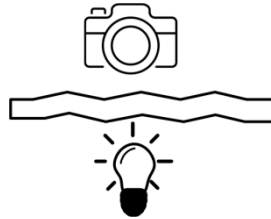


Description



Formation MRP FOR 2015

Online Formation measurement

The online formation measurement presented here is based on the leaflet of the Zellcheming Association for the standardization of the different formation measurements.

Formation is understood here to be various parameters that describe the uniformity of the optical appearance of a paper in transmitted light.

Indicator / Characteristics

The online formation measurement is characterized by the following features:

- two-sided contactless measurement
- can be installed in traverses and fixed position
- online capable
- applicable in industrial environment

Physical principle

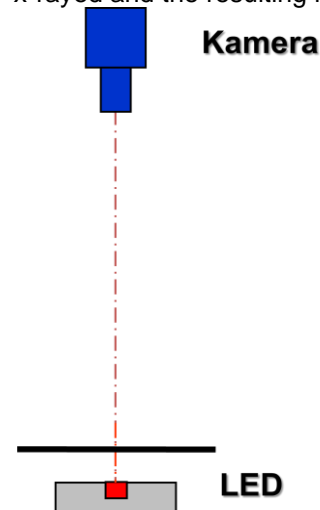
Traditionally, the formation is usually described by only one formation index. Since this often leads to unsatisfactory results, it is now proposed to evaluate the formation using three indices:

Contrast is the difference between the light and dark areas

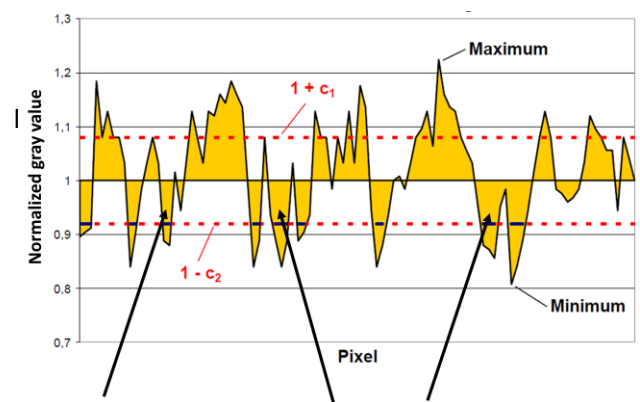
Cloudiness [mm] is the average size of the structures / clouds visible in the paper. The cloudiness F_{wi} (w_i - cloudiness index) is the average size of the flakes (clouds) in the paper. These are the areas "dark" in the paper (below the average value).

Orientation [-1...+1] is a measure of the directional dependence of the structures in the paper. The key figure for the orientation should be the symmetry / evaluate asymmetry of the image with respect to the two main directions.

These 3 characteristic values are evaluated by the optical formation measuring instrument. For this purpose a camera is mounted on one side of the web and an illumination on the other side. The paper is x-rayed and the resulting image is recorded.



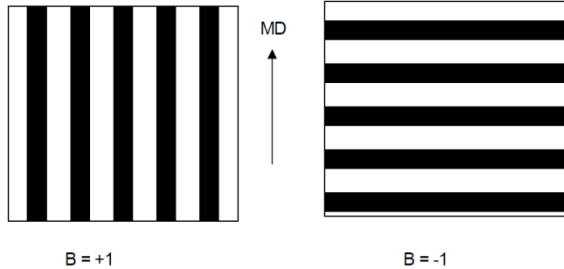
While the images in the online measurements are recorded with a line scan camera, a area camera is used in lab measurements.



Flock size is the average value of the dark areas in the paper

Cloudiness is the mean value of all blue lines

Besides the contrast and the cloudiness the orientation is evaluated. The following picture should explain the evaluation.



Orientation B = 0: no preferred orientation
Orientation B = +1 only orientation in MD,
"Clouds" on CD

Orientation B = -1 only orientation in CD,
"Clouds" in MD

Recorded and displayed measured variables of the system

- Contrast
- Cloudiness
- Orientation (MD/CD)
- Number of flocs
- Mean value floc size
- Angle of the flocs
- Image of the paper in transmitted light
- Dirt spots (per area or per time)
- Pin holes (pinholes per area or per time)