# EcoLace: Interlacing the economical way

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The air consumption in interlacing is directly linked to two variables: the pressure needed and the area of the orifice where the air blows with sonic speed into the chamber. There are no other parameters needed to compare the air consumption of different jets. At the same pressure it simply depends on the area of the orifice. It is interesting to note that the interaction with the yarn running through the interlacing chamber does not influence the flow rate, nor does surface manipulation or chamber design. The flow rate is one physical design criterion of interlacing jets. It means that a specific type of jet having 70 % of air consumption at the same pressure as another one, can be simply achieved by reducing the area of the bore by 30 %.

The other side of the physics cannot be so easily described in formulas. That is firstly the intermingling interaction with the yarn: node frequency, node stability and uniformity from position to position. These parameters are dependent on the stability/instability of the air flow and the filament bundle. The quality of the air flow while interlacing is therefore very important but can only be numerically described or empirically altered. Secondly, there are all those soft factors like leakage, compatibility to other housings, service life before cleaning, sturdy housing and slide, easy threading, handling, recognition at work and price (Fig. 1).

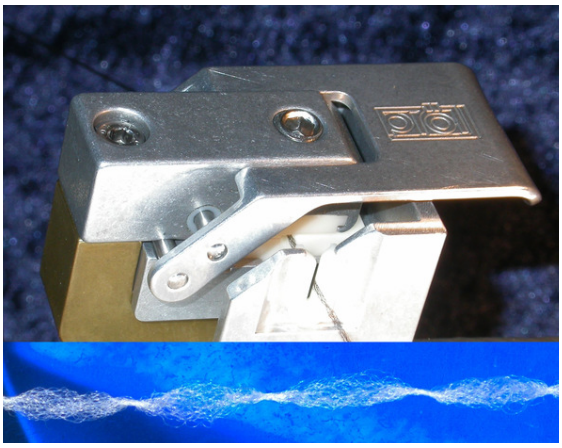

Fig.1: EcoLace with sturdy housing.

On the basis of the very successful OE-navels used in rotor spinning, BROELL developed and is still

expanding its family of EcoLace interlacing air jets, first shown at ITMA 2007. This family covers at the moment the range of linear densities from below 30 to 1200 dtex (Fig. 2).

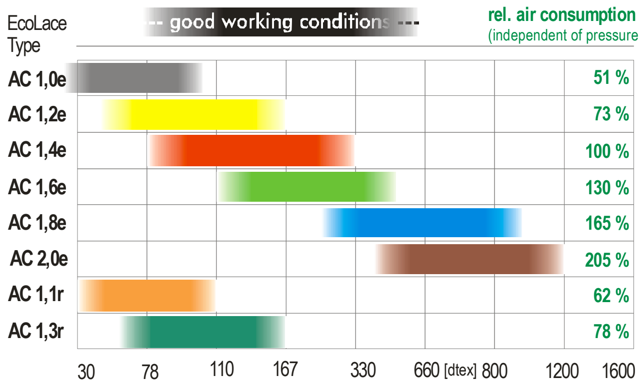


Fig.2 Working field of Ecolace intermingling air jet

The sliding house design of EcoLace allows easy jet interchange giving compatibility with the Heberlein system. All the aforementioned soft factors were considered. Through re-engineering from powder to product, we have been able to produce air jets keeping costs to a minimum and precision to a very high level using ultra dense high purity alumina ceramics (Fig. 3).

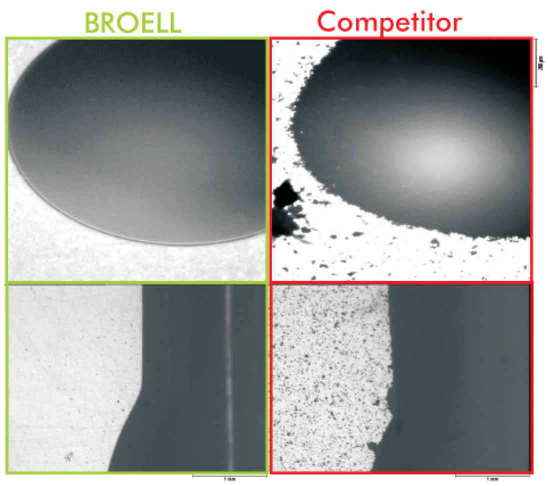


Fig.3 Comparison of surface quality.

Sharpness of defined edges, precision of vortex chambers and non-round orifices as well as surface finish and polishing have been achieved and controlled.

The efficiency of an interlacing jet can be described by the relationship between the energy needed to interlace a filament bundle and the energy available in the compressed air. Today this efficiency is still below 5 %. When 95 % of the air is not utilized, we feel that there is much room for optimization!. Our goal is to achieve significantly lower air consumption, having a satisfying node quality, not only due to smaller orifices, but by focussing the intermingling energy directly onto the yarn and not losing too much power through an uncontrolled pressure drop (Fig.4).

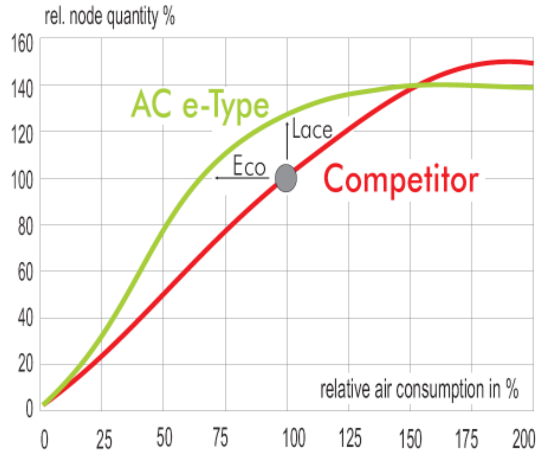


Fig.4 Advantages of AC.e-Type with elliptic vortex chamber.

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