

BFGoodrich

Bulletin G-62
Second Edition

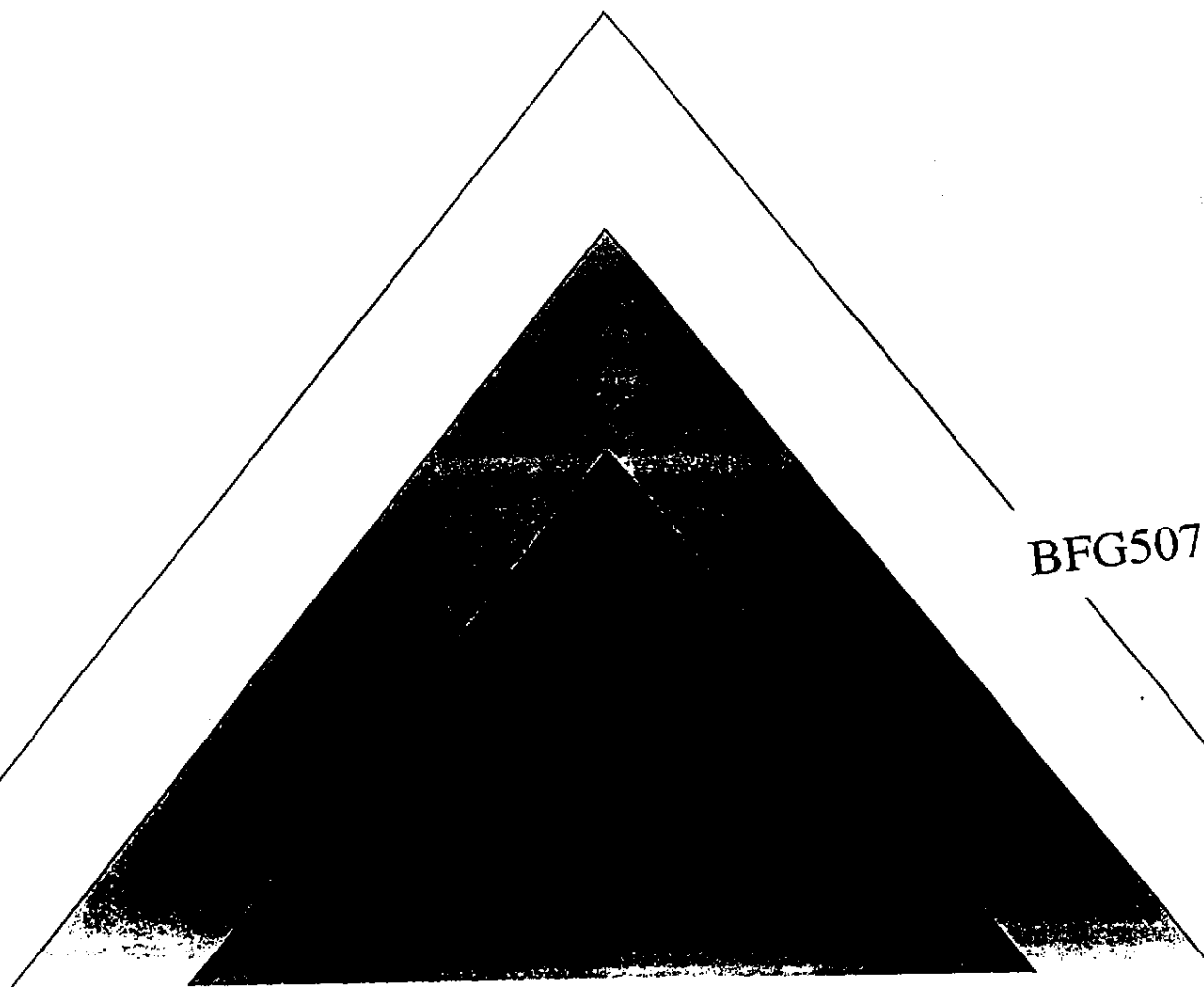
Issue Date:
January, 1980

MATERIAL SAFETY DATA

Geon[®] Vinyl Resins,
Compounds

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ABOUT THIS BULLETIN

The data in this bulletin is applicable to all Geon® vinyl resins — general purpose type, Super EP type, dispersion resins, blending resins, powder coating resins — and to all grades of rigid, flexible and Geon® cellular vinyl compounds. This bulletin is not applicable to Geon® latexes nor to Geon® CPVC materials.

The data in this bulletin is limited to the safe handling and use of the PVC polymer itself and to PVC based compounds we manufacture. It does not include information on the suitability of PVC for any particular application nor discuss any precautions that may be necessary during product use in service.

The format used to report material safety data information is essentially similar to the U.S. Department of Labor Form OSHA 20 modified to facilitate description of our materials.

USER'S RESPONSIBILITIES

A bulletin such as this cannot be expected to cover all possible individual situations. In addition, the conditions under which our products are processed and used are beyond our control. The products described herein can be hazardous if not processed properly. As the user of Geon® vinyls has the responsibility to provide a safe workplace, all aspects of an individual operation should be examined to determine if or where precautions, in addition to those described herein, are required. Any health hazard and safety information contained herein should be passed on to your customers or employees, as the case

may be. BFGoodrich must rely on the user of Geon® vinyls to utilize the information we have supplied to develop work practice guidelines and employee instructional programs for the individual operation.

DISCLAIMER OF LIABILITY

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without any warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof.

GENERAL INFORMATION

This bulletin has been prepared to provide guidelines and appropriate precautions to assist our customers in the safe handling and use of Geon® vinyl resins and compounds. BFGoodrich recommends that, before use, safety personnel and employees handling Geon® vinyls read and understand the information and precautions presented herein.

During processing or post-processing operations involving heat sufficient to cause mass melting, the sum total of the compounding ingredients present may emit vapors and odors irritating to the respiratory tract, eyes and skin. BFGoodrich recommends that Geon® vinyls always be used under well-ventilated conditions to avoid significant employee exposure.

SECTION I

Manufacturer's Name	The BFGoodrich Company, Chemical Group
Address	6100 Oak Tree Boulevard, Cleveland, OH 44131
Telephone Number	(216) 524-0200
Trademark	Geon® Vinyls
Chemical Name	Poly (vinyl chloride), PVC
Formula	(CH ₂ CHCL) _n
Chemical Family	Vinyl Chloride Homopolymer (With the following exceptions):
	Geon® 135, 130x24: Copolymer of vinyl chloride/vinyl acetate
	Geon® 130x17: Carboxy-modified vinyl chloride polymer

SECTION II

HAZARDOUS INGREDIENTS

PVC resins contain small but detectable amounts of residual vinyl chloride monomer (VCM), a cancer-suspect agent. Extensive product and process improvements have resulted in the reduction of residual vinyl chloride monomer to a very low level in prime grades of major Geon® vinyl resins (See Table 1 and read Section V).

Other ingredients, such as stabilizers, lubricants, plas-

ticizers, and pigments are added with resin to manufacture PVC compounds. The sum total of all ingredients will emit vapors during processing. All possible health effects of these vapors are not known and individual sensitivities will vary. Exposure may produce acute health effects in some sensitive individuals. The effects relate primarily to eye, nose, and throat irritation. Efficient ventilation should be provided (read Section VIII) to prevent significant employee exposure. BFGoodrich recommends that these materials be used under well-ventilated conditions to avoid breathing these vapors.

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Solvents

No organic solvents are used in the manufacture of Geon® vinyl resins. Organic solvents may be used in the manufacture of stabilizers and other ingredients, and therefore, be detectable in small amounts in PVC compound.

Carcinogenic Chemicals

See Table III.

Heavy Metals

- A) Resin: No lead, mercury, other heavy metals or heavy metal compounds are used in the manufacture of Geon® vinyl resins. These materials are ubiquitous and trace quantities may be found in the environment.
- B) Compound: Geon® vinyl compounds contain heavy metal stabilizers generally in amounts less than 5%. These may include organometallics such as tin, lead, cadmium, barium and zinc and metallic salts such as basic lead carbonate and basic lead sulfate.

Plasticizer

Geon® vinyl flexible (plasticized) compounds will contain polymeric, monomeric or mixed ester plasticizer in amounts generally between 20%-50%. These materials are volatile when heated, and will contribute to the sum total of the vapors released during processing.

Pigments

Geon® vinyl compounds may contain commonly available pigments based on lead, iron oxide, carbon black, chromium, ultramarines, titanium dioxide, mercaptans, phthalocyanines, molybdates, quinacridones and other organic or inorganic materials. In cube compound, these pigments are typically bound-up in our manufacturing process and are not expected to create any hazard in handling or processing. In powder compounds, because of potential dusty conditions, respiratory protection may be required. If conditions exist where dust is possible, the employee should be provided with a suitable NIOSH approved respiratory protection device. (See Section VIII. See Table III).

SECTION III

PHYSICAL DATA

Specific Gravity ($H_2O = 1.0$).

Resin: 1.40.

Compound: See Product Data Sheet.

Solubility in Water — Slight.

Particle Size.

Resin: See Table II

Compound: Cubes measuring approximately 3/16-inch per side; or powder. Particle size of powder compound varies due to compounding ingredients.

Appearance and Odor

Resin: White powder, practically odorless or bland odor.

Compound: Pigmented or unpigmented cubical granules or powder, slight odor.

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Extinguishing Media

Water is most effective. ABC dry powder and protein type air foams are also effective. Geon® vinyls would be considered "ordinary combustibles" (NFPA defined Class A). Carbon dioxide is not generally recommended for use on Class A fires as a lack of cooling capacity may result in reignition.

Special Fire Fighting Procedure

Self-contained breathing apparatus should be used for fires in which PVC becomes involved. Personnel not having suitable respiratory protection should leave the area to prevent significant exposure to toxic combustion gases.

Decomposition Products

- A) When forced to burn, PVC combustion products will mainly be carbon monoxide, carbon dioxide, hydrogen chloride and smoke. Other gases, including aromatics and aliphatics, are present in small amounts. Geon® 135 and 130x24 will also contribute minor amounts of acetic acid as gas and smoke.

Inhalation of, or overexposure to, PVC combustion products and primarily hydrogen chloride will cause irritation of the respiratory tract, eyes and skin. Depending on the severity of exposure, physiological response to inhalation will be coughing, pain, inflammation, edema, and desquamation in the upper respiratory tract. When burned, PVC will have a detectable pungent odor.

The combustion products of PVC, like those from most other natural and synthetic materials, must be considered toxic. Like most conventional materials including wood, paper and cotton, the major hazard is carbon monoxide. Carbon monoxide acts as an asphyxiant while hydrogen chloride is highly irritating.

- B) Under abnormal processing conditions (including equipment malfunctions or plug-up) decomposition of PVC compound may occur in an extruder, injection molding machine, or other processing equipment, resulting in a characteristic whitish smoke which will contain hydrogen chloride and vapors from metallic stabilizers and other ingredients. Inhalation will result in irritation of the respiratory tract, eyes and skin resulting in coughing, pain, and inflammation. Employees involved in removing decomposing materials should be provided with suitable air supplied respirators. Decomposing compound should be removed to a well-ventilated area, preferably outdoors, and thoroughly soaked with water. Stand safely back while dousing since water contacting the hot decomposing compound may result in an explosion-like burst of steam.

Refer to Cumulative Supplement June 1977, NIOSH Certified Equipment, NIOSH #77-195, for a listing of

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NIOSH approved respirators. It can be obtained, no charge, from

Publications Dissemination, DTS
NIOSH
4676 Columbia Parkway
Cincinnati, Ohio 45226

- C) During typical break-down and clean-up of equipment after processing, PVC compound may be held at processing temperature for a short period. While this should not result in significant decomposition, it should be understood that the combined vapors from all ingredients will be present. PVC compound cannot be held static in processing equipment under high heat or at processing temperature for extended periods of time. Decomposition will occur. During equipment clean-up operations, avoid inhalation of fumes. Local exhaust ventilation should be provided to prevent significant employee exposure.
- D) Post-processing operations at your workplace or at your customer's workplace involving heat sufficient to result in polymer breakdown emitting smoke and fumes should always be conducted in a manner to avoid inhalation of fumes. Local exhaust ventilation should be provided to prevent significant employee exposure.

Unusual Fire and Explosion Hazards

The potential dust explosion hazard of PVC has been evaluated by BFGoodrich using the Hartmann Vertical Tube Apparatus developed by the Bureau of Mines. In this test resin is fluidized in a vertical tube using a stream of air. Ignition is accomplished using a high voltage alternating current spark applied across brass terminals. Research has also been reported by the National Fire Protection Association (NFPA) based on equations using data from a battery of tests.

PVC Resin: - Geon® vinyl resins representing fine particle size (28 Microns: Geon® 121), medium particle size (75 Microns: Geon® 140x31) and large particle size (130 Microns: Geon® 103EPF76) neither ignited nor exploded in a test range of 0.1 - 2.0 gm/liter concentration using standard conditions of test. Fluidization becomes difficult at and above the 2.0 gm/liter level making it impractical to test at greater volumes.

- The NFPA (Fire Protection Handbook, 14th Edition, pg. 3-112) shows "fine" particle size homopolymer PVC resin to have a low order of risk:

Explosibility Index	0.1 (Weak)
Ignition Sensitivity	0.1 (Weak)
Explosion Severity	< 0.1 (Weak)

- These data indicate that typical homopolymer PVC resin has a very low order of explosion risk. As a precaution, it is prudent to employ standard safety measures used in handling finely divided organic powders.

PVC

Compound:

- **Cube Compound**, because of large particle size, does not represent an explosion hazard.
- **Powder Compound**, because of fine particle size fillers and additives or liquids added to the PVC resin, may have increased dust explosion potential. Because of the wide variety of possible ingredient combinations, operations using plasticized or unplasticized powder compounds should be evaluated as the individual situation exists.
- The NFPA Fire Protection Handbook (14th Ed., pg. 3-112) reports the following for a PVC (67%)/DOP (33%) mixture:
Explosibility Index 2.9 (Strong)
Ignition Sensitivity 3.6 (Strong)
Explosion Severity 0.8 (Moderate)
- Implement precautions to control or eliminate likely sources of ignition, such as static build-up. Maintain good house-keeping, notably, ventilation, to prevent accumulation of potentially explosive dust concentrations. Properly maintain and operate dust control devices.

Ignition Characteristics (ASTM D-1929)

PVC resin has a flash-ignition temperature of about 391°C (735°F) and a self-ignition temperature of about 454°C (850°F). Because PVC polymer contains chlorine in the molecule, these materials are difficult to ignite and burn slowly. Like all organic materials, PVC is combustible and can be forced to burn by continuous application of intense heat. Like all combustible materials, protect from open flame and maintain proper clearance when using portable heat devices, etc. Safely store flammable liquids away from PVC.

Flash Ignition Temperature: The lowest initial temperature of air passing around the specimen at which sufficient combustible gas is evolved to be ignited by a small external pilot flame.

Self-Ignition Temperature: The lowest initial temperature of air passing around the specimen at which, in the absence of an ignition source, ignition occurs of itself, as indicated by an explosion, flame or sustained glow.

SECTION V

HEALTH HAZARD DATA

Threshold Limit Value

None established.

Effects of Overexposure

Processing vapors may produce acute health effects in some individuals. The effects relate primarily to eye, nose and throat irritation. Individuals with bronchial asthma and other types of chronic obstructive respiratory disease may develop bronchospasm if exposure is prolonged.

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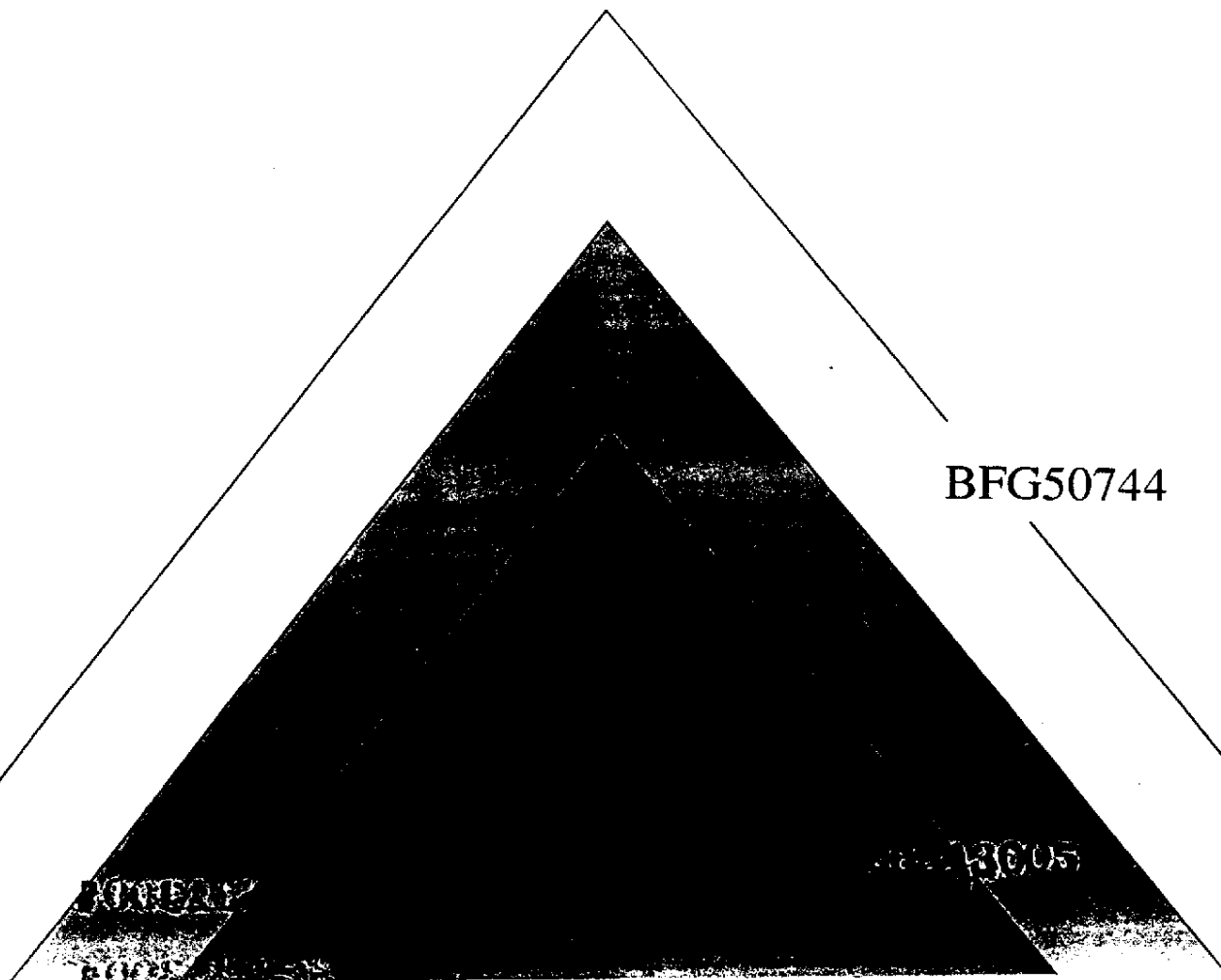
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MATERIAL SAFETY DATA SHEET

Geon® Vinyl Resins,
Compounds

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The data in this bulletin is applicable to all Geon® vinyl resins — general purpose type, Super EP type, dispersion resins, blending resins, powder coating resins —

and to all grades of rigid, flexible and Geon® cellular vinyl compounds. This bulletin is not applicable to Geon® latexes nor to Geon® CPVC materials.

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Chemical Family Vinyl Chloride Homopolymer (With the following exceptions):
Geon® 135, 130x24: Copolymer of vinyl chloride/vinyl acetate
Geon® 130x17: Carboxy-modified vinyl chloride polymer

SECTION II

HAZARDOUS INGREDIENTS

PVC Resin

- 1) Residual vinyl chloride monomer.

PVC Compound

- 1) Residual vinyl chloride monomer.
- 2) Heavy metal stabilizers.
- 3) Monomeric, polymeric or mixed ester plasticizer in flexible compound.
- 4) Pigments based on lead, chromium, mercadmiums, iron oxides or other organics or inorganics.

NOTE: Vinyl chloride (VCM) is an OSHA regulated material (REFER TO OSHA 1910.1017 FOR COMPLETE DETAILS). Current OSHA regulations require that no employee may be exposed to VCM concentrations greater than 1.0 ppm averaged over any eight hour period or 5.0 ppm averaged over any period not exceeding 15 minutes. All facilities where PVC is processed or fabricated (with heat sufficient to cause mass melting) shall be monitored to determine concentration of ambient VCM in the workplace atmosphere.

SECTION III

PHYSICAL DATA

Specific Gravity ($H_2O = 1.0$).

Resin: 1.40.

Compound: See Product Data Sheet.

Solubility in Water — Slight

Particle Size

Resin: Refer to Bulletin G-62.

Compound: Cubes measuring approximately 3/16-inch per side; or powder of variable particle size due to compounding ingredients.

Appearance and Odor

Resin: White powder, practically odorless or bland odor.

Compound: Pigmented or unpigmented cubical granules or powder, slight odor.

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Ignition (ASTM D-1929) 735°F.

Self-ignition (ASTM D-1929) 850°F.

Extinguishing Media

Water. ABC dry powder. Protein type air foams. Carbon dioxide may be ineffective due to a lack of cooling capacity which may result in reignition.

Special Fire Fighting Procedures

Wear self-contained breathing apparatus to prevent inhalation of combustion gases.

Unusual Fire and Explosion Hazard

PVC powder compound, especially plasticized powder compounds, may have dust explosion potential due to compounding ingredients. Control or eliminate likely ignition sources. Prevent accumulation of potentially explosive dust concentrations. Ventilate well.

For additional information read BFGoodrich Bulletin G-62, Second Edition

Section V and Table 1

Section II

Section II

Section II and Table III

Section V

Table II

Section IV

Section IV

Section IV

Section IV

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SECTION V**HEALTH AND HAZARD DATA**

Threshold Limit Value — None established.

Effects of Overexposure

Processing vapors may produce acute health effects in some individuals. The effects relate primarily to eye, nose and throat irritation. Individuals with bronchial asthma and other types of chronic obstructive respiratory diseases may develop bronchospasm if exposure is prolonged.

Emergency and First Aid Procedures

If irritation persists, remove affected individual from the area. Call a physician. Provide protection before re-entry. If overexposure occurs, leave the area.

SECTION VI**REACTIVITY DATA**

Stability — Stable.

Incompatibility (Materials to avoid)

In processing equipment, avoid contact of PVC resin or compound with acetal or acetal copolymers or with amine containing materials. At processing conditions these materials are mutually destructive and involve rapid decomposition.

Hazardous Decomposition Products

CO, CO₂, HCl, and (in small amounts) aromatic and aliphatic hydrocarbons. Geon® 135 and 130x24 will also contribute minor amounts of acetic acid as gas and smoke.

Hazardous Polymerization — Will not occur.

Section VI

Section IV

SECTION VII**SPILL OR LEAK PROCEDURES**

Steps to be taken if material is released or spilled

PVC material may be swept, shoveled, or vacuumed into containers for reuse or disposal.

Waste Disposal Method

Sanitary landfill or incineration in accordance with Federal, state or local regulations.

Section VII

SECTION VIII**SPECIAL PROTECTION INFORMATION**

Respiratory Protection — Dust

If conditions exist where dust is possible, wear NIOSH approved respiratory protection device.

Ventilation

Exhaust ventilation designed to pull vapors away from workers should be installed at all operations capable of creating dust, fumes or vapors.

Other Protection

- 1) Rubber gloves should be worn when cleaning condensate from exhaust hoods and other surfaces to prevent skin contact.
- 2) Safety glasses.

Section VIII

Section IV, Section VIII

Section IX

SECTION IX**SPECIAL PRECAUTIONS**

- 1) Open, handle and use Geon® vinyls under well-ventilated conditions.
- 2) Avoid breathing fumes.
- 3) Do not store or consume food in processing areas. Do not use processing equipment to heat food. Wash hands prior to eating. This will help prevent ingestion of unknown contaminants.
- 4) Cool regrind before placing in containers to prevent decomposition.
- 5) Prevent accumulations of PVC resins or compounds in walkways and other areas where people walk to prevent slippery footing.

Section IV, V

SECTION X**TRANSPORTATION INFORMATION**

For transportation purposes, Geon® vinyl resins and compounds are not defined or designated as a hazardous material by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations, 1977 edition.

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