

# ABP

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**AUTOMATIC SPRAY HANK DYEING  
MACHINE**

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**L** **LORIS**   
**BELLINI**

Dyeing machines

## AUTOMATIC SPRAY HANK DYEING MACHINE

The machine is a new technical evolution which integrates the wide range of Loris Bellini's yarn dyeing machineries for specialized application on delicate yarns on hanks :

- woollen knitting yarns in cashmere, lambswool, alpaca, mohair, wool and blends
- natural silk yarns and blends with viscose and wool
- filament viscose yarns
- mercerized cotton yarns
- acrylic knitting yarns, very-high bulk type (VHB).

APB is preset to simplify the manual hank loading and unloading operation and on request it may be delivered ready for automation of material handling, from hank reeling to dyeing and drying.

## TECHNICAL FEATURES AND ADVANTAGES

### MAIN MACHINE

- **Pressurized operation by air cushion**, upto a maximum **temperature of 102°C** at sea level, independent from atmospheric pressure variations: reduction of dyeing time and higher dyestuffs exhaust rates.
- Structure entirely made of **high-thickness plate in AISI 316 stainless steel**: long-term mechanical reliability.
- Inclined roof of special design: no drippings on the hanks.
- Pressure-tight inspection porthole: upto 102°C operation for additional safety.
- Internal lighting on upper side of hanks: easy inspection of material.
- Hank loading/unloading door made of high-thickness plate and equipped with sealing gasket: no steam leakages in dyehouse's environment; steady dyeing liquor temperature; reduction of steam consumptions.

- Upwards lid opening of manual type (standard) with weight-balancing device and stable open/closed positions: quick operation and high operator's safety.

- **Rotating arms with internal liquor distributor** engineered to guarantee a constant and even liquor flowrate along the entire arm's length: even dyeing on all hanks loaded along the arm.

- **Electrogalvanic mirror-polishing of hank-bearing arms**: absence of abrasion and felting effects on the most delicate yarns.

- **Hank rotation system by rotating movement of arms** (instead of conventional rotation by moving lifting bar and idle arm): no yarn tangles by hank slipping and perfect physical hank conservation for high-speed hank-to-cone winding.

- Dyeing liquor distributor from circulation pump to sprayer arms designed for **perfectly even flowrate on all sprayer arms independently from their central or latera positionl**: consistent even dyeing between the hanks loaded on different arms.

- Possibility of exclusion of lateral arms to reduce the load capacity per batch: flexibility for **dyeing of small batches.**

- Sensors for control of sprayer arms exclusion.

- Removable sprayer arms support with design to eliminate deformation even under heavy workload or during the loading-unloading operation by unskilled workers.

- **Sprayer arms removable from the front for cleaning.**

- Automatic control of specific liquor flowrate by **magnetic flowmeter**, independently from the number of arms in operation: color repeatability batch-to-batch.

- **Automatic liquor level control** in the dyeing chamber according to the number of arms in operation, so as to maintain a constant liquor ratio, hence, by a constant specific flowrate, a constant number of liquor contacts per minute: high levels of color repeatability and reduction of color corrections.

- **Automatic control of liquor flowrate of circulation pump by means of Inverter** (AC power frequency controller) acting on pump's speed based on "Leonardo" PC software with feedback from the magnetic flowrate measurement.

- Centrifugal liquor circulation pump with mechanical seals without cooling and maintenance. The pump does not have any cavitation effects due to the oversized suction mouthpiece and static pressure: reduction of total dyeing cycle duration.

- Automatic control of **liquor level and static pressure** by continuous electronic sensor.

- Safety system against over-pressure by hydraulic column device.

- Automatic cold/hot water blend fill valves for **machine filling at preset temperature**: reduction of steam consumptions, filling and heating times.

- Automatic valve for machine pressurization at cold conditions by compressed air.

- Automatic valve for static pressure control and regulation at preset value.



- **Automatic continuous rinse** function by emptying of dyeing chamber at minimum liquor level: rinse water is less diluted and the highly efficient washing effect reduces both water usage and rinsing times.

- Liquor mixing device in the dyeing tank also during machines operation: improved solubility of dyestuffs and salts.

- Automatic liquor drain valve of large size.

- **Rapid drain system by airpad pressure** to cut the drain time down to a few seconds: reduction of total dyeing times.

In older atmospheric spray dyeing machines the drain time is normally very high due to the wide tank surface and low hydraulic water column height before the drain valve.

- Spray arms rotation by a new **drive system with AISI 316 stainless steel gears inside the machine** and lubricated by means of dyeing liquor itself: elimination of traditional external chains or external gears requiring oil or grease lubrication.

The Loris Bellini rotation system completely deletes the mechanical seals between the rotating arms and the external side of dyeing chamber: long-term reliability and absence of seals maintenance.

- Motorized drive by means of one motoreducer for each group of 4 sprayer arms: no complex multiple motorizations and simplified electrical circuits for motors and relevant protections.

- Sprayer arms positioning by **encoder controlled by "Leonardo" PC software** for a fault-free precise positioning: no multiple proximity switches for higher reliability.

The encoder enables to determine and record with precision the number and direction of rotations on the hanks during the entire dyeing cycle for a perfect color repeatability.

- **HT color sampling device with depressurisation chamber:** color samples can be taken anytime without liquor cooling and reopening the front door of the machine. The device eliminates vapour leakages in dyehouse environment and it saves operating time.

- Safety thermometer with electrical contacts to prevent the opening of potentially dangerous automatic valves at liquor temperature exceeding 85°C.

## COLOR KITCHEN

- Automatic 1-tank color kitchen (optionally on request with 2 tanks).

- Tank washing ring by perforated piping.

- Tiltable closing lid for operator's safety..

- Dye injection pump suited to add dyes and chemicals even if the dyeing machine is pressurized.

- Dyestuffs and chemicals mixing device for **direct dyes dissolving** in the add tank.

- Powder salts dissolving device with control system of feeding speed preset by "Leonardo" PC software.

- **Liquor recycle** machine-tank-machine: the function can be preset or deleted by "Leonardo" PC programme.

- **Linear and exponential dosing system** of dyes and chemicals from the kitchen tank.

- Automatic tank fill and washing valve.

- Automatic dyes and chemicals injection valve.

- Automatic tank drain valve.

- Automatic dyes and chemicals mixing valve.

- Candle-type filter for powder salt dissolving.

- Electronic continuous liquor level sensor.

AIR-CONDITIONED CONTROL PANEL.

PROCESS CONTROL BY STANDARD PC, HARDWARE PENTIUM ® Intel WITH "LEONARDO" SOFTWARE.



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