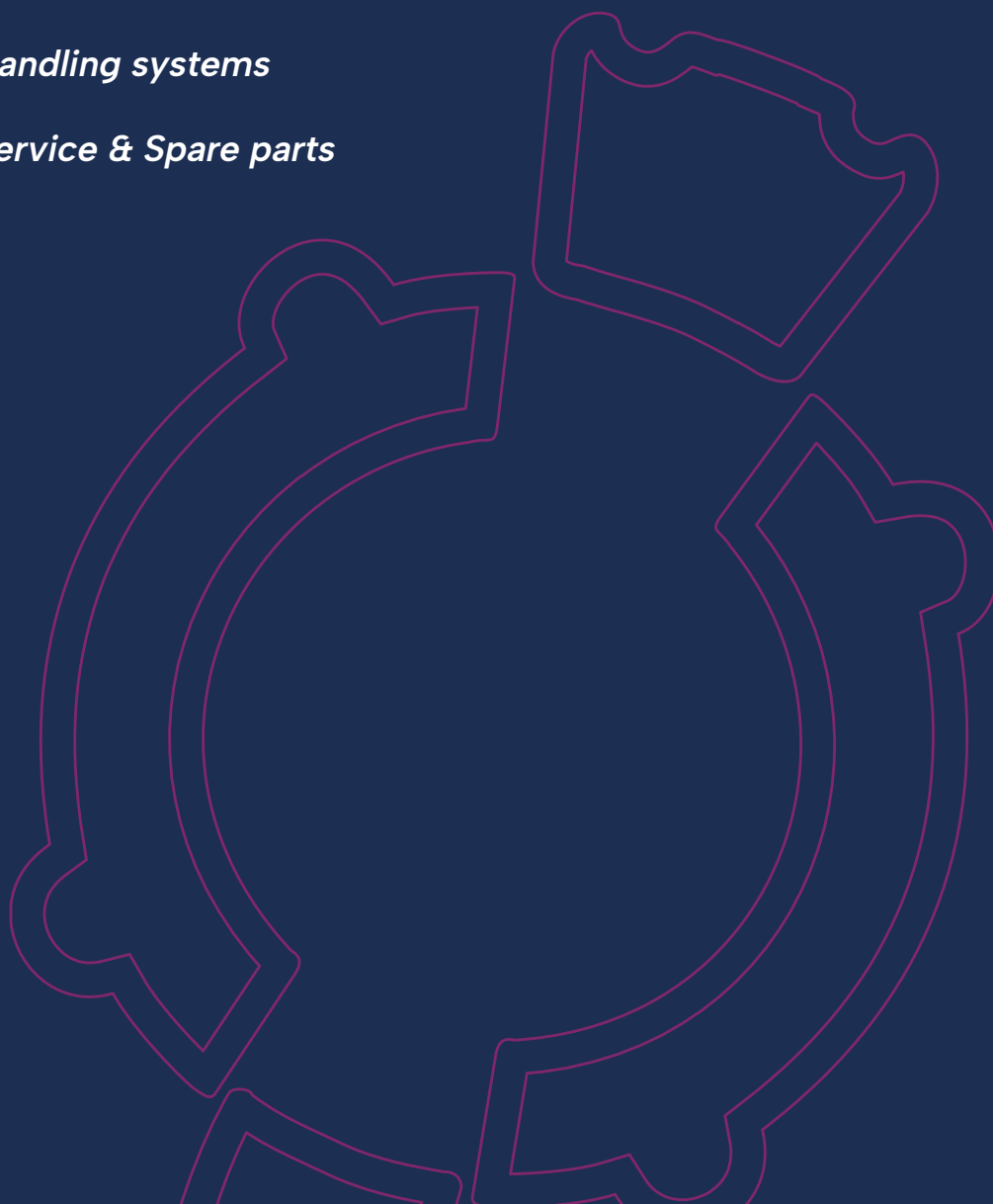


Profitable solutions for paper industry



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PROFITABLE SOLUTIONS FOR **PAPER INDUSTRY**

Fomat was established in **1973** in Lucca, at the heart of the well-known Italian paper district. Since the very beginning the company mission has been focused on providing the paper industry with quality services and innovative products.

With more than **5000 installations throughout the world**, Fomat's expertise and skills have let the company to develop well tested solutions for **increasing the efficiency, runnability and energy saving** of the paper mills. Today **FOMAT** is a brand of **AEROTHERMIC SRL** and with 75 employees and workshops featuring state of the art manufacturing instruments and machineries.

At the core of the company technical success, it is its know-how and the **unique capability to design, engineer and manufacture** in-house each component with the precise aim to improve the overall efficiency and runnability of the paper plant. This unique business model allows Fomat to have an uncompromised quality control of its products and a constant innovation-oriented process. Today Fomat has further expanded its know-how in the automation, control process and overall electronic engineering thanks to the synergies with the **Cacini Group**, of which Aerothermic is a part.

Aerothermic can provide its customers with tailor-made, turnkey solutions.



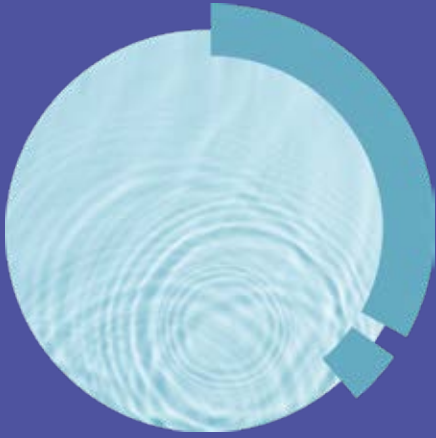
The company is well known for the solutions it offers in the **field of paper** and **corrugated cardboard production**, such as:

- *Systems for the water saving and increasing of the efficiency in the felt and wire cleaning processes*
- *Systems for Energy and water saving and increasing of the efficiency in the Drying processes*
- *Coil handling and wrapping systems and pulper feeding systems.*
- *Systems for improving paper quality.*

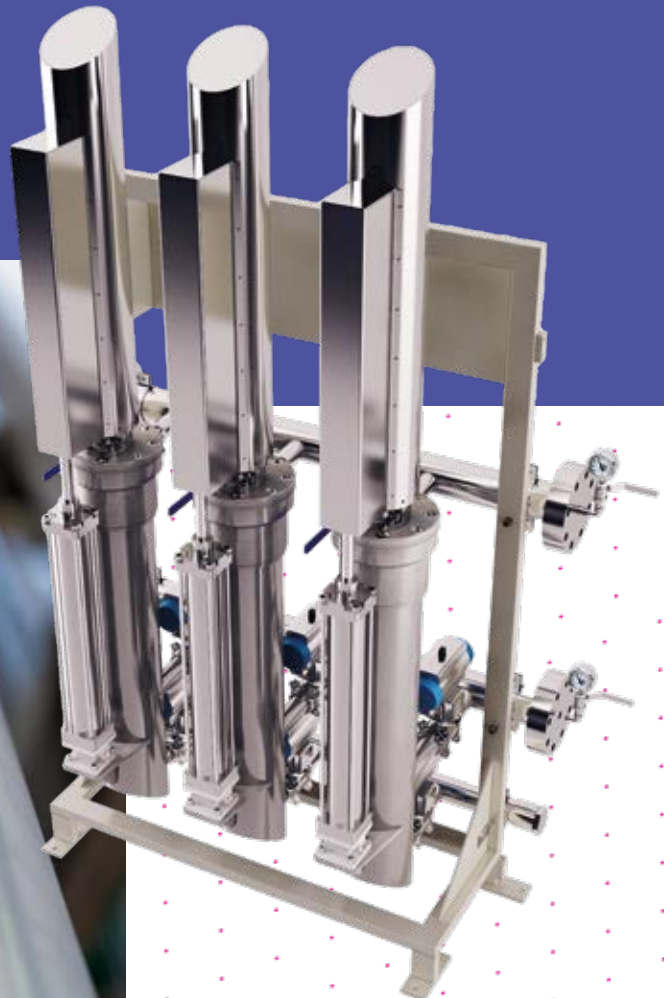


AEROTHERMIC FOMAT PRODUCTS INCLUDES:

- *Yankee Hoods*
- *Multi-dryer Machines Hoods*
- *Stabilizing boxes*
- *Steam & condensate system with rotary joints and siphons (For Tissue Paper & Corrugator machines)*
- *Ventilation and hall conditioning systems.*
- *Dust & Mist removal system*
- *Cleaning system for Felt and wire*
- *Filter systems for clarified and fresh water*
- *Tail-cutter for wet and dry section*
- *Edge trim machine & Anti bobble air HP water system*
- *Doctor blade oscillators*
- *Quality control system with latest Infrared technology*
- *Basis weight valve*
- *Handling system*



Water Saving



WATER AND PROCESS EFFICIENCY IMPROVEMENT

FELT AND WIRE CLEANING SYSTEMS

Fomat's knowledge in the field of the felt and wire cleaning has led to the **development of a series of solutions** that have been successfully adopted by the main players of the paper industry. Each component has been designed and further developed following a direct field experience. Each item is **engineered and manufactured** in house passing through a very strict quality control.



FIPS – FOMAT OSCILLATOR

Since its beginning, Fomat has pioneered the innovation related to the **synchronisation of the shower pipe system** with the machine speed. Thanks to the latest generation of the well-known Fomat **oscillators**, the cleaning of the felts and wires is today even more efficient and allows for:

- *Better cleaning of dirty areas.*
- *Higher Felts and wires life span*
- *Reduction of maintenance costs*
- *Improved user interface and diagnostics.*
- *Remote viewing of the operator panel via VNC software*



FAP 125: AUTOMATIC PIPE CLEANING

Automatic pipe cleaning solution through an advanced programmable pneumatic system that allows for:

- *To avoid electrical connections.*
- *Higher Safety for operators and papermakers of the pipe cleaning operation and therefore of the overall process*
- *Reduction of the maintenance costs and timing*



SHOWER PIPES

All Fomat shower pipes are provided with **standard Fan nozzles** and Fomat-made **ruby** needle nozzles and allow for:

- *Constant water flow over time*
- *Constant water consumption*
- *Elimination of turbulences*
- *Elimination of pipe deflection*

Fomat shower pipes can be equipped with a specific brush cleaning system designed to **avoid turbulence effects** and to ensure the perfect cleaning of both the nozzles and of the pipe's inner walls.



SHOWER PIPES - FAST REMOVING

Fomat-patented solution for the removal and substitution of the **shower components** (nozzles) with the **machine in operation**. It eliminates the need of stopping the machine in the event of a nozzle clogging and it allows the nozzle replacement while running the machine.

It includes a fixing and sealing systems that together with the **discharge system allows for easy**, safe and clean removal and replacement, therefore providing:

- *Improved quality*
- *Reduced maintenance*
- *Quick extraction*
- *Laminar flow*
- *Equal distribution*
- *Equal cross machine cleaning*
- *No deformation*
- *Safety for the operators*



SPECIAL APPLICATION AVAILABLE:

SHOWER FAST REMOVING tool for large -width lines. Where the line width requires it, Fomat developpe an inner-pipe extraction system completed with a support guide that allows the operators to perform these operations in total safety while the machine is running.

FELT AND FABRIC CLEANING SYSTEMS

SMART-JET



Designed to further improve the wire cleaning operations, the Smart Jet system **reduces water consumption**, and allows to intervene directly in the dirty area thanks to a **special rotating head with 5 nozzles providing higher** cleaning action. The system's design includes a parking/storage area for maintenance, while the machine is running.

SMART CLEANER



Fomat-designed system for the uniform distribution of chemicals **on cylinder and wires of dry end**. The system includes an in-house manufactured atomizing nozzle for reducing the chemicals consumption and a **HMI (remote touch panel)** allowing to set its speed accordingly to the machine speed.

The control unit can be linked to all types of DCS or interfaced directly with Fomat dosing system.

TURBO SCAN

Latest generation of **High-pressure cleaning system** that combines the action of high-pressure water along with

a super-efficient localized vacuum system in order to provide excellent **contamination removal** in the felt area. Manufactured in Stainless steel allows for:



- *One central cleaning unit*
- *Efficient cleaning*
- *No water spots in the paper during the process*
- *All contaminants are collected out of the paper machine*
- *High Permeability value for the felt life*
- *No shutdown of the paper machine due to manual felt cleaning*
- *Improved paper quality*
- *Reduced maintenance costs*
- *Parking/storage area for maintenance while the machine is running*
- *Water consumption reduction*



FAFF FRESH WATER FILTER & OTOCINCLUS CLARIFIED WATER FILTER



> FAFF system for freshwater

This filter allows a degree of filtration up to **80 micron** and features an automatic cleaning system in backwash. It's indicated for the use of freshwater in **total safety** especially when it is drawn from the well.

> Patented OTOCINCLUS filter

The patented OTOCINCLUS water filter allows for **clarified water use**, guaranteeing reduced maintenance operation thanks to the automatic cleaning. The OTOCINCLUS series ensures a high grade of **cleaning up to 80 microns**. Thanks to the backwashing and the patented mechanical cleaning systems included, the series prevents the risk of clogging.

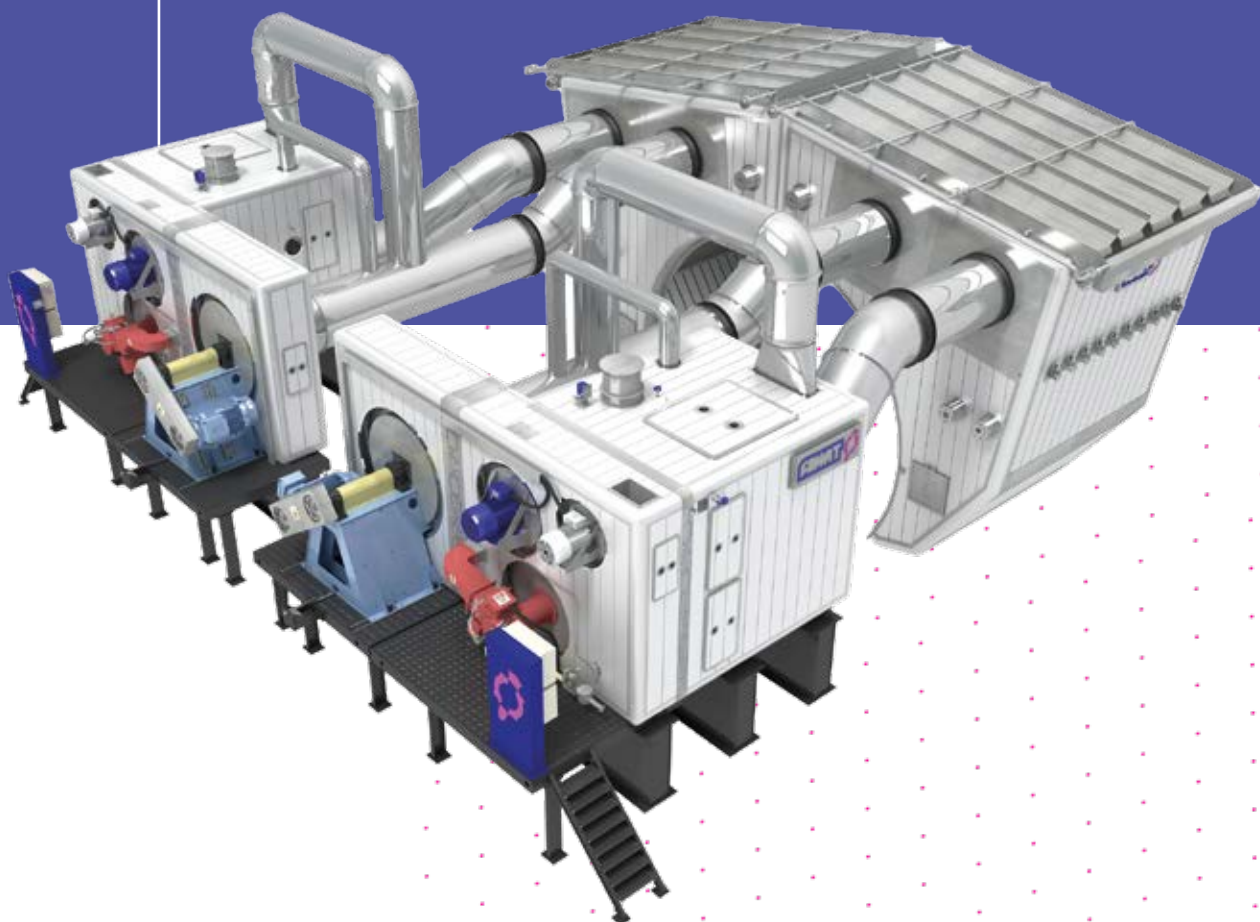
Therefore allowing for:

- *Prevention of shower nozzles clogging*
- *Reduced shower maintenance*
- *Increased machine runnability*
- *Simpler operation*
- *Fast installation*
- *Quick cartridge change*
- *Easier inspection and cleaning*
- *Recorded Freshwater saving*





Energy Saving



SYSTEMS FOR ENERGY SAVING AND EFFICIENCY INCREASING IN THE DRYING PROCESSES

Fomat Aerothermic is Leader in the taylor made **high-performance drying systems** thanks to a unique technology and reference list. The company's production includes:

- *Steam and Condensated System*
- *Steam Rotary joints and syphone*
- *Yankee Hood*
- *Yankee Hood HT – BI HOT: High temperature wet & dry 650° C*
- *Combo Air system*
- *Recovery / Boiler*
- *Integrex Boiler*



FOMAT STEAM AND CONDENSATE SYSTEMS

In the Seventies, Fomat was the first manufacturer to develop and successfully market a Closed Steam System with the precise aim to **avoid steam flash losses**, thus dramatically reducing fuel consumption within the wider goal of achieving significant energy savings. Following more than **400 successful installations** throughout the world, Fomat Closed Steam System is today well tested and updated in order to profitably meet the need of the modern paper industry.

Fomat supplies **pre-assembled** and **wired systems on skid**, cascade systems or systems with thermo-compressor accordingly to customer requirements and product features. Thanks to the company's expertise of every aspect of the steam power plant up to rotary joints and siphons, Fomat designs and manufactures also **complete systems** and turn-key installations.



DUOFLOW ROTARY JOINTS AND TURBULENCE BARS

In order to get a perfect drainage of the cylinder, Fomat recommends installing fixed siphons with rotary joints supported by the machine frame. In case that a **fixed anchoring structure** on the machine is not available, Fomat designs a self-supporting holder able to ensure the stability of the siphon itself. Both **solutions provide** high stability of the siphon, which is the basic condition to maximize the **steam system efficiency**.



Fomat systems are equipped with an interchangeable cartridge containing all the **sealing elements**. The regeneration of the wear elements can be conveniently made in total safety.

Extensive tests on pilot machines and accurate surveys on the suction shoe, has led Fomat to **design** and **engineer new siphons** which minimize the pressure losses and maximize the cylinder rotation effect.

In order to improve the heat exchange, thus reducing the rimming effect, Fomat provides also **turbulence bars** for each kind of application.



MONOFLOW AND DUOFLOW ROTARY JOINTS FOR YANKEE

After over 30 years of experience in steam systems, Fomat designed a steam joint to ensure **high reliability and easy and safe maintenance operations**. For this purpose we have designed in the nineties a series of joints equipped with a cartridge seal unit that can be replaced very easily in a few minutes and then **reconditioned** for **maintenance** in total safety.

BOILER ROOM DESIGN & TURN-KEY SUPPLY

Fomat **designs, builds and installs** complete Heating plants. The water treatment or degassing plant can be supplied **pre-assembled on skid** in order to reduce costs and installation time. The boiler room design follows the careful analysis of the current and future needs of each customers.



RECOVERY BOILER AND INTEGREGX SERIES

Fomat has confronted the energy saving problem and has first **developed an efficient, reliable** and low-maintenance solution. Fomat has been the first to realize that it was possible to add to the extraction system a shell recovery boiler, which guaranteed an **output up to 99%**, excellent steam quality, constant functioning and reduced maintenance.



INTEGREGX SERIES

After a large number of recovery boilers installed, Fomat realized that the high amount of steam produced by these boilers made the **traditional boiler installed** in the mill a low-performing product, obviously due to the lower demand for steam.

To solve this problem and further reducing consumption, Fomat has developed the exclusive **Integrex series**, in collaboration with an established brand in boiler manufacturing.

This series combines in one unit the recovery boiler and the burner, thus ensuring a further reduction in consumption.

The burner works only if necessary and does not **remain in stand-by** to be able to **function as steam** is needed.

Unlike our competitors who use an after-burner, the system has the highest yields and the fumes are then exploited in our recovery unit. In case of new installations, the advantages also includes **lower power consumption**, lower installation costs and reduced space.



DEGASSER UNIT

Fomat supplies a dedicated degasser unit specifically designed to **eliminate the oxygen** in the condensate only when it is needed, therefore saving **thermal power** and **water** compared with a standard degasser system.

Fomat Boiler room design advantages includes:

- *Higher Energy saving compared with the other conventional solution Higher efficiency of the combustion air fan*
- *Lower heat dissipation (reduced radiant surface area) Less space required*
- *Lower power consumption Lower maintenance costs No gas leak problems*
- *Lower burner start power required thus lower consumption and automatic power integration*
- *Complete recovery of all the boiler flue gas*

HIGH EFFICIENCY YANKEE HOODS

With over **500 successful installations** and start up in the world, Fomat High Efficiency Yankee hoods ensure:

- *Optimal Heat Exchange Coefficient*
- *Optimal Blow Box Pattern*
- *Lower air pressure losses*
- *Reduced thermal*
- *Dispersion Operator Safety*
- *Long life span of the system*
- *Energy savings*



Combo unit system:

- > All components in one single unit
- > 5 days Installation paper to paper
- > Easy maintenance compare standard system



FYS YANKEE HEAD INSULATION

The rising costs of energy made the minimizing of losses the main purpose of research. FOMAT **developed and patented** a new insulation system for the Yankee heads that can save up to 10% of steam consumption by eliminating the dissipat of the heads.

The main feature of our system is the fact of being fixed to the structure and not rotating, making the area totally safe for the operators. After the installation of some systeems, we also added as benefit the eliminantion of dust in the environment, **due to the centrifugal effect** of the cylinder.



VAF - VACUUM CONTROL VALVE

VAF VALVE is designed to maintain a **constant level of vacuum** in the suction boxes. When a high vacuum is requested: the valve ensures a stable and proportional control.

With low vacuum, unlike other market **valves**, Fomat VAF closes completely and put in communication the suction boxes with the atmospheric pressure, eliminating any internal residual pressure. Fomat VAF is equipped with the compressed air saving positioner

and pre-set for the installation of a **vacuum transmitter** to read and regulate the valve parameters.

The VAF can be provided with a dedicated control system or a **remote connection** to the existing overall line control panel. The system has been created to substantially reduce maintenance costs and time.



FIBERGLASS DRYER SECTION HOOD - GREENHOUSE

Fomat realizes dryer section Hoods made in the most suitable materials that combine, **energy saving**, **easy installation** and low maintenance as well as long lasting performances.

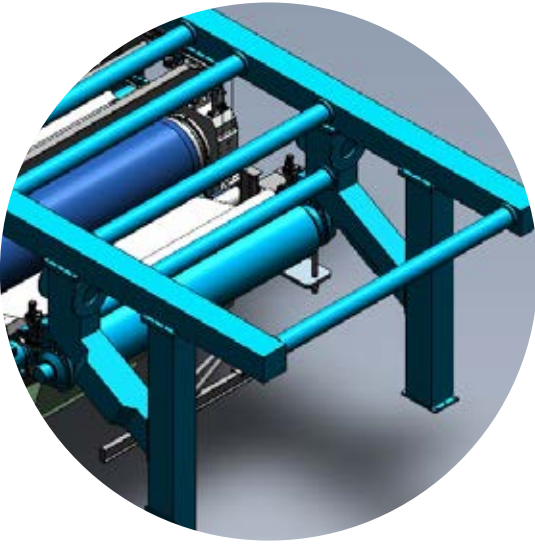
Benefits:

- *Higher dew point*
- *Panel materials: Fiberglass, Aluminium, Stainless Steel*
- *Elimination of thermal bridging*
- *Lighter and highly resistant material*
- *Self-supporting panels, thermally and mechanically resistant*
- *Higher acoustic and thermal insulation*
- *Long-lasting and stable performances*
- *Uniform suction of mist air*
- *Redundant mechanical lifting system easy to maintain and operate*
- *Panels with quick fastening to facilitate maintenance operations of the paper machine*
- *Taylor made design*



COMAT
aerothemic

WEJŚCIE
TYLKO DLA
OBSŁUGI

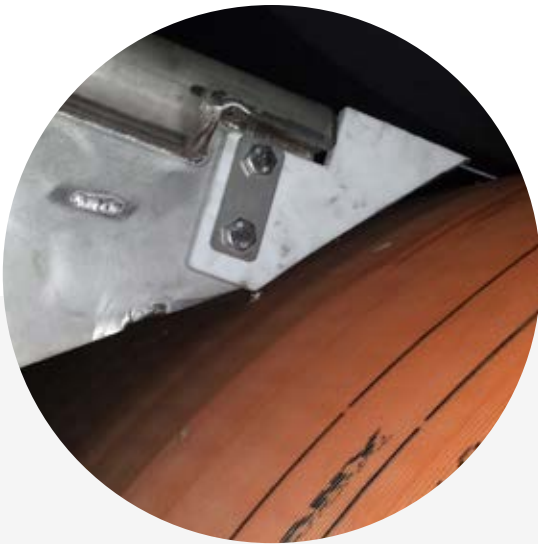


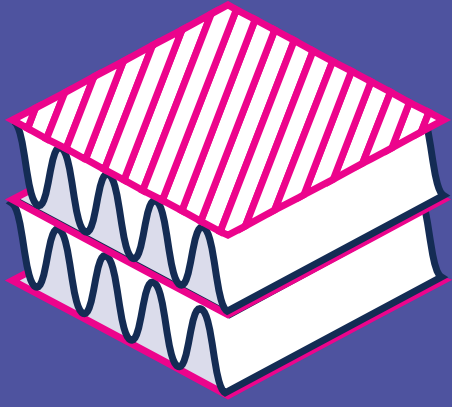
SHEET STABILIZATION SYSTEMS AND VENTILATION BOXES

Fomat product range includes the **sheet stabilization** system for press and drying section as well as the ventilation boxes for the drying section.

Press section boxes:

- *FSN : Stabilizer box for the nip of the press*
- *FSP : Stabilizer box at the inlet of the drying section*
- *FVP : Vacuum-based stabilizer box at the inlet of drying section*
- *Drying section stabilizer boxes :*
 - *FSP : Stabilizer box in displaced roll in the Double Felted Sections*
 - *FSPP : Pocket Stab with ventilation effect*
 - *FSR : Unifelt Section stabilizer box*
 - *FSDF : Double Unifelt Section stabilizer box*
 - *FTC : Transfer Box between Drying Sections*
 - *FSRV : Stabilizer box over the Vac-roll*
 - *FSRVA : Active Vacuum over Vac-Roll Stabilizer*
- *Drying section ventilation boxes :*
 - *FUV : Blow box placed under the Unifelt section for air balance*
 - *FRV : Pocket ventilation blow box*
 - *FPV : Blowing/exhaust box installed inside the pocket*
 - *FVF : Blow box for felt ventilation*





Solutions for corrugators



STEAM PLANT OPTIMISATION FOR CORRUGATOR

Since the early 70' Fomat has constantly developed and improved systems for the **increasing of the efficiency** of the corrugated board plants, in order to meet the request of an increasingly complex market.

Today, the **wider use of lighter** (often below 100g/sqm), recycled, chemicals or semi-chemicals papers asks for a higher plant flexibility and a special attention to the wet end process.

As a consequence of the **recycling treatments**, the paper today is more resistant to the starch penetration, extending this process time. But the growing market demands **higher overall production speed**, thus the need to develop components focused on assisting the paper makers in achieving the needed efficiency.

FOMAT AEROTHERMIC STEAM PLANT FOR CORRUGATORS

Fomat Aerothermic Steam Plant has been developed to enable the corrugators to reach higher overall performances, with increased output quality and **significant energy and chemicals** (including starch) savings. The core of the optimisation of a steam plant is the process of steam introduction and condensate extraction, in order to achieve the maximum heat transfer efficiency.

As a first step, Fomat Aerothermic has developed and engineered a **rotating joint** and **syphon system specific** for corrugators. Further on, Fomat Aerothermic has focused its efforts in the recovery of all the condensates in order to re-convey them directly to the boiler at the same **temperature of the steam**, thus eliminating the flash losses caused by the pressure variation.

Thanks to this integrated system and to this Steam Pump the machine operator is able to change the plant parameters according to the daily production variations. Fomat Aerothermic steam plant for corrugators is modular and composed of **pre-assembled components** as per the below block diagram.



FOMAT AEROTHERMIC FROOND ROTATING JOINT AND STATIONARY SYPHON

The Froond Joint is a unique system with high performances in the **removal of the condensates** while enabling extremely reduced maintenance. The Froond joint is adaptable to any corrugator cylinders, so as to ensure a simpler spare parts handling.

Thanks to the flanged coupling of the Fomat_ Aerothermic joint, that guarantees a **perfect alignment** and **position to the cylinder**, a fixed suction system can be obtained with a minimal distance to the bottom (only few millimetres). The assembly of the suction system can be done easily from the outside thanks to the articulated part. This part is then fixed during the normal operation, with the **extraction pipe**, avoiding the joint to open unwantedly.

1: Steam Pump

2: Boiler

3: Degasser unit

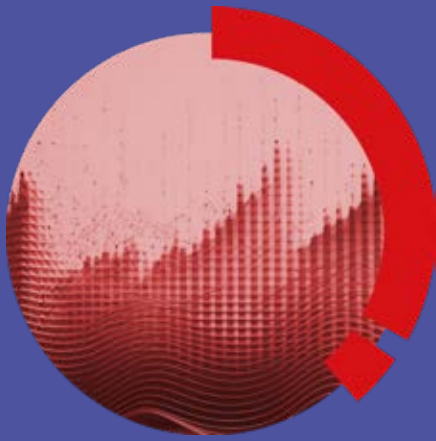
4: Condensate recovery

Fomat Aerothermic Steam Pumps has been developed to guarantee the **steam pressure control** throughout the corrugator, in order to avoid any loss of energy efficiency. An aspect that is even more important nowadays, given the **broad use of low weight and semi-chemical papers**.

Fomat Aerothermic Steam Pump installed throughout the machine (as per the above drawing) **automatically redirect the condensates** to the condensate recovery system that afterward pumps them directly in the boiler at a temperature corresponding to the one of the Steam. Thus creating a virtually closed system, safe for other consumption needs such as **sheet humidification** (in the single facer). In this case, Fomat Aerothermic includes alongside the system an Instant- Degasser that heat the fresh feed water needed to **compensate the above loss**.

Fomat Aerothermic Instant – Degasser unit operates exclusively when needed, therefore contributing to the overall **energy saving**, unlike most of the common market degassers that work constantly, wasting calories.





Quality Efficiency Improvement

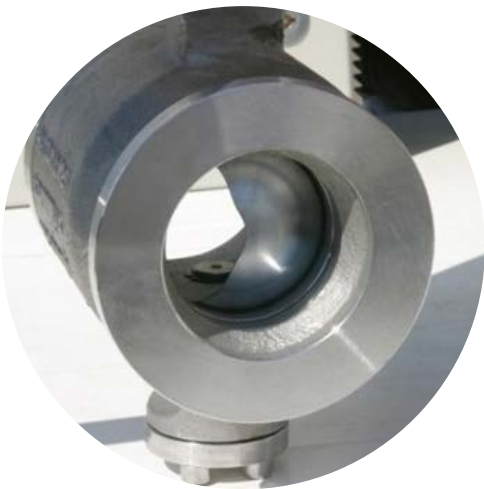




QCS SCANNER

With an increasingly demanding market, the quality control system (QCS) is a **base equipment** to maintain the standards of production. FOMAT offers a flexible, customizable and highly reliable system featuring low maintenance costs.

Our system also provides the possibility to log-in and remote assistance. Our systems can be equipped with conventional sensors or with infrared sensor **capable of reading basis weight and moisture**, thus avoiding the use of radioactive sources. Our infrared sensor has a self-calibration system, which avoids the high costs of scheduled annual maintenance.



BASIS WEIGHT VALVE

The basis weight valve is necessary to control with accuracy the **paper basis weight**, thus ensuring a constant profile in the machine direction. NEW FOMAT weight valve FRG was designed to ensure:

- *High accuracy in positioning and regulation*
- *Preventing the risk of clogging*
- *Backlash free*
- *Maintenance free,*
- *Relationship between flow rate and valve opening is linear.*
- *Limit switches free*



TRIM RUBY NOZZLES

Fomat-engineered and manufactured ruby nozzles specifically developed for **high pressure pipes and edge trim** with different diameters. The Fomat nozzles are compatible with production lines supplied by other brands. The company provides as well other custom-made nozzles according to specific customer requirements.



WET TAIL CUTTER

Made of a rigid structure with reliable components, this system **avoids vibrations** that can lead to inaccurate cutting, causing frequent breaks of the paper sheet.

The cutting speed (up to 2000mm/sec) is synchronized with the machine speed to avoid the formation of conical reels.

*Maintenance can be done while the machine is on operation thanks to the parking/storage position.
Sensor Free.*



DRY TAIL CUTTER

The system has a simple and robust structure with components suitable to work at high temperatures. Its **compact design** allows for installation in tight and narrow spaces. The cutting speed is synchronized with the machine speed. The system is controlled by a **dedicated PLC** which can be interfaced with the dry end tail cutter. The motor is equipped with an encoder that allows to detect the right position of the cutter **reducing maintenance problems**. Fomat provides a compact solution thanks to its design as the pneumatic system is installed outside the cutter head.

*Maintenance can be done while the machine is on operation when in Parking storage.
Sensor Free.*

Fomat provides a compact solution thanks to its design as the pneumatic system is installed outside the cutter head. Maintenance can be done while the machine is on operation when in **Parking storage**.



EDGE TRIM SYSTEM

Fomat Edge Trim Shower features a High accuracy Adjustment of the **Cutting Position** that can be done in Automatic or Manual mode. The system enables to change the nozzles in total safety while the machine is in operation:



- *Manufactured in stainless steel AISI 316*
- *Robust construction*
- *Reduction of Paper Breaks improving production time and efficiency*
- *Easy maintenance safe nozzle substitution*
- *Electro-polished surface to avoid fiber accumulation on the edge trim shower, thus reducing paper breaks frequency*
- *Easy setup of cutting width up to 400 mm per side*
- *Control panel with interface possibility to DCS (if needed)*
- *Electronic programmable controller panel (if needed)*
- *Nozzle pipe replacement can be done during machine running in total safety.*



Edge Trim Shower Anti-Bubble system

Fomat has developed an exclusive Pipe Degasser System specifically created for the edge nozzle trim pipe. The system is dedicated to those clients who face problems in using well water or whenever it arises the need to control the oxygen impact and effect in the piping. The Fomat Anti- Bubble system enables to avoid micro interruption of the flow, allows for a more homogeneous water, a better pressure control thus increasing as well the life span of the system, avoiding air bubbles and paper break.



DOCTOR BLADE OSCILLATOR

Fomat became aware in 1998 that the **life of the Yankee cylinders** was decreasing due to the increased speed and coating. A non-synchronized mechanical movement was no longer adequate. The solution was a hydro-electronic product with **variable stroke and speed**, without dead times in the inversion phase and with the possibility to set the inversion point, thus ensuring longer life time of the blades and a decrease.



COATING PLANT AND SPRAYING SHOWER

FOMAT coating plant allows the **complete independence** from the **suppliers of chemicals**. It ensures the proper mixing, heating and concentration as well as filtration of the product.

*Another feature of the system is our **FAST REMOVING** coating pipe with fan nozzles easy to be replaced in a few seconds while the machine is running..*

The shower is designed to ensure the uniform distribution of chemicals on the outer surface of the **Yankee with a double, triple and quadruple coverage**. The shower can be equipped with pneumatic or electronic oscillating system.

DUOFLOW ROTARY JOINTS FOR COOLING



Based on its experience on the engineering and running of the whole paper plant and manufacturing process at large, Fomat has designed the DUOFLOW Rotary joints with **cooling siphon** for calenders and cylinders. The cooling rotary joints comprises a cooling water inlet, a **compressed air** inlet that ensures pressure difference and a water outlet.

The joint cartridge is **interchangeable with the steam cartridge**. The water is injected in the cylinder by means of fan nozzles mounted on the fixed siphon, which ensures the uniformity of the cooling fluid.

The DUOFLOW ROTARY JOINTS FOR COOLING has been engineered and realized with the specific aim to conjugate functioning and Low maintenance costs differenza di pressione e un'uscita dell'acqua.



COOLING AND HEATING SYSTEM FOR CYLINDERS AND CALENDERS

Fomat manufactures customized **cooling/heating** equipment considering the energy source more convenient for the customer case by case.



DUST AND MIST REMOVAL SYSTEM

The dust generated around the doctor blades could deposit on the surrounding area, affecting the **paper quality** and increasing the fire risk. The mists generated in the wet area could damage the product **quality** and **workers safety**.

FOMAT provides for a tailor made solution in order to guarantee a safe and healthy working environment and at the same time an efficient functioning of the machine.

HALL THERMOVENTILATION SYSTEM

The mist generated in the paper drying process could damage the building and affect the operator's health as well as the environment. Fomat Aerothermic provides for tailor made solutions in order to **guarantee a safe and healthy working environment**, while preserving the plant, the building and the machineries.





Handling System



AEROTHERMIC HAS DEVELOPED A BUSINESS UNIT DEVOTED TO THE HANDLING PROCESSES

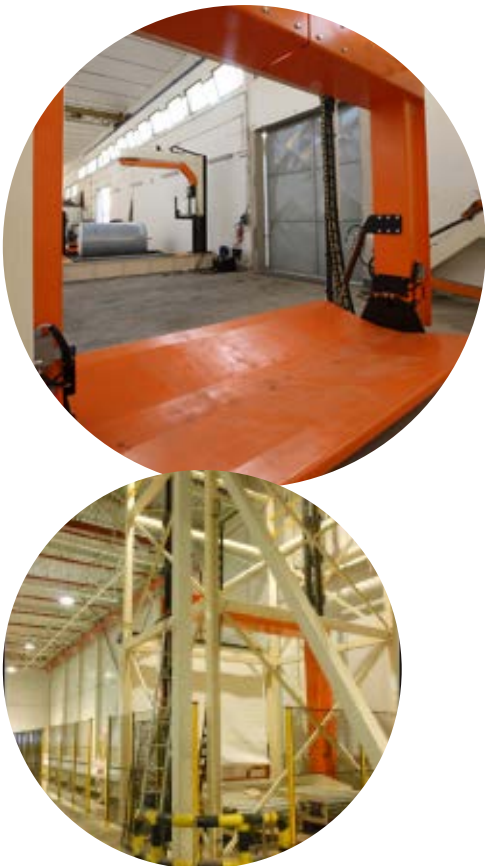
The experience and skills developed in the complete paper, tissue and corrugated manufacturing process has allowed the company to fulfil a market gap in the **handling process**, both with the realisation of the machinery and component and, first and foremost, with the capability of creating specific, tailor made and reliable **control logics**.

The new company investors, among which the Cacini group, maintains a pluri-decade experience in electronics and control logic in many **industrial/manufacturing fields** and today these **skills** are a very strategic and core-value part of Aerothermic services and experience.

MXL ELEVATOR FOR REELS

The elevator for reels MxL features a **heavy metallic structure** and an oscillating cradle or conveyor for reels. The supply includes:

- *Supporting main frame composed by a couple of columns equipped with Winker type guides.*
- *Bracing Structure in metal tubular.*
- *Lifting system composed by a double pair of hydraulic cylinders. The two systems, one for each column, are each composed by a pair of cylinders; the two cylinders are joined on the shirt, but rotated 180° relative to one another.*
- *Supporting structure of the cradle or conveyor for vertical sliding; the structure is connected with columns by means of Winker type wheels.*
- *If cradles, it's driven by two hydraulic pistons 80-30 stroke 400mm; if conveyor, it's driven by gearbox. The cradle is capable of an oscillating movement in order to receive the reel, then unload the reel once it reaches the ground floor.*
- *N°2 Sectional doors positioned on every exit of the elevator. Doors are composed by a PVC and metallic mesh which avoid access to the working area by Operators.*
- *Hydraulic plant including valves, joint, pipes and everything needed for machine running.*





MX702UP UP-ENDER

The Mx702UP Up-ender receive the roll in the arrival from the horizontal position and **tilts it** in vertical position on the slat conveyor. The Up-ender is composed by a tubular structure hinged on a heavy basement fixed under the floor level; the "L" shape structure supports the conveyor belt and the **cradle which receives the reel**. The tilting operation of the structure is put in action by means of two hydraulic pistons.

The cradle which receives the reel is a conveyor belt composed by two neutral rolls series mounted as a "V" shape which allow the sliding of the reels during the **tilting operations**. The slat conveyor on the exit side is composed by tubular shutters which are linked by chains. The chains are moved by an electrical gearmotor. The structure that supports the slat conveyor is **installed on rails** and it's driven by a couple of hydraulic cylinder; when is has been positioned on the slat conveyor, the structure is able to **slide 200mm** away from the cradle in order to allow the transfer of the reel without interference with it.



KICKER

The Kicker is made for **push the reel** positioned on the conveyor belt until the Wrapping Machine. The Kicker is composed by a heavy metallic structure fixed on the floor and by an arm moved by an hydraulic piston.

The arm is hinged on the upper side of the structure and it is equipped by a **neutral roll** at the other side in order to **avoid damages on the reel** during the pushing action. The rotation geometry applied the **right force** on the reel which every sizes of diameter.





ST3000 STOPPER

The ST3000 Stopper is a device designed in order to stop reels in arrival from the Rewinder Machine or other. The machine is composed by a mobile wedge installed in a **metallic box** to be inserted in the floor. The wedge is lifted by means of **pneumatic pistons** which help to absorb the shock of the reel. The mechanical configuration doesn't have cutting point in order to allow **safety movements** also if the Operator is working in the proximity of the machine.

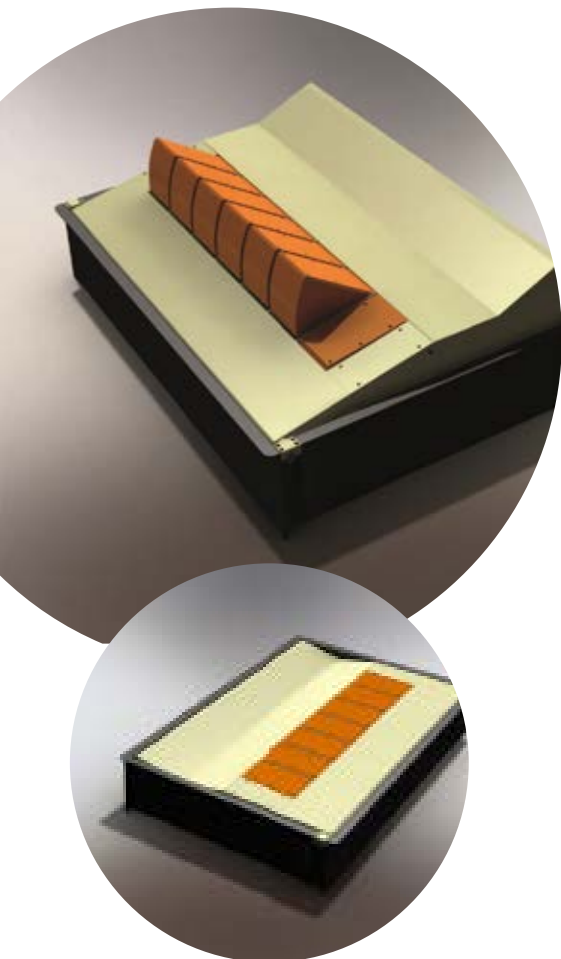
The Stopper is supplied complete by:

- *Metallic box to be installed in the floor.*
- *Balancing wedge.*
- *Pneumatic / Hydraulic pistons.*
- *Pneumatic group including filter and valves.*

ST3000-N STOPPER

The ST3000-N stopper stops the reel in arrival from the cradle of the rewinder and sends it till the wrapping machine or other. The stopper is composed by a **lifting flap** and a number of n balancing wedges hinged on the flap (according customer request). During the wait all the components are positioned **under the floor level**. Before the unloading operation of the cradle, the Operator pushes the button to lift up the balancing wedges; when the reel is stopped, the Operator pushes the button for the lifting command of the flap in order to tilt it, and after this he can **push down** all the balancing wedges or only a part of these to let the reel or only a portion of this in the direction of the conveyor belt.

The flap is lifted by means of a couple of hydraulic pistons and each balancing wedge is controlled by an independent pneumatic piston. The flat and the sectors are equipped with inductive sensors for the up and down positions. The drive of the machine must be interlocked with the management of the cradle: the cradle is disabled to unload the reel if the flat isn't in down position and the balancing wedges aren't in up position. ST3000-N cannot ensure the automatic transfer of reels with a **width less than 300mm**, that's the reason why a special function is integrated in control panel in order to allow the by-pass of the automatic unloading from the ST3000-N and allowing **manual push** of reels smaller than 300mm (single or grouped) by means of Operator.



MX177 WRAPPING MACHINE

The Mx177 is a wrapping machine for tissue paper reels characterized by a rolls group positioned **under the floor level** and by a structure over the floor level which supports the rotating arm. The wrapper is constituted by a single column and by **the rotating arm support**.

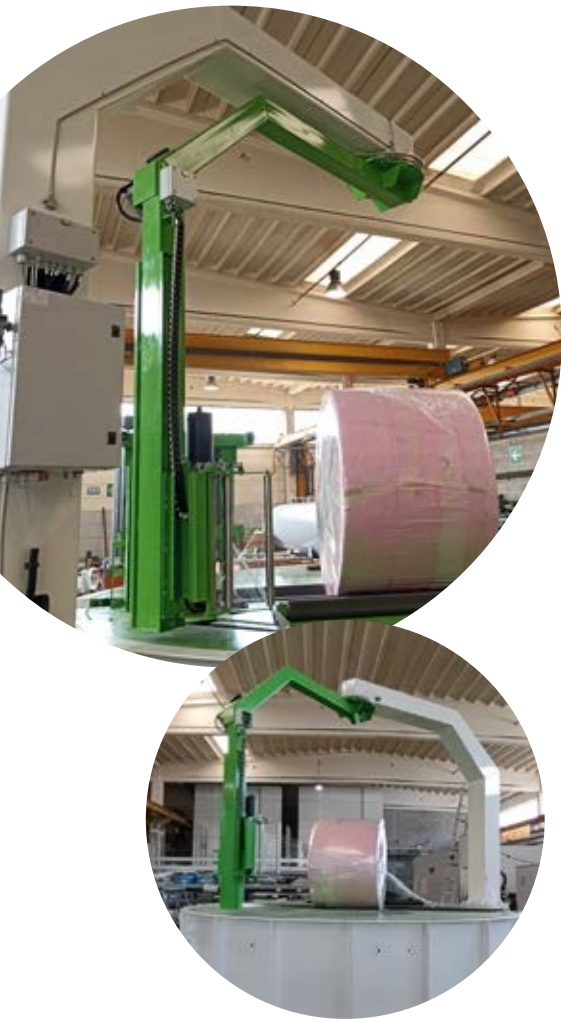
The support of the rotating arm is a heavy carpentry bracket which moves vertically on the column by means of a **hydraulic piston**. Inside the bracket are installed all drives which need to move and to control the rotating arm.

The bottom part of the structure is ready for the installation of the film **"cut and hold"** group for the automatic management of the wrapping cycle (optional). At the end of the rotating arm is installed the film holder threaded on the tubular structure: this solution permits easier maintenance and substitution actions. On the film holder are located the plastic films roll supporting systems, the tension control by means of an **hydraulic breaker** located in correspondence of the guiding roll and the film breakage detector.

The machine basement is constituted by the rolls group which turns the reel during the wrapping action; the group is composed by a main structure which supports two oscillating flats equipped with a **winding roll** and a neutral roll each one. Flaps are both hinged on center line of the main structure and each flap is lifted by a couple of hydraulic pistons. Flaps are concurring to form a "V" shape which keeps the reel centered on the rolls group. **Flaps lifting system** allows to vary the height of each flap independently: in this way it is possible to do following operation.

- *to stop the reel in arrival.*
- *to push out the reel from the machine at the end of the cycle.*
- *to vary the distance between the centres of the rolls in order to adapt the shape of rolls group to reel's diameter.*

The main structure is fixed on the floor by means of chemical bolts and supports are ready to be equipped with loading cells (optional).





MX747 WRAPPING MACHINE

The Mx747 wrapping machine is the first machine which includes in a sole solution the processes of **wrapping and standing up**. The wrapper is constituted by a single column and by the rotating arm support. The support of the rotating arm is an heavy carpentry bracket which moves vertically on the column by means of an hydraulic piston. Inside the bracket are installed all drives which need to move and to control the **rotating arm**.

The bottom part of the structure is ready for the installation of the film "cut and hold" group for the automatic management of the wrapping cycle (optional).



At the end of the rotating arm is installed the film holder threaded on the tubular structure: this solution permit easier maintenance and substitution actions. On the film holder are located the plastic films roll supporting systems, the tension control by means of an **hydraulic breaker** located in correspondence of the guiding roll and the film breakage detector and a film tension recovery system. The bottom part of the machine is constituted by a **metallic carpentry basement** which must be fixed under the floor level by means of a filling with concrete and in which is installed the rolls group.



This group is composed by two motorized rolls which **rotate the reels** during the wrapping cycle. The rolls group structure is mounted on a tilting device equipped with a couple of hydraulic cylinders for the lifting operations and by a fork, also actioned by a couple of hydraulic pistons, which controls the sliding of the reel during the tilting phase: in order to **avoid any damage** on the reel's surface during the tilting operation, between the rolls is installed a device equipped with **neutral rolls** which lift up the reel from the rolls surface.

At the end of the tipping cycle, the forks support the reel on a platform where it can be taken by a forklift operator. The platform can be equipped with a weighing system (Optional).

WE177R WRAPPING MACHINE



The We177R Wrapping machine is a device designed in order to wrap reels in axial mode using a rotating arm. The machine is composed by a rolls group installed on a rotating platform, which **supports the reel** during the wrapping cycle, and by a structure which supports the rotating arm.

The structure which supports the rotating arm has a single column configuration and it contains every needed to move and to control the rotating arm. On **rotating arm** is installed a trolley which supports the film holder. The vertical trolley is moved in vertical position by means of a belt in order to vary the alignment of the stretch film reel with the center of the **paper reel to be wrapped**.

On the film holder are located the plastic films roll supporting systems, the **tension control** by means of an breaker located in correspondence of the guiding roll and the film breakage detector. The rolls group turns the reel during the wrapping action; the group is composed by a main structure which supports two rolls driven by electric motors with **gear reducer**.

Rolls can be lifted in order to vary the height of each roll independently: in this way it is possible to do following operation:

- *to stop the reel in arrival.*
- *to push out the reel from the machine at the end of the cycle.*

The main structure supports are ready to be equipped with loading cells (optional).

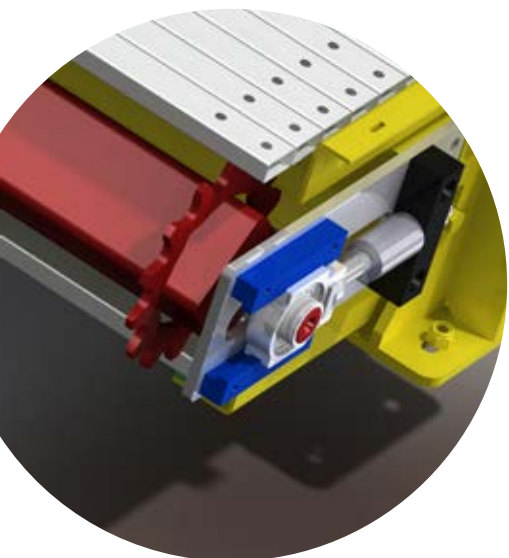
The rolls group is installed on a rotating platform in order to permit the **turning of the reel up to 90°**. The rotating platform turns on “Winkler” type wheels positioned all along the circumference and it’s moved by an electric motor which works on a circular rack.

The We177R Wrapping machine is supplied complete by power and logical equipments composed by a **main panel for the control** of the machine and the supervision of the working area.



PVC CONVEYOR BELT

The PVC conveyor belt structure is made by a sturdy metallic frame and it's composed by two **neutral rolls series mounted as a "V"** shape: the transport of the reel is made by a PVC belt which slide over the rolls.



SLAT CONVEYOR

The conveyor is equipped with a belt composed by tubular shutters which are linked by chains. The **chains are n°4 disposed** on conveyor's full width and the chains positioned at the belt's sides are equipped with flanged wheels in order to avoid lateral movements. The use of tubular shutters **allows a sweeter transfer of the reels** and avoids any sliding points which could damage the reels surface. The chains are supported by guide for whole the upper surface's length. The chains are moved by an electrical gear motor.



NT PULPER CONVEYOR

The conveyor belt above mentioned is designed in order to handle raw material, **waste paper bales or virgin paper bales** for feeding of pulper.

The conveyor belt is composed by:

- *Metallic frame with loading area to be positioned outside the floor level.*
- *Belt composed by steel chain and metal shutters. Steel chain, pitch 300 mm, is equipped with flanged wheels Ø78mm and 10mm thickness of the mesh.*





Aerothermic designed metal shutters, made from cold-bending, have a width either 1250 or 1500mm and a thickness of 5mm. The shutters are mounted on **the chain with bolts and locknuts**. On upper surface are mounted metallic pins in order to leave space between shutters and bales for **wires removal** after cutting.

- *Crankshaft mounted on bearings supports, driven shaft mounted on sliding supports with cushioning system*
- *Support frame composed by HEA200 profiles.*
- *Side protections of the sloping part composed by folded metal sheets 5mm thickness, height 1.000mm. Forklift bumper for the bales loading area, according the layout.*
- *Automatic lubrication system for chain including pneumatic pump.*
- *Manual Wires cutting device, composed by a structure which supports a pneumatic scissor connected to a trolley (The pneumatic scissor is able to cut wires from the virgin fibres bales in order to allow manual remove by the Operator).*
- *Electrical system, power and control including necessary sensors, encoder and inverter for bales moving following process..*
- *Safety wire system installed on side protection.*



MX711AF WIRE WINDING MACHINE

The Mx711AF is a machine for the winding of **iron wires in hanks**. The machine has an opening on the upper side of the structure that allows the operator to manually introduce the metal wires. Once introduced the wires in the machine, by means of a screw mechanism assisted by a **pneumatic pressure**, it surrounds the wires to form a skein of a **maximum diameter of 600mm**.

When the maximum diameter is reached by means of a pressure sensor, the machine stops and signals, using a dedicated light on the **operator panel**, the formed coil must be removed from the machine in order to continue with further cycles.



CHAIN CONVEYOR

The chain conveyor is a device designed in order to **handle virgin fiber bales** by means of chains. The frame is a sturdy metallic carpentry that supports a flat on which chains are sliding. The chains are arranged in three parallel rows on which the Operator positions the bales. Once the bales that compose the batch are all **positioned on the chains**, the Operator provide to cut the metallic wire which bound the bales; the cutting operation is helped by chains that are equipped with pins, in order to lift the bales allowing the easy extraction of cutted wires. The Chain conveyor is supplied complete by:

- *Pneumatic system for cutting, including pneumatic scissor, rail for sliding of the scissor along the conveyor and the metallic frame for supporting of the rail.*
- *Mechanical probes installed at conveyor's extremities.*
- *On board electric plant including sensors, switch, cabling, junction box and everything needed for make the machine running.*
- *Metallic protection on loading side of the conveyor in order to save the structure by forklift crash*
- *Metallic boardwalk to be positioned at the side of the conveyor with side protection and access ladder.*



REEL CUTTING MACHINE

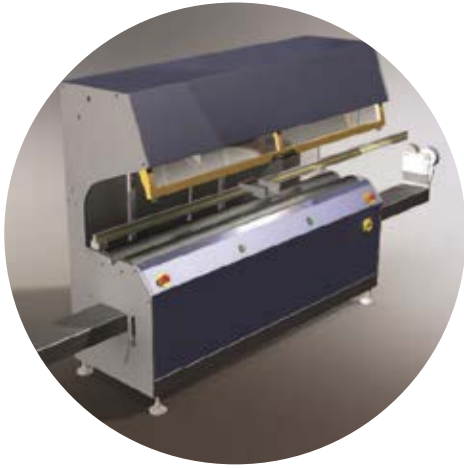
The reel cutting machine is designed in order to allow the **axial cut of big size reels** composed by materials as paper or virgin fibres. The machine is composed by means of a portal structure and by a couple of conveyor belts for the movements of the reels.

A transversal cutting blade slides vertically on the portal structure and it's driven by a couple of hydraulic pistons properly dimensioned; the blade is guided on the main structure by means of **special wheels** which slide on it on properly guides. The conveyor belt is composed of a PVC belt driven by an electric motor and its structure is sized to support the **weight of the reel and the vertical load** given by the thrust of the blade.

When the reel is positioned under the vertical portal, the Operator drives the **blade penetrates** the reel until you reach the inner cardboard core. The removal of the soul must be done manually by the Operator. When finished, the Operator may continue the descent of the blade in order to cut completely the resulting stack



of sheets. This can be repeated by operating the conveyor belt in order to split the pack leaves into smaller chunks.



MX450TA SEMIAUTOMATIC CORE CUTTER

The Mx450TA is a semiautomatic machine designed **in order to cut cardboard cores with high thickness**. The device is able to cut cores with diameters starting from 70mm up to 400m.

The wide working range of the machine is obtained with the blade always in the same position and turning the core by means of rolls. The rotation of the cardboard core is obtained by means of three rolls. Two rolls are positioned on the working flat of the machine and are **controlled by an electric gearmotor**. The third roll is neutral and it's installed on a vertical trolley which descends on the core vertically. The vertical trolley is moved by a pneumatic piston and slides up and down on linear rails.

The machine is equipped with some suction points properly positioned which recovers the **residual dust** if connected to a **suction device**.



MX450STA AUTOMATIC CORE CUTTER

The Mx450STA is a automatic machine designed in order to cut cardboard cores with high thickness. The device is able to cut cores with diameters starting from 70mm up to 400m.

The **wide working range** of the machine is obtained with the blade always in the same position and turning the core by means of rolls. Positioning and cut of the core is handled **automatically by a PLC** where the operator selects the total length of the core and number and size of pieces to cut.

The rotation of the cardboard core is obtained by means of three rolls. Two rolls are positioned on the working flat of the machine and are controlled by an electric gearmotor. The third roll is neutral and it's installed on a **vertical trolley which descends on the core vertically**. The vertical trolley is moved by a pneumatic piston and slides up and down on linear rails.



ASP400 SHAFT PULLER

The ASP400 Shaft puller is a machine realized in order to **extract the expandable** shaft from paper reels, and the insertion of the same one in a new cardboard core by the operator. This machine is a fully hydraulic device.

The ASP400 must be installed at the floor level by means of dedicated anchorages and it's composed by:

BASAMENT

Basement, in sturdy metallic **carpentry included "Winkler"** type longitudinal guides and linear gear with a 6.500 mm length. The basement features drilled holes in order to set its position on the ground by chemical fix.

MOBILE COLUMN

Mobile column equipped by "Winkler" type wheels and hydraulic motor for the **movement on basement guides**. The lower trolley is equipped with safety bumper. The column is also equipped with "Winkler" type guides for the vertical slide of the head of the shaft puller.

The hydraulic unit is installed at the base of the column. The support for the push button is installed at the top of the column.





VERTICAL SLIDING TROLLEY

Vertical sliding trolley equipped with device for the grip of the head of the shaft with **sensor of emergency** on the uncoupling and holds of the shaft. The trolley is lifted up by means of hydraulic piston and the carpentry includes a cantilever that receives the shaft's head in phase of lifting. The head is lodged on the trolley's cradle and get locked by means of a **block device**, set in action by a pneumatic cylinder.

PSP600 SHAFT PULLER

The shaft puller PSP600 is designed for the insertion and the **extraction** of the **expandable shaft** of the reels coming from the PM. Positioned in line with the stop position of the output guides of the wrapper, it works in conjunction with a platform liftable (see below).

The shaft puller PSP600 is provided with:

- *Main structure composed of a beam bearing the sliding guides of the clamping-head cart*
- *Clamping-head cart*
- *Cart moving system composed by chains with a 63mm pitch and equipped with metal slats; the slats are equipped with plastic material saddles, at regular intervals, in order to support the shaft during the whole pulling phase.*
- *Gear motor to move the chain-based system of the cart*
- *Electrical control panel installed close the equipment including logic and power controls*





LIFTING PLATFORM

The LP Lifting Platform is designed in order to lift up reel with **expandable shaft inserted** and it must be positioned in line with the above described PSP600 Shaft Puller.

The platform is composed by a **hydraulic lifting device** with a cradle installed on the upper side.

The lifting device is composed by a pantograph structure by Fomat exclusive design; the **tubular structure** of the scissor is extremely steady and it avoids any lateral movement of the cradle, for the correct alignment of the platform with the shaft puller. A **hydraulic piston** properly dimensioned operates the lifting.

The cradle is equipped with a **couple of hydraulic pistons** that allow the unloading of the reel at the end of the cycle. The cradle is equipped with an adjustable metallic cam on one side in order to stop the core in proper position during the insertion phase of the shaft. The Lifting Platform is supplied complete by dedicated hydraulic unit and **onboard electric plant**. The control panel is included in the PSP600 control panel.



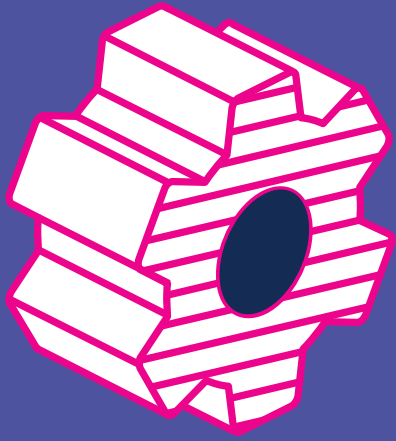
SHUTTLE

The shuttle is dedicated to the transfer of the reels from one point to another point. The shuttle is composed by a trolley which supports a conveyor belt. The conveyor belt structure is made by a **heavy metallic frame** and it's composed by two neutral rolls series mounted as a "V" shape: the **orizzontal transport** of the reel is made by a **PVC belt** which slides over the rolls. The conveyor belt is equipped with a hydraulic tensioning device for the belt alignment. For the vertical transport of the reel the shuttle includes a slat conveyor.



The shuttle is moved by means of an electric motor which drives the rubber coated wheels. The alignment of the shuttle is maintained by a couple of wheels installed below the structure which follow a guide installed **under the floor level**.

All electric equipments including electric panel and safety devices are installed on-board and the electric feeder is **provided by a special roll** which wraps the power cable during the transfer. The on-board conveyor can be loaded with a reel each time.



Service & Spare parts



SPARE PARTS AND SERVICE TECHNICIANS ALWAYS ON HAND

With more than 40 years direct field experience Fomat – Aerothermic is well aware that the **spares parts inventory** and the **scheduled maintenance plan** are at the very core of any paper mill successful runnability.

Fomat Aerothermic is able to combine the technical consulting services with a wide inventory of both original and **high-quality spare parts and components**, managed through the advanced vertical automated storage.

This dedicated unit, combined with the **know –how** and the capability to design, engineer and manufacture in-house the own-designed components, allow the **company for a total control** and reliability of the **spare part production and supply**.

Thus, the company's clients have the guarantee that each original Fomat Aerothermic designed spare parts can be realised in house with a quick process and that the **commercial spares** can be found in the company warehouse and quickly shipped. Our clients know that the company works daily to:

- *maintain optimal wear parts inventory at all times*
- *allow pain –free upgrade and retrofit activities*
- *quick answer and total control of the spare making processes: from drawing to shipping*









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