



ARSP0 ARSPV

HIGH EFFICIENCY PRESSURE DRYER



ENERGY RECOVERY HIGH PRESSURE DRYER

ARSPO and ARSPV are fully-automatic yarn package dryers at high pressure (5 Bar) conceived for direct loading of dyeing carriers coming directly from dyeing machines.

Bellini high-pressure dryers do not require a centrifugal hydroextraction.

They are normally used for drying all possible kinds of yarns without limitations in:

Fibre composition Yarn package type and size. Yarns can be cotton, acrylic, wool, polyester, rayon and blends) in form of packages (cylindrical, conical, biconical, compressible).



HIGH DRYING PERFORMANCE

ARSPO and ARSPV pressure dryers are rated for operation at **HIGH STATIC PRESSURE OF 5.0 KG/CM²** in order to increase specific weight of drying air, therefore conveying a larger quantity of heat for evaporating water from the yarn under process.

OPERATION IS PERFORMED IN CLOSED AIR CIRCUIT consisting of:

- Autoclave designed to receive the modular yarn package carrier (s).
- High-efficiency centrifugal blower.
- Automatic air flow direction reversal group.
- Centrifugal water drop separator.
- Indirect air heating battery.
- Indirect air cooling battery for water condensation by large contact surface.
- Electric control panel with PC for fully automatic operation.

RAPID DRYING CYCLES

- Cotton yarn packages: 80 minutes
- Acrylic yarn packages: 40 minutes
- Polyester yarn packages: 30 minutes
- Wool yarn packages: 50 minutes
- Textured filament: 30 minutes polyester

In case of delicate fibers or optical white the drying temperature may be decreased till 80°C.

Short drying cycles determine: reduction of investment cost for the drying plant, as one dryer can serve several dyeing machines, and low power consumption in terms of kW/h per kg of evaporated water



THE DRYING PROCESS

The complete drying operation is developed in three sequences which are performed automatically:

1 - HYDROEXTRACTION

Dynamic hydroextraction replaces centrifugal operation and is done directly after loading of wet yarn carrier coming directly from dyeing machine.

During this phase both heating and cooling batteries are excluded.

The air is delivered at high pressure by the blower to the autoclave and passes through the yarn in outside-to-inside direction.

The water removed from the yarn it is collected and measured.

During hydroextraction static pressure increases till reaching the preset

5.0 kg/cm² value.

2 - DRYING

Immediately after hydroextraction, the yarn drying phase starts automatically. Both air heating battery and air cooling battery are activated.

Air temperatures after heating and cooling are preset in control panel at the beginning of cycle and automatically maintained during process through thermostatic controls and modulating pneumatic valves.

The air is blown by the blower through heating battery, heated at preset temperature according to yarn type and colour shade, flows at high speed through the yarn in inside-to-outside direction, thereby transferring heat to the yarn and becoming saturate with evaporated water.

Saturated air enters the **cooling condenser** battery.

After cooling air loses its absolute humidity, which condensates in drops eliminated from dryer circuit by a second centrifugal separator installed at the base of cooling battery.

Also the second separator is equipped with automatic level control acting on a pneumatic water let-off valve.

The very large contact surfaces of heating and cooling batteries ensure rapid heat transfer.

The heat consumed during drying is **recovered as hot clean cooling water** from the condenser.

Air Flow direction is reversed at preset time intervals by a

special deviator installed at the base of autoclave consisting of a rotating curve operated automatically by a pneumatic piston.

This reversal system avoids the defects of conventional pressure dryers on the market: poor efficiency due to heavy head pressure losses in a square-shape reversal circuit and air channeling due to use of four cut-off valves.

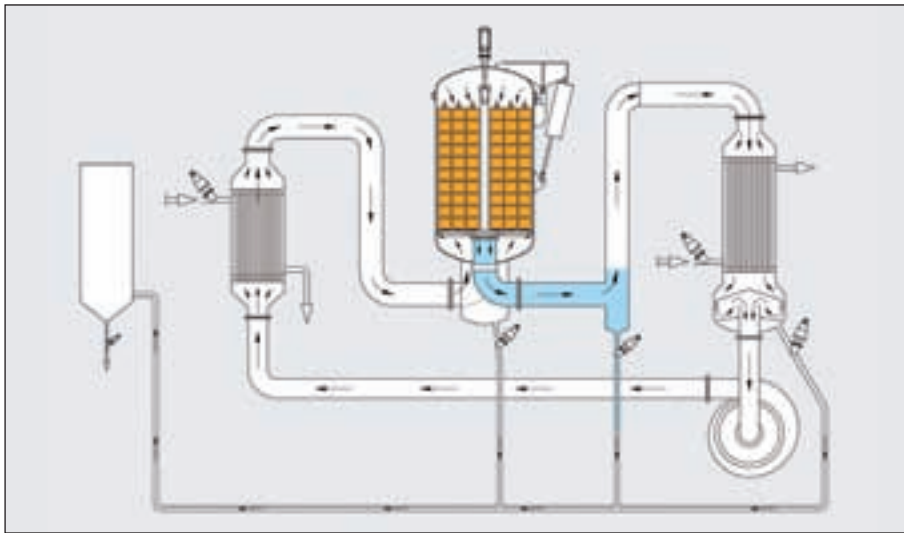
Duration of drying phase is preset on the base of air temperature at inlet and outlet of yarn packages.

3 - YARN CONDITIONING

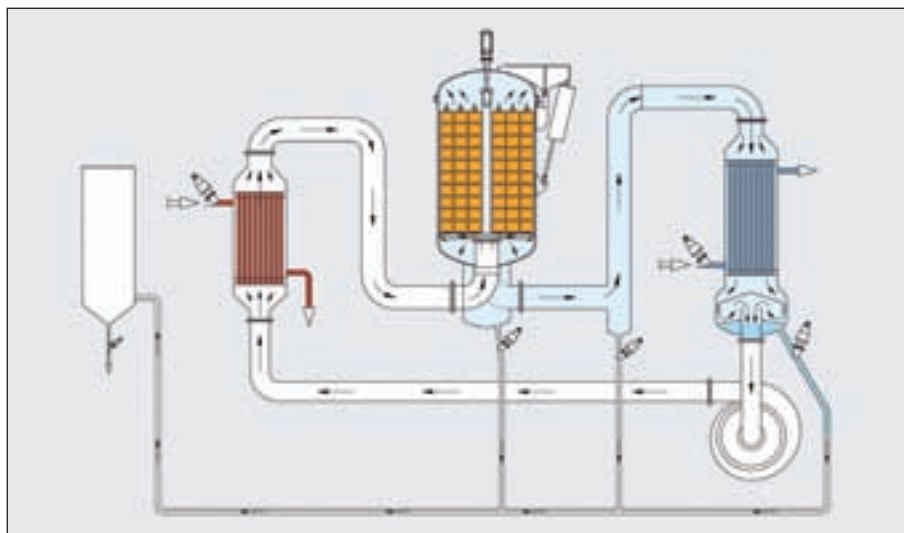
After the drying phase the air heating battery is excluded and air is circulated in outside-to inside direction in order to equalize residual humidity in yarn packages and reduce the temperature of the material.

After preset time duration expires, the autoclave is brought at atmospheric pressure by exhausting compressed air and can be opened for extracting yarn carrier.

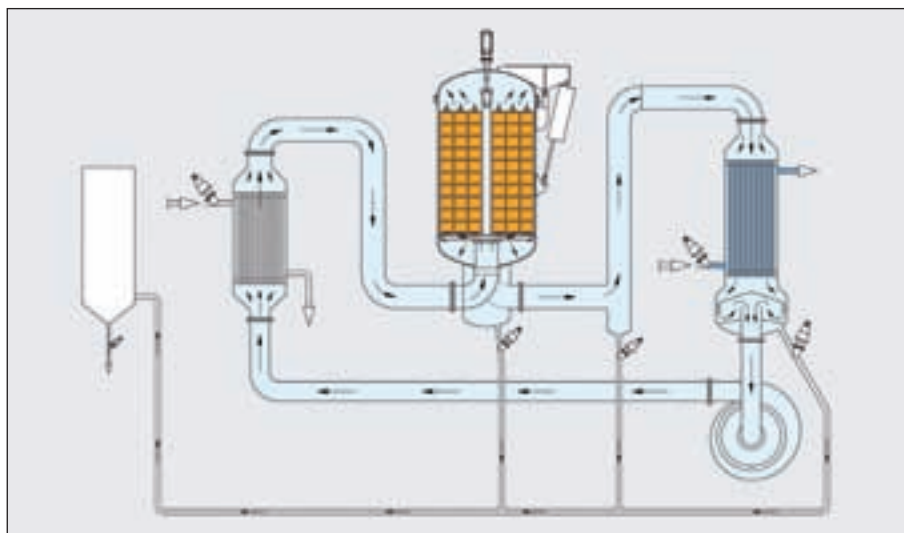
The outstanding productivity of ARSPO and ARSPV dryers is determined by the overall design and in particular by: blower, double-stage water separation, oversized and separate heating and cooling batteries, absence of air valves and head pressure losses.



Hydroextraction
Blower in operation.
Heating and cooling batteries inactive.



Drying
Blower heating and cooling batteries
in operation.



Conditioning
Blower and cooling batteries
in operation.
Heating battery inactive.





TOP-QUALITY DRYING. AUTOMATIC CONTROL OF RESIDUAL MOISTURE.

ARSPO and ARSPV pressure dryers operate efficiently with short processing times during drying at low temperature of:

- White yarns and yarns dyed in pale or brilliant colour shades.
- Yarns dyed with dyestuffs classes subject to migration at high temperature.

Delicate yarns and heat-sensitive yarns can be dried at low temperatures in the range from 80 to 105°C with optimum quality, without yellowing effects and with perfect conservation of physical properties of handle and bulkiness.

Due to closed-cycle operation, drying air in ARSPO-ARSPV pressure dryer remains clean and is not polluted by atmospheric dust.

Absence of air filter avoids cleaning and maintenance requirements. Construction in stainless steel allows for use of acid solutions in final stage after dyeing without problems of chemical corrosion.

AUTOMATIC MOISTURE CONTROL SYSTEM.

The pressure dryer is equipped with a proprietary residual moisture control system, which measures the amount of water drained from the cooling battery and automatically stops the drying cycle when the programmed weight is attained.

The system permits to control the yarn residual moisture accurately and to optimize drying conditions to prevent overdrying.



OVERSIZED HEATING AND COOLING BATTERIES

Loris Bellini pressure dryers are equipped with air heating and cooling batteries specially designed and tested for maximum efficiency in heat transmission.

Oversized pressure rating avoids maintenance problems during long-term operation on 24 hours/day basis and deformation due to continuous heating and cooling phases.

Heat exchangers are subject to three testing operations:

- before assembly welding
- after assembly of each module
- after assembly of complete battery.

Optionally it can be supplied a cleaning liquor collecting and feeding tank in order to perform a periodical washing operation when switching from dark colour shades to white yarn drying.

SPECIAL CENTRIFUGAL AIR BLOWER

The ARSPV dryer is operated by a centrifugal blower completely made of AISI 316 stainless steel and designed for high values of head pressure and airflow delivery.

Motor is installed coaxially to the blower and is of high power factor to limit the power consumption.

The blower is equipped with maintenance-free mechanical seals of radial type.

Blower is not stopped during carrier unloading and loading phase, in order to avoid heavy power consumption, peaks of absorbed power and rapid motor wear connected to intermittent delta-star restarting.



AUTOMATIC OPERATION

The complete drying process is fully automatic. Pressurization, hydroextraction, drying, conditioning and depressurizing phases are all executed **without any operator's interventions**.

ENERGY EFFICIENCY

Loris Bellini pressure dryers are engineered for maximum energy efficiency.

More than 90% of overall energy consumption, as calories consumed in heating fluid and electric power, is recovered as clean hot water to be collected and reused as process water for the dyeing process.



OPERATION IN ROBOTIZED DYEHOUSES

ARSPO and ARSPV pressure dryers are in operation in several fully-robotized yarn package dyeing plants and can be supplied on request with presetting for operation in automated conditions

Host-computer remote control. In order to preset optimum drying conditions for a wide range of yarn packages, fiber types and colour shades. Operation of the drying cycles can be performed by a one-touch digit of program number on the PC of the dryer.

Microprocessor is designed for direct interfacing with central computer or PC for centralized dyehouse management



OPTIONS

Pressure dryers can be supplied with the following optional equipment:

Automatic dryer washing system Tank equipped with high-pressure injection pump, valves and control devices for operating a cleaning cycle when passing from drying dark shades to pale color shades by a solution of water and detergent.

Cleaning products are high-pressure injected with the blower in operation and exhausted through the two-stage water separation systems after a preset time interval. Periodical cleaning avoids yarn pollution and increases drying efficiency.





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