

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):

ROFERON-A VIALS 18,000,000 IU/3 ML
ROFERON-A VIALS 36,000,000 IU/1 ML
ROFERON-A PRE-FILLED SYRINGES 3,000,000 IU/0.5 ML
ROFERON-A PRE-FILLED SYRINGES 3,000,000 IU/0.5 ML
ROFERON-A PRE-FILLED SYRINGES 6,000,000 IU/0.5 ML
ROFERON-A PRE-FILLED SYRINGES 9,000,000 IU/0.5 ML

CHEMICAL NAME:

For Active Ingredient: Interferon α -2a, Recombinant

PRODUCT CODES:

27078254; 27078257; 0399248; 0399175; 0399183

PRODUCT USE:

Treatment of Hairy Cell Leukemia, Malignant Melanoma, AIDS-Related Kaposi's Sarcoma, Laryngeal Papillomatosis (Growths in The Respiratory Tract) in Children, Genital Warts, and Some Kinds of Hepatitis

HOW SUPPLIED:

3 mL of 18,000,000 IU Solution in a Vial
 1 mL of 36,000,000 IU Solution in a Vial
 0.5 mL of 3,000,000 IU Solution in a Single-Use Syringe
 0.5 mL of 6,000,000 IU Solution in a Single-Use Syringe
 0.5 mL of 9,000,000 IU Solution in a Single-Use Syringe

SUPPLIER/DISTRIBUTOR'S NAME:

Hoffmann-La Roche Inc.

ADDRESS:

340 Kingsland Street
 Nutley, NJ 07110-1199

EMERGENCY PHONE:

1-800-827-6243

INFORMATION NUMBER:

1-800-526-0189

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	%w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH mg/m ³	OTHER mg/m ³
			TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³		
Sodium Chloride	7647-14-5	< 1	NE	NE	NE	NE	NE	NE
Benzyl Alcohol	100-51-6	≈ 1	NE	NE	NE	NE	NE	NE
Interferon α -2A	76543-88-9	1-10	NE	NE	NE	NE	NE	Roche Group Internal Occupational Exposure Limit = 0.00002
Water and other components. Each of the other components are present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance	None of the other components in this mixture contribute significantly to the hazards associated with this component. All hazard information pertinent to these products has been provided in these products Safety Data Sheet, per the requirements of the U.S. Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent standards, and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).					

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. These products has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: These products are clear, colorless, odorless liquids. The chief health hazard in an occupational setting in event of exposure is the potential for mild irritation of contaminated skin or eyes. These products present no significant contact, fire or reactivity hazards. In the event of a fire, these products will not contribute significant additional hazards. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

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3. HAZARD IDENTIFICATION (Continued)

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:
 The extent of entry into the body by most routes has not been fully investigated. Occupational exposures to these products may cause acute effects in humans, as described in the following paragraphs.

INHALATION: Inhalation of vapors, mists, or sprays of these products may slightly irritate the nose, throat, and lungs. Symptoms are generally alleviated upon breathing fresh air.

CONTACT WITH SKIN or EYES: Contact with the skin may cause mild irritation, which is alleviated upon rinsing. The Benzyl alcohol component of these products is a weak skin sensitizer; subsequent exposure to small amounts may cause allergic reaction in susceptible individuals. Contact of these products with the eyes may cause mild to moderate irritation, redness, and tearing.

SKIN ABSORPTION: The Benzyl Alcohol component of these products is readily absorbed through intact skin. Symptoms can include anesthetic or irritant effect. In addition, this material may carry other components into the skin and cause symptoms related to those other components. See "Other Potential Health Effects" for more information.

INGESTION: Ingestion is not anticipated to be a significant route of exposure for these products. If these products are swallowed, they may cause gastrointestinal distress and diarrhea. Ingestion of large volumes of these products may cause effects as described in "Other Potential Health Effects".

INJECTION: In terms of anticipated occupational overexposure effects, local redness and pain are the primary symptoms of accidental injection. Symptoms of such overexposure may also include the toxic effects described in "Other Potential Health Effects".



OTHER POTENTIAL HEALTH EFFECTS: Roferon is a pharmacological product used in the treatment of hairy cell leukemia, malignant melanoma, AIDS-related Kaposi's sarcoma, laryngeal papillomatosis (growths in the respiratory tract) in children, genital warts, and some kinds of hepatitis. The most common dose-dependent adverse effects associated with therapeutic treatments include confusion; mental depression; nervousness; numbness or tingling of fingers, toes, and face; trouble sleeping; trouble thinking or concentrating; aching muscles; change in taste or metallic taste; fever and chills; general feeling of discomfort or illness; headache; loss of appetite; nausea; vomiting; skin rash; and unusual tiredness. Less common adverse effects include black, tarry stools; blood in urine or stools; chest pain; cough or hoarseness accompanied by fever or chills; irregular heartbeat; lower back or side pain accompanied by fever or chills; muscle pain; numbness or tingling in the legs; pain, swelling or redness in the joints; painful or difficult urination accompanied by fever or chills; pinpoint red spots on skin; trouble speaking; unusual bleeding or bruising; back pain; blurred vision; diarrhea; dizziness; dryness of mouth; dry skin or itching; increased sweating; joint pain; leg cramps; sores in mouth and on lips; and weight loss.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**.

ACUTE: The primary health effects that may be experienced by medical personnel exposed to these products are mild irritation of contaminated skin and eyes or pain, redness, and local swelling after accidental injection. In the event of exposures via injection to therapeutic doses of these products, effects described in "Other Potential Health Effects" may result.

CHRONIC: The Benzyl alcohol component of these products is a weak skin sensitizer; subsequent exposure to small amounts may cause allergic reaction in susceptible individuals. Chronic injection of these products may cause effects as described in "Other Potential Health Effects". Refer to Section 11 (Toxicological Information) for additional information on these products.

TARGET ORGANS: Skin, eyes (anticipated occupational exposures). Central nervous system, peripheral nervous system, gastrointestinal system (therapeutic doses).

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD		(BLUE)	2
FLAMMABILITY HAZARD		(RED)	0
PHYSICAL HAZARD		(YELLOW)	0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Use and Handling Applications			

See Section 16 for Definition of Ratings

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PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to physician or health professional with victim.

SKIN EXPOSURE: Basic hygiene should prevent any problems. If these products contaminate the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The minimum recommended flushing time is 15 minutes. Victims must seek immediate medical attention, especially if an adverse reaction occurs.

EYE EXPOSURE: If liquid or vapors of these products enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. The contaminated individual must seek immediate medical attention after flushing if any adverse effect occurs.

INHALATION: If vapors, mists, or sprays of these products are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect continues after removal to fresh air.

INGESTION: If these products are swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directed by medical personnel. If conscious, have victim rinse mouth with water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

INJECTION: In the event of accidental injection, wash contaminated area with soap and water. Depending on the nature of the exposure, the Medical Surveillance requirements of the OSHA Bloodborne Pathogen standard (29 CFR 1910.1030) may be applicable. Victims must seek immediate medical attention, especially if an adverse reaction occurs.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing central nervous system conditions and other disorders involving the Target Organs of these products (see Section 3, Hazard Information) may be aggravated by exposures to these products (especially in doses approaching therapeutic levels for these products).

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure. Consult the Package Insert for additional information which can assist with treatment of overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: In the event of a fire, use suppression methods for surrounding materials.

Water Spray: YES

Carbon Dioxide: YES

Dry Chemical: YES

Halon: YES

Foam: YES

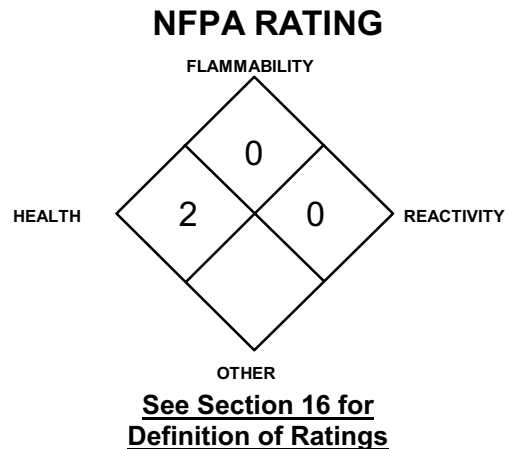
Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS: The Benzyl Alcohol component of this product is a weak sensitizer and so these products present a contact hazard to firefighters. When involved in a fire, these products may decompose and produce irritating fumes and toxic gases (including carbon oxides, nitrogen oxides, and hydrogen chloride).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Move containers from fire area if it can be done without risk to personnel. Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Firefighters whose protective equipment becomes contaminated should thoroughly shower with warm, soapy water and should receive medical evaluation if any adverse effect occur. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.



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6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Lightweight gloves, a lab coat, and eye protection should be worn. Absorb spilled liquid with paper towels or damp sponge. Wash contaminated area with soap and water, absorb with paper towels, and rinse with water. Trained personnel using pre-planned procedures should respond to large releases that are not immediately controlled. Proper protective equipment should be used. In case of a non-incident spill, clear the affected area and protect people. Minimum Personal Protective Equipment should be **Level D: lab-gloves, chemical resistant apron, boots, and splash goggles. Respiratory protection should not be necessary.** Absorb spilled liquid with polypads or other suitable absorbent materials. Decontaminate the area thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces (see Section 13, Disposal Considerations).

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting these products ON YOU or IN YOU. Wash hands thoroughly after handling these products or equipment and containers that contain these products. Avoid splashing or spraying these products. Do not eat or drink while preparing or administering these products. Follow SPECIFIC USE INSTRUCTIONS supplied with products. Particular care in working with these products must be practiced in pharmacies and other preparation areas and during manufacture of these products. Precautions should be taken during the following activities:

- Withdrawal of needles from drug vials;
- Drug transfers using syringes and needles or filter straws;
- Opening ampoules; and,
- Expulsion of air from drug-filled syringes.

DO NOT CLIP OR CRUSH NEEDLE WITH WHICH THESE PRODUCTS WAS IN CONTACT. Use of these products should meet the following provisions.

- Work should be performed in an appropriate, designated area;
- Contaminated waste must be properly handled; and,
- If necessary, work areas must be regularly decontaminated.

STORAGE AND HANDLING PRACTICES: All employees who handle these products should be trained to handle them safely. Contaminated waste must be properly handled. Work areas must be regularly decontaminated. Ensure containers of these products are properly labeled. Open containers slowly on a stable surface. Store vials as directed in these products insert. Keep vials tightly closed when not in use. Store away from incompatible materials. Store containers at room temperature, 2–8°C (35–47°F). Protect from light. Do not use discolored solutions. Inspect vials containing these products for leaks or damage. Read instructions provided with these products prior to use.

PRODUCT PREPARATION INSTRUCTIONS FOR MEDICAL PERSONNEL: Handle these products following standard medical practices and following the recommendations presented on the Package Insert.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: When cleaning non-disposable equipment, follow practices indicated in Section 6 (Accidental Release Measures). Collect all rinsates and dispose of according to applicable Federal, State, or local procedures. All needles, syringes, vials, and other disposable items contaminated with these products should be disposed of properly.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Follow standard medical product handling procedures. Technicians should be aware of the risks associated with this drug via training and should use the same equipment recommended in Section 6 (Accidental Release Measures). Ensure eyewash/safety shower stations are available near areas where these products are used.

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8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION: Respiratory protection is not generally needed when using this product. When manufacturing or handling product in large quantities and sprays or mist may be generated, maintain airborne contaminant concentrations below limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: None needed under normal circumstances of drug administration. For operations in which mists or sprays of these products will be generated, wear splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or Canadian Standards.

HAND PROTECTION: Use latex or similar type of glove when handling this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task, such as a lab coat. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not established.

SPECIFIC GRAVITY (water = 1): Not established.

SOLUBILITY IN WATER: Completely soluble.

VAPOR PRESSURE, mm Hg @ 20°C: Not established.

ODOR THRESHOLD: Not available.

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

APPEARANCE AND COLOR: Clear, colorless liquids.

HOW TO DETECT THIS SUBSTANCE: There are no unusual warning properties associated with these products.

EVAPORATION RATE (nBuAc = 1): Similar to water.

FREEZING/MELTING POINT: Not established.

BOILING POINT: Not established.

pH: Not available.

10. STABILITY and REACTIVITY

STABILITY: These products are stable, when refrigerated (NOT frozen) and protected from light.

DECOMPOSITION PRODUCTS: Thermal decomposition of these products may produce carbon oxides, nitrogen oxides, and hydrogen chloride.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, strong acids, some metals, substances that are incompatible with water.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Freezing, extreme heat, any conditions that are incompatible with water, mixing these products with incompatible chemicals.

PART IV *Is there any other useful information about these products?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following data are available for Granisetron Hydrochloride (the active ingredient in these products).

BENZYL ALCOHOL:

Standard Draize Test (skin, rabbit) = 16 mg/48 hours; mild

Standard Draize Test (skin, rabbit) = 100 mg/24 hours; moderate

Open Irritation Test (skin, rabbit) = 10 mg/24 hours; mild

Standard Draize Test (skin, pig) = 100%; moderate

Open Irritation Test (eye, rabbit) = 750 µg; severe

DNA Repair (*Bacillus subtilis*) = 21 mg/disc

DNA Damage (liver, rat) = 10 mmol/L

Mutation in Microorganisms (lymphocyte, mouse) = 250 mg/L

BENZYL ALCOHOL (continued):

Cytogenetic Analysis (ovary, hamster) = 4 µg/L

TDLo (oral, rat) = 2100 mg/kg/21 days/intermittent; weight loss or decreased weight gain, death

TDLo (oral, rat) = 13 g/kg/13 weeks/intermittent; Brain and Coverings: other degenerative changes; death

TDLo (oral, rat) = 24 mL/kg/12 days/intermittent; Liver: other changes;

Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

BENZYL ALCOHOL (continued):

TDLo (oral, mouse) = 12 g/kg/16 days/intermittent; death

TDLo (oral, mouse) = 6 g/kg/female 6–13 days after conception; Reproductive: Effects on Newborn: growth statistics

LD₅₀ (oral, rat) = 1230 mg/kg; Behavioral: somnolence, excitement, coma

LCLo (inhalation, rat) = 1000 ppm/8 hours

LD₅₀ (intraperitoneal, rat) = 400 mg/kg

LDLo (subcutaneous, rat) = 1700 mg/kg;

Sense Organs and Special Senses (Eye): miosis (pupillary constriction); Behavioral: coma; Kidney, Ureter, Bladder: other changes

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11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

BENZYL ALCOHOL (continued):

LD₅₀ (intravenous, rat) = 53 mg/kg
LD₅₀ (intraarterial, rat) = 441 mg/kg
LD₅₀ (oral, mouse) = 1360 mg/kg
LD₅₀ (intraperitoneal, mouse) = 650 mg/kg
LD₅₀ (intravenous, mouse) = 324 mg/kg
LDLo (intravenous, dog) = 50 mg/kg
LDLo (parenteral, dog) = 9 mg/kg
LDLo (skin, cat) = 10 g/kg
LDLo (intravenous, cat) = 625 mg/kg

BENZYL ALCOHOL (continued):

LD₅₀ (oral, rabbit) = 1040 mg/kg
LD₅₀ (skin, rabbit) = 2 g/kg
LD₅₀ (oral, guinea pig) = 2500 mg/kg
LD₅₀ (oral, wild bird species) = 100 mg/kg

INTERFERON α -2A:

TDLo (intramuscular, man) = 10157 kU/kg/24
weeks/intermittent; Behavioral: muscle
weakness; Lungs, Thorax, or Respiration:
fibrosis, focal (pneumoconiosis);
Musculoskeletal: joints

INTERFERON α -2A (continued):

LD₅₀ (oral, rat) > 100,000 kU/kg
LD₅₀ (intravenous, rat) > 100,000 kU/kg
LD₅₀ (intramuscular, rat) > 100,000 kU/kg
LD₅₀ (oral, mouse) > 100,000 kU/kg
LD₅₀ (intravenous, mouse) > 100,000 kU/kg
LD₅₀ (intramuscular, mouse) > 100,000
kU/kg

SUSPECTED CANCER AGENT: The components of these products are not found on the following lists: NTP, IARC, FEDERAL OSHA Z-List, and CAL-OSHA and therefore are neither considered to be nor suspected to be cancer causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with the skin or eyes may cause mild irritation, which is alleviated upon rinsing.

SENSITIZATION TO THESE PRODUCTS: The Benzyl alcohol component of these products is a weak skin sensitizer; subsequent exposure to small amounts may cause allergic reaction in susceptible individuals.

REPRODUCTIVE TOXICITY INFORMATION: Roferon-A is rated as Pregnancy Category C (RISK CANNOT BE RULED OUT, Human evidence is lacking, but animal evidence is positive). Listed below is information concerning the effects of Roferon-A on animal or human reproductive systems.

Mutagenicity: Ames tests using six different tester strains, with and without metabolic activation, were performed with Roferon-A up to a concentration of 1920 μ g/plate. There was no evidence of mutagenicity. Human lymphocyte cultures were treated in vitro with Roferon-A at non-cytotoxic concentrations. No increase in the incidence of chromosomal damage was noted. There are no published studies on the mutagenic potential of Roferon-A. However, a number of studies on the genotoxicity of human leukocyte interferon have been reported. A chromosomal defect following the addition of human leukocyte interferon to lymphocyte cultures from a patient suffering from a lympho-proliferative disorder has been reported. In contrast, other studies have failed to detect chromosomal abnormalities following treatment of lymphocyte cultures from healthy volunteers with human leukocyte interferon. It has also been shown that human leukocyte interferon protects primary chick embryo fibroblasts from chromosomal aberrations produced by gamma rays.

Embryotoxicity: Dose-related abortifacient activity was observed in pregnant rhesus monkeys treated with 1, 5 or 25 MIU/kg/day of Roferon-A in their early to mid-fetal period (days 22 to 70 of gestation). A late fetal period study (days 79 to 100 of gestation) is in progress and as yet there have been no reports of any increased rate of abortion.

Teratogenicity: Roferon-A has been shown to demonstrate a statistically significant increase in abortifacient activity in rhesus monkeys when given at approximately 20 to 500 times the human dose. A study in pregnant rhesus monkeys treated with 1, 5 or 25 MIU/kg/day of Roferon-A in their early to mid-fetal period (days 22 to 70 of gestation) has failed to demonstrate teratogenic activity for Roferon-A. There are no adequate and well-controlled studies in pregnant women.

Reproductive Toxicity: Roferon-A has been studied for its effect on fertility in *Macaca mulatta* (rhesus monkeys). Non-pregnant rhesus females treated with Roferon-A at doses of 5 and 25 MIU/kg/day have shown menstrual cycle irregularities, including prolonged or shortened menstrual periods and erratic bleeding; these cycles were considered to be an-ovulatory on the basis that reduced progesterone levels were noted and that expected increases in pre-ovulatory estrogen and luteinizing hormones were not observed. These monkeys returned to a normal menstrual rhythm following discontinuation of treatment.

A *mutagen* is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An *embryotoxin* is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A *teratogen* is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance that interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently, there are no Biological Exposure Indices (BEIs) determined for the components of these products.

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12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of these products will degrade in the environment into organic and inorganic constituents, especially upon exposure to light. Additional environmental data for components of this product are available as follows:

BENZYL ALCOHOL:

Water solubility = 40 g/L at 25°C; Log Kow = 1.10; Bioconcentration in fish and aquatic organisms will not occur to any significant extent.

Biological Oxygen Demand = 155% in 5 days.

Biodegradation: Benzyl alcohol underwent 70% biological oxygen demand in 5 days under aerobic conditions using an acclimated mixed microbial culture. At an initial concentration of 250 ppm, benzyl alcohol underwent 29% theoretical oxidation after 12 hours in a sewage sludge acclimated to this compound, and 31% oxidation in a sludge acclimated to mandelic acid. At an initial concentration of 500 ppm, it underwent 52%, 42%, and 43% theoretical oxidation in 12 hours using a settled sewage sludge acclimated to phenol, benzoic acid, and catechol, respectively, under aerobic conditions. It is listed as a synthetic, organic chemical easily biodegradable by biological sewage treatment. Benzyl alcohol at an initial concentration of 500 mg/L was shown to undergo rapid oxygen uptake under aerobic conditions when inoculated with municipal sewage sludge. It underwent 48% biological oxygen demand in 5 days using a sewage sludge seed. Benzyl alcohol underwent 60.8% degradation using an industrial sludge inoculum under aerobic conditions in 5 days

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Due to the small product size and dilute concentration of the components, no unusual effects on plants or animals are expected if these products are released into the environment.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No information is currently available on the effect of the components of these products on aquatic plants or animals in the environment. Due to the small product size and dilute concentration of the components, these products are not anticipated to cause adverse effects on aquatic life. Additional aquatic toxicity data for components of this product are available as follows:

BENZYL ALCOHOL:

LC₀ (*Scenedesmus quadricauda*) 96 hours = 640 ppm
LC₀ (*Lepomis macrochirus* bluegill sunfish) 24 hours = >5 mg/L
LC₀ (*Leuciscus idus*) 48 hours = 630 mg/L
LC₀ (*Salmo trutta*) 24 hours = >5 mg/L
LC₀ (*Carassius auratus*) 24 hours = > 5 mg/L
LC₀ (*Daphnia*) 48 hours = 369 ppm
LC₅₀ (*Pimephales promelas* fathead minnows) 24 hours = 770 mg/L
LC₅₀ (*Pimephales promelas* fathead minnows) 48 hours = 770 mg/L
(static bioassay in Lake Superior water at 18-22°C)
LC₅₀ (*Pimephales promelas* fathead minnows) 72 hours = 480 mg/L
(static bioassay in Lake Superior water at 18-22°C)
LC₅₀ (*Pimephales promelas* fathead minnows) 96 hours = 460 mg/L
(static bioassay in Lake Superior water at 18-22°C)
LC₅₀ (*Lepomis macrochirus* bluegill sunfish) 96 hours = 10 ppm/L
(static bioassay in fresh water at 23°C, mild aeration after 24 hours)
LC₅₀ (*Medina beryllina* tidewater silverside fish) 96 hours = 15 ppm
(static bioassay in synthetic seawater at 23°C, mild aeration after 24 hours)
LC_{50,S} (*Lepomis macrochirus* bluegill sunfish) 96 hours = 10 mg/L
LC_{50,S} (*Medina beryllina* tidewater silverside fish) 96 hours = 15 mg/L

BENZYL ALCOHOL (continued):

LC₅₀ (*Daphnia*) 24 hours = 55; 400 mg/L
LC₅₀ (*Petromyzon marinus* larvae) 24 hours = >5 mg/L
LC₁₀₀ (*Daphnia*) 24 hours = 100 mg/L
EC₀ (*Daphnia*) 24 hours = 26; 300 mg/L
EC₀ (*Anabaena inaequalis*) 3 hours = 30 mg/L
EC₀ (*E. coli*) 48 hours = 1,000 mg/L
EC₁₀ (*Pseudomonas putida*) 16 hours = 658 mg/L
EC₅₀ (*Photobacterium phosphoreum*) 30 minutes = 71 mg/L
EC₅₀ (*Photobacterium phosphoreum*) 5 minutes = 50 mg/L
EC₅₀ (*Scenedesmus quadricauda*) 3 hours = 79 mg/L
EC₅₀ (*Haematococcus pluvialis*) 4 hours = 2,600 mg/L
EC₅₀ (*Anabaena cylindrica*) 3 hours = 90 mg/L
EC₅₀ (*Anabaena variabilis*) 3 hours = 35 mg/L
EC₅₀ (*Chlorella pyrenoidosa*) 3 hours = 95 mg/L
(*Lepomis macrochirus* bluegill sunfish) static bioassay in fresh water at 23°C, mild aeration applied after 24 hours: 100% survival after 5 ppm/96 hours, 20% survival after 18 ppm/96 hours, 20% survival after 32 ppm/48hours
(*Menidia beryllina* tidewater silverside fish) : static bioassay in synthetic seawater at 23°C: mild aeration applied after 24 hours, 80% survival after 10 ppm/96 hours, 20% survival after 32 ppm/96 hours

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations and those of Canada and its Provinces. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. All gowns, gloves, and disposable materials used in the preparation or handling of this drug should be disposed of in accordance with established hazardous waste disposal procedures. Reusable equipment should be cleaned with soap and water. Incineration is recommended.

U.S. EPA WASTE NUMBER: Not applicable.

ROFERON-A VIALS 18,000,000 IU/3 ML ROFERON-A VIALS 36,000,000 IU/1 ML ROFERON-A PRE-FILLED SYRINGES 3,000,000 IU/0.5 ML ROFERON-A PRE-FILLED SYRINGES 6,000,000 IU/0.5 ML ROFERON-A PRE-FILLED SYRINGES 9,000,000 IU/0.5 ML	File No. 27078254, 27078257, 0399248, 0399175, 0399183	Page 8 of 11
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14. TRANSPORTATION INFORMATION

THESE PRODUCTS ARE NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION

PROPER SHIPPING NAME: Not Regulated
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable
DOT LABEL(S) REQUIRED: Not Applicable
EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): Not Applicable
MARINE POLLUTANT: Not applicable (49 CFR 172.101, Appendix B).
TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: These products are not considered as dangerous goods, per regulations of Transport Canada.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of these products are not subject to Sections 302, 304, and 313 reporting requirements under the Superfund Amendment and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of these products. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: These products are regulated by the Food and Drug Administration; it is exempt from the requirements of TSCA.

OTHER U.S. FEDERAL REGULATIONS: Based on the use of these products, the requirements of the OSHA Bloodborne Pathogen Standard (29 CFR 1910.1030) are applicable.

U.S. STATE REGULATORY INFORMATION: Components of these products that are listed in Section 2 (Composition and Information on Ingredients) are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No.	Michigan - Critical Materials Register: No.	Pennsylvania - Hazardous Substance List: Benzyl Alcohol.
California - Permissible Exposure Limits for Chemical Contaminants: No.	Minnesota - List of Hazardous Substances: No.	Rhode Island - Hazardous Substance List: No.
Florida - Substance List: Benzyl Alcohol.	Missouri - Employer Information/Toxic Substance List: No.	Texas - Hazardous Substance List: No.
Illinois - Toxic Substance List: No.	New Jersey - Right to Know Hazardous Substance List: No.	West Virginia - Hazardous Substance List: No.
Kansas - Section 302/313 List: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.	Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No components of these products are on the California Proposition 65 lists.

ANSI LABELING (Z129.1; Provided to Summarize Occupational Hazard Information): **CAUTION! MAY BE HARMFUL IF ACCIDENTALLY INJECTED. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE SKIN AND EYE IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED OR INHALED.** Do not taste or swallow. Do not get on skin, in eyes, or on clothes. Avoid breathing dusts or particulates. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves and goggles. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention if necessary. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Sweep up spill and place in suitable container. Consult Material Safety Data Sheet for additional information.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: These products are regulated by the Therapeutic Products Programme (TPP) of Health Canada and so it is excepted from requirements of the DSL/NDSL Inventory.

OTHER CANADIAN REGULATIONS: Requirements under the Therapeutic Products Programme (TPP) of Health Canada.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: The components of these products are not on the CEPA Priority Substances Lists.

ROFERON-A VIALS 18,000,000 IU/3 ML
ROFERON-A VIALS 36,000,000 IU/1 ML
ROFERON-A PRE-FILLED SYRINGES 3,000,000 IU/0.5 ML
ROFERON-A PRE-FILLED SYRINGES 6,000,000 IU/0.5 ML
ROFERON-A PRE-FILLED SYRINGES 9,000,000 IU/0.5 ML

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15. REGULATORY INFORMATION (Continued)

ADDITIONAL CANADIAN REGULATIONS (continued):

CANADIAN CLASSIFICATION AND WHMIS SYMBOLS: **D2B:** Materials Causing Other Toxic Effects/Toxic Material (sensitization).



16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
(619) 670-0609

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each component.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

IDLH-Immediately Dangerous to Life and Health: This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELs: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD:

0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L.; **1 (Slight Hazard):** Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L.; **2 (Moderate Hazard):** Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L.; **3 (Serious Hazard):** Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L.; **4 (Severe Hazard):** Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L.).

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD:

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1** (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; **2** (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); **3** (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

PHYSICAL HAZARD:

0 (*Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. *Unstable Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No "0" rating allowed. *Unstable Reactives*: Substances that will not polymerize, decompose, condense or self-react.); **1** (*Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives*: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III; *Solids*: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

1 (continued): *Liquids*: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); readily form peroxides upon exposure to air or oxygen at room temperature); **2** (*Water Reactivity*: Materials that may react violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II *Solids*: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. *Liquids*: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); **3** (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group I *Solids*: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. *Liquids*: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity*: Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides*: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives*: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases*: No Rating. *Pyrophorics*: Add to the definition of Flammability "4". *Oxidizers*: No "4" rating. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

ROFERON-A VIALS 18,000,000 IU/3 ML ROFERON-A VIALS 36,000,000 IU/1 ML ROFERON-A PRE-FILLED SYRINGES 3,000,000 IU/0.5 ML ROFERON-A PRE-FILLED SYRINGES 6,000,000 IU/0.5 ML ROFERON-A PRE-FILLED SYRINGES 9,000,000 IU/0.5 ML	File No. 27078254, 27078257, 0399248, 0399175, 0399183	Page 11 of 11
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DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury).

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily.

INSTABILITY HAZARD: **0** Materials that in themselves are normally stable, even under fire conditions. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REGULATORY INFORMATION:

U.S. and CANADA:

ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively.

Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.