

Armin Leder

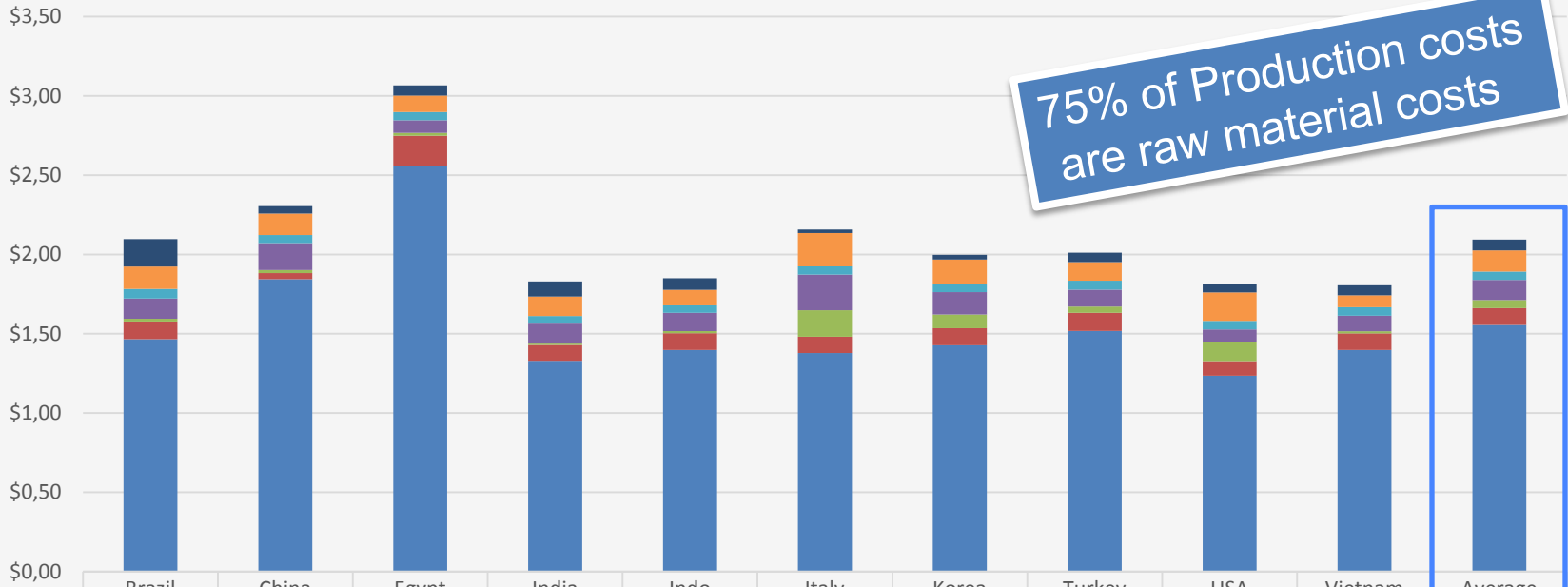


**A reduced spinning process
with the option of handling
a higher non-lint content**

**Cotton Conference, Bremen
March 2018**

Yarn manufacturing costs

ITMF International Production Cost Comparison for Rotor Ne20 [USD/kg]



	Brazil	China	Egypt	India	Indo	Italy	Korea	Turkey	USA	Vietnam	Average
Interest	0,17	0,05	0,06	0,10	0,07	0,02	0,03	0,06	0,05	0,06	0,07
Depreciation	0,14	0,14	0,10	0,12	0,10	0,21	0,15	0,12	0,18	0,08	0,13
Auxillary Material	0,06	0,05	0,05	0,05	0,05	0,05	0,05	0,06	0,05	0,05	0,05
Power	0,13	0,17	0,08	0,13	0,12	0,23	0,14	0,11	0,08	0,10	0,13
Labor	0,02	0,02	0,02	0,01	0,01	0,17	0,09	0,04	0,12	0,01	0,05
Waste	0,11	0,04	0,19	0,10	0,11	0,10	0,11	0,11	0,09	0,10	0,11
Material	1,47	1,84	2,56	1,33	1,40	1,38	1,43	1,52	1,24	1,40	1,55

■ Material ■ Waste ■ Labor ■ Power ■ Auxillary Material ■ Depreciation ■ Interest

Challenge for yarn spinner

How much waste can be added without noticeably losing yarn quality?

Cotton 1.55 \$/kg

Comber noil 1.00 \$/kg

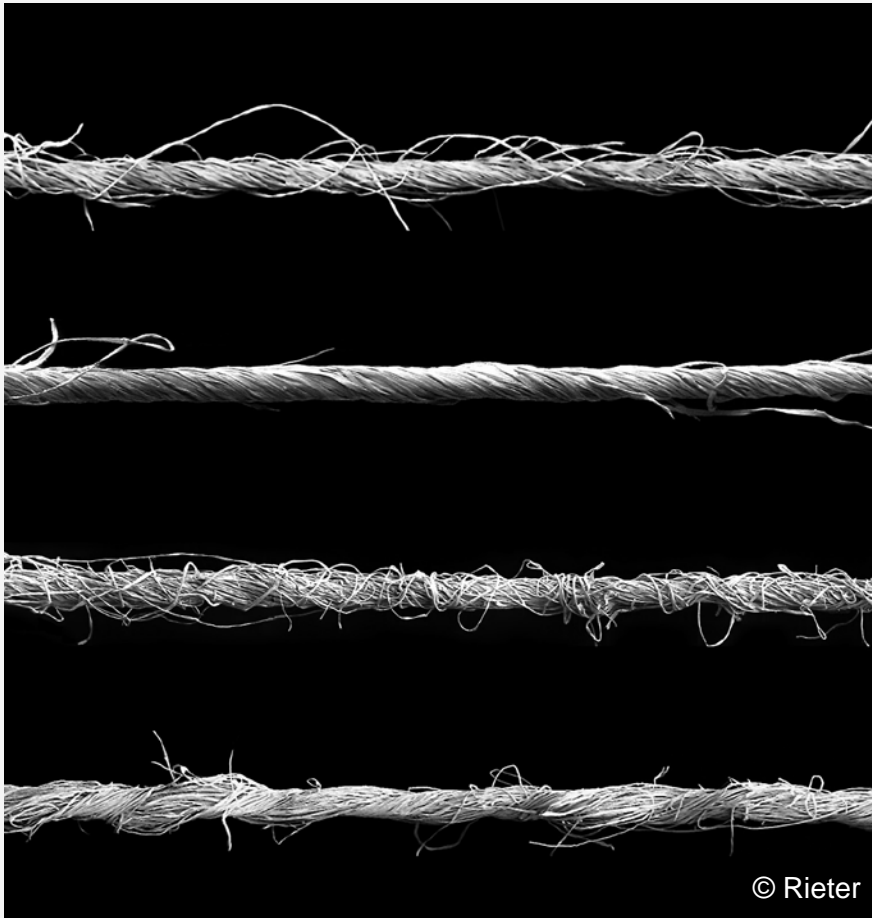
Flat Strips 0.80 \$/kg

Lickerin waste 0.60 \$/kg

Problem: Short fibers can not be drafted without causing defects in the yarn.

Four spinning/yarn processes

Question: Which yarn process requires the lowest draft?



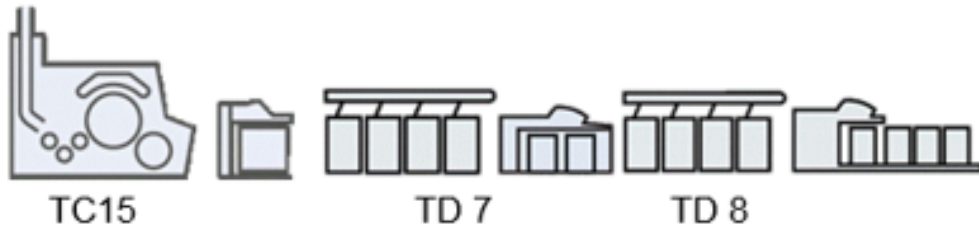
classic ring spinning

compact ring spinning

OpenEnd spinning

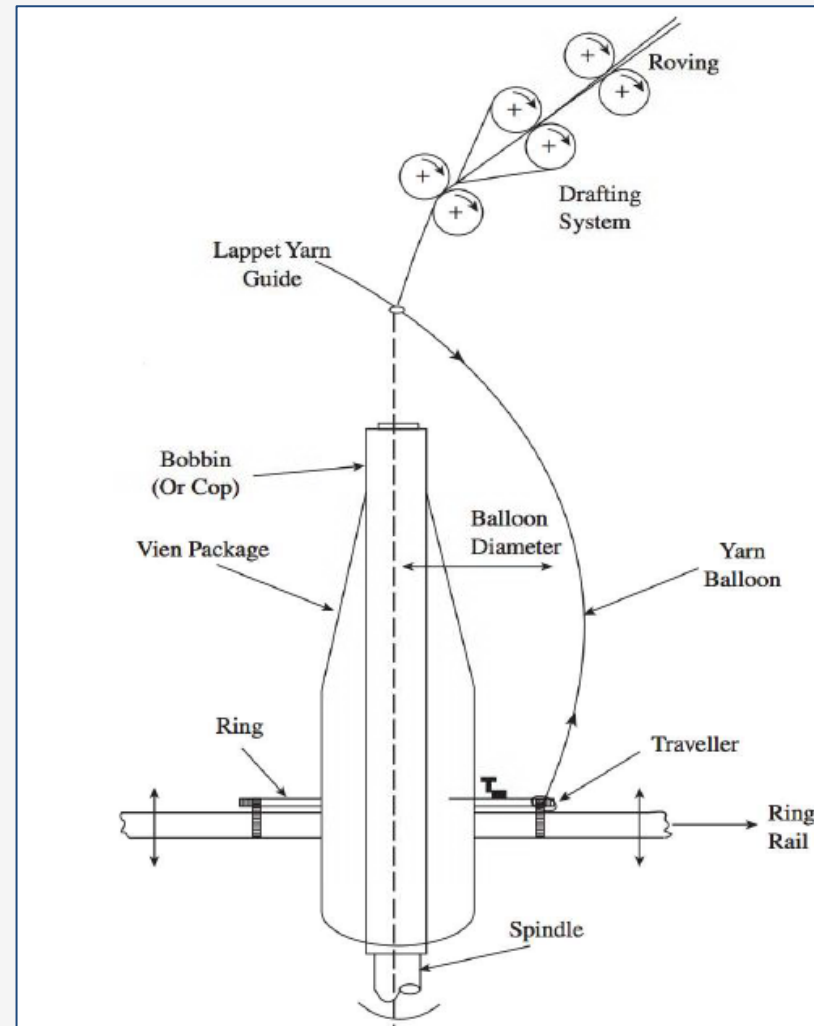
Airjet spinning

(Compact) Ring Spinning process

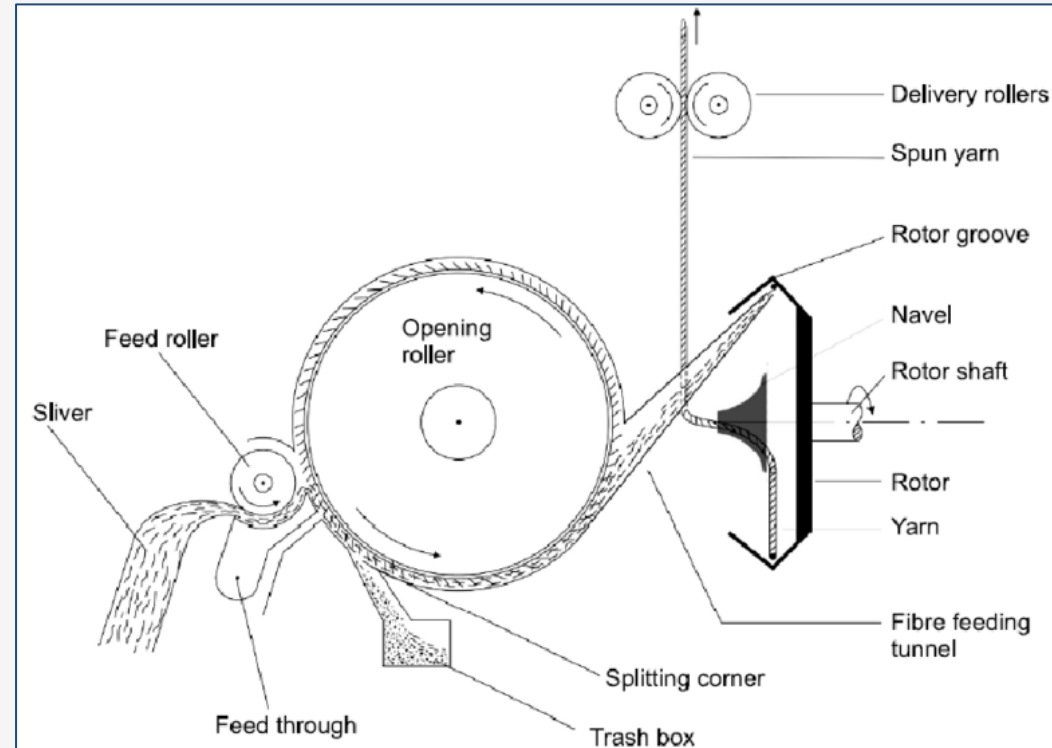
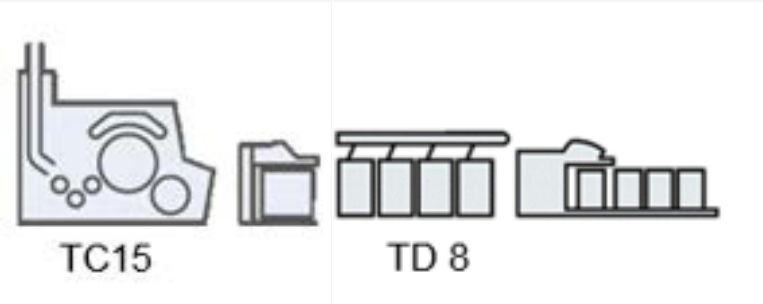


Yarn fineness is produced by a drafting process carried out in stages.

→ Increase of short fiber content creates more and more defects in the yarn



OpenEnd spinning process



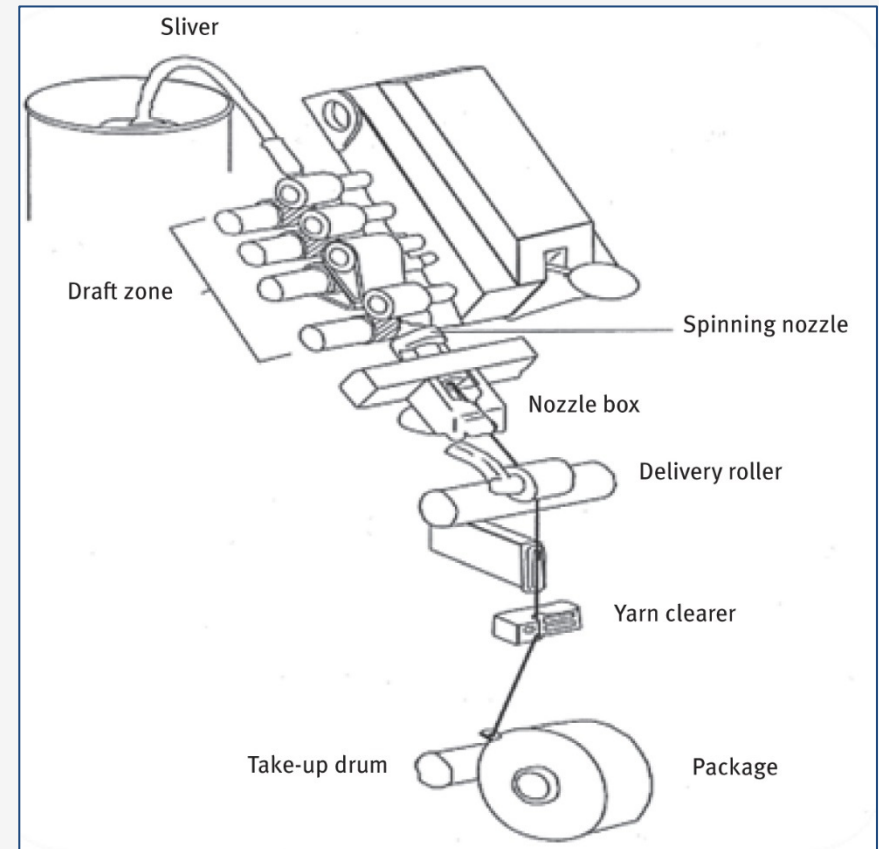
- **OE Spinning process completely opens the sliver structure coming from card or draw frame**
 - **Yarn production with virtually no drafting**
 - **In addition, dirt (non-lint) is excreted in this spinning process**
- very insensitive when using short fibers

Vortex Spinning process



Yarn fineness is produced by a drafting process carried out in stages.

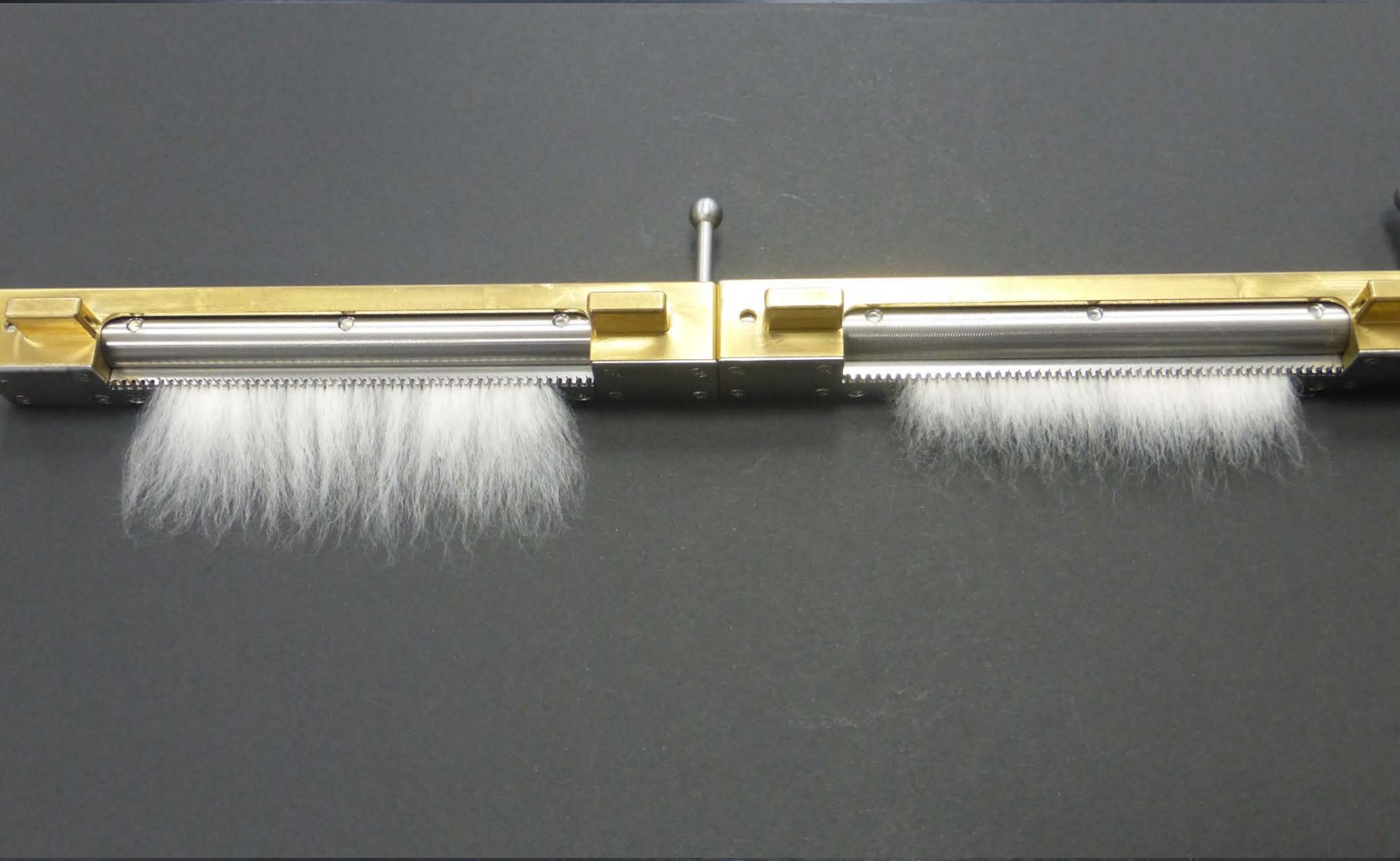
→ Increase of short fiber content creates more and more defects in the yarn



Trial setup

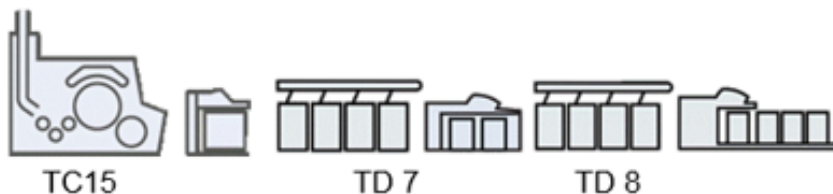
Virgin cotton

Waste/comber noil

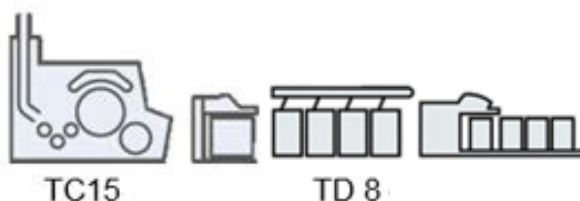


Trial setup

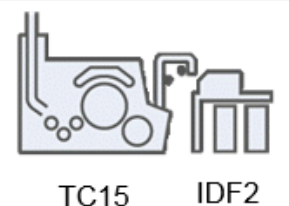
2 Draw Frame Passages



1 Draw Frame Passage

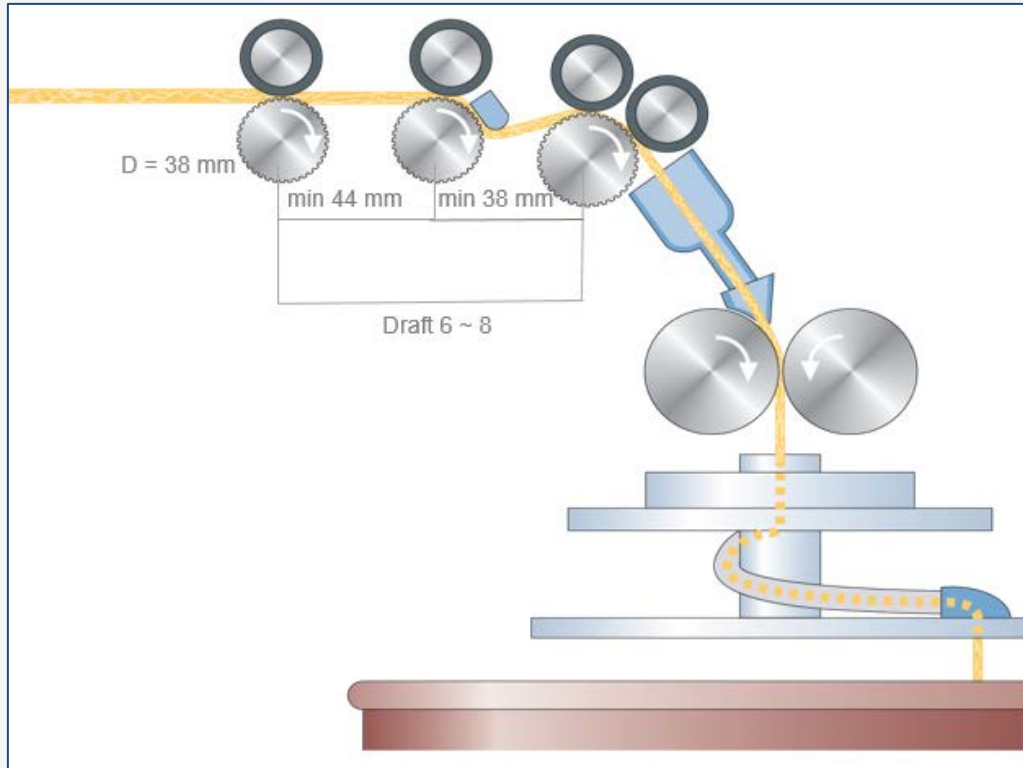


Short Process



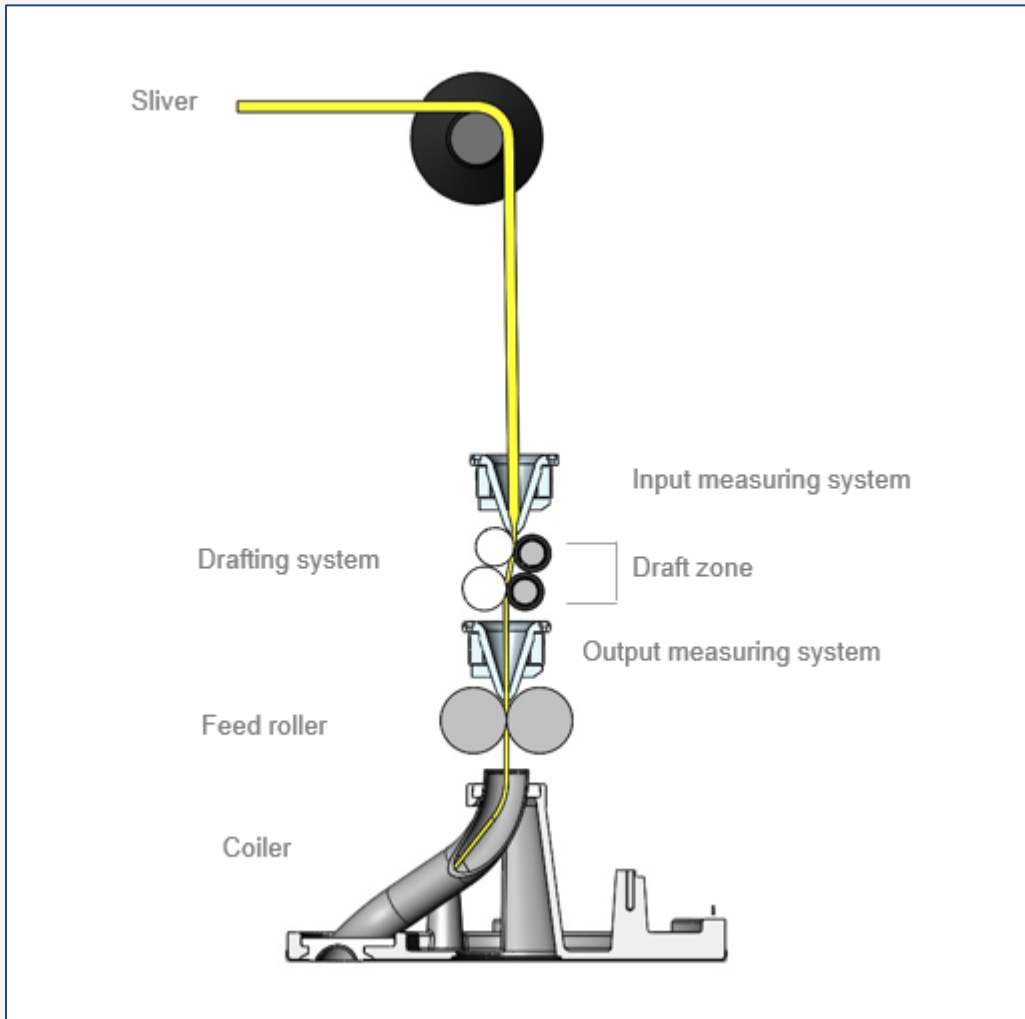
Cotton (Central Asia)		100%	70%	50%	30%	
Comber noil			30%	50%	70%	100%
Micronaire		3.9	3.7	3.5	3.3	3.1
UHML HVI	mm	27.4	24.7	23.0	21.1	18.4
SFC < 12.7mm (w)	%	7.7	23.1	33.4	43.7	59.2
Neps AFIS-N	1/g	434	542	614	687	795
Trash Content Shirley	%	2.1	1.8	1.6	1.4	1.1
Material cost	(\$/kg)	1.55	1.39	1.27	1.17	1.00

Drafting system of a Trützschler draw frame



- Draw frames duplicate and parallelize the fiber material (using high draft 6 to 8)
- Clamping distance cannot be reduced to such an extent that fibers of 20mm and shorter can be stretched controlled with high draft
- Low draft make no sense due to doubling

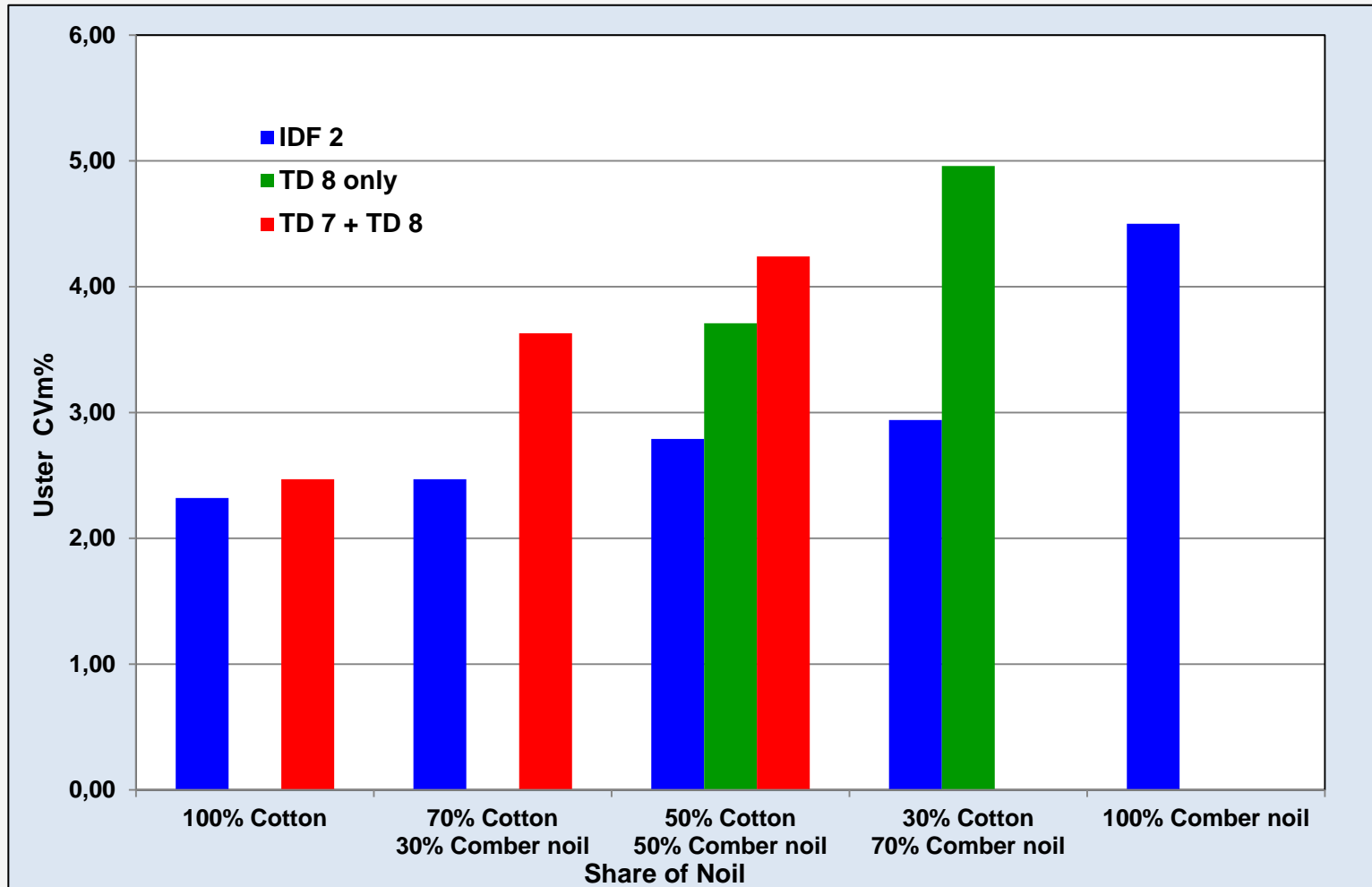
IDF 2, Trützschler



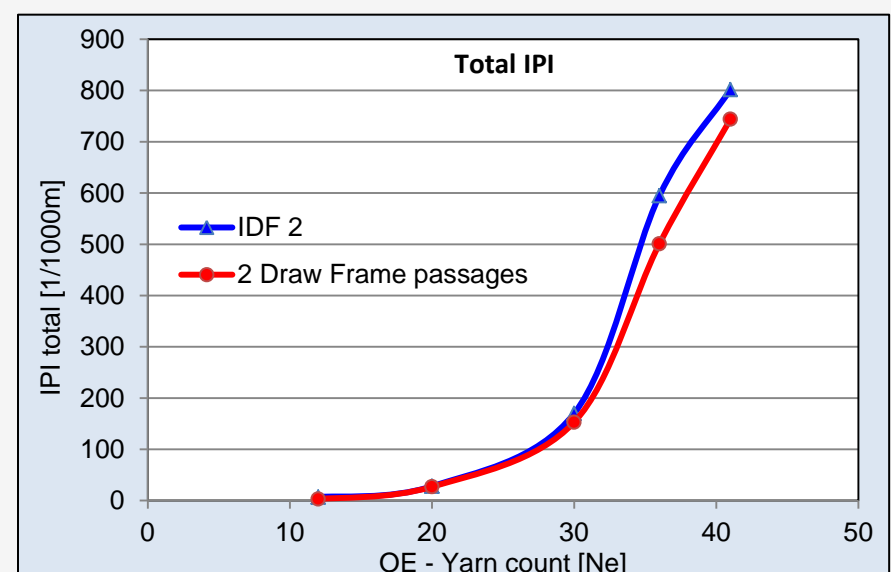
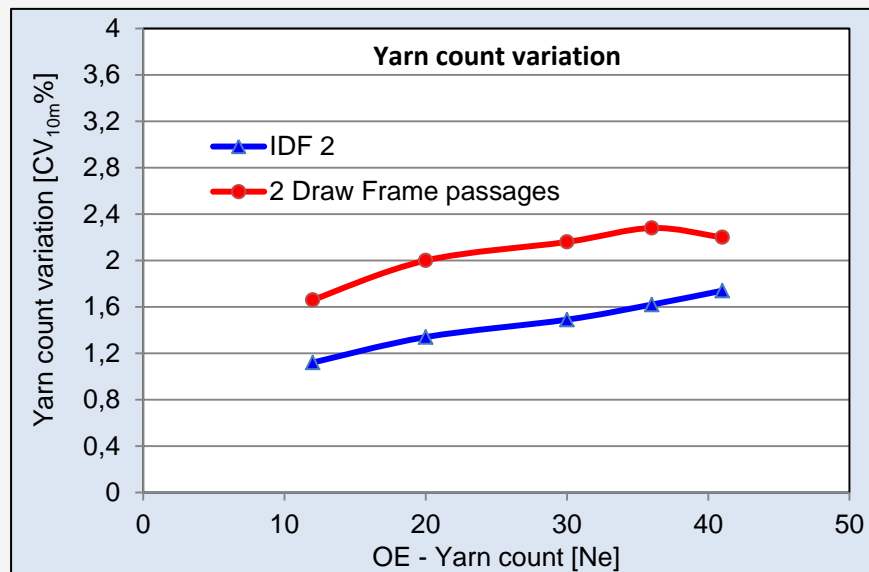
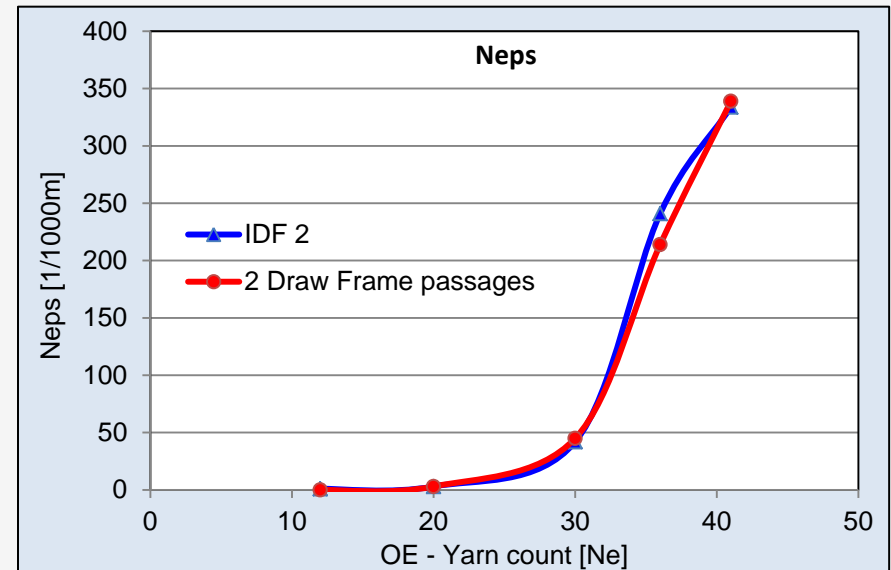
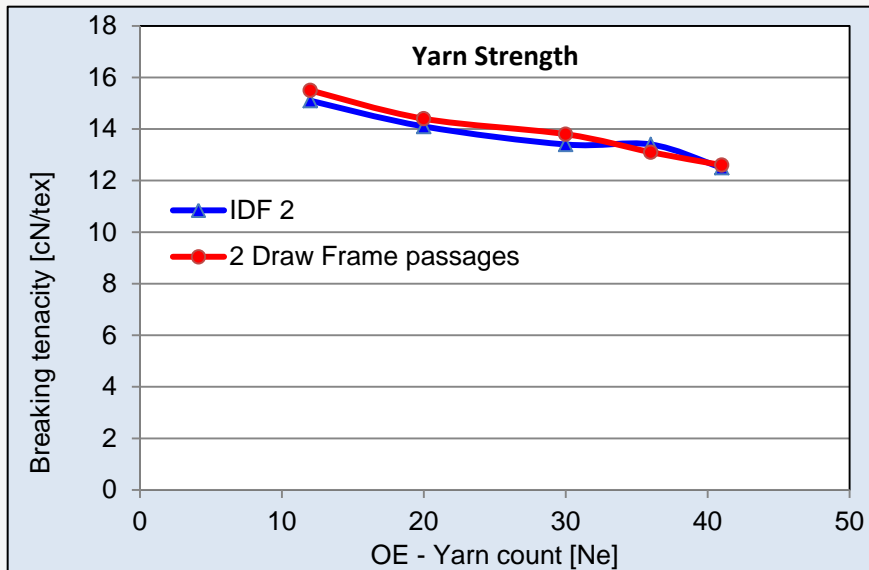
- **Material flow from top to bottom**
- **Measuring funnel instead of measuring rollers**
→ **short clamping distance**

The applied draft in IDF 2 is just so big that the short-wave sliver defects from the card can be corrected. Corresponding to these boundary conditions, it should be possible to produce an optimal sliver for OpenEnd spinning, with which even high short fiber fractions can be processed to a good yarn quality.

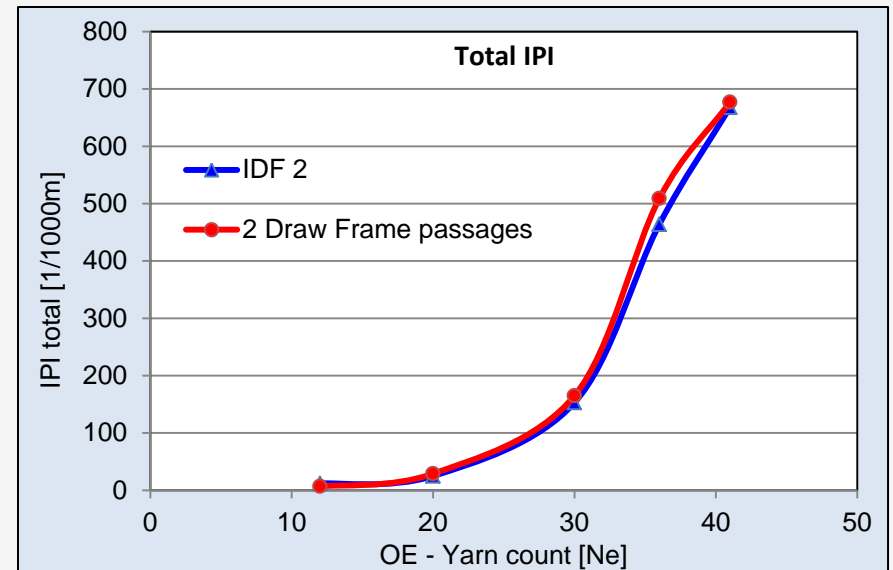
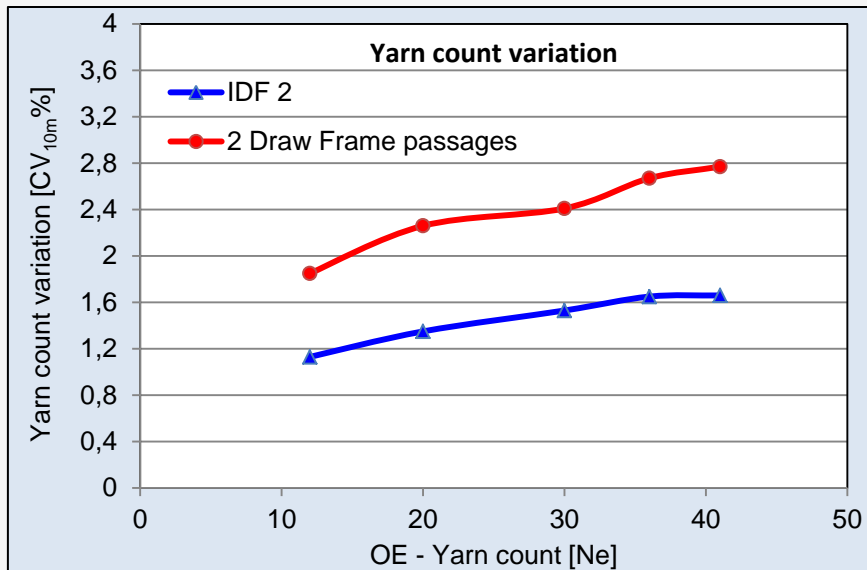
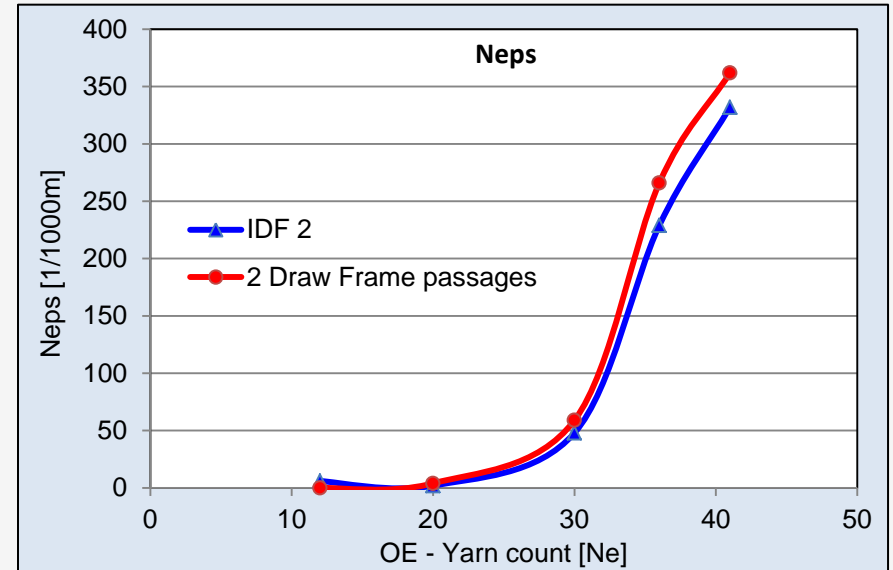
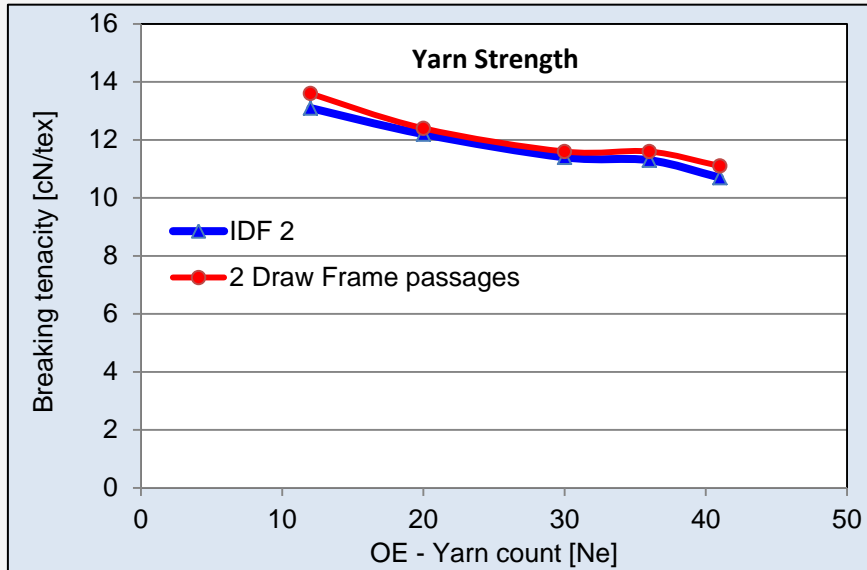
Sliver coefficient of variation (Uster CVm%):



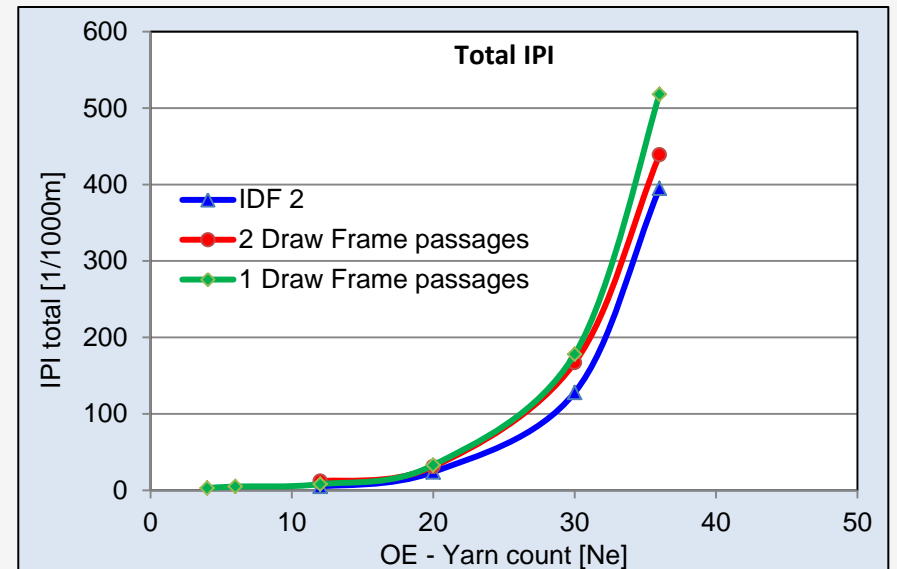
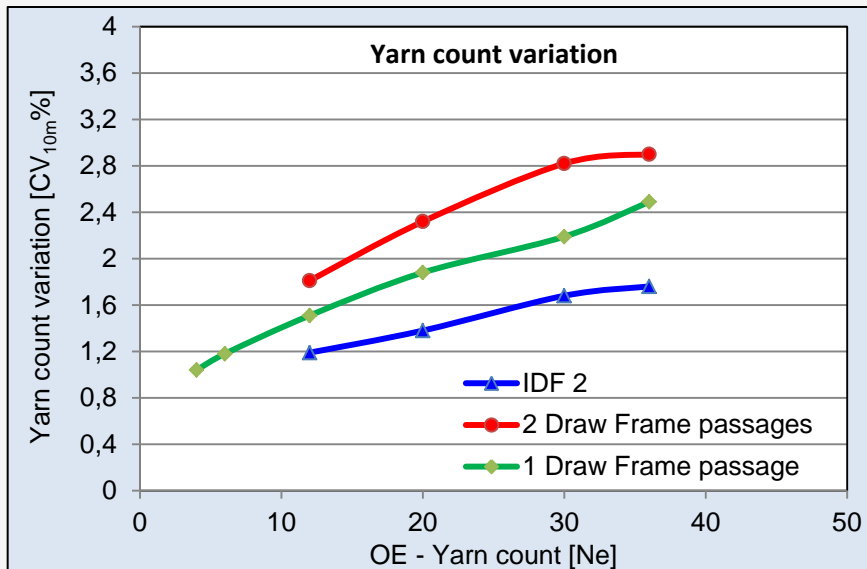
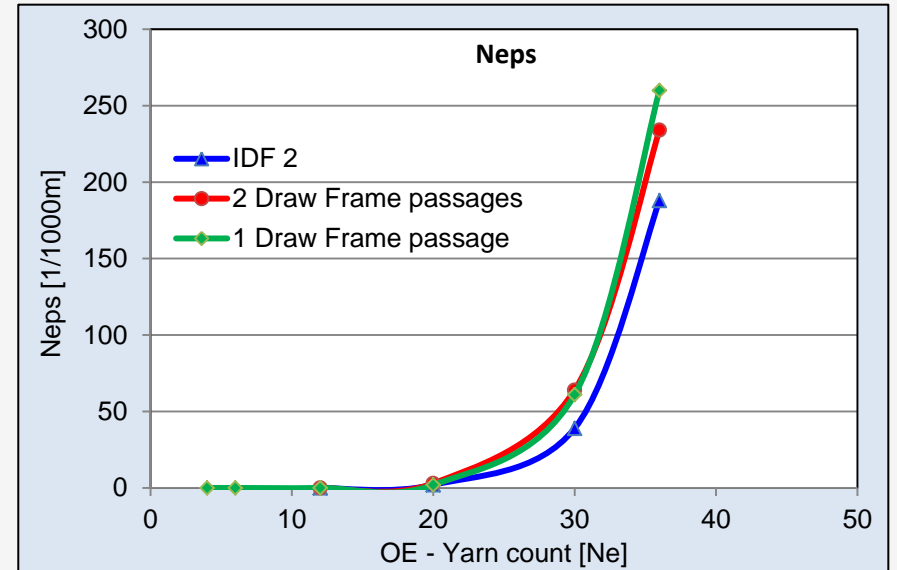
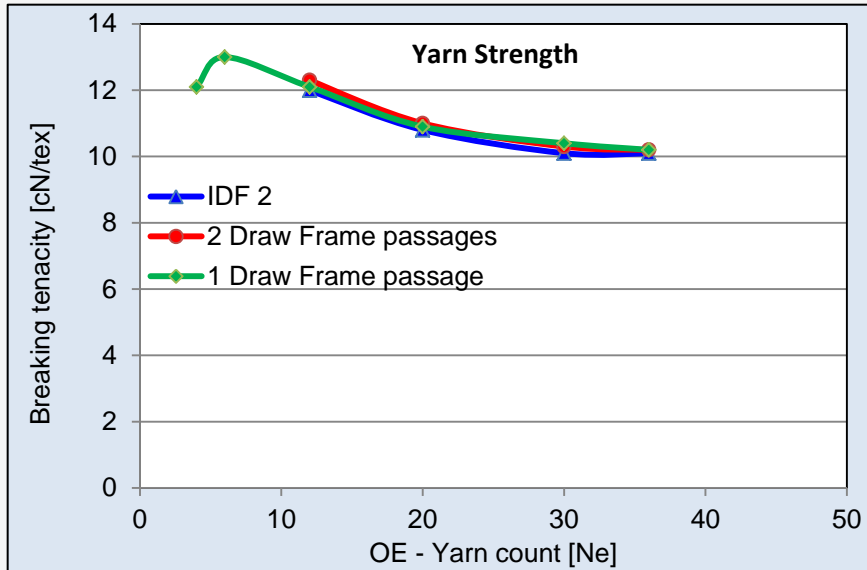
Results 100% Cotton – Yarn Quality



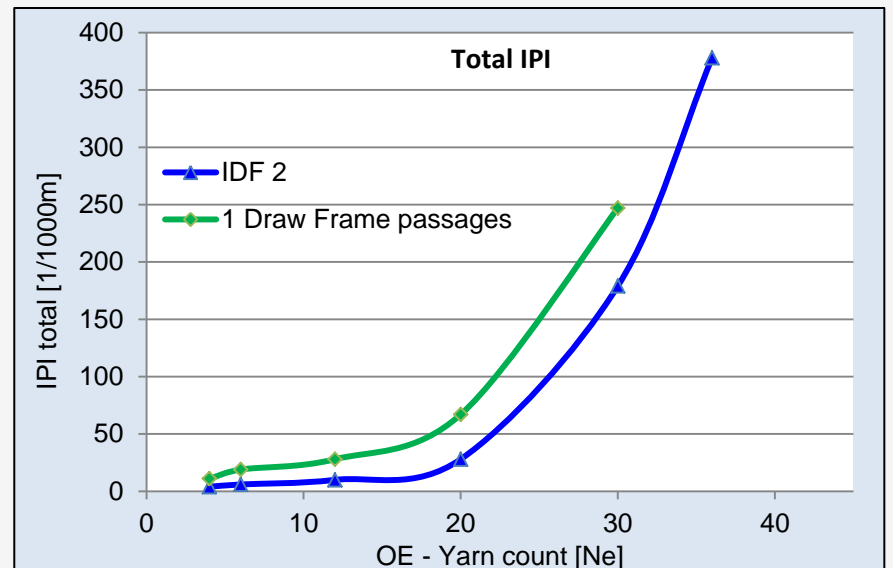
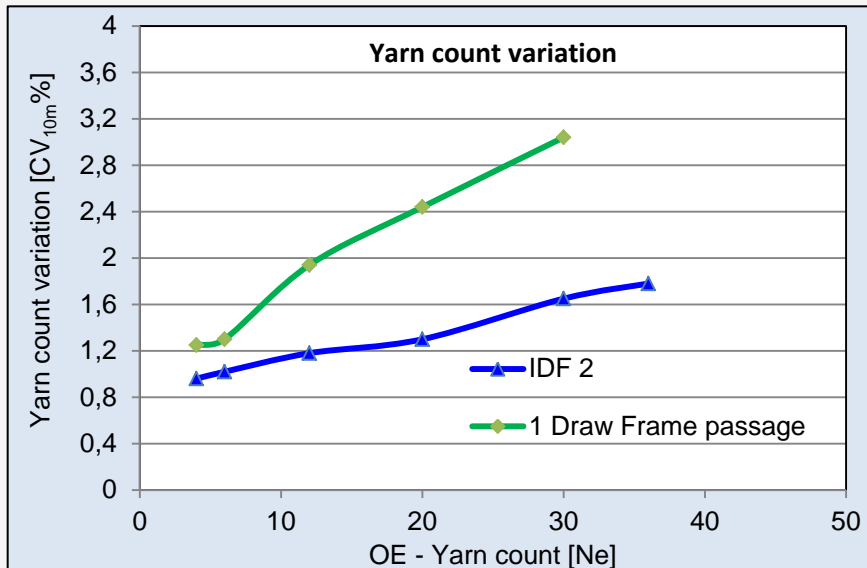
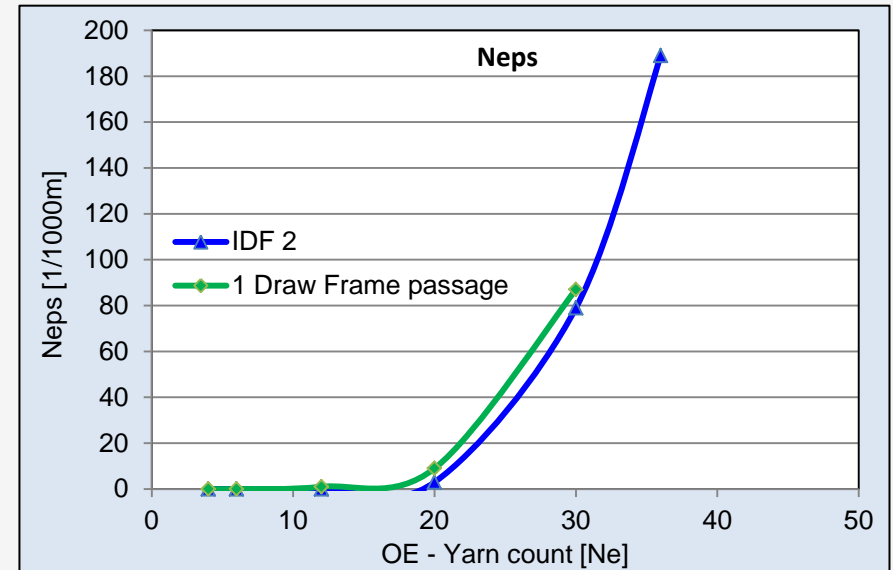
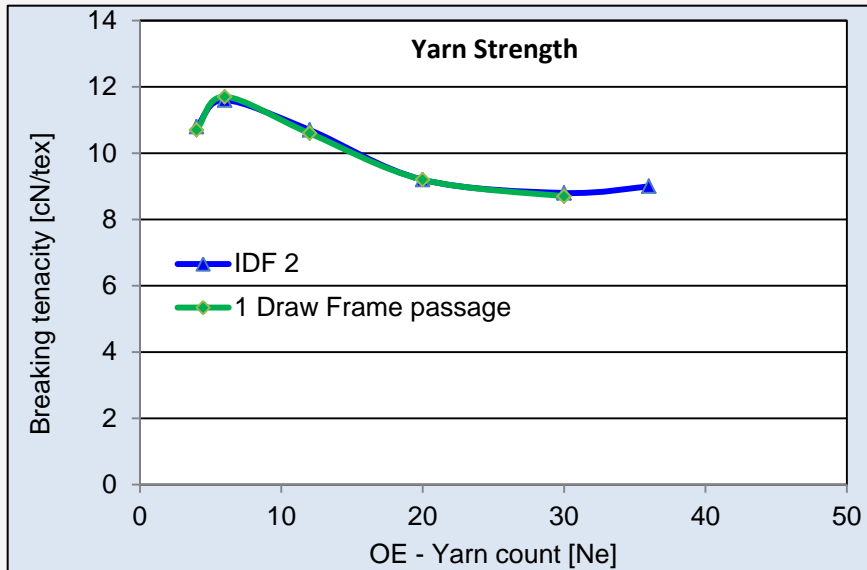
Results 70% Cotton/30% Comber noil – Yarn Quality



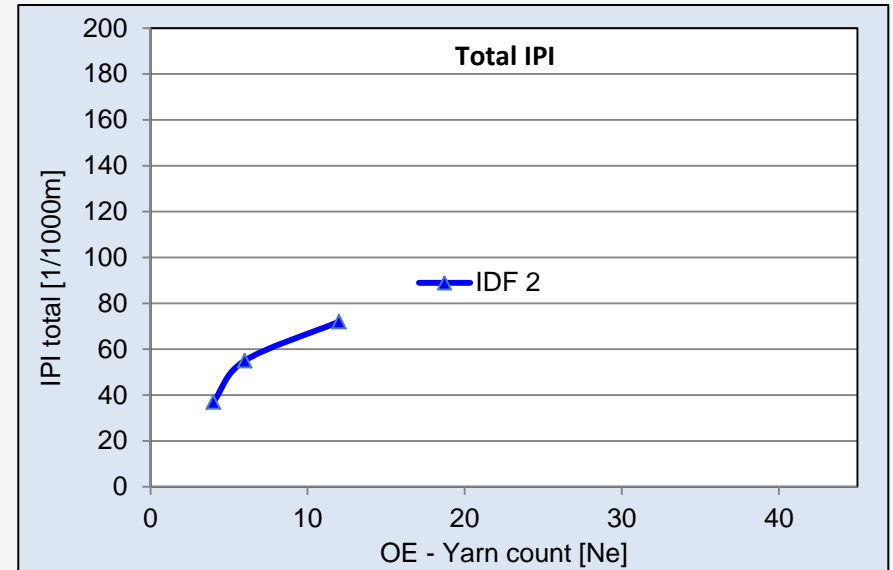
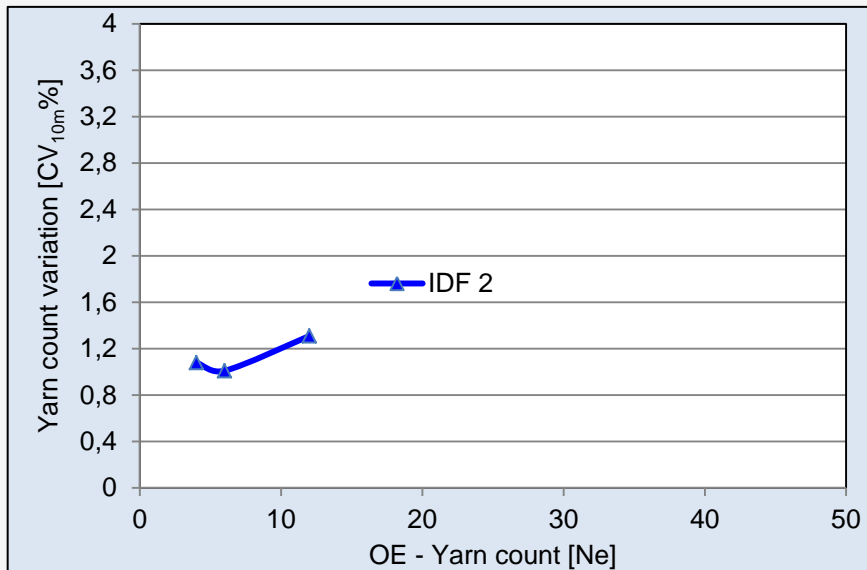
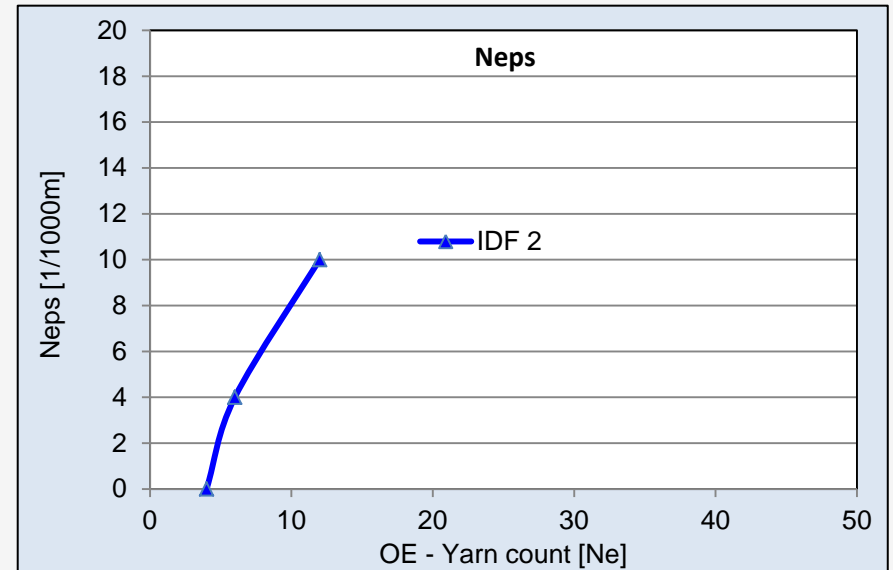
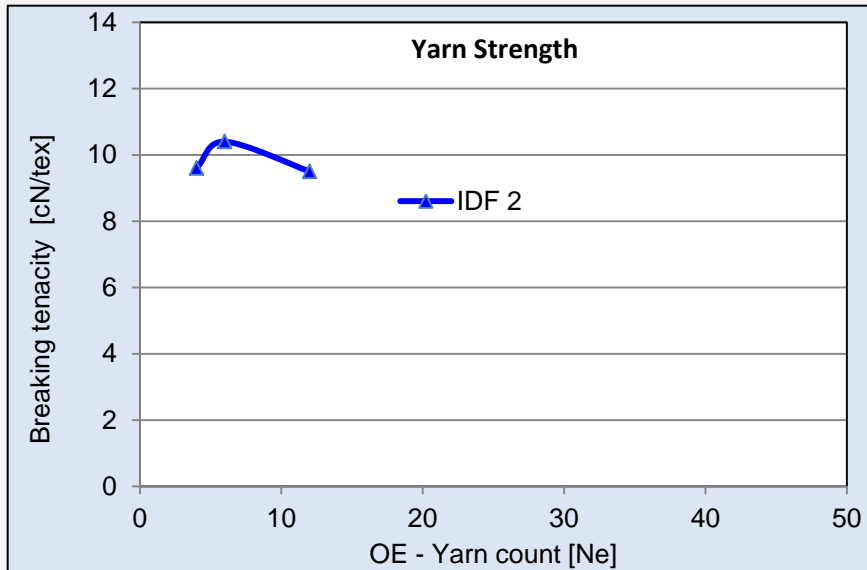
Results 50% Cotton/50% Comber noil – Yarn Quality



Results 30% Cotton/70% Comber noil – Yarn Quality



Results 100% Comber noil – Yarn Quality



Conclusion



- For the OpenEnd spinning process there is now a perfect preparation process through an integrated draw frame (IDF 2) into the card (TC 15, TC 10) with minimal draft.
- This process enables very good yarn values to be produced with a high proportion of short-fiber and foreign matter contaminated fiber material.

→ there is no reason to use conventional draw frames with doubling anymore to produce OpenEnd cotton yarn.

Questions?

