PRODUCT: DOWFROST 100%

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER: T. DONOVAN & SON (1997) LTD.
700 WILSON STREET
SAINT JOHN, NEW BRUNSWICK
CANADA E2M 3V2
TOLL FREE: 1-888-799-2645 / LOCAL (506) 642-1500

PRODUCT NAME: Dowfrost 100%.

CHEMICAL FAMILY: Glycol

MOLECULAR WEIGHT: 76.9 g/mol.

MATERIAL USE: Intended as a heat transfer fluid for closed-loop systems. This product is acceptable for use where there is possibility of incidental food contact and as a product for use in the immersion or spray freezing of wrapped meat and packaged poultry products.

EMERGENCY PHONE NUMBER: (613)-996-6666

SECTION 02: HAZARDS IDENTIFICATION

SIGNAL WORD: None.

HAZARD CLASSIFICATION: While this material is not considered hazardous by Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR (Code of Federal Regulations) 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of this product.

HAZARD STATEMENT: None.

PRECAUTIONARY STATEMENT: None.

OTHER HAZARDS: None.

SECTION 03: COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

INGREDIENT(S)	CAS #	WT. %
Propylene Glycol	57-55-6	100.0
Dipotassium Hydrogen Phosphate	7758-11-4	< 3.0
Water	7732-18-5	<2.0

Definitions:
CAS - Chemical Abstract Service registry number.
WT. % - Percent Weight.

SECTION 04: FIRST AID MEASURES

GENERAL ADVICE: If potential for exposure exists refer to Section 8 for specific personal protective equipment.

IF INHALED: Move person to fresh air; if effects occur, consult a physician.

IN CASE OF SKIN CONTACT: Wash off with plenty of water.

IN CASE OF EYE CONTACT: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

IF SWALLOWED: No emergency medical treatment necessary.

THE MOST IMPORTANT SYMPTOMS AND EFFECTS, WHETHER ACUTE OR DELAYED: Aside from the information found in this Section (04: First Aid Measures), any additional important symptoms and effects are described in Section 11: Toxicology Information.

NOTES TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

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SECTION 05: FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA:	Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC (Alcohol Type Concentrate) type) are preferred. General purpose synthetic foams (including Aqueous Film Forming Foam (AFFF)) or protein foams may function, but will be less effective.
UNSUITABLE EXTINGUISHING MEDIA:	Do not use direct water stream. May spread fire.
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL - HAZARDOUS COMBUSTION PRODUCTS:	During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide and carbon dioxide.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.
ADVICE FOR FIREFIGHTERS - FIRE FIGHTING PROCEDURES:	Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.
SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS:	Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 06: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:	Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.
ENVIRONMENTAL PRECAUTIONS:	Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEAN UP:	Small spills: Absorb with materials such as: Cat litter, Sawdust, Vermiculite, Zorb-all®. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Recover spilled material if possible. See Section 13, Disposal Considerations, for additional information.

SECTION 07: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING:	No special precautions required. Keep container closed. See Section 8: Exposure Controls and Personal Protection. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
CONDITIONS FOR SAFE STORAGE:	Do not store in: Galvanized steel. Opened or unlabeled containers. Store in original unopened container. See Section 10: Stability and Reactivity, for more specific information. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.

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SECTION 08: EXPOSURE CONTROLS/PERSONAL PROTECTION

INGREDIENT(S)	REGULATION	TYPE OF LISTING	VALUE / RATING
Propylene Glycol	US WEEL	TWA	10 mg/m^3
	CA ON OEL	TWA / TWAEV Total / TWA Vapours and aerosols	155 mg/m^3 50 ppm
		TWA / TWAEV / TWA (Aerosols)	10 mg/m^3

Definitions:
CA ON OEL - Canada - Ontario Occupational Exposure Limits (OELs).
TWA - Time Weighted Average.
TWAEV - Time Weighted Average - Exposure Value.
US WEEL – United States of America Workplace Environmental Exposure Levels.

ENGINEERING CONTROLS: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

EYE/FACE PROTECTION: Use safety glasses (with side shields).

SKIN AND BODY PROTECTION: **Hand Protection**: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber, Natural rubber (latex), Neoprene, Nitrile/butadiene rubber (nitrile or NBR), Polyethylene, Ethyl vinyl alcohol laminate (EVAL), Polyvinyl alcohol (PVA), and Polyvinyl chloride (PVC or vinyl). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

OTHER/TYPE: Wear clean, body-covering clothing.

RESPIRATORY PROTECTION: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.

COLOUR: Colorless.

ODOUR: Characteristic.

ODOUR THRESHOLD: No test data available.

pH: 10.0 (50%).

MELTING POINT/FREEZING POINT: Supercools.

BOILING POINT: 152°C (306°F).

FLASH POINT, METHOD: **Closed Cup:** 104°C (219°F) *Pensky-Martens Closed Cup ASTM (American Society for Testing and Materials) D 93* (based on major component), Propylene glycol. **Open cup:** *Cleveland Open Cup ASTM D92* None.

EVAPORATION RATE (Butyl Acetate = 1): <0.5 Estimated.

FLAMMABILITY (SOLIDS AND GASES): Not applicable to liquids.

LOWER EXPLOSION LIMIT: 2.6% vol.

UPPER EXPLOSION LIMIT: 12.5% vol.

VAPOUR PRESSURE: 2.2 mmHg.

VAPOUR DENSITY (AIR=1): >1.0.

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SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY (WATER=1):	1.05 at 20°C (68°F) / 20°C.
SOLUBILITY IN WATER (% W/W):	100%.
PARTITION COEFFICIENT, n-OCTANOL/WATER:	No Data Available.
AUTO IGNITION TEMPERATURE:	371°C (700°F)
DECOMPOSITION TEMPERATURE:	No test data available.
VISCOSITY:	43.4 cSt at 20°C (68°F).
EXPLOSIVE PROPERTIES:	No Data Available.
OXIDIZING PROPERTIES:	No Data Available.

NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY:	No Data Available.
CHEMICAL STABILITY:	Stable under recommended storage conditions. See Section 7: Storage, Hygroscopic.
POSSIBILITY OF HAZARDOUS REACTIONS:	Polymerization will not occur.
CONDITIONS TO AVOID:	Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Avoid direct sunlight or ultraviolet sources.
INCOMPATIBLE MATERIALS:	Avoid contact with: Strong acids, strong bases, and strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS:	Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes, Alcohols, Ethers, and Organic acids.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

ACUTE ORAL TOXICITY:	Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. For the major component(s): Propylene glycol - LD50, Rat, >20,000 mg/kg.
ACUTE INHALATION TOXICITY:	At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat). For the major component(s): LC50, Rat, 4 Hour, vapour, 6.15 mg/L No deaths occurred following exposure to a saturated atmosphere.
ACUTE DERMAL TOXICITY:	Prolonged skin contact is unlikely to result in absorption of harmful amounts. For the major component(s): Propylene glycol - LD50, *Leporidae sp.* (Rabbit), >20,000 mg/kg.
SKIN CORROSION / IRRITATION:	Prolonged contact is essentially nonirritating to skin. Repeated contact may cause flaking and softening of skin.
SERIOUS EYE DAMAGE / EYE IRRITATION:	May cause slight temporary eye irritation. Corneal injury is unlikely.
SENSITIZATION:	For the major component(s): Did not cause allergic skin reactions when tested in humans. For respiratory sensitization: No relevant data found.
MUTAGENICITY:	In vitro genetic toxicity studies were negative. For the major component(s): Animal genetic toxicity studies were negative.
CARCINOGENICITY:	Similar formulations did not cause cancer in laboratory animals.
TERATOGENICITY:	For the major component(s): Did not cause birth defects or any other fetal effects in laboratory animals.
REPRODUCTIVE TOXICITY:	For the major component(s): In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

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SECTION 11: TOXICOLOGICAL INFORMATION

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (STOT) - SINGLE EXPOSURE (SE): Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - REPEAT EXPOSURE (RE): In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

ASPIRATION HAZARD: Based on physical properties, not likely to be an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

TOXICITY:

Propylene Glycol:

Acute Toxicity To Fish: Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested). LC50, *Oncorhynchus mykiss* (rainbow trout), static test, 96 Hour, 40,613 mg/L, Organization for Economic Co-operation and Development (OECD) Test Guideline 203.

Acute Toxicity To Aquatic Invertebrates: LC50, *Ceriodaphnia dubia* (water flea), static test, 48 Hour, 18,340 mg/L, OECD Test Guideline 202.

Acute Toxicity To Algae/Aquatic Plants: ErC50, *Pseudokirchneriella subcapitata* (green algae), 96 Hour, Growth rate inhibition, 19,000 mg/L, OECD Test Guideline 201.

Toxicity To Bacteria: NOEC, *Pseudomonas putida*, 18 Hour, > 20,000 mg/L

Chronic Toxicity To Aquatic Invertebrates: NOEC, water flea, semi-static test, 7 d, number of offspring, 13,020 mg/L.

Dipotassium Hydrogen Phosphate:

Acute Toxicity To Fish: Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested). LC50, *Leuciscus idus* (Golden orfe), static test, 48 Hour, > 900 mg/L, Method Not Specified.

PERSISTENCE AND DEGRADABILITY:

Propylene Glycol:

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation may occur under anaerobic conditions (in the absence of oxygen). 10-day Window: Pass.

Biodegradation: 81 %

Exposure time: 28 d

Method: OECD Test Guideline 301F or Equivalent. 10-day Window: Not applicable.

Biodegradation: 96 %.

Exposure time: 64 d.

Method: OECD Test Guideline 306 or Equivalent.

Theoretical Oxygen Demand: 1.68 mg/mg.

Chemical Oxygen Demand: 1.53 mg/mg.

Biological Oxygen Demand (BOD):

Incubation Time	BOD
5 d	69.000 %
10 d	70.000 %
20 d	86.000 %

Photo Degradation: Atmospheric half-life: 10 Hour.

Method: Estimated.

Dipotassium Hydrogen Phosphate:

Biodegradability: Biodegradation is not applicable.

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SECTION 12: ECOLOGICAL INFORMATION

BIOACCUMULATIVE POTENTIAL:

Propylene Glycol: **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water (log Pow): -1.07 Measured.
Bioconcentration factor (BCF): 0.09 Estimated.

Dipotassium Hydrogen Phosphate: **Bioaccumulation:** No bioconcentration is expected because of the relatively high water solubility.

MOBILITY IN SOIL:

Propylene Glycol: Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process. Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): < 1 Estimated.

Dipotassium Hydrogen Phosphate: No relevant data found.

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler, Reclaimer, Incinerator or other thermal destruction device.

SECTION 14: TRANSPORT INFORMATION

Transportation of Dangerous Goods (TDG):	Not regulated for transport.
United States (US) Department of Transportation (DOT):	Not regulated for transport.
International Maritime Dangerous Goods (IMDG):	Not regulated for transport.
Transport in bulk according to Annex I or II of MARPOL 73/78 and the International Bulk Chemical (IBC) Code or International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC) Code.	Consult International Maritime Organization (IMO) regulations before transporting ocean bulk.
International Air Transport Association (IATA)/ International Civil Aviation Organization (ICAO):	Not regulated for transport.
UNITED NATIONS (UN) NUMBER:	Not Applicable.
TRANSPORT HAZARD CLASS:	Not Applicable.
PACKING GROUP:	Not Applicable.
PROPER SHIPPING NAME:	Not Applicable.
SPECIAL SHIPPING INSTRUCTIONS:	Not Applicable.

Note: This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

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SECTION 15: REGULATORY INFORMATION

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION:	This is not a WHMIS controlled product.
Canadian Domestic Substances List (DSL):	This product contains at least one substance that does not appear on the Domestic Substances List.
HAZARDOUS PRODUCT REGULATIONS (HPR) COMPLIANCE:	Not Regulated. This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.
US FEDERAL REGULATIONS:	
***Superfund Amendments and Reauthorization Act* (SARA):**	**Sections 311 and 312**: This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA. **Section 313**: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
OSHA HazCom Standard Rating:	This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
***US Toxic Substances Control Act* (TSCA):**	All components of this product are in compliance with the inventory listing requirements of the US TSCA Chemical Substance Inventory.
US STATE OR LOCAL REGULATIONS:	***Pennsylvania Worker and Community Right-To-Know Act:*** Propylene Glycol (CAS# 57-55-6) is listed because of the additional requirements of Pennsylvania law. **California Proposition 65 (*Safe Drinking Water and Toxic Enforcement Act* of 1986):** This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

SECTION 16: OTHER INFORMATION

National Fire Protection Association (NFPA):

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

PREPARED BY:	T. Donovan & Son (1997) Ltd.
PREPARATION DATE:	April 2018

DISCLAIMER:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. Regulatory requirements are subject to change and may differ between various locations. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.