PLASTICIZERS

Technical Bulletin O/PL-328A

MONTAR® POLYCHLORINATED POLYPHENYL COMPOUNDS

Introduction

Monsanto's Montar® polychlorinated polyphenyl compounds resist oxidation, impart flame retardance and tackiness to asphaltic, rubber, and various synthetic-resin compositions.

These compounds are effective low-cost solid plasticizer binders or tackifiers for adhesives, mastics, or hot-melt systems in which color is not objectionable. They are readily incorporated in rubber-based paper adhesives when dissolved in a suitable solvent.

The chlorinated polyphenyls contribute flame retardance to specialty asphalt products; Montar 5 in concentrations of 30 per cent or more yields products with excellent fire retardant characteristics.

All Montar products are compatible with polyvinyl chloride at concentrations of up to about 10 parts per 100 parts of resin and can be used as extender plasticizers to reduce formulating costs. They have been reported to be useful as extenders in epoxy resins, and their structure suggests that they may be useful as plasticizers for several other synthetic resins.

The Montar 5 compound is a high-melting, dark, chlorinated polyphenyl and Montar 9 is a mixture of unchlorinated polyphenyls.

Applications

Asphalt

All the Montar products are compatible with asphalt at concentrations up to two parts per part of asphalt. Montar 5 contributes flame retardance at concentrations as low as 10 percent, with excellent flame retardancy above 30 percent. This property is caused by the formation of an intumescent layer, which "snuffs" the flame.

Rubber-Based Adhesives

A 50 percent solution of Montar 5 in an aromatic solvent mixed with a 60 percent solids rubber emulsion (1:1 ratio) yields paper adhesives with good tack.

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The emulsifiability of this Montar product suggests additional applications in the adhesives field. When 5 percent of an emulsifier was added to a 50 percent solution of Montar in benzene or toluene and the mixture was progressively diluted with water, the emulsion did not break until water dilution reached 160 percent of the original mixture volume.

Neoprene

From 10 to 40 parts of Montar 5 per 100 parts of Neoprene W minecable stock cannot only replace antimony oxide with maintenance of zero flame-out time and reduction of after glow and smoking time, but also improves the tensile strength after aging and slightly softens the stock.

Vinyls

Up to 10 parts of any Montar product can be blended with 100 parts of polyvinyl chloride resin by simple mixing.

Cellulosics

The Montar products are suggested as potentially useful low-cost extenders for ethyl cellulose. They would also impart flame retardancy where desirable.

Typical Physical Properties

Property	*Polyphenyls* *Montar® 5*	*Montar 9*
Appearance (Monsanto specification)	Dark brown or black solid	Black solid
Softening range, °C	155-195	130-175
Acidity, mg. KOH/g	Slightly basic	0.1-0.3
Chlorine, %	53-55	none
Calcium oxide, %	1-3	none
Iron, %	0.1-0.2	0.2-0.4
Flash point (C.O.C.), °F	—	450-550
Fire point (C.O.C.), °F	—	530-630

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Solubility

Montar®	*Benzene*	*Toluene*	*Kerosene*	*Methanol*	*Acetone*
5	VS	VS	VS	SS	SS
9	VS	VS	SS	I	SS

Key: I — Insoluble
VSS — Very slightly soluble
SS — Slightly soluble
S — Soluble
VS — Very soluble

Toxicity and Safe Handling

Since Montar 5 resin is a chlorinated hydrocarbon, prolonged or repeated breathing of the vapors should be avoided, especially at elevated temperatures. Either local exhaust and adequate ventilation or suitable respiratory protection are suggested.

Contact with eyes and prolonged or repeated skin contact should be avoided. If skin contact occurs, remove the material by washing with soap and water. Clothing that becomes soaked with fluids that contain a Montar compound should be laundered — before being worn again. No special handling precautions, other than good industrial practice, is needed for Montar 9, which is not a chlorinated hydrocarbon.

Shipping

Shipping classification	Coal tar resin		
Labeling requirements	Product label required by law		
Regulations	None		
Standard containers	Montar®	Galvanized drum	Fiber drum
		(net weight, pounds)	
	5	500	—
	5 (crushed)	—	375
	9	500	—

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