



INTERNAL
CORRESPONDENCE

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To (Name) Mr. Jose Colucci
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Location Bldg. 772-14
Area

Date April 17, 1985

Originating Dept HS&EA

Area

Copy to Mr. L. A. Crisorio

Subject Regulation of Residual
Vinyl Chloride in
Polyvinyl Chloride

Regulations covering residual vinyl chloride monomer in polyvinyl chloride are:

1. Occupational Safety and Health Administration 29CFR 1910.1017 Vinyl Chloride.

This regulation does not set any limit on residual vinyl chloride monomer in PVC. The permissible exposure limit of 1 ppmv TWA 8 applies to employee exposure in the workplace. All containers of PVC must have a label stating "Contains Vinyl Chloride, Vinyl Chloride Is a Cancer Suspect Agent." All employees exposed to the resin must be monitored to establish their exposure level.

Certain vinyl chloride resins and latexes have been interpreted to be "fabricated products" and are exempt from the regulation. If a resin contains 1 ppmw or less of vinyl chloride monomer, it could conceivably be eligible for a "fabricated product" exemption if sufficient testing of employee exposure is done to demonstrate low employee exposure. There is no defined residual monomer exemption level.

2. Environmental Protection Agency, 40 CFR 61.61 Subpart F, National Emission Standard for Vinyl Chloride.

This regulation (attached) specifies that PVC resin from a monomer stripping system may contain no more than 400 ppmw residual vinyl chloride, or that PVC resin from a reactor when no stripper is used may contain no more than 0.4 gram/kilogram (400 ppmw) residual vinyl chloride. If this level is not achieved, then subsequent processing steps are subject to a 10 ppmv vinyl chloride concentration limit in vents.

EPA in 50 FR 1182-1201, dated January 9, 1985, propose some modifications to 40 CFR 61 Subpart F, but the residual vinyl chloride monomer limits in the original regulation will not be changed.

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3. Department of Transportation

DOT has no regulation on residual vinyl chloride in PVC. All distribution employees, however, are subject to the OSHA regulations.

The hardest limit to meet will be marketability. I have no idea what valuable special properties resin produced by the UNIPOL process may have, but I don't believe that a general purpose PVC resin containing more than 100 ppmw residual vinyl chloride is salable. Copolymer PVC could be higher in residual vinyl chloride monomer content but this depends largely on the usefulness of its special properties. I suggest you compare your PVC with that produced by the bulk process at B. F. Goodrich.


R. N. Wheeler, Jr.

RNW,Jr./maw

Attachment

0327G

40—Protection of Environment

source or a new source which initial startup date preceding effective date; or
 a sludge test shall be conducted 90 days of startup in the case of source which did not have an startup date preceding the effective date.

The Administrator shall be notified at least 30 days prior to a sludge test, so that he may at his observe the test.

Sludge shall be sampled according to paragraph (c)(1) of this section, charging rate for the plant shall be determined according to paragraph (c)(2) of this section, and the analysis shall be performed according to paragraph (c)(3) of this section.

The sludge shall be sampled after drying and before incineration or at a location that provides a representative sample of the sludge is charged to the incinerator or Eight consecutive grab samples obtained at intervals of between 60 minutes and thoroughly mixed into one sample. Each of eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composites shall be obtained within an operating period of 24 hours. When 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the grab sample is obtained. Samples shall not be exposed to any condition may result in mercury contamination or loss.

The maximum 24-hour period of incineration or drying rate shall be determined by use of a flow measurement device that can measure the mass rate of sludge fed to the incinerator or dryer with an accuracy of ± 5 percent over operating range. Other methods of measuring sludge mass charging rates shall be used if they have received approval by the Administrator.

The handling, preparation, and analysis of sludge samples shall be accomplished according to Method 105 of Appendix B of this part.

The mercury emissions shall be determined by use of the following method:

Chapter I—Environmental Protection Agency

§ 61.61

$$E_{Hg} = 1 \times 10^{-3} cQ$$

where:

E_{Hg} = Mercury emissions, g/day.

c = Mercury concentration of sludge on a dry solids basis, $\mu\text{g/g}$ (ppm).

Q = Sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(g) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

(40 FR 48303, Oct. 14, 1975, as amended at 43 FR 8800, Mar. 3, 1978)

§ 61.55 Emission monitoring.

(a) Wastewater treatment plant sludge incineration and drying plants. All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54 (c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54 (f) and (g).

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

(40 FR 48303, Oct. 14, 1975, as amended at 43 FR 8800, Mar. 3, 1978)

Subpart F—National Emission Standard for Vinyl Chloride

Source: 41 FR 46564, Oct. 21, 1976, unless otherwise noted.

§ 61.60 Applicability.

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerized vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of not more than 0.19 m³ (50 gal).

(c) Sections of this subpart other than §§ 61.61; 61.64 (a)(1), (b), (c), and (d); 61.67; 61.68; 61.69; 61.70; and 61.71 do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 m³ (50 gal) and no more than 4.07 m³ (1100 gal).

(41 FR 46564, Oct. 21, 1976, as amended at 42 FR 29006, June 7, 1977)

§ 61.61 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(b) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(c) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(d) "Slip gauge" means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

§ 61.62

Title 40—Protection of Environment

(e) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(f) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(g) "Dispersion resin" means a resin manufactured in such a way as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(h) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(i) "Bulk resin" means a resin which is produced by a polymerization process in which no water is used.

(j) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(k) "Wastewater treatment process" includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards; it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

(l) "In vinyl chloride service" means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(m) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(n) "Run" means the net period of time during which an emission sample is collected.

(o) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(p) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(q) "Reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(r) "Reactor opening loss" means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in § 61.65(a).

(s) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

(t) "Standard temperature" means a temperature of 20° C (69° F).

(u) "Standard pressure" means a pressure of 760 mm of Hg (29.92 in. of Hg).

[41 FR 46564, Oct. 21, 1976, as amended at 42 FR 29006, June 7, 1977]

§ 61.62 Emission standard for ethylene dichloride plants.

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2g/kg (0.0002 lb/lb) of the

0—Protection of Environment

ethylene dichloride purification includes any part of the process of ethylene dichloride production in which ethylene dichloride is produced.

"vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which vinyl chloride is produced.

"reactor opening loss" means emissions of vinyl chloride occurring from a reactor is vented to the atmosphere for any purpose other than emergency relief discharge as defined in § 61.65(a).

"stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, bulk resin, in the slurry form, by use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately after the polymerization step in the process flow.

"standard temperature" means a temperature of 20° C (69° F).

"standard pressure" means a pressure of 760 mm of Hg (29.92 in. of

65564, Oct. 21, 1976, as amended at 6006, June 7, 1977)

Emission standard for ethylene dichloride plants.

Ethylene dichloride purification: The concentration of vinyl chloride in exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from oxychlorination reactor are not to exceed 0.2g/kg (0.0002 lb/lb) of the

Chapter I—Environmental Protection Agency

§ 61.64

100 percent ethylene dichloride product from the oxychlorination process.

(43 FR 29006, June 7, 1977)

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Reactor. The following requirements apply to reactors:

(1) The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed 10 ppm, except as provided in paragraph (a)(2) of this section and § 61.65(a).

(2) The reactor opening loss from each reactor is not to exceed 0.02 g vinyl chloride/kg (0.00002 lb vinyl chloride/lb) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a reactor or as both a reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

(3) Manual vent valve discharge: Except for an emergency manual vent valve discharge, there is to be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any discharge to the atmosphere from any

manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Stripper. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(c) Mixing, weighing, and holding containers. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(d) Monomer recovery system. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(e) Sources following the stripper(s). The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) (or the reactor(s) if the plant has no stripper(s)) in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and in-process wastewater.

§ 61.65

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

(i) 2 g/kg (0.002 lb/lb) product from the stripper(s) [or reactor(s)] if the plant has no stripper(s) for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(ii) 0.4 g/kg (0.0004 lb/lb) product from the strippers [or reactor(s)] if the plant has no stripper(s) for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) *Relief valve discharge.* Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the

Title 40—Protection of Environment

discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) *Fugitive emission sources.*—(1) *Loading and unloading lines.* Vinyl chloride emissions from loading and unloading lines in vinyl chloride service which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m³ (0.13 ft³) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with paragraph (b)(1)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(2) *Slip gauges.* During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(3) *Leakage from pump, compressor, and agitator seals.*

(i) *Rotating pumps.* Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service are to be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl

Chapter I—Environmental Protection

chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(ii) *Reciprocating pumps.* Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(iii) *Rotating compressor.* Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service are to be minimized by installing double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(iv) *Reciprocating compressor.* Vinyl chloride emissions from all reciprocating compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.