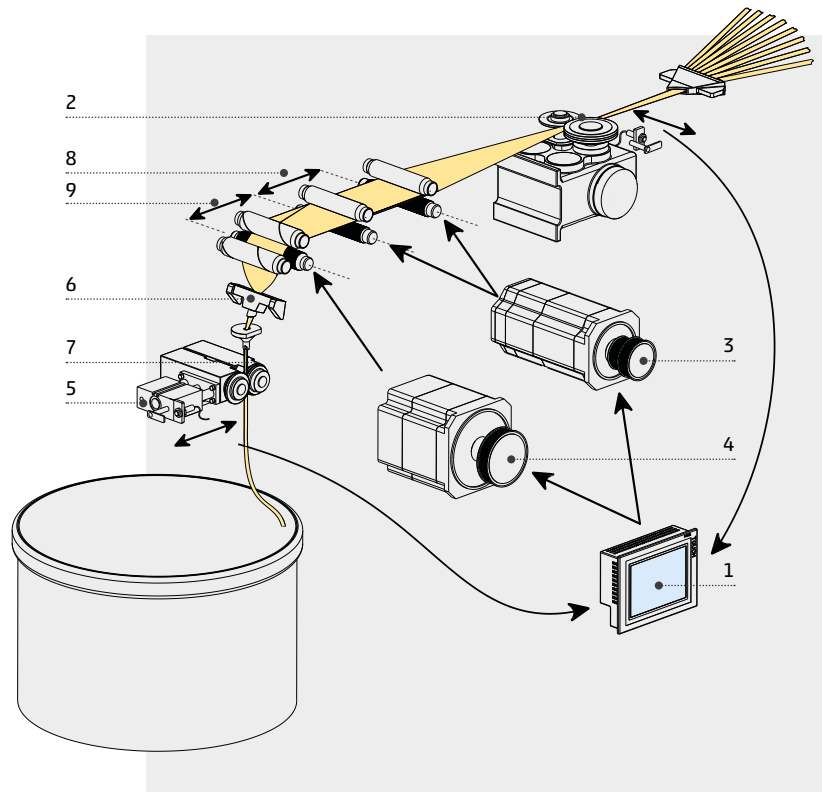


AUTOLEVELLER TECHNOLOGY - R

The sliver autoleveller works as an "open loop" control system (short term); the range of correction is more or less 25% of mass variation. The T&G scanning and the draft adjustment frequency is 3 ms thus ensuring a correction length within few mm at the maximum processing speed; the result is an excellent sliver evenness.

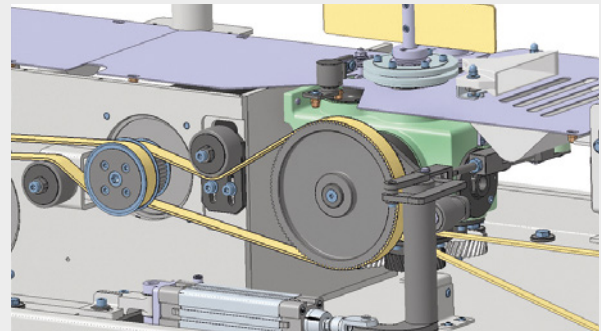
Technical description - Legend

- 1 PLC and Operator panel
- 2 "T&G" measuring unit
- 3 Servomotor
- 4 Main motor
- 5 Quality monitoring sensor
- 6 Web condenser
- 7 Output calender
- 8 Pre-draft (constant)
- 9 Main draft (variable)



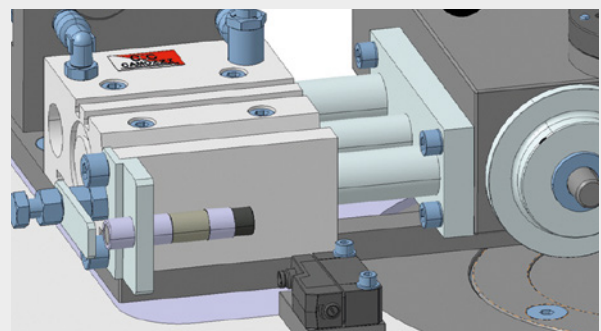
T&G SCANNING ROLLERS WITH LOW FRICTION

The tongue and groove measuring unit (T&G) has a great precision in scanning the mass of the feeding slivers. The on-board digital processor controls the real time difference between the nominal and the actual value, then elaborates a proper correction value to be sent to the dynamic servomotor.

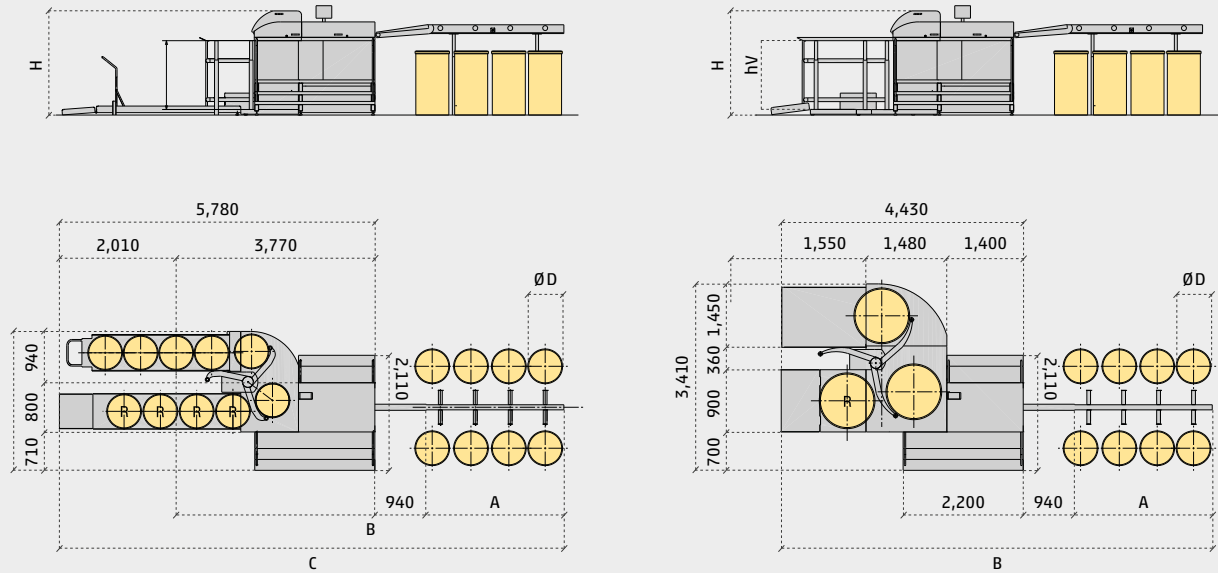


MARZOLI QUALITY MONITORING SYSTEM

The quality monitoring sensor, located at the delivery calender unit, accurately controls the mass of the delivered sliver (A% for sliver count deviation, CV% for mass sliver evenness and Cvt% for count variation coefficient). If real values exceed pre-set tolerance values, the Draw Frame immediately stops.



TECHNICAL DATA



DF1/DFR1

Design	DF1 - without autoleveller DFR1 - with autoleveller
Delivery heads	One
Material	Cotton, man made fibers and blends with a staple length up to 80 mm
Delivery speed	Up to 1,000 m/min (production speed)
Feeding	Power Creel 6 or 8 fold doublings Double row (VAC)
Sliver count processed	Feed count ktex 20 - 50 (20 - 50 g/m) Delivery count ktex 1.25 - 8.0 (from Ne 0.47 to Ne 0.07)
Draft	4 to 10 fold
Drafting system	3 over 3, pneumatic loading + 1 guidance roller
Can sizes	Round cans with diameter 18" to 40" (457 to 1,016 mm)
Installed power	Main motor: 8.14 (DF1) 5.37 (DFR1) Autoleveller: 3.14 kW Driving can: 0.82 kW Can changer: 0.25 kW Suction system: 1.1 kW (Optional)
Compressed air	Minimum 6 bar - Consumption: 200 NL/h
Technological air	1,000 m ³ /h

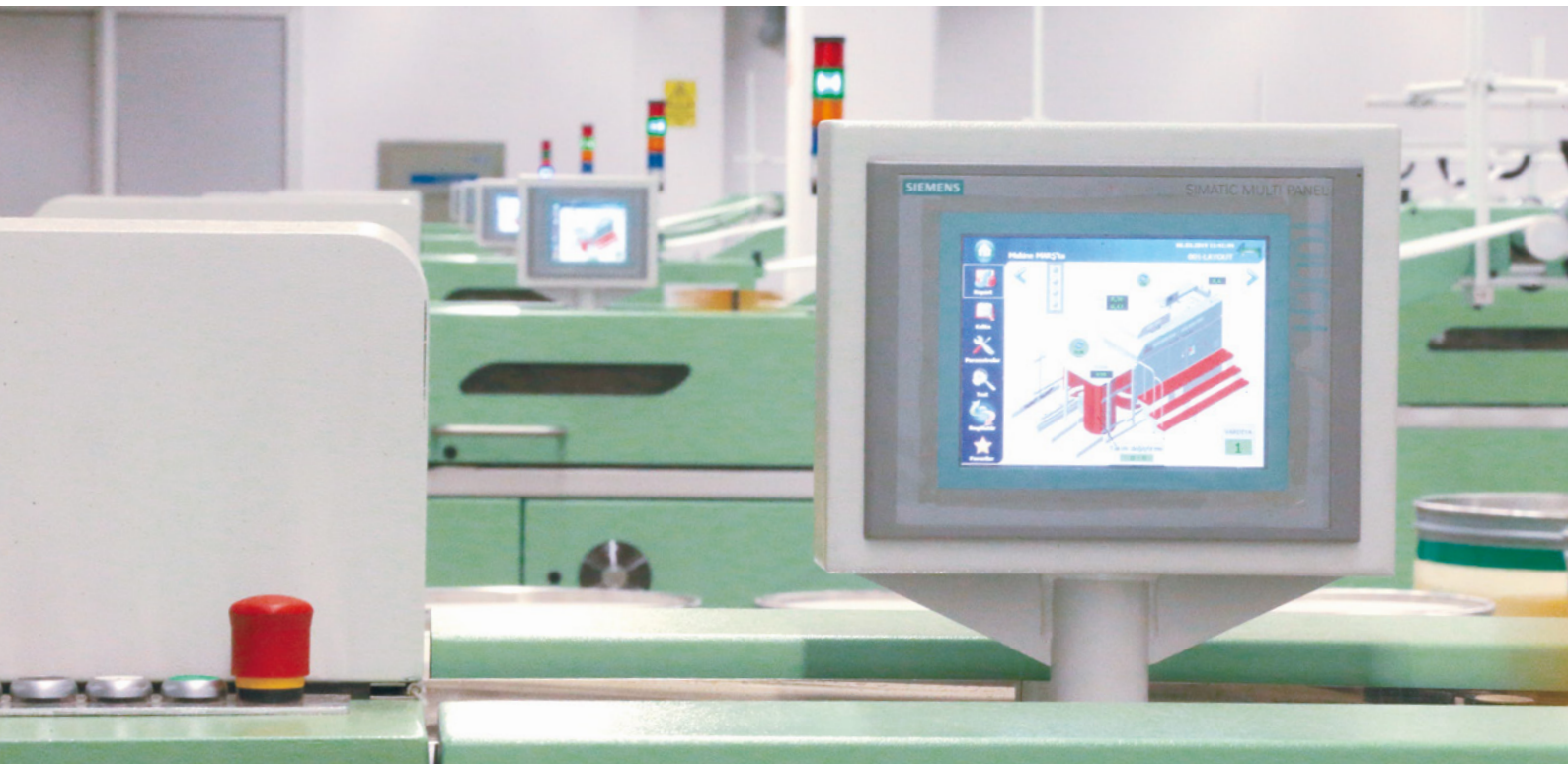
DF1/DFR1 - Dimensions with delivery cans dia. 18"/20"/24"

Machine height		Machine length			
hV	H	n x D	A	B	C
36"	1,590	6 x 24"	1,870	6,580	8,590
42"	1,740	8 x 24"	2,510	7,220	9,230
45"	1,815	6 x 40"	2,590	7,300	9,310
48"	1,990	8 x 40"	3,590	8,300	10,310

DF1/DFR1 - Dimensions with delivery cans dia. 32"/36"/40"

Machine height		Machine length		
hV	H	n x D	A	B
42"	1,740	6x24"	1,870	7,240
45"	1,815	8x24"	2,510	7,880
48"	1,990	6x40"	2,590	7,960
48"	1,990	8x40"	3,590	8,960

B = length of the draw frame with one spare can | C = length of the draw frame with 4 spare cans



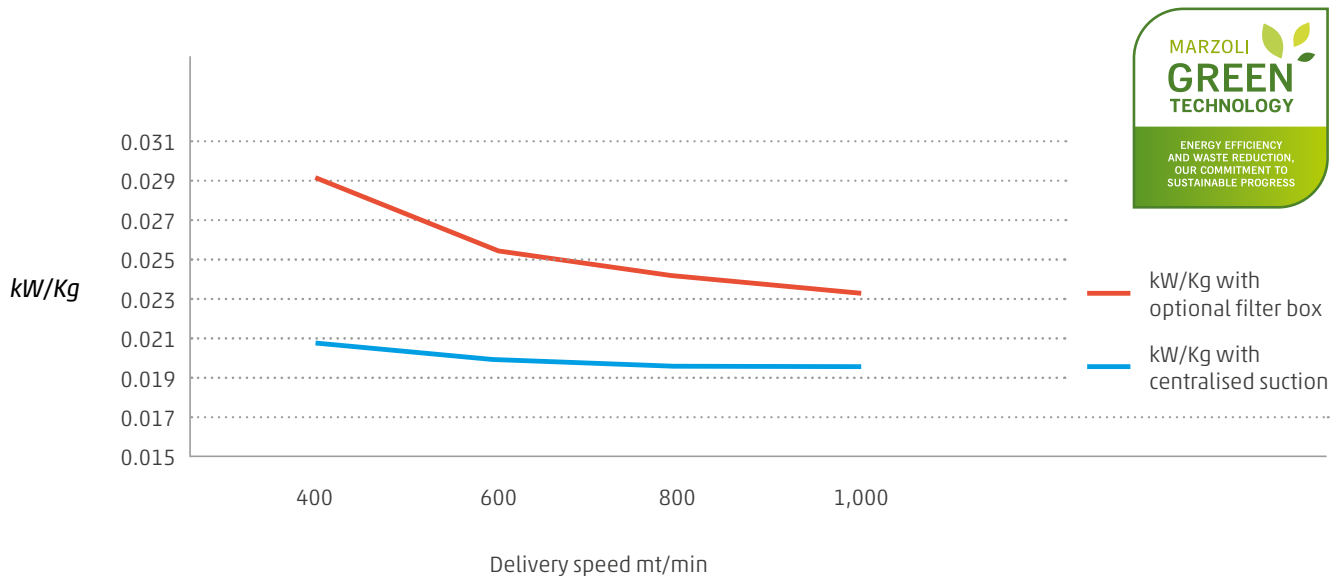
POWER CONSUMPTION: DRAW FRAMES DF1/DFR1

The equipment manufactured by Marzoli is conceived, designed, developed and built with the goal of offering affordable quality and excellent performance within the production process, so that the final product will have a competitive advantage that is created starting

with the earliest stages of production.

Marzoli cares about energy consumption saving and its R&D office aims at reducing the environmental impact of its products and lines.

DFR1 POWER CONSUPTION



— kW/Kg with optional filter box
— kW/Kg with centralised suction

LAP WINDER LW3

KEY POINTS

- HIGH PRODUCTIVITY UP TO 620 Kg/h
- HIGH LAP QUALITY
- MODERN DESIGN
- PRODUCTION SETUP AND CONTROL BY MARZOLI SOFTWARE FROM TOUCH SCREEN



The LW3 Lap Winder has been conceived to grant the best results on quality and productivity. The machine design and the lap formation system make it possible to start operations at a speed of 220 m/min and then reduce the speed while approaching lap completion. In this way LW3 lap winder yields top quality laps, but at the same achieves the highest productivity standards: the LW3 lap winder can reach an average lap formation speed of 190 m/min. The high speed and the fast doffing cycle, which lasts

around twenty seconds, allow the LW3 lap winder to reach production levels up to 620 Kg/h and feed up to six CM7 combers with top quality laps.

Modern Design

The LW3 lap winder is a machine that continues Marzoli tradition of performance, quality, and reliability. The LW3 responds to the requirements of technological innovation, with greater production and quality than competitors, affirming Marzoli advancements in research and development.

■ HIGH LAP QUALITY

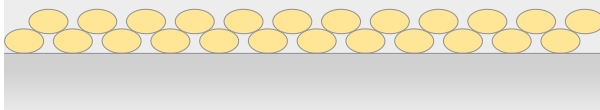
Thanks to the advanced technology and the innovative lap formation system, the LW3 lap winder allows to obtain outstanding quality levels.

The consistent and even quality of the superimposed cotton layers, which maintain homogeneous and uniform weight from the beginning to the end of the formation process, makes it feasible

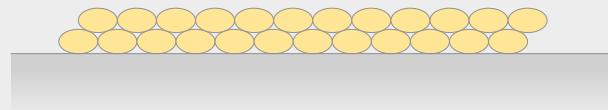
for the CM7 comber to process laps from the LW3 at very high production rates with improved quality of the combed sliver. The unwinding of the laps on the comber, with parallel and well positioned fibers, allows a more effective combing process with a reduction of long fibers in the waste. It follows that the same sliver quality can be obtained with a lower noil ratio.



Standard lap winders: **irregularity** of the superimposed cotton layers



LW3: **regularity** of the superimposed cotton layers for a superior quality of the laps



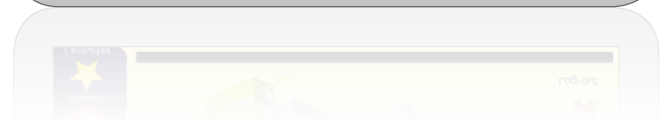
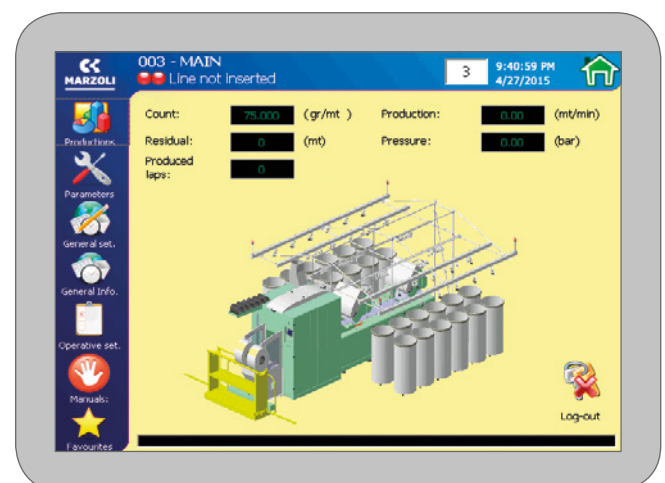
■ USER INTERFACE

Operator friendly H.M.I.

Easy to operate, great reliability and low operational costs are key features of LW3 electronic lap winder. The multi-language H.M.I. is user friendly and permits a simple use with clear diagrams, detailed monitoring pages and step-by-step troubleshooting procedures.

Production setup and control by software

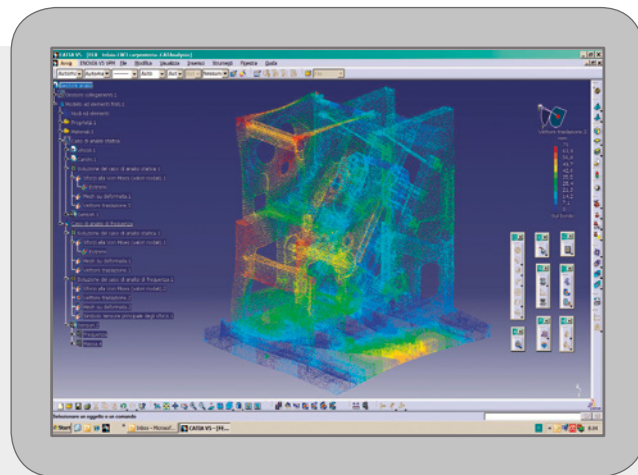
The LW3 lap winder is controlled by a modern PC microprocessor. All production data and working parameters are controlled and saved during the production cycle allowing perfect monitoring of the machine and all doffing procedures.



3D CAD ENGINEERING

The LW3 lap winder, like any other Marzoli's machine, has been designed with the latest CAD technology.

This enables our engineers to study the forces acting inside the machine while it is working at high speeds and find innovative solutions to further reduce inertial forces, uncontrolled vibrations and mechanical frictions while enhancing productivity and quality standards.



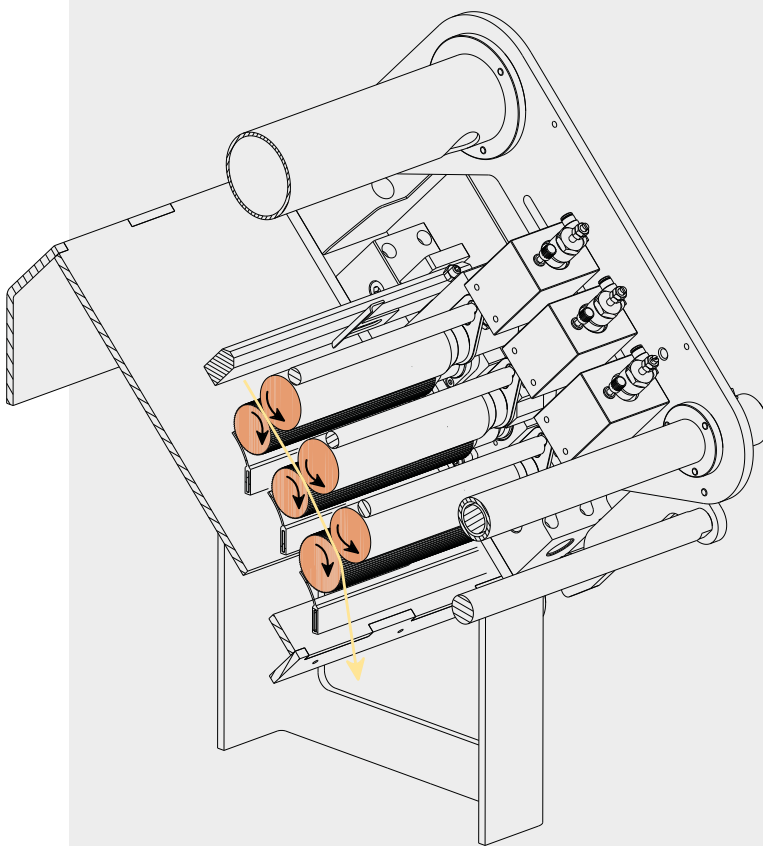
DRAFTING SYSTEM - 3 OVER 3 DRAFTING UNITS

The system features easy setting of back and main draft values through interchangeable toothed pulleys, thereby boosting the machine flexibility.

The pressure on the top roller is adjustable.

When the machine stops, the top rollers are automatically relieved from air pressure to protect the rubber surface. Scrapers at constant contact with the rollers assure high cleaning and avoid roller lapping.

Overall, the LW3's drafting unit guarantees high productivity, perfect reliability, high drafting quality and precision, low maintenance and high flexibility.





■ WEBS SUPERIMPOSITION

The position of the two drafting groups, in line with the lap formation calenders, enables the stacking of two webs on top of each other without using convoy plates.

This important innovation makes the superimposition of the two webs simpler and more precise and, by avoiding friction of the sliver against the convoy plates, it also reduces laps hairiness.

■ LAP TAPERING DEVICE

The two webs, perfectly superimposed and compacted by two pairs of calenders with adjustable mechanical pressure, are driven by movable guides located at the entrance of the formation calenders.

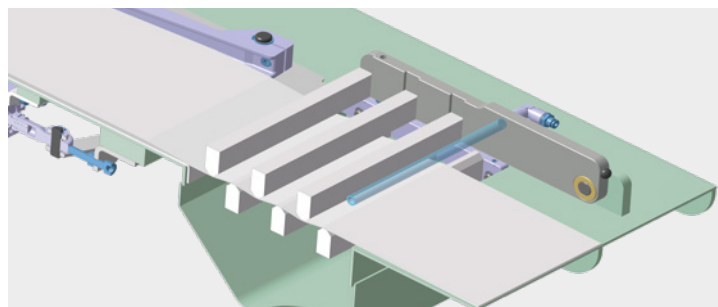
These special guides are driven by pneumatic cylinders that reduce the lap width shortly before the end of the formation process.

The narrowed ending part of the lap allows for a better detachment during the changeover on the lap winder and an easier search and preparation of the batt for the lap piecing on the comber.



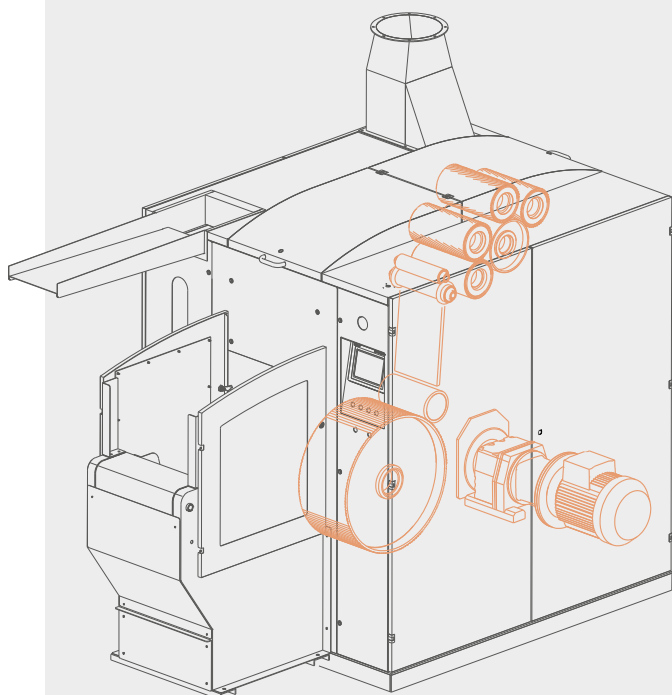
HAIRLESS DEVICE

The multiple layers of cotton go through the stacked chrome bars, which have the purpose of smoothing the external fibers and compressing the layers.



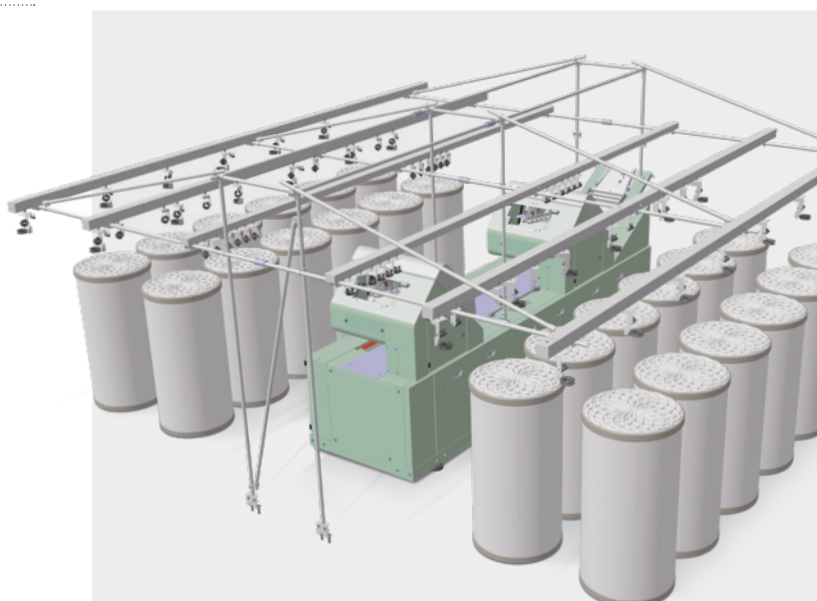
LAP FORMATION

Four points of calender pressure are needed to obtain a compact and uniform batt ready to be wound on the spools. This calender system also facilitates the insertion at the beginning of the process or after an interruption of the flow. A couple of rollers and a slide facilitate the transfer of the batt to the lap formation system made of a sliding lap formation disk with adjustable pressure and a large compressing calender. A special smaller compacting calender helps to avoid expansion of the layers at high speed and enables the production of laps that, when unwound on the comber, are free of turned fibers. This laps formation system facilitates a quick loading of empty spools and unloading of full laps, improving the performance of the machine.



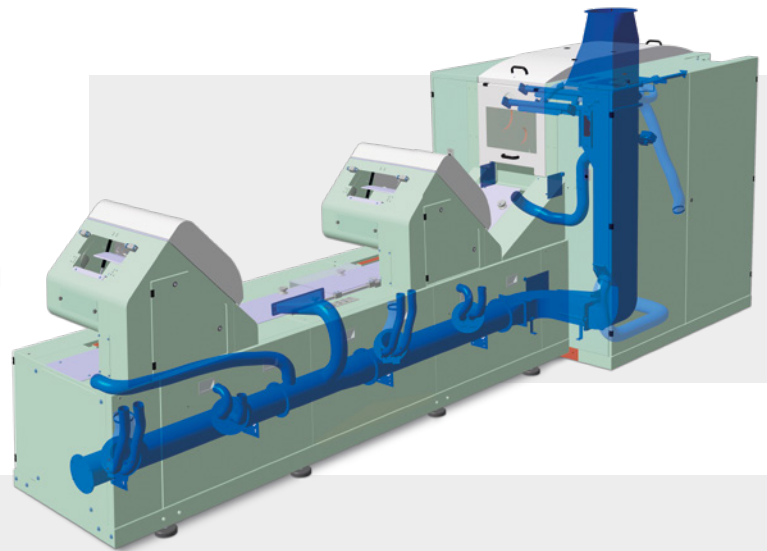
CREEL

On each can entering the creel, there is a sensor that detects sliver presence and stops the machine in case of breakages or when the sliver runs out before the tail enters completely in the drafting group. This makes it easy to join the new sliver and to restart the machine in a short time. A system of sliver guides at the entrance of the drafting system makes it possible to maintain evenly spaced slivers for optimum overlapping of layers after the drafting units.

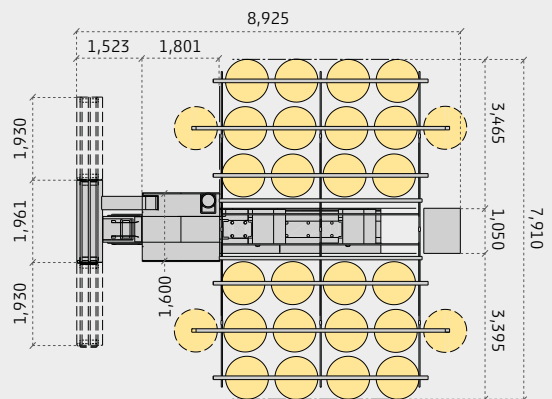
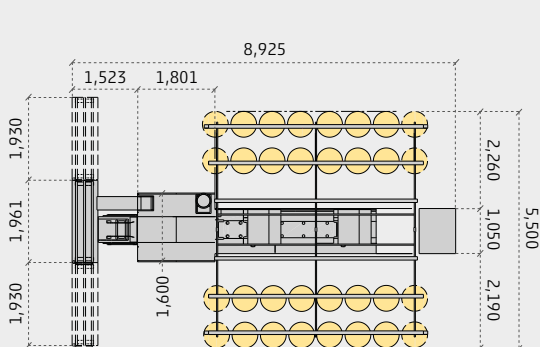
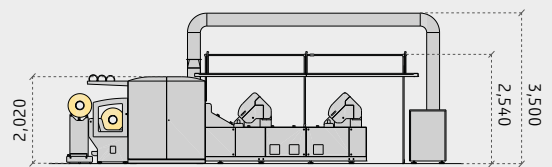
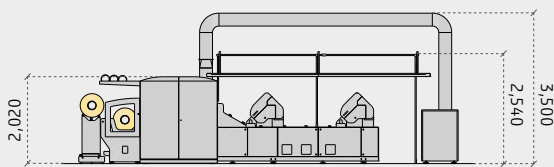


SUCTION SYSTEM

All the various points of cotton processing, from the entrance of the slivers in the drafting rollers to the formation and doffing of the full laps, are kept clean with an efficient suction system directly connected to a central suction system, or to a self cleaning filter box available as an option.



TECHNICAL DATA



Lap winder LW3

Lap weight	Up to 28 kg
Lap width	300 mm
Lap diameter	max 600 mm
Delivery speed	variable - up to 190 m/min average
Drafting System	3 over 3
Feed cans	24" x 48" 40" x 48"
Total installed power	14 kW - without filter box 16.5 kW - with filter box (optional)
Production	Up to 620 Kg/h
Application	Cotton 1 1/16" - 2"
Sliver count range	3.3 - 6 ktex
Doublings	24, 28, 32 (cans dia. 24") 24, 28 (cans dia. 40")
Total draft	1.4 - 2.3
Delivery lap weight	Up to 80 ktex
Power Consumption	0.022 kW/kg

COMBER CM7

KEY POINTS

- TOP SLIVER QUALITY
- OUTSTANDING ENERGY EFFICIENCY
- LOWER PERCENTAGE OF NOIL
- MECHANICAL SPEED UP TO 600 nips/min
- PRODUCTION UP TO 85 Kg/h & HIGH FLEXIBILITY



Marzoli has a long-standing tradition in the design and development of combers for short-staple fibers. The CM7 is the result of a thorough activity of research and development that has led to the achievement of the maximum results on:

- Quality (substantial reduction of neps and short fibers, perfect evenness of the sliver);
- Productivity (mechanical speed up to 600 nips/min with production volumes up to 85 Kg/h);
- Efficiency (reduction in energy consumption, reduction of long fibers in the waste and reduction of noil percentage);

These results have been achieved thanks to a complete revision of the kinematics of the machine and in particular to the optimization of the following parts: driving head, nipper unit, feeding rollers, detaching rollers, circular comb, top comb and drafting system.

The CM7 is also equipped with an automatic lap piecing device, which allows to boost productivity, by reducing the machine downtime, and quality, by increasing the regularity of the sliver. The completely revised suction system has enabled a substantial reduction of energy costs.

The CM7 scores very high on flexibility too, as it can be easily set up to process any type of cotton.

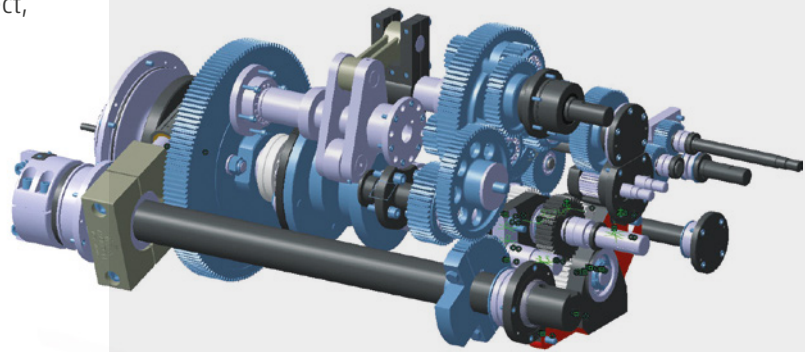
DRIVING HEAD

The optimization of the sequences of motion and their excellent coordination with the combing process ensure effective combing and low stress on mechanical organs also when running at high production speed. This aspect, coupled with an innovative lubrication system which guarantees the perfect oiling of all critical organs.

The detaching rollers are driven by a twin cam (higher precision) with optimized oscillator and differential in order to guarantee the perfect overlapping of the tufts.

The excellent quality of the components guarantee outstanding performances and their durability in the long run.

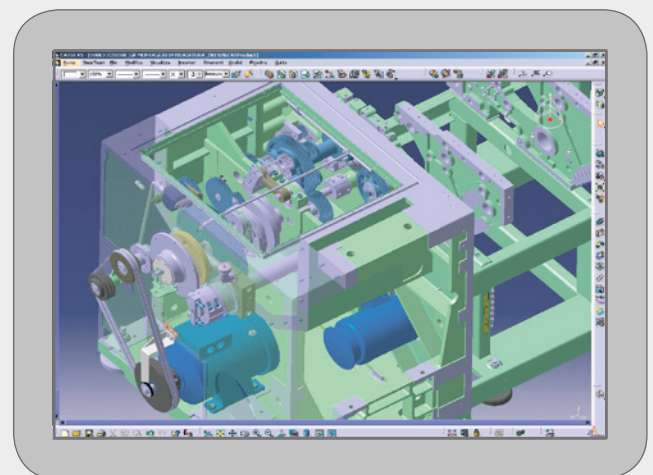
In order to guarantee the maximum degree of flexibility, the CM7 can be adapted, thanks to simple mechanical settings, to process any type of cotton.



The driving head has been designed with an advanced CAD 3D software, which permits the simulation of the dynamic load of the moving mechanical parts during the combing process.

Each single component of the frame has been designed after verifying the deformations during the functioning of the machine at its highest speed.

This guarantees a regular functioning without shocks and with reduced uncontrolled deformations and vibrations.

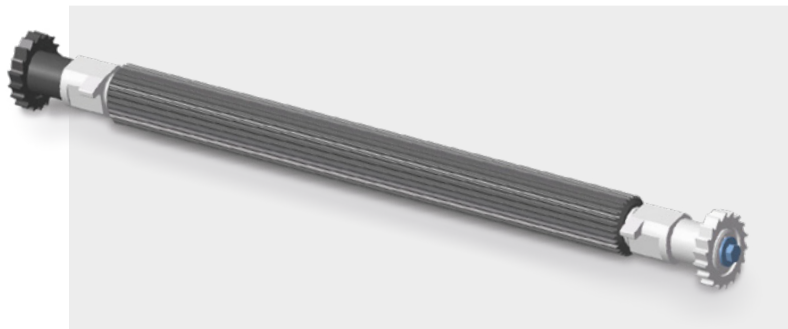
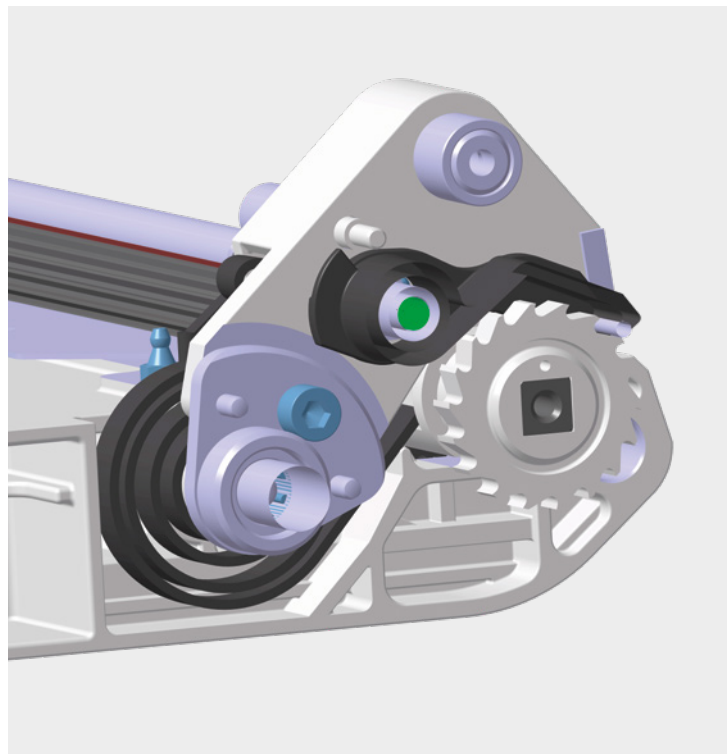


■ FEEDING ROLLER

The CM7 is equipped with feeding rollers that are substantially lighter than the previous models. This considerably reduces the inertial forces of the nipper unit. Furthermore, all feeding rollers present a special profile to guarantee a uniform and constant forwarding of the lap. Like all components of the CM7, also its feeding rollers are designed to offer the most effective, efficient and trouble-free combing process.

The CM7 feeding roller unit also grants high flexibility as it allows:

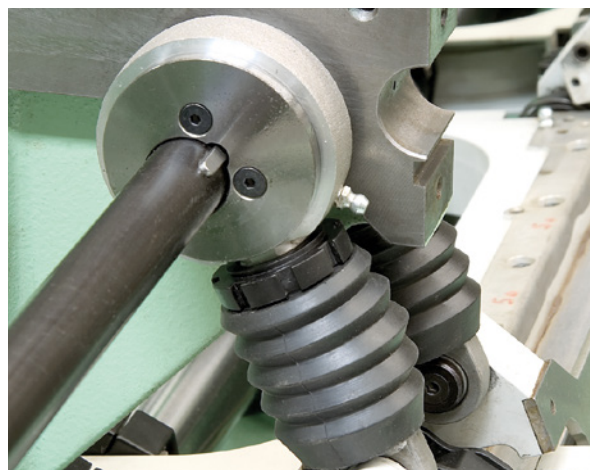
- To choose between forward feed, i.e. the feeding of the lap is undertaken while the nipper unit is moved towards the detaching rollers, or backward feed, the feeding of the sheet is undertaken during the return of the nippers.
- To choose between a higher number of feeding gears and consequently choose the most appropriate feeding rate.
- To easily change feeding rate as the innovative driving system of the feeding roller does not require a different setting of the jaws opening: the user simply inserts the feeding roller with a different number of teeth on the ratchet and restarts the machine.



■ NIPPER UNIT

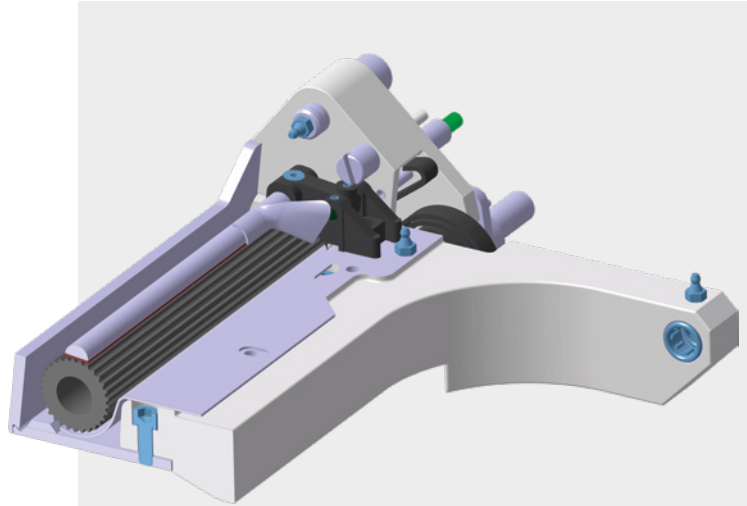
The optimized kinematics of the nipper unit guarantees the perfect nipping of the fibers even at high speed without increasing the mechanical stress stemming from the impact of the closing jaws.

The selection of light material, aluminum and magnesium alloy for the nipper unit sub-frames and titanium for the jaws, has resulted into a nipper unit whose weight is below 2 Kg. This entails reduced inertial forces and, consequently,



energy savings and the possibility to work at higher speeds. The shape of the jaws has been designed in order to process batt weights of 80 g/m. Furthermore, each component of the nipper unit ensures the perfect nipping uniformity on the entire width of the batt, even when working at high production volumes. The study of the new nipper unit has been carried out thanks to a micro camera, that has registered the movements and the flow of the fibers from the nipper unit to the detaching rollers during combing operations.

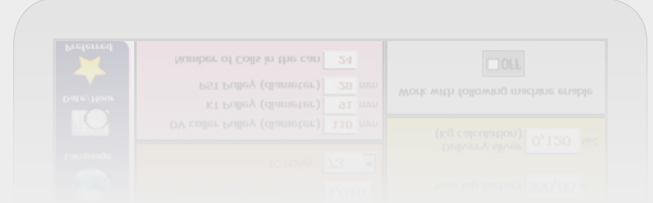
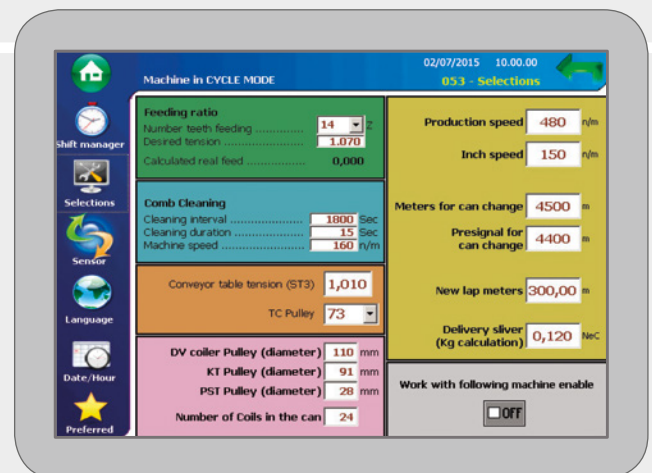
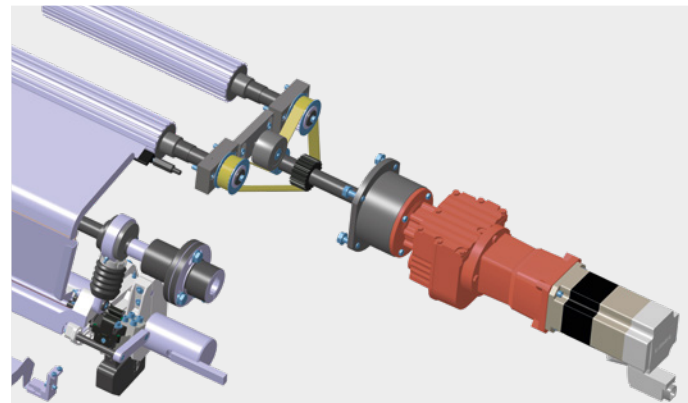
The outcome of this study has been the development of a complete line of optimized components that entail higher combing performances.



■ ELECTRONIC SETTING OF LAP TENSION

The unwinding rollers of the CM7 comber are controlled by a servomotor whose speed can be set through the touch screen interface.

This allows the customer to easily and precisely set the tension of the lap according to the feeding rate, the type of cotton, the lap weight and the machine speed.

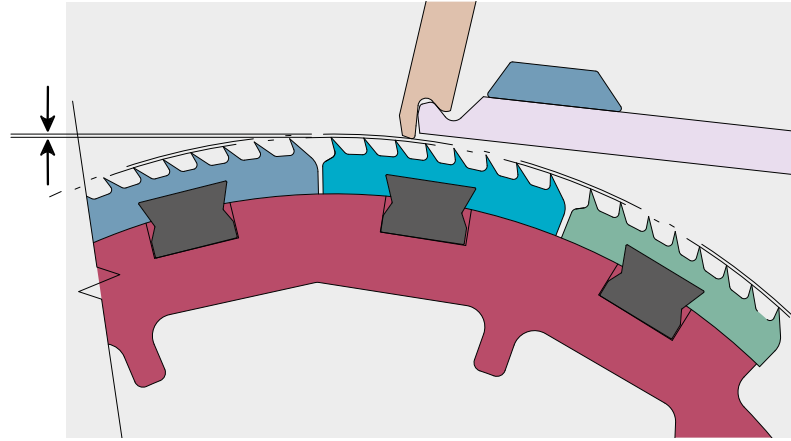


■ CIRCULAR COMB

Thanks to a crank arranged underneath the bottom nipper plate, the nipper unit swings as a standing pendulum with the nippers moving concentrically with the circular comb. This guarantees that the **distance between the jaws and the circular comb is very narrow and shows minimum difference** during the movement of the nipper unit. Hence, the geometry of the nipper unit and the circular combing segment ensures a uniform treatment of the fibers in the fringe. The acceleration of the circular comb during the combing phase allows to increase the time per nip available for all other phases. This is one of the main innovations that has allowed the CM7 to work at 600 nips/min with production volumes up to 85 Kg/h. To boost flexibility the CM7 allows the user to choose between two different types of circular combs and several options of pins density.

The two options of circular combs are:

- Staedtler Vario 4, with 4 sectors of pins density and a combing angle of 90°.
- Staedtler Vario 5, with 5 sectors of pins density and a combing angle of 112°.

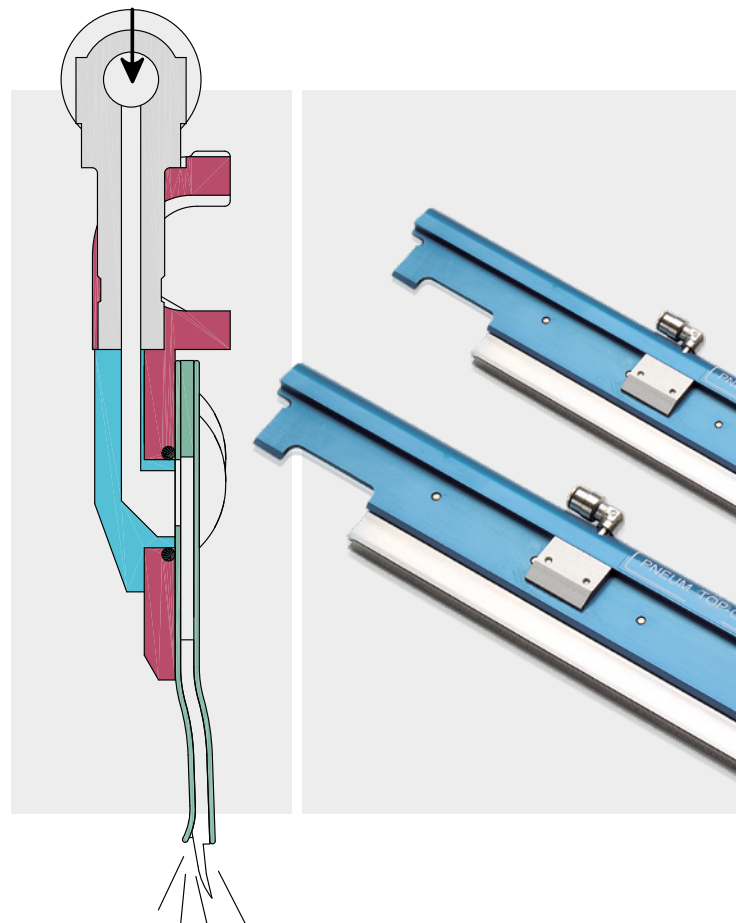


Both options are equipped with metallic clothing that is specifically designed to process thick batts at high speed.

The sectors entail a progressive increase in teeth density which allows a gentle treatment and an effective selection of the fibers and, consequently, a lower percentage of noil. Moreover, the sectors of both options can be combined and the density of the pins can be adapted according to the type of fiber being processed, the target output quality level and the desired percentage of waste.

■ TOP COMB/SELF CLEANING TOP COMB

The shape of the top comb has been improved, in order to guarantee the best combing action on the fiber during the passage from the nipper unit to the detaching rollers. The outstanding performances of the top comb in the removal of short fibers and reduction of neps are achievable with any type of cotton thanks to a wide variety of top comb densities: 23, 26, 29, 32 needles/cm. Marzoli offers as optional self-cleaning top combs: a jet of compressed air, blown through the top comb duct, perfectly cleans the needles thereby eliminating regular maintenance interventions and ensuring that the combing action is always at its best. This system guarantees perfect functioning even at the highest working speed. The frequency and the duration of the air blow are determined by an electronic system which can be easily set through the touch screen interface.



■ DETACHING ROLLERS

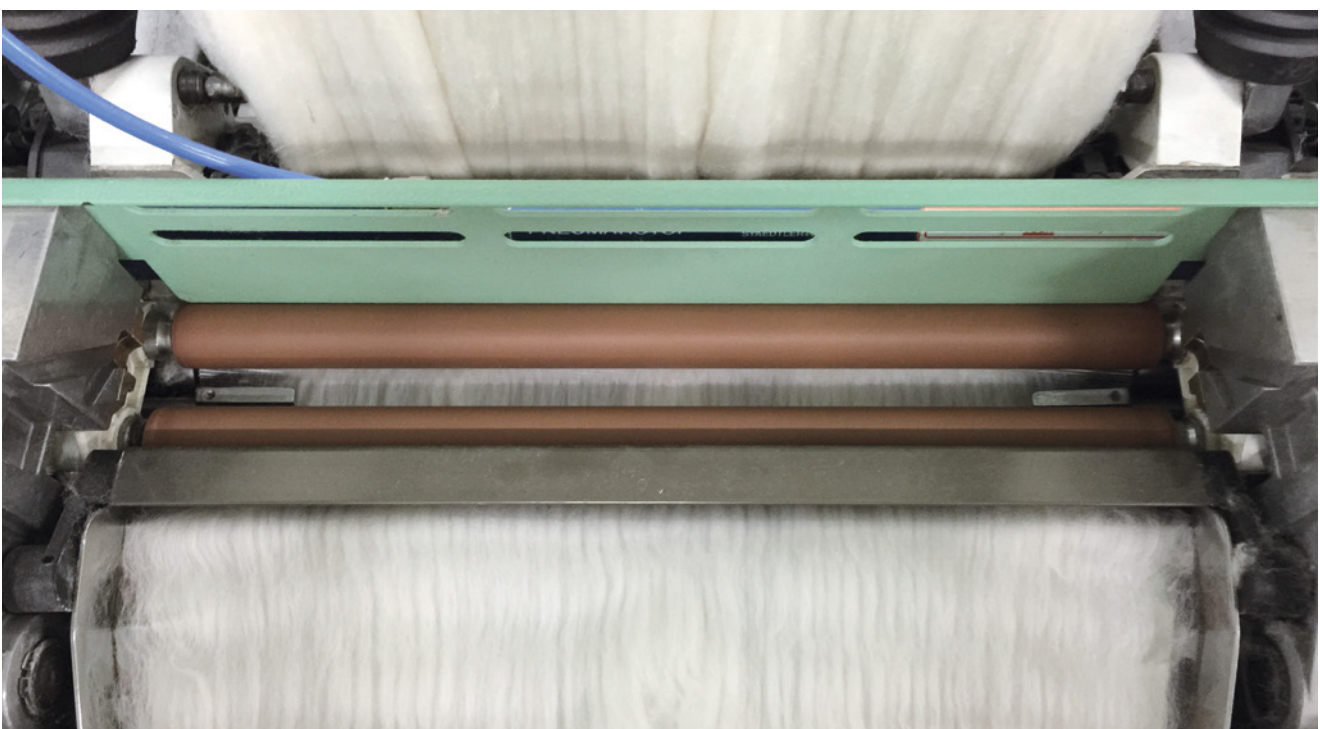
The CM7 presents detaching rollers that are specifically designed to ensure the perfect clamping of fibers along the entire lap width. The bottom rollers are in hardened steel and are lighter than the detaching rollers used for previous comber models. This allows to achieve higher mechanical speeds, perfect coordination of the rollers movements with the combing process and lower energy consumption. The easily settable pressure of the top rollers on the bottom rollers, the top quality rubber clothing of the top rollers and the helical fluting of the bottom rollers guarantee a highly effective, but still gentle, clamping of the fibers.

As the pressure on the top rollers is exerted on the sides of the roller, there could be the risk that the top roller does not exert a uniform pressure on the bottom roller. In fact, because of the rubber clothing deformation, there could be less pressure in the middle. To avoid this problem, Marzoli offers bottom rollers with conical diameters (bigger in the middle) that guarantee a homogeneous pressure on the bottom cylinder and consequently the perfect clamping of the fibers along the entire batt width.



In order to prevent damages to the detaching rollers, there is a proximity sensor which monitors the sliver thickness during the condensation process. If there are overlapping problems that can damage the detaching rollers, the sensor immediately detects them and stops the machine.

The sliver formation occurs through calender rollers whose pneumatic pressure can be easily set by the user. Then, the slivers, on their way to the drafting arrangement, pass through a stainless steel sliver table. All sliver tables, thanks to a special treatment of their surfaces, guarantee minimum false drafts.



LEADING TECHNOLOGY FOR RELIABLE AUTOMATION & OUTSTANDING FLEXIBILITY

Pneumatic drafting unit

The CM7 is equipped with a 3 over 4 drafting unit + 1 guidance roller, driven by timing belt for low maintenance and noise reduction. The user can easily set the desired pneumatic pressure (from 40 to 80 Kg) on the top rollers according to the type of fiber being processed. The drafting unit is positioned over the top of the coiler in order to guarantee no false drafts of the combed sliver from the drafting unit to the can.

Automatic insertion of the sliver in the condensing unit and coiler

The CM7 allows an easy restart of the machine: the insertion of the sliver into the condensing funnel and then into the coiler is automatically managed thanks to a blow of air; human intervention is no longer needed.

CM7 coiler unit with automatic can change

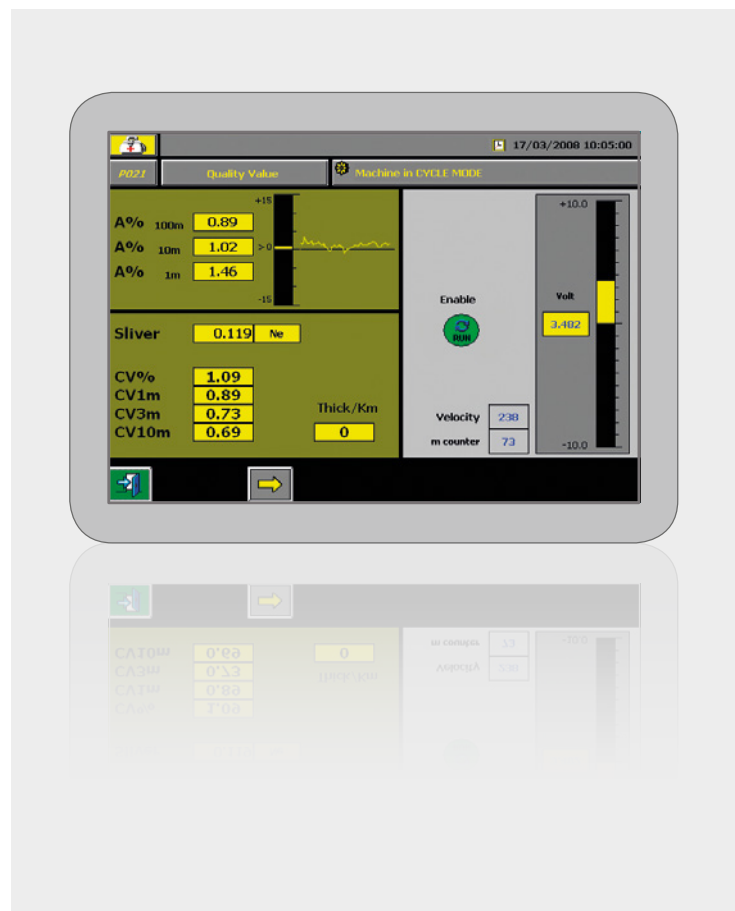
The sliver after going through the quality monitoring system is cycloidally coiled inside the cans (24"x48"). The CM7 sliver coiling unit comprises:

- A coiler which has been given a surface treatment in order to avoid electrostatic charges and consequently work at higher speeds.
- A can rotating plate driven by an independent motor. This motor can be set from the touch-screen interface in order to modify the number of coils per can lap and optimize the number of meters of sliver inside the can.

The can change is carried out automatically: when the can is full, the machine stops; the coiler unit undertakes a controlled breakage of the sliver; the full can is pushed outside the working position and it is replaced by the empty can.

Quality monitoring system

Two calenders, located after the drafting unit, compact the out coming sliver and increase its density and coherence.





The calenders are also part of a quality monitoring system which measures the evenness of the compacted sliver. A sensor monitors the position of the calenders, which is determined by the thickness of the compacted sliver. If the mass, and consequently the thickness, of the sliver exceeds the minimum or maximum pre-set tolerance values, the monitoring system immediately detects it and stops the machine.

■ CM7 DRIVEN BY INVERTER

The main motor of the CM7 is driven by inverter. This allows, thanks to a user-friendly interface, to set the desired technological parameters: the accelerations and decelerations, the machine speed (i.e. number of nips/min), etc. The simple control over technological specifications gives the operator the power to suit production with the types of fiber being processed and find the best compromise between productivity, quality and efficiency.

The presence of the inverter also allows that when the operator stops the machine, the comber always stops in position 24, except for the cases of doffing and emergency stop. Position 24 identifies the combing phase when the nipper unit is close to the detaching rollers and the fringe protruding from the nipper unit is clamped by the detaching rollers. By stopping in position 24, the CM7 ensures an easy and quick restart of the machine with no defects on the web.

■ PREMIUM EFFICIENCY MOTORS - IE3

The CM7 sets the lead in the market for energy savings: apart from the complete revision of the kinematics of the comber, which has reduced inertial forces and optimized the coordination of the moving organs with the combing process, the CM7 is driven by the most advanced electric motors available today on the market. Its Siemens IE3 premium efficiency electric motors grant electric efficiency standards over 90% entailing almost no energy waste and much lower power consumption levels.



MARZOLI
GREEN
TECHNOLOGY

ENERGY EFFICIENCY
AND WASTE REDUCTION,
OUR COMMITMENT TO
SUSTAINABLE PROGRESS

AUTOMATIC LAP PIECING

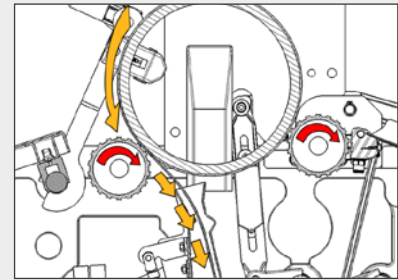
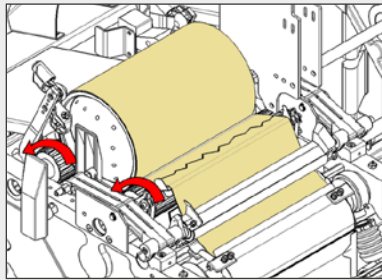
The CM7 presents a highly reliable automatic lap piecing system. This system allows to increase the productivity of the machine thanks to the reduction of machine downtimes and operator's effort. The automatic lap piecing system also has a positive influence on quality as it entails the perfect joining of the two laps thereby increasing

the regularity of the sliver also in the points where lap change has occurred.

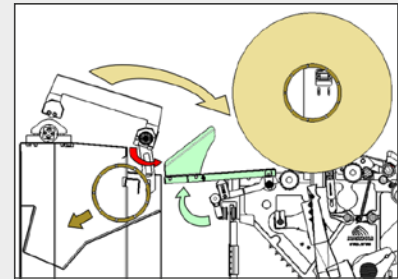
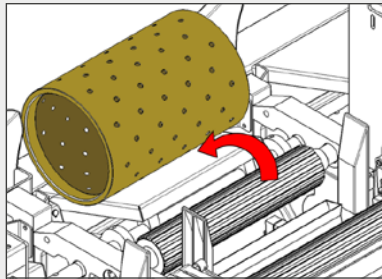
Functioning

As soon as the laps run empty the machine stops and the process of automatic lap piecing begins:

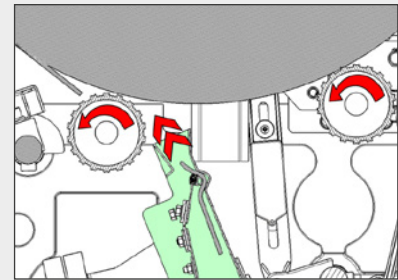
1. The rollers start rotating backwards in order to undertake a controlled breakage of the lap. Then, the rollers rotate forward in order to let the suction system, located underneath the unwinding rollers, take away the lap still on the tubes.



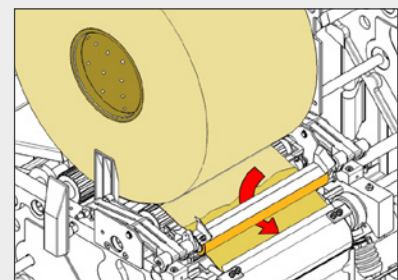
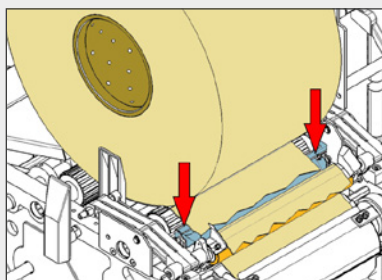
2. The empty tubes are tipped back into a storage area and the 8 full laps are tilted onto the working position.



3. The rollers start rotating forward until the ends of the laps are detached and then clamped by the suction system. Then the laps start rotating backwards in order to undertake a controlled breakage.



4. The laps rotate forward, their ends are directed towards the position of compaction with the ends of the previous laps and the machine restarts.



LAP TRANSPORT SYSTEM

Traditionally the transportation of the laps from the lap winder to the combers has been carried out manually through trolleys. The trolleys are automatically loaded at the lap winder with four laps; the operator brings the trolleys to the combers and manually substitutes the empty tubes with the new laps.

This activity has always been labor intensive and time-consuming: great quantities of unwieldy material must be continuously brought to the combers in order to ensure that the combing process proceeds smoothly without downtimes. Moreover, the manual transportation entails the risk of poor handling of the laps with potential negative effects on yarn quality. Along with the CM7, Marzoli offers transport solutions with different degrees of automation that have the potential to greatly reduce the operational costs

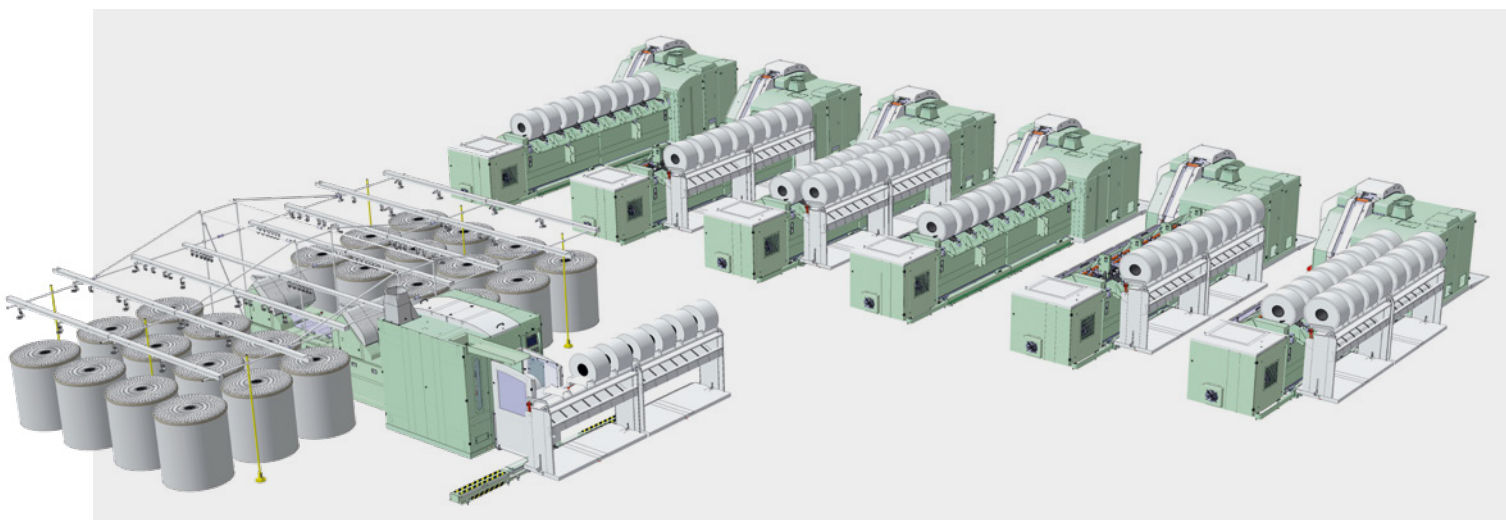
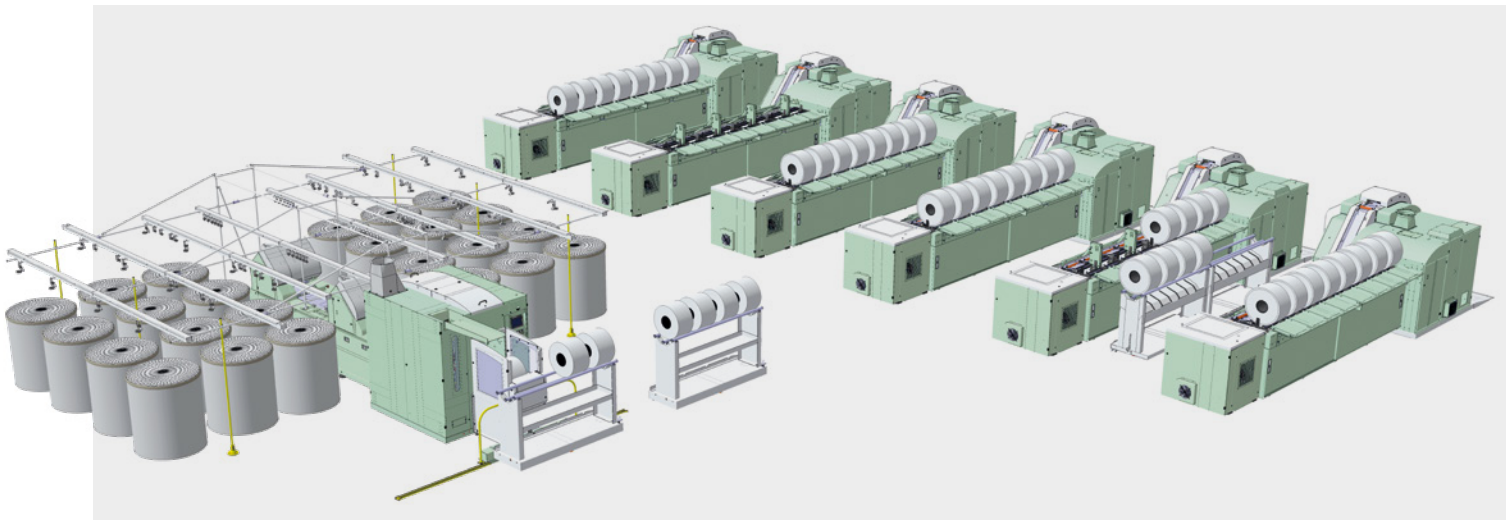
associated with the manual transportation and avoid the risk of poor handling of the laps:

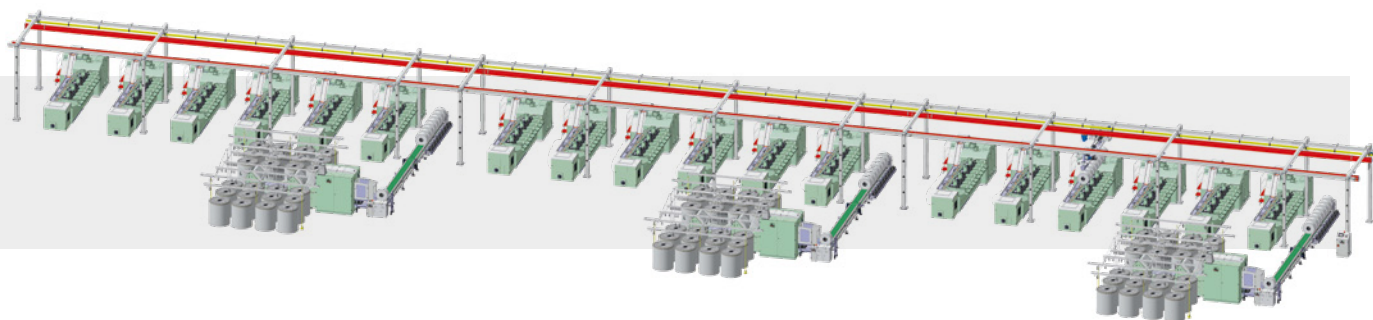
- semi-automatic transport with trolleys that automatically unload the laps on the comber;
- fully automatic transport with laps transfer

Semi-automatic transport

The semi-automatic transport option works as follows:

1. Special trolleys are automatically loaded at the lap winder.
2. An operator brings the trolleys from the lap winders to the combers and positions them so that the CM7 combers detect the presence of the trolleys.
3. The trolleys automatically unload the full laps on the combers.





Fully automatic transport

The fully automatic transport works as follows:

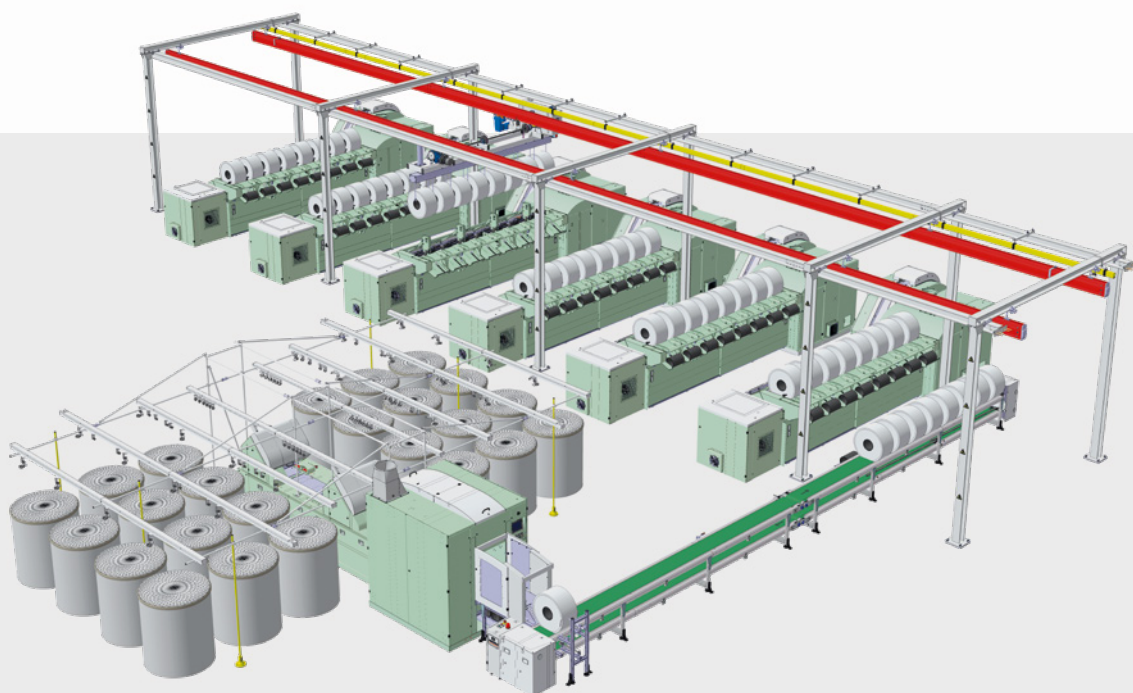
1. During the doffing cycle of the lap winder the laps are loaded on a special conveyor belt which carries the laps underneath the rail of an overhead crane.
2. Meanwhile the overhead crane collects the empty tubes from a CM7 comber that has undertaken automatic lap piecing.
3. The overhead crane collects eight full laps from the conveyor belt and automatically positions them on the spare laps pallet of the CM7 comber.

Although the fully automatic transport system requires the installation of additional components

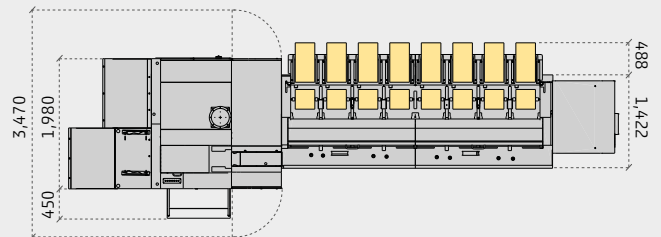
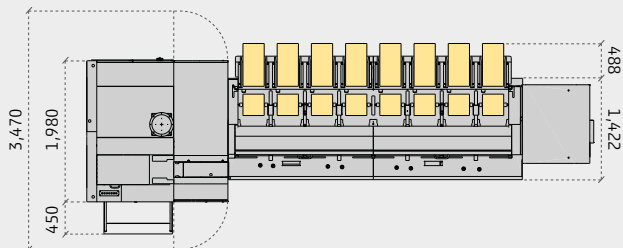
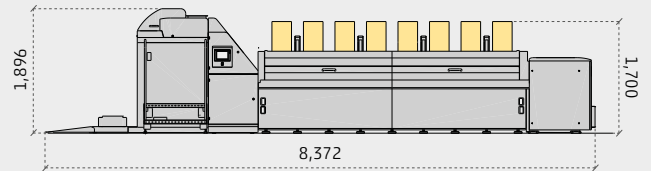
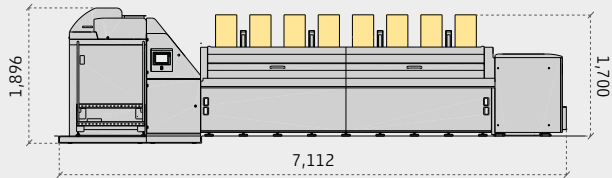
(overhead light crane, conveyor belt and, it also discloses several advantages:

- No operator effort in an activity which has traditionally been labor intensive.
- No waiting times at the combers.
- Higher productivity.

The advantages of the fully automatic transport solution become more and more relevant as the spinning mill becomes bigger. Moreover, as the number of combers grow, the investment becomes more convenient because the cost of the overhead crane and of the conveyor belt spreads on a higher number of machines.



TECHNICAL DATA



CM7

Combing elements:	90°-112°
· circular combs	23-26-29-32
· selfcleaning top combs tips per cm	
Cans dimensions:	24"
· diameter	48" (with castors)
· height	
Total installed power	12 kW
Processed fibers	Cotton 1 1/16" - 2"
Lap weight	Up to 80 ktex (up to 80 g/m)
Feed	forward/backward
Noil	8% - 25%
Mechanical speed	Up to 600 nips/min
Production	Up to 85 kg/h
Feeding rate	4.7 - 4.9 - 5.2 - 5.5 - 5.9 - 6.3



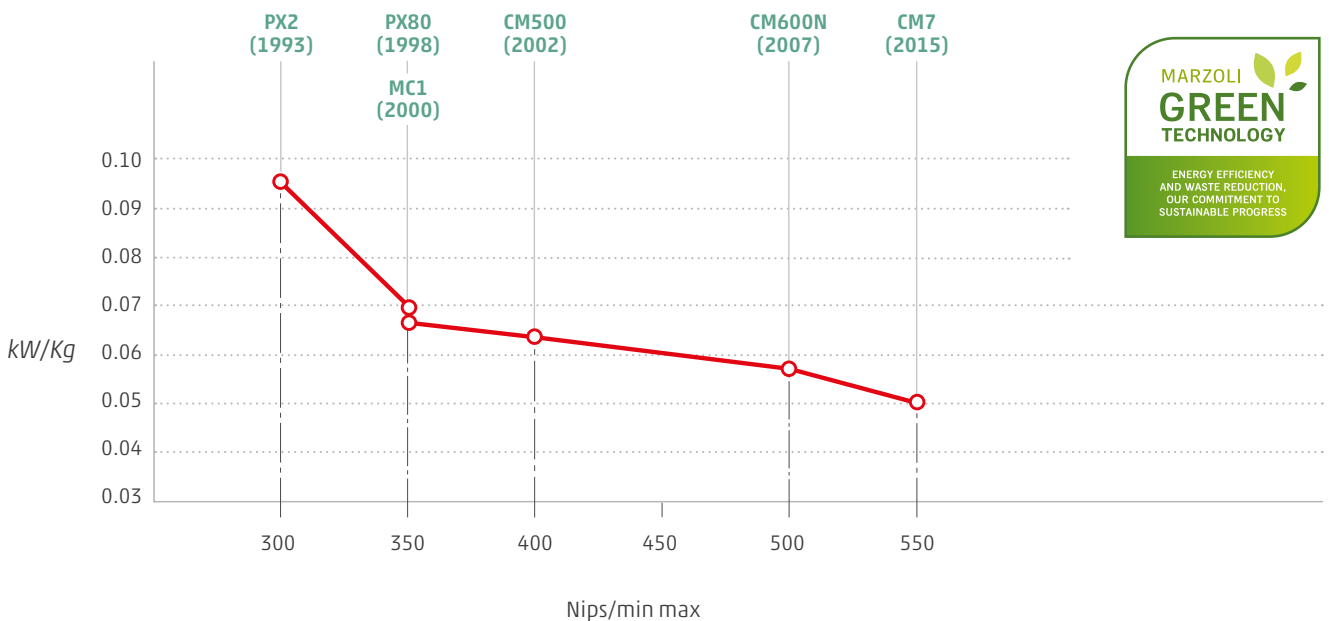
POWER CONSUMPTION: THE CM7 COMBER

The equipment manufactured by Marzoli is conceived, designed, developed and built with the goal of offering affordable quality and excellent performance within the production process, so that the final product will have a competitive

advantage that is created starting with the earliest stages of production.

Marzoli cares about energy consumption saving and its R&D office aims at reducing the environmental impact of its products and lines.

REDUCTION IN POWER CONSUMPTION LAST 20 YEARS



SOFTWARE PLATFORMS

END2END PRODUCTION MANAGEMENT PLATFORM: YARNET

YarNet is Marzoli production management software. It enables the monitoring of production levels, efficiency rates and downtime for both individual machines and the entire spinning mill. Comparisons between machines on selected periods of time are made very simple so that improvement opportunities can be easily identified. YarNet enables the operator to edit production recipes, downloading and uploading them between any machine and their computer. He can also export them in Excel format to share with colleagues as necessary. YarNet gathers and analyses data about production and energy consumption, giving a visual representation of the tradeoffs (kW/kg).

MRM

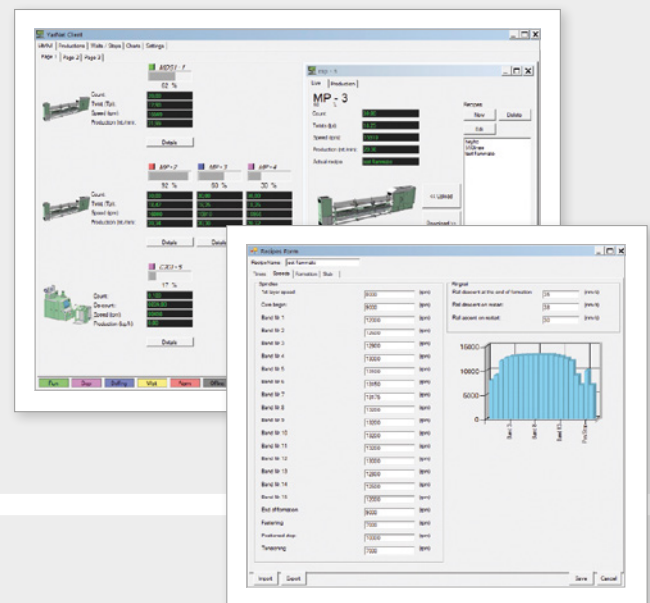
MRM is Marzoli software to continuously monitor the operating conditions of textile machines. It can identify developing malfunctions before a fault occurs and highlight improvement opportunities on efficiency rates and energy consumption levels. Data about temperature, power consumption, speed and vibration are collected from PLCs (programmable logic controllers) and sensors installed on each machine. The software verifies the monitored parameters are within the nominal operating ranges; it can even adjust for room temperature variations to ensure continuous optimisation. If any parameter is out of tolerance, an automatic email alert is sent to the customer. The customer can also access the dedicated online portal to see information for predictive maintenance and of the overall efficiency of the plant. Through dedicated modules (Optimisation Tools) it is possible to optimise the performance of every machine, in particular on energy consumption and levels of efficiency. If required, Marzoli's customer service team can access the data to diagnose actual and developing problems and recommend appropriate actions.

KEY POINTS

- EASY & FAST CONTROL OF EVERY STAGE OF THE SPINNING PROCESS
- IMPROVED SPEED OF RESPONSE IN PRODUCTION OPERATIONS
- EASY MANAGEMENT OF PRODUCTION RECIPES
- SUPERIOR, EASIER AND FASTER MAINTENANCE

YARNET

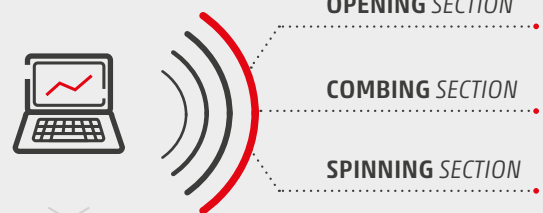
Marzoli Production Management



MRM

Marzoli
Remote
Maintenance

IoT Platform by Microsoft®



BENEFITS

- Higher productivity
- No machines unplanned downtimes
- Prevention from major machine failures
- Longer plant lifespan
- Higher efficiency
- Complete reliability
- Trouble free spinning experience
- Better maintenance planning

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