

The BFGoodrich Company
Geon Vinyl Division
6100 Oak Tree Boulevard
Cleveland, Ohio 44131
216-447-6000

W. H. Hinderer
Robert K. Hinderer, Ph.D.
Director, Health, Toxicology
and Product Safety

October 8, 1992

Jim Lowrie
Safety Manager
Sola Optical
1500 Cader Lane
Petaluma, Ca. 94953

Dear Mr. Lowrie:

This letter is in response to your request for comments on the letter from Dr. Patricia Bailey regarding the hazards of exposure to Geon 86416.

The hazards of Geon 86416 are described in the Material Safety Data Sheet (MSDS) for this product. Although you indicated that you have a copy of this MSDS, a second copy is enclosed for your convenience.

As you know, Geon 86416 is a mixture of polyvinyl chloride (PVC) and a number of other ingredients which are added to impart specific functional characteristics. PVC, which is the prime ingredient in this compound, is known to release hydrogen chloride (HCl) when excessive temperatures occur during processing. Under these conditions HCl can cause irritation to the eyes, nose and upper respiratory tract. Studies in nonhuman primates have shown that as the result of its high solubility in water and scrubbing action of the upper respiratory tract (moisture) no significant penetration to the lower lung or lung function effects are expected. Furthermore, Geon 86416 does not contain any ingredients which can generate hydrogen cyanide.

All of the hazardous ingredients are listed under Section II of the MSDS. PVC contains a small residual amount of vinyl chloride, the basic building block, which is a known human carcinogen. However, the residual levels of VCM have been reduced to the point where they are not expected to pose any significant risk. DEHP, also called DOP or bis(2-ethylhexyl)phthalate, has not been shown to be carcinogenic in man. Long-term studies have shown that DEHP is carcinogenic in rodents and have led some organizations to list this chemical as a possible human carcinogen. However, further studies of this carcinogenic response in rodents have indicated that this response is an artifact specific to the animal species tested and not a true indication of human hazard. This has led bodies like the Specialized Experts Working Group of the European Community to conclude that there is no evidence to warrant classification of DEHP as a carcinogen. The U.S. FDA also has not regulated DEHP as a

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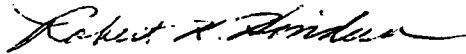
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carcinogen not only because of questions about the relevance of the rodent response, but because of the long history of use in medical devices and as an indirect food additive. Moreover, senior officials for the Environmental Protection Agency have taken the position that the process of tumor formation in the rodent may not be relevant to man.

Please call me at (216) 447-7978 if you have any further questions.

Sincerely,

THE BFGOODRICH COMPANY



Robert K. Hinderer, Ph.D.
Director of Health, Toxicology, and Product Safety

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Attachment

cc: John Dresch
Don Knechtges
Mike Marshall (w/attachment)
Charlie Ragland

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Geon Vinyl Division

MATERIAL SAFETY DATA SHEET

Geon® 86416 TRANSPARENT PELLETS 0027

Product No.: 86416 00D 0027

Issue: 005

Issued: July 1992

Supersedes: New Issue

Written by: M. Hross

SECTION I

The B.F. Goodrich Company
Geon Vinyl Division
6100 Oak Tree Blvd.
Cleveland, Ohio 44131

Telephone No.: 1-(800) 438-4366

Transportation Emergency No.:

CHEMTREC: 1-(800) 424-9300

Medical Emergency No.:

POISON CENTER: (216) 379-8562

The B. F. Goodrich Company
195 Columbia Street West
Waterloo, Ontario N2J 4N9

Telephone No.: (519) 888-4318

Transportation Emergency No.:

CANUTEC: (613) 996-6666

Chemical Family: Alloy

Chemical Name/Synonyms: Poly(vinyl chloride), PVC, vinyl

Trade Mark: Geon® Vinyl

Formula: Vinyl Resin* plus functional additives $*(CH_2CHCl)_n$

C.A.S. Registry No.: Not Applicable (Mixture)

TSCA Inventory Status: All ingredients comply with the USEPA's TSCA regulations

Canadian Domestic Substances List Status: All ingredients have been nominated or are eligible
for inclusion

Workplace Hazardous Materials Information System (WHMIS) Classification: D1B

Product Use: Various Applications

SECTION II - Hazardous Ingredients

Hazard Summary Statement: CAUTION! Processing fumes may cause irritation of the eyes and respiratory tract. Use with adequate ventilation. Avoid breathing process emissions. Read entire Material Safety Data Sheet (MSDS).

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<u>Material</u>	<u>C.A.S. Number</u>	<u>Amount in Product</u>	<u>ACGIH TLV-TWA</u>	<u>OSHA PEL-TWA</u>
Bis(2-ethylhexyl) Phthalate ^{1,2,3,4,5,6}	117-81-7	15-20%	5.0 mg/m ³ 10 mg/m ³ - short term exposure limit (STEL)	5.0 mg/m ³ 10 mg/m ³ - short term exposure limit (STEL)

Bis(2-ethylhexyl) Phthalate LD₅₀ (rat, oral) - 30,500 mg/kg

Bis(2-ethylhexyl) Phthalate LC₅₀ - N.E.

Bis(2-ethylhexyl) Adipate ^{1,2,4,5,6}	103-23-1	5-10%	N.E.	N.E.
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Bis(2-ethylhexyl) Adipate LD₅₀ (rat, oral) - 9,110 mg/kg

Bis(2-ethylhexyl) Adipate LC₅₀ - N.E.

Vinyl Chloride Monomer ^{1,2,3,4,5,6}	75-01-4	<8.5 ppm	5 ppm	1 ppm (5 ppm TWA for any 15 minute period)
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Vinyl Chloride Monomer LD₅₀ (rat, inhalation) - 18 pph/15M

Vinyl Chloride Monomer LC₅₀ - N.E.

N.A. - Not Applicable

N.E. - Not Established

Bis(2-ethylhexyl) phthalate is a National Toxicology Program (NTP) anticipated human carcinogen and an International Agency for Research on Cancer (IARC) possible human carcinogen.

Vinyl chloride monomer is shown as an OSHA cancer suspect agent (29 CFR 1910.1017), an American Conference of Governmental Industrial Hygienists (ACGIH) confirmed human carcinogen, and a National Toxicology Program (NTP) and an International Agency for Research on Cancer (IARC) human carcinogen.

Legislative Footnotes

¹ Ingredient listed on SARA Section 313 List of Toxic Chemicals

² Ingredient listed on the *Pennsylvania Hazardous Substances List*

³ Ingredient listed on the California listing of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*

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- ⁴ Ingredient listed on the *Massachusetts Substance List*
⁵ *Workplace Hazardous Materials Information System* ingredient found on the Ingredient Disclosure List - Canada
⁶ Ingredient listed on the *New Jersey Right to Know Hazardous Substance List*

Notes: *TLV-TWA* -- Threshold Limit Value - Time Weighted Average for concentration of the chemical substance in the ambient workplace air. American Conference of Governmental Industrial Hygienists (ACGIH).

OSHA PEL -- OSHA Permissible Exposure Limit, 8-hour TWA. 29 CFR 1910.1000 1989.

SECTION III - Physical Data

Appearance: Transparent Pellets
Odor: Slight Characteristic
Percent Volatiles: N.E.
Solubility in Water: N.E.
Physical State: Solid

Specific Gravity: 1.23 ± 0.02
Melting Point: N.E.
Glass Transition Temperature: N.E.
Bulk Density: N.E.

SECTION IV - Fire and Explosion Hazard Data

Flash Point: Not established for the product; the vinyl resin portion of the product has a flash-ignition temperature of approximately 391°C (735°F) and a self-ignition temperature of approximately 454°C (850°F). ASTM D-1929.

Notes: *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 absence of an ignition source, ignition occurs of itself, as indicated by an explosion, flame or sustained glow.

Extinguishing Media: Water, ABC dry chemical, protein type air foams. (Carbon dioxide may be ineffective on larger fires due to lack of cooling capacity which may result in reignition.)

Special Firefighting Procedures: Wear self-contained breathing apparatus (SCBA) in positive pressure mode. Personnel not having suitable respiratory protection must leave the area to prevent significant exposure to toxic combustion gases from any source. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

Unusual Fire and Explosion Hazards: None known.

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SECTION V - 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 and aliphatic olefins.

CAUTION! Prolonged heating (approximately 30 minutes or more) of the product above 200°C (392°F) or short term heating at 250°C (482°F) may result in rapid evolution of hydrogen chloride.

Incompatibility (Materials to Avoid): Avoid contact with strong oxidizers. Also, 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 VI - Health Hazard Data

Threshold Limit Value: Not Established

Primary Routes of Exposure: Inhalation of process emissions

Effects of Overexposure: No adverse health effects are anticipated from the product at ambient temperatures. However, at process temperatures, the product can emit fumes and vapors which may cause irritation of the eyes and respiratory tract. Any effects will depend upon processing technique and temperature, volume processed and the effectiveness of exhaust ventilation provided for the process. Effects of chronic exposure to off-gases at processing temperatures have not been fully evaluated.

Hazardous ingredient specific medical data (if ingredient found in "pure" form):

Bis(2-ethylhexyl) phthalate causes gastrointestinal effects in man. It is a mild eye and skin irritant. Although it causes liver cancer in rodents, the significance of this response to humans is not known. Reproductive and developmental effects have been observed in rodents fed high doses. However, experts from the EEC Commission have concluded that it could not be classified as a carcinogen or as a teratogenic substance. Bis(2-ethylhexyl) phthalate is an NTP anticipated human carcinogen and an IARC possible human carcinogen.

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Bis(2-ethylhexyl) adipate vapors or mists from heated material may irritate the respiratory tract. Repeated or prolonged contact may irritate the skin. Ingestion causes abdominal cramps and diarrhea. (Liver tumors seen in mice fed bis(2-ethylhexyl) adipate appear to be unique to the species.)

Vinyl chloride monomer in high concentrations can cause eye, nose and throat irritation, dizziness, euphoria, drowsiness, incoordination, nausea, headache, blurred vision, disorientation, persistent irregular heart beat, unconsciousness and death. Direct contact with the liquid causes freeze burns of the skin, eyes and mucous membranes with possible permanent damage. Repeated exposure causes angiosarcoma of the liver, a rare form of liver cancer. Repeated exposure to high concentrations can cause degeneration of the tips of the finger bones. Transplacental carcinogenicity has been observed in some long term studies with animals. Other organ system effects also have been observed in animal studies but have not been confirmed in humans. Vinyl chloride is an OSHA cancer suspect agent (29 CFR 1910.1017), an ACGIH confirmed human carcinogen and an NTP and IARC human carcinogen.

Emergency and First Aid Procedures:

Inhalation (of process emissions): Remove affected individual to fresh air. Contact a physician.

Eye Contact: Flush eyes with water for at least 15 minutes while lifting upper and lower eyelids. Seek medical attention if irritation persists.

Skin Contact: Not an anticipated hazard, however, good personal hygiene practices are always recommended for material handling.

Ingestion: Not an anticipated hazard.

SECTION VII - Spill and Leak Procedure

Steps to be taken in case material is released or spilled: Vacuum or sweep material into a clean, properly labeled container for reuse or disposal.

Waste disposal method: Dispose of waste in accordance with all federal, state/provincial and local regulations.

TCLP: This product or others of similar composition, in the as-shipped condition, have been tested and found to be not hazardous using the USEPA's Toxicity Characteristic Leaching Procedure (TCLP - 40 CFR 261, Appendix II). Any physical or chemical modification of this product may change the TCLP test results.

SECTION VIII - Special Protection Information

Ventilation: Effective exhaust ventilation should always be provided to draw fumes or vapors away from workers to prevent routine inhalation. Ventilation should be adequate to maintain the ambient workplace atmosphere below the legislated levels listed in Section II. Hot melt

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processing (e.g., extruding and molding), cutting or sawing, machining, regrinding, thermoforming, heat welding and other processing or post-processing operations involving heat sufficient to result in polymer breakdown should be examined to insure adequate ventilation.

Respiratory Protection: Wear a NIOSH/MSHA-approved respirator specific for chemicals listed in Section II and VI, as applicable, when concentrations exceed those limits listed. Comply with OSHA 1910.134 (29 CFR).

Protective Equipment: Wear protective gloves when handling hot material during processing. Safety glasses are recommended for all industrial activities.

SECTION IX - Special Precautions

Material Handling: As with any product, should dusting occur from material handling, sources of ignition, such as static discharge, should be addressed by the user to prevent the ignition and sudden release of energy from suspended, finely divided particulates. Remove product from walkways and floors to prevent slipping hazards.

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: 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. 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). 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 purge equipment prior to shut-down 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).

Processing Fume Condensates: Processing fume condensates, which may include toxic contaminants, may be combustible and should be periodically removed from exhaust hoods, ductwork and other surfaces. Protective clothing, including impervious gloves, should be worn during cleanup operations to prevent skin contact.

Storage: Sprinklered warehouse areas are recommended. The product by itself will not support combustion, however, materials such as wooden pallets, paper bags, cardboard boxes and other combustibles can provide sufficient fuel to cause the product to burn.

Material Not Used Within One Year: Material not used within one year should be tested to determine if degradation has occurred.

Abnormal Conditions: Abnormal conditions such as equipment malfunction or using improper equipment or procedures, or hang-up or stagnation of material during processing may cause decomposition. Employees involved in removing decomposing material should be provided suitable air-supplied respirators and other appropriate protection.

Housekeeping: Remove any dust generated as a result of material handling from areas such as rafters, roofs, building columns and ductwork to eliminate any secondary potential dust explosion or fire hazards.

SECTION X - Hazard Codes

NFPA 704 (1980)

(National Fire Protection Association)

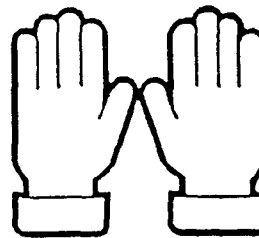
Health: 2
Flammability: 1
Reactivity: 0
Special:

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

HMIS

(Hazardous Materials Identification System -
National Paint and Coatings Association)

Health: 0
Flammability: 1
Reactivity: 0
Personal Protection: B



User's Responsibility

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this bulletin should be provided to the user's employees or customers. We must rely upon the user to utilize this information to develop appropriate work practice guidelines and employee instructional programs for his or her operation.

Disclaimer of Liability

As the conditions or methods of use are beyond the control of B.F. Goodrich, B.F. Goodrich does not assume any responsibility and expressly disclaims 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 warranty, expressed or implied, regarding the accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

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PRODUCT LABELING INFORMATION

Product: Geon® 86416 TRANSPARENT PELLETS 0027

The B.F. Goodrich Company
Geon Vinyl Division
6100 Oak Tree Blvd.
Cleveland, Ohio 44131

Telephone No.: 1-(800) 438-4366
Transportation Emergency No.:
CHEMTREC: 1-(800) 424-9300
Medical Emergency No.:
POISON CENTER: (216) 379-8562

The B.F. Goodrich Company
195 Columbia Street West
Waterloo, Ontario N2J 4N9

Telephone No.: (519) 888-4318
Transportation Emergency No.:
CANUTEC: (613) 996-6666

READ MATERIAL SAFETY DATA SHEET (MSDS) BEFORE USE

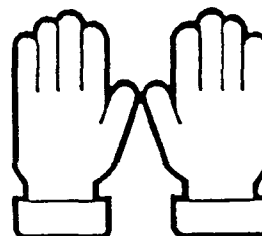
NFPA



CAUTION! Processing fumes may cause irritation of the eyes and respiratory tract. Use with adequate ventilation. Avoid breathing process emissions.

HMIS

Health	0
Flammability	1
Reactivity	0
Personal Protection	B



First Aid:

Inhalation of process emissions: Remove affected individual to fresh air. Contact a physician

Eye contact: Flush eyes with water for at least 15 minutes while lifting upper and lower eyelids. Seek medical attention if irritation persists.

Contains:

Bis(2-ethylhexyl) Phthalate
(CAS No. 117-81-7) 15-20%
Bis(2-ethylhexyl) Adipate
(CAS No. 103-23-1) 5-10%
Vinyl Chloride Monomer
(CAS No. 75-01-4) <8.5 ppm

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Ingredients List Required by the New Jersey Right-To-Know:

Polyvinyl Chloride CAS No. 9002-86-2

Ethyl Acrylate Methyl Methacrylate Polymer CAS No. 9010-88-2

Epoxidized Soybean Oil CAS No. 8013-07-8

Bis(2-ethylhexyl) Phthalate CAS No. 117-81-7

Bis(2-ethylhexyl) Adipate CAS No. 103-23-1

LABEL INFORMATION FOR CANADIAN WHMIS

Product: GEON® VINYL COMPOUND Product No.: 86416 00D 0027 CAUTION! Processing fumes may cause irritation of the eyes and respiratory tract. Under certain conditions and without proper ventilation and/or personal protection, exposure to carcinogens could occur. PRECAUTIONS: Use with adequate ventilation and avoid breathing process emissions. FIRST AID MEASURES: INHALATION OF PROCESS EMISSIONS: Remove affected individual to fresh air. Contact a physician. EYE CONTACT: Contact medical personnel for removal of foreign bodies. See MATERIAL SAFETY DATA SHEET The BFGoodrich Company Geon Vinyl Division, 6100 Oak Tree Blvd., Cleveland, OH 44131 Telephone: 1-(800) 438-4366 CHEMTREC: 1-(800) 424-9300 Poison Center: (216) 379-8562	 Produit: COMPOSÉ VINYLIQUE GEON^{md} N° du produit: 86416 00D 0027 ATTENTION! Les fumées dégagées lors de la mise en oeuvre peuvent provoquer une irritation des yeux et des voies respiratoires. Dans certaines conditions et sans ventilation appropriée et/ou protection personnelle une exposition à des éléments cancérigènes est possible. PRÉCAUTIONS: À utiliser avec une ventilation appropriée et éviter d'inhaler les vapeurs émises par la mise en oeuvre. PREMIERS SOINS: INHALATION DES ÉMISSIONS LORS DE LA MISE EN OEUVRE: Emmener la victime à l'air frais. Appeler un médecin. CONTACT OCULAIRE: Appeler un personnel médical pour extraire les corps étrangers. Voir la FICHE SIGNALÉTIQUE The BFGoodrich Company Division Vinyle Geon, 6100 Oak Tree Blvd., Cleveland, OH 44131 Téléphone: 1-(800) 438-4366 CHEMTREC: 1-(800) 424-9300 Centre anti-poison: (216) 379-8562
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Shipping Information

IDENTIFICATION - DOMESTIC TRANSPORTATION

Proper Shipping Name (172.101(c)): N.A.

(Technical Names(s)) (172.203(k)): N.A.

Hazard Class (172.101(d)): N.A.

UN/NA# (172.101(e)): N.A.

Haz. Substance (171.8): N.A.

Reportable Quantity: N.A.

Inhalation Hazard (172.2a(b)): N.A.

PACKAGING (Part 173)

• Packaging Sections (172.101(g)) - Col. 5(a): N.A.

Col.5(b): N.A.

• General Packaging Sections - General 173.24

Hazard Class: N.A.

DANGEROUS GOODS DETERMINATION (2.1) - INTERNATIONAL TRANSPORT

Proper Shipping Name (Col. B): N.A.

Class/Division (Col. C): N.A.

Subsidiary Risk (Co. D): N.A.

UN/ID# (Col. A): N.A.

U.S. Haz. Substance (US 1): N.A. Other/Inhalation Haz. (US 34): N.A.

Variations (1.8): States (Governments): N.A.

Carrier (Table 1.8B): N.A.

PACKAGING

• Max. Qty. Per PKg.(Cols. H/J) - Passenger: N.A.

Cargo: N.A.

• Packaging Instructions (Cols. G/I) - Passenger: N.A.

Cargo: N.A.

MARKING

A. Proper Shipping Name (172.301(a))

(Technical Name(s))(172.301(c))

B. UN/NA Number (172.301(a))

C. Name and Address (172.306(a))

D. THIS END UP 9(172.312(a))

E. Haz. Substance RQ (Name)(172.324)

- ORM Designation (172.316(a))

- Inhalation Hazard (172.301(a))

DOMESTIC LABELING

1. HMT LABELS (172.400)

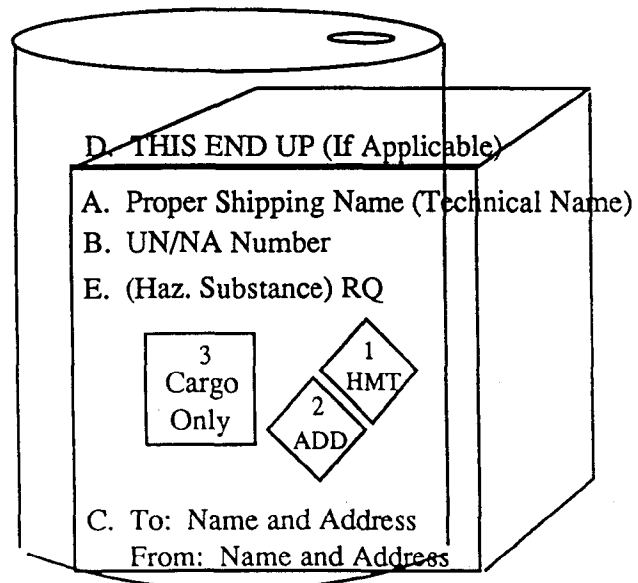
2. Additional Hazard (172.402(a))

INTERNATIONAL LABELING

1. Primary Hazard

2. Subsidiary Risk (If Appropriate)

3. Cargo Aircraft (If Appropriate)



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