The impact of heartwood and sapwood on biological discoloration of a painted wood surface

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Introduction
Wood material

Wood species:
• Norway Spruce (*Picea abies*)

Size of samples:
20x100x375 mm
Sawn to a smooth & uniform finish

Wood characteristics:
• Heartwood
• Sapwood
• Low density  (above 4 mm growth rings, density = 300 - 500kg/m²)
• High density  (below 4 mm growth rings, density = 400 - 600kg/m²)
Surface coatings

Treatments:
• A: water borne Alkyd
• B: water borne Acrylic
• Oil application

Application on the bark side of the panels
Method

Exposure:
5 years in southern Sweden,
on racks with a 45-degree
inclination to the south

Measuring total weight
every 2nd month

Evaluating biological
discoloration in June 2016
(EN ISO 4628-1)
Results discoloration

- Heartwood
- Sapwood

Grade of discoloration

- A-low dens
- A-high dens
- B-low dens
- B-high dens
- A-low dens oil
- A-high dens oil
Results- Alkyd coating

Low density heartwood

Low density sapwood
Results Average Moisture content

- **A-low dens**
- **A-high dens**
- **B-low dens**
- **B-high dens**
- **A-low dens oil**
- **A-high dens oil**

**Heartwood** vs **Sapwood**

Average MC %

- A-low dens
- A-high dens
- B-low dens
- B-high dens
- A-low dens oil
- A-high dens oil
Conclusions

- Wood characteristics sapwood and heartwood have in general an impact on biological discoloration of coated spruce regardless of the impact from the coatings.

- Samples made of sapwood with an alkyd based coating had the highest discoloration in this experiment.

- MC was higher for sapwood than for heartwood for all coating combinations.

- Low density samples had higher MC but no correlation to discoloration.

- Application of oil decreases the level of discoloration for low density sapwood.
Question remained to be answered in further research

Is the difference in discoloration due to the presence of nutrients or the higher MC in sapwood?
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THANK YOU

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