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Material Safety Data Sheet for Recombinant Proteins

Section 1. Identification

All EnCor recombinant proteins were expressed and purified from *E. coli*. These preparations are at 50-100g/mL protein concentration dissolved in 6M urea

Manufacturer:

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Section 2: Composition/Information on Ingredients

1. CHEMICAL NAMES/ Carbamide resin; Isourea; Carbonyl diamide; DESCRIPTION: Carbonyldiamine
2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	%	Comp	CAS #	EINECS #	TLV (units)
Urea	100	57-13-6	200-315-5	10mg/m ³	8 hr TWA
3. 3. HAZARDS IDENTIFICATION APPEARANCE AND ODOR: White crystals or white powder. EMERGENCY OVERVIEW - IMMEDIATE HAZARD CAUSES IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. UREA IS HARMFUL IF SWALLOWED OR INHALED. EMERGENCY OVERVIEW - CHRONIC HAZARD WARNING LONG-TERM EXPOSURE TO HIGH AIRBORNE CONCENTRATIONS CAN LEAD TO PROTEIN METABOLISM. DISTURBANCES, MODERATE EMPHYSEMA, AND CHRONIC WEIGHT LOSS. POTENTIAL HEALTH EFFECTS INHALATION: Causes irritation to the respiratory tract. INGESTION: Causes irritation to the gastrointestinal tract. SKIN: Causes irritation to the skin. EYES: Causes irritation to the eyes. SIGNS AND SYMPTOMS OF OVEREXPOSURE INHALATION: Symptoms may include coughing, shortness of breath. May be absorbed into the bloodstream with symptoms similar to ingestion. INGESTION: Symptoms may include nausea, vomiting, and diarrhea. May also cause headache, confusion and electrolyte depletion. SKIN: Symptoms include redness, itching, and pain. EYES: Redness, itching and pain. CARCINOGENICITY: Not listed as a carcinogen by NTP or IARC. MUTAGENICITY: No information found. REPRODUCTIVE TOXICITY: No information found. TERATOGENIC EFFECTS: No information found. ROUTES OF ENTRY: Ingestion and inhalation. TARGET ORGAN STATEMENT: Supersensitive individuals with skin or eye problems, kidney impairment or asthmatic condition should have physician's approval before exposure to urea dust.
4. FIRST AID MEASURES INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. INGESTION: Induce

vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician. SKIN: Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse. EYES: Immediately flush eyes with plenty of water for at least fifteen minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. FIRE FIGHTING MEASURES FLASH POINT: N.A FLAMMABLE LIMITS: N.A FLASH POINT METHOD: N.A AUTOIGNITION TEMPERATURE: N.A EXTINGUISHING MEDIA: Use media appropriate to the primary cause of fire. PROTECTIVE EQUIPMENT: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. HAZARDOUS COMBUSTION PRODUCTS: Urea decomposes upon heating and can form products including ammonia, oxides or nitrogen, cyanuric acid, cyanic acid, biuret, carbon dioxide. UNUSUAL FIRE AND EXPLOSION HAZARDS: Not considered an explosion hazard. NFPA CODES: Health: 1 Flammability: 0 Reactivity: 0
6. ACCIDENTAL RELEASE MEASURES STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Ventilate area. Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. WASTE DISPOSAL METHOD: Disposal must be made in accordance with applicable federal, state, and local regulations PERSONAL PRECAUTIONS: Wear appropriate protective equipment as specified in section 8.
7. HANDLING AND STORAGE HANDLING: Avoid contact and inhalation. Do not get in eyes, on skin, on clothing. Wash thoroughly after handling. STORAGE: Keep in a tightly closed container, stored in a cooled, dry, ventilated area. Protect from physical damage. Isolate from incompatible materials (section 10). STORAGE TEMPERATURE: Room Temperature DISPOSAL: Observe all national, state, and local regulations regarding disposal.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION AIRBORNE EXPOSURE LIMITS: Component: Urea ACGIH Threshold Limit Value (TLV): 10 mg/m³, 8-hour TWA OSHA Permissible Exposure Limit (PEL): not available ENGINEERING CONTROLS: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborn Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source. RESPIRATORY PROTECTION: For conditions of use where exposure to the dust or mist is apparent, a full-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air supplied respirator. EYE PROTECTION: Safety glasses SKIN PROTECTION: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. OTHER CONTROL MEASURES: N.A.
9. PHYSICAL PROPERTIES Boiling Point Decomposes Evaporation Rate No data found. Melting Point 132-135C (270-275F) Solubility in Water Very soluble. Vapor Pressure No data found. PH 7.2 (10% in water) mm Hg Vapor Density No data found. Specific Gravity 1.32 @ 20C Air = 1 (H₂O = 1) % Volatile by Volume 0
10. STABILITY AND REACTIVITY STABILITY: This product is stable. CONDITIONS TO AVOID: Incompatibles. HAZARDOUS DECOMPOSITION PRODUCTS: Urea decomposes upon heating and can form products including ammonia, oxides or nitrogen, cyanuric acid, cyanic acid, biuret, carbon dioxide. HAZARDOUS POLYMERIZATION: Will not occur. INCOMPATIBLES: Urea reacts with calcium hypochlorite or sodium hypochlorite to form the explosive nitrogen trichloride. It is incompatible with sodium nitrite, gallium perchlorate, strong oxidizing agents (permanganate, dichromate, nitrate, chlorine), phosphorus penta 11. TOXICOLOGICAL INFORMATION PRODUCT LD50 VALUES: Urea Oral Rat LD50 (mg/kg): 8471 Urea Dermal Rabbit LD50 (mg/kg): N.A. COMPONENT CANCER LIST STATUS: NTP Carcinogen Component Known Anticipated IARC Category

Urea No No None 12. ECOLOGICAL INFORMATION When urea is released to soil, this material will hydrolyze into ammonium in a matter of days to several weeks. When released into the soil, this material may leach into groundwater. When released into water, this material may biodegrade to a moderate extent. When released into water, this material is not expected to evaporate significantly. This material has an experimentally determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. 13. DISPOSAL CONSIDERATIONS Observe all national, state, and local regulations regarding disposal. 14. TRANSPORT INFORMATION D.O.T. Proper Shipping Name: Not regulated. Hazard Class: N.A. UN Number: N.A. Packing Group: N.A. I.A.T.A.: Item is not prohibited or restricted as per IATA. Proper Shipping Name: Not regulated. Hazard Class: N.A. UN Number: N.A. Packing Group: N.A. I.M.O. Proper Shipping Name: Not regulated. Hazard Class: N.A. UN Number: N.A. Packing Group: N.A. 15. REGULATORY INFORMATION UNITED STATES Hazardous Label(s): N.A. Safety phases: S 24/25 Avoid contact with skin and eyes Risk phases: R 36/37/38/60 16. OTHER INFORMATION NFPA CODES: Health: 1 Flammability: 0 Reactivity: 0