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TECHNICAL DATA SHEET

POLYVINIL ACETATE

Vinavil solid homopolymers of vinyl acetate differ in degree of polymerization.
Each product is identified by a code number directly related to the molecular weight of the product (Fikentscher constant).
Vinavil solid homopolymers are available as translucent beads.
Their most interesting property is their ability to adhere to an extremely wide range of substrates develloping strong adhesive bonds.
Therefore they can be employed in the manufacture of adhesives, paints, and composition boards of various types.
The films developed by Vinavil solid homopolymers are not affected by light. Their average refractive index is 1.462, that is, very close the glassone.
They are neutral, not corrosive, and not toxic products.

SUPPLY SPECIFICATIONS AND MAIN PROPERTIES

The chemical and physical properties of Vinavil solid homopolymers are shown in table 1.
The Brookfield Viscosity of the solution as well as the volatile substances of the solid constitute the product supply specifications.

SOLUBILITY

Vinavil solid homopolymers are insoluble in water.
However, prolonged immersion may cause them to take up small quantities of water and swell. They are insoluble in mineral and vegetal oils, aliphatic hydrocarbons, turpentine and glycerol. They are readily soluble in a large number of solvents, as shown in table 2.
To dissolve them in ethanol and isopropyl alcohol a certain amount (i.e., 5 and 12% respectively) of water must be added. Polymerization degree widely affect the solubility of Vinavil solid homopolymers.
The viscosity of the solutions containing Vinavil solid homopolymers is depending of the degree of polymerization of the product, solvent used, and product concentration.
When selecting the solvent to dissolve Vinavil solid homopolymer, the evaporation rates of individual solvent must be taken into account (table 2). For example, it is desirable to adopt a mixture of solvents with different evaporation rates in the manufacture of paints, especially of those to be applied by the spray method.

COMPATIBILITY WITH ADDITIVES

Vinavil solid homopolymers can be mixed with plasticizers, resins, pigments, extenders, dyestuffs, etc. to obtain a wide range of final product formulations.

PLASTICIZERS

Plasticizers can be incorporated in the formulation of the final product to increase its elasticity, flexibility, and adhesion as well as to lower its softening point, improve its resistance to moisture and to low temperatures, and make it combustion-resistant.
The plasticizers usually specified to attain these objectives include n-butyl, isobutyl, methyl, ethyl, and benzybutyl phthalates; tricresyl phosphate; trichloroethyl phosphate; tributyl citrate and acetyltributyl citrate; etc.

NATURAL AND SYNTHETIC RESINS

Natural and synthetic resins showing compatibility with Vinavil solid homopolymers include hydrogenated, oxidized, and esterified rosin; phenol-formaldehyde and cumarone-indene resins; phenol, urea, and melamine precondensates; chlorinated rubber; nitrocellulose; cellulose acetate butyrate containing no more than 30% of acetyl groups.
All the above compounds and products impart hardness to the films and are useful to increase the initial tack of adhesives formulated with Vinavil solid homopolymers, and improve waterproofs and gloss of their films, etc.

PIGMENT, EXTENDS, AND FILTER

Complete compatibility for all the inorganic pigments that are usually employed in paints can be claimed for Vinavil solid homopolymers. As to organic pigments, compatibility testing is desirable used.

Extenders and fillers that can be safely specified with Vinavil solid homopolymers include calcium carbonate, calcium sulfate dihydrate, barium sulfate, bentonite, kaolin, quartz, mica, wood sawdust, and cork, as well as any other inert extender.

The above additives can be added to Vinavil solid homopolymers as powder with stirring or by dissolving them in one of the solvents included in the final product formulation.

APPLICATIONS

Paints

Vinavil solid homopolymers are used in the manufacture of primers and finish paint to be applied onto wood, composition board, paper, paperboard, etc. In this industry Vinavil solid homopolymers with low or medium degrees of polymerisation are generally preferred on account of their stonger adhesive properties, the opportunity to prepare solution with high solid contents from them, and their greater compatibility with other resins such as nitrocellulose, cellulose acetate butyrate, chlorinated rubber etc.

Paints formulated with Vinavil solid homopolymers and the above-mentioned resins are particularly suitable to coat paper, cellophane and aluminium foil, since they enable materials coated with them to be heatsealed.

Since Vinavil solid homopolymers are non toxic, the paints containing them can be used to manufacture containers that come in contact with foods.

Vinavil solid homopolymers with high degrees of polymerization are particularly useful in combination with nitrocellulose and alkyd resins in the manufacture of ovendried enamels for metals.

Adhesives

As adhesives, Vinavil solid homopolymers are used both in solution and as hotmelts to bond substrates of various types.

Solvent-based adhesives can be used for direct bonding as such. They can also be used for heat-sealing after solvent evaporation. In this application, due account must be taken of the softening temperature of each Vinavil solid homopolymers (table 1).

Addition of plasticizers, natural or esterified rosin, cumarone resin, terpene resin, etc. to Vinavil solid homopolymers is necessary when hotmelts are prepared from the latter.

The main applications of hotmelts made with Vinavil solid homopolymers are book - and journal-binding and automatic packaging of various products.

Printins inks

As a results of the strength of the adhesive bonds they can develop on many types of substrates, Vinavil solid homopolymer can be used quite successfully to bind pigments in the manufacture of inks for solvent rotogravure and silk-screen printing on many materials, such as aluminium foil, cellophane, fiber glass tissues, etc.

The most frequently used solvents are denatured alcohol,ethyl acetate, and acetone. However, when solvent evaporation must be delayed, small quantities of solvents with higher boiling points can be added.

The most suitable Vinavil solid homopolymers are those with low and medium degrees of polymerization.

Composition board

Vinavil solid homopolymers can be used advantageously as binding agents in the manufacture of compositions of several materials, including textile fibres, granulated cork, wood sawdust, etc. An important application in this sector is the manufacture of moldings and frames for the furniture industry, and composition board for coffins. Wood sawdust and, occasionally, a mineral extender is usually dry-mixed with a binder, that is, Vinavil K 115 (a product with a high degree of polymerization). The solvents and release agents are added to the mixture later stirring till a homogeneous mass result.

Chemical industry

Vinavil solid homopolymers are used as the raw materials in the synthesis of polyvinyl alcohol and polyvinyl acetals, such as polyvinyl formal and butyrral.

Vinavil solid homopolymers are available in 25 Kg bags.

STORAGE

Vinavil solid homopolymers must be stored at temperatures lower than 30°C to avoid beads caking.

Table 1 - Physical-Chemical properties		Unit	Value	Method
VINAVIL K 40				
K Values			40±2	MVPF 12
Brookfield viscosity	(1)	mPa.s	26±6	MVPF 11
Softening range		°C	83÷101	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09
VINAVIL K 50				
K values			50±3	MVPF 12
Brookfield viscosity	(2)	mPa.s	73±13	MVPF 11
Softening range		°C	100÷119	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09
VINAVIL K 55				
K values			54±3	MVPF 12
Brookfield viscosity	(3)	mPa.s	13±2	MVPF 11
Softening range		°C	114÷125	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09
VINAVIL K 60				
K values			62±3	MVPF 12
Brookfield viscosity	(4)	mPa.s	25±5	MVPF 11
Softening range		°C	145÷165	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09
VINAVIL K 70				
K values			72±3	MVPF 12
Brookfield viscosity	(5)	mPa.s	9±2	MVPF 11
Softening range		°C	195÷225	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09
VINAVIL K 115				
K values			118±5	MVPF 12
Brookfield viscosity	(6)	mPa.s	16±4	MVPF 11
Softening range	(7)	°C	(7)	K. Sarnow
Volatile substances		%	1.5 max	MVPF 09

(1) ethyl acetate solution at 20%, Mod. LVT (ULA), 6 rpm
(2) ethyl acetate solution at 10%, Mod. LVT (ULA), 30 rpm
(3) ethyl acetate solution at 10%, Mod. LVT (ULA), 12 rpm
(4) ethyl acetate solution at 5% Mod. LVT (ULA), 30 rpm
(5) ethyl acetate solution at 2%, Mod. LVT (ULA), 30 rpm
(6) ethyl acetate solution at 2%, Mod. LVT (ULA), 30 rpm
(7) decomposes before softning

Table 2 - Solubility of Vinavil solid homopolymers in solvents

Solvent	Solubility of Vinavil	Boiling range (°C)	Evaporation time relative to ethylether =1	Flash point (°C)
Acetone	Excellent	55-56	2.1	- 17
Cyclohexil acetate	Good	170-177	77	57
Amyl acetate	Good	135-140	13	25
Benzene	Excellent	80-81	3	- 8
Benzyl alcohol	Good	204-208	1770	96
Butanol	used as a diluent	114-118	33	34
Butanediol	Excellent	164-176	163	60
Butyl acetate	Excellent	121-127	11.8	25
Cyclohexanone	Excellent	156-163	40	44
Diacetone alcohol	Excellent	155-165	147	45
Ethanol denaturad	Good	78	8.3	18
Ethyl acetate	Excellent	74-78	2.9	- 8
Ethylene glycol acetate	Excellent	149-160	52	47
Ethylene polypropyleneglycol	Good	190-200	970	93
Isopropyl alcohol	used as a diluent	80-81	21	18
Methanol	Good	64-65	6.3	6.5
Methyl acetate	Excellent	56-62	2.2	- 13
Methycyclohexanone	Excellent	165-171	47	48
Methylene chloride	Excellent	39-41	1.8	Non flammable
Methylene glycol	Good	120-130	34.5	36
Methylene glycol acetate	Good	138-152	35	44
Toluene	Excellent	109.5-110.5	6.1	7
Trichloroethylene	Good	85-87	3.8	Non flammable
Xylene	used as a diluent	136-140	13.5	23