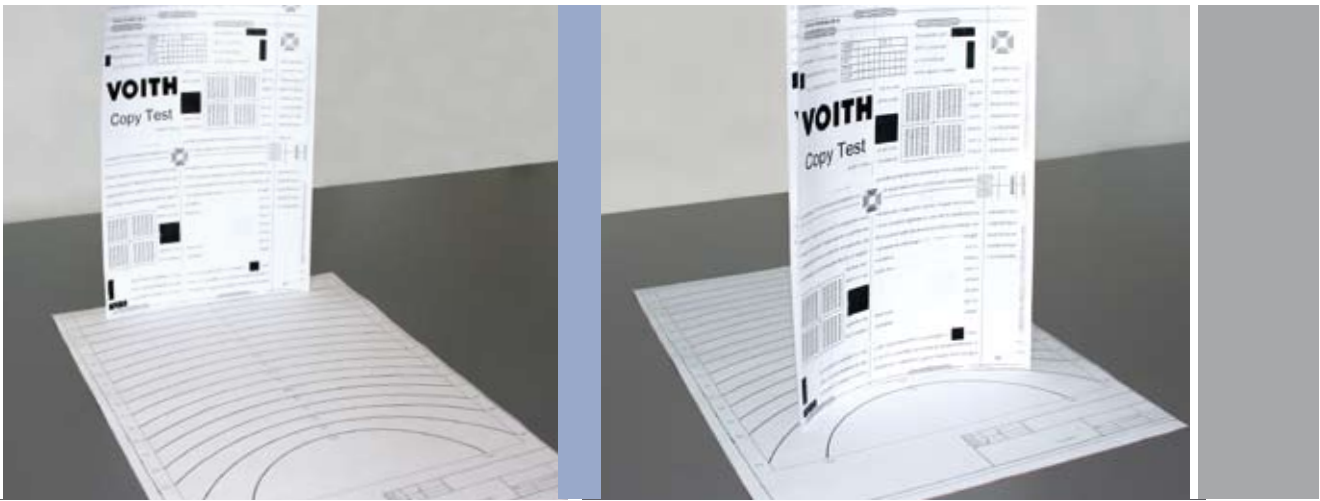


New technologies make two-sided identical copying characteristics possible

ParaSlice – quality leap with copy paper

Too high curl values still cause a lot of trouble for manufacturers of copy paper. The increasing market demand for two-sided identical copying characteristics puts further pressure on papermakers. Voith Paper has seen this as an opportunity and developed the ParaSlice. The new headbox nozzle allows optimal sheet symmetry and thus the best possible copying characteristics within a wide operating window.



The quality of copy paper is revealed during the copying test. The sample produced with ParaSlice (left) shows a noticeably reduced deformation in comparison to conventionally produced paper.

The basis for optimal curl values is a symmetrical sheet structure in the z-direction of the paper. This is already well known from the available literature and was documented during numerous tests at the Paper Technology Center in Heidenheim. Influencing copying capability is also possible with other machine sections such as the size press or dryer section. However, if the paper has a basic structural two-sidedness, then optimization with the aid of

these process steps cannot be achieved in a very satisfactory way.

Headbox nozzle is key to curl control

During the dewatering process in the former, the fibers are deposited and thus define the structure of the sheet. This process is decisively influenced by shear forces caused by dewatering elements in the former, but especially by the pre-orientation

of the fibers in the headbox jet. Optimization of sheet structure by means of former settings is only of limited effectiveness, and is generally not possible due to the influence of additional quality parameters. For that reason, a high quality headbox jet is the best precondition for an optimal sheet structure and thus good copying characteristics.

Conventional nozzles are hardly suitable for this. The side of the

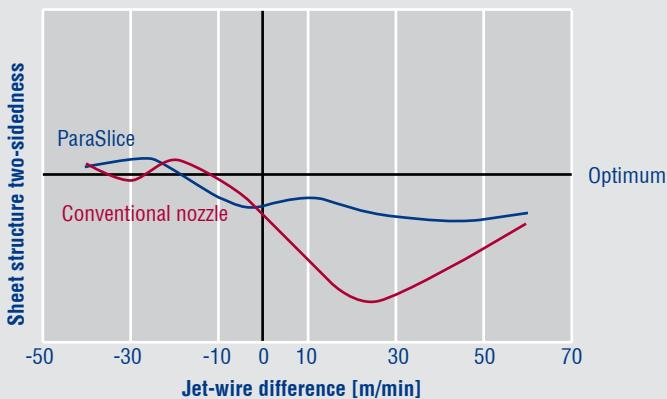


Fig. 1: Analysis of paper structure sheds light on sheet two-sidedness.

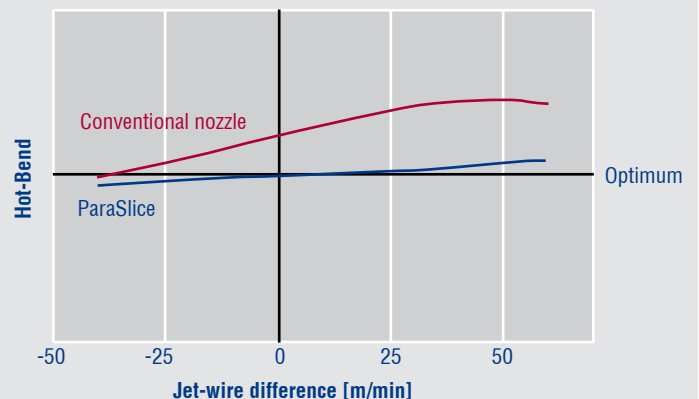


Fig. 2: The hot bend test evaluates thermal reactivity – the decisive parameter for good copy paper.

paper turned toward the slice blade has a stronger orientation in machine direction (MD) than the bottom-lip side. This is reflected in the sheet as a pronounced structural two-sidedness.

The new ParaSlice reduces this asymmetry to a minimum. Therefore, differences in the orientation of the paper sides are prevented as much as possible.

Symmetrical sheet structure

The positive influence on sheet symmetry is proven through targeted analysis of the paper structure. For this, numerous paper samples were split and their orientation measured in the respective individual layers. The results are shown in Fig. 1. The diagram shows the occurrence of structural two-sidedness with various jet-wire differential speeds. Improvement through use of the ParaSlice can be clearly seen. Especially in rush mode, important for copy paper, the asymmetry has been noticeably reduced.

The reduced two-sidedness in turn leads to substantially improved thermal stability. Fig. 2 shows the results of the hot bend test for this. In this procedure, test strips are briefly heated and then their curvature is measured. The main advantage of the test is in its close correlation with the real copying process. During copying, thermal stability is the essential key parameter due to the intense heat involved. The samples produced with ParaSlice show a noticeably reduced deformation in comparison to conventionally produced paper. In particular, the curve runs almost independently of the jet-wire differential speed. This guarantees a wide operating window for the system with relation to copying characteristics. The jet-wire difference is available for optimization of additional quality parameters such as formation.

First practical experiences

The potentials for improvement demonstrated at the Paper Technology Center in Heidenheim were confirmed in production machines. Fig. 3 and 4

show the development of the paper's copying characteristics after installation of ParaSlice. The curling tendency was evaluated on the basis of the Xerox method. In this procedure, test copies are created under defined conditions and then their curvature is measured. Very good copying results in general mean Xerox values ≤ 20 .

High-quality copy paper is produced at around 1,350 m/min in the system. Sheet formation takes place in a gap former. Only curl values are shown after duplex copy, i.e., two-sided copying. They react very sensitively to machine or furnish parameters and are usually more critical in contrast to curl after simplex copy.

In both diagrams, both with an initially copied top as well as bottom side, a clear reduction in curl values appears in the course of the rebuild. The improvement is considerable – in the range of 10 to 15 Xerox points.

Furthermore, copying characteristics on both sides are nearly symmetrical

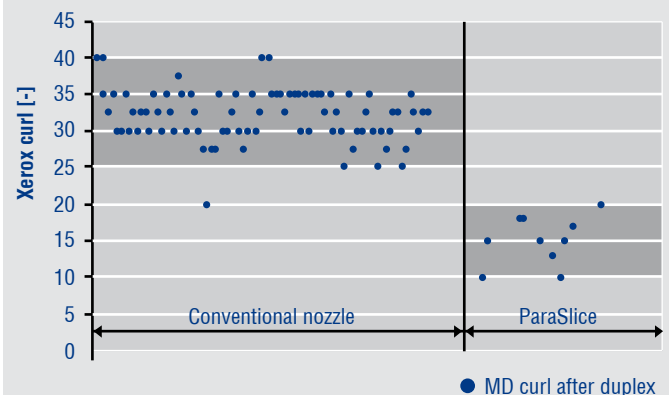
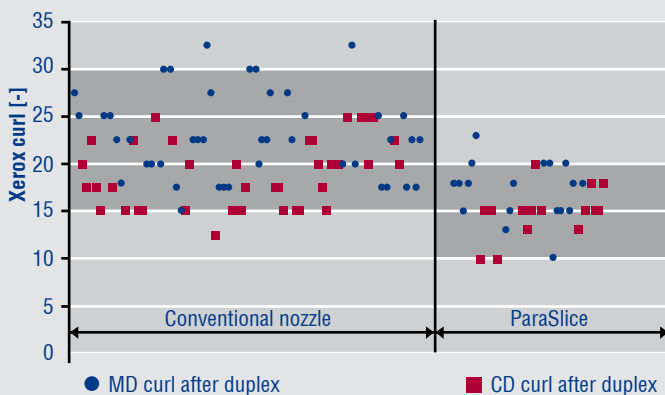


Fig. 3 and 4: Both on the bottom (Fig. 3) and top side (Fig. 4), a noticeably improved copying result appears due to installation of ParaSlice.

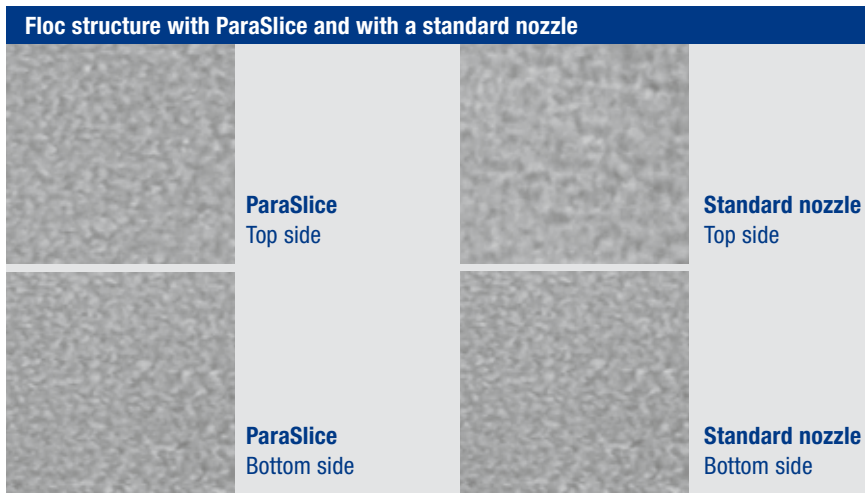


Fig. 5: Different flocculation on the top and bottom side of the jet is minimized with ParaSlice.

due to installation of ParaSlice. The two values are on similar levels, while clearly different ranges appear with the standard nozzle. The improvements shown are also confirmed in the long-term trend. The system produces successfully with ParaSlice. Along with the improved copying characteristics, the expanded operating window is especially appreciated. The compromise previously often necessary between copying characteristics and quality parameters is a thing of the past. Similar improvements were observed with subsequent installations. Use in combination with gap former sheet forming has proven to be especially advantageous. The optimized jet characteristics are immediately frozen here and thus lead to the maximum improvement potential of the sheet structure.

Influence of ParaSlice on jet quality

Along with the noticeable improvements in curling characteristics,

the new nozzle type also has advantages in floc structure and the surface of the free jet. Different flocculation on the top and bottom side of the jet is nearly eliminated (Fig. 5). This can lead to reduced two-sidedness of formation or porosity.

Furthermore, an improved jet surface appears, shown in Fig. 6. The occurrence of jet disturbances, which can lead to streaky formation in the end product or to tiger stripes in packaging papers is significantly reduced. This makes ParaSlice an interesting option even for applications beyond copy paper.

New system or rebuild

ParaSlice can be used in new machines and can also be retrofitted in existing headboxes. Both methods have already been successfully implemented many times. Therefore, it is a very efficient optimization method that can be installed easily and with low risk, even when budgets are tight.



Fig. 6: ParaSlice (top) reduces the occurrence of jet disturbances.

On Focus: ParaSlice

ProRunnability

ProQuality

ProSpeed

Section: sheet forming
Width: all
Paper grade: copy paper

Contact

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