SARTOMER
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Amine Modified Polyether Acrylates

Sartomer offers several amine modified polyether acrylate oligomers for use in wood coatings (parquet, furniture, joinery), OPVs, flexo and inkjet inks, and plastic coatings.

These oligomers can be used as sole binders or with monomer diluents and oligomers. The main physical properties of these Amine Modified Polyether Acrylates (AMPA) are described in the below Table. Their low viscosity allows them to be used in OPVs, vacuum and spray applications.

Product	Viscosity (mPa.s) at 25°C	Amine Value (mg KOH/g)
CN502	100	20
CNUVA421	100	58
CN550	2900	57
CN551	650	35
CN501	70	20
CN554	450	30
CN503	450	35

PHYSICAL PROPERTIES:

Several physical properties were evaluated which include surface cure, acetone resistance, flexibility, hardness, scratch resistance, scotch brite resistance, Taber scratch resistance and yellowing Resistance.
A Fusion Curing Unit with a mercury lamp of 120W/cm was used. The tested formulations were composed of 96% AMPA and 4% photoinitiators.

SURFACE CURE:

Twelve µm-films (applied on Leneta 2A sheets) were run under UV lamps at varying speeds. The fastest speed achieving a dry film surface is the surface cure in m/min.

Data reveals that the oligomers with the highest amine values provide the fastest surface cure speed. The PI system of 2% benzophenone with 2% Darocure 1173 (Ciba Specialties) provides more efficient curing than using only Darocure1173.

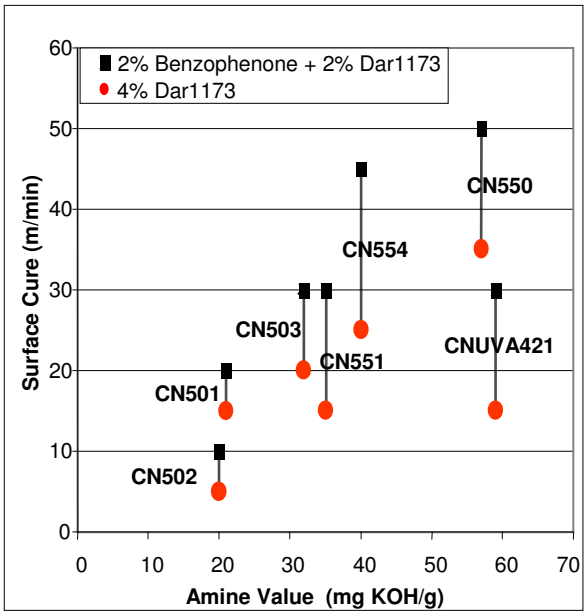

Figure 1: Surface Cure

ACETONE RESISTANCE:

Acetone resistance of the AMPAs were tested. A tissue regularly soaked with acetone is used to gently rub a12µm film, applied on glass, until it cracks. Data is presented in Figure 2. Acetone and MEK are the harsher solvents for acrylate coatings.

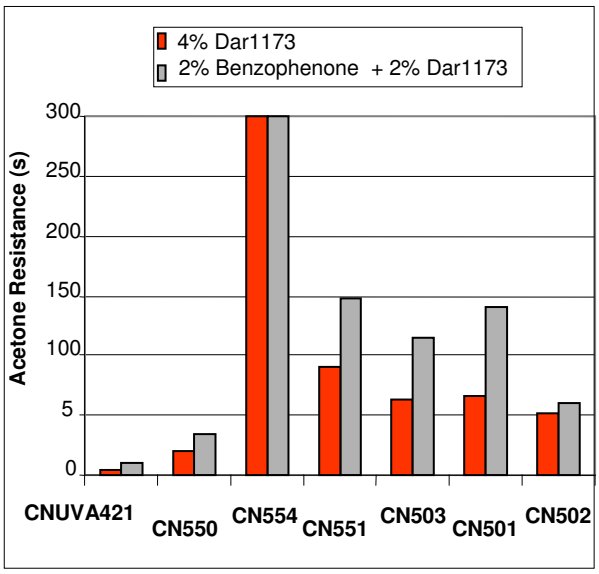

Figure 2: Acetone Resistance

CN554 has excellent acetone resistance regardless of the photoinitiator system used.

FLEXIBILITY:

Flexibility was tested using the cylindrical mandrel method following the ISO1519 Method. A 100µm film is applied on metal and then bent around cylinders of varying diameters. The smallest diameter providing no crack and detachment indicates the flexibility of the film.

Data (figure 3) is reported in millimeters and indicates that CN554 and CN550 are very flexible. Flexibility is not significantly affected by the photoinitiator system used in this testing. Flexibility of a film is important in applications such as OPVs, plastic coatings and furniture.

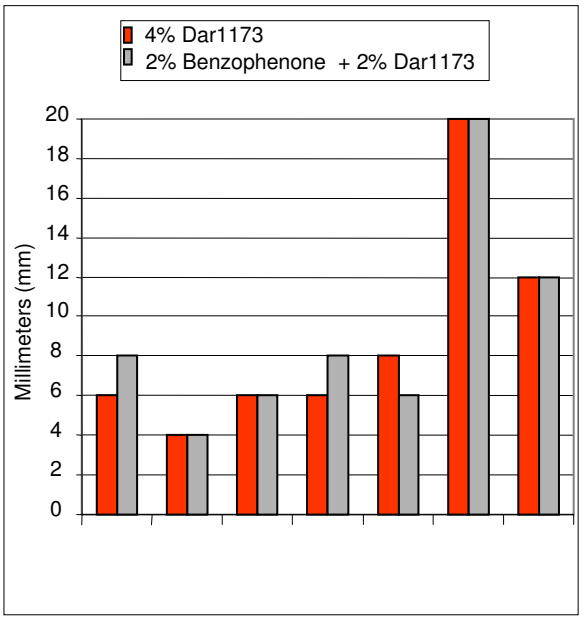

Figure 3: Flexibility

HARDNESS:

Persoz hardness and pencil hardness were determined for the AMPAs. The formulation tested used a 100µ m film applied on glass. The photoinitiator system is 2% benzophenone and 2% Darocure 1173.

Persoz hardness or pendulum hardness is evaluated by measuring the damping time of an oscillating pendulum according to ISO 1522 procedure.

The data in Figure 4 shows that CN501 and CN503 have a good hardness. CN554 performs well as do CN501 and CN503.

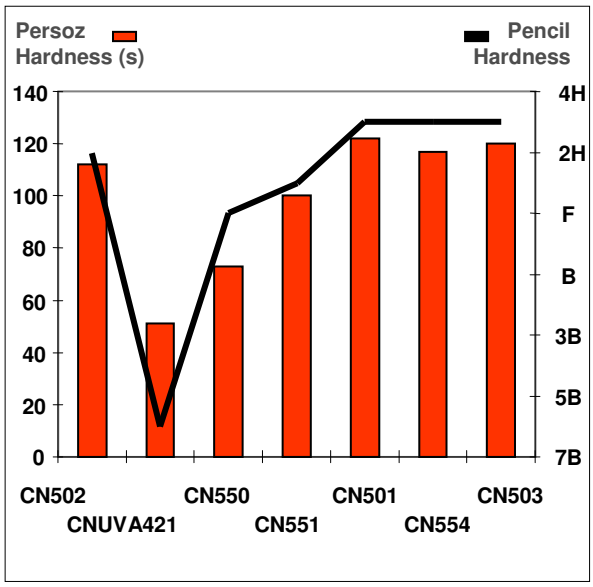

Figure 4: Pencil and Persoz Hardness

Data also reveals that there is a definite correlation between the two hardness tests. CNUVA421 and CN550 have the lowest hardness values.

SCRATCH RESISTANCE:

Scratch resistance is one of the key properties of industrial wood coatings, both for furniture and parquet flooring. Different techniques can be used to evaluate the performance of a coating. Taber and scotch brite testing were performed.

Taber testing for scratch resistance is defined by the ISO 4586 standard as the minimum load applied to an indenter of defined geometry which produces a continuous mark visible to the naked eye at the surface of the coating.

Scotch Brite resistance is measured according to DIN 53778 (ISO 11998). The weight used is 371 grams. Figure 5 shows that the products with the higher Taber scratch have the best scratch resistance.

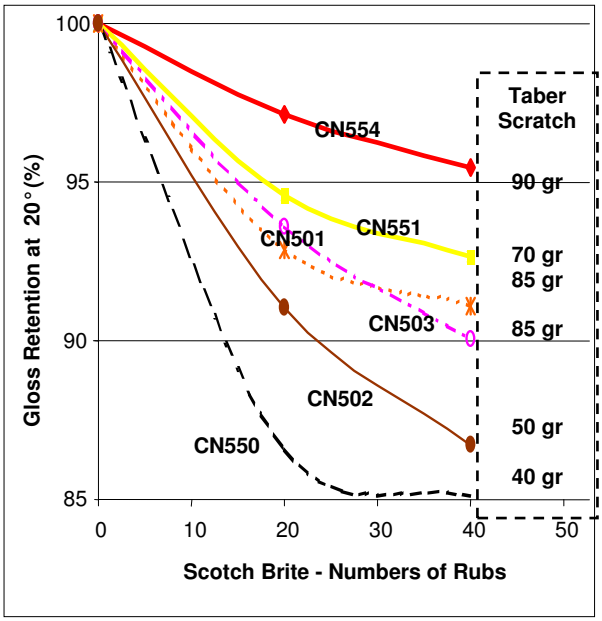

Figure 5: Scotch Brite Resistance and Taber Scratch

YELLOWING TESTING:

Following 1000 hours of UV-B exposure, coatings based on CN501 demonstrated a comparable Yellowing Index to CN132 and CN963A80, an aliphatic urethane acrylate oligomer known for its low yellowing (see figure 6)

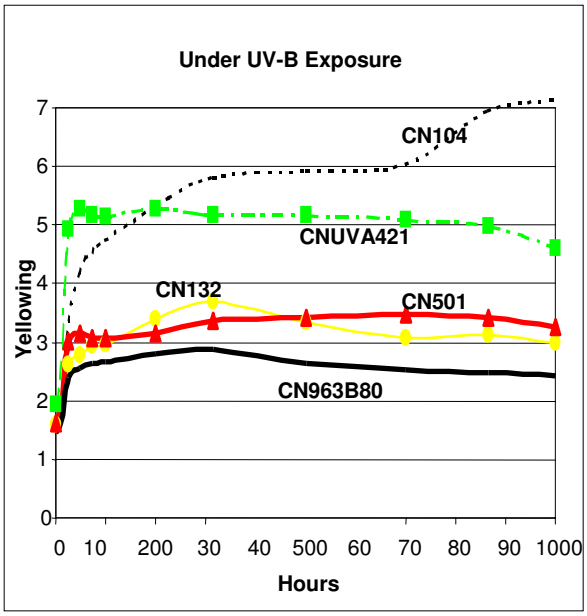

Figure 6: Yellowing Index

SUMMARY:

	CN554	CN502	CNUVA421	CN550	CN551	CN50	CN503
Cure Speed (m/min) - PI: Benzophenone + Dar1173	45	10	30	50	30	20	30
Flexibility (mm)	6	12	8	4	8	20	6
Acetone Resistance (s)	300	61	10	35	148	140	115
Persoz Hardness (s)	117	112	51	73	100	122	120
Scratch Taber (grams)	90	50	35	40	70	85	85
Scratch Resistance - Gloss Retention at 20° (%)	95	87	N.A.	85	93	91	90
Stain Resistance (Coffee and	5	5	N.	5	5	5	5
Yellowing after 1000 hrs in QUV B	N.A.	N.A.	bad	N.A	N.A.	Good	N.A.