



INTERNAL CORRESPONDENCE

V L Solis & D. J. 500-149-2A

CHEMICALS AND PLASTICS

To (Name) M. W. JONES

Company

Location

120 SOUTH RIVERSIDE PLAZA • CHICAGO, ILLINOIS 60606

Date May 29, 1975

Originating Dept.

Answering letter date

RECEIVED

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R. N. WHEELER, JR.

Copy to

H. McNair - NY - 33
T. Proctor - Chgo
R. N. Wheeler ✓ So. Chas.
D. E. Hardman - NY - 33
A. J. Caldwell
M. E. Harmony
S. G. Hawes
J. C. Lang
A. J. Lyon
R. C. Quarnstrom
D. E. Stockman
J. H. Myers
A. L. Thompson
R. G. Neri

Subject FABRICATED PRODUCTS STATUS
OUR VINYL SOLUTION RESINS BY OSHA

I appreciated your advising me of the report given you by Reg Robertson of Conchemco of his conversations with other technical directors at the Technical Conference of the NPCA at Louisville May 22. You mentioned he felt there was still misunderstanding of whether the "Fabricated Product" status of our resins exempted their customers from monitoring for VCM in work spaces, where solutions or dispersions of our solution or dispersion resins are used.

It is not necessary to monitor the work space where a Fabricated Product is shipped and stored or used. "Fabricated Product" is defined by OSHA as "a product made wholly or partly from polyvinyl chloride, and which does not require further processing at temperatures and for times sufficient to cause mass melting of the polyvinyl chloride resulting in the release of vinyl chloride." Implied here, also, is the release, in an amount which is over 1.0 ppm, of vinyl chloride in the work space above the resin - or "Fabricated Product."

I am attaching a copy of the letter Mr. R. N. Wheeler wrote to Mr. Grover C. Wrenn of OSHA explaining the classifications of coatings and gasketing usages into which our coatings resins go and requesting "Fabricated Product" status for our resins. It also point out the difference between these uses and the mass-melting that fabricating resins undergo in their normal usage.

Inasmuch as Mr. Wrenn gave "Fabricated Product" status to Union Carbide's vinyl solution and dispersions in answer to R. N. Wheeler's letter of February 14, it should be clear to your customer(s) that neither they nor their customers need worry about their standard coatings uses, whether the coatings are baked or not. Any attempt by an OSHA inspector to impose a monitoring operation on a user of a "Fabricated Product" should be resisted and reported to us. The resistance must be initiated by them, but if it is reported to either R. N. Wheeler of South Charleston, John W. Whittlesey of New York X-6797, we will attempt to give them assistance by giving them

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arguments they can use in accordance with the problem.
Please let me know if any problem arises.

COS:jg

C. O. Schwahn

Enc.

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Union Carbide Corporation
Riverdale, Chicago, Ill.

UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS

P.O. BOX 8004, SOUTH CHARLESTON, W. VA. 25303

SOUTH CHARLESTON PLANT

February 14, 1975

Mr. Grover C. Wrenn
Chief, Division of Health Standards Development
Occupational Safety and Health Administration
U. S. Department of Labor
1726 M Street, N.W.
Washington, D. C. 20210

Re: Classification of Union Carbide Corporation
Vinyl Coating Resins
Occupational Safety and Health Administration
Standard Exposure to Vinyl Chloride

Dear Mr. Wrenn:

Union Carbide Corporation's vinyl coating resins from its Dispersion and Solution Vinyl Resin processes should be considered fabricated products under the Occupational Safety and Health Administration Standard Exposure to Vinyl Chloride for the following reasons:

1. Dispersion and Solution Vinyl Resins are "fabricated" for use and application via coating technology.
2. Dispersion and Solution Vinyl Resins are controlled to contain less than one part per million by weight of residual monomer. Storage, transport, or use of these resins does not result in work place air vinyl chloride concentrations in excess of the standard's action level of 0.5 ppm.

A plastic, by definition, is a material which, when subjected to heat and pressure, can be formed into useful articles. In the case of a vinyl resin, the vinyl chloride monomer, with or without other monomers, is reacted to form a free-flowing, non-dusty powder. The resin particles are approximately one hundred microns. To convert this material to a finished plastic product, the powder is first mixed and heated in a high intensity mixer for approximately ten minutes at 200°F. From this mixer the batch is transferred to a Banbury mixer, a two-roll mill, or an extruder where it is mechanically mixed and heated to 375-400°F, converting the resin plasticizer and additives

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to a hot, doughy mass. This mass is then calendered to produce a film, molded to make records or extruded into a shape such as garden hose. The finished product is then cooled. The mixing and forming requires five to ten minutes followed by cooling for possibly ten minutes. The heating for periods up to twenty minutes, coupled with mechanical working which constantly exposes new surfaces, drives out contained residual vinyl chloride monomer. This vinyl chloride monomer driven out must be removed or destroyed to avoid serious contamination of the work space air.

A coating is a polymeric composition applied to a substrate. This polymeric composition is made applicable by dissolution in a solvent or by a fine particle dispersion in an organic or aqueous medium. The fluid coating composition is sprayed, rolled, brushed, or poured on the substrate where by evaporation, dissolution, or reaction a film is formed. For industrial applications, such as can lining, film formation is accelerated by brief periods of heating - one to five minutes at temperatures up to 350°F followed by cooling. There is no mechanical working of the coating and no need to have a hot plastic mass for an extended period. The brief heating period serves to drive out the solvent, or the dispersing medium, to react the polymeric materials and to dissolve the plasticizer or film-former in the resinous coating material. A vinyl resin for coating application may be said to be a material fabricated in manufacture as a particular composition, molecular weight, or particle size which makes it suitable for use via coating technology.

A few examples of such resins and coatings utilizing Union Carbide Corporation products are as follows:

1. Air dry vinyl coating systems for ship bottoms consist of a primer coat of vinyl butyral resin XYHL, zinc chromate, and phosphoric acid dissolved in alcohols and sprayed on the clean metal. This is followed by vinyl chloride copolymer resin, VACH, and pigment in ketone-toluene medium. The top coat, carrying anti-fouling pigments, consists of VMCH and VYHL resins in ketone-toluene medium.
2. Beer and soft drink can linings consist of an epoxy primer on tin plate topped with a sprayed coating of VYHD and VMCC resins. The spraying is followed by baking; all handled automatically on a can manufacturing line.
3. Container caps and closures utilize the unique properties of vinyl chloride resins to their fullest. A flat, metal substrate may be given a white pigmented VACH resin coating on one side and a decorative QYNY resin organosol coating on the other side. The metal sheet is baked and the closures punched and formed without destruction of the coating. The formed closure is then coated inside with a QYKY plasticol and baked again, yielding a gasket surface.

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4. Strippable coatings provide the basis for such useful items as surgical gloves. A hand-shaped form is dipped into a QYKV resin plastisol. The form is then baked briefly to set the coating. On cooling, the very thin vinyl glove is stripped off the form for use in surgical operations.

The fact that these Solution and Dispersion Vinyl Resins contain essentially no residual monomer is very important. Solution vinyl resins are first stripped free of residual monomer while they exist in solution; this is followed by hot-water washing and vacuum stripping when the resin particle has been formed. The Dispersion Resins are made as a very small particle, 1 to 2 microns suspended in water as a latex. This fine particle size latex is spray dried. The spray-dried resin is then ground suspended in an air stream to break up any large or agglomerated small particles. Analysis of both Solution and Dispersion Vinyl Resins, at this point, shows they contain less than one part per million by weight of residual monomer. Even this small amount of monomer leaves the resin quickly so that within twenty-four hours they are nearly monomer free. Study of these resins, monitoring closed containers, warehouses, and customers' plants is reported in the attached memorandum entitled Solution and Dispersion Vinyl Resins Vinyl Chloride Monitoring Study. This study shows that the probability of employee exposure to work space air concentrations of vinyl chloride in excess of 0.5 ppm is very low.

The foregoing discussion shows the difference between coating technology and usual vinyl resin fabricating operations such as callendering, molding, or extrusion. It also points out that the vinyl resins produced by Union Carbide's Solution or Dispersion processes are essentially free of residual monomer as a result of specialized operations. These two differences from normal industrial polyvinyl chloride resin operations are the basis for Union Carbide Corporation's statement that its Solution and Dispersion Vinyl Resins for coating operations should be considered fabricated products as defined in the Occupational Safety and Health Administration Standard.

The particular resins manufactured by Union Carbide Corporation for inclusion in this category are:

Mr. Grover C. Wrenn

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<u>Resin Code</u>	<u>Type of Polymer</u>	<u>Inherent Viscosity</u>
VYNS	Copolymer	0.7
VYHH	Copolymer	0.5
VYHD	Copolymer	0.4
VMCH	Copolymer	0.5
VMCC	Copolymer	0.3
VMCA	Copolymer	0.3
VAGD	Copolymer	0.4
VAGH	Copolymer	0.5
VROH	Copolymer	0.3
VERR	Copolymer	0.3
VYLE	Copolymer	0.3
QYNV	Homopolymer	1.25
QYKV	Homopolymer	1.20
QYJV	Homopolymer	0.9
QYOH	Homopolymer	1.25
VLEF	Homopolymer	1.00

Union Carbide resins for the coating market include but are not necessarily limited to the above resins. In this highly specialized area, new products and new applications are developed frequently.

Very truly yours,

R. N. Wheeler Jr.

R. N. Wheeler, Jr.

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