

Top Ironing Efficiency by Right Clothing

Speaking of improvement of the ironing process, two objectives must be taken in consideration:

- Reach a high ironing efficiency (output in kg/h or m²/h).
- Obtain a satisfactory ironing quality.

Up to now it was difficult to make an objective judgement about ironing quality although some indications are available. However investigations about correlations which permit a progressive classification are still missing. Our investigations were based on visual judgments eliminating such processes which gave unsatisfactory effects. When bed surfaces and clothing were in perfect condition, the ironing effect as secondary result was generally good insofar the linen was completely dry.

The efficiency of the ironer is, opposite to the quality easily measurable on a physical way if the test conditions are kept constant (e.g. the kind of textile and the moisture of the linen). The output of the ironer is obtained by the capacity of evaporation which depends of the heat transmission. The heat transmission is calculated by the following formula:

$$Q = k.F.\Delta t$$

Δt : temperature difference (°C)

k : heat transmission coefficient (kcal/m².°C.h)

F : surface of contact (m²)

The heat-flow depends on following factors :

1. The difference of temperature between the bed and the linen. Between 100° and 250°C the ironing output increases practically on a linear way with the temperature of the bed surface. Applying higher temperatures is limited by a possible deterioration of the fibres as soon as the textile is completely dry. As long as moisture is still present, the temperature, as it is known, doesn't rise above 100°C. At the end of the drying it is nevertheless possible that over-drying takes place at such parts which are more intimately in contact with the bed surface. The condition to admit the application of higher temperatures is to feed the ironer with similar linen, at an appropriated speed and with an even ironing pressure.

2. The heat transmission coefficient k which depends on the sort and the texture of the textiles, the conditioning of the textiles, the condition of the bed surface and the ironing pressure. The first factors depending on the linen, the condition of the bed surface (regular maintenance) and the ironing pressure are determined by the laundry. Tests made in the past which were confirmed now, show however that the variation of the k in relation with the ironing pressure is very important in the beginning (according to the sort of textile between 40 and 80 mbar (g/cm^2) but decreases gradually and finally trends to a limit which is only 10-15% higher. There is also a little improvement of the glossy effect above 80 mbar but the required power increases considerably.

3. The surface of the contact depends, as already said, on the "filling" of the bed by the roll which is covered with the linen. This filling according to the ironer construction is in fact dependable on the roll clothing which must be able to fulfil a series of requirements.

The task of the roller clothing consists in assuring following effects:

3.1. Even pressing on the heated bed of the fabrics which must be ironed to ensure the best contact which results in a maximum heat transmission.

3.2. Far-reaching compensation of thickness differences of linen with variable thickness (seams, buttons, multiple plies). The clothing must be elastic enough to avoid a loss of pressure resulting in a poor contact in the surrounding of the asperities. Insufficient drying and wrinkles are the consequences.

3.3. The linen must be carried through the bed by friction hence the surface of the clothing must be raw enough to surpass the friction between the bed and the linen. Consequently the clothing must be strong enough to take up the friction forces and transmit them to the roll.

3.4. The clothing must give free passage to the vapours.

3.5. The clothing must be thermo-stable. This requirement is nowadays only a small problem since special polyester and polyamide (Nomex ®) are used. These properties must be kept in good condition during the entire time the clothing is used.

These requirements are also valuable for press-clothing; in this case they are more severe because the surface of contact is bended and not flexible. A slight diminishing of the clothing thickness hence of the roll-radius results in a diminishing of the contact-angle or the contact-surface and thus reduces the output of the ironer.

This effect increases when the angle of contact becomes larger and when the thickness of the fabric gets smaller. So the stability of the clothing is very important; the efficiency of the ironer depends on it.

Only a good elastic material can reach all these requirements.

SPRINGPRESS does return to its initial state after compression and releasing regardless the pressure, time and frequency.

As the ironing performance is in fact determined by the clothing thickness, this factor is the most important.

The other requirements are complementary in relation with the performance:

- elasticity
- pressure repartition over length and width of the ironer
- heat transmission from bed to linen
- permeability of padding
- changes in friction relations.

3.6. Permeability of padding has to be in a range of 0.2 to 0.3 litres per minute per square centimetre. If the vacuum is too strong the padded roll cools down.

If the vacuum is too weak, the padding stays wet.

3.7. Chest and roll sizes have to be designed in such a way that it is possible to keep the contact constant.

First of all we have to keep in mind that the chest will not react in the same way if steam or oil heated.

An 800 mm chest will expand to 804 mm under steam pressure. The same chest will only expand to 801 mm if oil heated at 200°C and of course if well insulated. As an example we consider an 800 mm chest at 10 bar steam, said 804 mm, the roll has been lathed to 774 mm we would use 11 mm springs and two turns of needlefelt 900 g/m² (2 mm per turn).

The sum will be: 774 mm + 22 mm + 8 mm = 804 mm. Due to the importance for large size rolls of the contact between chest and roll, SPRINGPRESS gives the right answer to most of the questions.