

P-Series Detmaster System for Coated Multi-ply Board Products

Detmaster is a product family dedicated for concurrent on-line web inspection and quality control of paper, board and pulp products. The Detmaster P-series systems are able to simultaneously detect the primary defect types such as streak, impurity, hole, spot, etc. as well as to measure critical web quality parameters such as brightness, gloss, formation, gloss-mottling, white-top mottling, etc.

This novel approach became possible by exploiting high purity PIN diode arrays having large dynamic range and high signal to noise ratio. The large dynamic range and the new frequency multiplexing method enable the parallel and simultaneous exploitation of several different illumination geometries in a single detector frame, which makes the system cost efficient compared to conventional technologies and methods for same purpose. Furthermore, the ambient light doesn't disturb the measurement since PIN diode arrays are locked to receive only the frequencies from the system's illumination sources.

The unique Detmaster technology provides for coated multi-ply board inspection excellent tools to reveal various defect types as well as surface quality parameters. The technology enables for coated top and / or bottom surface inspection simultaneous utilisation of 2 illumination angles (reflective and diffuse), 2 frequencies (one for each illumination angle) and 2 illumination wavelengths (white light and ultraviolet light). All this is integrated into a single detector beam, which makes the Detmaster system extremely cost efficient compared to the conventional solutions.

The aforesaid single beam solution enables detection of all the most hazardous defect types such as streaks, missing coatings, delaminations, dark spots, light spots, glossy spots, matt spots, impurities, holes, optical brightener spots and even streaks of the lower coating layers as well as measurement of surface quality parameters such as gloss, white top mottling, brightness and gloss-mottling. The optical brightener spots and streaks of the lower coating layers are revealed with ultraviolet light when optical brightener is used for concerned board grade manufacturing. The conventional competing technologies can't exploit ultraviolet light wavelengths for defect detection purposes.

Furthermore, the Detmaster technology enables on an open draw with a single detector beam solution integrated with a transmission illumination source on the other side of the web the detection of tiny holes ($> 0.1 \text{ mm}^2$), edge cracks and even core ply holes as well as formation measurement of the web through all plies. As transmission illumination source is used LEDs emitting infrared light wavelengths because infrared light provides high light intensity and passes through thick and dense coated multi-ply board material.

Please find on the next page the pictures of a single beam Detmaster solution for coated surface inspection installed against a roll as well as a single detector beam solution integrated with a transmission illumination source on the other side of the web installed on an open draw.

