Mottling and graininess analysis

PapEye Mottling for Windows
PapEye Graininess for Windows

Analysis according to ISO/IEC 24790

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Definitions

Mottling: *Defect occurring in prints which has a negative influence on the perceived evenness of the print.*

Graininess: *Fluctuations in the lightness of the printed sample, which causes inhomogeneity in the printed image while it is viewed under a homogeneous light source. [1]*

[1] B. Panahi, S. G. Kandi.: Introducing new methods based on the standard iso/IEC 24790 to evaluate graininess for coloured printed images

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# Procedure according to ISO/IEC 24790

1. Obtain image and select homogeneous region of interest (min. 1x1 inch for mottling, 0.5x0.5 inch for graininess)

2. Convert image to grayscale with CIE index method

3. Apply 2-dimensional wavelet filter

4. Calculate variance of filtered image to obtain **mottling/graininess value**

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Examples of mottling values
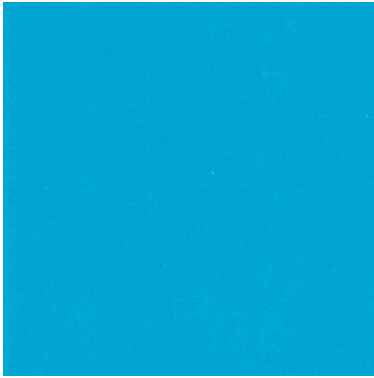
Good print quality

Mottling value 0.29
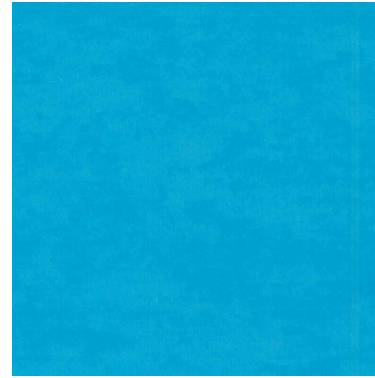
Worse print quality

Mottling value 1.34

Mottling values indicate variations in the print

Lower mottling values = better print quality.

Mottling vs graininess scale

Graininess: 0.3 to 1.47 1/mm

Wavelengths: 0.68 mm … 3.3 mm

Mottling: 0.09 … 0.37 1/mm

Wavelengths: 2.70 mm … 25 mm

Table 2 — Frequency band of 6 wavelet levels

Scale level	Frequency band (cy/mm)	
5	23,6220 to 11,8110	High frequencies to be removed
4	11,8110 to 5,9055	
3	5,9055 to 2,9526	
2	2,9526 to 1,4763	
1	1,4763 to 0,7382	Frequencies for graininess
0	0,7382 to 0,3691	

Graininess

Table 3 — Frequency band of nine wavelet levels

Scale level	Frequency Band (cy/mm)	
8	23,6220 to 11,8110	High frequencies to be removed
7	11,8110 to 5,9055	
6	5,9055 to 2,9526	
5	2,9526 to 1,4763	
4	1,4763 to 0,7382	
3	0,7382 to 0,3691	
2	0,3691 to 0,1846	Frequencies for mottle
1	0,1846 to 0,0923	
0	0,0923 to 0,0461	

Mottling

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Difference: Graininess is calculated from finer variations (shorter wavelength).

Mottling and graininess analysis scale example

**Mottling
1x1 inch**

Original image   **Grayscale**   **Wavelet filtered**
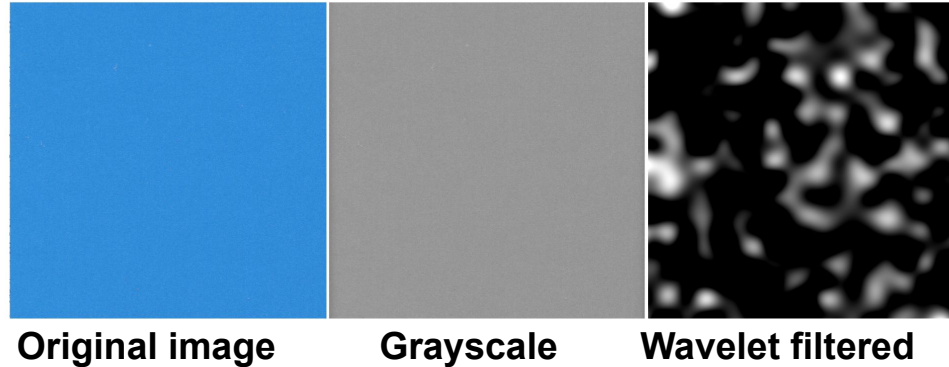
**Graininess
0.5x0.5 inch**
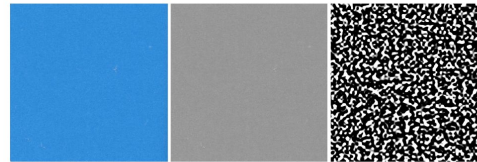
Images in scale with each other.

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Mottling analysis areas (can be saved and loaded, right click to delete)

Mottling results

Image files in working directory

Working directory

PapEye Mottling for Windows

Mottling analysis areas (can be saved and loaded, right click to delete)

Mottling results

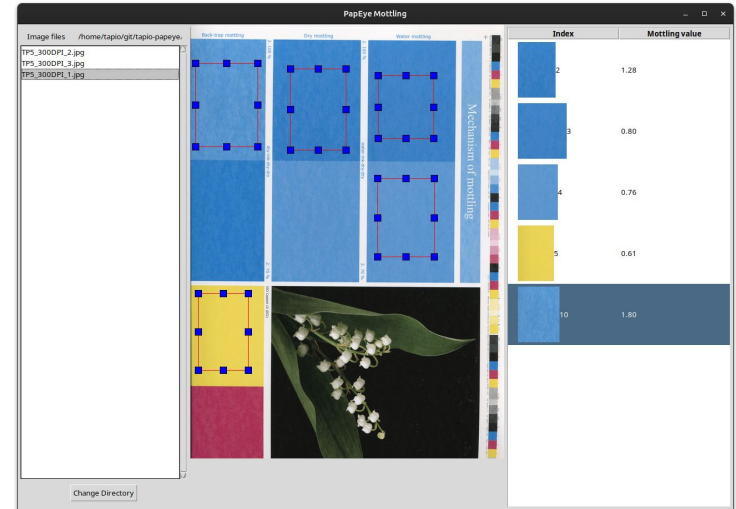Image files in working directory

Working directory

PapEye Mottling for Windows working procedure

1. Scan mottling samples.
2. Define mottling analysis areas
3. View, log and export results

*List of recommended scanners available from Tapio Technologies.*

Recommended resolution for mottling: 300 DPI.

Recommended resolution for graininess: 1200 DPI.

PapEye Mottling for Windows features

- Select mottling analysis areas, view mottling values
- Run mass mottling analysis for entire working directory
- Export results into excel
- Load and save mottling analysis areas

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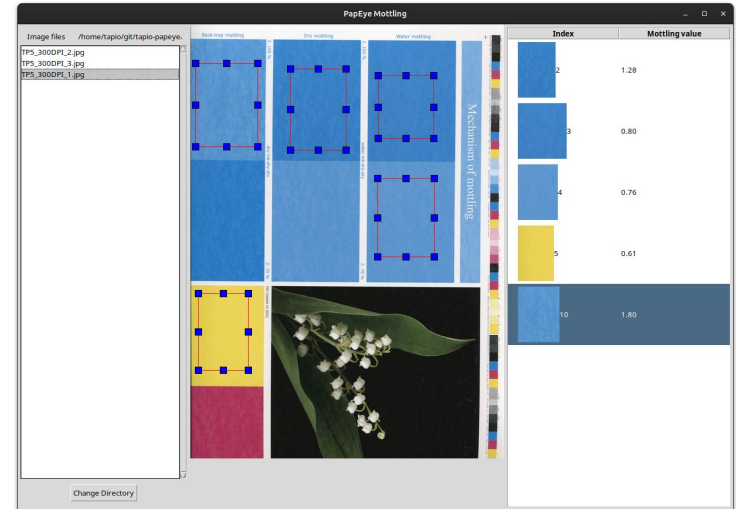
PapEye Mottling for Windows
PapEye Graininess for Windows

Sold as permanent license for single PC.

Contact for demo and sales:
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