Neuburg Siliceous Earth as pigment extender in yellow road marking paint, water-based

Author: Barbara Mayer

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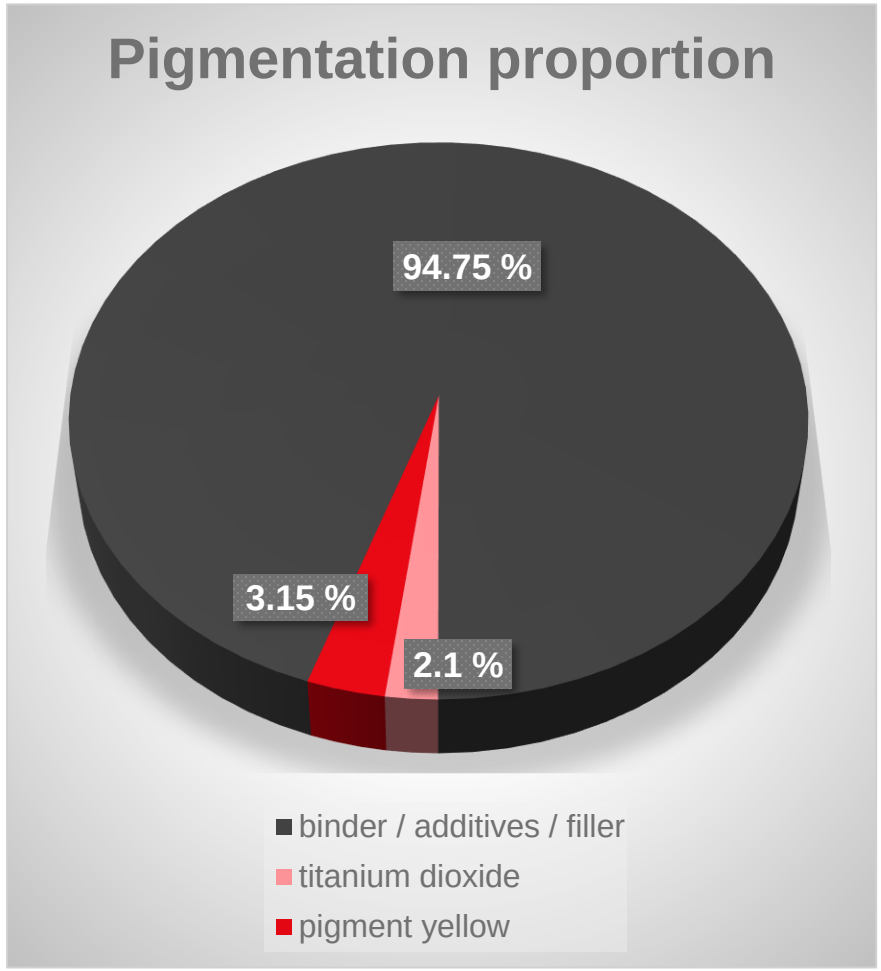
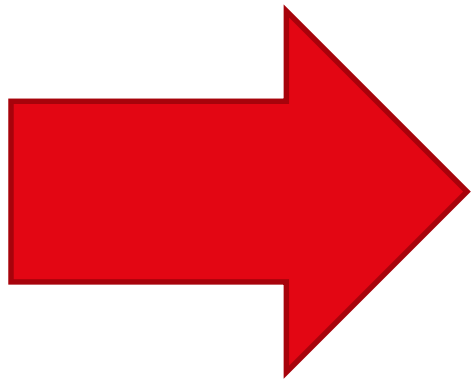
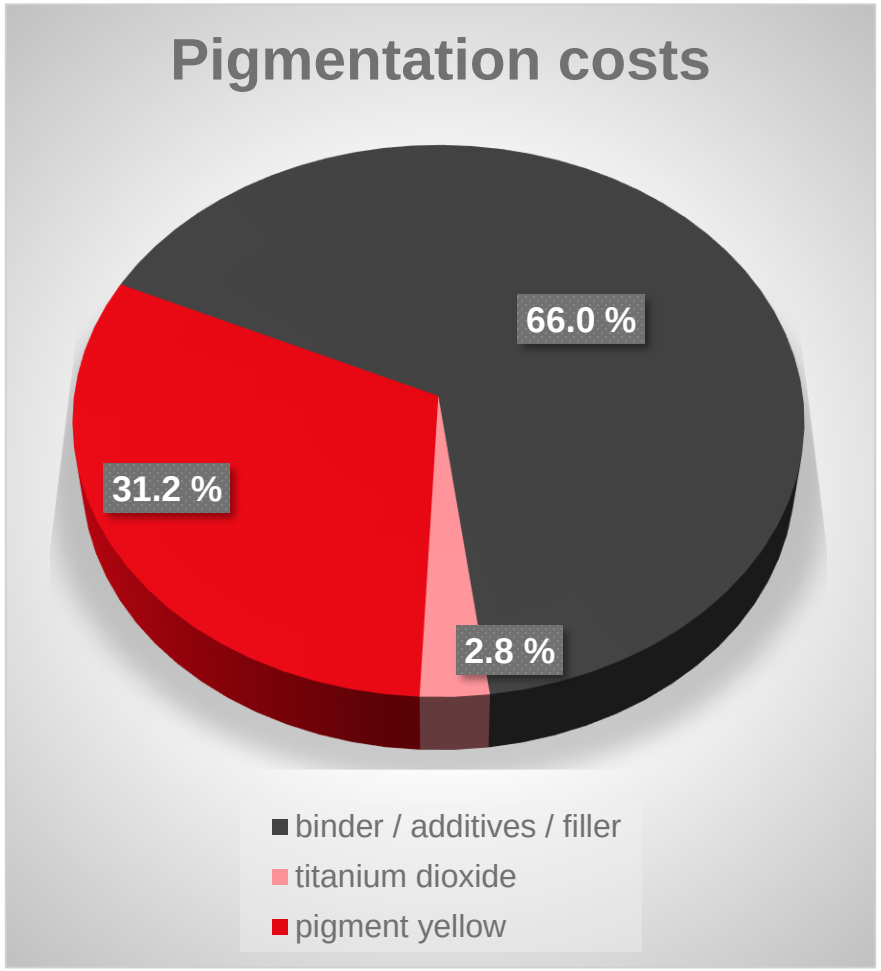
Contents

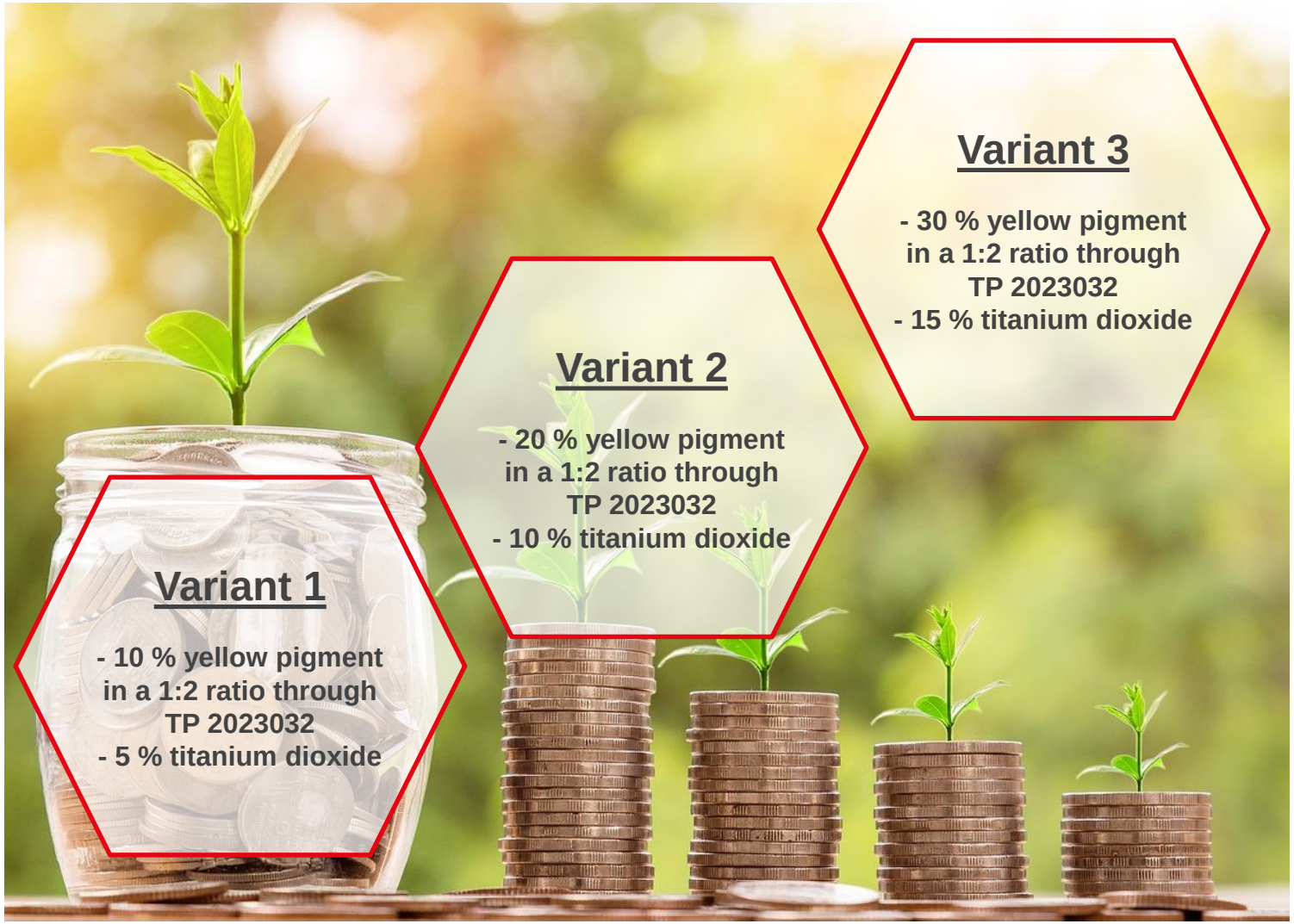
Status Quo


Pigmentation proportion
94.75 %
3.15 %
2.1 %
binder / additives / filler
titanium dioxide
pigment yellow




Pigmentation costs
66.0 %
31.2 %
2.8 %
binder / additives / filler
titanium dioxide
pigment yellow

Objective



TP 2023032

- ✓Reduction of yellow pigment by up to 30 %
- ✓Reduction of titanium dioxide by up to 15 %
- ✓Replacement with natural, sustainable mineral with low CO_2 – balance

Formulation variants

Variant 3

- 30 % yellow pigment in a 1:2 ratio through TP 2023032
- 15 % titanium dioxide

Variant 2

- 20 % yellow pigment in a 1:2 ratio through TP 2023032
- 10 % titanium dioxide

Variant 1

- 10 % yellow pigment in a 1:2 ratio through TP 2023032
- 5 % titanium dioxide

	Control	Variant 1	Variant 2	Variant 3
Fastrack 53	38.38	38.38		
Foamaster MO 2134	0.25	0.25		
AS-238 NF	0.86	0.86		
Ti-Pure R-900	2.10	1.99	1.89	1.78
Novoperm Gelb HR 70 PY 83	3.15	2.84	2.52	2.21
TP 2023032		0.63	1.26	1.88
Omyacarb 5	47.81	47.60	47.39	47.19
Tergitol 15-S-40	0.30	0.30		
Ethanol	1.24	1.24		
Foamaster MO 2134	0.03	0.03		
Deionized water	1.90	1.90		
Texanol	3.98	3.98		
Total	**100.00**	**100.00**		

Filler characteristics

			TP 2023032
Particle size	d_{50}	[µm]	4.5
	d_{97}	[µm]	18
Oil absorption		[g/100g]	45
Color	L*		93
	a*		1
	b*		9

Tests

Color measurement based on DIN EN 1436:2018-03 appendix C

- Colorimeter with geometry 45°/0°
- Evaluation of spectral data with standard illuminant D65 and observer 2°
- Class Y1 for permanent markings
- Class Y2 for temporary markings

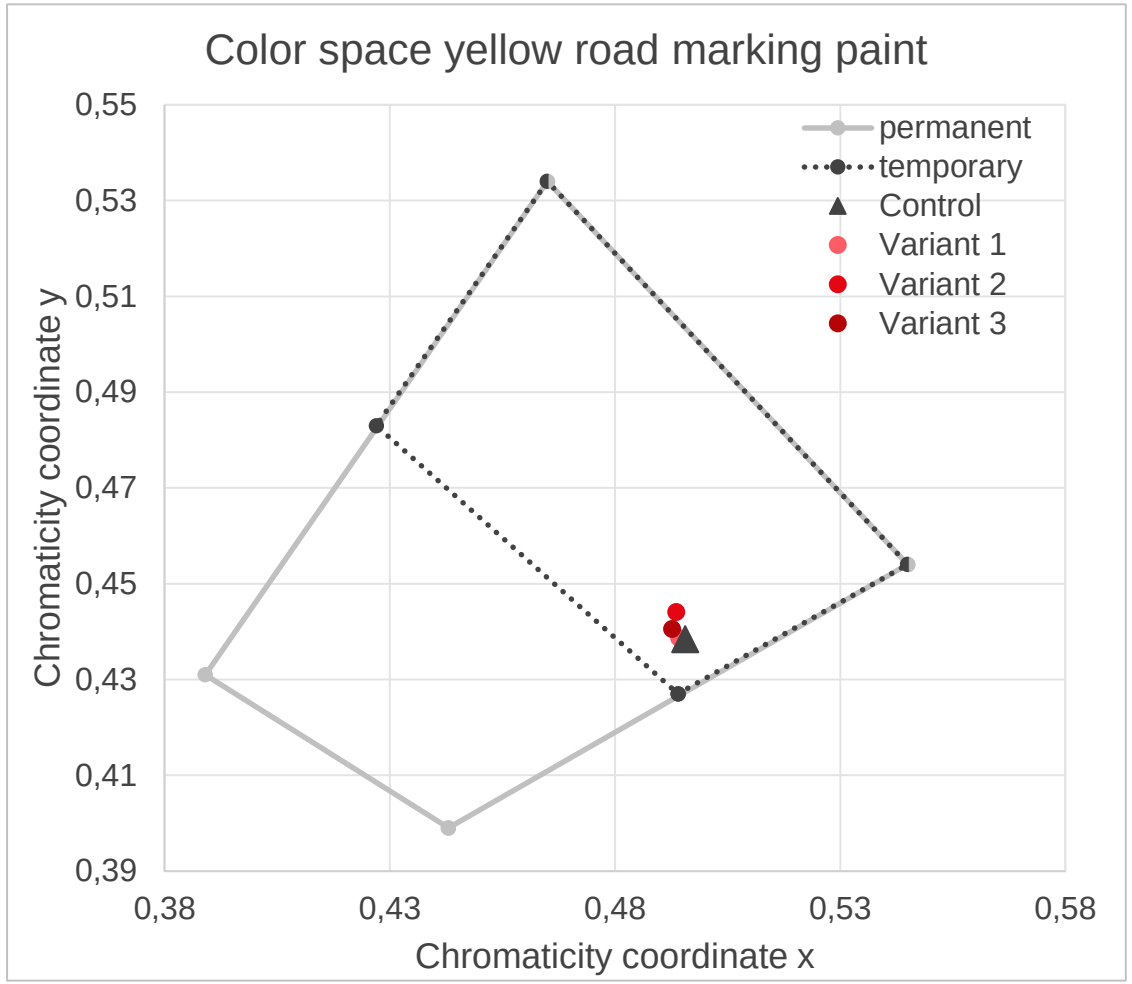
- Calculation of the chromaticity coordinates x and y from the XYZ data of the CIE standard color system
  $x = X / (X + Y + Z)$
  $y = Y / (X + Y + Z)$
- Evaluation using the corner points for the yellow road marking color range in an xy-dot diagram

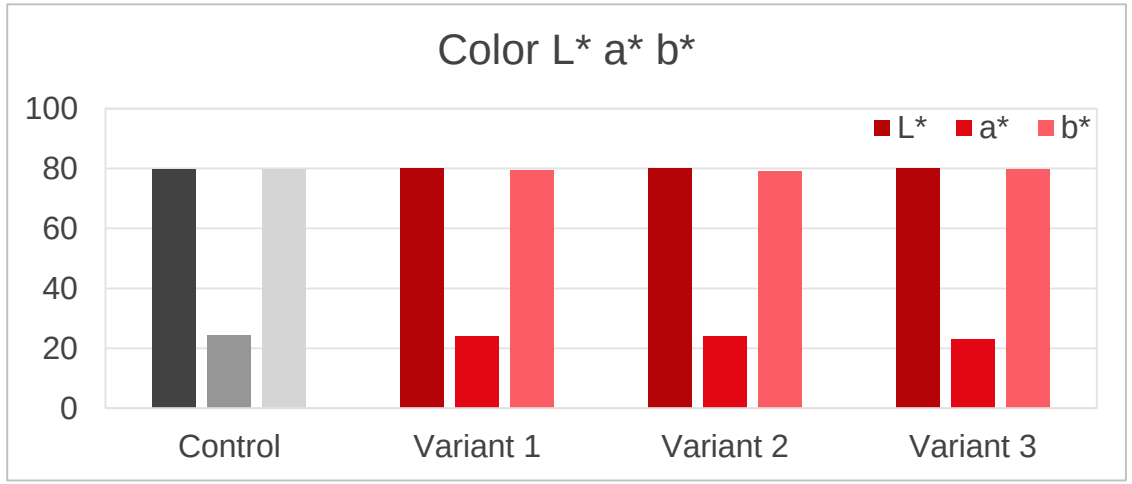
- Evaluation of L* a* b* and calculation of the color distance ΔE

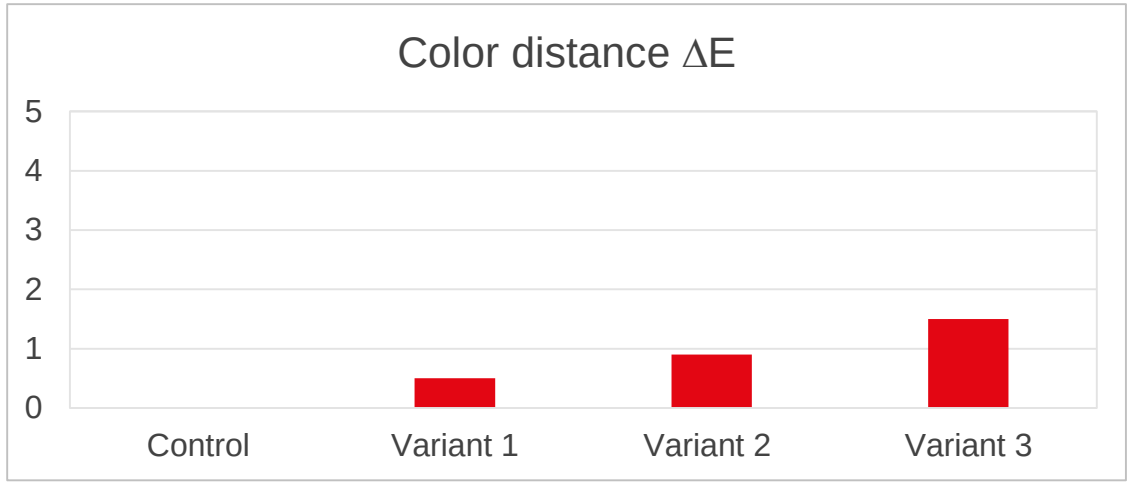
Measurement of viscosity and gloss → Results see appendix

Color 45°/0° D65/2° Pigment Yellow 83: Novoperm Gelb HR 70

Color measurement based on DIN EN 1436:2018-03 appendix C



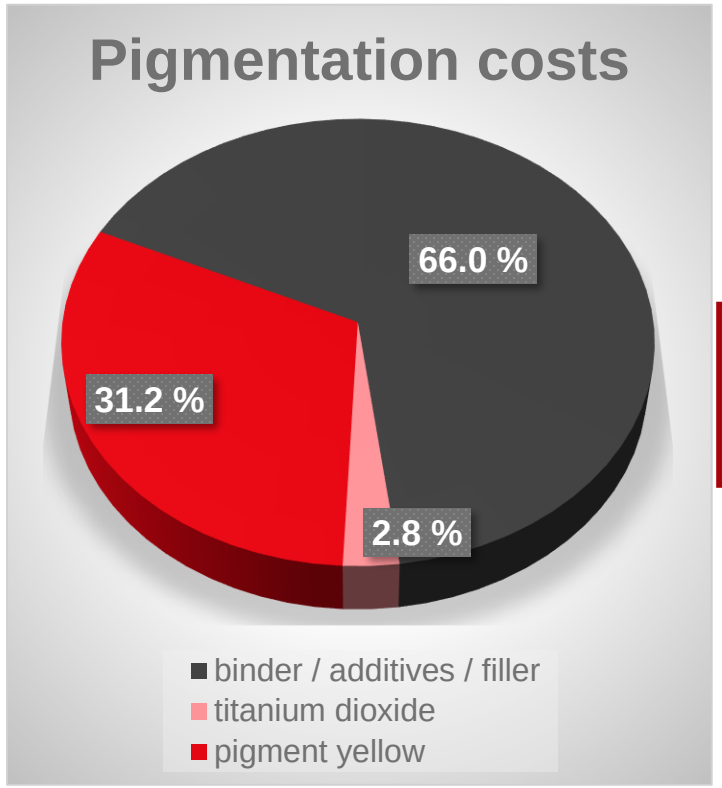




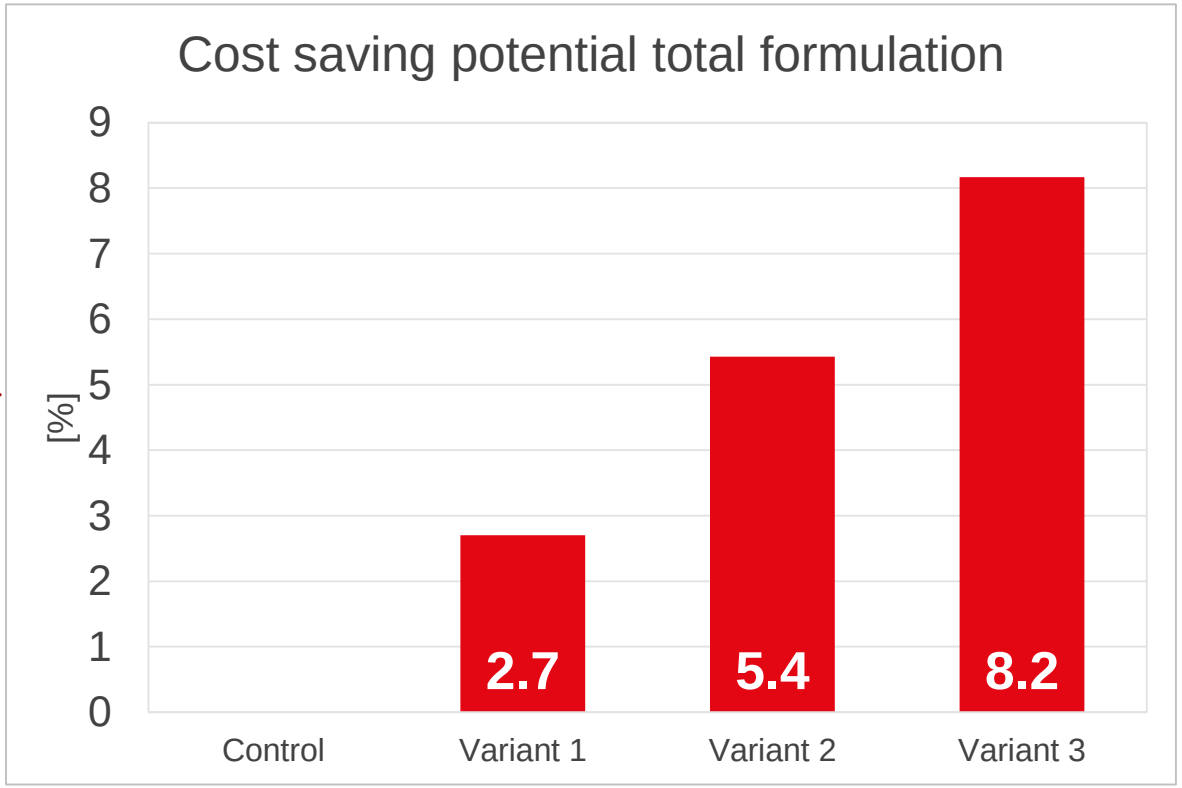
Conclusion

Pigment Yellow 83: Novoperm Gelb HR 70

Pigmentation costs – savings potential of total costs with partial pigment replacement



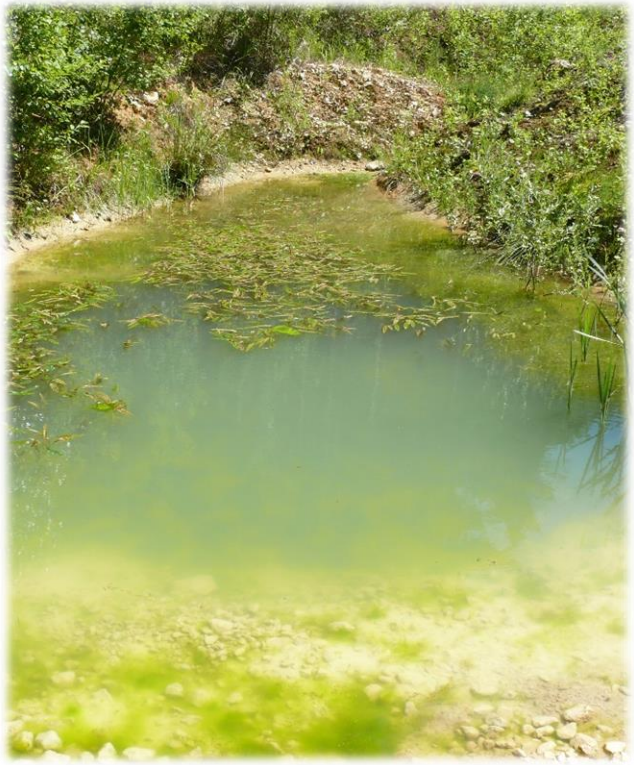
with TP 2023032



Conclusion

Properties and advantages of TP 2023032 in water-based yellow road marking paints:

- Environmentally friendly and sustainable mineral
- Compliance with the color requirements DIN EN 1436
- Low Carbon footprint
- **Partial replacement of yellow pigment up to 30 % and titanium dioxide up to 15 %**
- Cost savings potential of up to 8 %
- Easy dosing and dispersion
- Worldwide available



We supply material for good ideas!

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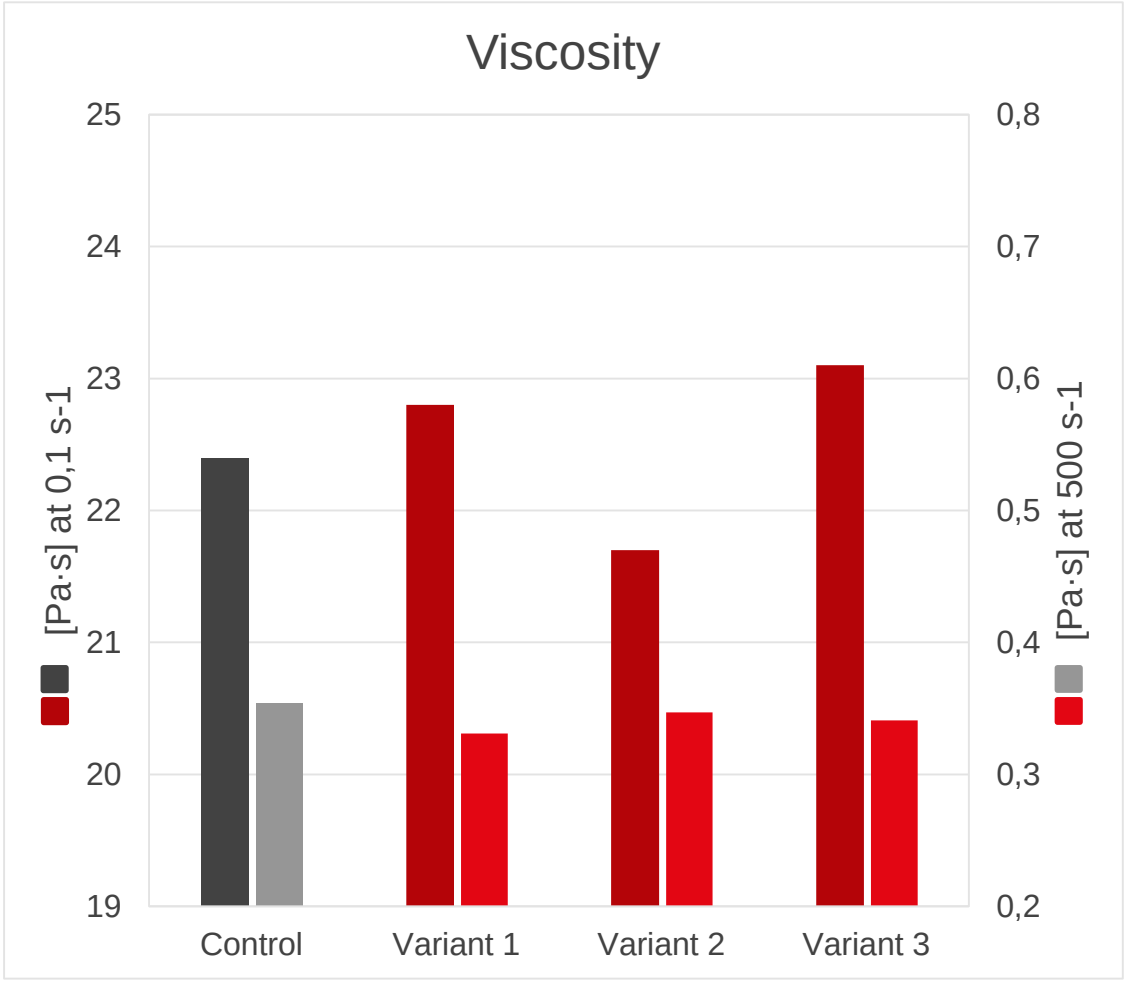
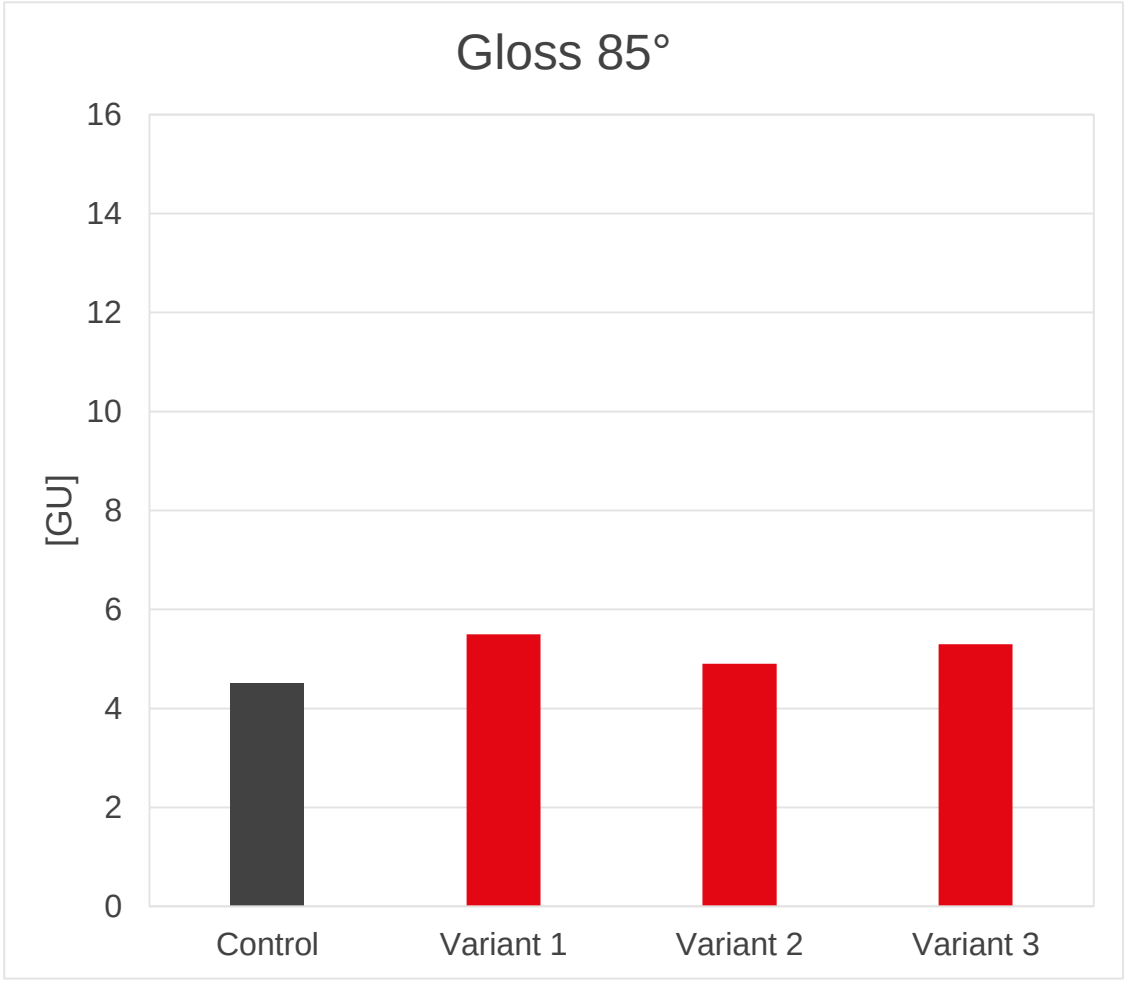
Viscosity and Gloss

Pigment Yellow 83: Novoperm Gelb HR 70

Viscosity: Measurement with MCR 300 and CC17 at 23°C



Gloss: Measurement with micro-Tri-gloss at DFT ~ 550 µm



Formulation – Manufacturing instructions

Component			
1	Fastrack 53	38.38	Dissolver with toothed disc Mixing vessel with temperature control (counter-cooling) Place components 1 to 3 in the mixing vessel Mix at 1.5 m/s for 1 min
2	Foamaster MO 2134	0.25	
3	AS-238 NF	0.86	
4	Ti-Pure R-900	1.78	Then add components 4 to 7 step by step Incorporate solids at 1.5 m/s to 2.1 m/s Remove any loosely adhering solids from the mixing vessel and mixing tool
5	Dalamar YT-805-D PY 65 *or* Novoperm Gelb HR 70 PY 83	2.21	
6	TP 2023032	1.88	
7	Omyacarb 5	47.19	
8	Tergitol 15-S-40	0.30	Component 8 to drip at 2.1 m/s
9	Ethanol	1.24	Mix components 9 to 11 in advance and then add at 2.1 m/s
10	Foamaster MO 2134	0.03	
11	Deionized water	1.90	
12	Texanol	3.98	Add component 12 at 2.1 m/s Then mix for 10 min at 5.0 m/s and fill
	Total	**100.00**	

Formulation variants

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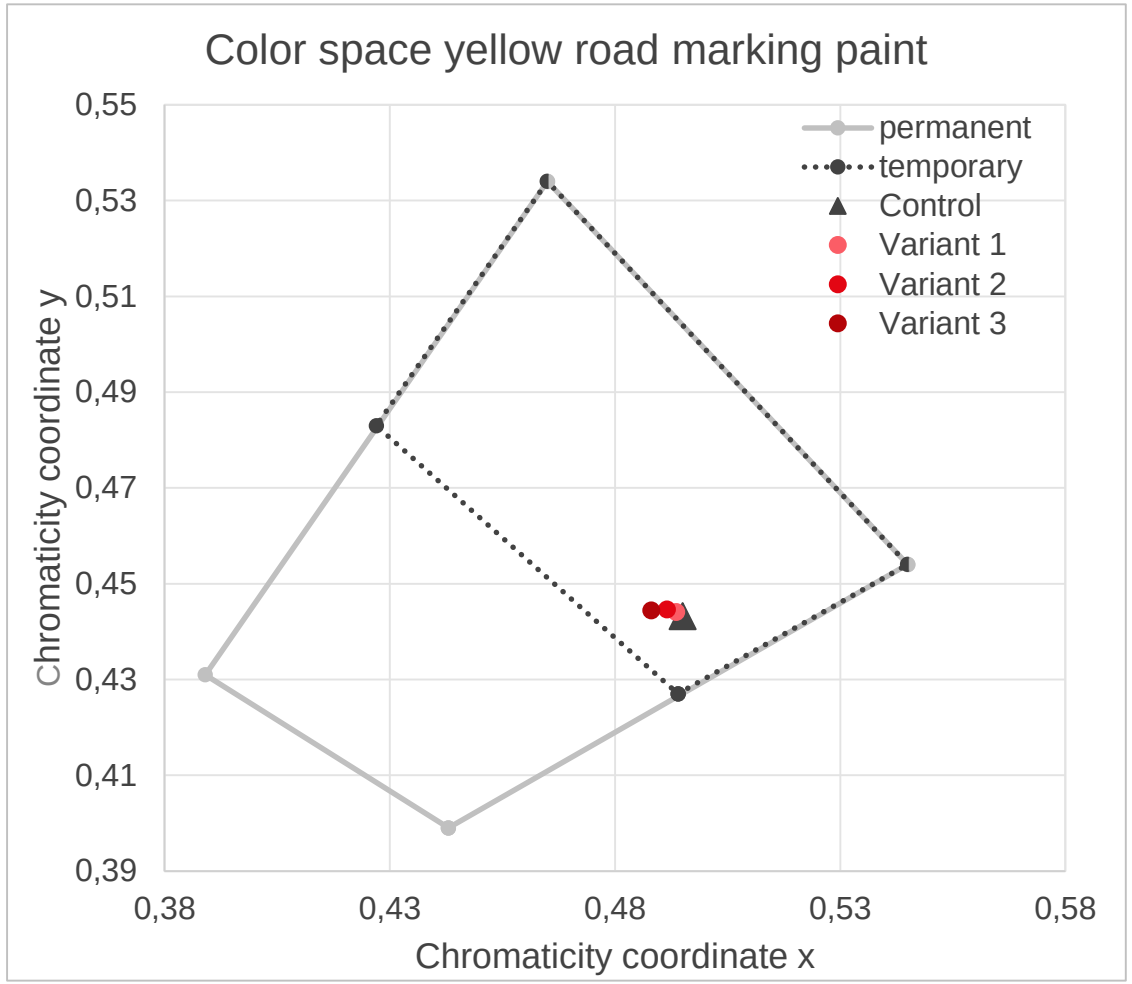
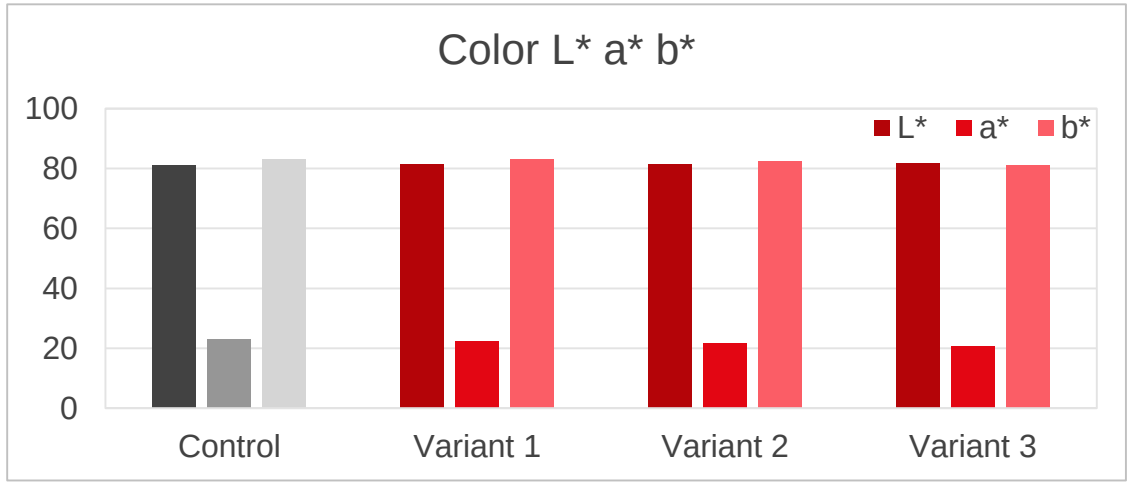
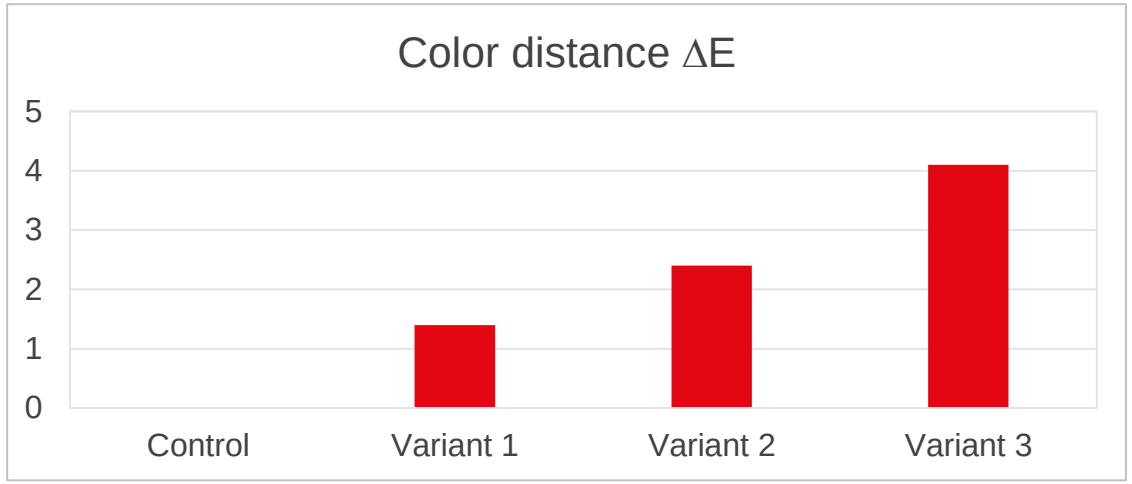
Deionized water	1.90	1.90		
Texanol	3.98	3.98		
Total	**100.00**	**100.00**		

Color 45°/0° D65/2° Pigment Yellow 65: Dalamar YT-805-D

Color measurement based on DIN EN 1436:2018-03 appendix C



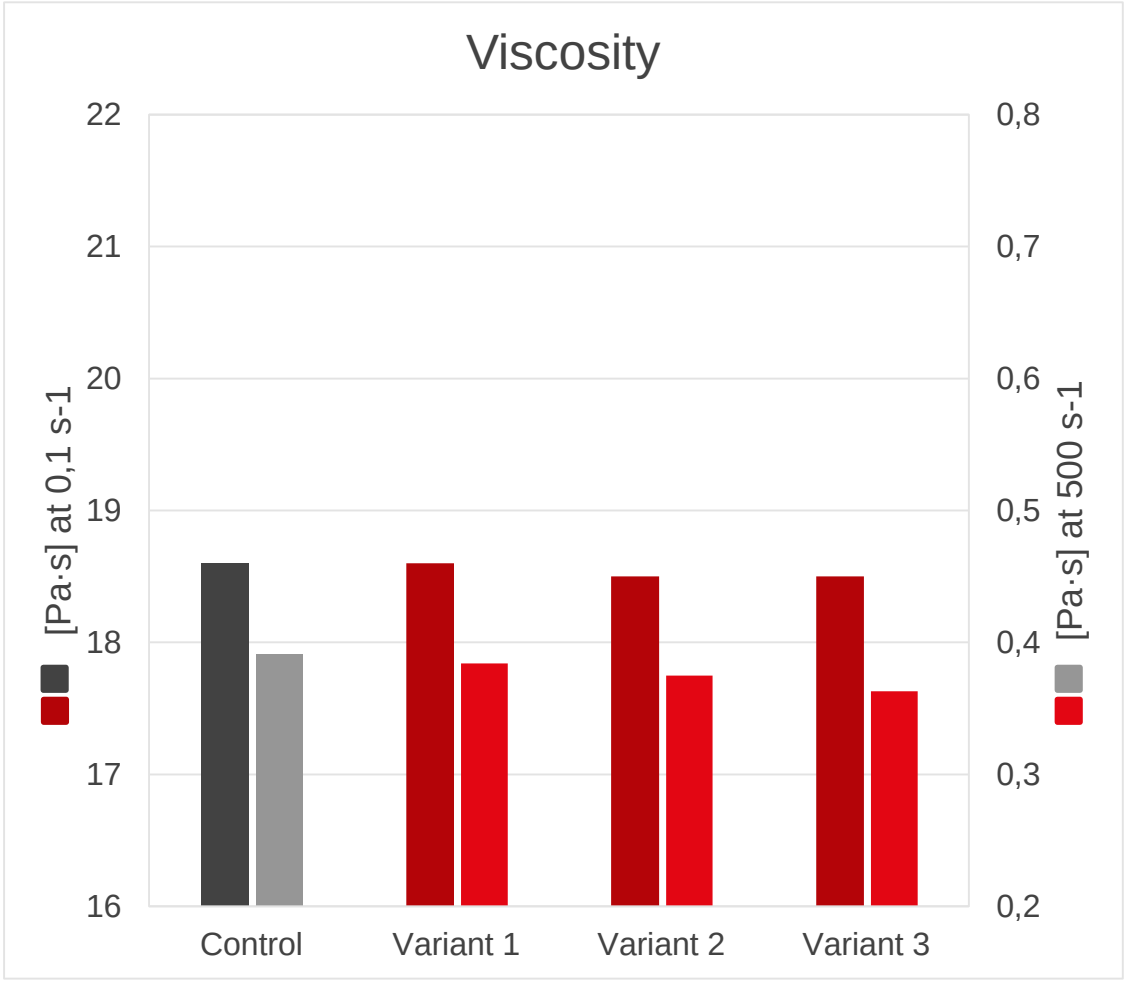




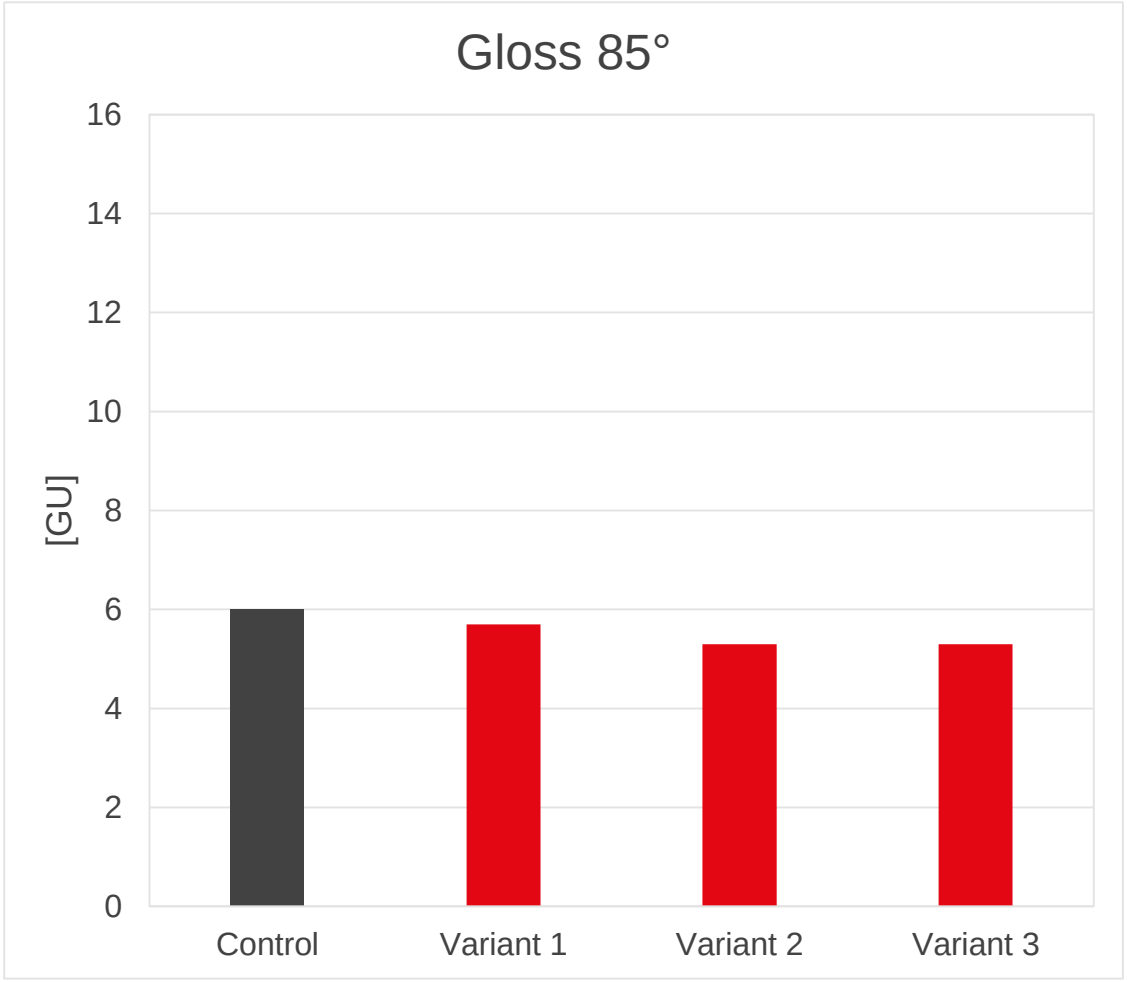
Viscosity and Gloss

Pigment Yellow 65: Dalamar YT-805-D

Viscosity: Measurement with MCR 300 and CC17 at 23°C



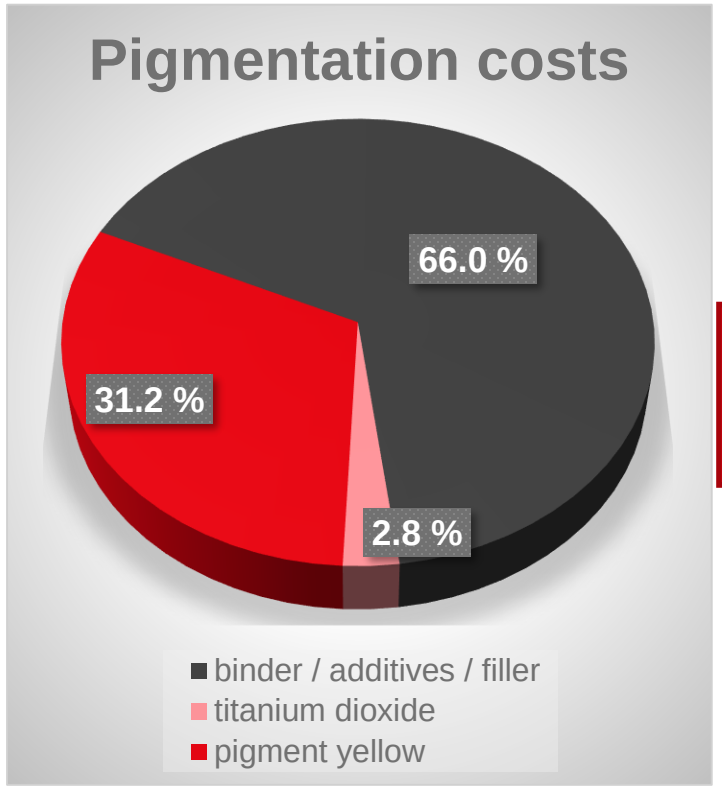
Gloss: Measurement with micro-Tri-gloss at DFT ~ 550 µm



Conclusion

Pigment Yellow 65: Dalamar YT-805-D

Pigmentation costs – savings potential of total costs with partial pigment replacement



with TP 2023032