Regalite™ hydrocarbon resins R1100 and R1125

Improving colour stability, drying, and hardness development of interior wood trim paint

Regalite™ hydrocarbon resins R1100 and R1125 are low-molecular-weight, fully hydrogenated, water-white, inert thermoplastic resins derived from petrochemical feedstocks. These resins are specially designed for use as tackifiers in hot-melt systems requiring excellent colour retention on aging.

Benefits can be seen when Regalite R1100 and R1125 are added to a high-solids long-oil alkyd resin (Crestakyd® 10-3508/10-0501)—in particular, improvements in yellowing, hardness, and BK drying. Hardness is of particular importance to enhance durability in service, while a faster drying time is essential to avoid contamination in the drying process.

Table 1. Properties

Product	Softening point (°C)[a]	Molecular wt (M_z)[b]	Chemical type
Regalite R1100	100	1250	Fully hydrogenated aliphatic hydrocarbon resin
Regalite R1125	125	1900	Fully hydrogenated aliphatic hydrocarbon resin

[a]*Ring-and-ball softening point, ASTM E28* [b]*Molecular weight, Z-average from gel permeation chromatography*

Pendulum hardness

Improvements are seen with the addition of Regalite R1100 and R1125. Hardness results are shown in Figure 1 and Figure 2.

Figure 1. Pendulum hardness @ 75 µm 23°C (BS EN ISO 1522)

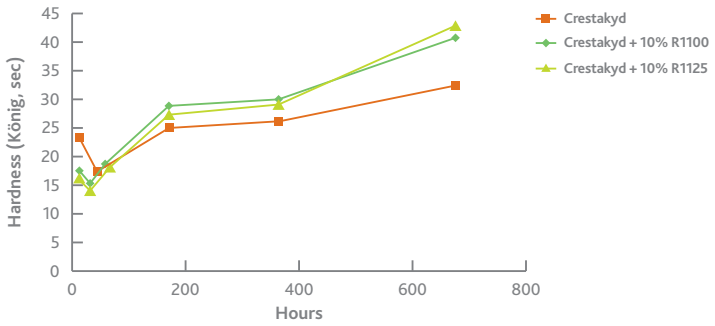
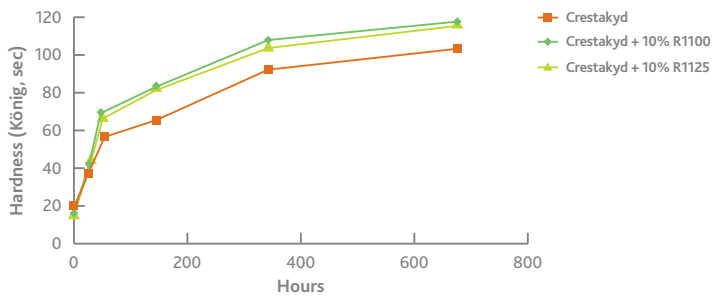


Figure 2. Pendulum hardness @ 75 µm 50°C (BS EN ISO 1522)



Yellowing (ASTM E313)

Less yellowing was observed with the addition of Regalite R1100 and R1125. Results are shown in Figure 3 and Figure 4.

Figure 3. Yellowing (against the control) 75 µm 23°C (ASTM E313)

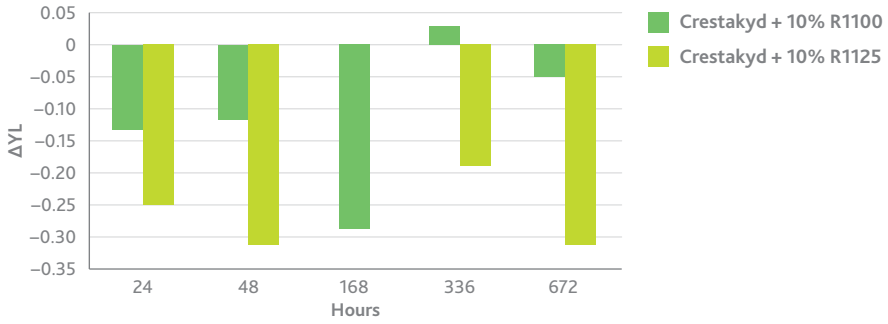
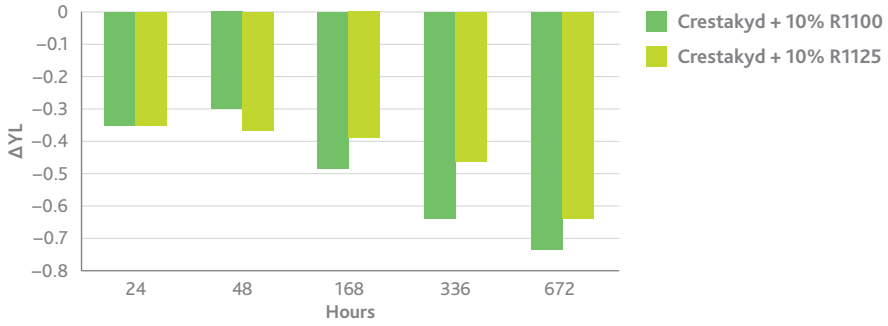


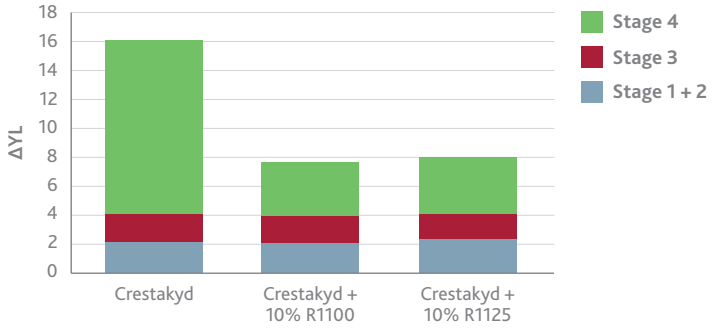
Figure 4. Yellowing (against the control) 75 µm 50°C (ASTM E313)



Beck Koller (BK) drying time (ASTM D5895)

The BK drying time is reduced with the addition of Regalite R1100 and R1125. BK drying results are shown in Figure 5.

Figure 5. BK drying time



Conclusion

The results demonstrate that benefits can be seen when Regalite R1100 and R1125 are added to a high-solids long-oil alkyd resin (Crestakyd® 10-3508/10-0501). The main improvements are less yellowing, enhanced hardness development, and a faster BK drying time.

Appendix 1

Table 2. Interior wood trim paint formulations

	Supplier	Control	10% Regalite R1100	10% Regalite R1125
Tioxide® TR92	Cristal Global	29.35	29.35	29.35
Crestakyd® 10-3508 (85% NVC)	Scott Bader	28.15	29.45	27.10
Crestakyd 10-0501 (100% NVC)	Scott Bader	15.00	10.00	12.00
70% Regalite™ hydrocarbon resin R1100 in D40	Eastman	—	5.56	—
70% Regalite hydrocarbon resin R1125 in D40	Eastman	—	—	5.56
70% Eastotac™ hydrocarbon resin H-142W in D40	Eastman	—	—	—
Co/Zr drier (Co 6%/Zr 9% metal)	—	0.69	0.62	0.62
Ca drier (10% metal)	—	0.92	0.82	0.82
Methyl ethyl ketoxime	—	0.28	0.28	0.28
Exxsol™ D40	Exxon	14.54	12.67	13.02
Total (g)		**88.93**	**88.75**	**88.75**
Total solids (%)		77.00	77.00	77.00
P:B ratio		0.75	0.75	0.75
ICI viscosity (poise)		4.20	4.30	4.00
VOC (g/L)		292	292	292

Appendix 2

Experimental test methods

Hardness development

Coatings were applied to glass panels using a PC&T Co. No. 3 cube applicator to give a 75-µm (1.5-mil) wet film thickness (WFT). Hardness development was carried out using Sheen Pendulum Hardness Rocker, and the damping time (seconds) was calculated by multiplying the number of oscillations by 1.4. Each sample was measured three times and the average results were reported. One set of panels was stored at 23°C and the other stored at 50°C during the test period. Measurements for the 75-µm WFT were initially taken after 3 hours for the panels stored at 50°C and 7 hours for the panels stored at 23°C. Then readings were taken after 24 hours, 48 hours, 7 days, 14 days, and 28 days.

Yellowing index

Coatings were applied to glass panels using a PC&T Co. No. 3 cube applicator to give a 75-µm (1.5-mil) WFT. One set of panels was stored at 23°C and the other set at 50°C. Measurements were taken after 24 hours, 48 hours, 7 days, 14 days, and 28 days using the Minolta CM-3600d Spectrophotometer. Each panel was measured three times and the average results were reported.

BK drying time

Coatings were applied to glass panels (305 x 25 mm) using a 75-µm applicator. The glass panels were placed on the BK drying-time recorder (DT-BK3) and the drying time set for 24 hours. Tests were carried out at 23°C. When completed, the times were recorded for each of the following 4 stages.

1. The first stage is a pear-shaped impression, corresponding to the time taken for the evaporation of solvent.
2. The second stage is the cutting of a continuous track, corresponding to a sol-gel transition.
3. The third stage is an interrupted track corresponding to the surface dry time.
4. The fourth stage is where the needle no longer penetrates the film, corresponding to the final drying time.

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