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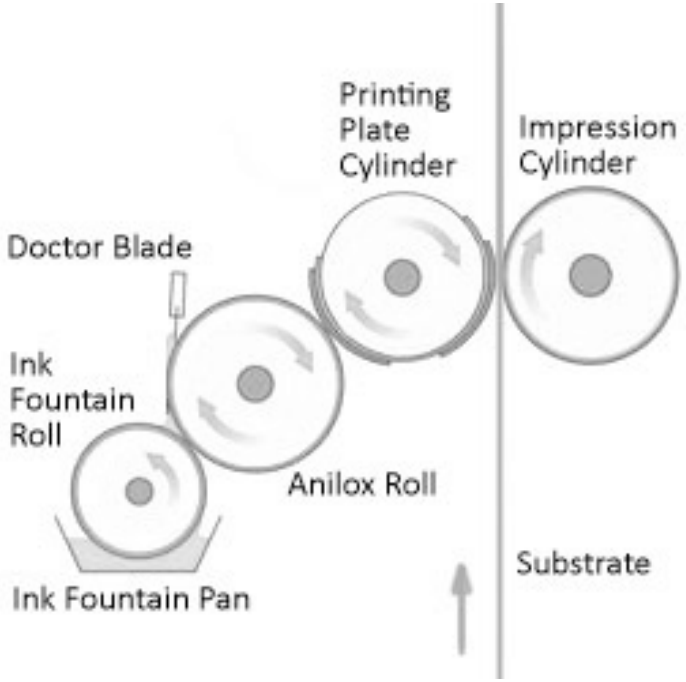
MEETING THE QUALITY REQUIREMENTS IN THE FLEXOGRAPHIC PLATE MAKING PROCESS

Content

- Flexographic printing technique
- Computer to Flex (CtF)
- Digital workflow
- Experimental part
- Results and discussion
- Conclusion

Flexographic printing technique

- Direct printing technique
- Packaging industry
- Printing on a wide range of substrates
- Printing plates based on photosensitive monomers
- Computer to Flex – plate-making procedure



Photopolymer printing plates

- Flexibility of the plate: advantage and weakness
  - Printing on a wide range of materials;
  - Possibility of deformation of printing elements because of the straining on plate cylinder and pressure in printing process.
- A number of parameters which should be controlled, standardized and defined in the reproduction workflow.
  - properties of the printing substrate and printing ink;
  - possible deformations of printing plate during the printing should be defined and predict as well.

Digital workflow

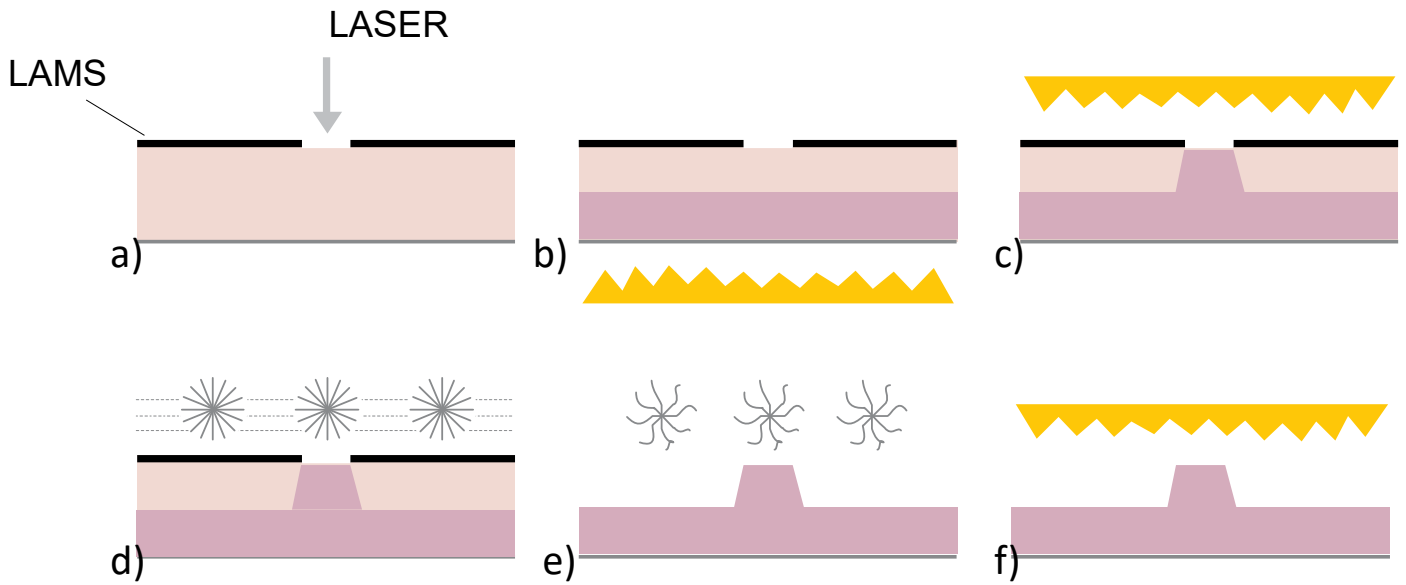
- Adjustment of the plate making process must be performed to compensate deformations and material limitations in the workflow
- In this paper the adjustment of the photopolymer printing plates to match qualitative requirements of different substrates have been presented.
- The influence of different printing substrates on printing plate curves adjustment has been observed.

Experimental part

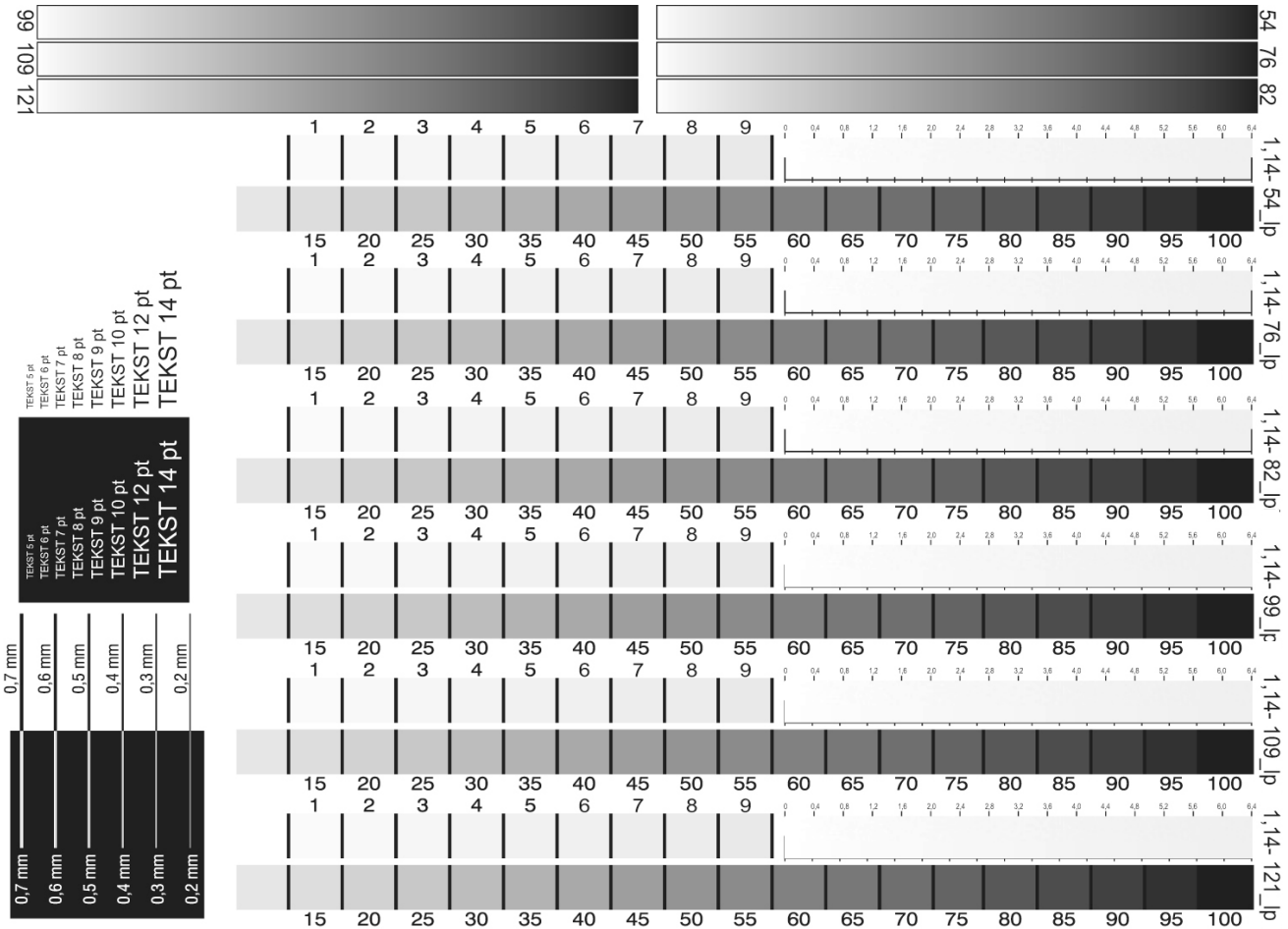
- Esko Artwork digital workflow was used.
- EskoArtwork enables automatization and optimization of the whole flexographic printing plate production.
- Samples : Asahi AFP-HF with LAMS mask were imaged on Esko CDI Spark 5080 unit.
- Calibration of CDI unit was performed before this study.

LAMS technology

a) LAMS ablation
b) Back-exposure
c) Main-exposure
d) Chemical and mechanical developing
e) Drying (UV-A)
f) After-exposure (UV-C)



Digitally generated control wedge



Metodology

- Plate samples for 4 substrates
- Different screen ruling: 76, 99 and 121 $lincm^{-1}$
- Adjustment procedure:

1) Calibration process (samples: C76 and C121)
2) Bump-up curve (samples: B76 and B121)
3) Proof
4) Application of corrected curve (S1,S2, S3, S4)
5) Distorsion factor
6) Proof, printing process

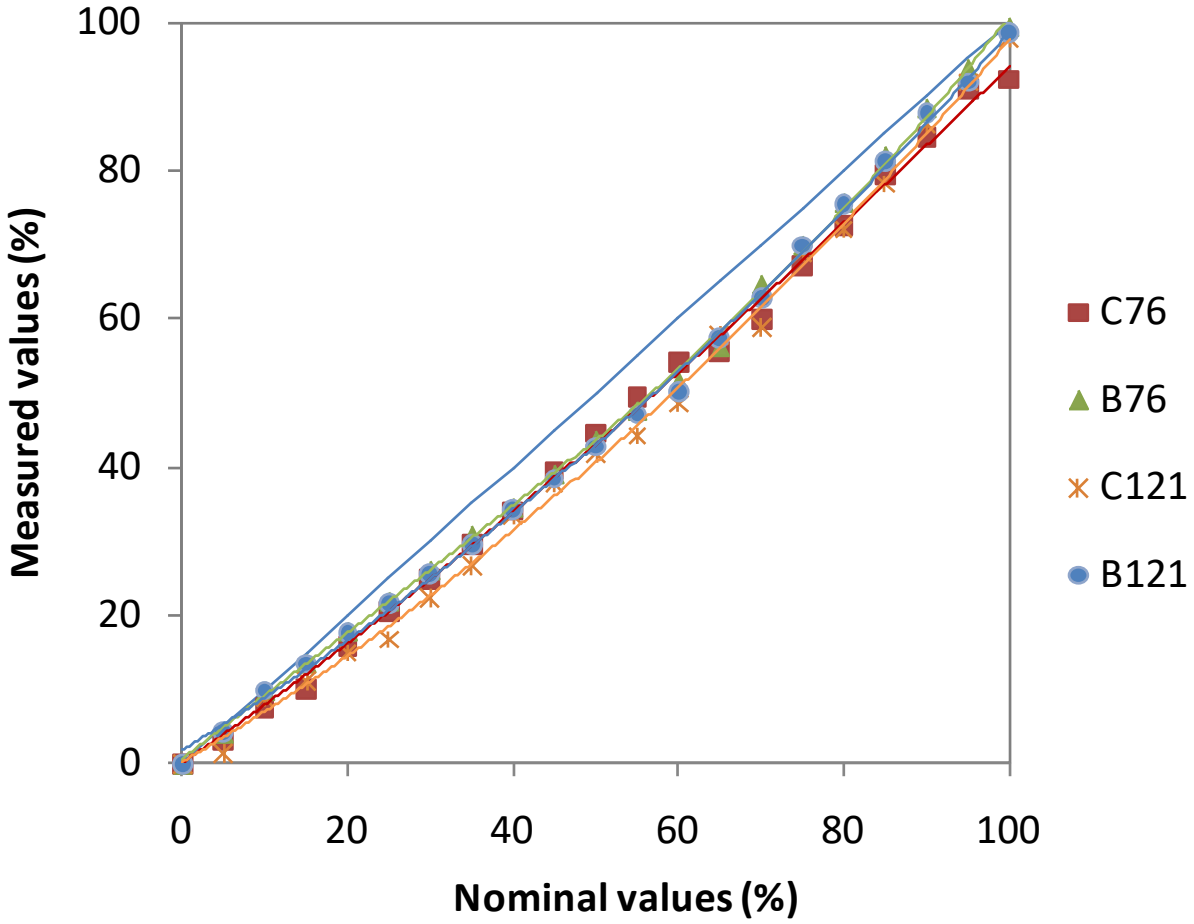
Metodology

- Measurements of coverage values on the samples were performed by VipFlex – a device for film, imprint and flexographic printing plate analysis.

- For visual analysis of printing plate samples the images were made by Olympus Metallurgical Microscope BX51.

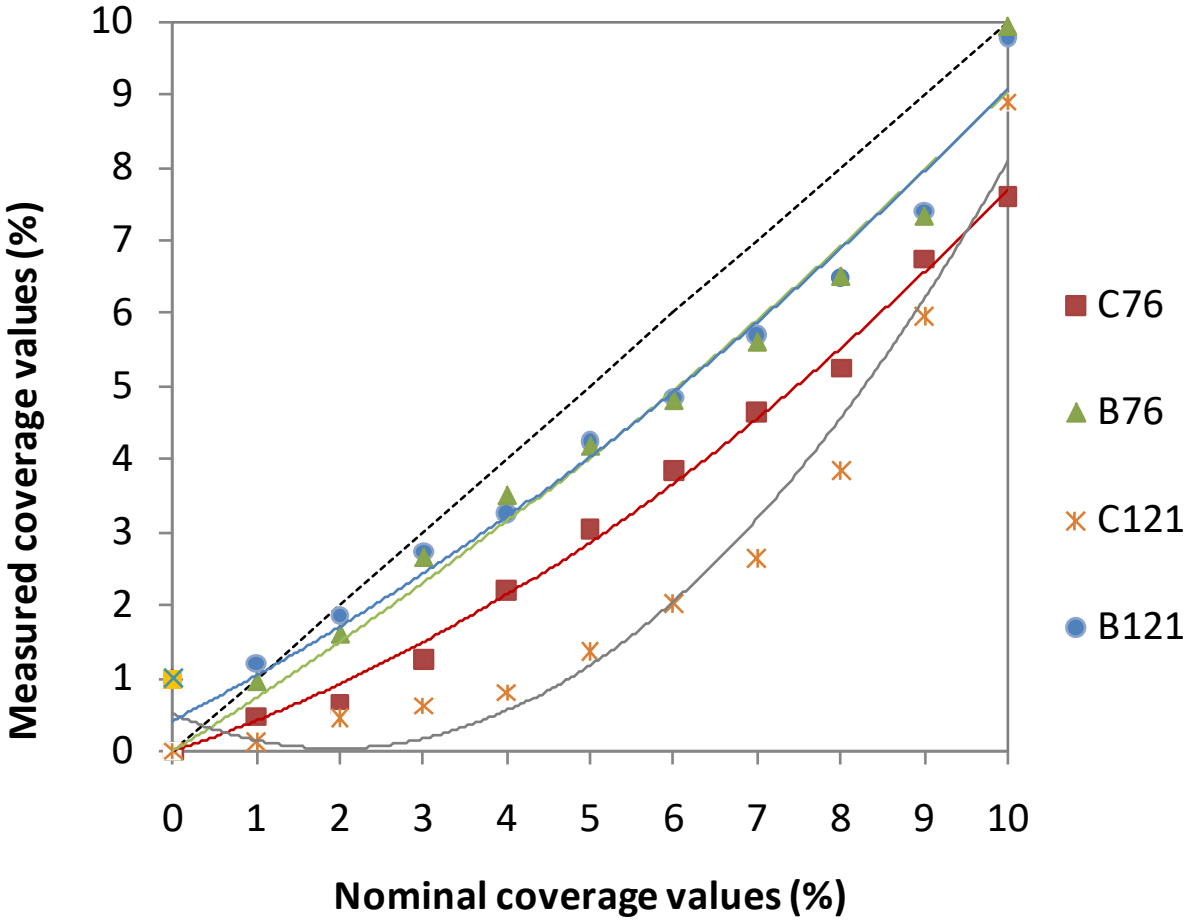
Results and discussion

1) Influence of the bump-up curve on tone reproduction



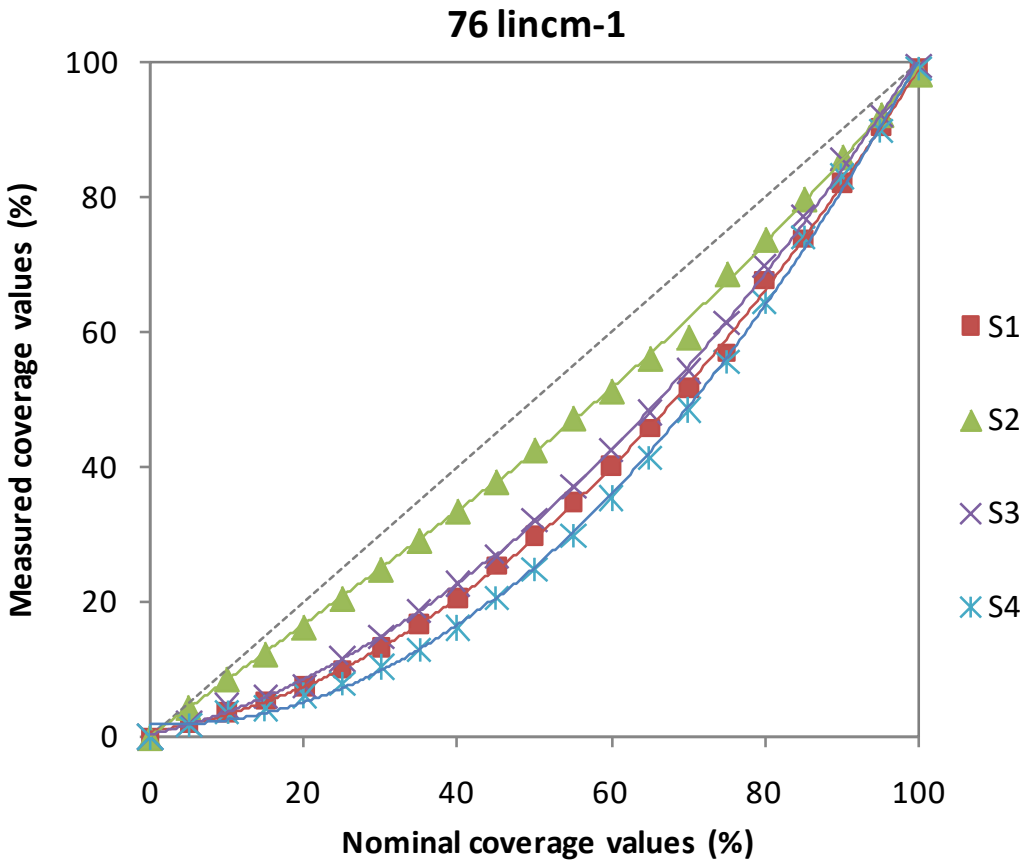
Results and discussion

1) Influence of the bump-up curve on tone reproduction



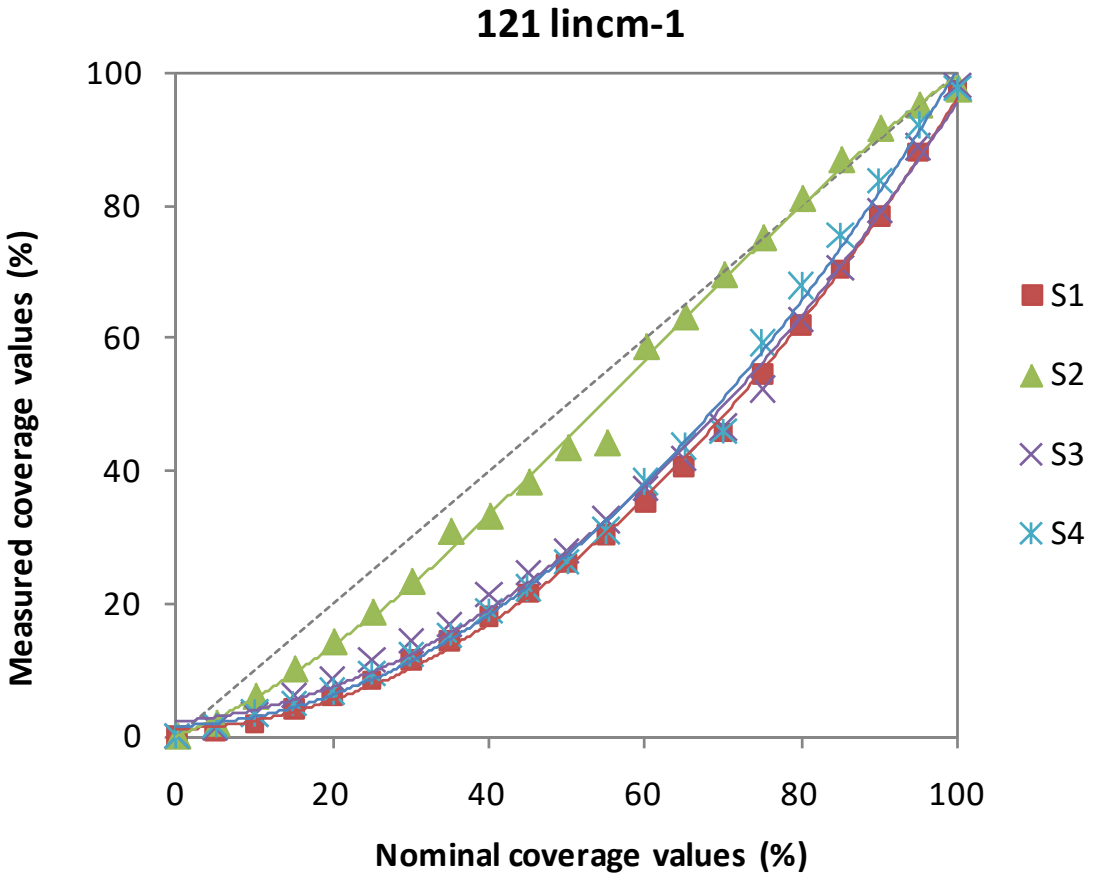
Results and discussion

2) Influence of the corrected curve on tone reproduction



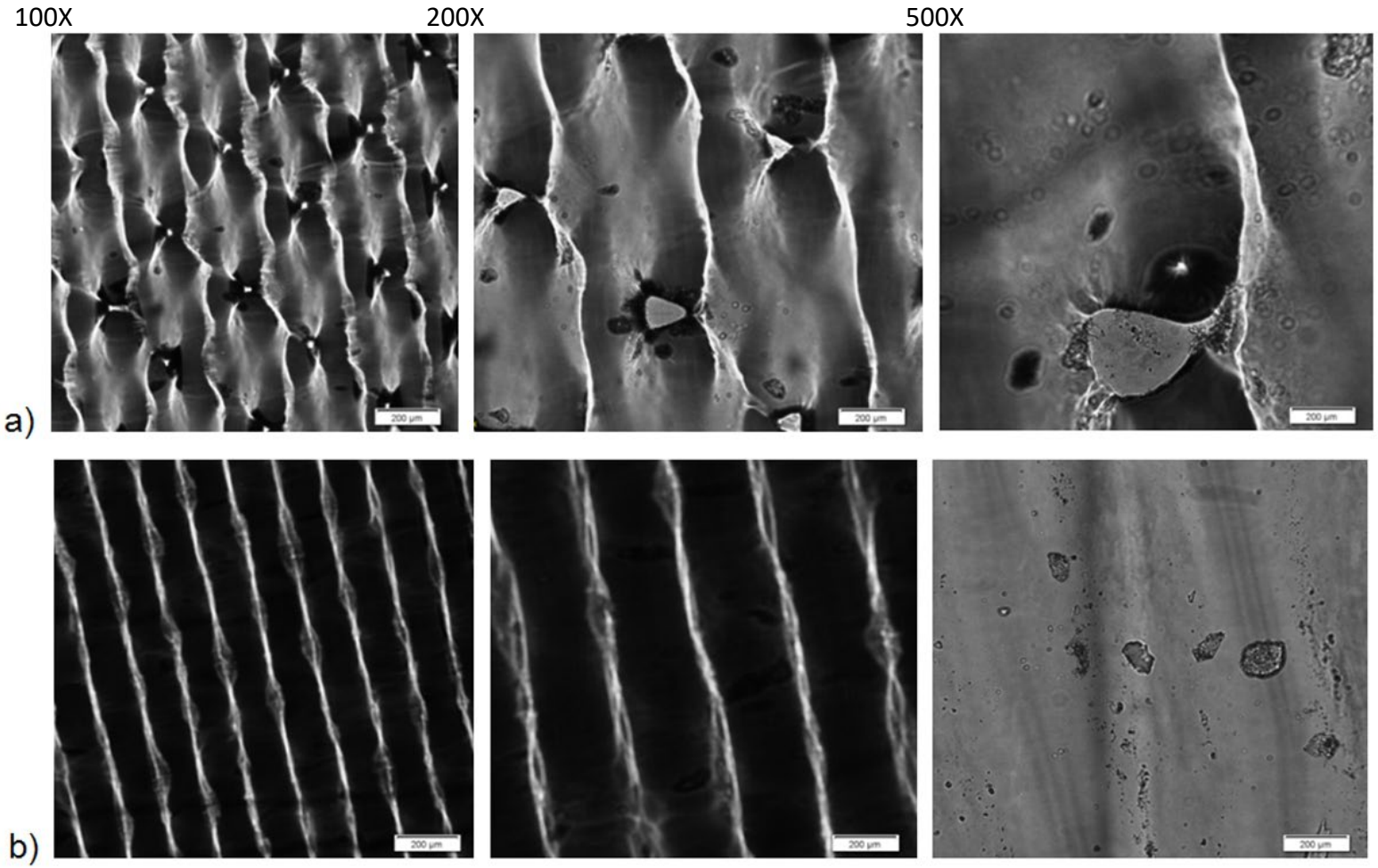
Results and discussion

2) Influence of the corrected curve on tone reproduction



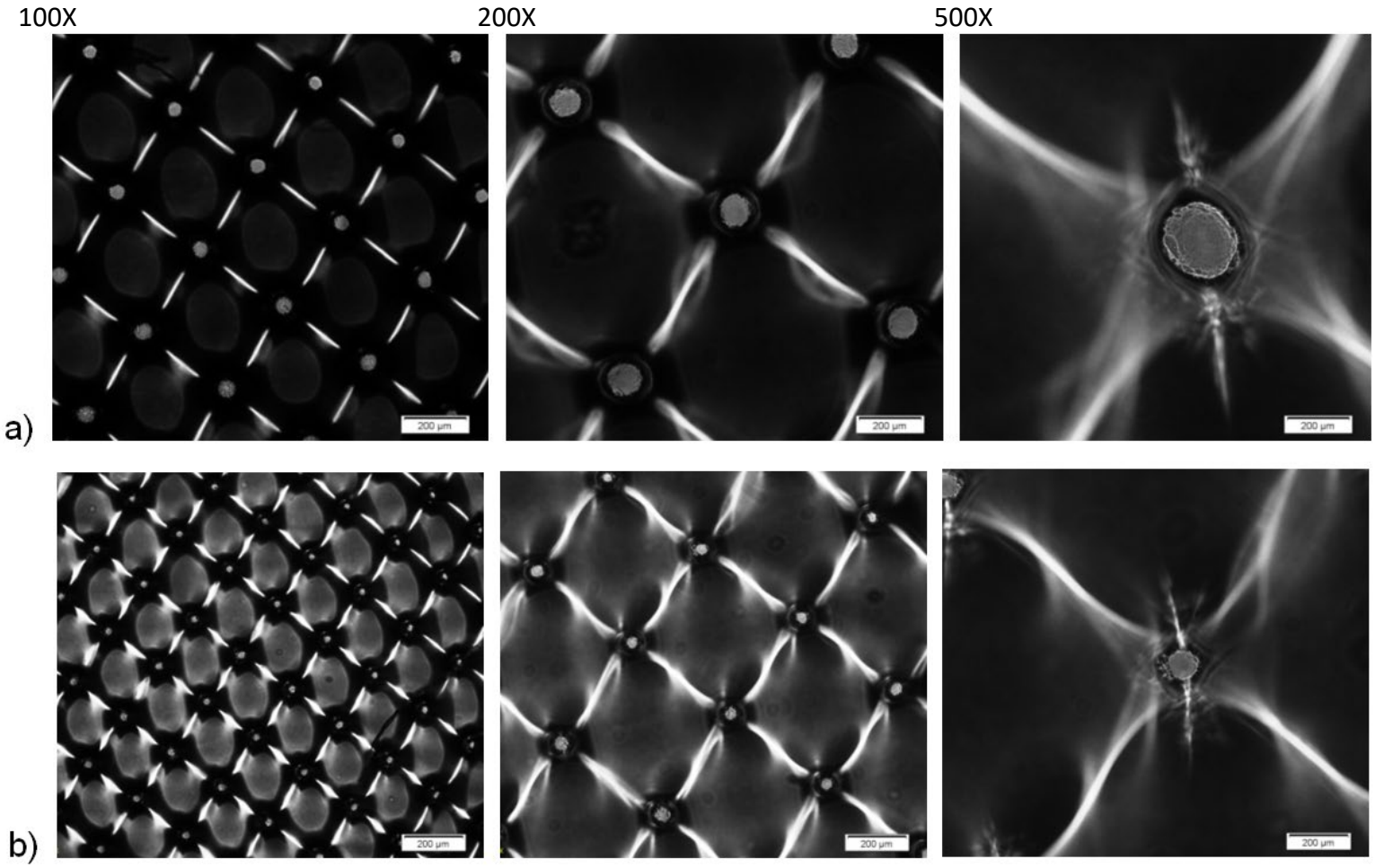
Results and discussion

3) Microscopic images – 1% samples C76 (a) and C121 (b)



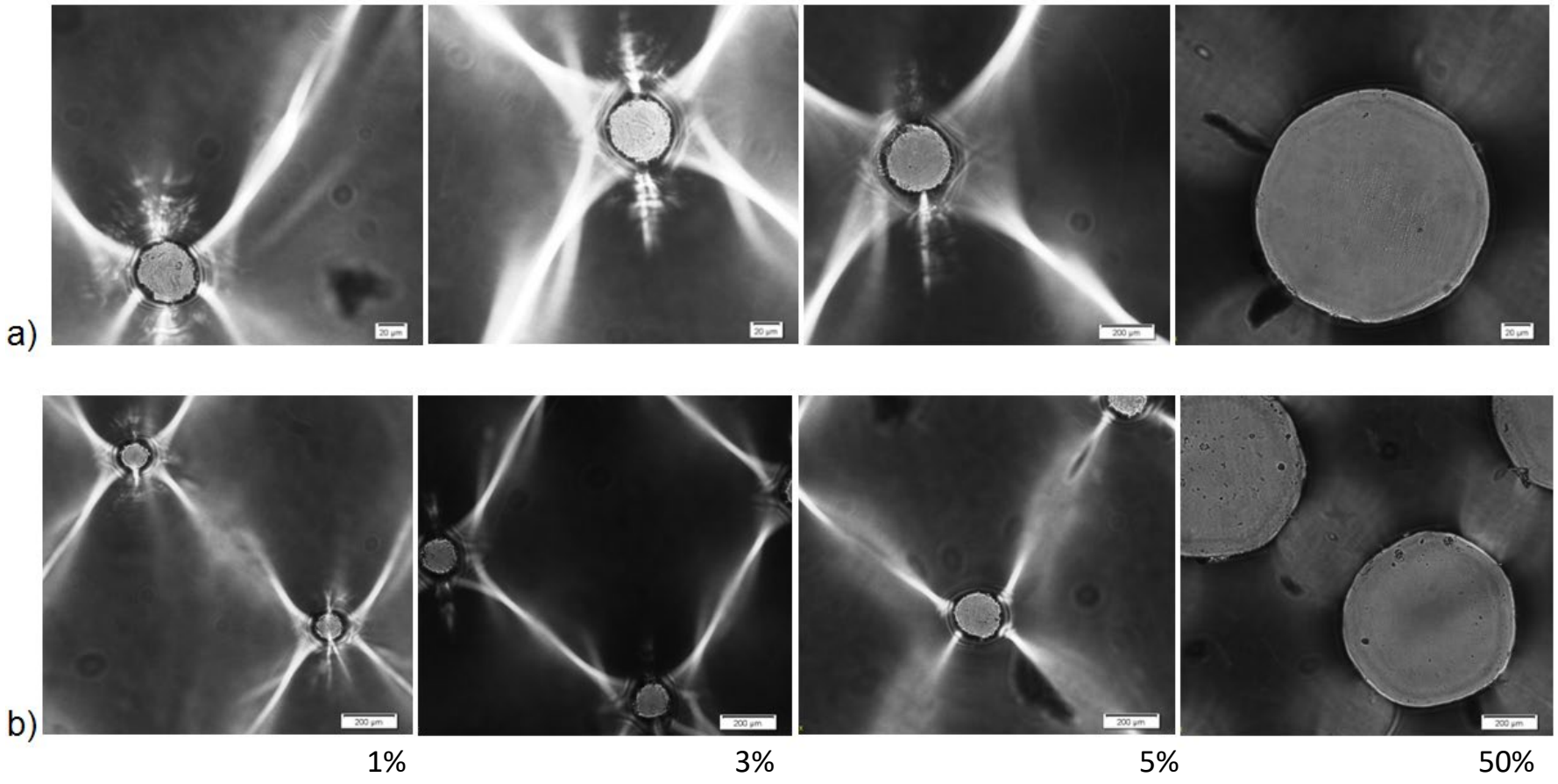
Results and discussion

4) Microscopic images – 1% samples B76 (a) and B121 (b)



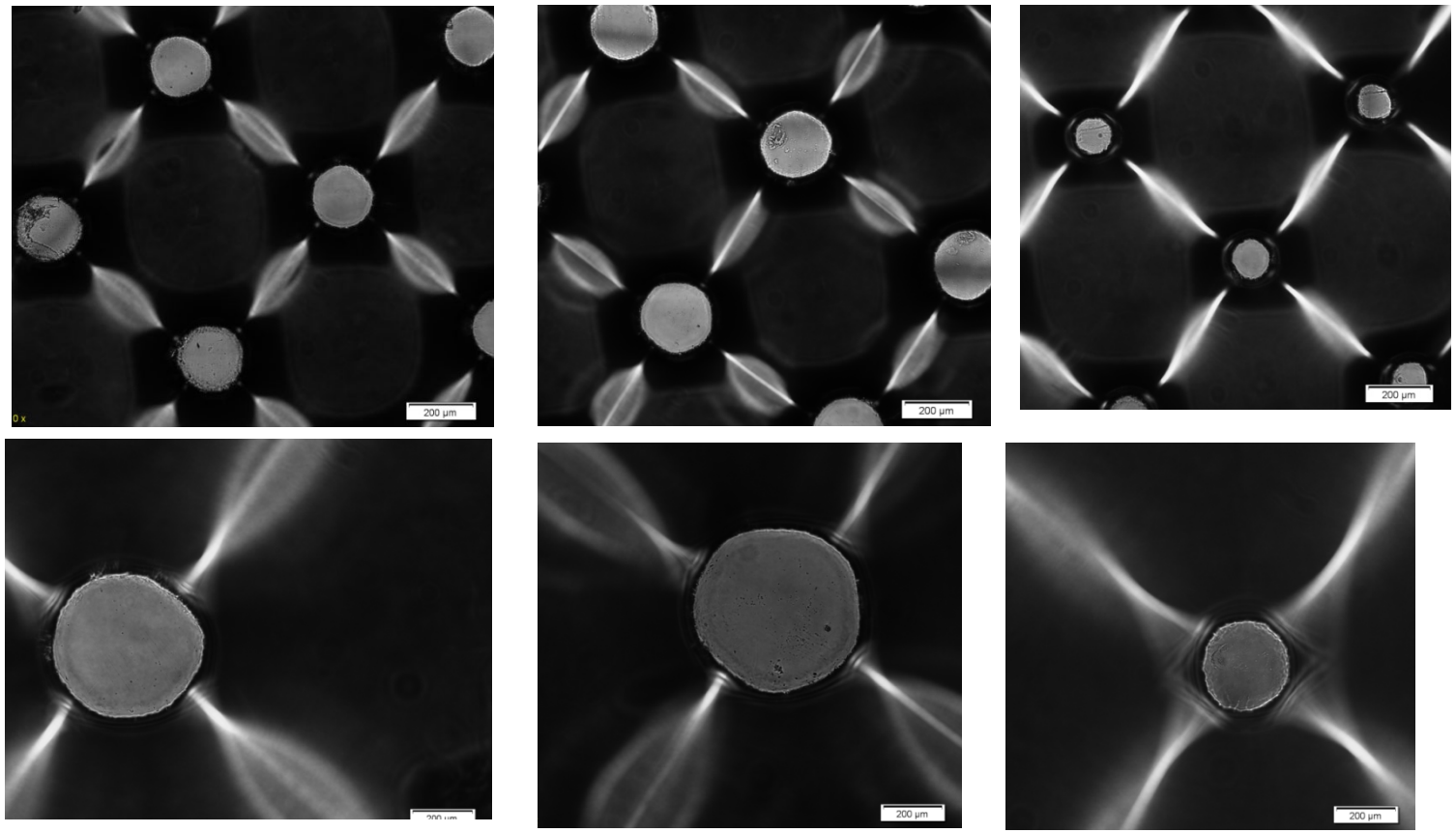
Results and discussion

5) Micro. images – sample S4, 76(a) and 121 (b)



Results and discussion

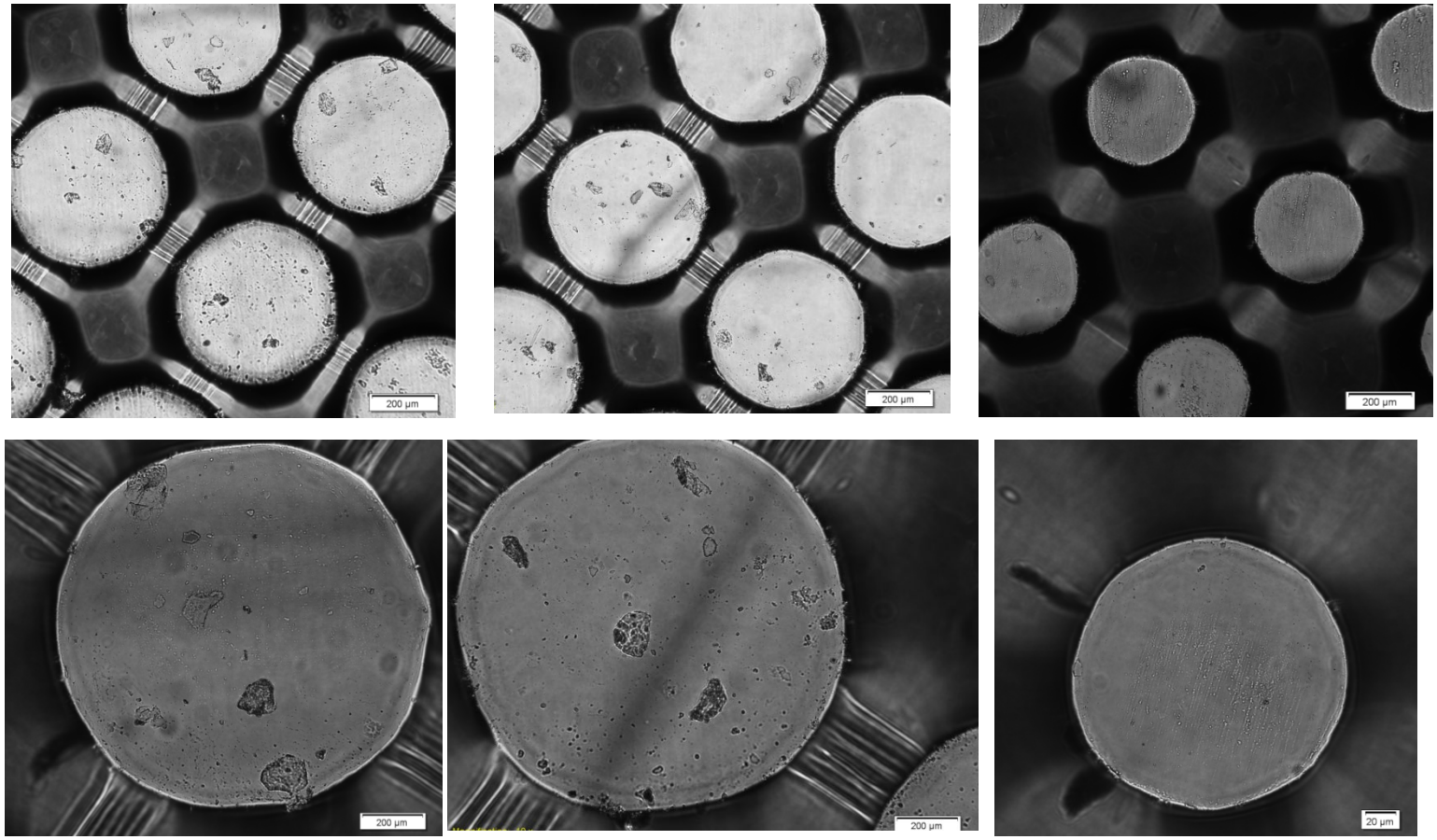
6) Microscopic images – sample S4, 10%



C76 B76 S4

Results and discussion

7) Microscopic images – sample S4, 50%



C76 B76 S4

Conclusion

- The objective of this research was to observe the reproduction of different coverage values on the flexographic printing plate by using different adjustment curves.
- To ensure the optimal quality of the imprint it is necessary to create printing plate that will compensate limitations of the parameters in printing plate production, and in printing process in general.
- From the results obtained in this research one can conclude:
  1) calibration;
  2) bump-up curve
  3) correction curve should be applied.

Conclusion

- This paper has shown that the printing plate making phase and adjustment of coverage values reproduction are important and highly demanding procedures that depend on various parameters.
- Implementation of a procedure for the adjustment of digital data which will compensate distortions in the printing process are necessary to meet the increased qualitative requirements which are present in flexography today.
- One can say that various graphic products which will be reproduced in flexography require individual approach based on the used reproduction system, and change in any of the observed reproduction segments induces the changes in the adjustment model.

Thank you for your attention!

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