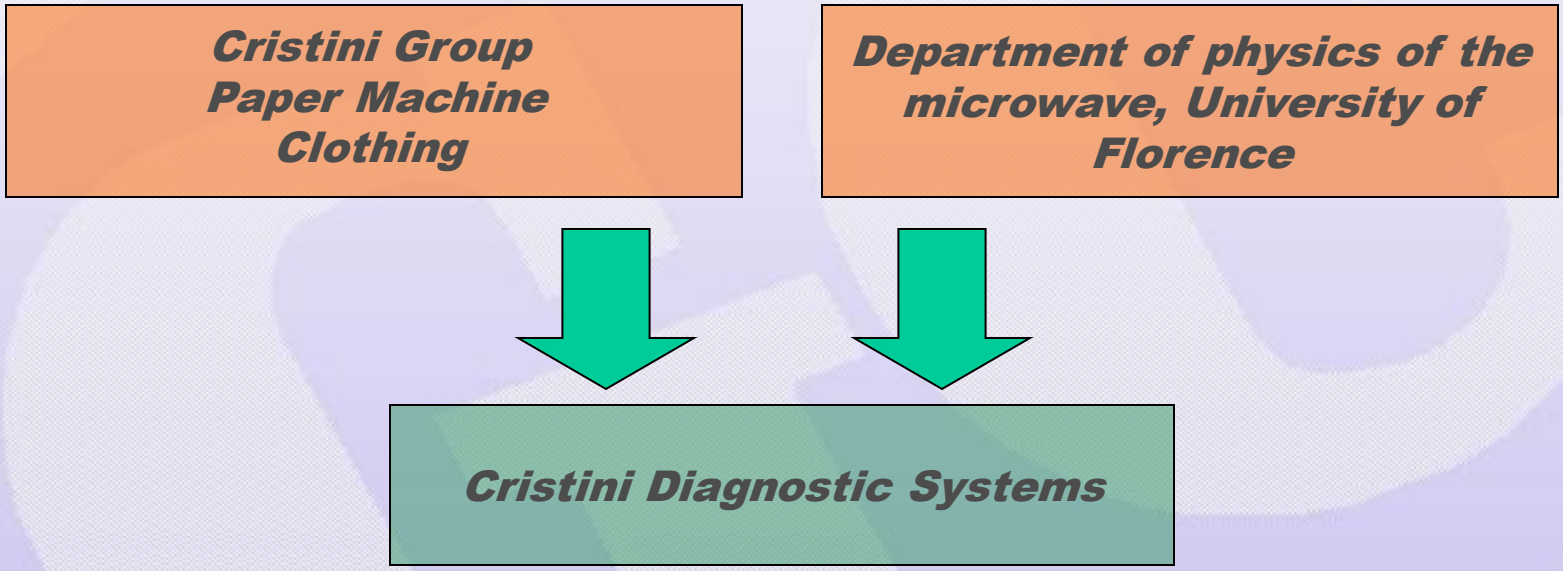
Cristini Diagnostic Systems



Microwave Diagnostic Instruments Line

	FiberScan ONE™	PresScan™ MKIV	PermFlow™	PermFlow DUOFIX™
Instrument				
Machine section	*Forming Section*	*Press Section*	*Press Section*	*Press Section*
Installation type	*Portable, on line*	*Portable*	*Portable*	*On line*
Features	*Microwave water mass consistency meter, CMD trends, connection to DCS systems*	*Microwave moisture meter avg temp*	*Felt permeability meter, temp. trend, trigger*	*Felt permeability meter, temp. trend, trigger, connection to DCS systems*

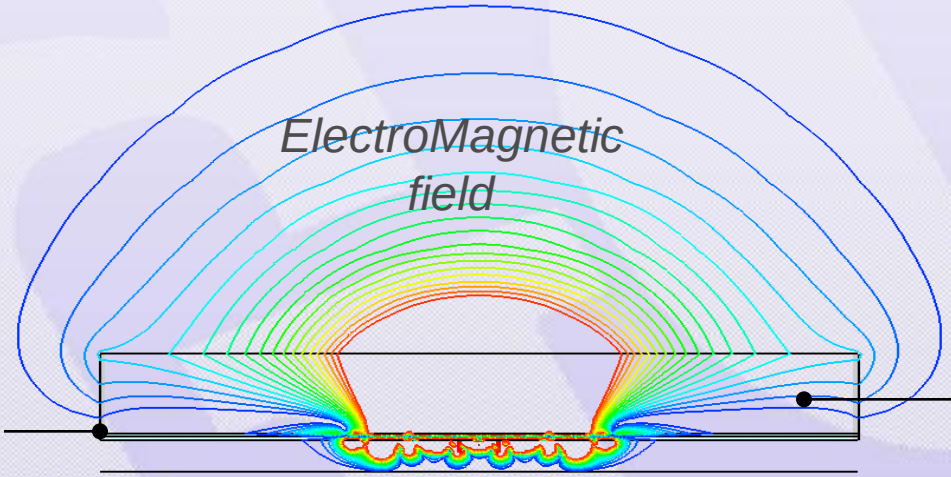
On-line Diagnostic Systems

The logic of Cristini planar microwave sensors technology is typically oriented to the integration into other elaborate systems (DCS-MCS), more and more frequent in the control loop of the papermaking process.

There are two main reasons for this:

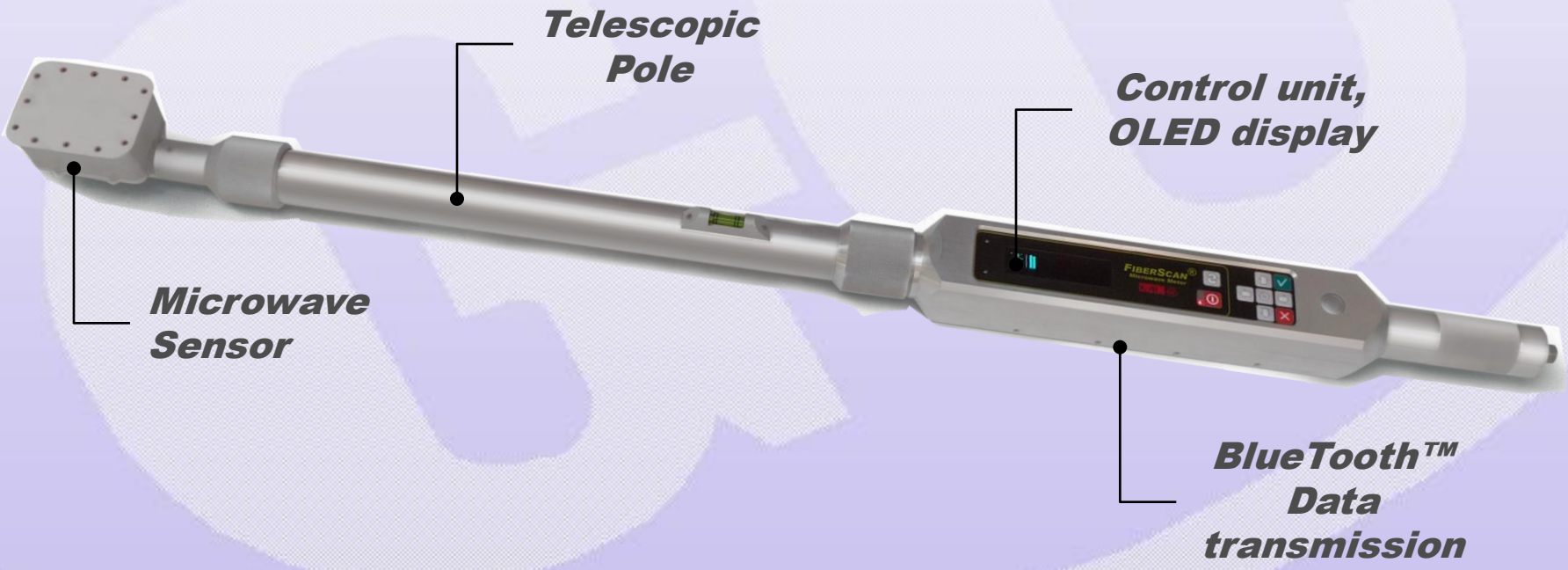
1. *safety reasons for the operator; it is more and more difficult to take data sampling "by hand" on the paper machines;*
2. *higher complexity of the new paper machines; now equipped with better controls systems. DCS-MCS systems are more and more evolved and they require more on-line data.*

Planar Sensor Microwave Emission



EY component of the near EM field on a transverse x cut plane

FiberScanONE™ Microwave Consistency Meter



FiberScan™ Microwave Consistency Meter

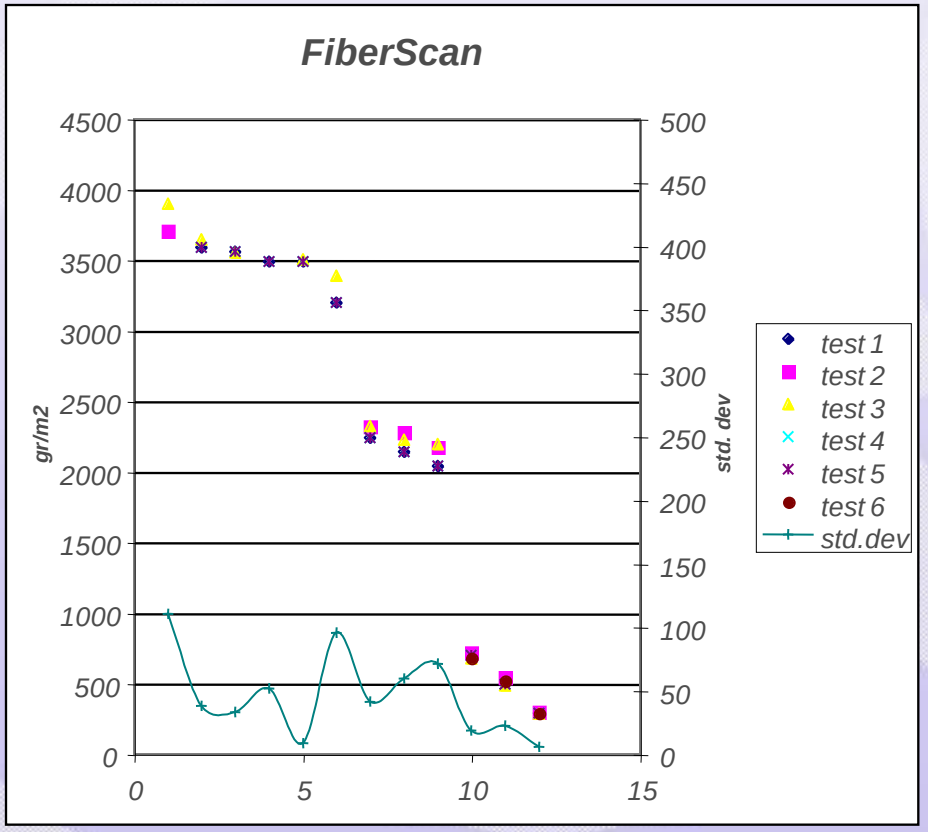
The FiberScan™ consistency meter permits to:

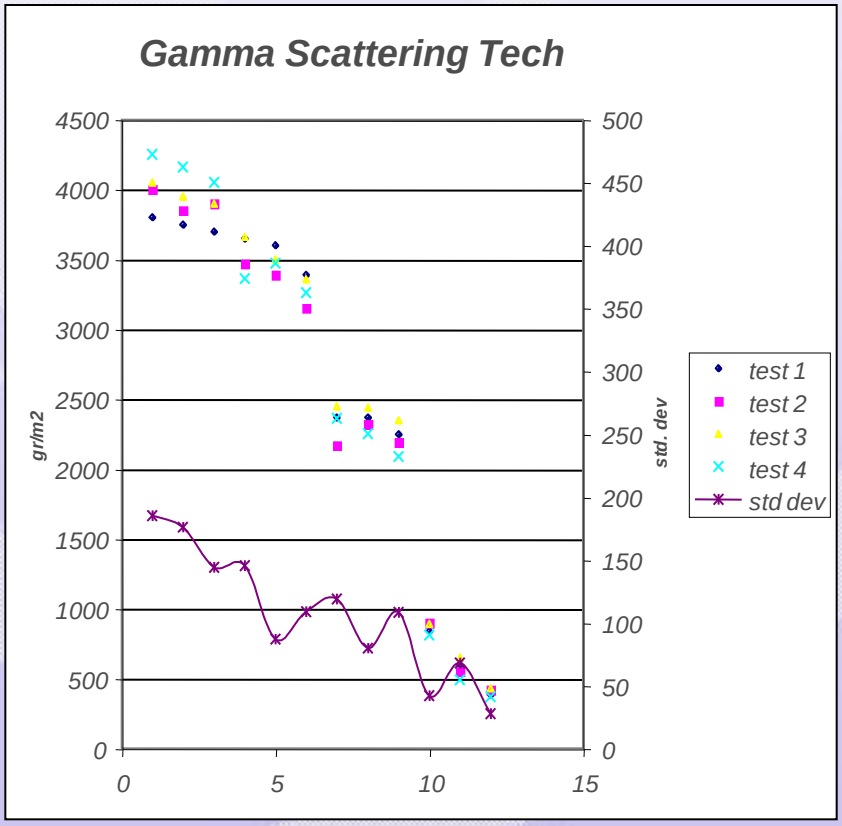
- *Troubleshoot drainage, retention & consistency in forming sections;*
- *Evaluate the efficiency of the chemicals used in the papermaking process, the drainage aids and the fabric cleaning;*
- *Conduct pulsation and turbulence analysis trough FFT filtration of the MD consistency profile. With a sampling speed of 1024Hz FiberScan™ is the fastest consistency meter on the market.*

FiberScan™ Consistency Meter: Advantages

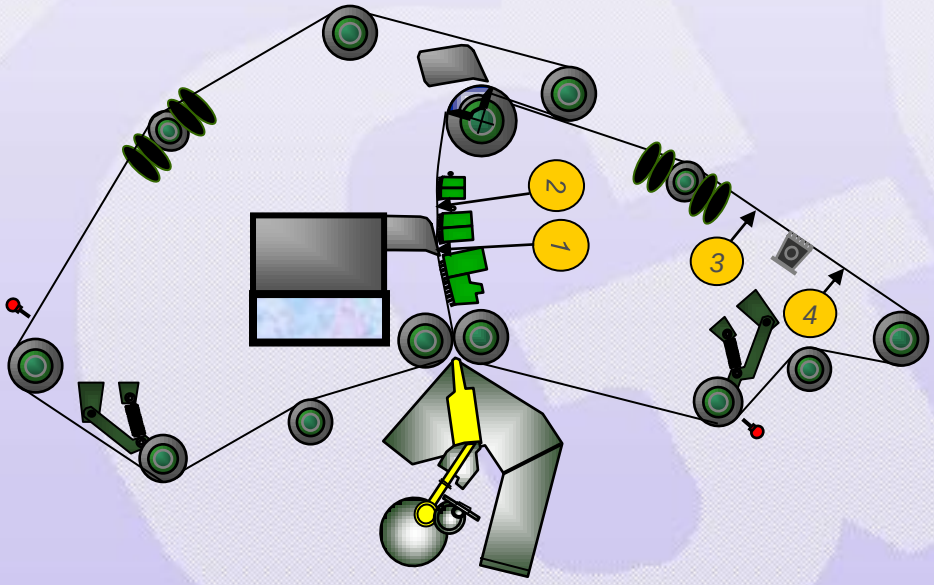
- *Harmless microwaves instead of radioactive sources to obtain the measurements. No radioactive hazard to the operator;*
- *No licences nor permissions to stock, transport or use radioactive materials.*
- *Improved reading reliability and repeatability;*
- *FiberScan™ technology permits to read up to 48.000gr/m2 of water (48mm), making not only suitable for paper, but also for pulp machines.*
- *Connection to DCS systems;*
- *Patented principle to compensate the water charge changes, insensitivity to chemicals;*
- *OptiWave™ high speed FFT analysis of the headbox pulsation, and foils activity.*

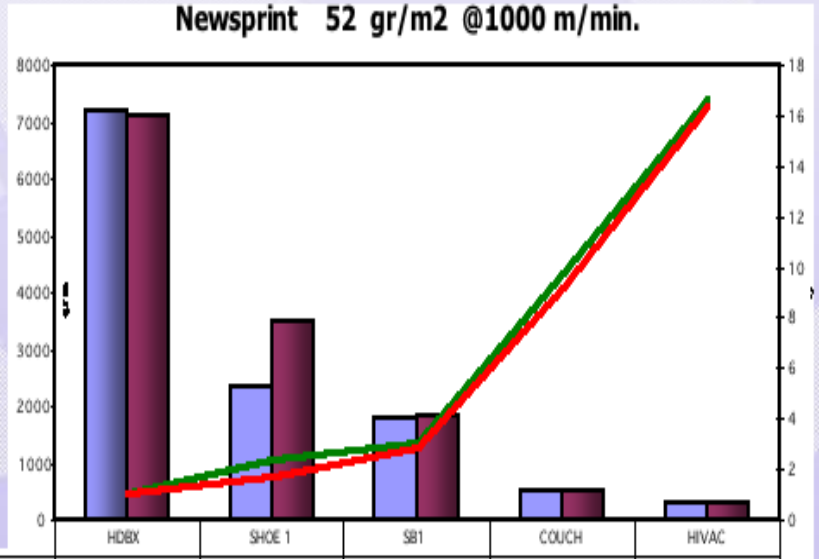
Reliability Matter. Precision by Design





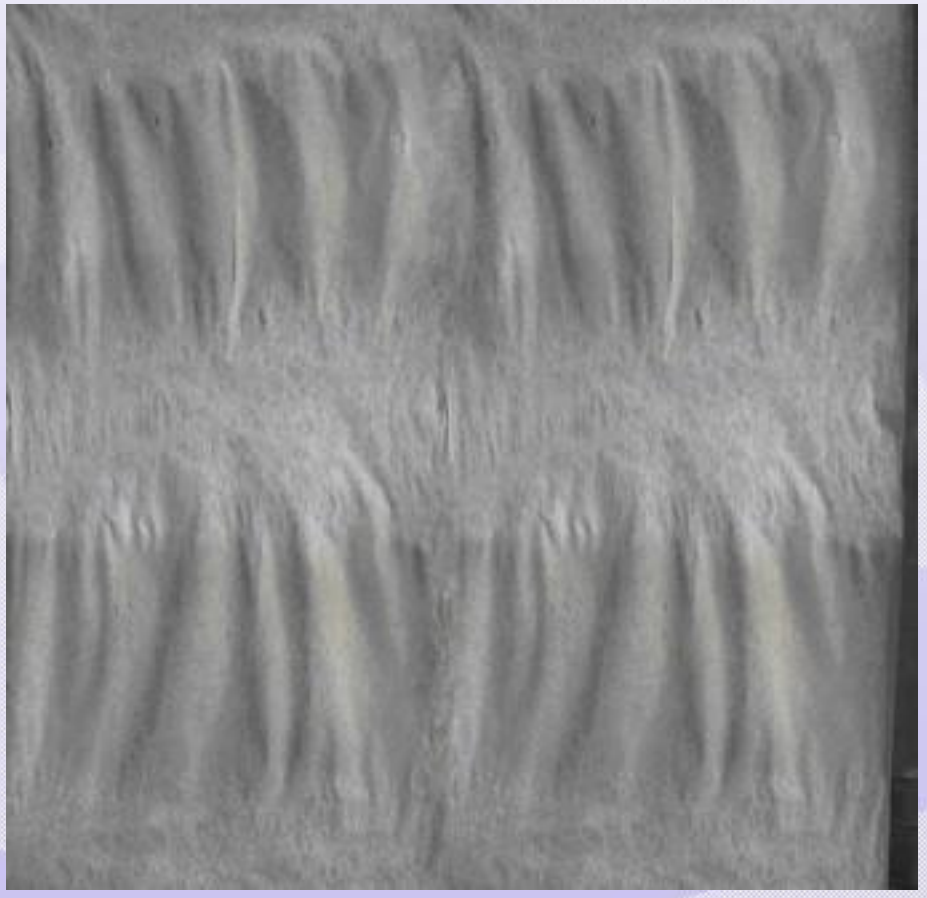
New Measurement Points Available





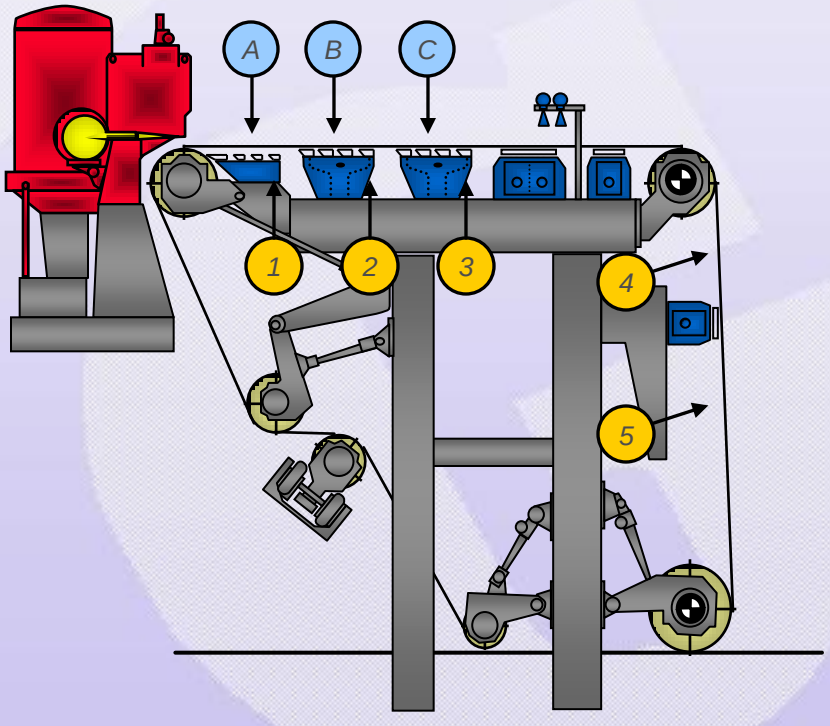
	HDBX	SHOE 1	SB1	COUCH	HIVAC
Mass on wire FiberScan	7176	2343	1766	498,57	290,34
Mass on wire Gamma Gauge	7107	3500	1850	530	295
Dryness FiberScan	1,1	2,41	3,05	9,74	16,65
Dryness Gamma Gauge	1,1	1,76	2,92	9,17	16,39

High Speed FFT Analysis Fan Pump Problems

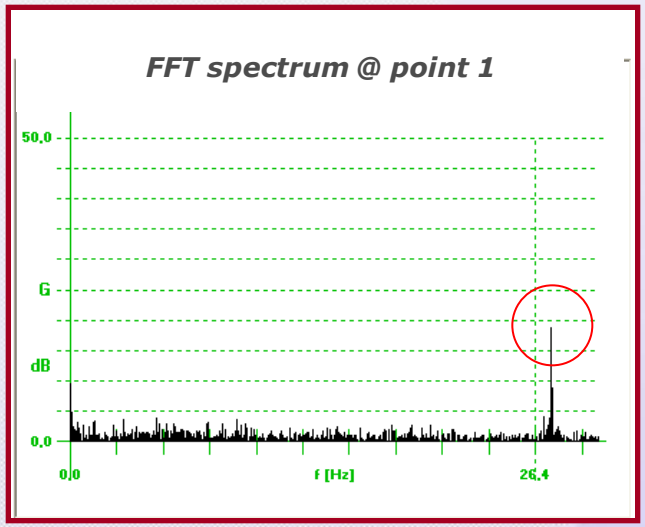


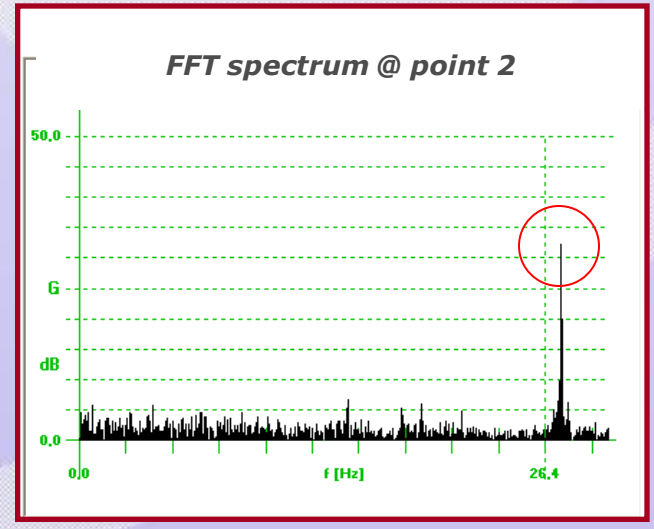
Paper picture showing a transversal barring defect

High Speed FFT Analysis

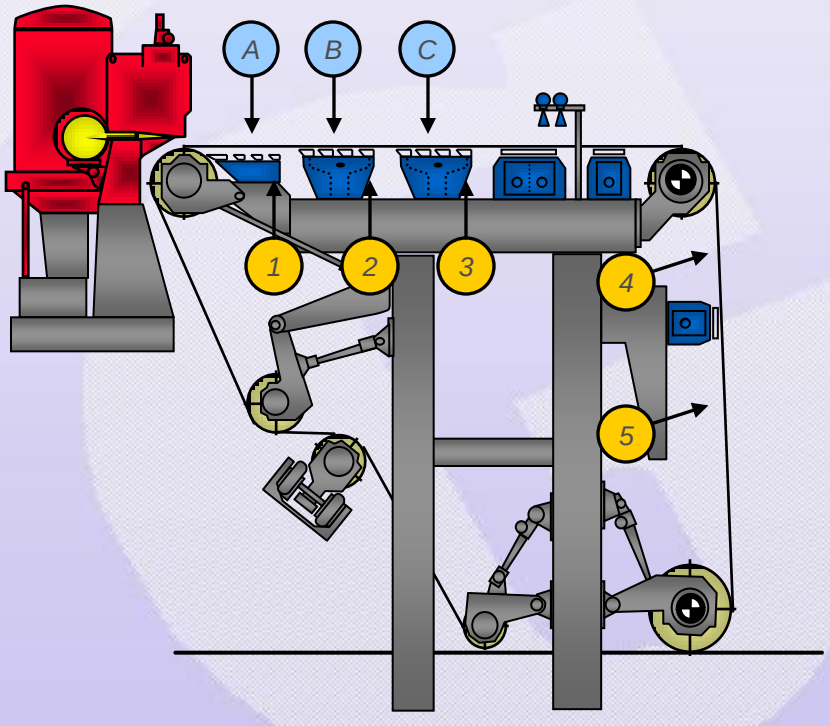


Picture of the Top Former where the FFT analysis was conducted





High Speed FFT Analysis



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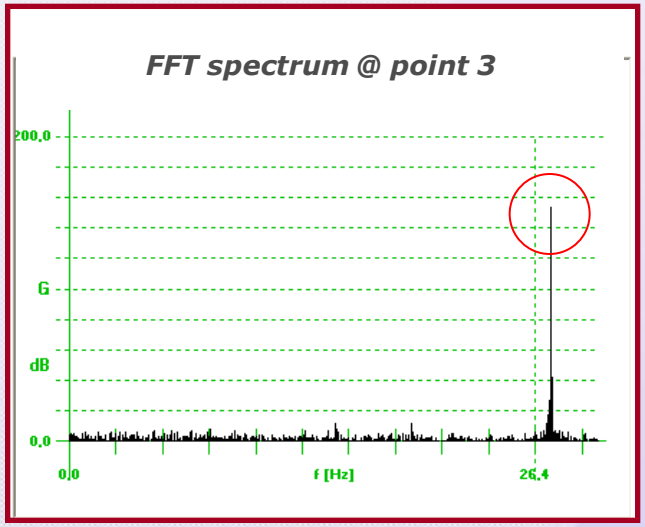
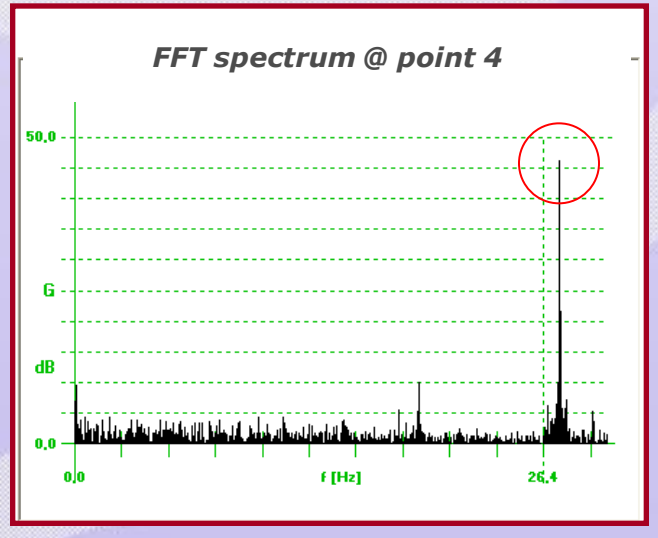
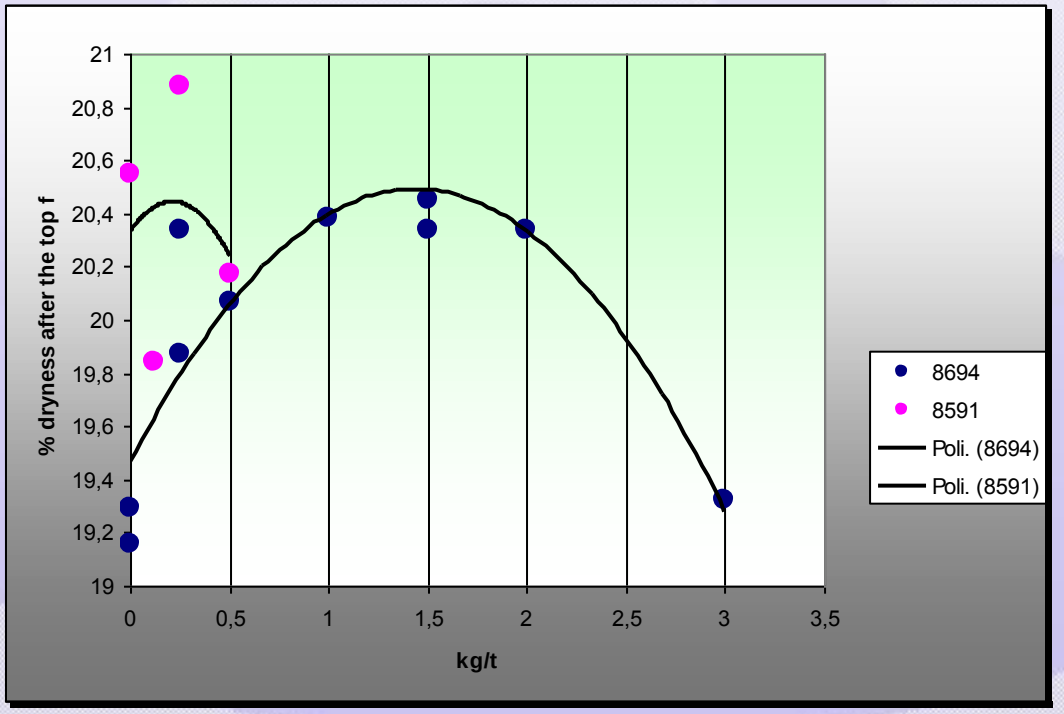




Drainage Effect on Wire by Retention Aid Type & Dilution

The following graphs show how the chemical dosage effect on sheet consistency after the top former unit. Very easy to understand the optimal dosage of the chemical.



8694			
Dosage	Dryness	Ratio	Delta %
0	19,29	-0,669413	-0,13
0,5	20,07	3,34706488	0,65
1	20,38	4,94335736	0,96
1,5	20,45	5,3038105	1,03
2	20,34	4,73738414	0,92
1,5	20,34	4,73738414	0,92
3	19,32	-0,5149331	-0,10
0,25	20,34	4,73738414	0,92
0	19,16	-1,338826	-0,26
0,25	19,87	2,31719876	0,45

8591			
0,25	20,88	7,51802266	1,46
0,5	20,17	3,86199794	0,75
0	20,55	5,81874356	1,13
0,125	19,84	2,16271885	0,42

FiberScan™ Consistency vs Grammage, Vacuum, Steam

Suction roll Vacuum (bar)

Consistency (%)

Steam Pressure (bar)

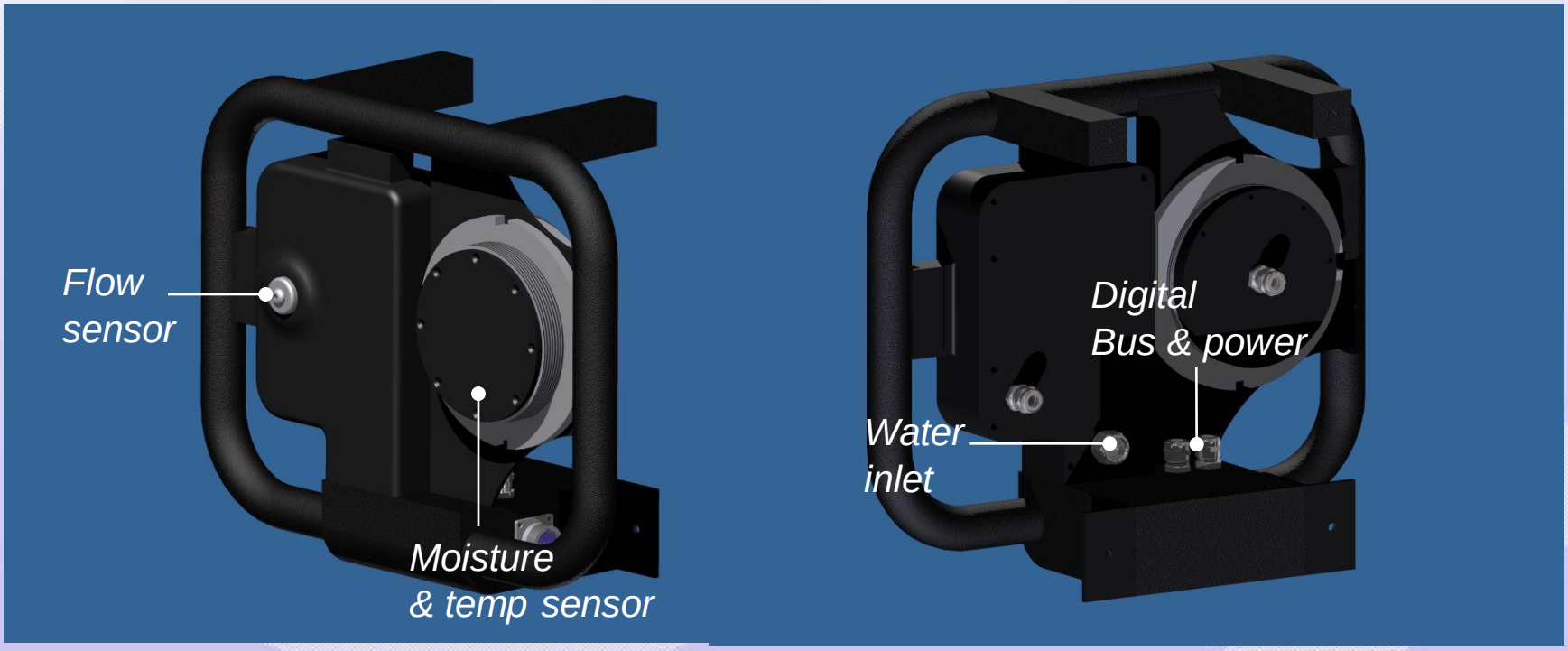
Water Mass (gr/m2)

PermFlowDUOFIX™ on-line Multiple Meter

The PermFlowDUOFIX™ diagnostic meter allows to:

- *Scan press fabrics CMD moisture trends, therefore the machine efficiency and paper quality;*
- *Scan press fabrics CMD water permeability to find out clogging bands, therefore the machine efficiency;*
- *Scan press fabrics CMD surface temperature, to monitor the work of the steam boxes if present, and find dangers fiber degradation;*
- *The system can be installed on the tail-cutter transversal beam of the paper machine, for CMD scans of the press fabric moisture, permeability and temperature;*

PermFlowDUOFIX™ On-line Moisture & Permeability Meter



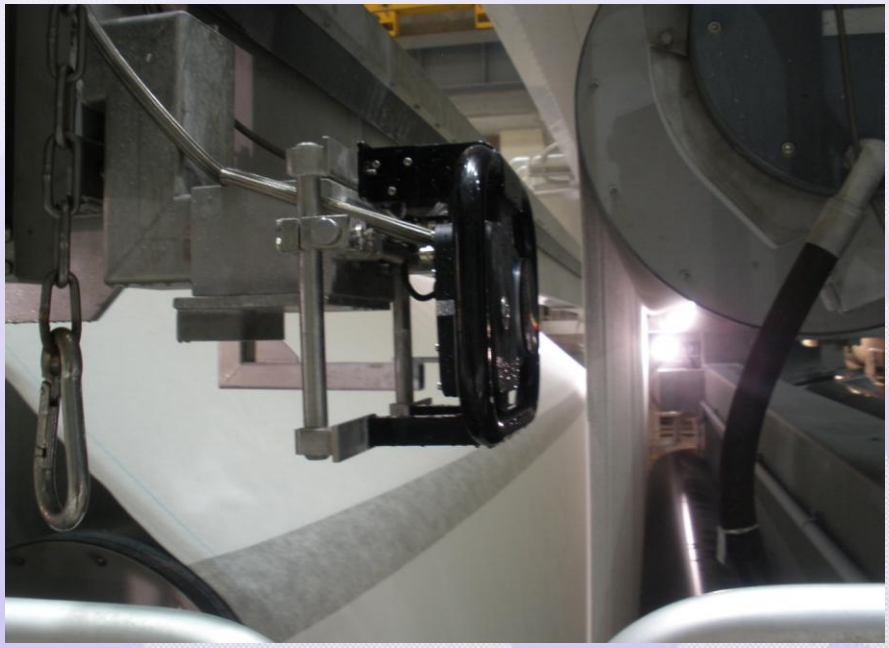
PermFlowDUOFIX™ Advanced Multiple Meter: Features

- *Moisture sampling rate 2048 sample/sec. A world record, the best resolution when conducting FFT pulsation & vibration studies:*
- *Water permeability sampling rate 512 samples/sec, more than 2 times the actual permeability meters;*
- *Fabric surface temperature 512 samples/sec;*
- *Digital data bus for machine DCS connection;*
- *Fully digital sensor, for maximum data reliability;*
- *Waterproof IP68 level.*

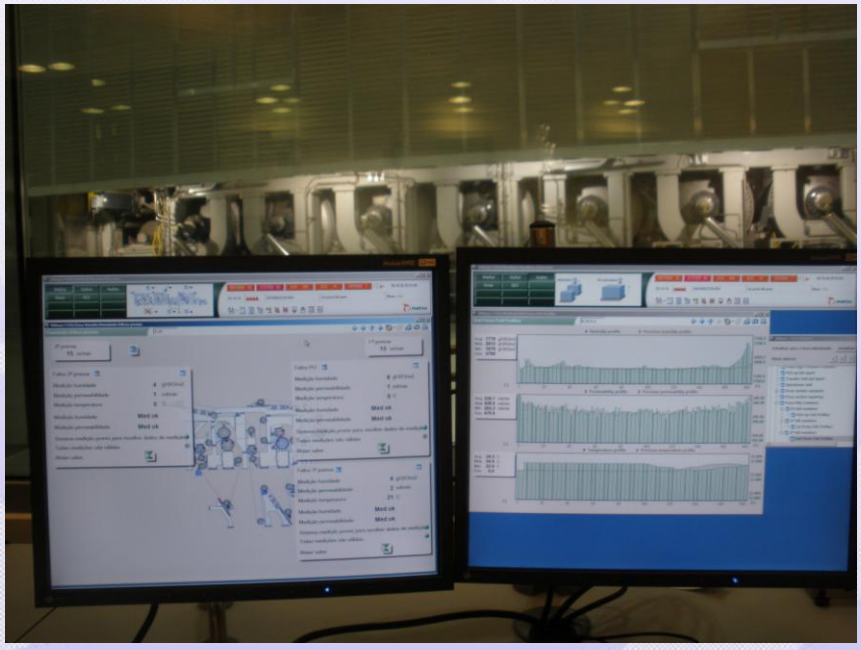
PermFlowDUOFIX™ Experience @ Soporcel ATF

Soporcel About the Future, Portugal. New PM4, 11,5m wide, 2000m/min. 3 PermFlowDUOFIX™ sensors installed. Started-up August 15th, 2009.

PermFlowDUOFIX™ Sensors @ Soporcel ATF PM9

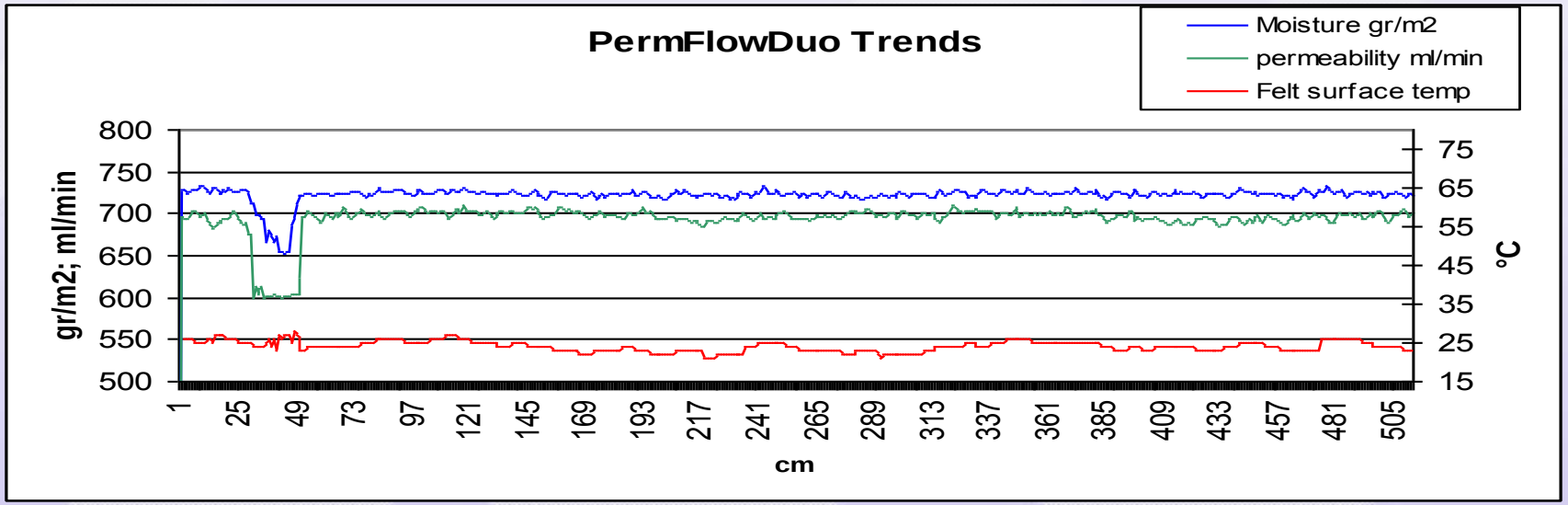


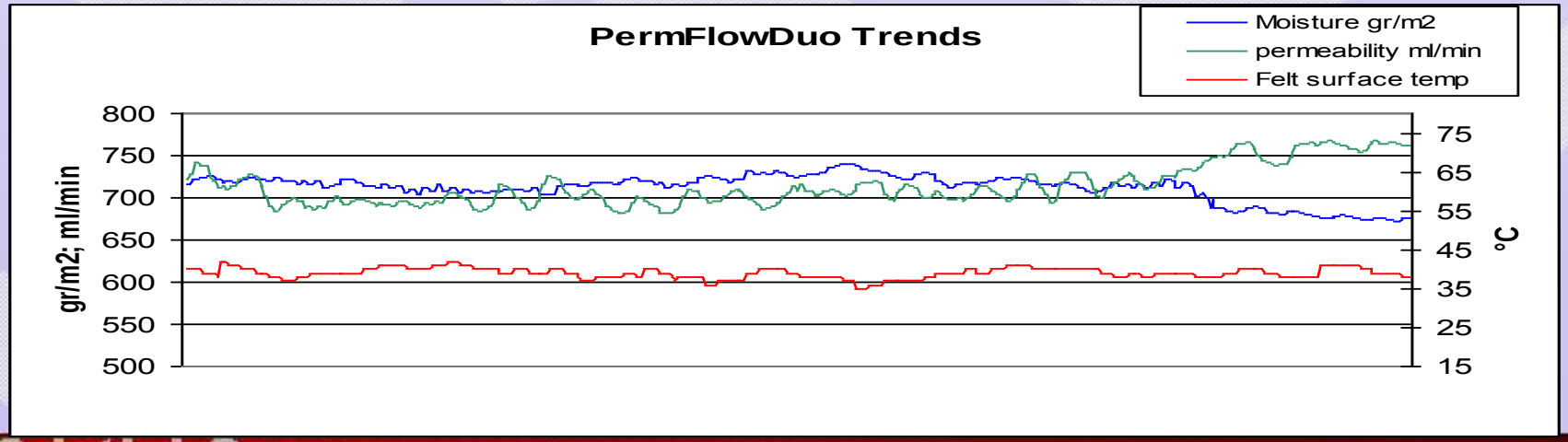
Pick up PermFlowDUOFIX™ Sensors



DCS permeability & moisture profiles

PermFlowDUOFIX™ Moisture & Water Permeability Profiles





Thank you
for your attention!