





# Loris Bellini

Portfolio



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# Company Profile

Founded in 1949, Loris Bellini is an Italian company specialized in designing and manufacturing complete plants for the dyeing and drying of yarn.

With its headquarter and productive facility located in Casalromano, in the Mantua area, and its sales and administrative offices in Bollate, a small town very close to Milan, the Company sells its products in the major Markets Worldwide, either directly or indirectly.

In over seventy years of activity, through large investments in R&D, Loris Bellini substantially contributed to the growth of its own sector by introducing several industrial innovations with great technological impact. Since the very first day of its foundation, in every aspect of the daily operations, Loris Bellini is very much committed towards the highest possible standards of quality.

*Quality is our greatest capital since more than seventy years.*

Designing and manufacturing our products in Italy means our products are realized at the state-of-the-art, in virtue of modern production technologies managed by experts with long-time experience in this field. Likewise, the meticulous selection of the materials and components which are a fundamental trait of our products ensures the quality and the extraordinary reliability of each single machine comprised in our portfolio. These aspects make it possible for our customers to benefit of safe machines that are meant to last in time, at a point that ordinary maintenance is virtually reduced to a very minimum level lifetime.

Loris Bellini implemented a special department in its own premises which is expressly dedicated to engineering and manufacturing dedicated hardware and software applications for a complete automation of the dyeing processes.



# History in a nutshell

- 1949** - Loris Bellini, Albano Bellini e Armando Formentini join in what is destined to become a successful reality in the International scene of quality yarn dyeing machinery
- 1963** - Patent for a special "extractable carrier for hanks". Since then, this system has completely revolutionized the use of cabinets for hanks
- 1969** - Construction of the first rapid pressure dryer for packages ARSPV 200
- 1978** - Presentation of the first and innovative system CASTO for the degumming and bleaching of linen on cops
- 1981** - First introduction of an air-pad system within a pressure vessel for yarn package dyeing
- 1982** - Loris Bellini introduces on the market an air-pad system on cabinets for hank dyeing
- 1982** - Loris Bellini introduces thicker stainless steel plates for dye cabinets, from 2,5 mm to 6 mm
- 1983** - Installation and start-up of the first worldwide industrial robotized & fully automatic horizontal plant for yarn package dyeing and drying with RBNO machines
- 1983** - Introduction on the market of the first system for the fully automatic regulation of the pump flow to dye at constant differential pressure (DPC)
- 1984** - Worldwide patent for the innovative horizontal system for package yarn dyeing (RBNO)
- 1986** - Installation and start-up of the first worldwide industrial robotized & fully automatic vertical plant for yarn package dyeing and drying with RBNV machines
- 1987** - Worldwide patent for a cabinet for hank dyeing capable of variable loading (1 or 2 floors) at constant liquor ratio (APPC-LV)
- 1991** - Presentation of the first centrifuge with columns for the complete direct hydro extraction of packages
- 1995** - First introduction of a dye machine controlled by industrial PC based on DOS OS
- 1996** - First introduction of a dye machine controlled by a Desktop PC based on Windows OS
- 1998** - Presentation of the first pressurized spray dyeing machine for hanks in the World. Based on special rotating arms, it is capable of reaching a temperature of 102°C
- 2011** - Worldwide patent for the innovative Pulsar system for the dyeing of yarn in packages, with unparalleled advantages in terms of utility consumptions
- 2014** - Official presentation of the Pulsar system to the Market.



**Products**

# PULSAR

Innovative system for the dyeing of packages, tops and small warp beams



**Pulsar** is the result of a brave but simple idea aimed at redefining the standard concept of yarn dyeing in package. Due to its completely innovative concept, Pulsar ensures both relevant savings of costs as well as an overall improvement on the quality of the final dyed product.

This last aspect — plainly confirmed by extensive laboratory tests and by the end users who could personally have a direct evidence — finds explanation from the reduced installed power and from the totally renewed hydraulic circuit. Due to the combination of these two aspects, liquor circulation has an increased “respect” for the treated fiber.

Pulsar takes advantage from a completely reengineered hydraulic circuit, which divides the base plate of the dyeing carrier in three different sectors. By means of dedicated butterfly valves, liquor circulates through them at pre-set intervals marked by the dedicated software.

Combined with a specific mixer (Thermocolormix) installed in the lower portion of the main kier, this solution brings unprecedented savings along the complete dyeing process, such as 70% less electric energy and nearly 30% less water (LR 1:4).

Even for steam — which is now required in smaller quantity due to the reduced level of water — Pulsar brings savings of approximately 20% over a traditional system.

As per all the machines produced by Loris Bellini, Pulsar is designed and manufactured following the highest standards of quality, for its materials as much as for its total safety.

Pulsar does not require an overall different approach if compared to a traditional machine.

Process controller *Leonardo 600*, which is fully developed by our engineers, allows a very easy and intuitive approach with the final intent to simplify the interaction of the final end user, thanks to the highly automated functions expressly conceived for this machine.

In case a larger integration with pre-existing Management Systems is required, Pulsar is also ready to accept process controllers manufactured by third parties.

This machine is available in different capacities, starting from the small size of 50kg up to very large lots of 1,5 tons each. By means of a pressurized air-pad system, Pulsar allows variable loading down to 50% of the nominal capacity of each kier, while keeping liquor ratio to a nearly constant level.

By assuring a concrete reduction in the consumption of water, steam and, in some cases, chemical products, as well as savings of electric energy up to 70%, Pulsar is projected into the future and make it the best choice for all those Customers who intend to accelerate the payback of their investment, while improving the final dyeing quality of the end products.



## **PULSAR. Some Characteristics**

The base plate of the loading carrier is divided in three different sectors that allow dye liquor to flow through a single portion of the material by pre-set intervals — normally 15 seconds each. This logic can be extended to any Pulsar, no matter what the nominal capacity of reference is.

The hole located at the center of the base plate, which is aligned with the Thermocolormix installed in the lower portion of the main kier, allows a proper mixing of the dye bath from both thermal and chemical aspects.

The loading carrier of Pulsar is normally provided with spindles having a star section bar up to half of their height, while the rest is a M16 threaded rod up to the top, so that variable loading down to 50% can easily be achieved at nearly constant liquor ratio. It is also possible to equip the loading carrier of Pulsar with perforated spindles having a cylindrical section, without altering the flexibility of variable loading.

As per the traditional RBNVI vertical machine, also the Pulsar system has an internal serpentine for the indirect heating/cooling of the dye bath. This is installed between the base plate of the loading carrier and the very bottom of the kier.

This solution ensures two great technical advantages:

1. improves liquor ratio due to a better optimization of the otherwise empty space in the lower portion of the main kier
2. allows a more accurate control of the heating/cooling gradients.

The indirect serpentine is connected to the circuit by means of flanges that give access to an easy and fast intervention in case of ordinary maintenance.

# RBNVI

Vertical machine for the dyeing of packages, tops, bumps, loose fiber and tow



Introduced on the market in the early 80's, the pressurized air-pad system is part of the **RBNVI** as well as of all other machines in our portfolio. The implementation of such technology makes it possible to achieve great advantages by flooding just the pump and the packages alone, thus significantly reducing liquor ratio (1:6) and lowering the global consumptions of water, steam and electric energy.

The use of the air-pad system ensures an unaltered liquor ratio even when the machine is loaded at 50% of its nominal capacity.

The variable loading logic (100-50%), along with the automatic system for the continuous monitoring of the differential pressure between the inner and outer portion of the material, guarantees total flexibility of the machine in regards of the material (cotton, polyester, wool, blends, etc.) and its relative configuration (packages, tops, tow, loose fiber).

By means of the helico-centrifugal pump designed by Loris Bellini, the amplitude of the spectrum of available differential pressure (0.2 to 2.5 bar) gives the opportunity of dyeing very different fibers within the same machine, from acrylic to wool with excellent permeability, to cotton and viscose with reduced permeability, as well as very dense packages of polyester.

The flow reversal device, which is integrated in the pump, does not require to slow down the liquor circulation at each inversion (thus preventing peak absorptions) and avoids the formation of turbulence within the dye bath.

The machine can be configured in different ways depending on the materials that need to be dyed — such as high temperature drain, linear/exponential alkali dosing system, preparation/recovery tank — which are all managed by the *Leonardo* system installed on a industrial PC.

The air-pad system, combined with an extremely compact hydraulic circuit, ensures very low figures for the liquor ratio.

This leads to global savings of water and chemical products, with a consequent reduction of production costs and a faster payback over the initial investment.

# RBN01

Horizontal machine for the dyeing of packages, tops, bumps



Presented in world premiere during ITMA 1983, its peculiar design was object of an international patent during the month of December the following year, with file number 89.109.914.0. No horizontal machines for the dyeing of packages were seen anywhere on the market before that moment.

**RBNOI** was born to give a substantial answer to all those customers with challenging needs in terms of logistics for both the infrastructures and the handling of the final product. In fact, horizontal machines can easily be installed in low clearance buildings where the vertical option is otherwise not compatible.

RBNOI takes advantage from the same proven technology of its vertical counterpart: pressurized air-pad system, which allows the flexibility of variable loading (100%-50%) while keeping liquor ratio at a nearly constant level; flexible approach for the dyeing of different fibers due to a very much efficient helico-centrifugal pump that amplifies the spectrum of differential pressure between the inner and outer portion of the material. In addition, as per the vertical machines, the automatic system for the continuous control of the differential pressure ensures a very high repeatability of the dyeing process.

The horizontal machine is based upon the concept of modular dyeing carriers such as they are all interchangeable between them: the minimum working batch defines the size of the single loading carrier and all the machines are based on its multiple (1, 2 or 3 loading carriers). Each machine can easily work at 50% of its nominal capacity and this is possible by means of a heat exchanger installed outside of the main kier.

RBNOI machine is installed at floor level and does not require environmental structures such as mezzanines or roof cranes. Handling of the loading carriers occurs by means of manual trolleys on wheels or through the use of a shuttle on rails conceived for automation.

This machine brings several advantages. The absence of structures of support (mezzanines and roof cranes) reduces the global investment, while the pressurized air-pad system brings a substantial benefit on containing running costs. All these aspects concur in a faster and more profitable payback over the initial investment.

# ARSPV-ARSP0

Pressure dryers



**ARSPV** and **ARSPO** are high-pressure rapid dryers (5 bar) for the drying of yarn on packages conceived for the direct loading of carriers coming from the dyeing machines.

Our high-pressure rapid dryers do not require any preliminary centrifugation and this is crucial to preserve the initial geometry of the packages. These dryers are commonly used to dry any type of yarn, independently from the composition of the fiber or from the type and shape of the packages.

Cotton, acrylic, wool, polyester, viscose or blends either on cylindrical, conical or compressible dye tubes. ARSPV and ARSPO guarantee perfect drying results through three different working phases.

1. **Dynamic hydro-extraction** - Dynamic hydro-extraction completely substitutes the necessity of a preliminary centrifugation and it is performed on the wet material coming from the dyeing machines directly.

2. **Drying** - Drying phase automatically starts right after the dynamic hydro-extraction is concluded. Both heating and cooling batteries are activated. Air temperature is preset in the control panel at the beginning of the cycle and automatically kept constant along the entire process through thermostatic controls and modulating pneumatic valves.

3. **Conditioning** - At the end of the drying phase, heating battery is excluded and the air is circulated through the material in the outside-to-inside direction in order to equalize residual humidity in the yarn packages and reduce the temperature of the material.

Drying times and temperatures are optimized in accordance with the type of fiber and the type of package:

- cotton: 80 minutes
- acrylic: 40 minutes
- polyester: 30 minutes
- wool: 50 minutes.

The operating principle behind these dryers, along with a meticulous engineering development through the years, make it possible to recover up to 90% of the consumed electric energy in the form of clean and warm water that can be reused in the next dyeing processes.

The complete lack of manual handling throughout the whole process (from the preparation of the greige material to the final end product), the chance of using the dried package in production directly without the need of rewinding it and the total integrity of the dye tubes, all concur to drastically reduce running costs in favor of a much faster payback over the initial investment.

# APPC-LV

Cabinet for hanks



True strongholds of our portfolio, the **APPC-LV** cabinets are manufactured by using 6mm thick 316L stainless steel plates, usually purchased from European manufacturers of the highest quality.

These cabinets use an axial pump which is directly fitted on the main body of the machine and this completely eliminates connecting pipes, from which derives the compact design of the hydraulic circuit and the consequent optimization of the liquor ratio.

In fact, APPC-LV cabinets can assure a very low liquor ratio that, according to the type of material and to the cycle of reference, can range between 1:12 and 1:15.

As all the other components of the machine, the pump itself is easily accessible from all sides, thus making maintenance a breeze in every context.

APPC-LV cabinets are installed at floor level and do not require holes, nor civil work. Such solution makes these cabinets true "plug & play" and facilitates the loading/unloading operations of the loading carriers by means of trolleys on wheels.

Ideal for the dyeing of wool, acrylic HB and mercerized cotton, APPC-LV cabinets frequently are the first choice for all those customers who prefer to dye such fibers in hank form with exceptional results. Being the direction of the flow parallel to the fibers, there is a total absence of turbulence inside the machine, such as yarn is not compromised by entanglements, for smoother and more consistent hank-to-cone operations. The pressurized air-pad system gives the chance for a 50% variable loading at almost constant liquor ratio and ensures a very high level of flexibility for every production needs.

APPC-LV are available in different sizes, starting from 5kg up to very large lots of 420 kg. Such maximum capacity can easily be doubled by considering two APPC-LV 250 (2-door) in coupling mode.

Investing in APPC-LV cabinets means purchasing machines for the dyeing of yarn in hanks with unique characteristics, either for the reduction of running costs and for the highest dyeing quality, unparalleled in this field.

# ABEP

Spray dyeing machine



**ABEP** is the technical solution that consolidates the range of products manufactured by Loris Bellini for the application of special fine yarn in hanks:

- cashmere, alpaca, mohair, wool and blends
- natural silk and blends of viscose/wool
- filament viscose
- mercerized cotton
- very high bulk (VHB) acrylic for knitting.

The structure of ABEP is entirely manufactured using thick 316L stainless steel plates. Its arms, which are mirror polished and have an internal liquor distributor, are designed to guarantee a uniform and constant flow along the entire length of the arm. The tilting opening door of the machine is now provided with pneumatic pistons that grant even a higher level of safety and simplify further the global user experience with this system.

The pressurized air-pad system allows a working temperature of 102°C at sea level. This makes our ABEP independent from the variation of atmospheric pressure, thus allowing VAT dyeing and a more accurate regulation of the process temperature.

The arms are of extractable type for an easy loading/unloading operation of the hanks. As standard, all ABEP machines are equipped with a magnetic flowmeter in continuous communication with the inverter for a constant flow no matter how many arms are in operation. In fact, all ABEP machines can work at variable loading by means of the manual exclusion (automatic as an option) of arms down to 50% of the nominal installed capacity, thus reducing the total production of each batch in accordance with the requirements of the dyehouse.

The rotating mechanism of the arms, entirely built with AISI 316L stainless steel, is self-lubricating and does not require maintenance.

The control of liquor level allows working at constant liquor ratio by setting the volume of the liquor in accordance to the arms in operation. Such solution brings a very high shade repeatability with a strong reduction of any possible shade corrections.

ABEP machines are available in different sizes, starting from 10 kg of the 2S up to 200 kg of the ABEP 20. In addition, it is possible to connect two machines in coupling mode for a total installed capacity of 400 kg.

ABEP machines have a very low liquor ratio of 1:10. Such reduced consumption of water, in combination with a low requirement of maintenance, ease of use and a very high dyeing quality, make it our ABEP a very special machine in its field, which is able to satisfy even the most demanding user.

# CASTO

Machine for the scouring and bleaching of flax sliver on cops



**Casto** integrates degumming and bleaching processes in one single machine. Such integration leads to a more efficient planning of the entire production.

The modular stainless steel loading carriers are designed in such a way they are easily transportable with standard transpallets and can replace the traditional trolleys. The operators can load the loading carriers directly instead of the trolleys and reach the degumming/bleaching machine through the lanes of the spinning and roving departments without interrupting the operation.

This entirely avoids traditional cop rehandling during scouring, which consists in unloading the trolleys and loading the carriers.

The pump is specifically designed to operate at low head pressure and high flow rate, as required by the soft winding of sliver cops which need very smooth circulation to prevent felting, which would cause spinning troubles and defects.

The unique design of the plant is not limited to the sole pump, but it is also extended to the entire circulation system, such as the intake manifold (liquor flow out-to-in), axial impeller pump, delivery manifold (liquor flow in-to-out), carrier seats and carriers. A smooth and solid liquor circulation with a limited pressure drop is obtained and this means low installed power.

Casto can accommodate 8 modular carriers suitable for sliver cops of various standard sizes.

The electronic control of the entire process can be limited to controlling time/temperature parameters by modulating pneumatic valves and manual control of on-off interception valves.

Alternatively, by using a dedicated controller, it can manage all the valves and electrical equipment thereby obtaining a fully automatic cycle and significantly reducing operating costs, with outstanding repeatability and reliable results.

Due to the use of special pumps, combined with a complete automation of the very short productive cycle, Casto brings a substantial reduction of electric consumption and global savings of running costs for degumming and bleaching. The increased working efficiency of the spinning machines is furthermore guaranteed by the complete elimination of any intermediate handling by means of cops directly loaded on loading carriers, with consequent benefits in terms of manpower and process times.

# RBNV/PULSAR 270

Laboratory machine



End users consider our **RBNVI/PULSAR 270** as a very useful machine between the actual lab and the industrial production.

This machine benefits of all the same peculiarities of a proper production machine and it consequently gives the possibility to work on a sample of material adapting the same parameters and the same configuration of bulk production (1 or more packages).

Despite its very compact design, RBNVI/PULSAR 270 is equipped with all the devices available for larger industrial machines. In virtue of such full configuration, this machine is meant for working on small lots and their respective cycles to be consequently transferred to the bulk production.

RBNVI/PULSAR 270 is pressurized at 5 bar and has a working temperature of 140°C. Complete with electronic sensors, probes and pneumatic/automatic valves, this machine can go through the different phases of the dyeing cycles in an automatic way by means of our process controller *Leonardo 600*.

Considered as a true “bridge” machine, it allows the transition between the laboratory stage and the production, thus minimizing the risk of error on the final product and assuring savings on production costs.

The availability of specific loading carriers for packages — but also for hanks, loose fiber and small tops — makes this machine a true support for a more efficient management of the dye house.



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