INSIDEWELKER
About Technology, Know-How & More by C. Koch

HOW TO CORRECTLY USE SATURATED STEAM

Vacuum %	Pressure millibar	Temperature °C
98,00	20,00	17,51
97,50	25,00	21,09
97,00	30,00	24,10
96,50	35,00	26,69
96,00	40,00	28,98
95,00	50,00	32,90
94,00	60,00	36,18
93,00	70,00	39,03
92,00	80,00	41,54
91,00	90,00	43,79
90,00	100,00	45,84
89,00	110,00	47,71
88,00	120,00	49,45
87,00	130,00	51,06
86,00	140,00	52,58
85,00	150,00	54,00
84,00	160,00	55,34
83,00	170,00	56,63
82,00	180,00	57,83
81,00	190,00	58,99
80,00	200,00	60,09
78,00	220,00	62,17
76,00	240,00	64,09
74,00	260,00	65,88
72,00	280,00	67,55
70,00	300,00	69,13
68,00	320,00	70,62
66,00	340,00	72,03
64,00	360,00	73,38
62,00	380,00	74,66
60,00	400,00	75,89
58,00	420,00	77,07
56,00	440,00	78,20
54,00	460,00	79,29
52,00	480,00	80,33
50,00	500,00	81,35
45,00	550,00	83,74
40,00	600,00	85,96
35,00	650,00	88,02
30,00	700,00	89,96
25,00	750,00	91,78
20,00	800,00	93,51
15,00	850,00	95,15
5,00	950,00	98,20
0,00	1000,00	99,63

SATURATED STEAM

By physical definition saturated steam is, in contrast to superheated steam, steam that is in equilibrium with heated water at the same pressure. If saturated steam is reduced in temperature (whilst retaining its pressure) it will condense to produce water droplets.

UTILISATION IN CONDITIONING

The conditioning machine works with vacuum pump (s) to reduce the pressure sucking the air out. Once the final vacuum level is achieved, the introduction of water with any higher temperature than the equilibrium temperature will transform immediately into saturated steam.

MISSING THE SATURATION POINT

The relation between vacuum, saturation point and the temperature to allow saturation are largely underestimated. If, for instance, a conditioning temperature of 55,0°C is to be applied to the goods, a minimum vacuum of 84°C has to be achieved by the vacuum pumps.

Often, due to wear, vacuum pumps have a lower performance and plants suppose they are conditioning, but in reality they are just heating up the yarns without deeper penetration of steam.

RISK OF BARRÉ EFFECT

In textiles, different degrees of humidity in textiles can have heavy influence in the dyestuff absorption or tension in weaving beams or other similar effects. Therefore, it should be ensured that conditioning is really made from the outer to the inner layers of the yarn bobbins. Uneven humidity can cause shadows on surface, the so called Barré Effect.

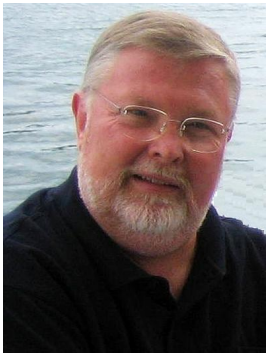
MEASURES TO AVOID BARRÉ

To make sure that BARRÉ does not happen, the observation of the saturation point inside the machine is most important.

First, to avoid any trouble, we recommend to strictly keep vacuum over 90% when starting the steaming procedure.

Second, if bobbin diameters are over 250 mm and weights over 2,60 kg, we recommend to use two cycles of vacuum (fractioned vacuum). With the additional vacuum it is proven that bigger bobbins have a much better distribution of moisture.

Third, steam exposure time should be increased but never less than 45 minutes. Hence, often plants are under production pressure and reduce the total time the yarns are exposed to saturated steam. This increases the risk of less absorption at the center of the bobbins and may cause a complaint.



Claus Koch, president and CEO of the WELKER GROUP is a textile and mechanic engineer with a textile life in all continents since more than 40 years. Having worked for renowned spinning machinery makers in South America and Europe as head of sales and technology, he made a career as CEO of a large German Industrial Group. In 2001 with a management buy in, he took over control of the WELKER GROUP which he streamlined and turned around. With various patents he re- engineered products and processes making of WELKER one of the market leaders in the field of conditioning and steam heat-setting. INSIDE is published aiming to inform the interested public about technological aspects and details of the technology in which we detain our expertise.

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