SELVOL™
POLYVINYL ALCOHOL

Selvol 425 Polyvinyl Alcohol for Improved Oil Resistance and Ink Holdout

Selvol Polyvinyl Alcohol (PVOH) is an extremely hydrophilic polymer, and as a continuous film, exhibits total barrier properties to oils, greases and most organic solvents.

On paper and paperboard substrates, however, the add-on level of PVOH is limited by its viscosity to very low percentages based on dry fiber weight. Thus, true barrier properties are never achieved. But even at low add-on levels, PVOH finds use in meeting papermaker's oil resistance needs, usually to a defined specification standard.

Selvol PVOH is used on a variety of paper and paperboard grades for the purpose of controlling oil penetration, as in food grade applications or to control ink penetration and feathering on uncoated printing and writing grades. The following are two commercial examples:

1) A recycled paperboard mill achieved a 20-unit Vanceometer improvement by switching to a 70/30 starch/Selvol PVOH formulation from a straight starch system.

2) A solid, bleached paperboard mill achieved an 80 Vanceometer specification- unobtainable with starch alone- by switching to a 60/40 starch to Selvol PVOH formulation.

TABLE 1:
Selvol PVOH Typical Properties

Grade	Hydrolysis, %	Viscosity, (cPs*)
Selvol PVOH 425	95.5-96.5 (intermediate)	27-31
Selvol PVOH 325	98.0-98.8 (fully)	28-32
Selvol PVOH 125	99.3+ (super)	28-32

**4% Aqueous solution, 20˚C*

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FIGURE 1: Effect of Polyvinyl Alcohol Surface Size on Paper Porosity 73 lb Grade

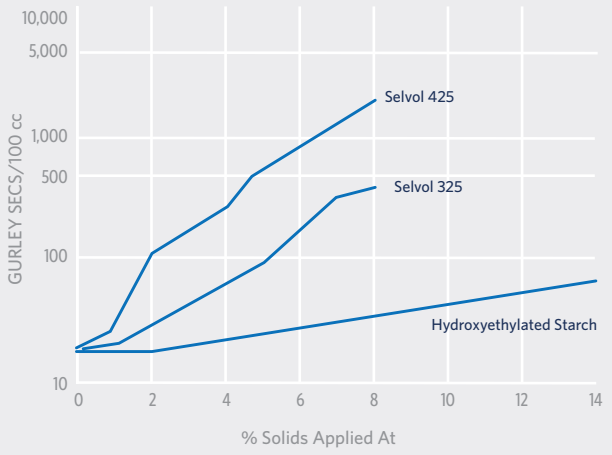
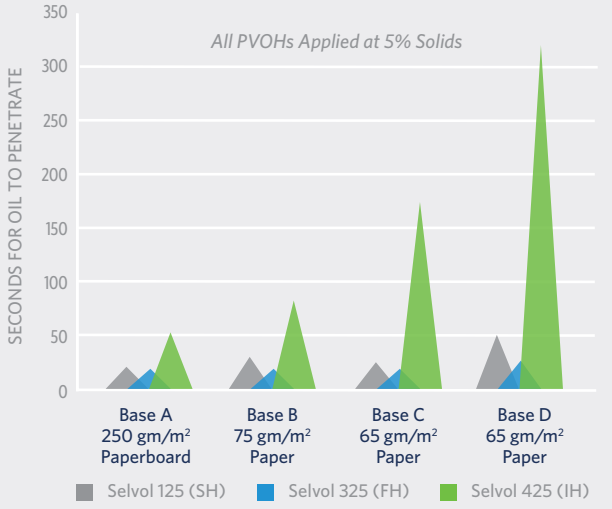


FIGURE 2: Selvol 425 for Oil Resistance on Paper and Paperboard Mazola Oil Drop Penetration Test



LABORATORY STUDIES

These experiences typify the superiority of Selvol PVOH over starch. Laboratory studies have demonstrated that this superiority is due to the ability of PVOH to more effectively reduce the porosity of the sheet. Figure 1, for example, compares Selvol 425, Selvol 325 and a hydroxyethylated starch as surface sizers on a 73-pound remailer grade of paper. Starch was applied at solids levels of up to 14% in 2% increments, and the two PVOH grades (differing only in degree of hydrolysis) were applied at up to 8% solids in 1% increments. When compared at any equal solids level, both PVOH grades demonstrated dramatically less porosity than the starch treatment. Also note that of the two Selvol PVOH grades, the lower percent hydrolysis grade, Selvol 425, demonstrated significantly less porosity.

Figure 2 shows that this air porosity reduction improvement correlates directly to improved oil resistance. Selvol 425, 325 and 125 (see Table 1) were applied to four different substrates at 5% solids by means of a laboratory Keegan size press, and the treated sheets where then tested for Mazola oil drop holdout. Note that on all four substrates, Selvol 425 exhibited much better oil holdout. These results have been confirmed in many other evaluations, including K&N ink holdout, Magic Marker pen holdout, ink feathering control, chocolate resistance, Vanceometer oil holdout, the 3M Kit test and the TAPPI Turpentine Test T 454-OM-84.

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