Solvent Scouring of Wool Looks Promising

In addition to ecological benefits, this process delivers fiber with higher strength and felting resistance while showing promise in spinning on rotor systems

Wooltech Ltd., an Australian organization with ties to Kerry Packer's Consolidated Press Holdings Ltd., is sitting on a radical wool scouring system that could have major ramifications. The Packer organization has been supporting the concept since it acquired the company in 1989. First came a pilot operation in Launceston, Tasmania, and then the full-scale production unit the firm has set up in Trieste, Italy. Why Trieste? Italian authorities will only accept new industrial operations in Trieste that are environmentally friendly. Moreover, grants are available for such projects.

Wooltech's solvent-based scouring system was developed by Dr. Peter Hopkins. As solvent is recovered and recycled it creates virtually no effluent, quite a contrast from aqueous processing that requires harsh surfactants and generates a substantial volume of noxious effluent that requires special treatment. The new process affords gentler fiber treatment while opening the way for developing new types of wool for apparel applications.

Capacity of the two lines in Trieste is 2,500 tonnes annually of clean, scoured wool. One line is for top-making; the other for the woolen and nonwoven trades.

Wooltech is raising some eyebrows with the claim that its cleaned wool will eventually be used in rotor spinning. But some say the question of staple length could be a stumbling block.

Environmental problems created by typical aqueous scouring of wool are well documented. The typical fleece contains 13% grease. About half of that is usually discharged as an emulsion in waste water during scouring. The process can not only recover the grease for re-use, 99% of the fleece dirt is separated.

Moreover, as sheep are treated with insecticides, about half of those accompany the lost grease into the effluent, which requires special treatment in additional to its unwelcome odors. Conventional scouring can create yet other problems: It requires a large volume of water, averaging 10 liters per kg of clean wool; also, wool tends to felt during the required agitation of water scouring. A primary objective of the process is to minimize this fiber entanglement.

Solvent selection demanded that it should be used in a simple chemical engineering range and from which dissolved lanolin is recovered by standard distillation procedures. Undissolved dirt remains in the solvent for removal via filtration. Technicians selected an ICI solvent, Triwool, because of four characteristics. In addition to enhancing fiber strength and elasticity to provide softer hand, the solvent is noncarcinogenic and nonflammable.

Technicians say widespread adoption of the process could have profound effects on the wool industry. For example, it provides some 2.5% higher yield in top making than wools scoured via aqueous processes. This means a plant producing 20,000 tonnes of top annually could realize a gain of 400-600 tonnes of top. Economics would, of course, depend in large part on the wool's micron count, but at current prices, 20-micron top is selling for about Australian $10 ($7.90 U.S.). In the above example, the plant's annual financial gain would be Austrailian $5-million ($3.9-million U.S.).

Wooltech has developed a number of fabrics that have passed the International Wool Secretariat's Tm 31 machine washability test—but without chemical treatment that wool normally requires to achieve machine washability. Other possible benefits cited include:

- Improved bulk that allows a more open woven construction for a given cover factor.
- Potential for using unsized singles yarn in both warp and filling.

As for rotor spinning, wool may be poised to follow in the steps of short-staple fibers. Accumulation of grease in the rotor has all but prevented open-end spinning of wool. But Wooltech claims that solvent-scoured wool is appreciably cleaner and the way could be open for faster, more economical woolen yarn production via the rotor. ❑

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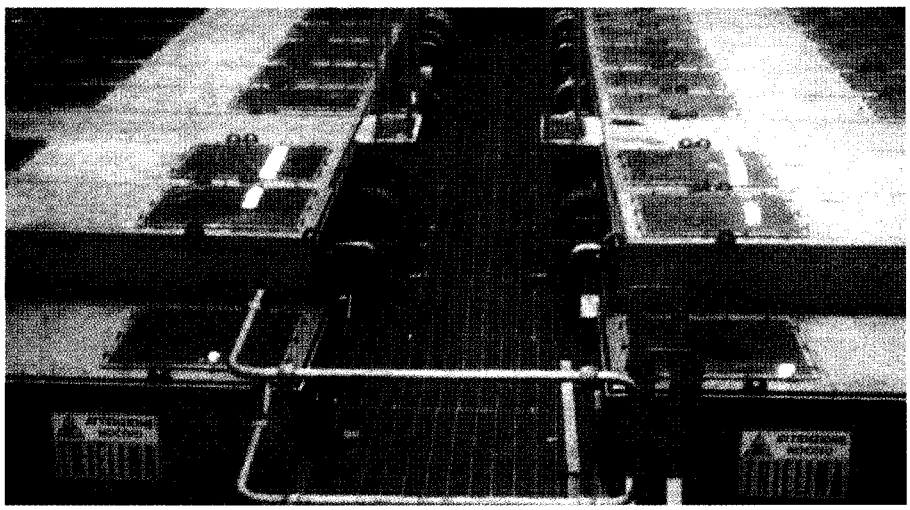

Wool exits the Trieste scouring system after passing through various bowls. Solvent-scoured wool contains no unwanted oils, pollutants or extraneous plant matter.