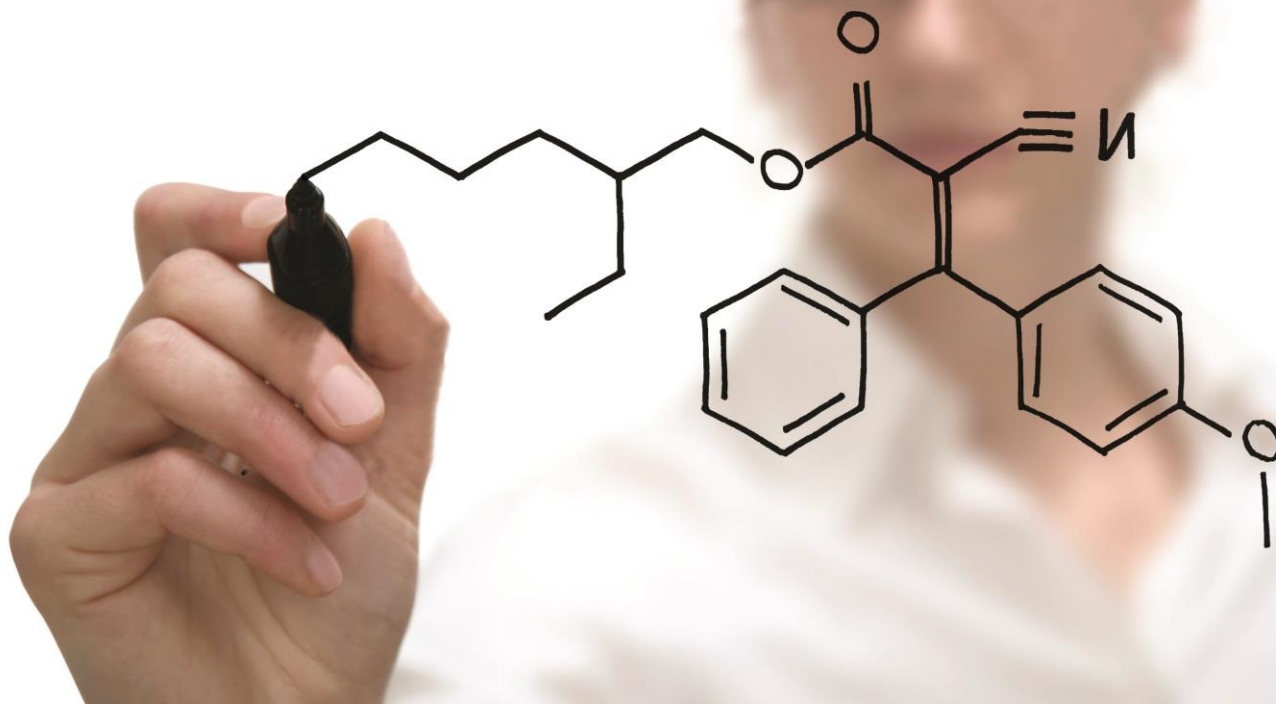


Hallstar Ester Plasticizers for VAE Adhesives



VAE Adhesive Study

Goal: to identify performance advantages using specialty esters in VAE

Advantages:

- Viscosity Reduction
- Low Temp Performance
- Shelf Stability
- Peel Strength

Binder: Wacker Vinnapas[®] 400 (VAE/PVOH, 55% solids emulsion)

Formulation

Vinnapas [®] 400	100 phr
DI Water	20 phr
Plasticizer	20 phr

Plasticizers Evaluated

TegMeR [®] 804S (PEG ester)
TegMeR [®] 809 (PEG ester)
Plasthall [®] P-900 (Polymeric ester)

Vinnapas[®] is a registered trademark of Wacker Chemie AG

VAE Adhesive Study

	TegMeR 804S	TegMeR 809	Plasthall P-900	No Additive
Brookfield Vis@25 C, 20 RPM				
1 day	760	670	450	2415
7 days	765	660	460	2355
28 days	755	615	430	2360
Pencil Hardness				
ASTM D3363	<6B	<6B	H	2H
Tg by DSC, °C				
	-43.16	-39.01	-19.52	-4.99 3.49
Peel Strength (pli)				
2 in/ minute, 180° peel				
Cotton/Cotton Cloth Dry Peel	5.00	4.65	4.78	3.63
failure mode	Adhesive	Adhesive	Adhesive	Adhesive
Cotton/Cotton Cloth-Wet Peel	1.85	1.04	2.24	0.23
failure mode	Adhesive	Adhesive	Adhesive	Adhesive
Cotton to PP Film-Dry Peel	0.04	0.04	0.66	0.29
failure mode	AF	AF	5% - C, 95% - AF	AF

- Viscosity Reduction
- Low Temp Flexibility
- Improved Adhesion

VAE Adhesive Study- Summary

Hallstar Esters provided performance advantages in a VAE formulation

- Viscosity Reduction
- Stability after aging
- Tg Reduction= Low Temp Flexibility
- Efficient at Softening & Lowering Tg
- Increased Dry & Wet Adhesion- Cotton/Cotton
- Increased Dry Adhesion- Cotton/Plastic (Plasthall P-900)

Questions?

www.hallstar.com