Productivity in FineYarn Packages

Roberto Molteni, of Noseda Srl, introduces the high flow-rate HPF and HPF-HS machines

We define three types of yarns and packages, according to the maximum flow rate that can be achieved during the dyeing process:

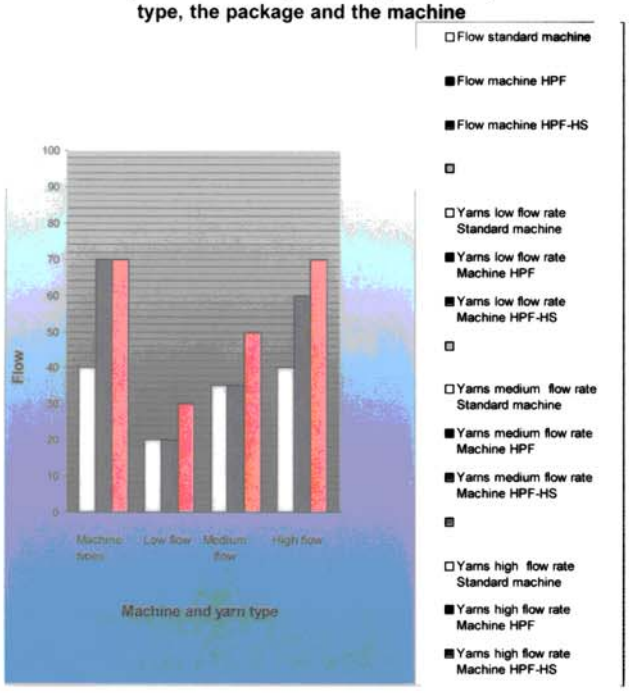
- Dyeable at low flow rate
- Dyeable at medium flow rate
- Dyeable also at high flow rate.

We assume that each kind of yarn/package has a particular flow-rate limit, over which it is not possible to work without causing deformation, water channels and, consequently, all the associated defects.

In addition, we assume that there is an inverse proportion between specific flow rate (l/min x kg) and the dyeing time. That is, as the flow rate increases, the process time can be reduced.

Finally, we assume that the flow-rate limit, related to a specific yarns wound on a rigid cone, depends on the characteristics of the yarn itself (fibre nature, yarn count, twisting, texturing, etc) and on the winding process (cone, tension, crossing, density, etc).

Quality flow rate analisys with regard to the yarn type, the package and the machine



Three types of machine

On this basis we can recognise three types of machine:

- 'Standard' hydraulic machines that allow, thanks to the most advanced control systems, reduction of the flow rate and differential pressure values to the levels required by the most sensitive fibres and packages. However, when particular fibres and packages can bear higher flow-rate values, these machines are not able to provide those values and result in a loss of production.
- HPF Nodeda machines, fitted with the HPF hydraulic circuit, which allows flow rates to be raised to the limit values actually borne by the fibres and/or packages.
- HPF-HS Noseda machines, which allow dyers to surpass these limits and obtain further advantages.

In fact, it is always possible to increase the flow-rate values over those of standard machines – even when these values are lower, and so theoretically achievable, than the hydraulic limits of the machine itself. In this case it will be possible to reduce the process time and increase the quality of the goods.

The package on the left, dyed by the HPF-HS process, at twice the theoretical maximum flow-rate bearable by the yarn/package, has perfectly preserved its shape. The package on the right, dyed at twice the flow rate, but without application of HPF-HS process, has highly modified its shape and formation of water channels is evident.

In detail:

- Reducing water channelling leads to higher levelness, thanks to a more regular bath circulation, and to disappearance of local defects, thanks to the lack of local flow-speed increases.
- Reducing the package deformation leads to easier rewinding and, in some conditions, can allow rewinding to be avoided altogether.
- Nodeda HPF-HS series machines are designed for applications involving sensitive yarns and/or packages, giving a flow-rate increase and/or a better preservation of the yarns and package. With yarns and packages to be processed at medium and high flow-rate, they allow the hydraulic limits of standard machines to be surpassed and provide operating conditions that lead to better preservation of the goods. ❍