

# ChemBrief



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## ENCORE™ NF55E *Environmentally Compliant Emulsion for Wood Stains*

As more stringent VOC restrictions loom on the horizon, formulators are looking for alternative technologies that will allow them to meet the impending regulations. Low VOC alkyd formulations typically exhibit extended dry times, poor stability, and less than optimum exterior durability. Traditional waterborne systems have not offered suitable performance characteristics when compared to their solvent borne counterparts. Now Süd-Chemie has introduced a new technology based on an olefin and natural oils copolymer emulsion. This innovative copolymer, ENCORE NF55E, provides formulators with an easy means to meet impending VOC regulations without sacrificing performance. The environmentally friendly technology allows for zero VOC finishes, fast dry, excellent penetration, outstanding weatherability and water cleanup.

Reducing the VOC while maintaining the desired properties of the stain can be a difficult task to accomplish. ENCORE NF55E allows the formulator to produce Zero VOC stains while offering excellent dry time, lapping, exterior durability, penetration, stability, ease of manufacture and brushability.

Typical Properties	Encore™ NF55E
Solids Content	53-57%
VOC	0
Viscosity (mPas)	2000 – 3500
pH	6 – 8
Form	Aqueous Emulsion

### **Zero VOC Capability:**

Using proprietary technology, Southern Clay Products, Inc. is able to produce low viscosity and solvent free emulsions like ENCORE NF55E. Due to its molecular weight and low viscosity (the molecular weight is comparable to a long oil alkyd at 80% solids but has one tenth the viscosity), ENCORE NF55E makes formulating zero VOC penetrating stains easy.

In addition, ENCORE NF55E is produced at a neutral pH and offers excellent stability and high resistance to saponification. By

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contrast, other waterborne technologies must be buffered to a pH of 8.5 – 9.0. This can lead to instability and poor saponification resistance. Our technology yields a unique copolymer emulsion with no actual saponification value and an acid value less than 2, while other products typically have acid values from 5 to 20. Its high resistance to saponification also makes ENCORE NF55E an excellent choice for producing zero VOC stains for porous concrete.

**Dry to Touch & Cure:**

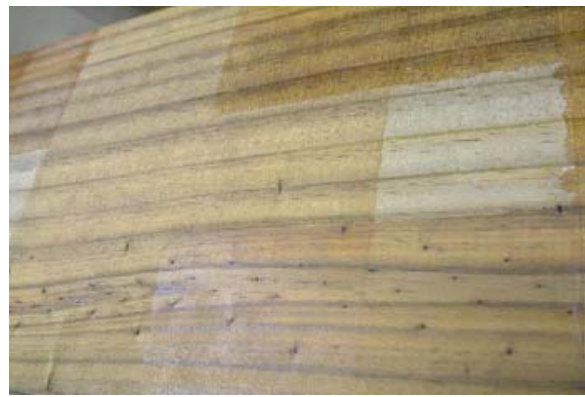
ENCORE NF55E is a non-traditional film former that is supplied with the appropriate driers. Formulations based on this technology penetrate into the substrate before curing offering finishes that can be dry to the touch in as little as 30 minutes but will not achieve full cure until approximately 24 hours. The combination of quick penetration and slow cure allows for excellent dry time and deep penetration while improving application properties like lapping.

**Lapping:**

ENCORE NF55E has excellent lapping characteristics due to its rapid penetration and slow cure. The copolymer is also unique in its ability to maintain open time. After application, even as the substrate is dry to the touch, Encore NF55E can be re-emulsified during second coat applications and touch-ups, thus significantly increasing open time.



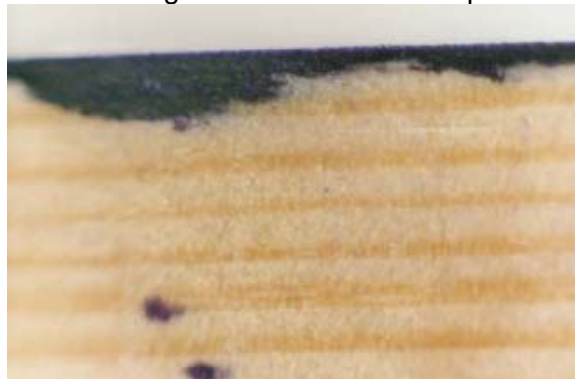
Encore™ NF55E Lapping



Commercially Available Stain Lapping

**Penetration:**

There are several reasons why ENCORE NF55E has excellent penetration. To start it is based on a low molecular weight resin with a viscosity of around 400 cps. As a result, most stains formulated with ENCORE NF55E are less than 1,000 cps. Its unique emulsifying agent and slow cure help as well by improving substrate wetting and increasing the time available for penetration.



Penetration of Encore™ NF55E with phthalo blue dye



**Ease of Formulation and Manufacture:**

Formulating and manufacturing stains and varnishes based on ENCORE NF55E are extremely easy. It is supplied at 55% solids with the appropriate driers. The emulsion solution viscosity is approximately 3,000 cps, making it very easy to pour and/or pump. Formulating can be as simple as just adding water, biocide and colorants. Inherently, it offers good water beading, however, if needed waxes and stearates can be used. The copolymer readily accepts colorant, yielding deep rich colors that help highlight and enhance the character of the wood.

**Exterior Durability: Mildew Resistance and Water Beading:**

The mildew resistance of this product is quite good. Customer studies have been done showing this product to have very little negative impact on the efficacy of the biocide, unlike most other systems. This property in combination with the excellent penetration of the copolymer helps exterior durability by carrying highly effective biocide deep into the wood. ENCORE NF55E can also be preserved with either a water or oil soluble biocide, giving the formulator flexibility. An oil soluble biocide will need high speed dispersion to be incorporated and can be aided by premixing the biocide with a small amount of solvents like butyl glycol or methoxypropanol.

Aged water beading of ENCORE NF55E is excellent even though it contains no water repellency additives. Water beading is aided by the very low polarity of the resin, as signified by the low acid value and a hydrophobic emulsion. This is not the case with typical alkyd emulsions as the acid value is usually somewhere between 5 and 20. The water beading actually improves to a point over time as the emulsifier is deactivated. Water beading, exterior durability, and/or hardness can be improved as needed by adding waxes or stearates, UV inhibitors, or blending in acrylics.



Commercially available stain with 9 months horizontal exposure



Encore™ NF55E with 9 months horizontal exposure

**Conclusion:**

While the challenges of the new VOC regulations are many, there is an alternative that will allow formulators to produce zero VOC stains with fast dry, excellent lapping, good water beading, deep penetration, easy formulating, and low cost manufacturing. Southern Clay Products, Inc. has developed such a product in the ENCORE NF55E.

*For more information on how Southern Clay Products can assist you, please contact us at (800) 324-2891 or visit us on the internet at [www.scprod.com](http://www.scprod.com).*



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**ROCKWOOD**  
ADDITIVES

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