

Thies dyeing machine manufacturer fights increasing energy costs and labour shortage

A comparison between the Thies pressure dryer and RF drying

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For more than 50 years the German textile machinery manufacturer Thies Textilmaschinen GmbH & Co. KG has produced yarn pressure dryers, during which period they have delivered worldwide more than 2,000 units.

Set against a background of rising energy; and labour costs, a further refinement and development of the process. This principal of drying yarn in package form is gaining renewed interest.

The latest model of the pressure dryer, employing the most recent refinements producing excellent drying results with minimal energy consumption, a conditioning device ensuring uniform residual moisture content within and throughout the yarn packages.

The principal difference between an atmospheric and pressure dryer is the use of a closed recirculating system working at 5 bar pressure. The overpressure increasing the moisture retention properties of the air and furthermore its heat retention characteristics, so that more heat energy is transferred to the drying material, in turn reducing the total drying or cycle time.

The constantly rising costs of energy will ensure that the pressure dryer principal will continue to gain ground. Using a computer controlled process with precise programmed values; the air exiting the drying vessel carries the maximum possible amount of moisture, resulting in savings of up to 50% in process heating and cooling costs.

The T-h values shown in diagrams 1 (old process) and 2 (new process) illustrate the savings in heating and cooling energy. From which can be seen the difference between the hot air inlet temperature T_E and the cooling temperature T_R , the heat energy used and the difference between the exit temperature T_A and the cooling temperature T_R the cooling energy required.

Significant improvements in recent years include an optimized heat exchanger, yarn conditioning device and a completely new high capacity blower design.

An integrated heat recovery unit, in which the heated cooling water can be recycled to the dyehouse process water system, is an important advantage of these pressure dryers.

A cost comparison between a Thies pressure dryer and a radio frequency (RF) dryer operating under Asian conditions, based on a yearly capacity of 6000 t shows significant savings.

Labour to operate the RF dryer – it requires eight people to unload the packages from the dyeing machine carriers, load and unload the centrifuge, load and unload the RF dryer.

In comparison the personnel required to operate a pressure dryer is significantly less. It requires just two people to load and unload the machine and unload the carrier.

- ❖ Electrical energy consumption of a RF dryer/centrifuge - 0.67 kwh/kg Co yarn.
- ❖ Electrical energy consumption of a Thies pressure dryer - 0.25 kwh/kg Co yarn.

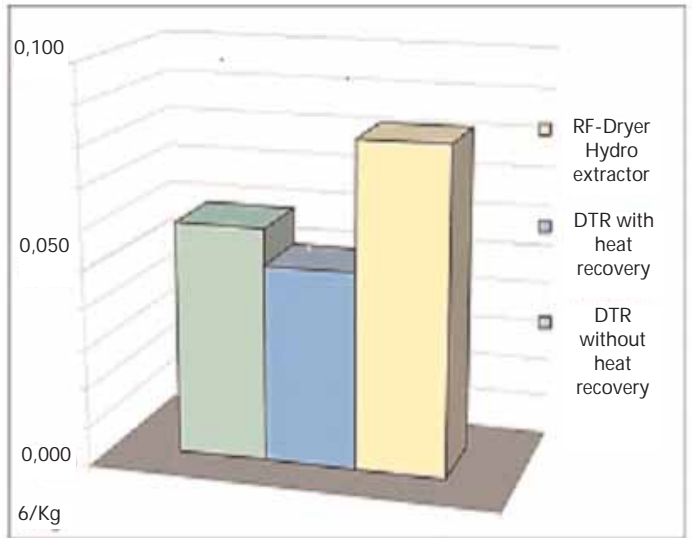


Diagram 3.

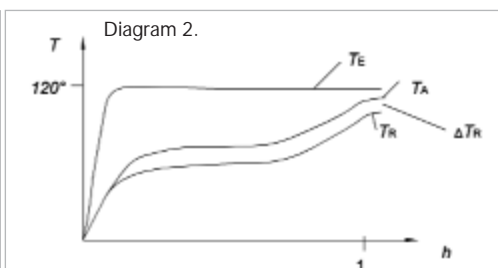
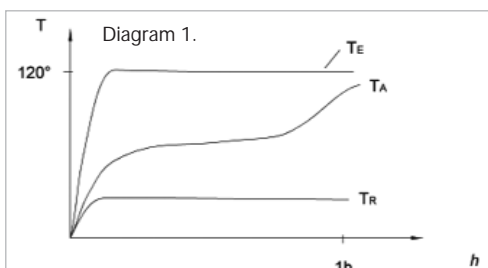
The steam consumption for a Thies pressure fitted with a heat recovery system is 1.1 kg steam/kg CO yarn.

A comparison of the average results obtained by a number of Asian customers and their corresponding energy and labour costs using the latest 'state of the art' pressure dryer can be seen in diagram 3. This shows a total of cost of 5.0 Euro cents/kg yarn for a pressure dryer fitted with a heat recovery system producing heated cooling water for use in the dyehouse. This compares with 8.2 Euro cents/kg yarn for a process using a combination of centrifuges and RF dryers.

Based on an average production of 6000 t of yarn per year this represents a potential annual energy saving of up to Euro 192,000/year. Not to be ignored is the damage to yarn packages by unnecessary handling during the RF drying process, which leads to waste yarn and poor rewinding characteristics, especially of fine counts.

The new design of the pressure dryer provides a service and maintenance friendly environment. Reducing down time and further minimizing costs significantly.

These results speak for themselves and today are reflected in an ever increasing number of pressure dryer installations, a trend certain to continue as energy and labour costs show no sign of reducing. ♦



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