

PenetrationDynamicsAnalyzer emtec PDA.C 02

Module **PEA** Print Evenness Analyzer

Ultrasonic Tester for Prediction of Print Unevenness/Print Mottle of paper/board via Multi-Sensor Measurements of the Wetting and Absorption Behavior of Liquids



Gathering of the **profile** / the **distribution** of **printing process relevant surface parameters** of paper/board like **binder, pores, pigments, surface sizing** by measuring the interaction between testing liquid and paper using a novel sensor

Main applications:

- Prediction and determination of the reasons of print mottle with
 - coating base paper/board
 - printing paper/board uncoated
 - paper/board coated
 - Research & Development
 - Quality Assurance
 - Troubleshooting

Main user:

- Producer of paper/board
- Converter of paper/board
- Chemical supplier
- Machine building

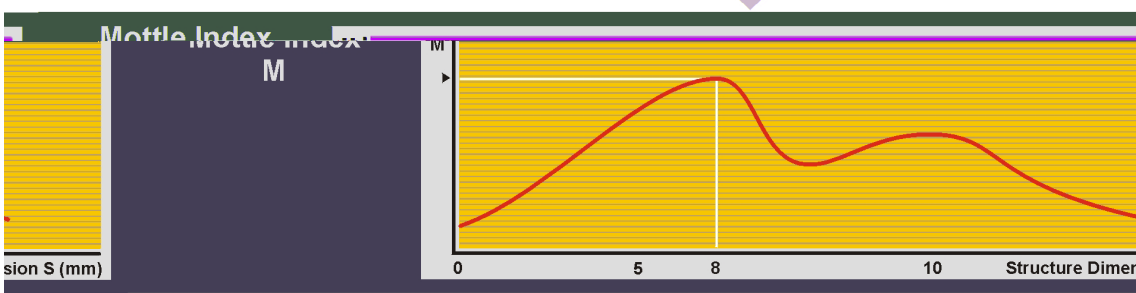
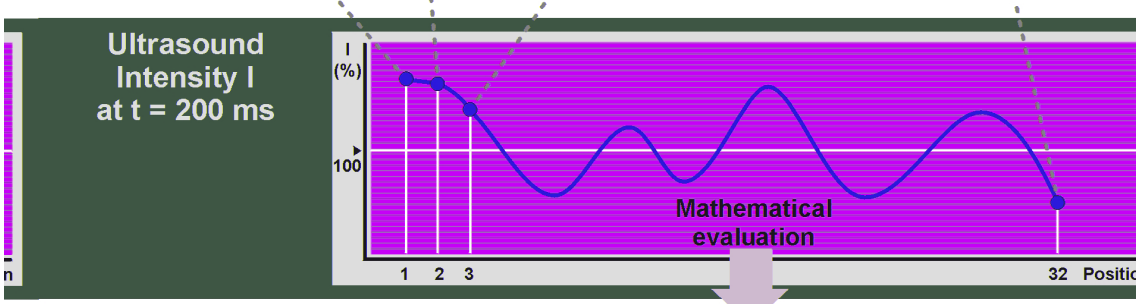
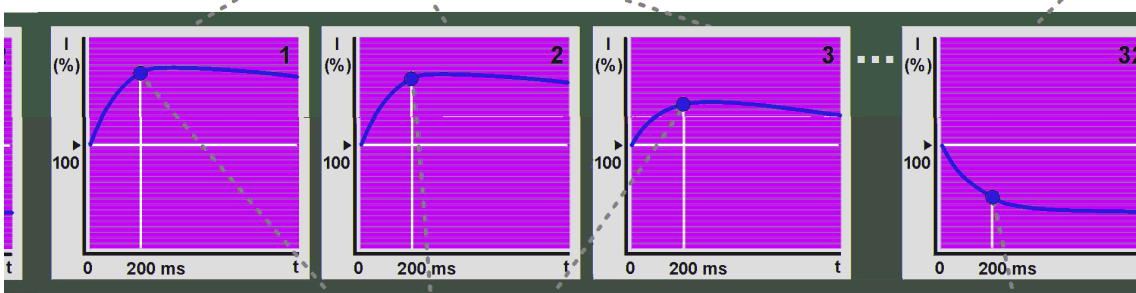
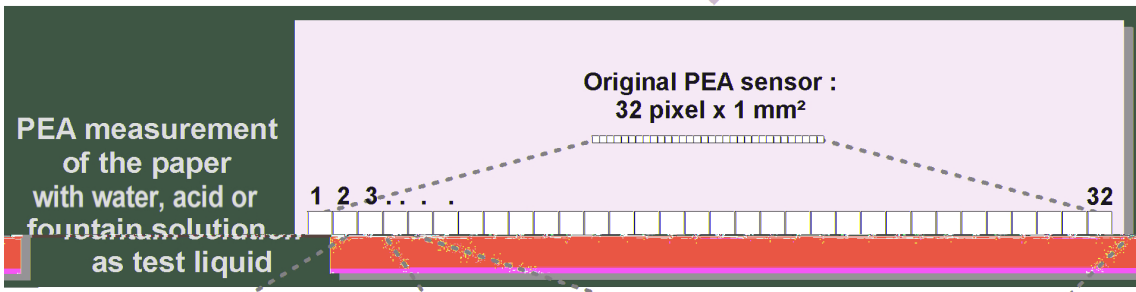
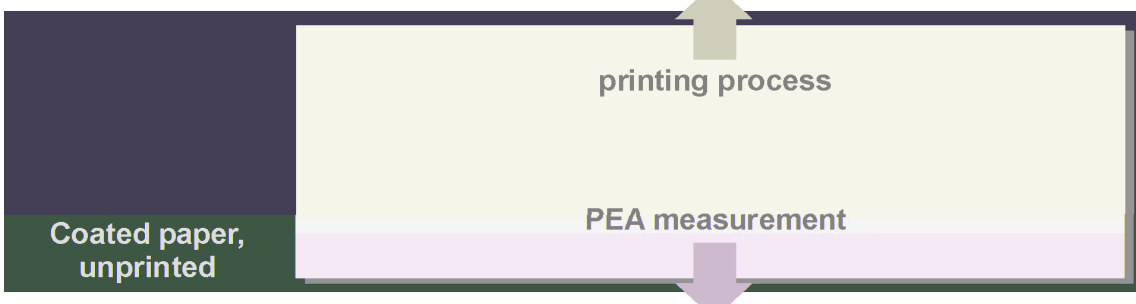
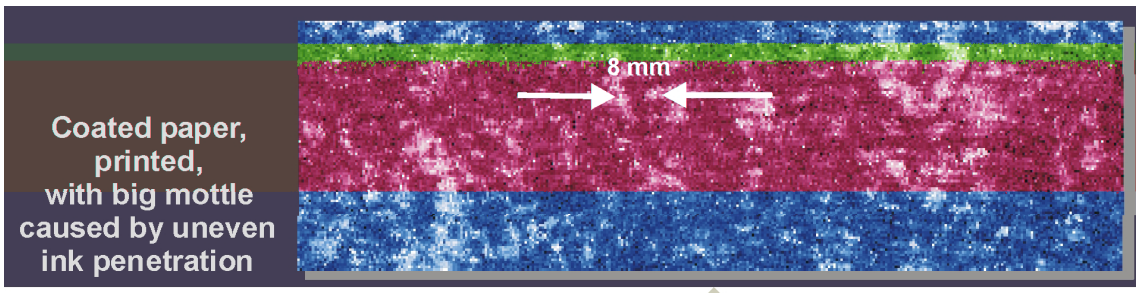
General application recommendation: Comparison of similar products, for the proof of changes in quality within one grade or a trial with one changed parameter, mainly of coating base paper / board

Features:

- R&D: efficient product design & optimization
- Troubleshooting: fast and efficient determination of the reasons for production malfunctions (back trap mottle, water interference mottle, coating base paper investigations)
- QA: avoidance of rejects as measured values are available immediately after production of a reel
- Assessment of formation, in particular with board
- Assessment of two-sidedness, filming degree / latex distribution in the coating
- Reduce or replace requirement of test prints and image analysis
- Absolute measuring results
- Fast available results
- Creation of an user specific mottle scale
- Automatically calculated results, based on a correlation analysis: PEA Mottle-Rating
- High statistical certainty by multi measurements and implementation of statistical methods
- Measuring duration: preferably approx. 8 up to max 15 secs. (depending on aim)
- Time requirement for a measuring series including sample preparation approx. 8 – 12 min.
- Sensor: 32 pixels per 1mm², resolution: 25dpi
- Average curve of 32 single curves available
- Initial reading approx. 40ms after liquid contact
- Volume of testing liquid: approx. 240ml
- Assessment of reasons for mottle by using different testing liquids:
e.g. water, fountain solution, ink jet ink, mineral oil
- Widely user-independent results
- Automatic self-test of the complete system prior to each measurement
- User-friendly software
- A single mouse click converts the analytical data to PDA format or exports it into MS Excel
- Very easy to operate

PEA application „printability“

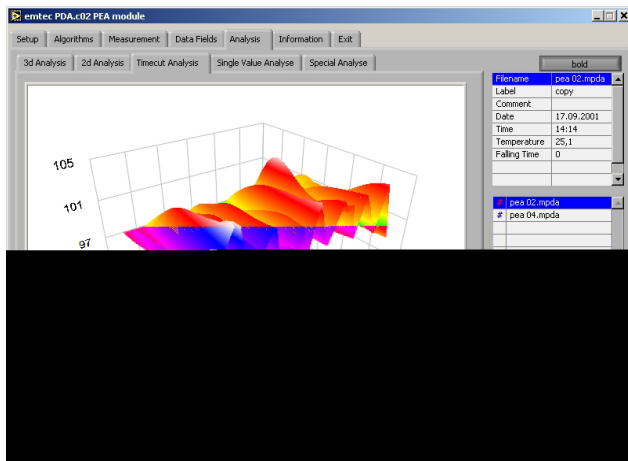
- Assessment of the **average** quality by the average curve of all 32 sensor elements
 - coating base paper, uncoated paper/board
 - sized: surface sizing and surface porosity
 - unsized: surface porosity
 - coated paper/board
 - porosity
 - covering, thickness of coating layer
 - coat weight
- Assessment of the **profile/distribution** of chemical and mechanical surface parameters by evaluation of the scattering of the measuring values of each of the 32 sensor elements
 - coating base paper, uncoated paper/board
 - sized: distribution of the surface sizing agent
distribution of the surface porosity
 - unsized: distribution of the surface porosity
 - coated paper/board
 - distribution of binder/porosity/pigments



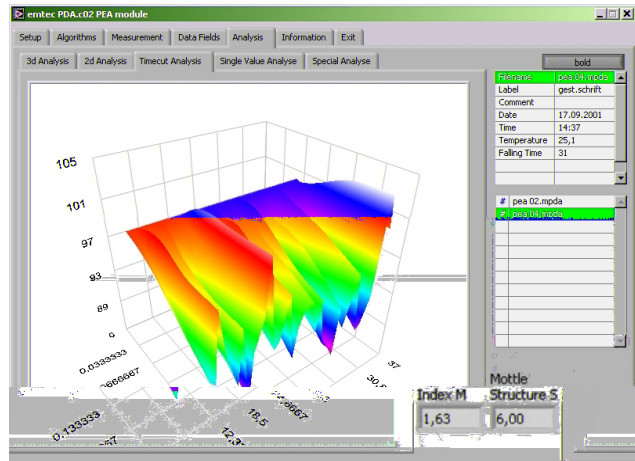
Measuring Principle

A paper sample is fixed with double-sided tape at a sample holder and is brought in contact with testing liquid in a measuring cell by the PDA.C 02 Basic Device. From the moment of liquid contact, it is radiated in the Z-direction with high-frequency low-energy ultrasonic signals with a frequency of 2MHz or 1MHz optional. The attenuation of the ultrasound changes as the paper reacts with the liquid. Uneven liquid reaction/ penetration from point to point results in different signal intensities at the different sensors. This variations are gathered point-dependent by a novelty receiver with a resolution of approx. 25dpi. The Mottle Rating, the Variance, the Mottle Index M and the Structure Dimension S are calculated by a personal computer.

PEA measurement of two unprinted coating base papers with different mottle tendency:
3D-Figure (intensity I; time t; position x) as well as Mottle Index M and Structure Dimension S



weak mottle



strong mottle

Technical Data

- **Sensor:** one line of 32 sensor elements, each 1mm x 1mm horizontally
- **Measuring frequency:** 2MHz (for paper) or 1MHz (for paper and board)
- **First analy** 5.6(o)2(x)hou8(F)-5.2(i)-0d8(F)-5 c.6(o)2((an)-5F)-5