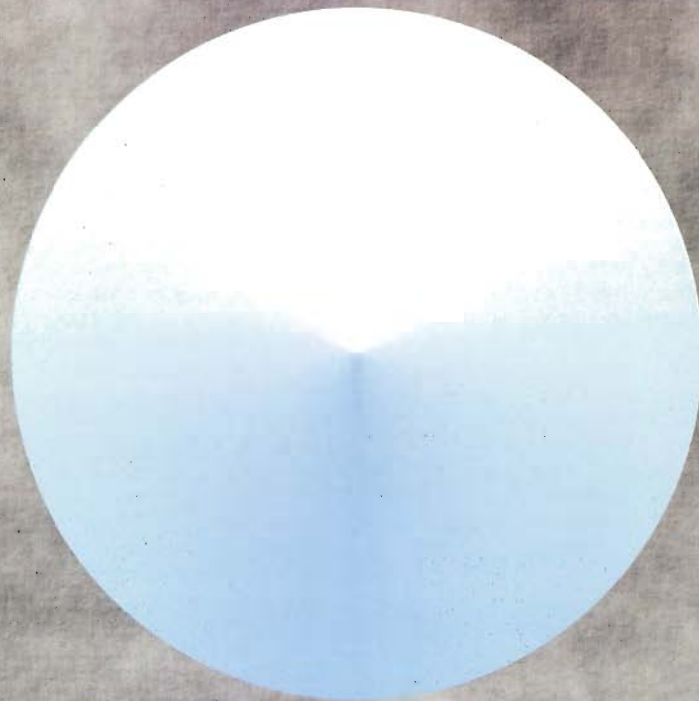


# AQuafix



**YARN  
CONDITIONING  
MACHINES**





## THE NEW AQUAFIX TECHNOLOGY FOR THE CONDITIONING OF YARNS

The continuous push towards higher efficiency in spinning technology has led to a progressive mechanisation of product handling.

The general trend is to link the automatic doffing of the spinning frames to the formation of pallets which are then automatically moved towards the packing and stocking stages.

This achieves maximum efficiency in shipment but could jeopardise product quality if traditional conditioning technology is used.

How **AQuafix** POZZI technology solves the problem.

### Why conditioning

An average count cotton yarn coming from an open-end spinning operation has a typical regain of 4-4,5 % even if the air conditioning in the spinning room has been carefully controlled.

Any plastic filming operation directly performed on the pallets would inevitably freeze this humidity content and thus would prevent any further humidity uptake of the yarn.

As commercial trade rules for cotton fix standard regain at 8,5 %, the spinner will lose money when selling goods with a regain lower than the standard trade allowance.

But regain in textile products is not only a commercial problem; from yarn elasticity to its dyeing behaviour, many a characteristic of the final yarn rely on the correct level of fibre humidity, usability and handle can be spoiled by bad conditioning procedures.

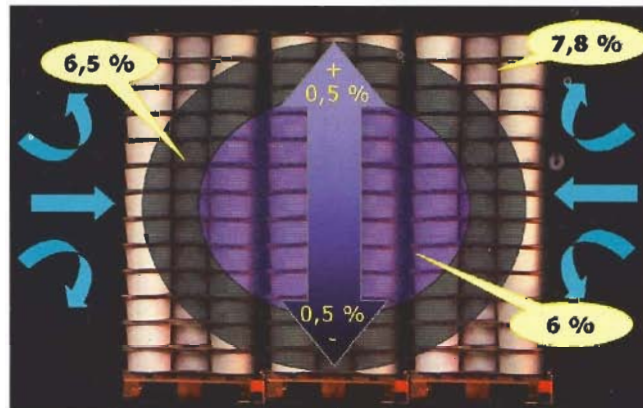
### How it is done now

Conditioning rooms have been designed in the effort to obtain a quicker regain uptake.

The yarn is placed in a sealed room where air, saturated with moisture and micro droplets of water, is circulated. The material slowly absorbs the moisture which is deposited on its surface.

To be really effective the material must remain in the conditioning room for a long time, typically 16 to 36 hours, and the attainable evenness of distribution, even if acceptable, is far from perfect.

## Regain distribution after treatment in conditioning room



This means that the bobbins can not be used directly after the conditioning process but need a long resting time in order to level out moisture differences within themselves. Furthermore as the humidity is deposited selectively onto the outer layers of the cones in the form of micro droplets of water, this spots of high water concentration can trigger a biochemical reaction which can degrade the quality of the yarn.

But probably the worst problem is due to the differences of humidity content from cone to cone which remain after conditioning.

This defect is gaining importance with the widespread use of pallets. The free circulation of air around the bobbins is very important as water is conveyed by the humid air flow. The palletised structure is therefore incompatible with good conditioning in a saturated air room as the innermost cones will be at least partially shielded from the air flow by the outer ones.

### What we propose

The only effective solution to the problem is to add moisture using a different conveying mean for water: saturated steam.

The new "on line" conditioning system by POZZI is based on the technology of saturated steam humidity addition.

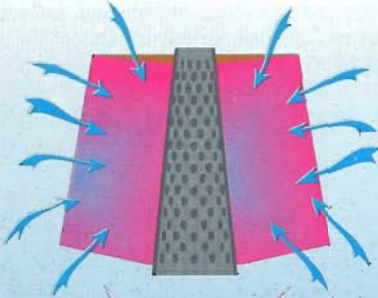
CONDITIONING ROOM	AQuafix TECHNOLOGY
Large floor space occupation: high hidden costs.	Limited ground floor occupation: high productivity per square meter.
Lengthy cycle time: typically 16 hours.	Very short cycle time: typically 40 min.
Uneven distribution of moisture.	Perfect treatment uniformity.
Uncertain control of the result during the operation.	Perfectly tuneable results.
Does not improve the quality of the product.	Improves quality: effective fixing of the yarn and increased strength are uniformly attainable.
Water reaches the yarn in the form of micro drops.	Water penetrates the yarn in the form of steam.
Scarcely compatible with pallets technology.	Perfectly compatible with pallets technology.
Costing operation of creel loading / unloading.	No need for special supports.
Unusable with boxed material.	Compatible with boxed material.



## HOW IT WORKS



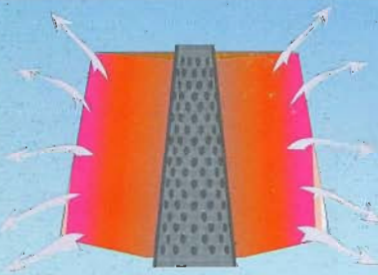
After spinning the bobbin has a natural regain. It is necessary to increase its water content in order to re-establish the original characteristics of fibres. Uniform distribution of humidity is a must: spot wetting can lead to defects in the following dyeing operations.



The material is heated by the condensation of water on the fibres. In traditional autoclaves the diffusion of steam inside the bobbin is counteracted by the presence of residual air trapped inside the packages.



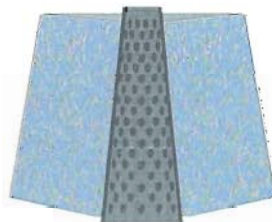
Diffusion of steam inside the bobbins is guaranteed to be absolutely uniform by the **AQuafix** process: the procedure allows steam to fully penetrate the mass of material.



After the steaming operation the bobbin gains a high humidity content but must then lose part of its water content to cool down to ambient temperature.



The **AQuafix** technology allows this to happen by evaporating the water contained in the outermost strata of the bobbin. In the same time the excess humidity of the innermost portion of the bobbin is transferred towards the colder outer layers.



Once the humidity is fixed to the fibre by absorption, the cooling of the cone continues only through thermal conduction of the boundary layer interface between bobbin surface and air. Absorption and re-evaporation balance themselves in creating a new, higher regain, equilibrium condition.





Saturated steam at low temperature is in fact water which is ready to condense over any mass which comes in contact with it.

To be effective it must be produced in an autoclave which has been designed to permit total penetration of the steam inside the cones.

The **AQuafix** technology guarantees that the conditioning machine produces an environment in which saturated steam behaves like a perfect gas.

The vacuum in the autoclave must be such as to avoid air bubbles to be trapped inside the bobbins and the overall construction must be able to avoid the splashing of water drops on the surface of the product: a defect which could impair the quality of the material.

The bobbins are heated by the condensing action of the steam onto the fibres and this naturally results in the addition of a little quantity of water which is perfectly distributed over the total mass of the material.

A final procedure followed after the condensation phase fixes the maximum water addition into the material.

The weight increase at the end of the process can vary from 2 to 4 % according to the machine parameters.

The uniformity of the treatment is important as avoiding high moisture concentration spots in selected parts of the bobbins is necessary to avoid bio-activation of moulds in the cotton.

In the following table few comparative considerations between traditional and **AQuafix** technologies are listed. In the modern trend towards palletisation the advantages of automated handling are better achieved by the

## CONDITIONING A YARN

- ✓ Increases yarn elasticity.
- ✓ Increases stability of the yarn.
- ✓ Lowers breakages.
- ✓ Reduces dust during production.
- ✓ Reduces electrostatic charges during production.

**AQuafix** technology as automatic loading/unloading of conditioning room can become an economic nuisance. The correct importance has to be given to the fact that the **AQuafix** technology induces the absorption of water by the fibres and doesn't limit itself to deposit water on the surface of the bobbin.

Absorption rebuilds the molecular bonds of cellulose with water and re-establishes the perfect physical equilibrium of the fibres.

**AQuafix** is an effective tool in controlling the quality of the spun product as it yields a natural mechanical elasticity increase together with an higher abrasion resistance of the cotton.

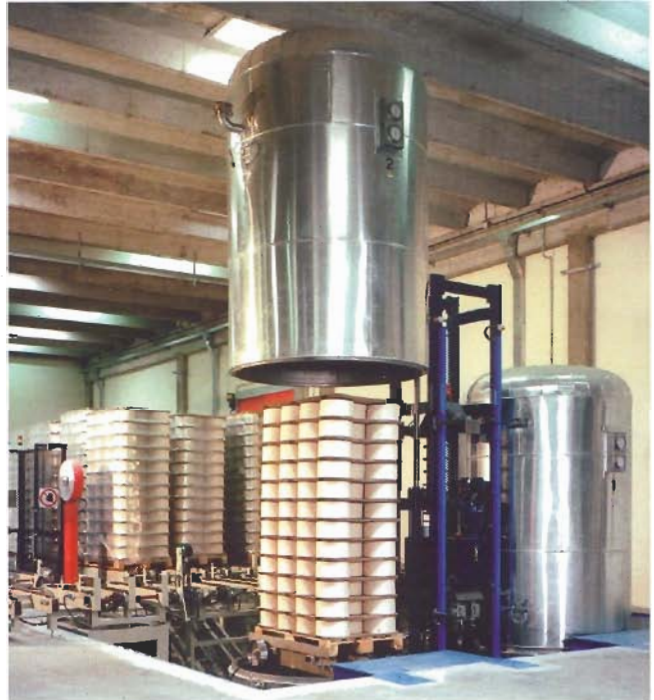
This two combined effects dramatically reduce dust in the following operations.

Conductivity of the fibre is increased and thus electrostatic charges are eliminated.

The net overall result is a reduction of yarn breakage in the looms.

POZZI can supply machines to implement the **AQuafix** process using three different design options:

Vertical **AQuafix BR C**: with cylindrical design for treating high pallets: both in single or twin versions this is the preferred conditioning solution where productions of a



AQuafix BRC

maximum of 15000 kg a day are to be produced in the form of pallets.

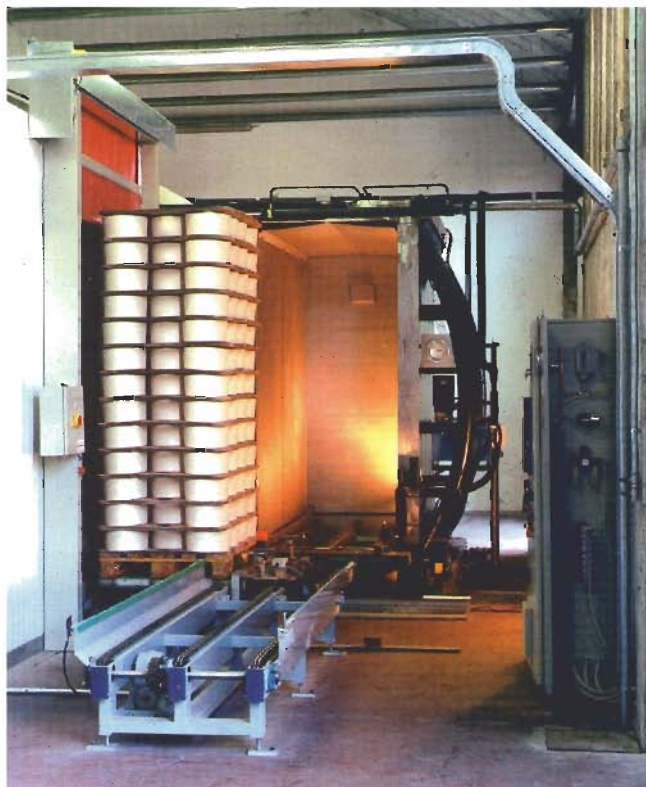
There is no practical limitation of pallet height (13 strata can easily be treated) as far as the building permits the total lift of the vacuum bells.

The machine is easily integrated with the pallet handling automation: the PLC control is designed for easy interface and programmability.



AQuafix BR





AQuafix BRQ

Horizontal **AQuafix BR**: autoclave for treating boxed bobbins or creels.

When the height of the load is limited to 6 or 7 strata of cones or the load is made up of cardboard boxes or carts, the most efficient form of machine is the horizontal one. The material can be tunnelled through the machine or fed on one door only

**Cube AQuafix BR Q**: designed to treat large productions of extra high pallets.

This is an original POZZI innovation which has been met by enthusiastic market reactions: enclosing a full pallet in a cylinder widthways certainly is not a bright solution to the problem of treating large quantities of material. To process more than a pallet at once there is no better way than lining them up in a box the same size as the load.

This new machine offers tremendous improvements over competitive solutions:

Production wise: the modular cube form of the machine allows the loading of up to five pallets at a time at full height this can amount to around 3500 kgs. of material produced in each run which takes about an hour. The total production of a single machine is therefore sufficient to satisfy the need of the most demanding application.

Space wise: a cube to receive a pallet has obviously the smallest possible footprint thinkable. Total space taken up by the system is roughly the same of a conveyor belt holding the same load. Important savings in building costs and floor space requirements are directly achieved.

Energy wise: the actual treating chamber is made of a thin layer of stainless steel while the resisting structure is an exoskeleton of steel which works on the same principle of

a suspended bridge structure.

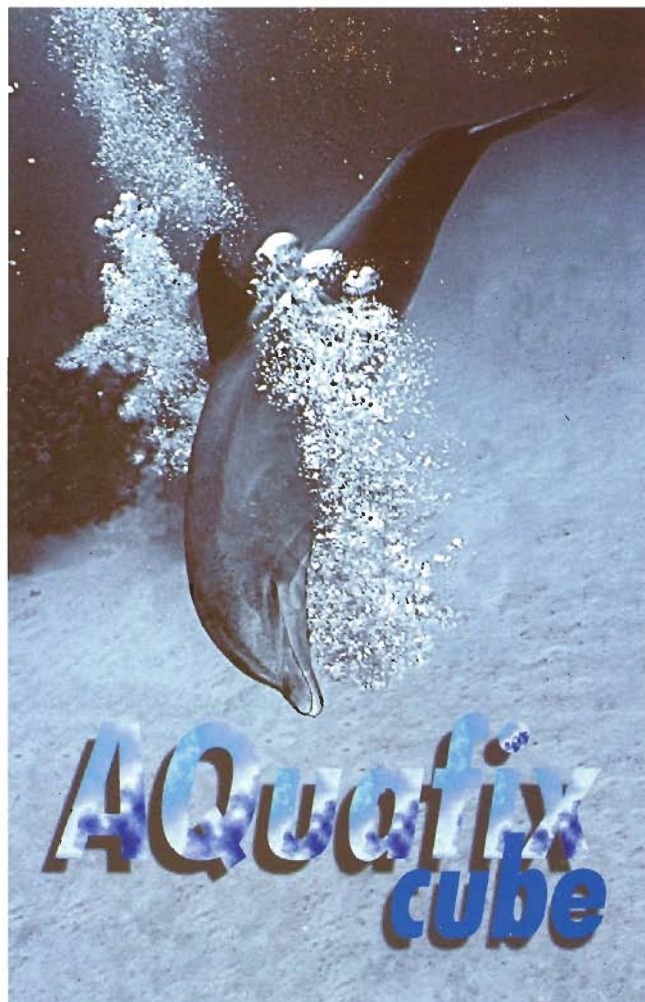
The heated portion of the machine is the chamber itself only: no thermal dispersion occurs on the resisting structure.

The ability of the machine to recover the sensible heat of the water needed to produce conditioning effect further reduces the cost of the operation.

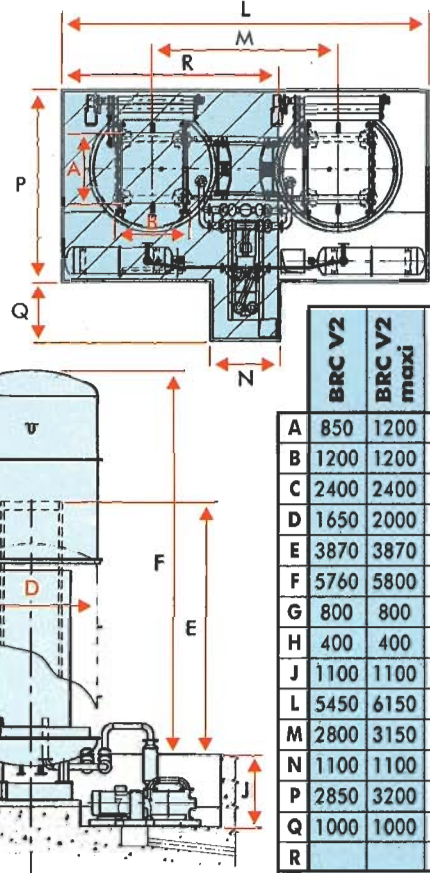
Installation wise: the space requirement for this machine is minimum; automation of machine is simple and straightforward.

Pallets can be moved as on a simple conveyor without the need of sticking or translating devices which could dramatically increase the hidden costs of the installation. Cost effectiveness: the combination of the aforesaid points, leads to a small total cost of ownership which results in a reduced cost per kilo coupled to a large improvement in the quality of product.

The **AQuafix** machines can be mounted in series to increase the total quantity of humidity deposition by adopting a cyclic conditioning strategy.

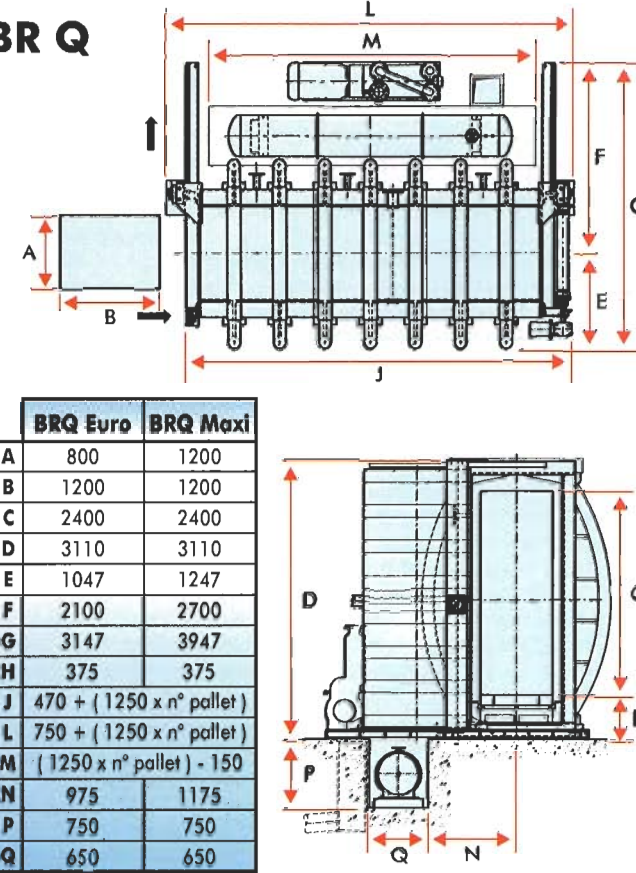


### BR C



	BR C V2	BR C V2 maxi	BR C V1	BR C V1 maxi
A	850	1200	850	1200
B	1200	1200	1200	1200
C	2400	2400	2400	2400
D	1650	2000	1650	2000
E	3870	3870	3870	3870
F	5760	5800	5760	5800
G	800	800	800	800
H	400	400	400	400
J	1100	1100	1100	1100
L	5450	6150		
M	2800	3150		
N	1100	1100	1100	1100
P	2850	3200	2850	3200
Q	1000	1000	1000	1000
R			3300	3650

### BR Q

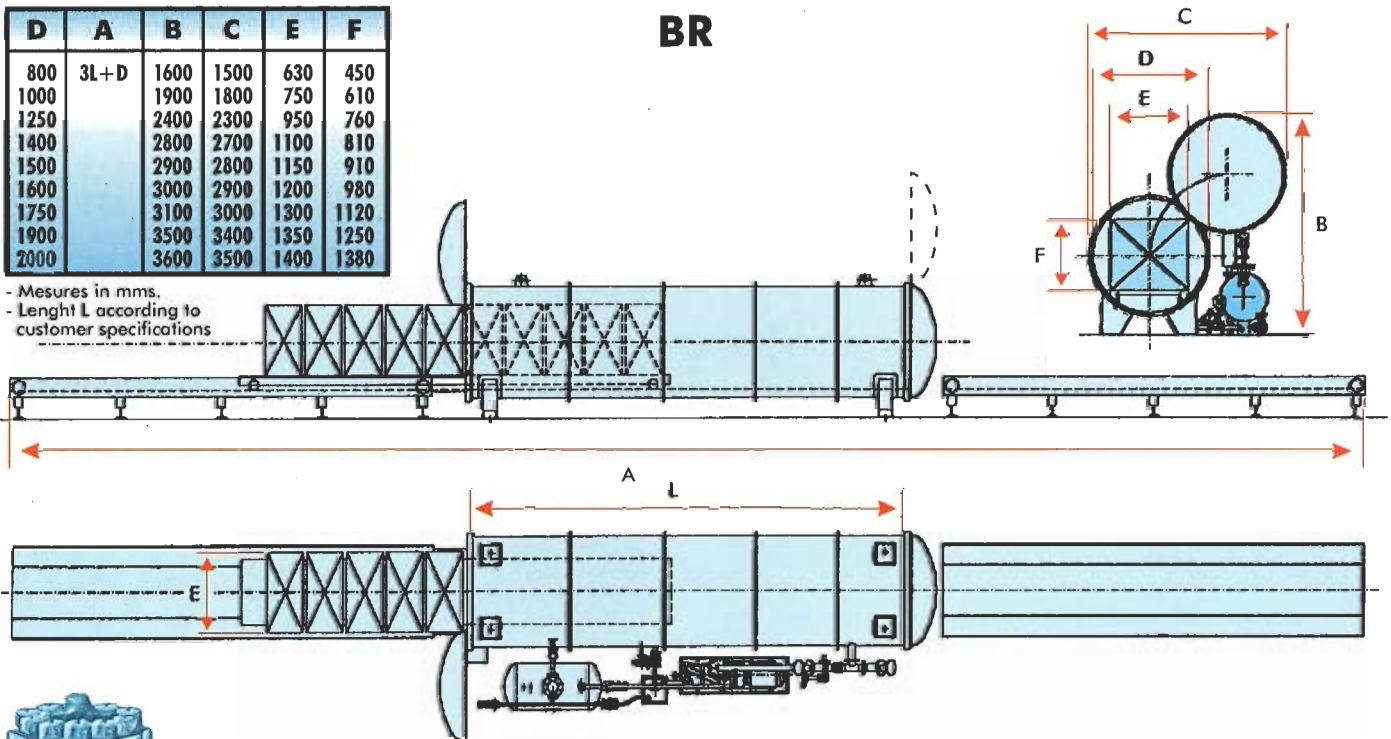


	BRQ Euro	BRQ Maxi
A	800	1200
B	1200	1200
C	2400	2400
D	3110	3110
E	1047	1247
F	2100	2700
G	3147	3947
H	375	375
J	470 + (1250 x n° pallet)	
L	750 + (1250 x n° pallet)	
M	(1250 x n° pallet) - 150	
N	975	1175
P	750	750
Q	650	650

D	A	B	C	E	F
800	3L+D	1600	1500	630	450
1000		1900	1800	750	610
1250		2400	2300	950	760
1400		2800	2700	1100	810
1500		2900	2800	1150	910
1600		3000	2900	1200	980
1750		3100	3000	1300	1120
1900		3500	3400	1350	1250
2000		3600	3500	1400	1380

- Mesures in mms.  
- Length L according to customer specifications

### BR




## DYEING MACHINES AND HEAT RECOVERY SYSTEMS