

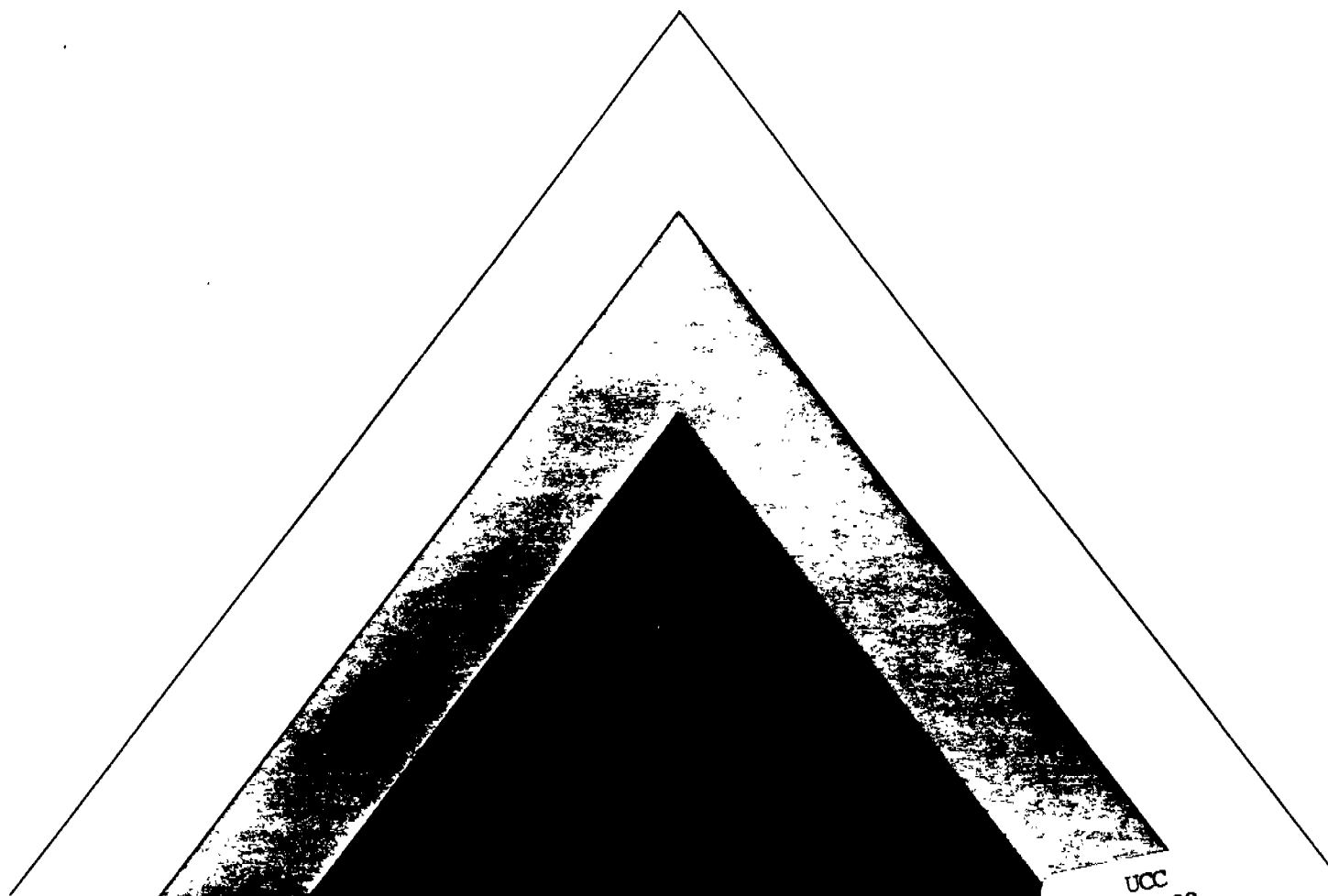
BF Goodrich

Bulletin G-62
Second Edition

Issue Date:
January, 1980

MATERIAL SAFETY DATA

**Geon® Vinyl Resins,
Compounds**



UCC
040029

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 $(CH_2CHCl)_n$
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.

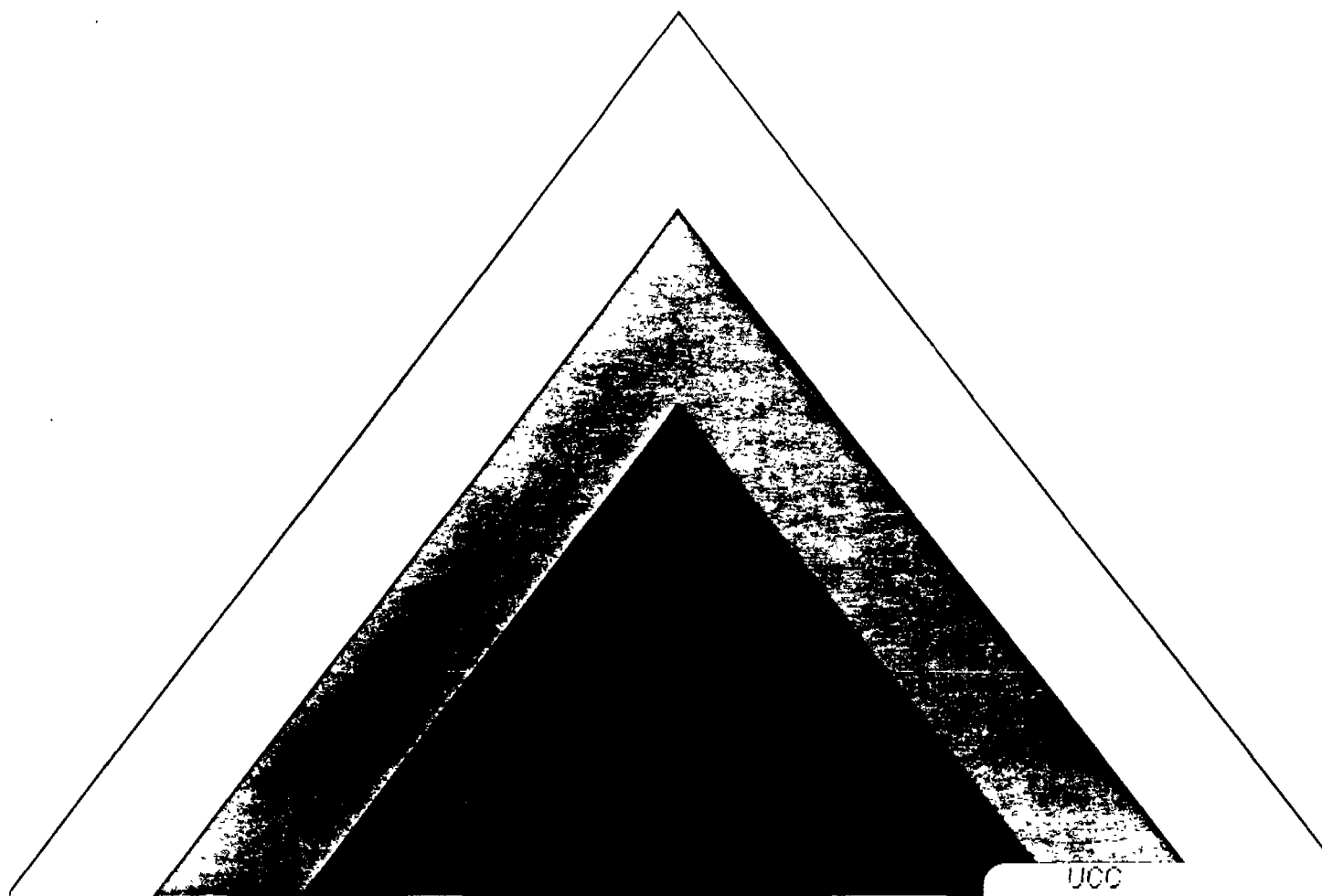
BF Goodrich

G-62
Supplement

Issue Date:
January, 1980

MATERIAL SAFETY DATA SHEET

**Geon® Vinyl Resins,
Compounds**



UCC
040031

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.

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 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.

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

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.

Table II

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.

Section IV

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.

Section IV

Special Fire Fighting Procedures

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

Section IV

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.

Section IV

UCC
040032

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.

UCC
040033

BFGoodrich Chemical Group

The BFGoodrich Company
Chemical Group

6100 Oak Tree Boulevard
Cleveland, Ohio 44131
216-524-0200

Sales Offices

CLEVELAND AREA

Suite 300
7550 Lucerne Dr.
MIDDLEBURG HGTS., OH 44130
216-524-0200

ATLANTA AREA

Suite 535
2700 Cumberland Parkway N.W.
ATLANTA, GA 30339
404-434-7761

BOSTON AREA

385 Elliot Street
NEWTON UPPER FALLS, MA 02164
617-332-2700

CHICAGO AREA

715 Oak Brook Executive Plaza
1301 West 22nd Street
OAK BROOK, IL 60521
312-654-4700

DETROIT AREA

Suite 207
30200 Telegraph Road
BIRMINGHAM, MI 48011
313-357-3939

KANSAS CITY AREA

1000 Blue Ridge Tower
4240 Blue Ridge Boulevard
KANSAS CITY, MO 64133
816-353-6440

LOS ANGELES AREA

Suite 970 Wilshire Centre
3055 Wilshire Boulevard
LOS ANGELES, CA 90010
213-386-7436

PHILADELPHIA AREA

200 Office Center
275 Commerce Drive
FORT WASHINGTON, PA 19034
215-643-6805

CANADA

409 Weber Street, West
KITCHENER, ONT., Canada
519-742-3641

INTERNATIONAL DEPARTMENT

6100 Oak Tree Boulevard
CLEVELAND, OH 44131
Cable Address:
GOODRICHCHEM

USER'S RESPONSIBILITY

A bulletin such as this cannot be expected to cover all possible individual situations. 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 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 the accuracy of information, the hazards connected with the use of the material or the results to be obtained from the use thereof.

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained therefrom. The information is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance. Because of variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. BFGoodrich shall not be liable for and the customer assumes all risk and liability of any use or handling of any material beyond BFGoodrich's direct control. THE SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation, nor as an inducement to practice any patented invention without permission of the patent owner.

WE RECOMMEND POSTING THIS SUPPLEMENT ON EMPLOYEE BULLETIN BOARD.

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, mercuriums, 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

UCC
040035

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.

UCC
040036

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.

Skin Sensitization

Human patch tests conducted with numerous Geon® vinyl resins indicates these materials have a low order of toxicity and do not cause skin sensitization.

Vinyl Chloride Monomer (VCM)

By a process called polymerization, vinyl chloride monomer, which is a gas at ordinary temperature and pressure, is converted into polyvinyl chloride (PVC) resin, which is a white powder. A small number of workers exposed for many years to large amounts of VCM gas developed a rare cancer of the liver called angiosarcoma. All confirmed VCM related cases have been among workers in plants that either manufacture VCM or convert VCM into PVC. OSHA has implemented regulations which also apply to PVC because small amounts of residual VCM remain in resins or compounds and potentially may be released into the workplace atmosphere during storage or processing.

VCM Monitoring Requirements

Current OSHA regulations require all facilities where PVC is processed (including blends of PVC with other polymers) or fabricated (with heat sufficient to cause mass melting*) shall be monitored to determine concentrations of ambient VCM in the workplace atmosphere. These regulations require that no employee may be exposed to VCM concentrations greater than 1.0 ppm (part per million by volume) averaged over any eight hour period or 5.0 ppm averaged over any period not exceeding 15 minutes. The action level is 0.5 ppm averaged over any eight hour work day.

Monitoring may be discontinued for any employee only when at least two consecutive determinations, made not less than five working days apart, show exposures for that employee at or below the action level. REFER TO OSHA REGULATIONS (INCLUDING 1910.1017) FOR COMPLETE DETAILS.

Since small quantities of VCM do remain in PVC resin, we recommend that periodic monitoring programs be conducted. If you choose to have monitoring conducted by an independent laboratory, we suggest that the laboratory be one accredited by the American Industrial Hygiene Association.

*"Mass melting" occurs when the entire structure is heated so that the physical integrity and form of the input material is lost.

Places where VCM May Concentrate

With the low level of residual VCM in today's resins and by following the guidelines provided in this bulletin, it is highly unlikely under normal circumstances that anyone engaged in handling or processing Geon® vinyls will be exposed to ambient VCM concentrations above the OSHA "action level."

There are, however, conditions under which VCM may accumulate to measurable amounts in the workplace atmosphere. Since VCM is volatile, it is released from the resin gradually in storage and more rapidly under heat and further processing. Open, handle, and use PVC resin and compound under well-ventilated conditions to avoid significant employee exposure.

Areas where VCM might concentrate are:

- 1) Closed containers such as bulk railcars, bulk trucks, storage tanks, and drums. Vent the air space above the resin or compound and monitor for VCM; or, provide suitable respiratory protection prior to exposure of personnel (See OSHA 1910.1017).
- 2) Storage areas for bagged or boxed PVC and places where incoming resins and compounds are unloaded, where packages are first opened, and where material is first melted. Provide suitable ventilation.
- 3) Processing areas such as compound preparation; extruding, curing, or coating operations, and other areas where heat is being applied. Provide suitable ventilation.

VCM at low levels cannot be detected by odor. Suitable test equipment and methods must be used.

Low VCM Content of Geon® Vinyls

BFGoodrich has implemented continuing technical efforts to reduce the level of VCM in the work atmosphere, the environment, and in PVC resin. Extensive product and process improvements have resulted in General Purpose, EP-type, Dispersion and Mass Polymerized Blending resins with extremely low levels of residual VCM. Residual VCM in major types of Geon® vinyl resins are presented in Table 1.

Studies in PVC processing and fabricating plants have shown exposures to be below the "action level." With current resins, in combination with ventilation and work practice programs, it should be possible for a typical processing plant not to have to regulate the area. Compliance with OSHA regulations require that a program of initial monitoring be implemented (See OSHA 1910.1017). BFGoodrich recommends that periodic monitoring be conducted thereafter.

Progress has also been made in reducing residual VCM in suspension grade blending and paste resins. Because of the unique characteristics of blending and paste resins, there is greater technical difficulty in stripping residual VCM without damaging the polymer. Residual VCM in suspension grade blending and paste resins may result in detectable quantities of ambient VCM above the action level in storage and processing areas of the resin user's plant. The user should monitor personnel periodically and implement ventilation and work practice programs to prevent significant employee exposure and to comply with OSHA regulation 1910.1017.

SECTION VI

REACTIVITY DATA

Stability — Stable.

Decomposition Products — See Section IV.

Hazardous Polymerization — Will Not Occur.

Incompatibility

Avoid contact of PVC resin or compound with acetal or acetal copolymers and with amine containing materials during processing. At processing conditions these materials are mutually destructive and involve rapid degradation of the products. Thoroughly purge and mechanically clean processing equipment to avoid even trace quantities of these materials from coming in contact with each other. Prevent cross contamination of feedstocks.

SECTION VII

SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
PVC materials may be swept, shoveled, or vacuumed into containers for reuse or disposal. If conditions occur where dust is possible, employees should be supplied with NIOSH approved respiratory protective devices. (See Section VIII).

Waste Disposal Method

Sanitary landfill or incineration in accordance with federal, state, or local regulations. If incineration is used, recognition should be made that corrosive hydrogen chloride is generated.

SECTION VIII

SPECIAL PROTECTION INFORMATION

Ventilation

Exhaust ventilation designed to pull vapors away from workers should be installed at all mixing operations, the hot end and feed area of processing equipment and at cut-off equipment. Ventilation should always be used to prevent routine inhalation of smoke, fumes or vapors from processing or other operations. Other operations to consider include regrind operations, thermoforming, heat sealing, soldering, and curing.

We suggest that you obtain a copy of the **NIOSH Recommended Industrial Ventilation Guidelines**, GPO #017-033-00136-7. It can be obtained from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. There is a fee for this publication (\$3.90 as of August, 1979).

Respiratory Protection — Dust

Operations involving possible exposure to airborne PVC particles should be evaluated as the individual situation exists. OSHA 1910.1000 states that if airborne concentrations of dust particles are found to exceed a total mass of 15 mg/m³, or 5 mg/m³ respirable particles, appropriate engineering controls or NIOSH approved respiratory protection is recommended. Refer to **Cumulative Supplement, June, 1977, NIOSH Certified Equipment** described in Section IV.

Other Protection Information

- 1) PVC resin must be compounded with other ingredients. If you purchase PVC resin, the other ingredients you select for compounding purposes may require special consideration, especially respiratory protection. You must determine to your own satisfaction that your techniques, processes and additives comply with applicable regulations. As we cannot be responsible for materials or operations outside of our direct control, we recommend you contact your additive supplier for necessary information regarding specific compounding ingredients you select.
- 2) Safety glasses are recommended for all industrial workplaces. Special protective gloves and clothing are not required when handling Geon® vinyl resins or compounds. Gloves should be worn when handling hot PVC.

SECTION IX

SPECIAL PRECAUTIONS

- 1) Vapors emitted during processing may condense on exhaust hoods, ductwork or other surfaces. Avoid skin contact with condensate during clean-up operations. Condensate may contain contaminants which may be toxic. Rubber gloves should be worn when cleaning condensate from exhaust hoods and other surfaces.
- 2) Observe good rules of personal industrial hygiene. Wash hands prior to eating. Do not store or consume food in processing areas. Do not use processing equipment to heat food. These precautions will help prevent ingestion of unknown contaminants.
- 3) The process of regrinding PVC scrap for re-extrusion or waste disposal generally results in substantial heat. Cool regrind before placing it in containers. The excellent insulating quality of PVC will prevent heat in the center of a container from escaping potentially resulting in slow thermal decomposition of the material. This may not only render the product unsatisfactory for further processing but also result in fumes and vapors from all ingredients being released into the workplace atmosphere which can cause irritation of the respiratory tract, eyes and skin.
- 4) Prevent accumulations of PVC resin or compound in walkways and other areas where people walk to prevent slippery footing.

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.

TABLE 1 RESIDUAL VINYL CHLORIDE MONOMER (RVCM) IN MAJOR TYPES OF GEON® RESIN AND COMPOUND

DESCRIPTION	DESIGNATION	INHERENT VISCOSITY ASTM D-1243	CLOSEST CLASSIFICATION ASTM D-1755	TYPE COMPOUND USED IN	AVERAGE AMOUNT OF RVCM (PPM) PRIME GOODS		AVERAGE AMOUNT OF RVCM (PPM) OFF-GRADE RESIN* TAILINGS (B, C & E-GRADES)
					IN RESIN PRIOR TO COMPOUNDING	IN COMPOUND	
Suspension Resins							
Homopolymers							
1. High Molecular Weight	102EP F-5	1.13	GP6-15443	Rigid	<1	<1	<50
2. Med. Molecular Weight	103EP	1.00	GP5-15443	Rigid &	<1	<1	<50
	103EP F-76	0.92	GP4-16043	Flexible	<1	<1	<50
	92	1.00	GP5-15543	Flexible	<1	<1	<5
3. Low Molecular Weight	110x334	0.68	GP1-16243	Rigid	<3	<3	<5
Emulsion Resins							
Dispersion	121,128	1.20	Not Applicable	None	≤5	Not Applicable	<20
Mass Resins							
Low Molecular Weight							
	80x5	0.76	GP2-16243	Rigid	<20	<10	<50
	140x30	0.76	GP2-46043	None	<10	Not Applicable	<50
	140x31	0.84	GP3-46343	None	<10	Not Applicable	<50
	140x32	0.76	GP4-46243	None	<10	Not Applicable	<50

NOTE: < means "less than." ≤ means "equal to or less than." *Downgraded resin (B & C grade) Same as prime.

TABLE II

Particle Size of Geon® vinyl resins: 100% through the following mesh screen.

40 Mesh Screen	200 Mesh Screen	30 Mesh Screen
80x5	120x241	92
80x6	120x251	99
80x24	120x271	
80x25	120x276	
80x26	120x279	
100x122	121	
102EP	124	
103EP	124F1	
103EPF76	128	
110x334	130x17	
110x350	130x24	
140x30	135	
140x31		
140x32		

95% Through
100 Mesh Screen

101F4

100x130

120x284

TABLE III CARCINOGENIC COMPOUNDS

None of the following substances are used in the manufacture of Geon® vinyls nor are they anticipated by-products in our production process. Although the following materials do not represent any official governmental list nor all possible carcinogenic compounds, they do represent specific substances our customers have typically inquired about.

Some of these materials are ubiquitous and trace quantities may be found in the environment or as impurities in ingredients used in compounding.

Asbestos	OSHA 1910.1001
Coal tar pitch volatiles	.1002
4-Nitrobiphenyl	.1003
alpha-Naphthylamine	.1004
4, 4' - Methylene (bis) 2-chloroaniline	.1005
Methyl Chloromethyl Ether	.1006
3, 3' - Dichlorobenzidine (and its salts)	.1007
bis-chloromethyl ether	.1008
beta - Naphthylamine	.1009
Benzidine	.1010
4 - Aminodiphenyl	.1011
Ethyleneimine	.1012
beta-Propiolactone	.1013
2-Acetylaminofluorene	.1014
4 - Dimethylaminoazobenzene	.1015
N-Nitrosodimethylamine	.1016
Benzene	.1028
Polybrominated biphenyls	-
Polychlorinated biphenyls*	EPA (40 CFR Part 761)

*Polychlorinated biphenyls (PCB) may be present as impurities in certain phthalocyanine and diarylide pigments. Our suppliers have notified us that the pigments we purchase comply with the 50 ppm maximum allowable limit found in the EPA final rule to be published under Title 49 of the Code of Federal Regulations, Part 761.

UCC
040039

BFGoodrich Chemical Group

The BFGoodrich Company
Chemical Group

6100 Oak Tree Boulevard
Cleveland, Ohio 44131
216-524-0200

Sales Offices

CLEVELAND AREA

Suite 300
7550 Lucerne Dr.
MIDDLEBURG HGTS., OH 44130
216-524-0200

ATLANTA AREA

Suite 535
2700 Cumberland Parkway N.W.
ATLANTA, GA 30339
404-434-7761

BOSTON AREA

385 Elliot Street
NEWTON UPPER FALLS, MA 02164
617-332-2700

CHICAGO AREA

715 Oak Brook Executive Plaza
1301 West 22nd Street
OAK BROOK, IL 60521
312-654-4700

DETROIT AREA

Suite 207
30200 Telegraph Road
BIRMINGHAM, MI 48011
313-357-3939

KANSAS CITY AREA

1000 Blue Ridge Tower
4240 Blue Ridge Boulevard
KANSAS CITY, MO 64133
816-353-6440

LOS ANGELES AREA

Suite 970 Wilshire Centre
3055 Wilshire Boulevard
LOS ANGELES, CA 90010
213-386-7436

PHILADELPHIA AREA

200 Office Center
275 Commerce Drive
FORT WASHINGTON, PA 19034
215-643-6805

CANADA

409 Weber Street, West
KITCHENER, ONT., Canada
519-742-3641

INTERNATIONAL DEPARTMENT

6100 Oak Tree Boulevard
CLEVELAND, OH 44131
Cable Address:
GOODRICHCHEM

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained therefrom. The information is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance. Because of variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. BFGoodrich shall not be liable for and the customer assumes all risk and liability of any use or handling of any material beyond BFGoodrich's direct control. THE SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation, nor as an inducement to practice any patented invention without permission of the patent owner.