

SECTION VI

REACTIVITY

Stability — Stable

Hazardous Polymerization — Will not occur

Hazardous Decomposition Products

Hydrogen chloride, carbon monoxide, carbon dioxide and small amounts of benzene and aromatic and aliphatic hydrocarbons. Plasticized compounds will also contribute aliphatic olefins.

Incompatibility (materials to avoid)

Avoid contact with acetal or acetal copolymers and with amine containing materials during processing. At processing conditions these materials are mutually destructive and involve rapid degradation. 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 PROCEDURE

Steps to be Taken in Case Material is Released or Spilled

Vacuum powder or sweep cubes/pellets into a closed container for reuse or disposal.

Waste Disposal Method

Dispose of waste in a licensed landfill or by incineration in accordance with federal, state and local regulations. For waste disposal purposes, Geon® vinyl cube or pellet compound are not defined or designated as hazardous by current provisions of the Federal Resource Conservation and Recovery Act (RCRA — 40CFR261). If incinerated, be aware that hydrogen chloride is generated.

Geon® vinyl powder compound containing lead, indicated on the bag label, is considered to be a hazardous waste if disposed of in its powdered form.

SECTION VIII

SPECIAL PROTECTION INFORMATION

Ventilation

Volatiles from extrusion and molding operations should not be discharged into unventilated work areas. Provide effective exhaust ventilation, including local exhaust when necessary, to draw dust and/or fumes, vapors or smoke away from workers to prevent routine inhalation. Hot melt processing (extruding, molding, etc.), cutting or sawing, machining, regrinding, heat welding, thermoforming and other processing or post-processing operations involving heat sufficient to result in polymer breakdown should be examined to ensure adequate ventilation.

Ventilation guidelines and techniques may be found in the following publications:

- NIOSH Recommended Industrial Ventilation Guidelines; GPO #017-033-00136-7. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

— Industrial Ventilation, 1976 Edition; Available from the American Conference of Governmental Industrial Hygienists, 3500 Glenway Avenue, Bldg. D-5, Cincinnati, Ohio 45211.

Respiratory Protection

Not normally necessary. Abnormal conditions such as equipment malfunction or user's improper equipment or procedures, or hangup or stagnation of compound during processing may cause decomposition. If general dilution or local exhaust ventilation is not adequate to keep fume or vapor concentrations at low (non-irritating) levels, then employees involved in removing decomposing material should be provided with suitable air supplied respirators, such as NIOSH/MSHA approved positive pressure, self-contained breathing apparatus.

Wear NIOSH approved nuisance dust respirator to protect against airborne dust created during handling of non-lead containing powder compound. Wear NIOSH approved toxic dust respirator to protect against airborne dust containing lead created during handling of lead containing powder compound. Air monitoring may be necessary to determine employee exposure to lead in powder compound. See 29 CFR 1910.1025, OSHA lead standard.

Other Protective Equipment

Wear protective gloves when handling hot material during processing. Safety glasses are recommended for all industrial workplaces.

SECTION IX

SPECIAL PRECAUTIONS

Normal Melt Processing — Virtually all thermoplastic materials will emit fumes and/or vapors when heated to processing temperatures. The concentration of these emissions in the workplace air will depend upon variables such as the specific compound formulation, amount processed, processing method and temperature and the effectiveness of exhaust ventilation. Always use Geon® vinyl compound under well ventilated conditions and avoid continued or prolonged breathing of process vapors. For personal hygiene, wash thoroughly after processing compound, especially before eating, smoking or using toilet facilities. Do not store or consume food in processing areas. Do not use processing equipment to heat food.

Cleanup following normal melt processing should be performed under well ventilated conditions. Geon® vinyl compound may be held at process temperatures for a short time without significant thermal degradation. However, it should be recognized that exposure to either elevated temperature or excessive heat history (time) will result in decomposition.* Equipment should not be shut down for extended time periods with compound in it, or decomposition and possible corrosion of unprotected metal may result. If dies and screws are not to be cleaned manually, then compound should be purged from processing equipment prior to shutdown using special vinyl purge compound or a compatible thermoplastic such as general purpose ABS (do not use flame-retarded or halogen-containing grades for this purpose).



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*The time and temperature required to initiate degradation will vary depending upon processing technique, degree of compound stabilization and other factors. As a general rule-of-thumb, degradation begins to occur after about one hour at 177° C (350° F), about 10 minutes at 204° C (400° F) and within five minutes at 232° C (450° F).

In case of power loss or other mishap, shut off the machine and dismantle the die assembly as soon as possible before degradation or decomposition begins. If decomposition begins (with gassing and "popping" sounds) before the die can be disassembled, dangerously high pressure may occur in the die system. In this event, shut off the machine, clear the area of personnel and wait until decomposition stops. Thoroughly ventilate the area. Remove and disassemble the die system. These are guidelines only.

SECTION X

TRANSPORTATION

For domestic transportation purposes, vinyl cube/pellet or powder compounds are not classified as hazardous by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations, 1986 Edition.

- DOT Proper Shipping Name: Not applicable
- DOT Hazard Class: Not applicable
- DOT Label: Not applicable
- UN/NA Hazard No.: Not applicable
- Reportable Quantity: Not applicable

SECTION XI

HAZARD CODES

For Pellet or Cube Compound

NFPA 704¹

Health: 2
Flammability: 1
Reactivity: 0
Special: None

HMIS²

Health: 0
Flammability: 1
Reactivity: 0
Personal Protection: (See Section VIII.)

For Powder Compound

NFPA 704¹

Health: 2
Flammability: 1
Reactivity: 0
Special: —

HMIS²

Health: 1
Flammability: 1
Reactivity: 0
Personal Protection: (See Section VIII.)

Hazard Code Key: 0 = Insignificant
1 = Slight
2 = Moderate
3 = High
4 = Extreme

¹ National Fire Protection Association.

² Hazardous Materials Identification System, National Paint and Coatings Association.

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APPENDIX 1

VINYL CHLORIDE MONOMER (VCM)

Vinyl chloride and polyvinyl chloride (PVC) are not the same material. Vinyl chloride is a flammable gas that is strictly regulated by DOT, EPA and OSHA. Through a chemical reaction, this gas — known as a monomer — is converted to a non-hazardous white granular powder called polyvinyl chloride resin, PVC or simply, vinyl. It is this vinyl resin that is then combined with functional additives to make Geon[®] vinyl compound. Vinyl resin is not a cancer suspect agent. Moreover, the reaction is not reversible. That is, thermal processing or decomposition will not cause polyvinyl chloride to revert back to vinyl chloride monomer.

Employee exposure to vinyl chloride monomer (CAS Registry Number: 75-01-4), a carcinogen, is regulated by OSHA (29 CFR 1910.1017). The current regulation requires that no employee may be exposed to VCM concentrations greater than 1.0 ppm (parts 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 workday.

The regulation applies to the manufacture, packaging, repackaging, storage, handling or use of vinyl chloride or polyvinyl chloride, but does not apply to the handling or use of fabricated products made of polyvinyl chloride. Purchasers of vinyl compound for processing purposes must comply with the permissible exposure limits set by OSHA. Moreover, the regulation requires a program of initial monitoring in each facility to determine if there is any employee exposure in excess of the action level without the use of respirators. If monitoring does not find VCM above 0.5 ppm, no further action is necessary. Refer to OSHA regulations (including 29 CFR 1910.1017) for complete details.

SPECIAL NOTE: Vinyl Chloride Warning Labels on Compound Containers

Monitoring of vinyl processing and fabricating plants and modeling studies show that the action level (0.5 ppm) cannot be exceeded when residual VCM is at or below 8.5 ppm in Geon[®] vinyl compound. Shipping containers for these compounds are not labeled by BFGoodrich



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FUNCTIONAL ADDITIVES USED IN PVC COMPOUND

Additives chosen for a specific compound will vary according to processing and final product requirements. The following list does not represent all possible additives but it does represent typical ingredients which may be used in vinyl compounds.

- **Stabilizer** inhibits thermal degradation of the compound during processing and throughout the service life of the product. Stabilizers may be grouped into four classes: organometallic tins, lead salts, mixed metal salts and special-purpose stabilizers. The most common organometallic tin stabilizers are tin mercaptides, mainly methyl tin and butyl tin. Some stabilizers, including di-n-octyl and dimethyl tin mercaptide, are FDA acceptable for food contact applications. Geon[®] vinyl compound containing organic tins are labelled. Lead salts, like dibasic lead phosphite, are mainly organic lead compounds and include sulfates, silicates, phosphates, stearates, phthalates and maleates. Powdered lead compounds are labelled. Lead compounds will not be emitted into the workplace during normal thermal processing operations. Mixed metal salts include calcium-zinc and barium-cadmium systems. Special-purpose stabilizers include flame retardants such as antimony derivatives and ultraviolet light absorbers. Stabilizer will typically be present in amounts up to 5% by weight.
- **Processing aids** — The most common processing aids used with vinyl compound are acrylics or styrene-acrylonitrile copolymers present at levels up to 5.0% by weight.
- **Impact modifiers** commonly used with vinyl include acrylates, chlorinated polyethylene, methacrylate-butadiene-styrene (MBS), acrylonitrile-butadiene-styrene (ABS) and rubber. Although not present in all compounds, when used, impact modifier may range up to 20% by weight.
- **Fillers** — Most common are metal carbonates, mainly calcium carbonate, which is usually in the form of ground limestone and coated with stearic acid. Other fillers may be silicates, gypsum, clay, alum and barytes.
- **Plasticizer** — Many kinds of plasticizer are available such as dioctyl, dihexyl and dibutyl phthalates, phosphate esters such as isodecyl diphenyl phosphate, aliphatic alcohol esters such as dioctyl adipate, polymeric plasticizer such as polyesters of adipic acid and monomeric esters such as trimellitate. Dioctyl phthalate is FDA acceptable for food contact applications. When used in flexible vinyl compound, plasticizer concentrations will generally range between 20-50%, by weight.
- **Lubricants** — include paraffin waxes, mineral oils, polyethylene, salts of fatty acids and fatty acids, esters and amides. Lubricants would be present up to approximately 5%.
- **Pigment** — Pigments may be present up to 5% to achieve opacity and color.

unless a customer specifies otherwise. Geon[®] vinyl compound will be labeled if residual monomer exceeds 8.5 ppm. The OSHA regulation requires that the label say "Polyvinyl chloride contains vinyl chloride. Vinyl chloride is a cancer suspect agent."

The vinyl in Geon[®] vinyl is not a cancer suspect agent. It is the trace amount of unreacted vinyl chloride monomer that must be controlled, not the vinyl resin itself.

Although some containers may be labeled, this does not necessarily mean that employee exposure to VCM will exceed permissible exposure limits. Using "worst case" conditions of thermal processing, our studies show that more than 30 ppm of unreacted monomer in vinyl resin is needed to cause 0.5 ppm to be present in the atmosphere of a hot, poorly ventilated workplace. For further information, please read BFGoodrich Technical Service Bulletin No. 12, "Vinyl Studies." Good ventilation in those areas where VCM might concentrate — such as where containers are stored and first opened, where materials are mixed and where compound is melted — will further ensure a work environment virtually free of VCM.

APPENDIX 2

POLYVINYL CHLORIDE AND HAZARD COMMUNICATION

The OSHA hazard communication standard requires that manufacturers of products state in the MSDS whether or not the material is listed as a carcinogen. The lists to be consulted include OSHA Health Standards, The International Agency for Research on Cancer (IARC) and the National Institute for Occupational Safety and Health's Registry of Toxic Effects of Chemical Substances (RTECS).

NIOSH in the 1983 RTECS listed Polyvinyl Chloride (PVC) as a carcinogen. NIOSH misinterpreted the IARC monograph 19.377.76 (Summary of Data Reported and Evaluation). The monograph states that "studies (about)... the possibility of cancer in workers involved in the fabrication of plastics, including polyvinyl chloride, are insufficient to evaluate carcinogenicity."

IARC monograph 19.419.79 correctly identified vinyl chloride monomer as a carcinogen. NIOSH's inexplicable expansion to include all the polymers listed (including Tygon which is used in medical tubing) was in error.

The Vinyl Institute, a trade organization representing the PVC industries in June, 1987 managed to get the RTECS review board to correct the misinterpretation of the IARC monographs. Polyvinyl chloride is now listed as presenting inadequate evidence of being a human or animal carcinogen.



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