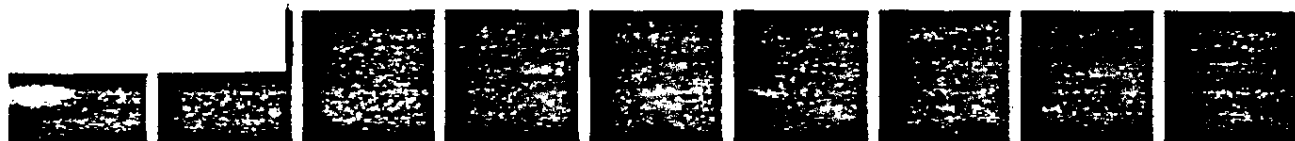


RFP #3

CAL

Marvinol® vinyls



TECHNICAL DATA SHEET

MARVINOL 22

MARVINOL 22 is a high molecular weight general purpose suspension type PVC homopolymer. Its exceptional gel and dry blend properties are well suited for a variety of applications in calendering, extrusion, wire and cable, medical tubing and general compounding.

PROPERTY	TEST METHOD	TYPICAL DATA
Specific viscosity	ASTM D-1243-66T (Method B)	0.44
Inherent viscosity	ASTM D-1243	1.05
Apparent Density	ASTM D-1895	29 lbs/ft ³
Oil Absorption	ASTM D-281	0.90
Screen Analysis (cumulative % retained):	ASTM D-1921-63	
80 mesh		5
100 mesh		30
140 mesh		75
200 mesh		97
Gels	MARVINOL Test	3 minutes
Moisture & Volatiles	MARVINOL Test	0.30%
Hot Dry Blend Time	ASTM-2396-69	2.8 minutes
Extract Electrical Conductivity	ASTM-2396-69	0.14 microhms/cm/gm
Volume Resistivity	MARVINOL Test	15 x 10 ¹⁴ ohms/cm
ASTM Classification	ASTM D-1755	GP5-15353
Physical Properties(50 hr DOP)		
Tensile Strength	ASTM D-412	2,800 psi
100% Modulus	ASTM D-412	1,500 psi
Elongation	ASTM D-412	340 %
Tear Strength(DIEC)	ASTM D-624	450 psi

ECT:dmb (12/7/71)

® Reg. U.S. Pat. Office

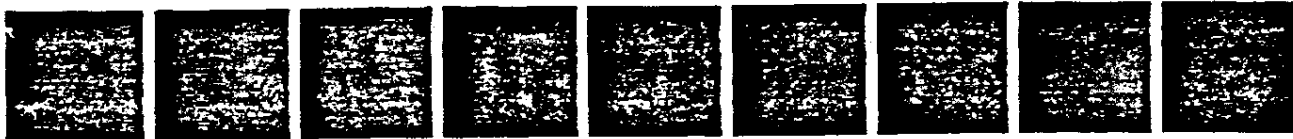
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URL 00791

UNIROYAL CHEMICAL
Division of UNIROYAL, Inc.
Naugatuck, Connecticut 06770

Marvinol® vinyls



TECHNICAL DATA SHEET

MARVINOL 1001

A Plastisol Blending Resin

Polymer	:	Polyvinyl Chloride
Specific Viscosity (1)	:	.44
Particle Size	:	Trace retained on a USSS 200 mesh screen
Specific Gravity	:	1.40
Apparent Density	:	30 lbs/ft ³
Heat Loss	:	0.2%

DESCRIPTION

MARVINOL 1001 is a plastisol blending resin of controlled particle size. It is recommended in blends with MARVINOL 50 or other dispersion grade resins for cost reduction, gloss control and viscosity reduction in all casting and molding applications.

Because of its controlled particle size, MARVINOL 1001 may be processed at high rates of shear without the usual difficulties of coarse particles culling out on the milling or casting equipment.

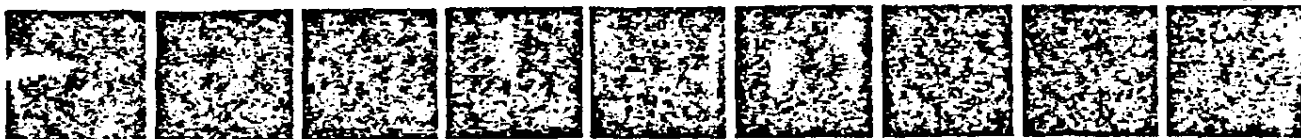
ACW:dcj 3/12/68
Rev. 5/9/68

®Uniroyal Reg. TM for its PVC resins

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TECHNICAL DATA SHEET

MARVINOL 50

Typical Properties

Polymer	Homopolymer of PVC
Resin Type	Stir-in plastisol
Specific viscosity (1)	0.48
Inherent viscosity (2)	1.15
Particle size	Trace retained on 200 mesh USS screen
M & V	0.2%
Methanol extractable	1.8%
Bulk density	15 lbs/ft ³
Brookfield viscosity (3)	7,000 cps
Severs viscosity (3)	145 poises

Application

MARVINOL 50 is a high molecular weight PVC plastisol-grade resin used in the coating of cloth, paper and flooring substrates. MARVINOL 50 exhibits a high degree of compatibility with plasticizer, stabilizer and other formulating ingredients. MARVINOL 50 also possesses exceptionally high clarity and gloss properties. The rheological properties of MARVINOL 50 are particularly suited for high shear knife, reverse roll and strand coating. MARVINOL 50 is available in viscosity grades suited for cloth coating where cloth penetration control and pigment floatation resistance are critical properties. MARVINOL 50 is also available in a lower viscosity grade where maximum flow-out is necessary. For all these reasons MARVINOL 50 has a continuous record of unsurpassed performance in the cloth coating, paper coating and flooring fields since 1955. MARVINOL 50 is also used in dipping and slush and rotational casting where its automotive fog resistance can be used to advantage. MARVINOL 50 is approved for use in food contact applications. Through careful emulsifier selection MARVINOL 50 possesses low taste and odor pick-up.

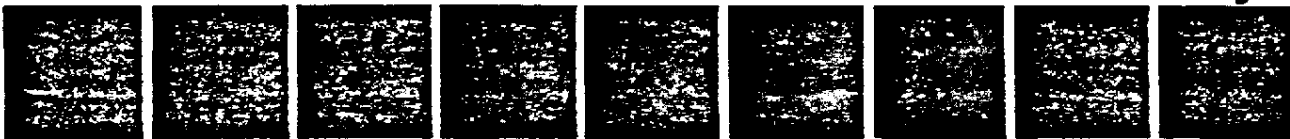
- (1) ASTM-D-1243-60
- (2) ASTM-D-1243-66
- (3) 60 phr DOP

ACW (2/23/72)

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URL 00793



MARVINOL 56

A Copolymer Plastisol Resin for Adhesive Applications

TYPICAL PROPERTIES

Polymer	Vinyl chloride-acetate copolymer
Inherent Viscosity ⁽¹⁾	.99
Specific Viscosity ⁽²⁾	.41
Retained on 200 Mesh	Trace
Specific Gravity	1.38
Heat Loss	0.2%
Methanol Extractable	1.2%
Bulk Density	.24 gms./cm ³ .
Brookfield Viscosity ⁽³⁾	20,000 cps
Severs Viscosity ⁽³⁾	200 poises

URL 00794

MARVINOL 56 is a copolymer plastisol resin specifically designed for adhesive plastisol applications. MARVINOL 56 is also used in the coating of heat sensitive substrates or where only limited fusion heat is available. The normal fusion temperatures for MARVINOL 56 falls in the 275-300°F. range which can be lowered to 250°F. through careful plasticizer selection.

MARVINOL 56 is available in a range of viscosities to meet virtually all coating requirements and is particularly suited to those applications where compounds with a high plasticizer level tend to reduce viscosity below a practical coating range.

MARVINOL 56 is blended with other plastisol resins to lower gelation temperature in slush and rotational molding applications where special control is needed and not obtainable with standard molding resins.

- (1) ASTM D-1243-66
- (2) ASTM D-1243-60
- (3) 60 phr DOP

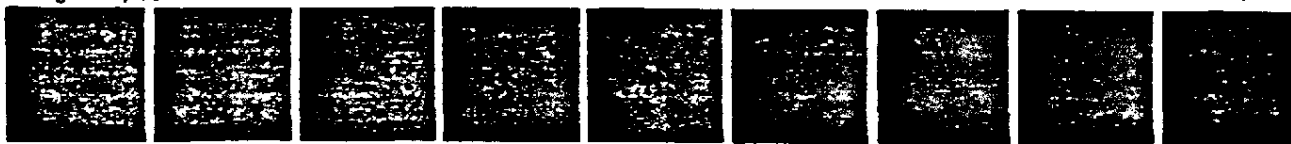
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ASP-33B4
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UNIROYAL CHEMICAL
Division of UNIROYAL, Inc.
Naugatuck, Connecticut 06770

Marvinol® vinyls



MARVINOL® 5051

A PVC Plastisol Resin for General Coating, Molding and Compounding

TYPICAL PROPERTIES

Inherent Viscosity ⁽¹⁾	1.15
Specific Viscosity ⁽²⁾	0.48
Retained on 200 Mesh	Trace
Specific Gravity	1.40
Heat Loss	0.2%
Methanol Extractable	1.6%
Bulk Density	.24 gms./cm ³ .
Brookfield Viscosity ⁽³⁾	8,000 cps
Severs Viscosity ⁽³⁾	160 poises

URL 00795

MARVINOL 5051 is a high molecular PVC plastisol grade resin with a balance of properties suiting it for use in virtually all plastisol coating and molding applications. These include the spread coating of cloth, paper, and flooring substrates as well as slush and rotational casting, plus general compounding.

MARVINOL 5051 has exceptional compatibility, heat stability, fog resistance, long term ultraviolet stability, plus complete freedom from plate-out and spew.

MARVINOL 5051 is available in a range of viscosity properties including balanced Brookfield and Severs properties for spread coating on paper and flooring substrates where flow out is essential, as well as on cloth where penetration control is required. MARVINOL 5051 is also available in a low Brookfield range for slush and rotational molding and general compounding. The air release properties of MARVINOL 5051 are exceptional for all applications.

MARVINOL 5051 is available in a high gloss range for high gloss coatings for flooring and apparel. With low taste and odor properties Manual 505 is suited for food contact applications.

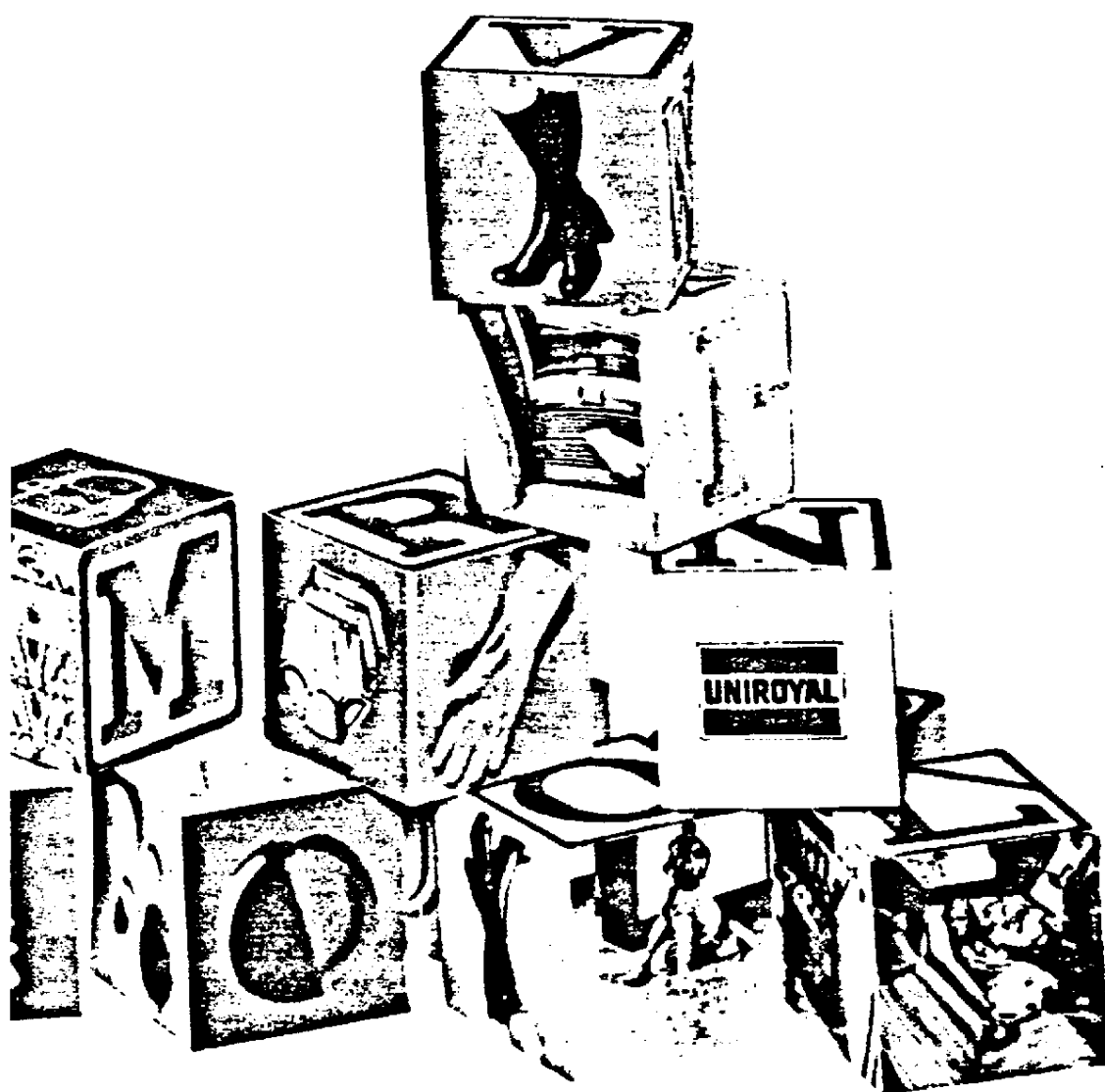
- (1) ASTM D-1243-66
- (2) ASTM D-1243-60
- (3) 60 phr DOP

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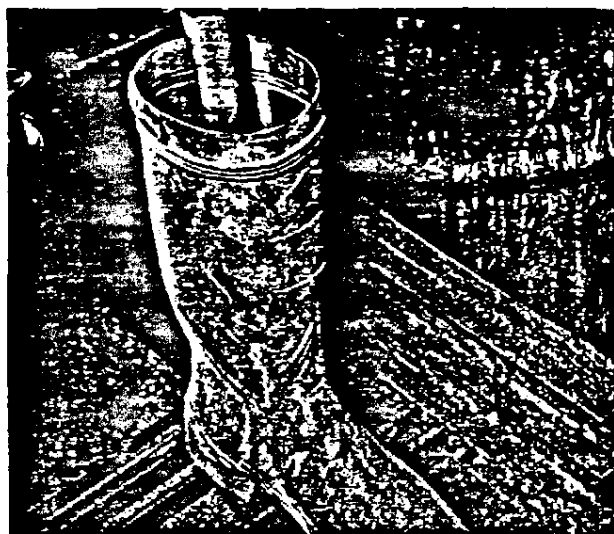
ASP-3385
Printed in U.S.A.



A selection guide to Marvinol: a family of PVC resins.



dispersion



The MARVINOL® line of vinyl resins includes dispersion resins, plastisol blending resins and general purpose suspension resins for calendering and extrusion. This brochure is intended to acquaint you with the basic properties of these materials so that you may make a proper selection for your application. All MARVINOL resins are available in 50-lb. bags and MARVINOL suspension resins are available for bulk shipment as well. Detailed technical information is available upon request through our MARVINOL technical sales representatives. Such information will provide the latest technology associated with the use of these materials.

MARVINOL DISPERSION RESINS

MARVINOL dispersion resins are available for use in all plastisols and organosols. MARVINOL 5051 is a general purpose resin for coating, molding and compounding. MARVINOL 53 is specifically for chemically blown foam laminates. And MARVINOL 56, a vinyl chloride acetate copolymer is used for adhesive tie coat applications.

MARVINOL 5051

MARVINOL 5051 is most useful in a wide variety of slush and rotational molding, knife and reverse roll coatings, hot and cold dipping, spray and general compounding applications. The careful balance of high and low shear rheological characteristics and exceptional air release properties makes MARVINOL 5051 ideally suited for all these applications. The high degree of compatibility of MARVINOL 5051 with other formulation ingredients and freedom from plate-out combine with high gloss to make MARVINOL 5051 a pre-eminent resin for all flooring and cloth coating applications. MARVINOL 5051 is also available in a reduced gloss range.

The availability of MARVINOL 5051 in various viscosity ranges suits this resin for such diverse requirements as maximum flow-out in paper coating and controlled penetration in cloth coating.

MARVINOL 5051's other properties include exceptional freedom from fogging for automotive applications and low taste and odor pick-up for closure applications as well.

MARVINOL 5051 is also useful in pressure molded, chemically blown foam where high molecular weight is a requirement rather than the low molecular weight normally required for atmospherically blown foam.

MARVINOL 53

MARVINOL 53 (used with Uniroyal's blowing agent, Celogen AZ) is the number one resin for the chemically blown foam laminates so popular in vinyl cloth coating, paper coating and floor coverings.

MARVINOL 53 provides exceptional quality foam over a very wide range of oven processing temperature and time conditions, as well as an ability to be formulated over a wide range of recipe changes including plasticizer type and level and blowing agent concentration. It also possesses excellent fog resistance for automotive applications and low taste and odor properties for food closures.

MARVINOL 53 is available in a variety of viscosity grades for applications where high shear coating performance may be coupled with cloth penetration control through partial gelation or controlled low shear viscosity, or where applications require maximum flow-out.

MARVINOL 56

MARVINOL 56 is a copolymer dispersion resin for tie-coat applications. Its exceptional compatibility combined with reduced fusion temperature ideally suits this resin for all plastisol adhesive applications. Such applications include rotogravure printing thin gauge adhesive coats to bond cloth and vinyl film. MARVINOL 56 can also be used as a coating for heat sensitive substrates and works exceptionally well with lower temperature blowing agents (CELOGEN OT).

MARVINOL 56 is available in a variety of viscosity grades, particularly useful where high plasticizer level adhesives tend to drop plastisol viscosities below the level needed for proper coating rheology and coating weight.

In combination with selected plasticizers the fusion temperature of MARVINOL 56 based compounds can be reduced to the 120° C range.

MARVINOL PLASTISOL BLENDING RESINS

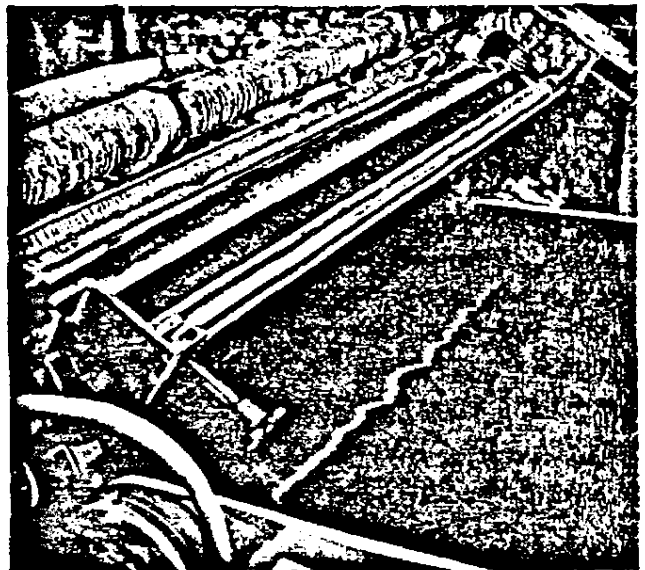
The MARVINOL line of dispersion resins is complemented with an equally versatile line of plastisol blending resins. MARVINOL 10 has been the preeminent resin for all slush and rotational molding applications for over two decades. MARVINOL 18 with its controlled particle size is specifically designed for the needs of the coating industry. MARVINOL 19 serves in general compounding applications. Detailed information on these resins follows.

MARVINOL 10

MARVINOL 10 is one of the original plastisol blending resins and possesses unique properties which have never been matched in competitive products. MARVINOL 10 is used principally in slush and rotational molding where up to 50% of the primary plastisol resins may be replaced. Here MARVINOL 10 has as a most valuable property with its unusual ability to lower gelation temperature, a highly desirable feature in slush molding. Also, the high molecular weight of MARVINOL 10 provides hot strength, an essential property for slush and rotational molding when parts are removed from the mold prior to complete cooling. And the high molecular weight of MARVINOL 10 provides maximum physical strength during the service life of a molded boot, toy, or automotive part.

MARVINOL 10 additionally enhances viscosity and air release properties as a desired feature for the processing of plastisol compounds.

**plastisol
blending**



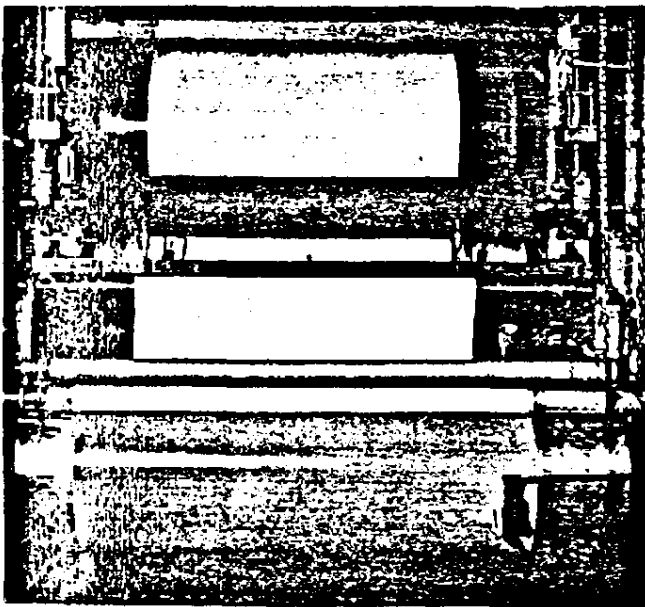
MARVINOL 18

MARVINOL 18 is a carefully controlled particle size plastisol blending resin specifically designed for high speed, thin gauge coatings on cloth, paper and flooring substrates. The absence of large particles allows for the replacement of up to 35% of the plastisol resin in such applications with no subsequent accumulation of large particles in the coating trough or large particles slipping through the coater to cause streak marks in the coating.

With its controlled particle size, MARVINOL 18 is most useful as a gloss control agent. With its carefully selected molecular weight MARVINOL 18 can be used simultaneously in both top coatings and foam coatings where physical strength and foam quality are critical properties. Again, due to a controlled particle size distribution, resin settling in low viscosity compounds is minimized.

MARVINOL 19

MARVINOL 19 is a general purpose plastisol blending resin suited for a variety of molding and dipping applications. Plastisol viscosity and air release are enhanced with its use.



**calendering,
extrusion
and injection
molding**

URL 00799

MARVINOL GENERAL PURPOSE RESINS

MARVINOL 22 and MARVINOL 23 are suspension type, hot dry blend resins for calendering and extrusion applications. They exhibit high heat stability, excellent compatibility and electrical properties, freedom from gels, and are readily air-veyed.

MARVINOL 22 and 23 differ only in molecular weight.

Applications for Marvinol® Dispersion and Plastisol Blending Resins

Application	MARVINOL 5051	MARVINOL 53	MARVINOL 56	MARVINOL 10	MARVINOL 18	MARVINOL 19
Cloth coating	•				•	
Paper coating	•				•	
Metal coating	•				•	
Flooring	•				•	
Slush molding	•			•		•
Rotational molding	•			•		•
Hot dipping	•	•		•		•
Cold dipping	•			•		•
General compounding	•			•		•
Adhesives			•			
Atmospherically blown foam		•			•	
Lower temperature foam			•			
Pressure molded foam	•			•		
Mechanical foam			•			•
Food closures	•	•		•	•	•

URL 00800

Marvinol® Resin Properties

MARVINOL*	Inherent Vis. ASTM D 1243	Specific Vis.	Specific Gravity	Methanol Extract %	Brookfield Viscosity cps	Servers Viscosity Poises @ 60 phr DOP	Gelation Temperature °C			
DISPERSION										
5051	1.15	.48	1.40	1.6	8,000	180	75°			
53	.88	.36	1.40	1.6	7,000- 20,000	180	70°			
56*	.99	.41	1.38	1.2	20,000	200	67°			
PLASTISOL BLENDING						% Retained on (Cumulative)				
				Bulk Density #/ft³	Oil Absorp- tion	40	100	200	270 mesh	
10	1.20	.50	1.40	24	.7	nil	1	20		
18	.84	.34	1.40	38	.4			nil	1	
19	.84	.34	1.40	30	.5				20	
CALENDER & EXTRUSION										
22	1.05	.44	1.40	29	.9	nil	30	95		
23	.93	.38	1.40	30	.9	nil	25	95		

* All MARVINOL resins are PVC homopolymers except MARVINOL 56 which is a vinyl chloride -vinyl acetate copolymer.