

OVERVIEW



GALILEO
PRODUCT RANGE



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.

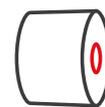
OVER
160 YEARS
OF SUCCESSES

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

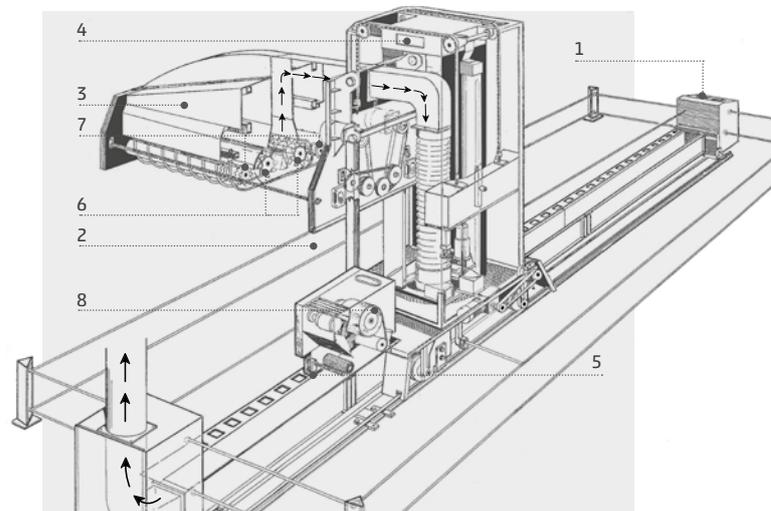
OPENING SECTION B12 BALE OPENER

KEY POINTS

- FINE OPENING OF RAW MATERIAL
- MINIMUM STRESS OR CURLING OF FIBERS
- PRODUCTION UP TO 1,600 kg/h
- SETTABLE FOR TWO BLENDS



Automatic plucking of the bales with effective opening and minimum stress or curling of the fibers thanks to the two plucking rollers, the two conveying rollers and the cage condenser to suck the material. The machine can also be set to process two blends to feed two independent blow room lines. The detacher follows the contour of the bales and ensures smooth and continuous plucking all the way down to the floor, no material left on the ground. Thanks to the vertical movement of the grid of the detacher, the degree of penetration of the plucking rollers and consequently the production rate of the machine are automatically adjusted according to the amount of material inside the mixer.



MACHINE DESCRIPTION - LEGEND

- | | |
|------------------------------------|---|
| 1 Control panel | 6 Two plucking rolls |
| 2 Bale lay-down area | 7 Two vertically-moving conveying rollers |
| 3 Detacher (1,700 mm or 2,250 mm) | 8 Conveying winding roller |
| 4 Automatic rotating tower | |
| 5 Duct for material transportation | |

B12

Processed material	Cotton, man-made fibers up to 65 mm (2 1/2")
Feeding one blowroom line	B12 (detacher with 1,700 mm working width): up to 1,100 kg/h B12 (detacher with 2,250 mm working width): up to 1,600 kg/h
Feeding two blowroom lines	B12 (detacher with 1,700 mm working width): up to 800 kg/h B12 (detacher with 2,250 mm working width): up to 1,100 kg/h

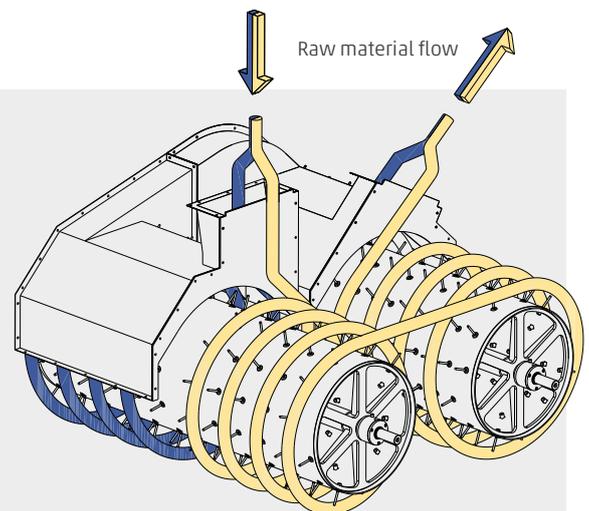
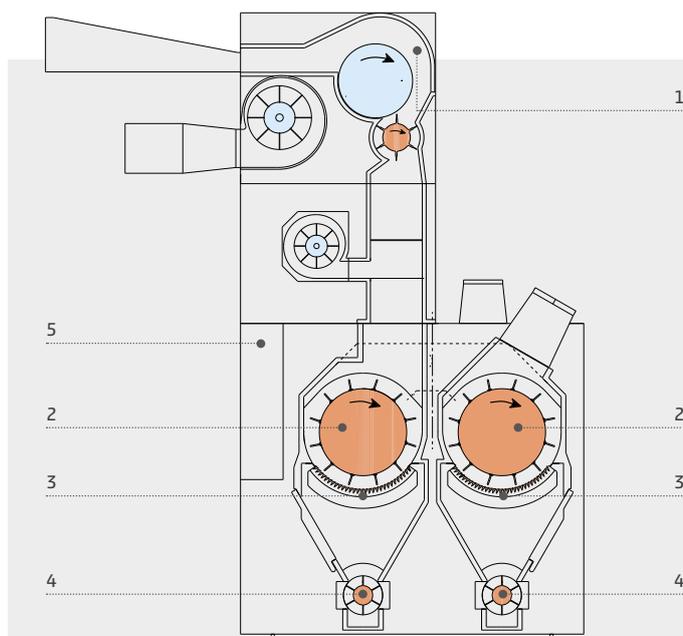
Production depending on the processed fibers

OPENING SECTION B390L OPENER

Highly effective coarse-trash removal thanks to two beaters and two individually-settable grids. Cotton is processed gently, without altering the fibers tenacity and elasticity. The cotton is sucked by the B450L cage condenser located at the top of the machine. The tufts of raw material hit the B450L's perforated cylinder sucked on both sides to ensure effective dedusting. Through a detaching roller the material falls at the center of the first beater where it is split into two flows that are processed separately and consecutively by the two halves of the two beaters. Each flow of material rotates four times around the first semi-beater and four times around the second semi-beater. The individually-settable grids located under the beaters remove the trash which falls into the two waste chambers. The two flows of material rejoin at the center of the second beater and are sucked by the downstream fan.

KEY POINTS

- HIGH PRODUCTION
- EFFECTIVE DEDUSTING AND REMOVAL OF COARSE TRASH



MACHINE DESCRIPTION - LEGEND

- | | |
|-------------------------------|---------------------|
| 1 Dust Separator B450L | 4 Bucket wheel lock |
| 2 Double cleaning rolls | 5 Control Panel |
| 3 Independent adjustable grid | |

B390L

Processed material

Cotton, cotton waste, gin motes and blends up to 65 mm

Production up to 1,600 kg/h depending on the processed material

OPENING SECTION B143L MIXER

KEY POINTS

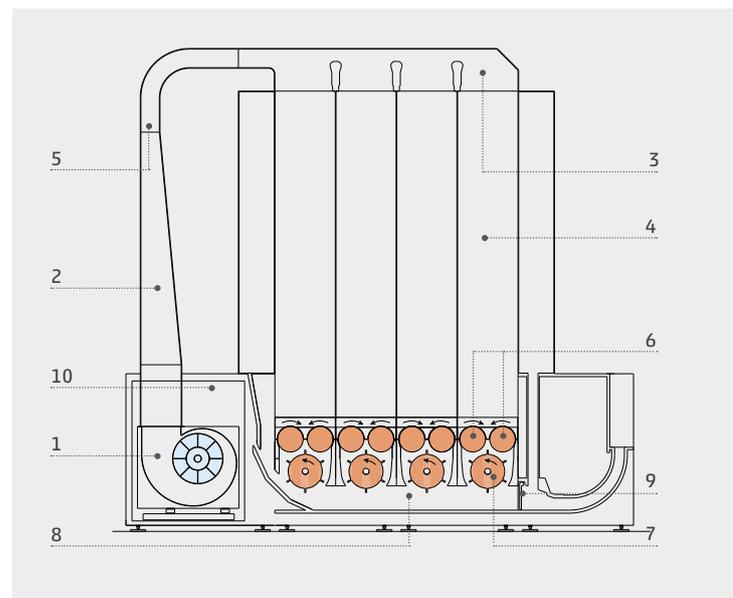
- PERFECT BLENDING
- 4 OR 8 BLENDING CHAMBERS



Four or eight blending chambers with additional tuft blend through suction in the blending channel and production rates up to 1,600 kg/h. The integrated fan sucks the material from the previous machine and delivers it to the blending chambers. After having been pneumatically compacted, the raw material inside each chamber is opened by a beater and delivered to the blending channel. The fine tufts are blended and sucked by the air flow of the cage condenser or the fan of the opener placed after the mixer.

MACHINE DESCRIPTION - LEGEND

- | | |
|-----------------------|--------------------|
| 1 Motorfan B152 | 6 Delivery rolls |
| 2 Feed duct | 7 Opening rolls |
| 3 Distributing duct | 8 Blending channel |
| 4 Blending chambers | 9 Air by-pass |
| 5 Pressure transducer | 10 Microprocessor |



B143L

Processed material

Cotton, man-made fibers and blends up to 65 mm

Production up to 1,600 kg/h with 8 chambers depending on the processed material

OPENING SECTION B380L OPENER

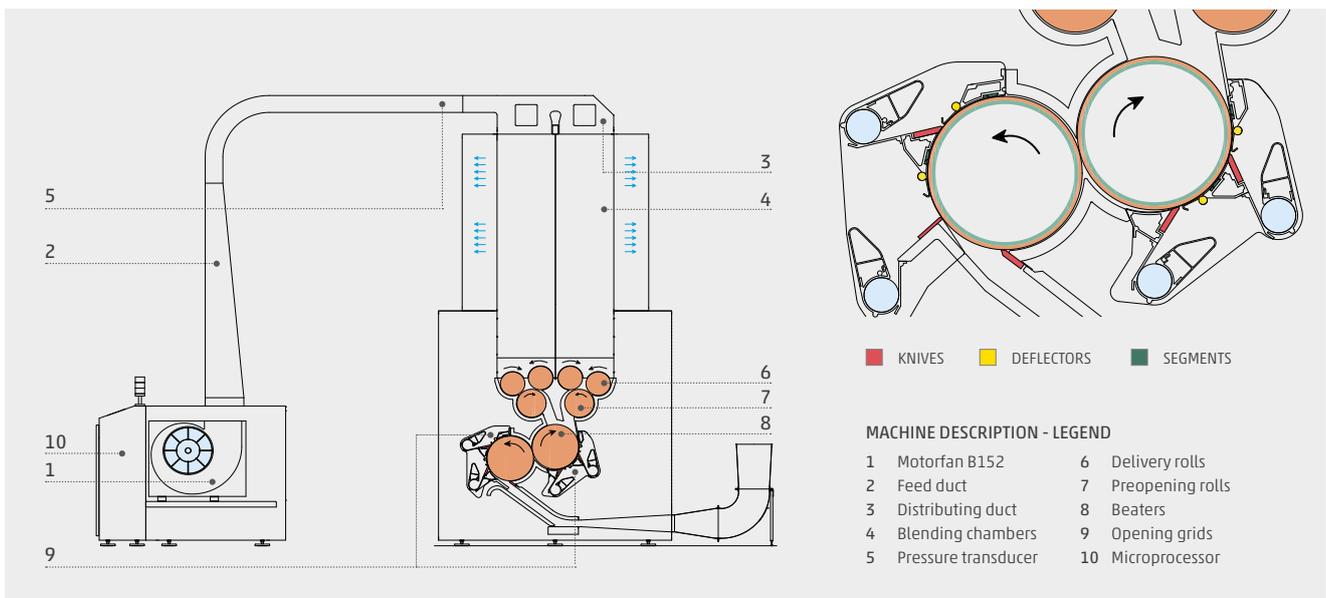
Fibers are sucked through a fan that delivers the material to two blending chambers located at the top of the machine. The technological air exits the perforated blending chambers carrying along dust and micro-trash. The fibers in the blending chambers are delivered by two pre-opening rollers to the beaters without being nipped.

A progressive opening action is carried out by two consecutive beaters and four carding sectors with increasing point densities. Each carding sector is followed by an individually-adjustable knife with deflector to ensure excellent cleaning. Knives and deflectors are individually settable so that the best fiber selection can always be achieved.

After having been opened and cleaned, the material is sucked by the next machine in the line.

KEY POINTS

- PROGRESSIVE OPENING & INTENSIVE CLEANING
- FURTHER BLENDING OF THE MATERIAL
- EFFECTIVE DEDUSTING
- PRODUCTION UP TO 1,000 kg/h



B380L

Processed material

Cotton, man-made fibers and blends up to 1,000 kg/h depending on the processed material

OPENING SECTION B13 & B23 TUFT BLENDING

KEY POINTS

- TUFT BLENDING AT PRESET RATIOS
- UP TO 5 COMPONENTS IN THE BLEND
- HIGH BLENDING ACCURACY: DISCREPANCY <1%
- PRODUCTION UP TO 350 kg/h/B13



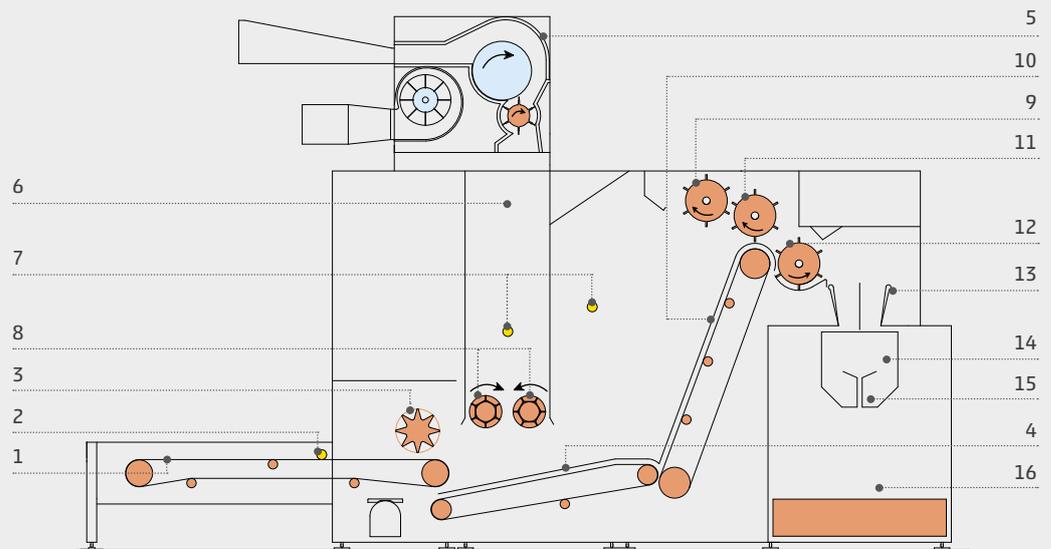
The combination of two or more B13 weighing bale openers and one B23 conveyor is the ideal solution for a precise blend of fibers at preset percentages. The operator through the display inserts the weighing parameters in order to achieve the desired blend percentages; each B13 works until it reaches its set weight. Once all B13 have stopped the material is discharged on the conveyor of the B23 which then moves and carries each layer of material under the next B13, it stops and waits for the B13s to discharge again. After the last B13, the stratified layers are carried through a pressure table and pincer roller to a beater; the material is opened and sucked away by the next machine in the line.

Each B13 has 3 possible configurations:

- With conveyor from 2 up to 10 m long for manual loading of the bales;
 - With silo for automatic feed;
 - With conveyor and silo to allow the operator to choose between manual or automatic feed.
- A sensor positioned on the conveyor signals lack of material on the conveyor, sensors within the silo activate or stop material feed from the previous machine. The material in the blending chamber is picked by a spiked conveyor that takes it to an evener roller whose distance from the conveyor is settable. The material is then delivered to the high capacity (0.44 cbm) weighing pan which, once the target weight has been reached, closes the flaps interrupting the supply of material. The feed of material to the weighing pan has variable speed to ensure high productivity and weighing accuracy: high speed at the beginning, lower speed as the machine approaches the set weight.

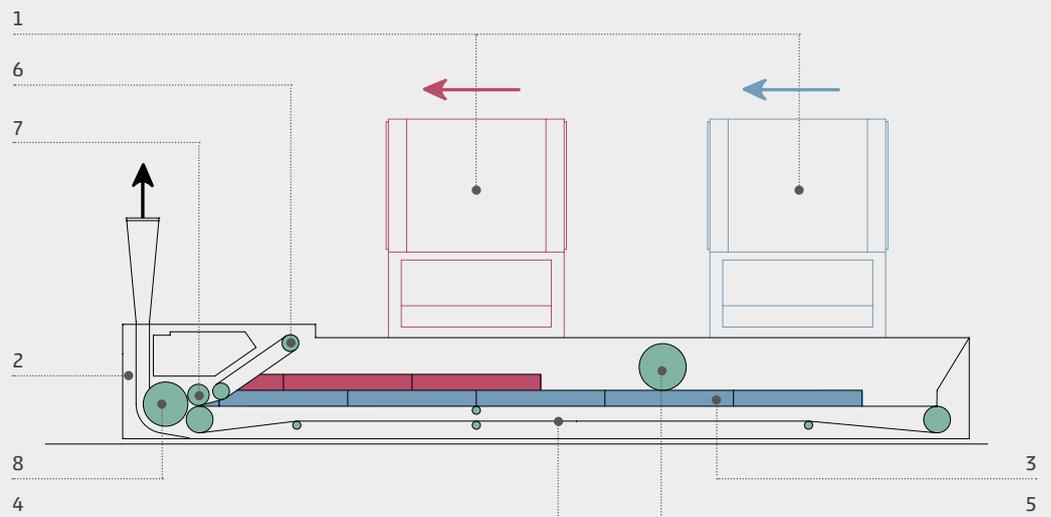
MACHINE DESCRIPTION - LEGEND

- 1 Feed conveyor
- 2 Feed conveyor photocell
- 3 Retaining roll
- 4 Feed lattice
- 5 Cage Condenser
- 6 Material reserve trunk
- 7 Photocell
- 8 Delivery rolls
- 9 Roll clearer
- 10 Spiked lattice
- 11 Evener roll
- 12 Stripper roll
- 13 Closing flaps
- 14 Weight pan
- 15 Bottom traps
- 16 Tuft blender B23



MACHINE DESCRIPTION - LEGEND

- 1 B13 Weighing Bale Opener
- 2 B23 Tuft Blender
- 3 Material from 1st B13
- 4 Conveyor belt
- 5 Pressure roller
- 6 Pressure table
- 7 Pincer roller
- 8 Beater

**B13 & B23**

Processed material

Cotton, man-made fibers and blends up to 350 kg/h/B13

Production depending on the processed fiber and set blend percentages

OPENING SECTION B14 & B15 (+B18)

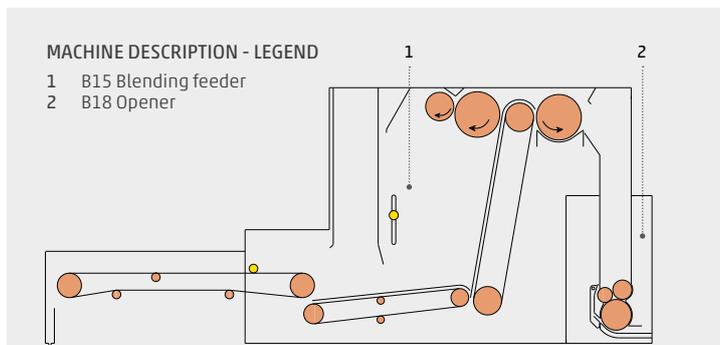
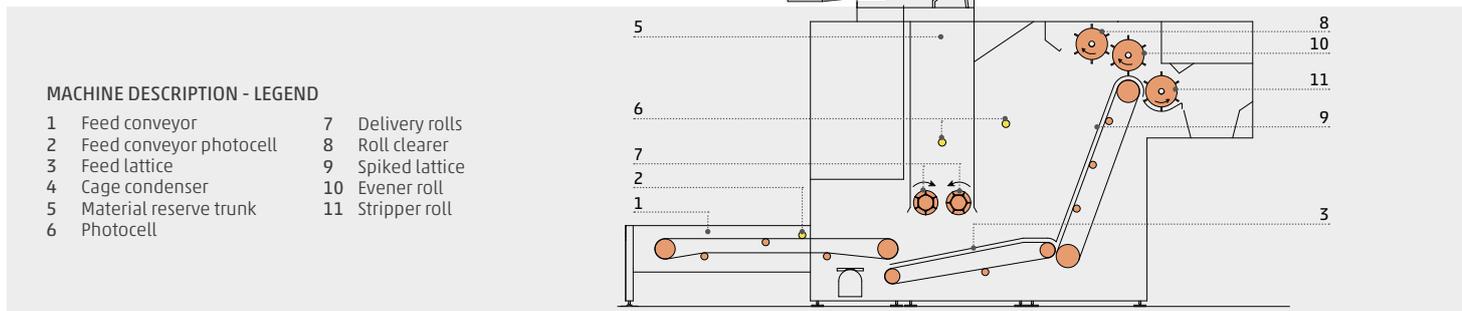
The B14 is a feeder which can be fed manually or automatically via B450L cage condenser. The raw material is delivered to an upright conveyor which carries the clumps of material through an evener roller. If the material is sufficiently opened it passes through, if not it is thrown back into the hopper where a gentle blending action is carried out. A photocell in the hopper settable in height activates the feed conveyor in case the material goes under a certain level. The material, after having been evened, is taken by a stripping roller and delivered to a suction duct or a conveyor which brings the material to the next machine. The machine can also be equipped with a grid with 11 adjustable knives under the stripping roller in case it is processing cotton to remove coarse trash. Production can reach 600 kg/h. A smaller version of this machine, the B15, is also available for the recover of good fibers or for small lots. Production up to 300 kg/h for raw material, 80 kg/h for recovered material.

KEY POINTS

- MANUAL AND/OR AUTOMATIC FEED
- DISTANCE BETWEEN EVENING ROLLER AND UPRIGHT CONVEYOR EASILY SETTABLE
- STRIPPING ROLLER WITH GRID FOR COTTON
- LARGE HOPPER FOR GENTLE MATERIAL BLENDING



The B15 at the exit can also be equipped with an opening unit, the B18. This is the ideal solution to process small lots of already-cleaned material to feed one or two cards.



B14 & B15 (+B18)
 Processed material Cotton, man-made fibers and blends up to 600 kg/h the B14, 300 kg/h the B15, depending on the processed fibers

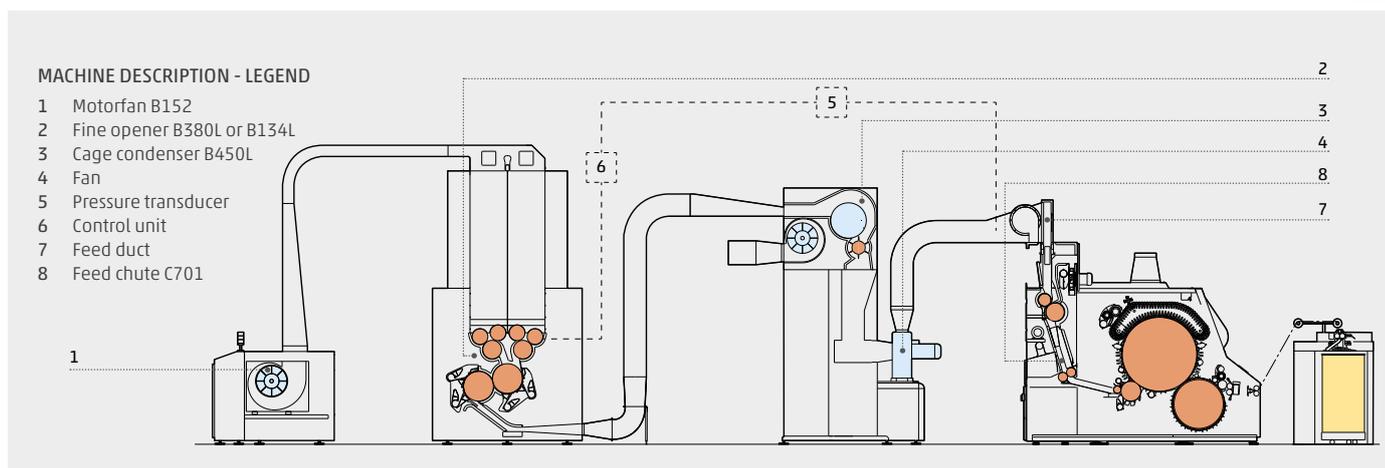
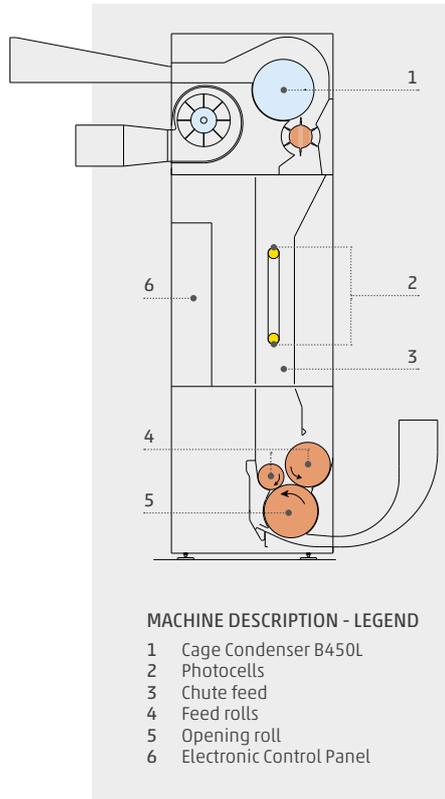
OPENING SECTION B134L & B153L

The B134L is a highly efficient opener for already-cleaned cotton and for man-made fibers. A B450L cage condenser located at the top of the machine sucks the material from the previous machine and dedusts it through its perforated cylinder.

The flocks are then stored into the silo where two photocells activate and deactivate the feed of material. Two feed rollers deliver the material to an opening beater that has 3 options for point density: 10,240 pins, 14,880 needles or saw tooth clothing.

KEY POINTS

- FEED WITH CAGE CONDENSER B450L
- EASY SETTING BY CONTROL PANEL
- PRODUCTION OF THE B134L UP TO 1,600 kg/h



The B153L delivers up to 800 kg of material per hour to the cards. The material is sucked from the previous machine by a B450L cage condenser, which removes

the dust from the highly-opened flocks. The material is sucked by the fan and blown to the cards. Suction of cage condenser and fan speed are settable.

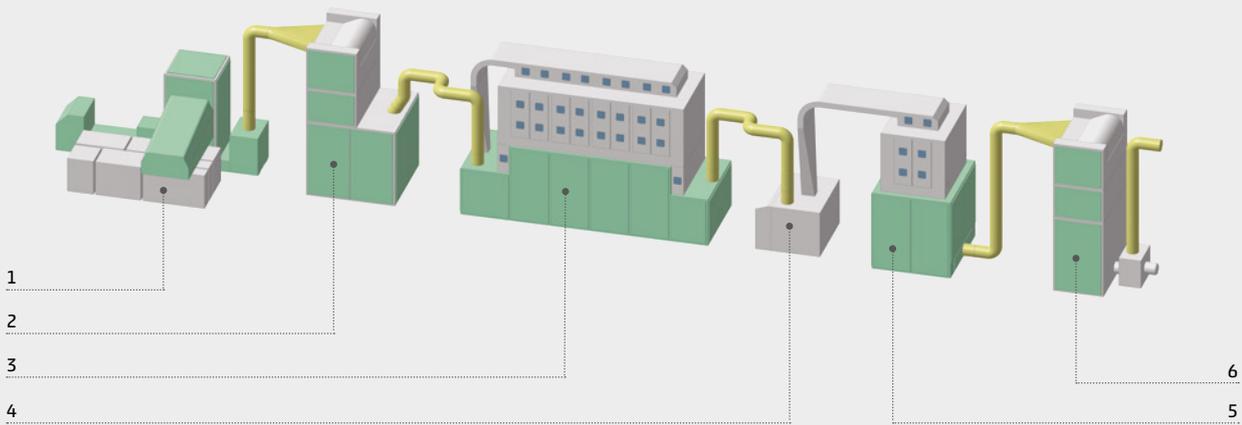
B134L & B153L

Processed material

Cotton, man-made fibers and blends up to 1,600 kg/h the B134L, 800 kg/h the B153L, depending on the processed fibers

GALILEO BLOW ROOM LINES

Cotton with trash content up to 3%
Production 1,000 kg/h

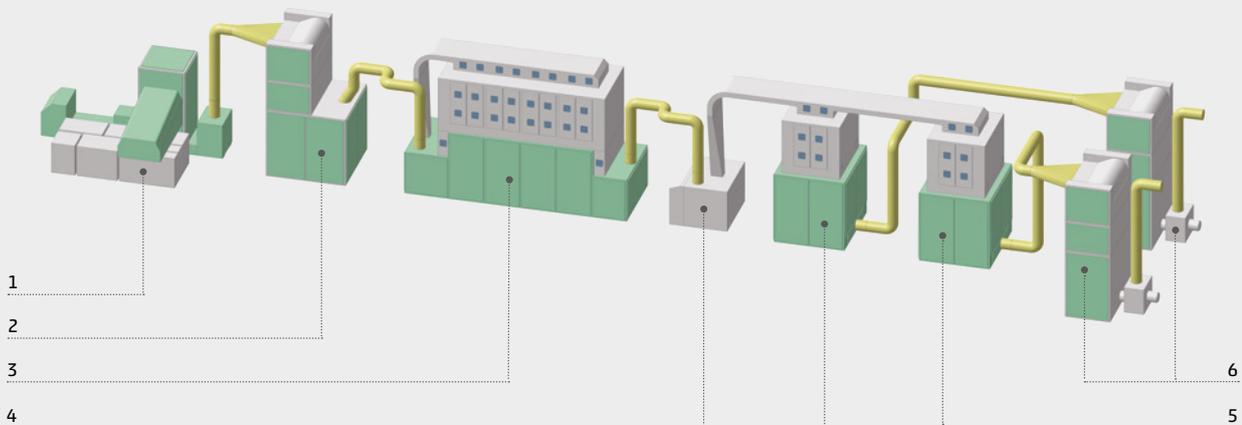


TECHNICAL DESCRIPTION - LEGEND

- | | |
|----------------------------------|----------------------|
| 1 B12 - 1,000 kg/h | 4 B152 - 1,000 kg/h |
| 2 B390L - 500+500 kg/h | 5 B380L - 1,000 kg/h |
| 3 B143L, 8 chambers - 1,000 kg/h | 6 B153L - 1,000 kg/h |

Blending	8 x 2 = 16
Cleaning efficiency	Up to 70%

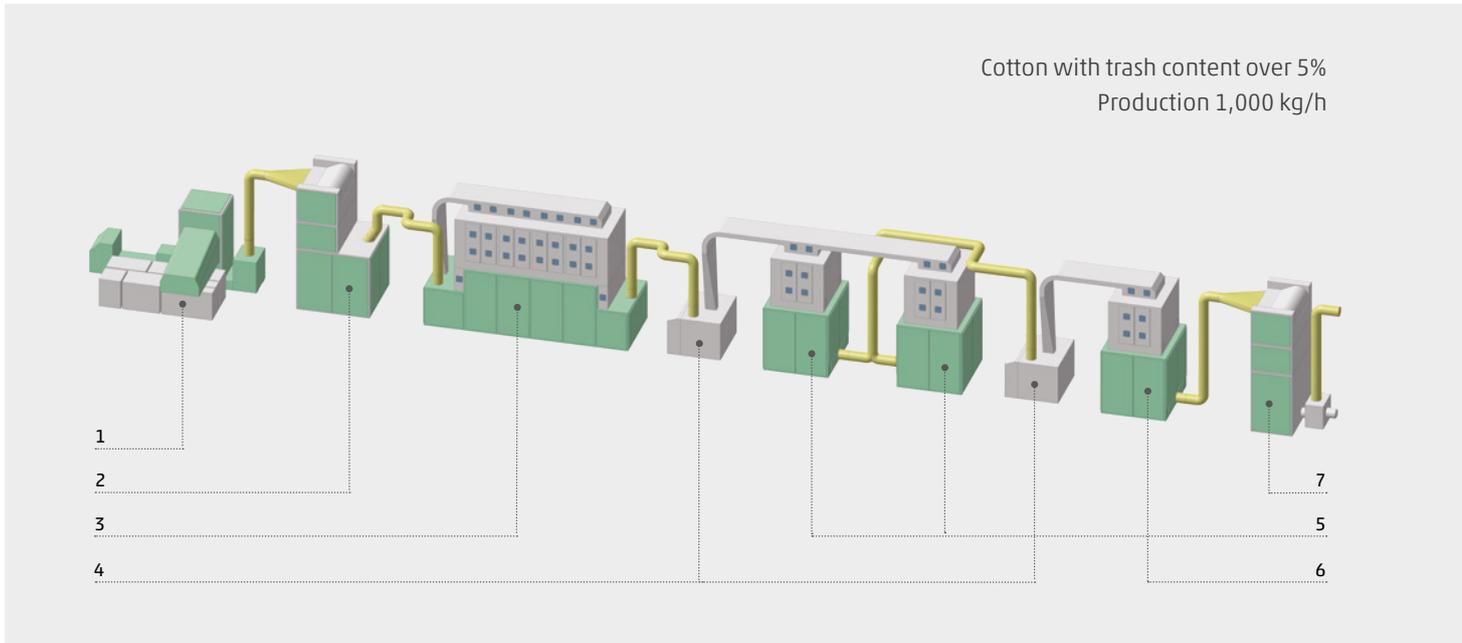
Cotton with trash content up to 3%
Production 1,600 kg/h



TECHNICAL DESCRIPTION - LEGEND

- | | |
|----------------------------------|---------------------|
| 1 B12 - 1,600 kg/h | 4 B152 - 1,600 kg/h |
| 2 B390L - 800+800 kg/h | 5 B380L - 800 kg/h |
| 3 B143L, 8 chambers - 1,600 kg/h | 6 B153L - 800 kg/h |

Blending	8 x 4 = 32
Cleaning efficiency	Up to 70%

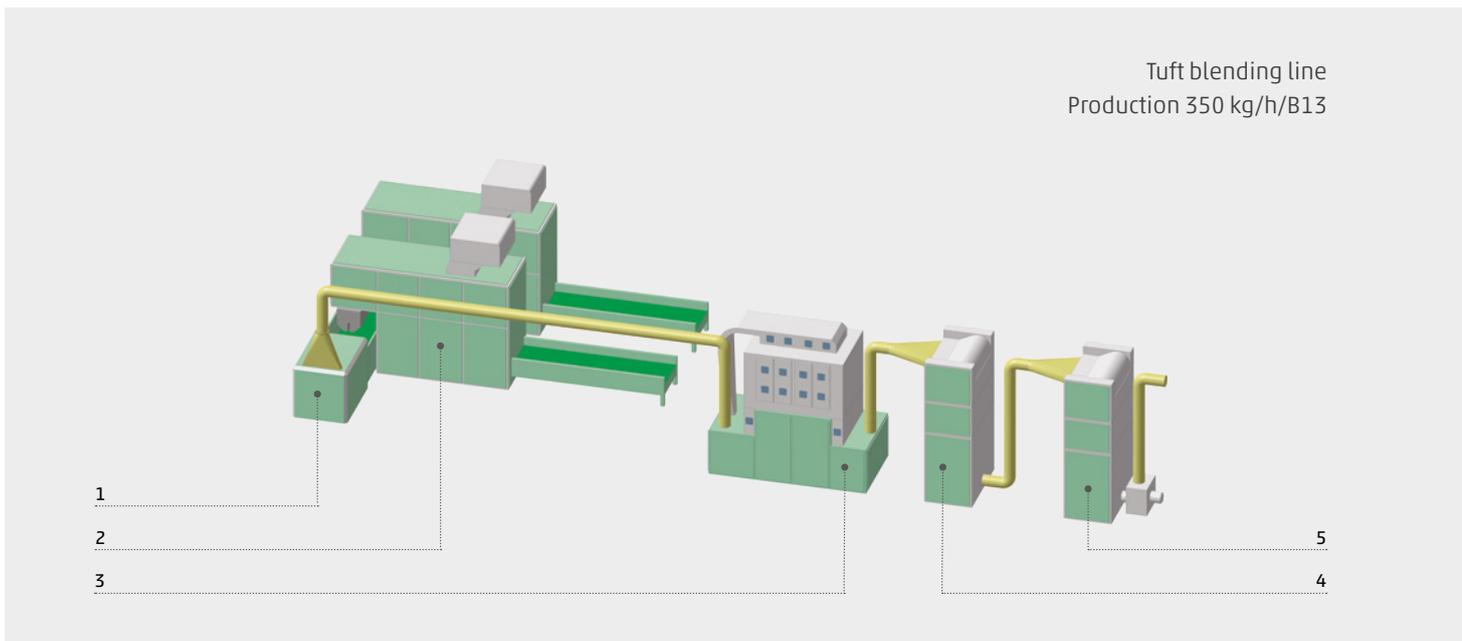


TECHNICAL DESCRIPTION - LEGEND

- | | |
|----------------------------------|----------------------|
| 1 B12 - 1,000 kg/h | 5 B380L - 500 kg/h |
| 2 B390L - 500+500 kg/h | 6 B380L - 1,000 kg/h |
| 3 B143L, 8 chambers - 1,000 kg/h | 7 B153L - 1,000 kg/h |
| 4 B152 - 1,000 kg/h | |

Blending	$8 \times 4 \times 2 = 64$
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Cleaning efficiency	Up to 80%
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TECHNICAL DESCRIPTION - LEGEND

- | | |
|---------------------|---------|
| 1 B23 | 4 B134L |
| 2 B13 | 5 B153L |
| 3 B143L, 4 chambers | |

Tuft blending	Up to 5 components
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Blending accuracy	Discrepancy <1%
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CARDING SECTION

C701

KEY POINTS

- INTENSIVE OPENING & CLEANING FOR THE BEST FIBER SELECTION
- CARDING AREA OF 3.74 SQM WITH 32 MOVING FLATS IN WORKING POSITION
- GREAT ENERGY SAVINGS (kW/kg DOWN BY 30%)
- OUTSTANDING QUALITY & PRODUCTIVITY



Marzoli's C701 card has been specifically designed to achieve a superior tradeoff between quality and productivity in processing any type of fiber. This has been possible thanks to the great number of innovations in some specific areas of the machine.

The two pieces chute with integrated opening system guarantees a perfect opening of the feedstock.

The blow of air and the sensor located in the batt formation chamber guarantee an even distribution of the flocks with constant pressure. This, along with the medium-term auto-leveling technology that adjusts the speed of the feed roller according to the batt thickness, ensures high regularity in the sliver.

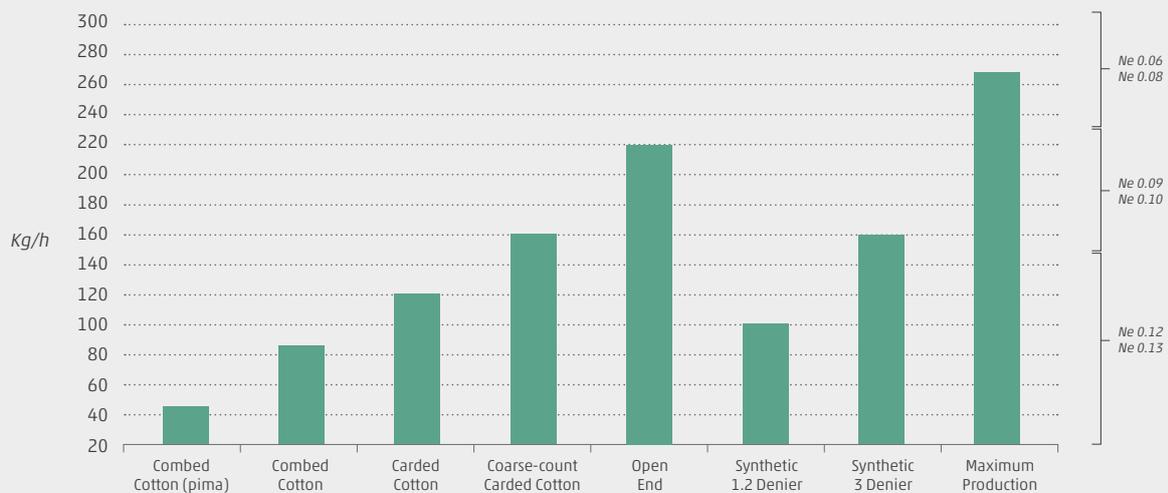
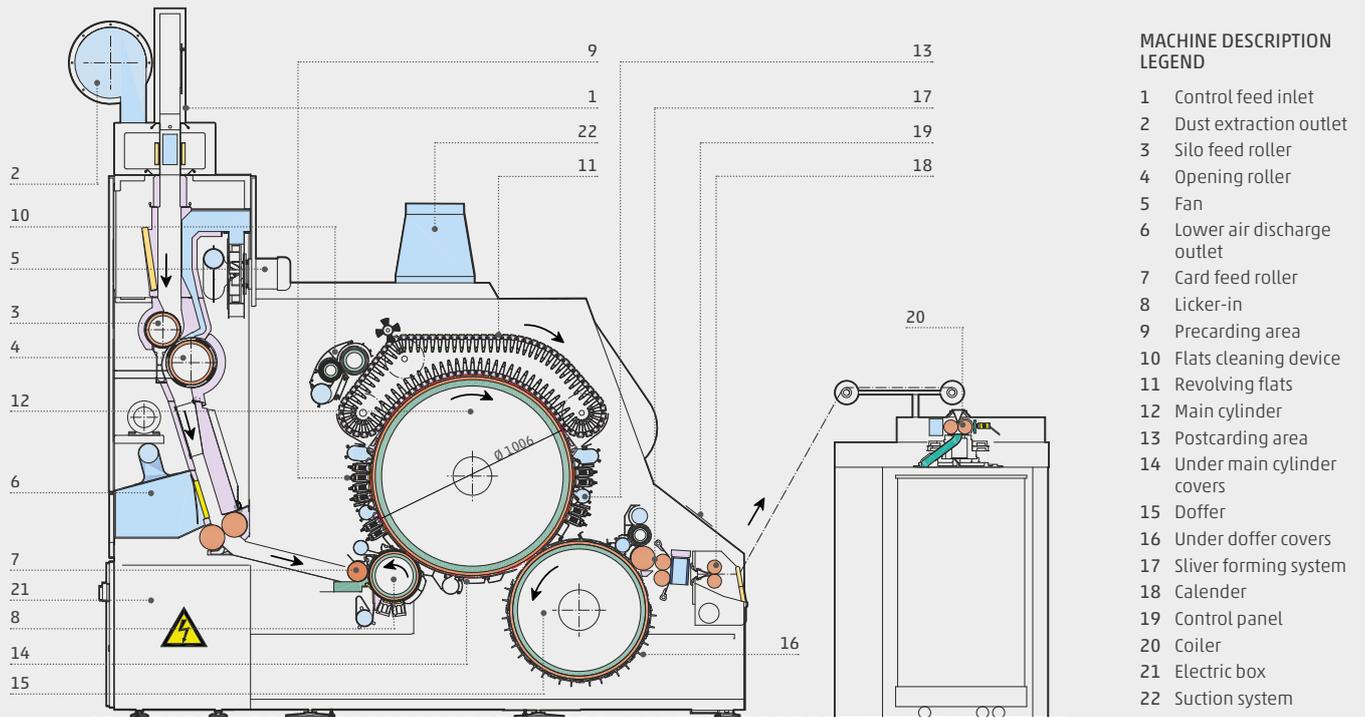
The small diameter of the licker-in allows to reach high speed and consequently high centrifugal force which, in combination with the knife with settable deflector and the carding segments positioned under the licker-in,

contributes to an easy elimination of dust and trash.

The carding area of 3.74 sqm with a working width of 1.5 meters, 32 mobile flats in working position and the capacity to hold constant settings thanks to the high quality of the components guarantees outstanding carding performances.

The pre-carding area of 1.08 sqm allows to host 6 carding segments and 2 mote knives; the post-carding area of 1.09 sqm allows to install 4 carding segments and 2 knives. The increasing density of the points of the carding bars guarantees a progressive opening action of the material. The sequence of carding bars followed by mote knives entails perfect cleaning of the material.

When compared to standard cards with working width of 1m, Marzoli's C701 allows an increase in production under the same quality level of up to 50% and a reduction of energy consumption (kW/kg) up to 30%.

**C701**

Processed material

Cotton, man-made fibers and blends up to 65 mm

Production - up to 270 kg/h

SPINNING PREPARATION

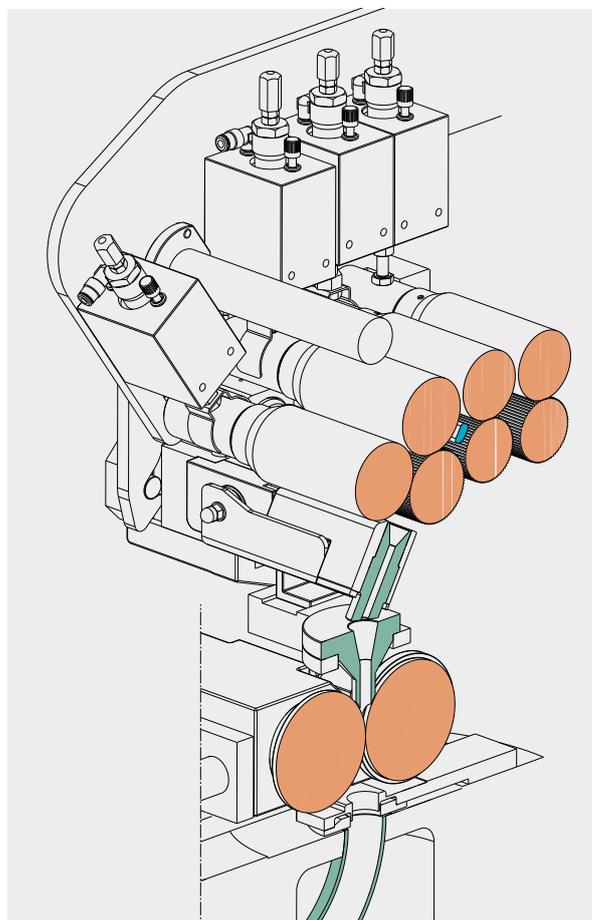
DF1-DFR1 DRAW FRAMES

KEY POINTS

- HIGH-PERFORMANCE PNEUMATIC DRAFTING SYSTEM
- ADVANCED AUTO-LEVELING TECHNOLOGY (DRAFT ADJUSTEMENT IN 3 MILLISECONDS)
- SPEED UP TO 1,000 m/min



The DF1, for first passage, and the DFR1, with auto-leveler for second passage, are Marzoli's high performance single-delivery draw frames. Designed to excel on output quality and productivity, these draw frames guarantee production speeds up to 1,000 m/min with high sliver evenness. 3-over-3 drafting system with pneumatic load. Pneumatic pressure on the drafting cylinders is relieved automatically after some time that the machine has stopped. Scrapers in contact with the top rollers and the cylinders assure their constant cleaning. Suction on and under the drafting system removes the dust produced during draft. The machine can be linked to the centralized suction system or can be equipped with a self-cleaning filter box. At the end of the drafting system a guiding roller guides the web towards the condenser. Technological parameters are set directly on the touch screen and all recipes can be saved and reloaded at any time. The draft on the DFR1 is conveyed through servomotor. State-of-the-art inverters by Siemens guarantee that the tension applied to the drafting rollers is kept constant even when working at the highest speed. A system of fans ensures that all inverters and motors work at low temperatures.



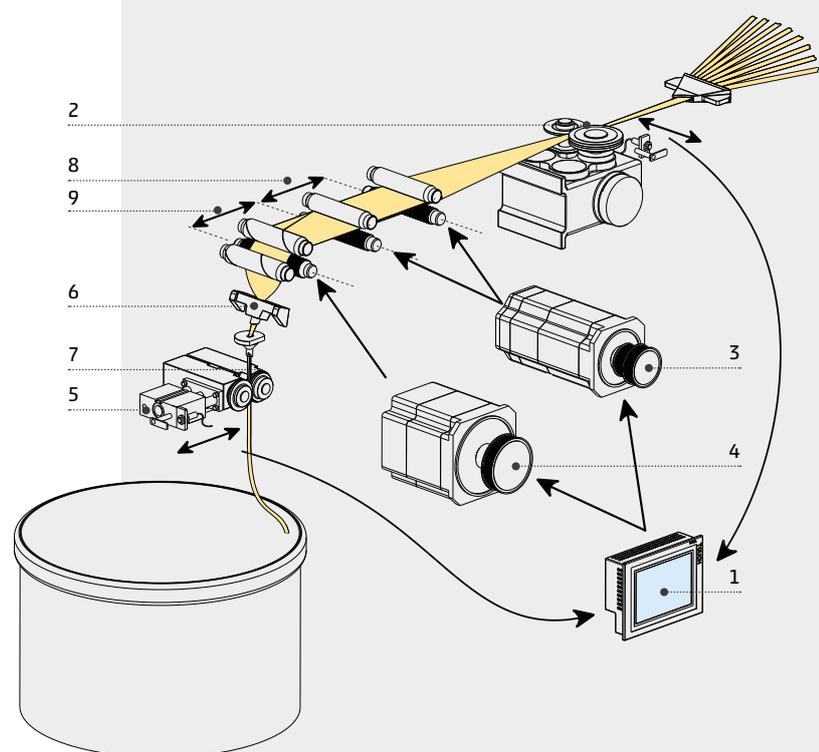
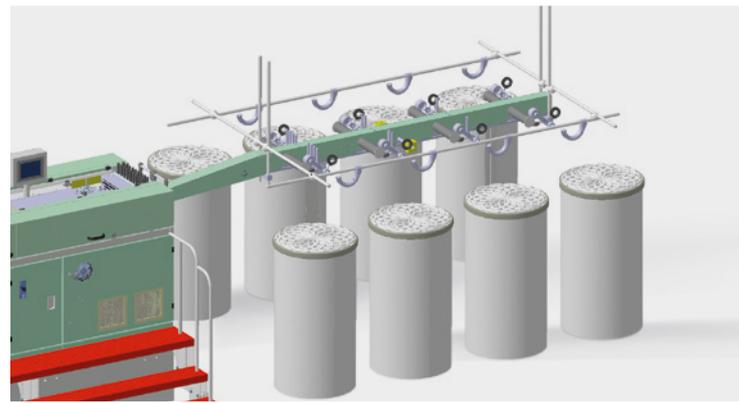
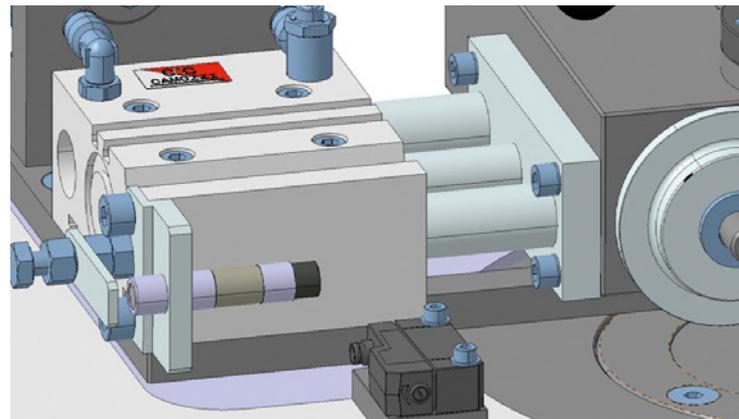
After the condenser, a calender compacts the sliver and scans its mass with calculation of sliver count deviation and CV%. If the scanned values exceed the pre-set tolerance values the machine immediately stops.

The creel with positively-driven stainless steel rollers can process up to 8 slivers. The creel rollers are equipped with contact sensors so that in case of sliver break the machine immediately stops. An additional sliver break control system is located at the sliver condenser before the drafting system.

The auto-leveler of the DFR1 works as an open-loop control to ensure immediate correction of any variation in sliver count. The measuring sensor of the T&G precisely scans the mass of the fed slivers; the processor compares the actual value with the reference value, elaborates a correction value and sends an input to the servomotor driving the second and third cylinders of the drafting system. The reaction time of the drafting cylinders is 3 milliseconds thereby ensuring a correction within few millimeters at the maximum processing speed.

Technical description - Legend

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



DF1/DFR1	
Design	DF1 - without autoleveler DFR1 - with autoleveler
Material	Cotton, man made fibers and blends up to 80 mm
Delivery speed	Up to 1,000 m/min (production speed)
Draft	4 to 10 fold

SPINNING PREPARATION

LW3 LAP WINDER

KEY POINTS

- AVERAGE SPEED UP TO 190 m/min
- AUTOMATIC DOFFING IN 20 SECONDS
- PRODUCTION UP TO 620 kg/h
- HIGH-PERFORMANCE DRAFTING SYSTEMS
- PERFECT SLIVERS OVERLAY



The LW3 lap winder represents the best technology for quality and productivity. The innovative design of its lap formation area with 4 calenders and a compacting cylinder to avoid expansion of the wound layers allows to reach an average speed of 190 m/min. This, together with an automatic doffing system of only twenty seconds,

allows to produce up to 620 kg/h of high quality laps and feed up to six CM7 LP combers.

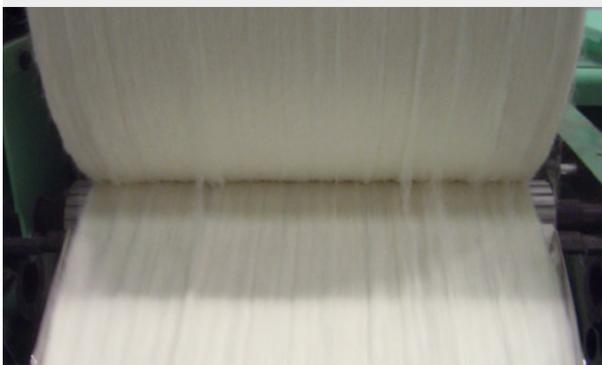
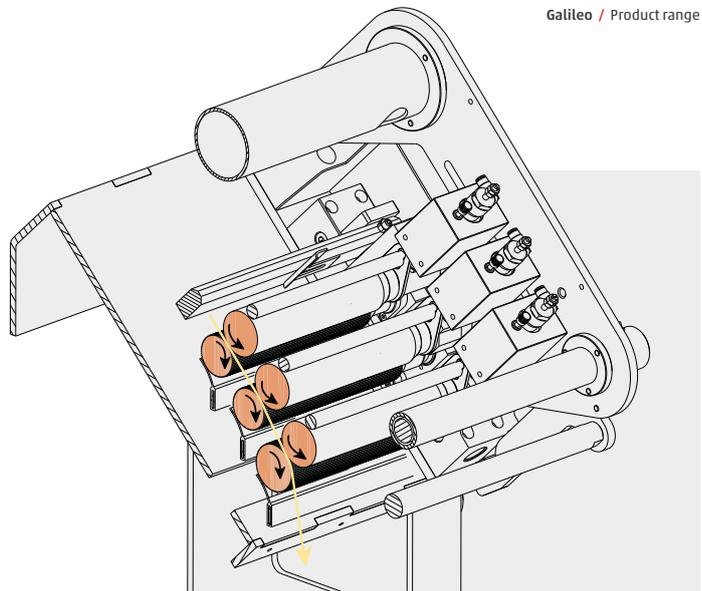
The creel can host up to 28 cans with diameter up to 40". Every sliver has a dedicated sensor on the creel so that in case of breakage or end of the sliver the machine stops before the end of the sliver enters the drafting system.

LW3

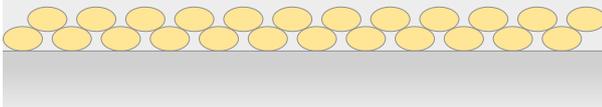
Lap weight	Up to 28 kg, 80 g/m
Lap width	300 mm
Lap diameter	max 600 mm
Delivery speed	Variable - up to 190 m/min average
Drafting system	3 over 3
Production	Up to 620 Kg/h

The two drafting groups are three-over-three and are driven by independent motors; draft settable through toothed pulleys. Pneumatic pressure on the drafting cylinders is relieved after some time that the machine has stopped.

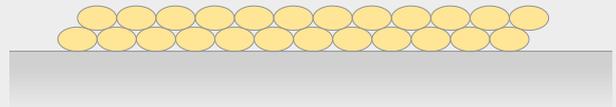
Special scrapers assure perfect cleaning of top rollers and drafting cylinders. Suction is carried out on and under the drafting system so that dust created during draft is immediately removed.



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



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



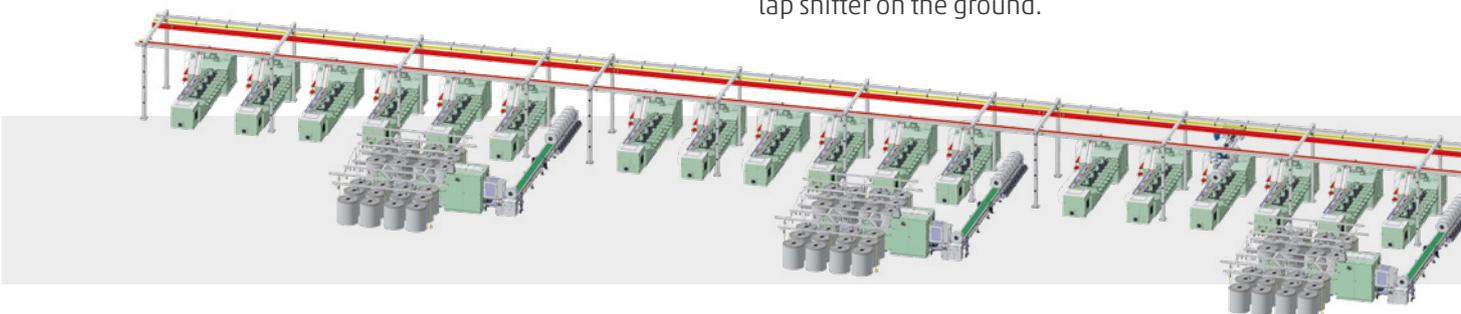
The two drafting groups are in line with one another and with the lap formation calenders.

This, besides eliminating the need of convoy plates, also ensures, along with the sliver guides positioned

on the slide table, a simple alignment and a perfect overlay of the slivers, with a consequent reduction of hairiness and better nipping of the lap at the comb.

Available as options to reduce labor costs, increase efficiency of the combing section and maintain the quality of the laps:

- Semiautomatic transport system with trolleys that automatically unload the laps on the combers;
- Fully-automatic transport system with lap shifter on the ground.



SPINNING PREPARATION CM7 LP

KEY POINTS

- PERFECT COMBING
- THOROUGH REDUCTION OF NEPS
- AUTOMATIC LAP PIECING
- HIGH PRODUCTION: 600 Nips/min, UP TO 85 kg/h



Comber with 8 combing heads, automatic can change and automatic lap piecing technology (option). Thanks to the variable speed of the circular comb and the revised kinematics of the nipper the machine can reach up to 600 nips per minute, enabling production levels up to 85 kg/h.

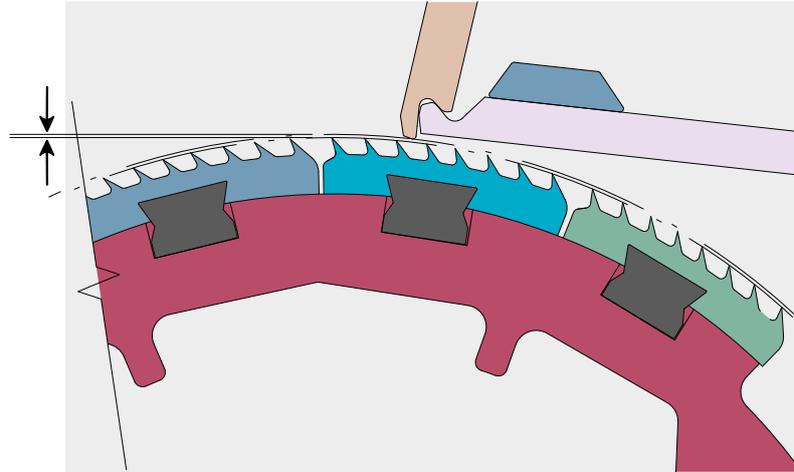
The CM7 LP also guarantees top combing performance on cotton of any length, with a perfect selection of fibers in relation to the staple diagram and a substantial reduction of neps in the sliver.

The unwinding rollers are driven by servomotor and lap tension is settable by touch screen.

Structure of the nipper and jaws in ultra light alloy for an overall weight below 2 kg. Jaws designed to ensure perfect nipping throughout the entire width of the batt and to process batt weights up to 80 grams per meter.



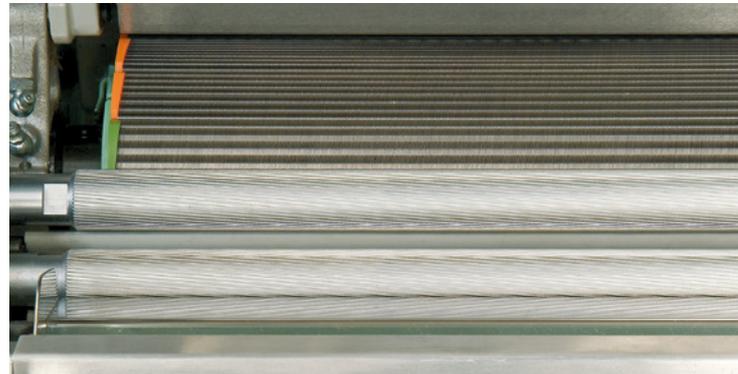
Standing pendulum movement of the nipper to maintain minimum and constant distance between the jaws and the circular comb throughout the combing cycle. Top quality of circular combs with 4 sectors (combing angle of 90°) or 5 sectors (combing angle of 112°) with progressive point density, specifically designed to process thick batts at high speed.



Several options for the point density of the top comb (23, 26, 29, 32 points/cm). Marzoli offers a top comb which automatically cleans its points through a jet of compressed air (option). Frequency and duration of the air blow is settable.



Bottom detaching rollers in hardened steel and biconical diameter to guarantee homogeneous pressure of the top rollers on the entire width of the batt. After condensation, the eight slivers are delivered to the three-over-four pneumatic drafting system, located on the top of the coiler to avoid false drafts. The calender, located after the drafting system, increases the coherence of the fibers and monitors the sliver evenness. In case the coefficient of variation of the mass of the sliver exceeds the pre-set tolerance range the machine stops.



CM7 LP

Processed fibers	Cotton 1 1/16" - 2"; 27 mm - 51 mm
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

SPINNING PREPARATION FT60 & FT70 ROVING FRAMES

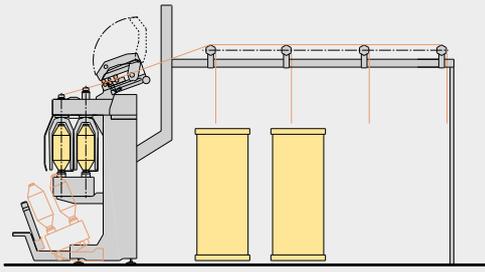
KEY POINTS

- OVER 150 ROVING FRAMES INSTALLED EVERY YEAR
- BIG PACKAGES WITH HIGH QUALITY ROVING
- INDEPENDENT HIGH-EFFICIENCY DRIVES
- AUTOMATIC DOFFING IN 3 MINUTES

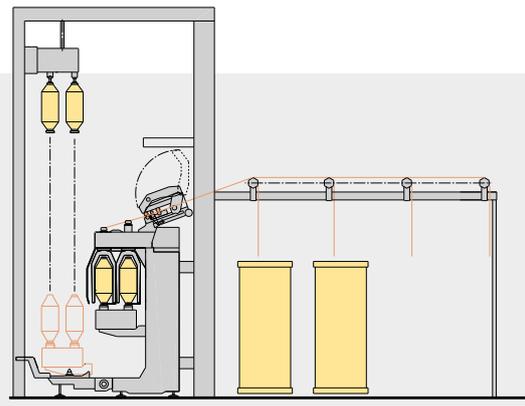


With over 150 roving frames installed worldwide every year, Marzoli offers the best technology. Two models: the FT60 with a gauge between spindles of 110 mm, number of spindles up to 240 and bobbins of 6" x 16"; the FT70 with 130 mm gauge, up to 192 spindles and bobbins of 6" x 16" or 7" x 16". Both machines have independent drives for drafting system, flyers, spindles and bobbin rail, coordinated by the CPU of the machine. Spindles and flyers have group drives with toothed belts: several motors each one driving a limited number of spindles/flyers. The drafting system has a brushless motor driving second and third cylinder that allows to set main draft from touch screen (option). Three-over-three or four-over-four drafting system with the possibility to further reduce the gauge between first and second cylinder thanks to the option of the cylinder of 27 mm. Highly efficient cleaners for both top rollers and bottom drafting cylinders. Roving tension is kept constant through sensors that monitor roving's fluctuations and adjust the speed of the spindles. All rovings lay parallel to one another to ensure congruency of the spinning triangles and equal tension of the rovings in first and second row. The creel is equipped with hexagonal aluminum rollers positively driven to prevent false drafts.

The machine either has a semiautomatic or fully automatic doffing system. The automatic doffing system, along with Marzoli's new bobbin transport systems, assures full automation, efficient and continuous supply of roving bobbins to the spinning frame, no poor handling of the bobbins and an overall easier management of internal logistics of the spinning mill. The machine downtime during doffing is less than three minutes and piecing of the roving is fully automatic. Individual sensors at each spinning position (option) guarantee that, in case of roving break, the roving frame immediately stops, even in case of overlap. The roving frame, in this case, can be supplied without suction box that entails an energy saving up to 4 kW for every hour of operation. Energy saving is also guarantee by the IE3 premium efficiency motors, light weight components (e.g. lighter bobbin rail in aluminum) and an overall design intended to minimize friction. Marzoli's bobbin transport systems are available for random creeling (MTR) and block creeling (MTT). They both can draw on an integrated bobbin stripper on the exchanger, the IBC, that increases the efficiency of the section. MTR and MTT have been designed to maximize the number of standard components and minimize the components subject to wear.



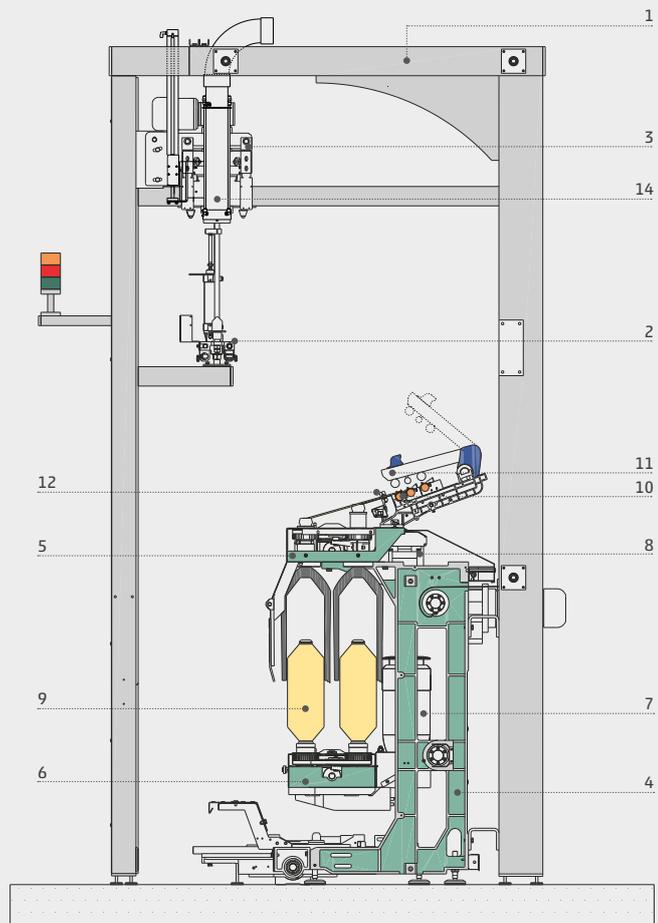
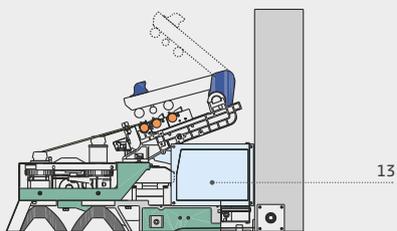
Roving frame with semiautomatic doffing



Roving frame with automatic doffing

TECHNICAL DESCRIPTION | LEGEND

- 1 Supports and doffing columns
- 2 Exchanger
- 3 Doffer rail
- 4 Intermediate leg
- 5 Flyers rail
- 6 Bobbins rail
- 7 Bobbins motor
- 8 Flyers motor
- 9 Bobbin
- 10 Drafting cylinders
- 11 Weighting arm
- 12 Sensors for roving breakages
- 13 Suction ducts if installed
- 14 Integrated bobbin cleaner



Roving Frame FT60 / FT70		FT60	FT60D	FT70	FT70D
Material	Cotton, man-made fibers and blends, up to 60 mm	Gauge 110 mm	110 mm	130 mm	130 mm
Roving count range	Ne 0.40 - 3.5 / Nm 0.7 - 5.9 / Tex 1,470 - 170	Spindles per section 16	16	12	12
Roving twist range	Tw/" 0.30 - 3.55 T/M 12 - 140	Max. spindles 240	240	192	192
Draft	4 - 20	Bobbin size 6"	6"	7"	7"
		Doffer no	yes	no	yes

Roving Frame FT60 / FT70	
Flyer speed	(mechanical) up to 1,500 rpm
Delivery speed	up to 50 m/min

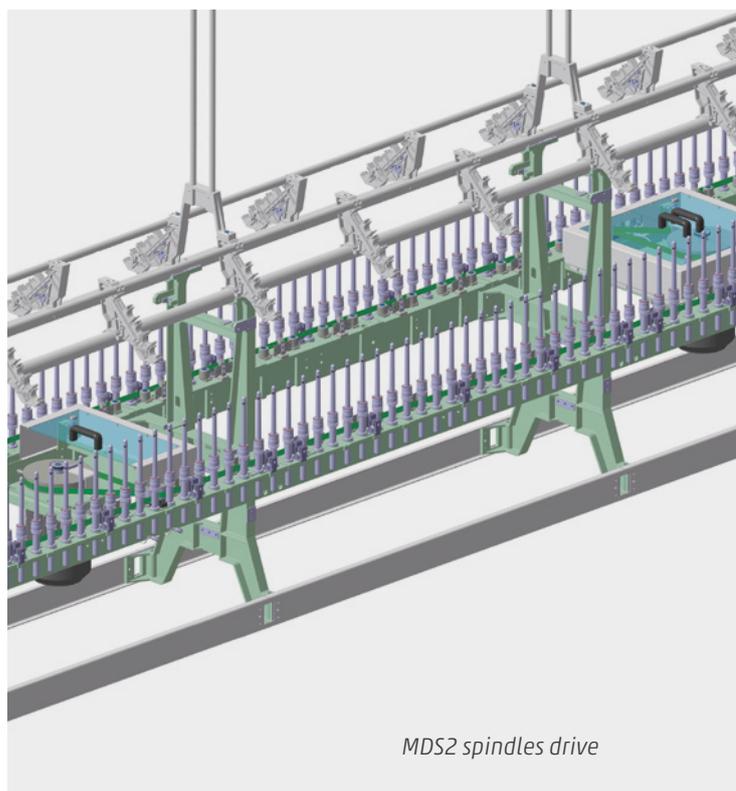
SPINNING SECTION MDS2 & MP1N SPINNING FRAMES

KEY POINTS

- FULLY ELECTRONIC FRAMES UP TO 1,824 SPINDLES
- INDEPENDENT DRIVES SETTABLE FROM TOUCH SCREEN
- ANY TYPE OF ADVANCED YARN
(CORE-SPUN, DUAL CORE, COMPACT, SLUB YARN, ETC.)
- FULL AUTOMATION

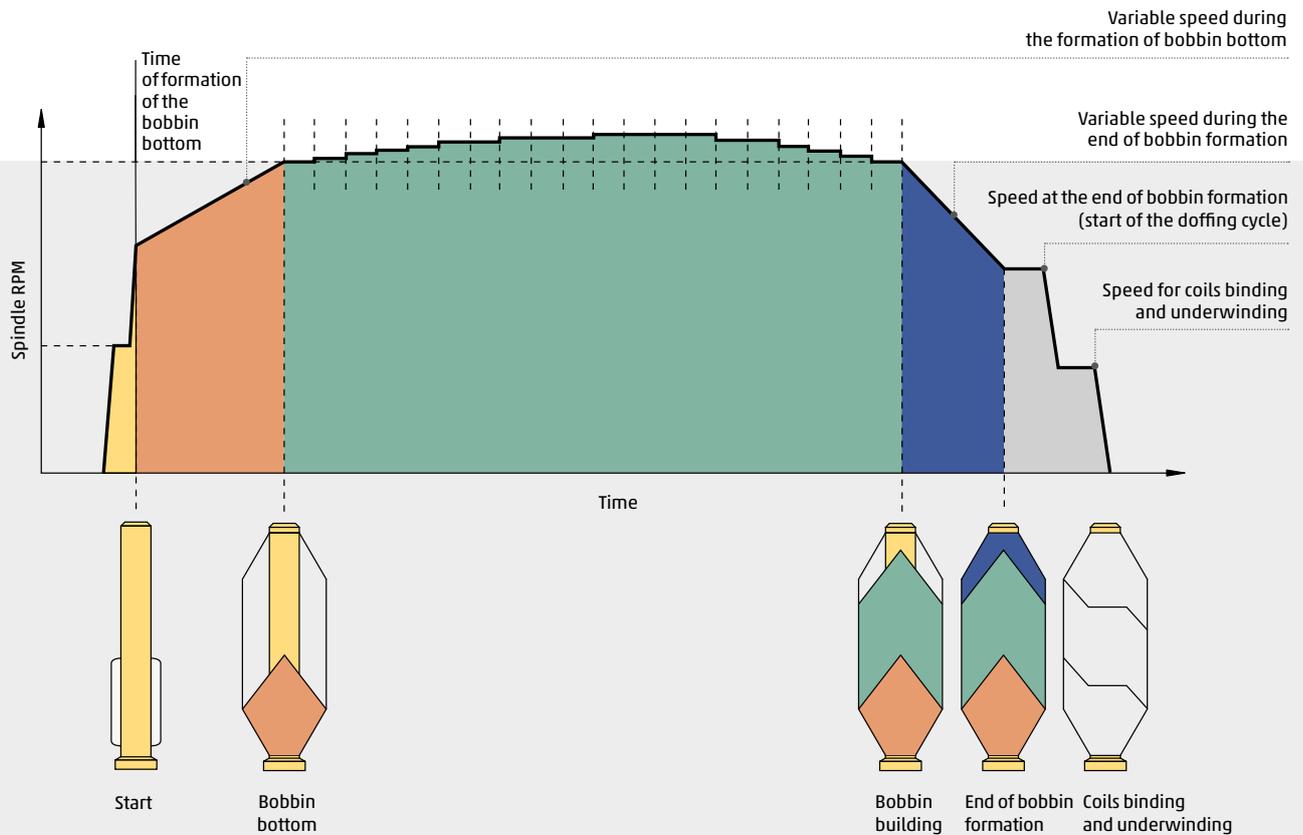


Marzoli ring spinning frames, the MDS2 and the MP1N, are fully electronic machines with independent drives for spindles, ring rail and drafting system. They can reach 1,824 spindles with two options for spindles gauge: 70 mm for rings with a diameter up to 48 mm; 75 mm for rings with a diameter up to 54 mm. To drive the spindles, the MDS2 has a single-tangential-belt drive with one motor every 96 spindles. The adherence of the belt to the spindles is assured by one double-pulley tightener every four spindles. The MP1N has a 4-spindles tape drive where the main motor, through a shaft with pulleys, transfers speed to the tapes, each one driving 4 spindles. The special design of these drives guarantee the lowest possible speed variation among spindles. The speed of the spindles can be set according to the progress percentage of the cop production to reduce variations in yarn tension to a minimum.



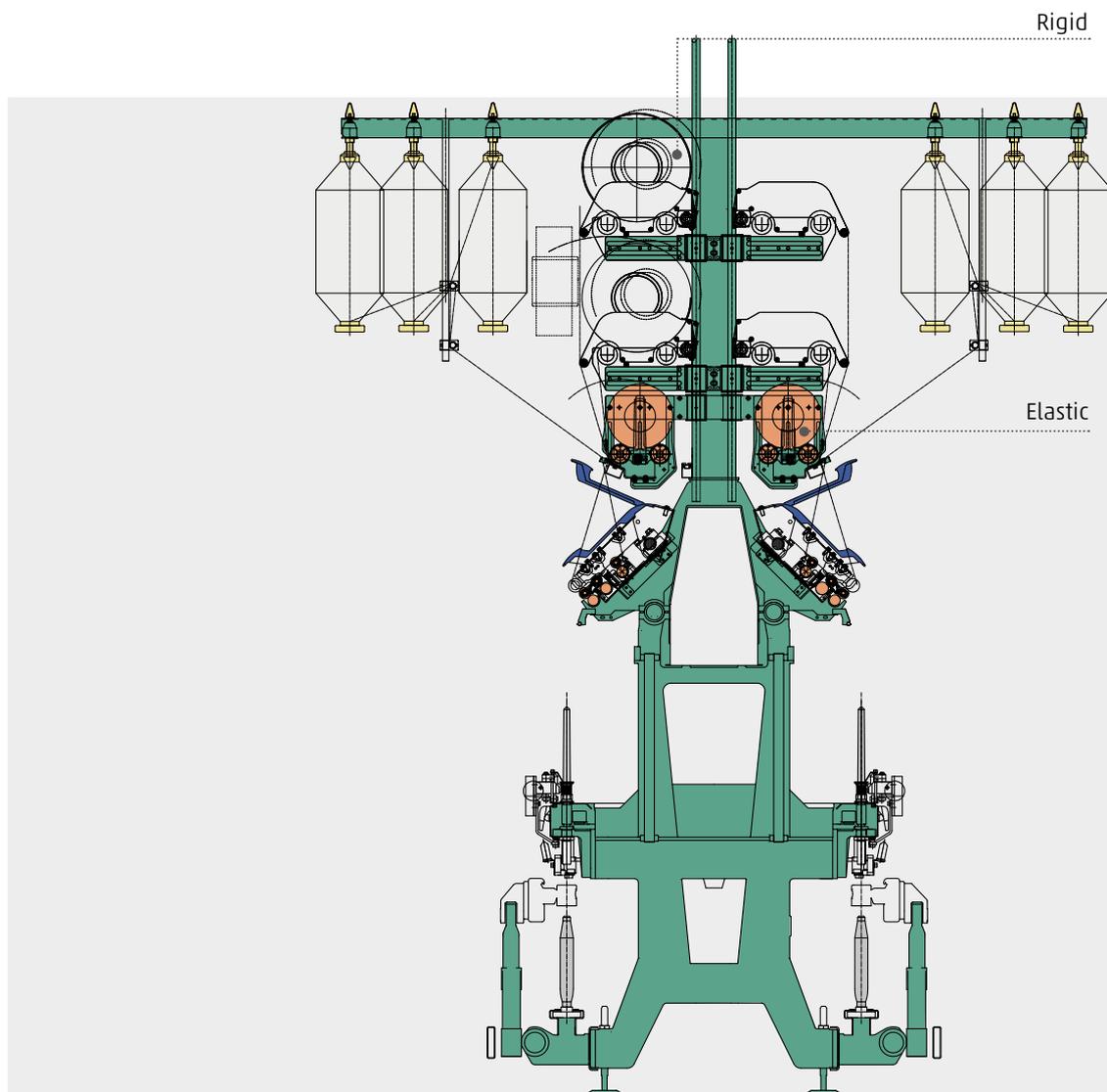
MDS2 spindles drive

THE SPEED IS PROGRAMMABLE IN ORDER TO MAINTAIN THE REGULARITY AND COSTANCY OF YARN TENSION AND MINIMIZE ENERGY CONSUMPTION



The drafting system has two independent drives: one for the first cylinder and one for the second and third cylinder. This configuration allows to change main draft and twist directly from the touch screen. It also allows to produce slub yarn thanks to a special software (option) with no mechanical modification to the machine. For spinning frames with more than 1,200 spindles there is an intermediate drive to minimize torsion and avoid vibrations on the drafting rollers. The ring rail is driven by one frequency controlled motor. All the data related to the movement of the ring rail are settable by touch screen. All Marzoli spinning frames are equipped as standard with Marzoli weighting arms and rings. Marzoli spinning rings, the MRC and the MRR, present very high hardness levels, up to 1100 Hv, and particular coatings to foster fiber lubrication and assure very low friction coefficients.





All technological parameters are set directly on the touch screen display and all production recipes can be saved and re-loaded at any time.

The creel, which can be designed to perfectly integrate third party applications, the integrated slub device (option) and Mac3000 compact system allow Marzoli spinning frames to produce any type of yarn: Lycra, core-spun, double roving, slub, compact, dual-core, compact dual-core, etc.

Marzoli's Mac3000 is an apron compact system with a self-cleaning effect of the holes of the apron.

Suction is carried out through dedicated tubes with self-cleaning filter and variable speed motorfan.

All Marzoli spinning frames rely on leading-edge automation in order to boost productivity and reduce costs: automatic bobbin transport systems, link to cone

winders, automatic doffing technology with parking rail which allows to produce cops with diameters up to 52 mm with the ring of 54 mm.

From the touch screen display the operator can set several functions (repositioning of the ring rail, speed at start-up, delayed start and stop of the drafting system, etc.) to guarantee perfect tensioning of the threads and start up of the machine maintaining ends down below 8 every 1,000 spindles. Cooling system with large filter surface and fans guarantee low temperature within the cabinets. Suction system with IE3 premium efficiency motor and progressive increase of the cross section of the 8-nozzles suction modules keep suction constant at every spinning position.



MDS2 & MP1N spinning frames

Material	Carded and combed cotton, man-made fibers and blends, up to 60 mm
Yarn count range	Ne 4 - Ne 350 / Nm 6 - Nm 678 / Tex 150 - Tex 1.68
Yarn twist range	Tw/" 4 - 56 / T/M 160 - 2,210
Direction of twist	Z-S twist
Draft	7.5-80
Number of spindles:	<ul style="list-style-type: none"> · max 1,824 · min 96 · per section 48
Splindles gauge	70 mm - 75 mm
Ring diameter	36 - 54 mm
Tubes lenght	180 - 260 mm
Spindles speed	max 25,000 rpm (mechanical)

SOFTWARE PLATFORMS: YARNET

KEY POINTS

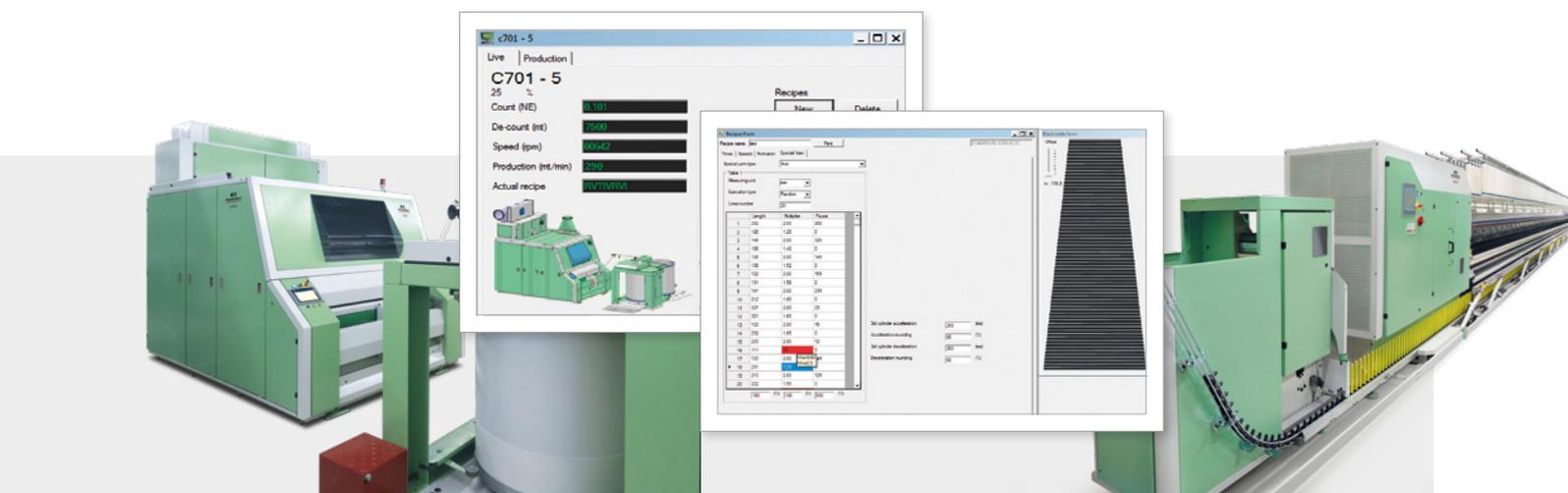
- ONE SOFTWARE FOR THE ENTIRE SPINNING LINE
- EASY & IMMEDIATE MONITORING OF EVERY MACHINE
- RECIPES EDITING & UPLOADING
- POWER MANAGEMENT FUNCTION

YARNET
Marzoli Production Management



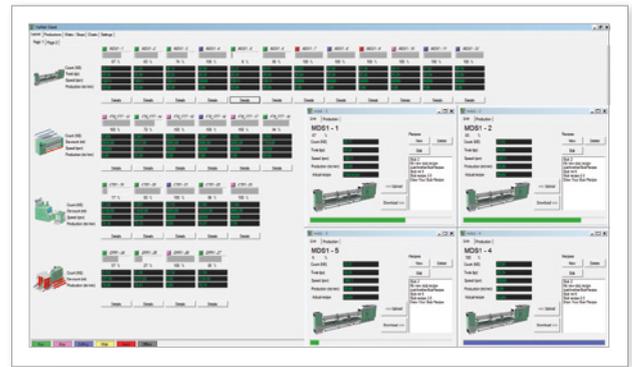
YarNet is Marzoli production management software. It allows to register and elaborate all production data, operating conditions and technological parameters of the machines in real time in one simple, intuitive and well-structured interface. This allows the user to interact directly with each and every machine

of the spinning plant by downloading, editing and uploading any production recipe. The centralization of all the information about the spinning process enables the client to have everything under control in any moment and to manage production from his office.



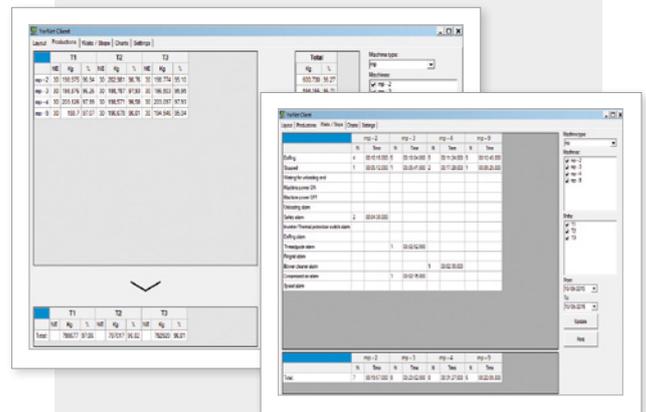
The interface is organized in 5 different pages.

The Layout page allows to monitor the entire spinning mill: it lists all the machines and for each one of them it showcases the real-time production data and technological parameters (e.g. count, twist, speed, production, etc.). By clicking on the details button located under the parameters of the machine, the user can access the recipes saved for that machine.

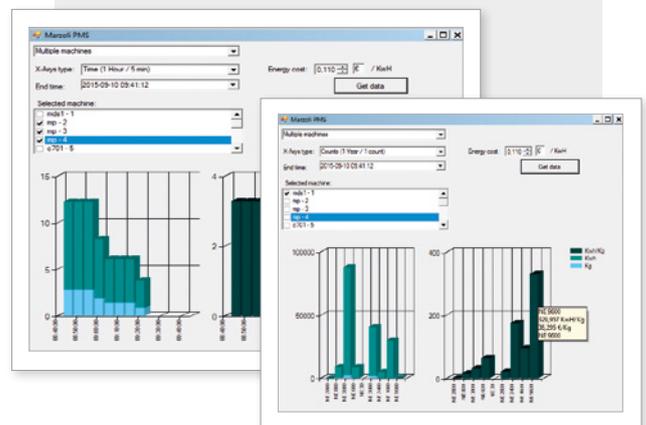


The Production and Charts pages display production levels and efficiency levels of the machines and of the entire mill. The data can be filtered in several ways (e.g. shift, machine, product, etc.).

The Waits & Stops page displays the causes of stops for each machine with related frequencies giving valuable information for maintenance.



Embedded in YarNet there is also a power management function which elaborates the data about production and energy consumption and generates graphs that identify the trade-offs (kW/kg). The client can therefore adjust production levels in order to minimize energy consumption.



OPENING SECTION

- Openers & Cleaners
- Mixers & Blenders
- Card



COMBING SECTION

- Draw Frames
- Lap Winder
- Comber
- Lap Transport



SPINNING SECTION

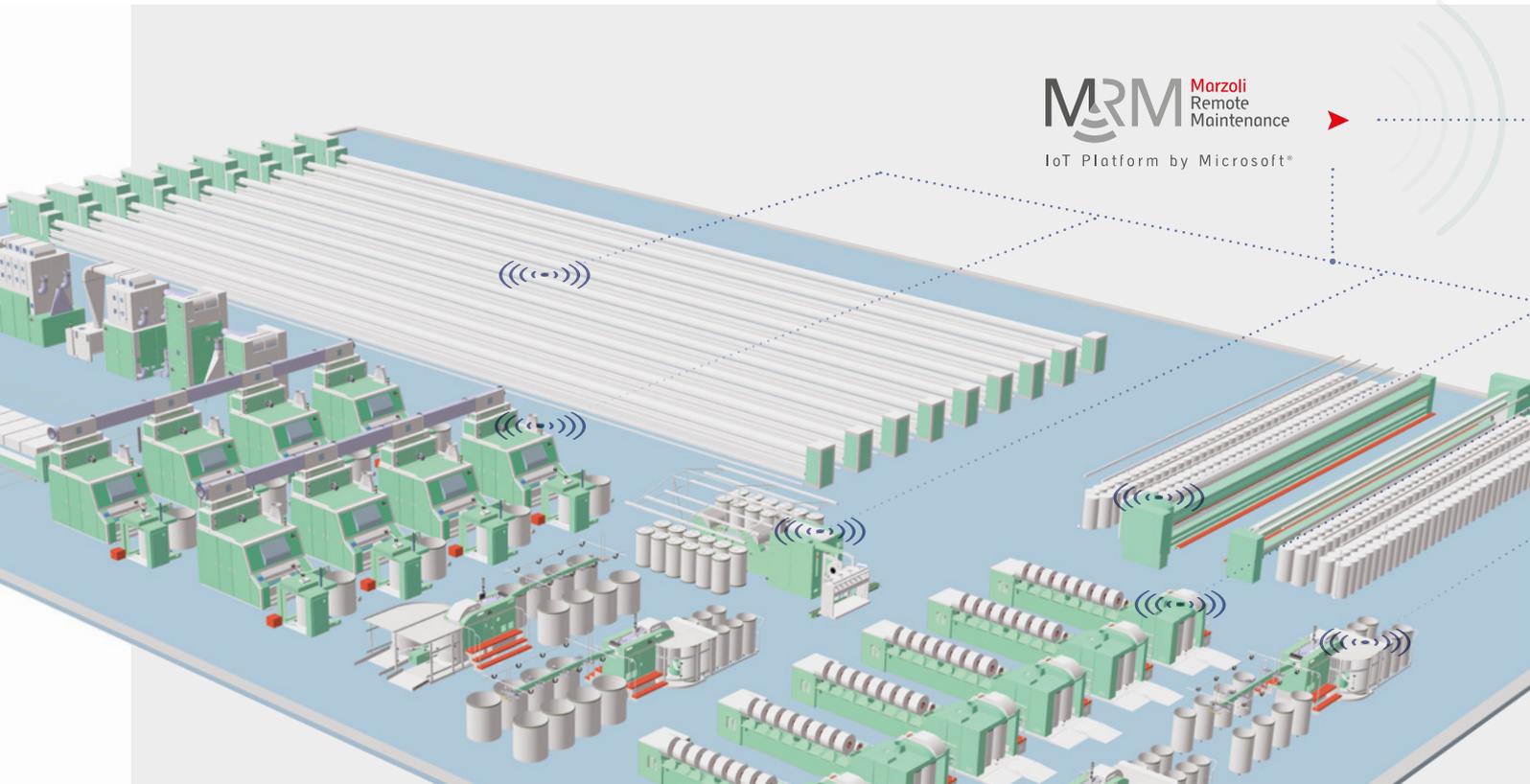
- Roving Frame
- Ring Spinning Frame
- Bobbin Transport System



SOFTWARE PLATFORMS: MRM

KEY POINTS

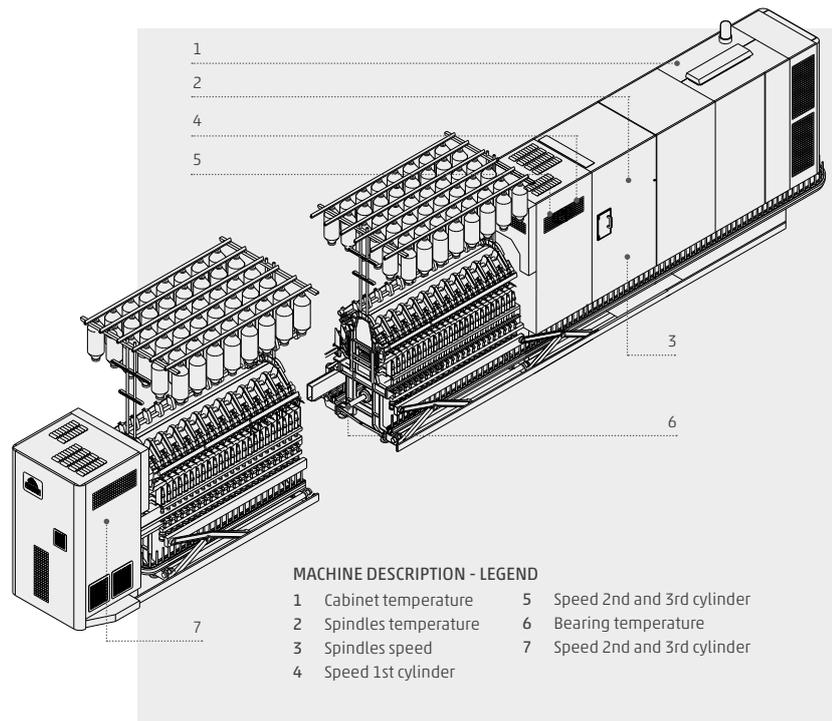
- CONTINUOUS MONITORING OF CRITICAL PARAMETERS
- IMMEDIATE WARNING IN CASE OF DEVIATIONS FROM STANDARDS
- PREDICTIVE MAINTENANCE



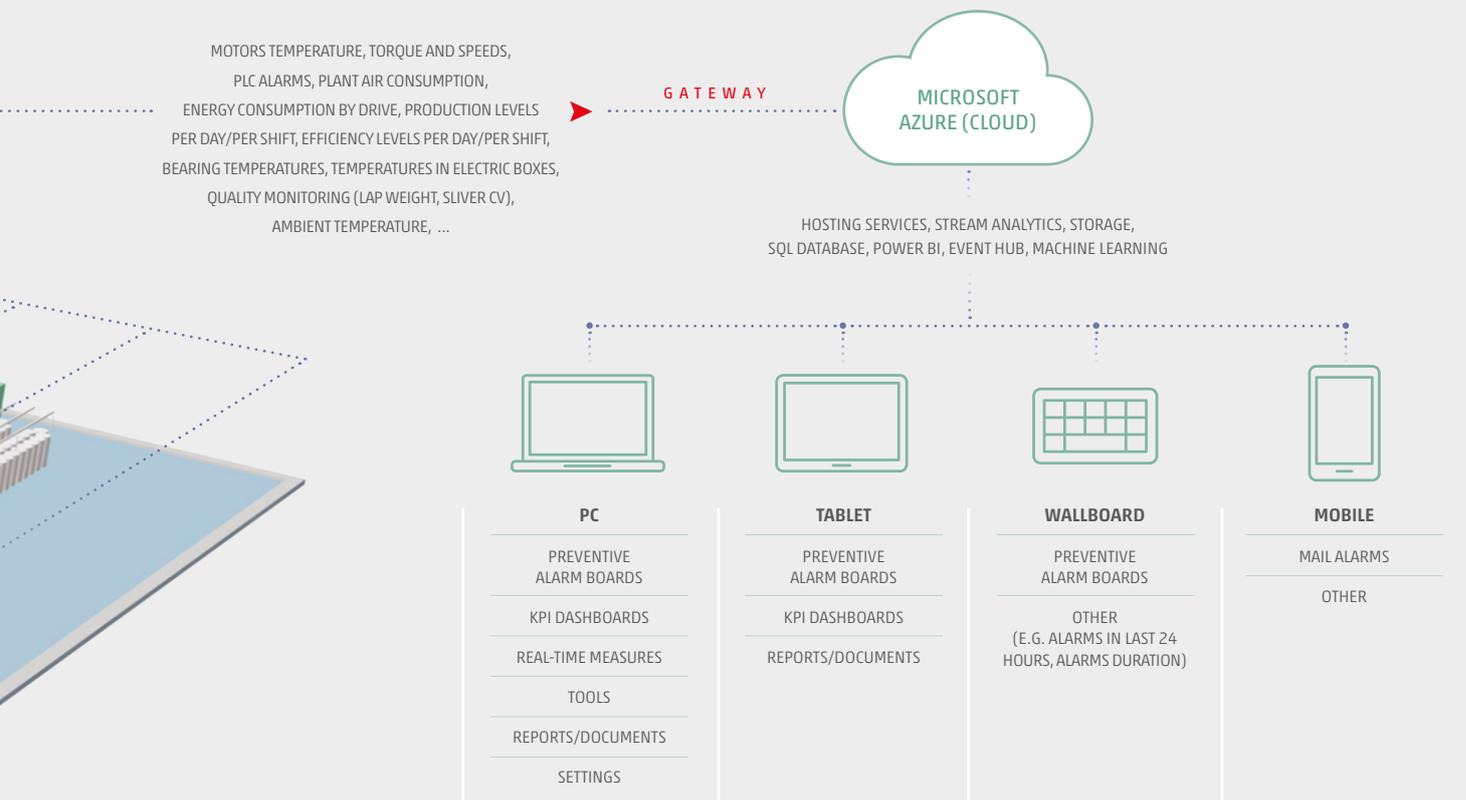
MRM is an innovative software platform developed by Marzoli that continuously analyzes the symptomatic data gathered by processors and sensors installed in critical parts of the machines to constantly monitor their efficiency. The data about temperatures, power consumption, pressures, speeds and vibrations are gathered and, through a gateway, are sent to the Azure Cloud provided by Microsoft.

The data are then analyzed through special algorithms developed by Marzoli which verify that the monitored parameters are inside the machine nominal operating ranges according to the machine working conditions.

If anyone of them is not, an automatic email alert is sent to the client's addresses registered in the system.



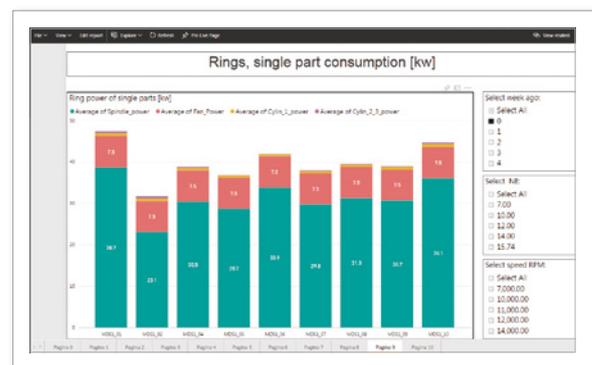
- MODULES FOR OPTIMIZATION OF ENERGY CONSUMPTION AND EFFICIENCY LEVELS
- REMOTE ASSISTANCE BY MARZOLI'S CUSTOMER SERVICE



The client can always access the dedicated portal where it is possible to see the information for predictive maintenance of the machines and of the overall efficiency of the plant.

Through dedicated modules (Optimization Tools) included in the software it is possible to optimize the performances of every machine, in particular on energy consumption and efficiency levels.

Marzoli's customer service can access, if necessary, the data of the customer's machines to diagnose an eventual problem and communicate the necessary steps to solve it.



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