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MENS

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SALUS

NEGOTIA

FROM TEXTILE CHEMISTRY TO FASHION:
MULTIFUNCTIONALITY, SUSTAINABILITY, COMPETITIVITY

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INTERNATIONAL CONGRESS
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WITH THE SUPPORT OF THE PRESIDENT OF ITALIAN REPUBLIC



**INNOVATION,
FLEXIBILITY AND
SAVINGS, FOR A
SUSTAINABLE
COMPETITIVITY IN
THE YARN DYEING.**



Innovation, flexibility and savings for a sustainable competitiveness in the yarn dyeing.

A necessary premise:

Dyeing Processes are currently based on

- Powder or liquid **conventional dyestuffs**
- **Water** as processing fluid vehicle

No realistic alternatives seem to be available and ready to be industrialised.

On the other hand, eco-friendly culture is (or, anyway, is coming) a must.

All Machinery Manufacturers efforts can then be, in the short period, “just” oriented in eco-eco optimisations:

- Cost wise : **SAVING AND RECOVERY**
 - Water, electric power, thermal power.
- Environment wise : **LOW IMPACT PROCESSES**
 - Air and water pollution.
- Market wise : **FLEXIBILITY**
 - Type of fibre
 - Batch-size



Innovation, flexibility and savings for a sustainable competitiveness in the yarn dyeing.



Processing costs reduction in Yarn Dyeing.

Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" packages)

About 2 hours	About 2 hours	?? Hours, for good fastness
Pretreatment	Dyeing	Washing-Soaping-Rinsing
"Chemical" time. Due to -Substrate -Chemical system.	"Chemical" time. Due to dyestuffs.	"Physical" time. Also due to machine efficiency.
Almost fixed.	Almost fixed.	Widely Variable.
About 20% of total water and energy	About 10% of total water and energy	About 70% of total water and energy



Processing costs reduction in Yarn Dyeing.

Dyeing machine efficiency:

**Exclusive Helico-Centrifugal pump
with shockless incorporated reversing system:**

Optimized flow-rate/headpressure module

=

Intensive exchange dyeing-rinsing liquor / material

+

Material preservation and material flexibility



Exclusive PULSE RINSING system:

Optimized saturation rinsing

=

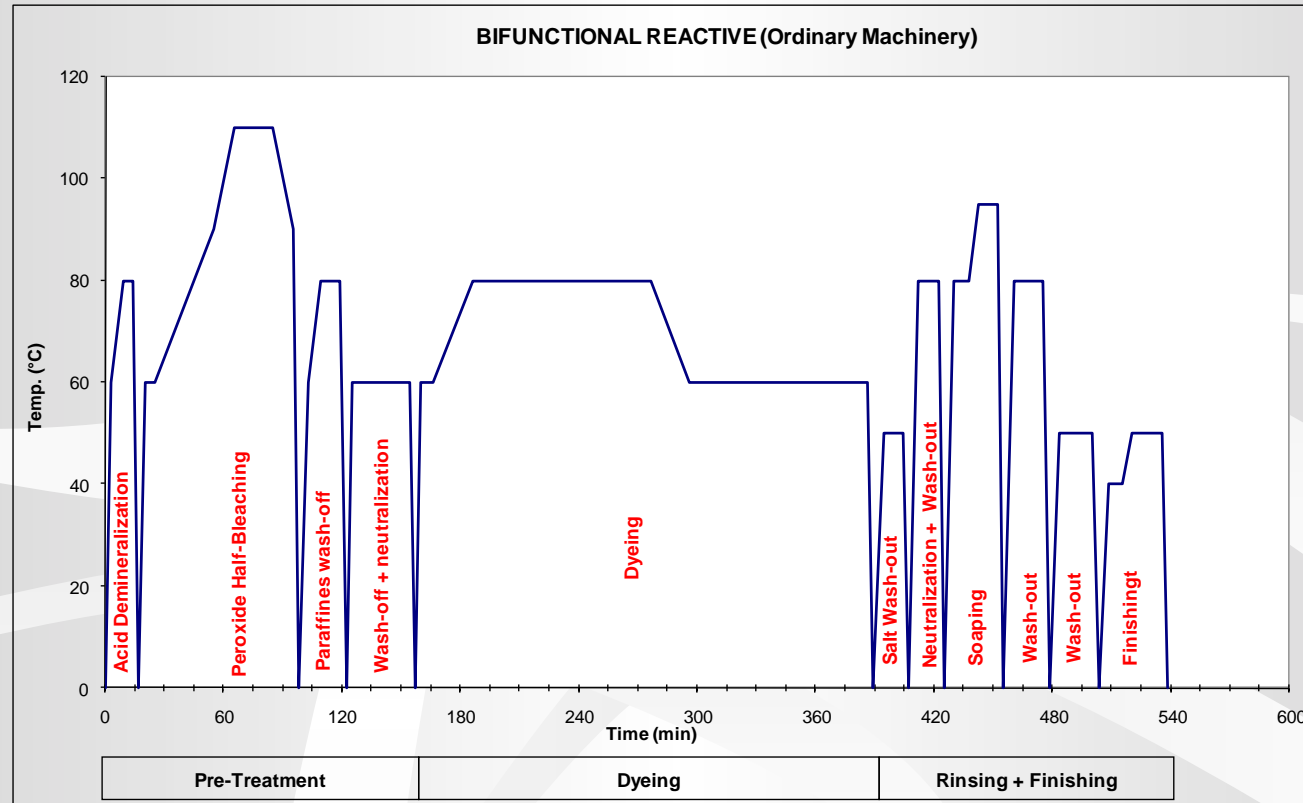
High-efficiency wash-out and soaping

+

Water and energy (kW and Steam) savings.



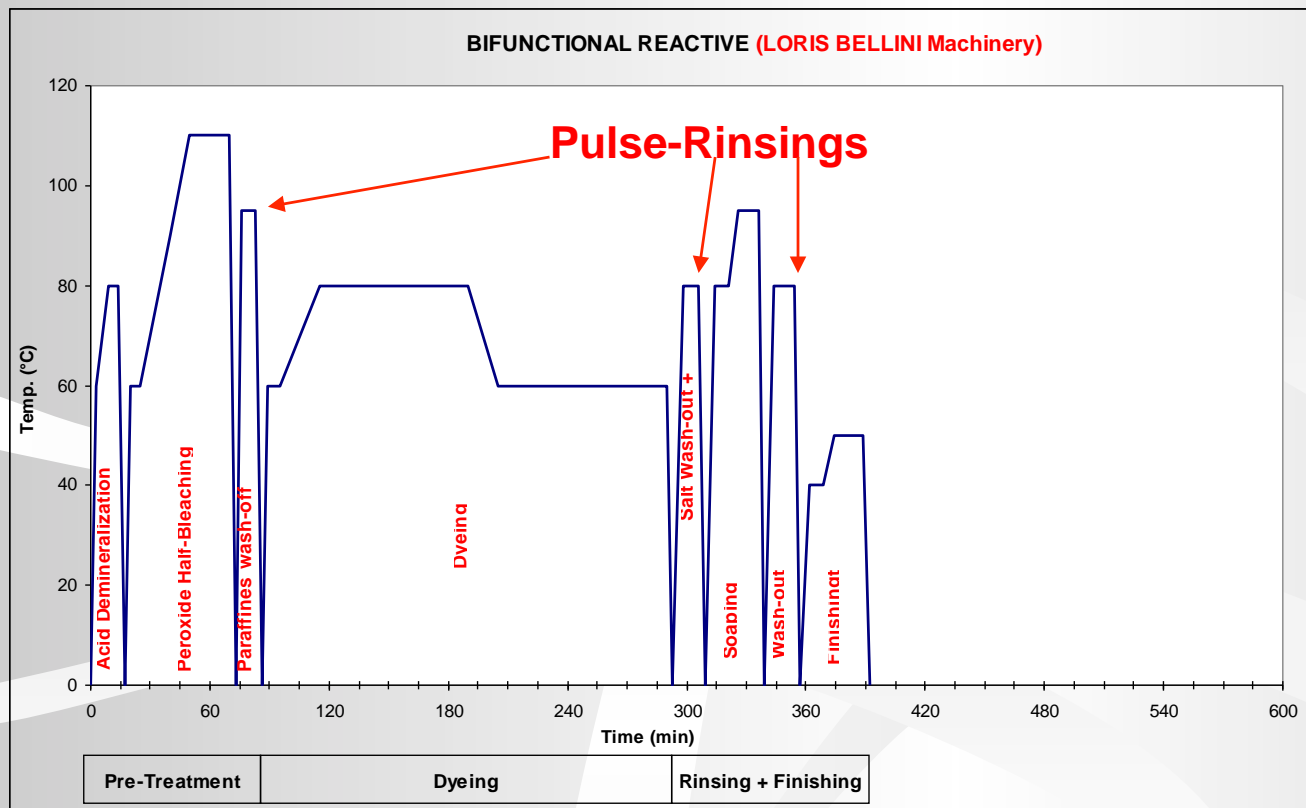
Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" pack.)



Capacity (kg yarn)	Water (lt/kg of yarn)	Electric energy (kWh/kg of yarn)	Steam (kg of Steam/kg of yarn)	Compressed Air (NI/kg of yarn)
640,0	54,06	0,62	9,27	32,23



Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" pack.)



Quality data:

dE in/out < 0,3

Fastness:

Washing ISO105/C06

Water ISO 105/E01

according to dyes suppliers specifications.

Rewinding:

Speed = 1.100 m/min'

Knots = < 1 knot/cone

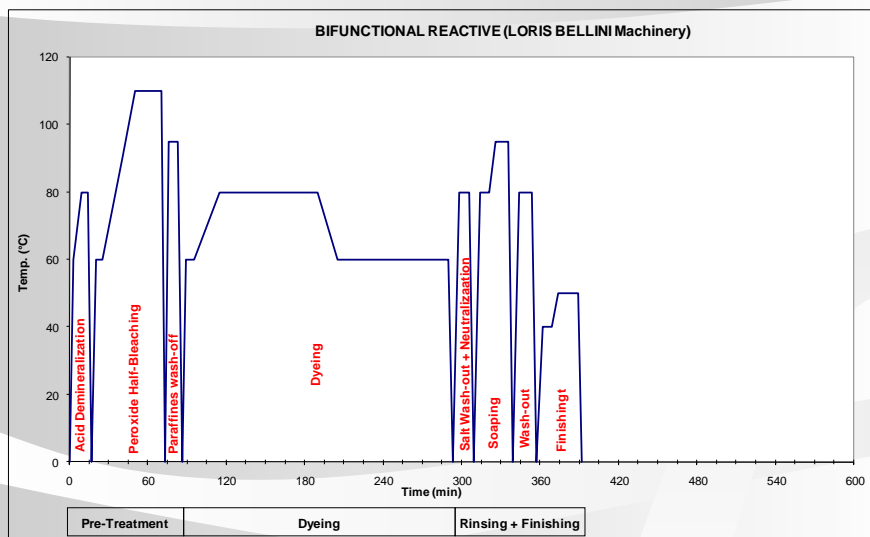
Hairiness:

Lower (only visual evaluation)

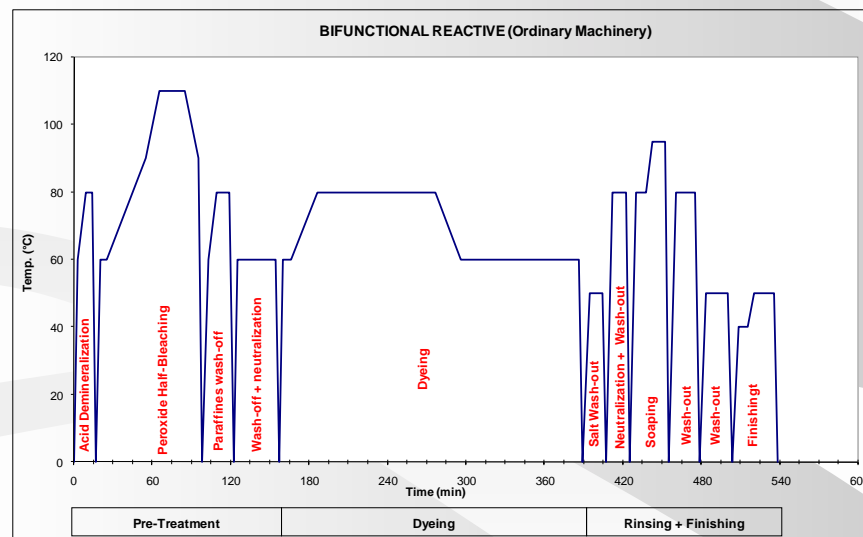
Capacity (kg yarn)	Water (lt/kg of yarn)	Electric energy (kWh/kg of yarn)	Steam (kg of Steam/kg of yarn)	Compressed Air (NI/kg of yarn)
640,0	40,00	0,45	7,26	23,44



Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" pack.)



LORIS BELLINI



ORDINARY

MACHINE	Capacity (kg yarn)	Water (lt/kg of yarn)	Electric energy (kWh/kg of yarn)	Steam (kg of Steam/kg of yarn)	Compressed Air (NI/kg of yarn)
LORIS BELLINI	640,0	40,04	0,45	7,26	23,44
ORDINARY	640,0	54,06	0,62	9,27	32,23
SAVINGS		14,02	0,17	2,01	8,79
%		25,9%	27,4%	21,7%	27,3%



Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" pack.)

ECO-ECO

ECONOMICS:

1 x 640 Kg Machine	LORIS BELLINI	ORDINARY	UTILITIES COSTS (Northern Italy)			
			PROCESSING TIME H	6,5	8,9	Process water
BATCHES / 24 H	3,7	2,7	Electric Power	€/kWh	0,13	
DAILY CAPACITY	2.363,08	1.725,84	36,92%	Steam	€/Kg	0,032
				Compressed air	€/N-lt	0,011

MACHINE	Capacity (kg yarn)	Water		Electric energy		Steam		TOTAL/Kg (€/kg)	TOTAL YEAR (€/YEAR (250 d/Y))
		(lt/kg)	(€/kg)	(kWh/kg)	(€/kg)	(kg/kg)	(€/kg)		
LORIS BELLINI	640,0	40,04	0,078	0,45	0,059	7,26	0,232	0,369	217.921,77
ORDINARY	640,0	54,06	0,105	0,64	0,083	9,27	0,297	0,485	209.369,31



Reactive Dyeing on Ne 80/2 Cotton Package Dyeing (1,8 Kg x 6" pack.)

ECO-ECO

ECOLOGY:

1 x 640 Kg Machine	LORIS BELLINI	ORDINARY
PROCESSING TIME H	6,5	8,9
BATCHES / 24 H	3,7	2,7
DAILY CAPACITY	2.363,08	1.725,84

MACHINE	(lt/kg)	WATER SAVED m3/year	(kWh/kg)	SAVED Kg CO2/y	(kg/kg)	CO2 SAVED Kg/y	
LORIS BELLINI	40,04		0,45		7,26		
ORDINARY	54,06		0,64		9,27		
SAVINGS	14,02	4.839,30	0,19	37.381,69	2,01	119.873,32	157.255,01

Base:

1 Nm³ CH₄ = 1,90 Kg CO₂

1 kWh_{el} = 0,57 Kg CO₂

Source: US-EPA 2009



Ne 80/2 Cotton Package Drying (1,1 - 1,8 Kg x 6" pack.)



Ne 80/2 Cotton Package Drying (1,8 Kg x 6" pack.)

ARSPO-ARSPV Rapid pressure Dryer

Energy supplied (KW) = 100%

Hydroextractor + RF-Dryer

Energy supplied (KW) = 100%

Wet Cotton yarns



Dry Cotton yarns

Hot and not conditioned

Cool and conditioned

Energy Recovered (KW) = 0%

Energy Recovered (KW to Kcal) = 90%



Ne 60/2 Cotton Package Drying (1,1 Kg x 6" pack.)

DATA FILE	CLIENTE	FIBRA	COLORE	ROCCA		CARICA	TEMPERATURA	TEMPO	UMIDITA'	EE	VAPORE	H2O CALDA		REUPERO
				Tipo	Peso	asciugata	ASCIUGAMENTO	impiegato	RESIDUA	consumo	consumo	prodotta	temp.	ENERGIA
					kg	kg	°c	min	%	kWh/kg	kg/kg	l/kg	°C	%
08/11/2008	TOSI	Cotone	Reattivo	CIL 6"	1,1	260	115 - 110	53	0	0,39	1,09	19,62	67	85
13/12/2009	TOSI	Cotone	Reattivo	CIL 6"	1,1	264	120 - 110	55	-1,14	0,40	1,67	19,68	67	90
13/12/2008	TOSI	Cotone	Reattivo	CIL 6"	1,1	264	120 - 110	40	14,17	0,24	1,03	13,62	64	96
05/12/2008	TOSI	Cotone	Reattivo	CIL 6"	1,1	520	115 - 110	77	0	0,31	1,84	23,08	58	87
10/01/2008	TOSI	Cotone	Reattivo	CIL 6"	1,1	528	115 - 110	90	6,1	0,35	1,67	20,81	63	90

Organzine Silk Package Drying (0,6 Kg x 8" pack.)

Filato conservazione rocca OK trama purga + tintura		Rocca	Greggia	Bagnata	Asciugata		PMapp.		Rocc./PM	Rocc./app	Carica/pp	H2O da togliere												
		Tubetto Cil 8"	Peso Kg 0,577	Peso Kg	%	Peso Kg	%	N° 2	N° 176	N° 352	kg 203,10	kg												
FASE	Durata fase	Circolazione	Pressione statica	Temp. Set riscaldat	Temp. Set condens	Aria Tout riscaldat	Aria Tout filato	Aria Tout condens	H2O estratta	Inverter frequenza out	Potenza motore	Dp ventilatore	Dp riscaldatore	Dp filato	Dp condensatore	Vapore	H2O raffreddamento	H2O Temp. IN	H2O Temp. OUT					
	min		Bar	°C	°C	°C	°C	°C	Kg	Hz	kW (132)	mmH2O	mmH2O	mmH2O	mmH2O	Kg/h	litri	°C	°C					
			Bar	°C	°C				Kg		kWh					Kg	litri	°C	°C					
Stizzatura		E/I																						
Stizzatura	15	E/I	4,3	0	50	43,0	140	51	20,5	3.633	43	1.992	1.538											
Asciugamento		E/I																						
Asciugamento	29	E/I	4,3	95	50	95,0	75,0	43,0	123	51	40,1	3.531	249	1.890	1.377	242	4.400	10,0	53,0					
Asciugamento		I/E																						
Asciugamento	36	I/E	4,3	85	50	85,0	80,6	42,0	86	51	51,0	3.531	234	1.802	1.421	236	4.700	10,0	52,0					
Asciugamento		I/E				85,0																		
Asciugamento	6	I/E	4,3	0	50	51,0	51,4	37,5	3	42	4,7	2.637	87	1.318	1.157		500	10,0	52,0					
Asciugamento																								
									Totale 352															
									Afreddo IH2O/kg 0,69		EE kWh 116,3					EnergiaTermica/ciclo kgvap kWh 478,6 306	H2O litriH2O 9.600	ETrecup. kWh % 413 97,8						
									Acaldo IH2O/kg 1,03		EE/kgfilo kWh/kg 0,57					EnergiaTermica /kg kgvap/kWh/kg 2,36 1,51	IH2O/kg 47,27	ETrecup./kg kWh/kh % 2,03 97,8						
									Totale IH2O/kg 1,72															



We thank for the kind cooperation:

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