ITMA 2003: REVIEW OF AIR-TEXTURING/INTERMINGLING

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ABSTRACT

Air textured yarns are produced from thermoplastic, cellulosic or non-organic filament yarns using compressed air. Loops are formed on the surface of the filament yarn, giving it a voluminous character. Depending on the material used, the loop structure results in a yarn with characteristics resembling those of conventional staple-fiber yarn. The resulting yarns are used for sewing thread applications, apparel fabrics, fancy yarn articles, automotive interior fittings, and home furnishing fabrics, carpets, fire blankets and a wide range of other applications. This report presents a review of the latest developments in air-jet texturing/intermingling machinery and nozzle manufacturing from around the world that were on display at ITMA 2003 in Birmingham U.K.

Keywords: Air texturing, Intermingling, SSM Staehle, Heberlein, Air jet Nozzles, Intermingling Nozzles, Loops

INTRODUCTION:

Air textured yarns are produced from thermoplastic, cellulosic or non-organic filament yarns using compressed air. Loops are formed on the surface of the filament yarn, giving it a voluminous character. Depending on the material used, the loop structure results in a yarn with characteristics resembling those of conventional staple-fiber yarn. The resulting yarns are used for sewing thread applications, apparel fabrics, fancy yarn articles, automotive interior fittings, and home furnishing fabrics, carpets, fire blankets and a wide range of other applications.

In its simplest form, the air-texturing machine consists of a supply yarn creel, a suitable winding head fitted with yarn transport including an extra pair of feed rolls and an air jet interposed.

Traditionally air-texturing machines fall in two main groups:

- Machines with individual drives (SSM Staehle)
- Machines having a headstock with motors, drives, and shafts at each position; the lineshaft machines (Guidici, ICBT and RPR)

Due to their ability to process a very wide range of yarns and the fact that each machine position can be set up to produce a different yarn, machines with individual drives have become the norm in present day air-jet technology. Apart from the few
developments in winding technology applied to air-texturing machinery and the method of water application, the development of air texturing over the years has been dependent on the development of air-jet nozzle technology. Newer nozzles have led to the processing of a wider range of yarns at greater processing speeds, lower energy consumptions and lower noise levels.

THE MACHINERY:

Air-Texturing:

The major exhibitors of air-texturing machinery at ITMA 2003 in Birmingham U.K were **Dietze & Schell** Maschinenfabrik GmBH, Germany and **SSM Staehle Eltex** GmBH, Germany.

**Dietze & Schell** presented their DS 60, DS 90 E, DS 60 D and DS 90 MFB air-texturing units. All of them are primarily designed to texture glass fibers and artificial grass. They use **Heberlein** and custom in-house jets for air-texturing textile bobbins, spin cakes and direct rovings. Except for DS 90 MFB, which has a maximum production speed of 300 m/min, the other models have production speeds as in the range from 100 – 600 m/min. All the machines are equipped with precision cross-winding take-up system, sealed jet box and a draw-in/draw-out godet system.

The DS 60 is used for processing glass yarns from 68 tex – 1200 tex, while DS 90 E for 500 – 5000 tex. The DS 60 D employs a special jet and false-twist spindle assembly for texturing glass fibers from 68 tex – 400 tex. It is claimed that this system prevents the filament from breaking up and results in even texturing, which otherwise could only be achieved using pre-twisted material. Also, the DS 60 D has a steplessly adjustable production speed controller that allows for the variation of overfeed “on-the-fly”, thereby facilitating the production of air-textured yarns with variable features along the length of the yarn. Finally the DS 90 MFB (Figure 1) that was showcased is used for texturing yarn directly either from spin cakes or direct roving in the range of 220 tex – 4800 tex.

**SSM Staehle** exhibited their RM3-T and DP2-T air-texturing units (Figure 2). The DP2-T textures yarns from fine to medium filament yarns up to 900 dtex, while RM3-T is designed to texture high linear density yarns up to 3200 dtex. Both these machines are designed to run at production speeds as high as 1000 m/min. They are also equipped with a sound box that includes a yarn-wetting device, rubber coated cold feeding elements for slip-free feeding, chromium plated-half polished heated feeding elements and the SSM DIGICONE preciflex take-up system. An elastane feeding device is available optionally.

![Figure 1: DS90 MFB](image)
Intermingling:

The intermingling machinery showcased at ITMA 2003 was primarily concerned with producing air-covered yarns that employed an elastane component covered by a continuous filament yarn OR staple fiber yarn. The DP3 C (Figure 3) from SSM Staehle and the Sincro-Jet (for filament – elastomeric yarns) & Sincro Jet-T (for spun – elastomeric yarns) from FADIS (Figure 4) were the prominent Air-Covering machines to be exhibited. Both companies employed the Heberlein SlideJet (for continuous filament yarns) and the Heberlein Spunjet (for staple fiber yarns) nozzles for their processes.
NOZZLE TECHNOLOGY:

Heberlein Fiber Technology Inc., Switzerland, TEMCO Textilmaschinenkomponenten GmbH, Germany and Fiberguide ltd from the U.K were the major air-texturing/intermingling nozzle manufacturers at ITMA 2003.

Air-texturing nozzles:

Heberlein Fiber Technology introduced their new line of ceramic nozzles under the A-Series trademark. These included the A 317, A 327, A 347 and A 357 (not available commercially), with each subsequent nozzle being able to texture higher linear density yarns. These nozzles claim to reduce the noise as well as minimize compressed air consumption compared to the other commercially available products. They also claim to produce more compact yarns, afford higher process stability compared to the T-series and provide better blending.

Interlacing nozzles/jets:

Heberlein, Fiberguide and TEMCO showcased their lines of interlacing jets. Heberlein showcased their popular SlideJet and SpunJet series. The Slidejet-DT (Figure 5) units are used to interlace flat yarns while the Slidejet-FT (Figure 6) are used to interlace textured yarns.
**Fiberguide** presented their FG5 -all purpose interlacers (Figure 8), FG 8-continuous interlace of microdenier yarns (Figure 7) and FG10M -for interlacing between godets (Figure 9) and uniform oil distribution) series of interlacing jets.

**TEMCO**, Germany featured their Y-Profile Jet LD 22 (Figure 10) that may be used to intermingle flat or textured yarns. As shown in the figure 10 the Y-technology is based on special flow orifice geometry and its location in the jet yarn path. **TEMCO** claim that this y-profile gives the interlacing nips a very high stability as well as uniformity over the length of the yarns.
OVERALL:

There was very little groundbreaking or innovative in air-texturing/intermingling machinery OR nozzle technology at ITMA 2003. The production speeds were not much higher compared to existing models, nor were newer, more efficient winding systems or water application systems displayed. Nozzle manufacturers did not showcase any new nozzle technology that facilitated noise reduction or lower compressed-air consumption compared to existing models. The quality monitoring and assessment systems on display did not exhibit any improvements or departure over their existing counterparts. The only process that seemed to be relatively new was the “Air-Covering” of elastane by continuous or staple fiber yarns using intermingling jets. According to published accounts, even that has been tried and tested for a few years now. Coupled with a review of available literature, it is clear that air-texturing/intermingling is a very “mature” processing technology that has become stagnant and requires the impetus of innovative market demands to develop in the future.

Note: All images used in this report have been obtained from the brochures of the companies cited herein.

Acknowledgements:

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Index of Companies:

- Dietze & Schell
- SSM Staehle Eltex
- FADIS
- Heberlein
- Fiberguide
- TEMCO