

10/60

R. W. HOGAN

January 21, 1965

The stock of this bulletin is depleted. What is the future?

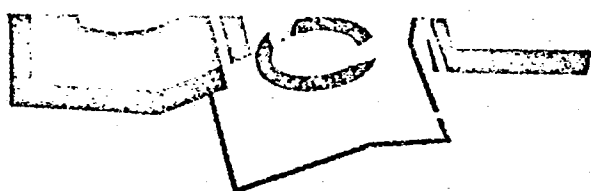
Per Al Heilman this bulletin is now obsolete, and will not be reprinted. - Al Heilman -

This bulletin

has NOT had a replacement -

Per Al Heilman

9-14-65



Monsanto

REVISED
OCTOBER, 1960

Monsanto Chemical Company
Plasticizer Sales Department
Organic Chemicals Division
800 North Lindbergh Boulevard
St. Louis 66, Missouri

DSW 322200

STLCOPCB4073851

TAKEN AS A CLASS

... solid plasticizers show more versatility than just about any other group. You find them in adhesives, lacquers, foams, rigid compositions and films... and in each type they perform unusual functions. Many times it is the solid plasticizer that allows a different product to be made, one that commands attention by its uniqueness.

This folder will acquaint you with the solid plasticizers available from Monsanto, and Monsanto can offer you the industry's largest selection. You'll find detailed information on each plasticizer in a Monsanto technical bulletin... see page 7 for the list. If you'd prefer, a Monsanto salesman will call and discuss your particular application. Investigate the new products or product improvements you can make by using solid plasticizers. Monsanto technical service will be glad to show you how solid plasticizers can work for you.

SOLID PLASTICIZERS GIVE YOU...

Hot processing

Hot processing is one area where solid plasticizers perform to good advantage. For instance, if you're mixing plasticizer and resin in a Banbury mixer, a solid plasticizer will melt at the processing temperature and function as a solvating liquid plasticizer for the resin. The lowered viscosity improves the formulation flow and results in much easier processing. Upon cooling, the plasticizer returns to its solid state which produces a stiff film or article.

Solvent use

In lacquers, certain solid plasticizers permit higher solid percentages. High-solid lacquers need fewer coats to build up a surface and therefore reduce application costs. As the lacquer dries, the presence of the solid plasticizer helps reduce blushing, sweating and separation.

SOLID PLASTICIZERS GIVE YOU...

For adhesives...*unusual properties*

Delayed-tack and heat-seal adhesives owe their existence to solid plasticizers, because it is the solid plasticizer that makes delayed-tack and heat sealing possible. Delayed-tack adhesives are activated by heat, and once activated, remain tacky long enough to permit handling before the adhesive cools and sets. The sharp melting point of solid plasticizers provides a sharp activation point for the adhesive. This activation temperature varies with different solid plasticizers, and special adhesives can be easily formulated to fit handling methods by selecting the proper solid plasticizer. Delayed-tack adhesives are covered by U. S. Pat. Nos. 2,462,029; 2,608,542; 2,608,543; 2,613,156 and 2,613,191.

For films...*no blocking*

Solid plasticizers can be used with other primary plasticizers to produce tough, clear films that feel dry and separate easily. Liquid plasticizers used alone often cause blocking due to a slight surface tackiness. Solid plasticizers also add resilience to films and impart exceptional resistance to extraction by kerosene, oils and greases.

For rigid products...*easier processing*

Processing of rigid vinyl products can be made easier by using solid plasticizers... without changing present equipment or methods. With heating, the solid melts and acts as a solvating liquid plasticizer for the resin. Upon cooling, the article becomes rigid because the plasticizing effect of the solid plasticizer is slight at room temperature. Used strictly as a processing aid, the solid plasticizer pays its own way by lowering processing costs.

For heat-seal coatings...*sharp activation temperature*

Like adhesives, heat-seal coatings require the sharp melting points of solid plasticizers to give them the heat-seal property. By themselves, liquid plasticizers cannot endow coatings with a sharp activation temperature. Instead, the coatings tend to block and be tacky at temperatures beneath the activation temperature. In this type of coating, solid plasticizers can be chosen to provide an exact temperature at which the heat-seal property is activated. And beneath that critical temperature, the coating does not block or have tackiness.

For rigid foams...*toughness*

In the chemically-blown foams, solid plasticizers can be used to add toughness to the finished foam.

In the plastisol foam process, solid plasticizers thicken the starting formulation to make possible more uniform cell formation as the gas is released. A uniform cellular structure makes the foam tough and provides uniform dimensional stability.

In chemically-blown vinyl foams made by milling or Banburying, the solid plasticizer acts as a liquid solvating plasticizer at the process temperature to make possible easy processing. At room temperature, the solid plasticizer's inefficiency results in a higher compression-resistant foam.

For Impregnants...*better flow*

To get even dispersment of impregnating powders, solid plasticizers can be used as a flow aid for producing brake band linings. The flow aid property is also useful in certain types of adhesives, phenolic moldings and thermosetting ureas.

**CHECK
THIS
LIST**

*of applications
for Monsanto's
solid plasticizers*

Heat-sealing coatings

Dicyclohexyl phthalate (DCHP), Diphenyl phthalate, Santolite* MPH, Santicizer* 1-H, Santicizer 9

Rigid extrusions

Diphenyl phthalate, Aroclor* 5460, Triphenyl phosphate Santicizer 1-H, DCHP

Moldings and rigid foams

Triphenyl phosphate, Diphenyl phthalate, Aroclor 5460 and 1268, DCHP

Break-away "glass"

Santolite MHP

Phenolic brake linings

Santicizer 9

Surface coatings and composition wallboard

Cellulose acetate	Triphenyl phosphate
Nitrocellulose	DCHP, Diphenyl phthalate, Santolite MHP, Aroclor 5460
Melamine	Santicizer 9
Thermosetting resins	Santicizer 9, Santicizer 1-H, Triphenyl phosphate, Aroclor 5460 and 1268

Urea molding compounds

Santicizer 9

Fire-resistant cellulose acetate

Triphenyl phosphate

Crystallizing lacquers

Santicizer 1-H

Polyamides

Santicizer 9, Santicizer 1-H

Vinyl and other hot melts

Triphenyl phosphate, DCHP, Diphenyl phthalate, Aroclor 5460 and 1268, Montar* 4, 5, and 9

Delayed-tack adhesives

Diphenyl phthalate, Santicizer 1-H

Book-binding adhesives

Triphenyl phosphate, DCHP, Diphenyl phthalate, Aroclor 5460 and 1268, Santolite MHP, Santicizer 1-H

You can add to this list by developing your own special applications with solid plasticizers.

For special problems, take advantage of Monsanto's "Plasticizer Council" service. Research and technical service specialists are available to discuss and recommend ways to solve plasticizing problems.

Write: "Plasticizer Council"

Monsanto Chemical Company
Organic Chemicals Division
800 North Lindbergh Boulevard
St. Louis 66, Missouri

* Santolite, Santicizer, Aroclor, Montar, Monsanto Trademarks, Reg. U. S. Pat. Off.

**of Monsanto
solid plasticizers**

**DICYCLOHEXYL
PHTHALATE (DCHP)**

Appearance	White Solid
Acidity (phthalic acid)	0.01 per cent maximum
Melting point	63.0° C. minimum to start
Assay (ester content)	99.0 per cent minimum
Color of melt (APHA)	100 maximum
Odor	Moderately aromatic, slightly phthalic characteristic
Moisture (KF in methanol)	0.1 per cent maximum

**DIPHENYL
PHTHALATE**

Appearance	Essentially white, fused solid with slight yellow or brown cast
Color (diluted 20:50 ml with acetone), APHA	160 maximum
Turbidity (diluted 20:50 ml with acetone)	Essentially clear
Acidity (as phthalic acid)	0.10 per cent maximum
Free phenol	0.20 per cent maximum
Ash	0.05 per cent maximum
Moisture	0.25 per cent maximum

**TRIPHENYL
PHOSPHATE**

Appearance	White flakes
Odor	Very faint aromatic, maximum
Melting point	48.5° C. minimum to start
Acidity (as phosphoric acid)	0.003 per cent, maximum
Stability to potassium permanganate	65 per cent transmission, minimum

**AROCLOR
5460**

Appearance	Clear, yellow to amber brittle resin
Color, NPA, Molten	2 maximum
Softening Point (ASTM E28-51T), °C.	98 - 105.5
Solubility (25 g in 25 g Acetone at 25° C.)	1 hour minimum
Acid number, mg KOH/g	0.05 maximum
Chlorine, per cent	58.5 - 60.6

**AROCLOR
1268**

Hold Point, °C.	135 - 160
Acid Number, mg KOH/g	0.05

SPECIFICATIONS.... (Continued)

MONTAR 3 MONTAR 4	Appearance	MONTAR 3 Black Solid	MONTAR 4 Black Solid
	Softening Point, °C. (ASTM E28-51T)	120 - 170	140 - 200
	Acidity	Slightly basic	Slightly basic
	Chlorine, per cent	50 - 52	54 - 56
	Calcium Oxide, per cent	5 - 10	5 - 10
	Iron, per cent	0.3 - 0.6	0.5 - 1.0

MONTAR 5 MONTAR 6 MONTAR 9	Appearance	MONTAR 5 MONTAR 6 MONTAR 9 Dark Brown or Black Solids		
	Softening Point, °C. (ASTM E28-51T)	180 - 250	150 - 210	130 - 160
	Acidity, mg KOH/g	Slightly basic	Slightly basic	0.1 - 0.3
	Chlorine, per cent	53 - 55	59 - 61	—
	Calcium Oxide, per cent	1 - 3	2 - 5	—
	Iron, per cent	0.1 - 0.2	0.2 - 0.4	0.2 - 0.4
	Flash Point, °F.	—	—	450 - 550
	Fire Point, °F.	—	—	530 - 630

SANTICIZER 1-H	Appearance	Yellow-brown fused mass
	Crystallizing point, °C. (in vacuum jacket)	82.5 minimum
	Melt test:	
	Color APHA	300 maximum
	Clarity	Slightly turbid maximum
	Moisture, per cent (KF in methanol)	0.15 maximum

SANTICIZER 9	Appearance	Fine, white to light-cream, granular particles
	Color & Turbidity (33 1/3 wt. % in acetone)	
	Turbidity	APHA 40 maximum
	Color	APHA 300 maximum
	Screen Test	
	Retained on 20 mesh	Trace, maximum
	Retained on 40 mesh	3.0 per cent, maximum

SANTOLITE MHP "A" GRADE	Appearance	Hard, practically colorless resin
	Color of solution (25 g in 75 g butyl acetate), APHA	50 maximum
	Refractive index, 25° C. (25:75 butyl acetate)	1.4275 to 1.4325
	Solubility (25:75 butyl acetate)	Complete

DSW 322205

**CHECK THIS
RANGE OF
MELTING
AND
SOFTENING
POINTS**

MELTING POINTS (°C)

48.5	Triphenyl Phosphate
62	Santolite MHP
63	Dicyclohexyl Phthalate
69	Diphenyl Phthalate
82.5	Santicizer 1-H
105	Santicizer 9

a) Crystallization Point

SOFTENING POINTS (°C)

98 - 105.5	Aroclor 5460
120 - 170	Montar 3
130 - 160	Montar 9
135 - 160 ^b	Aroclor 1268
140 - 200	Montar 4
150 - 210	Montar 6
180 - 250	Montar 5

b) hold point

BULLETINS

PL-1H	Santicizer 1-H
PL-9	Santicizer 9
PL-301	Triphenyl Phosphate
PL-306	Aroclor Plasticizers
PL-312	Dicyclohexyl Phthalate
PL-319	Diphenyl Phthalate
PL-320	Santolite MHP, MS-80%
O-139	Montar Compounds

**TECHNICAL
LITERATURE**

...is available on
all of Monsanto's
solid plasticizers.
Send for your
copies today.

The information contained in this bulletin is, to our best knowledge, true and accurate, but all recommendations or suggestions are made without guarantee, since the conditions of use are beyond our control. The Monsanto Chemical Company disclaims any liability incurred in connection with the use of these data or suggestions.

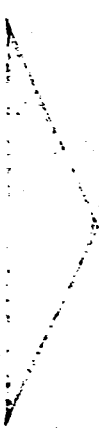
Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

DSW 322206

STLCOPCB4073857

Gentlemen:

Please send me the indicated technical bulletins about your solid plasticizers:

- 
- ☐ PL-1H Santicizer 1-H
 - ☐ PL-9 Santicizer 9
 - ☐ PL-301 Triphenyl Phosphate
 - ☐ PL-306 Aroclor Plasticizers
 - ☐ PL-312 Dicyclohexyl Phthalate
 - ☐ PL-319 Diphenyl Phthalate
 - ☐ PL-320 Santolite MHP, MS-80%
 - ☐ O-139 Montar Compounds

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

DSW 322207

STLCOPCB4073858

**MONSANTO CHEMICAL COMPANY
ORGANIC CHEMICALS DIVISION
ST. LOUIS 24, MISSOURI**

**AKRON
ATLANTA
BOSTON
CHICAGO
CINCINNATI
CLEVELAND
DETROIT
HOUSTON
LOS ANGELES
MINNEAPOLIS
NEW YORK
PITTSBURGH
SAN FRANCISCO
SEATTLE
SYRACUSE
WILMINGTON
MONSANTO CHEMICALS LTD.
London
MONSANTO CHEMICALS
(AUSTRALIA) LTD. Melbourne
MONSANTO (CANADA) LTD.
Montreal • Toronto • Vancouver**

DSW 322208