



IMPORTANT FOR FUTURE REFERENCE

Please complete this information and retain this manual for the life of the equipment:

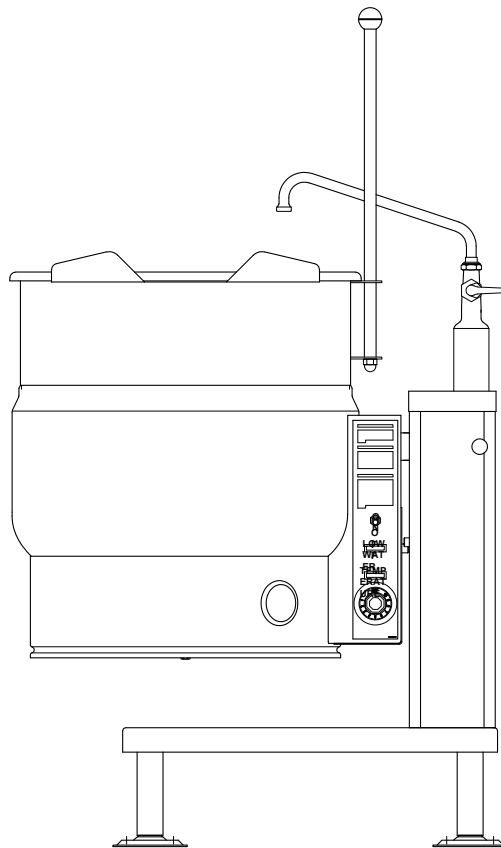
Model #: _____

Serial #: _____

Date Purchased: _____

INSTALLATION & OPERATION MANUAL


Self Generating Steam Jacketed Tilting Kettle EC-20T



⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

CROWN FOOD SERVICE EQUIPMENT

 A Middleby Company

70 Oakdale Road, Downsview (Toronto) Ontario, Canada, M3N 1V9

Telephone: 919-762-1000 www.crownsteamgroup.com

Printed in Canada

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

IMPORTANT NOTES FOR INSTALLATION AND OPERATION

It is recommended that this manual be read thoroughly and that all instructions be followed carefully. This manual should be retained for future reference.



WARNING: This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



WARNING: Improper installation, operation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing, operating or servicing this equipment.

Intended for commercial use only. Not for household use.

NOTICE: Contact the factory, the factory representative or local service company to perform maintenance and repairs.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

TABLE OF CONTENTS

DESCRIPTION	PAGE
IMPORTANT NOTES FOR INSTALLATION AND OPERATION	2
SERVICE CONNECTIONS	4
1.0 INSTALLATION INSTRUCTIONS	5
2.0 INTRODUCTION	6
3.0 OPERATION INSTRUCTIONS	7
4.0 CLEANING INSTRUCTIONS	10
5.0 ADDING WATER	13
6.0 VENTING INSTRUCTIONS	14
7.0 TILTING INSTRUCTIONS	14
MATERIAL SAFETY DATA SHEETS	15

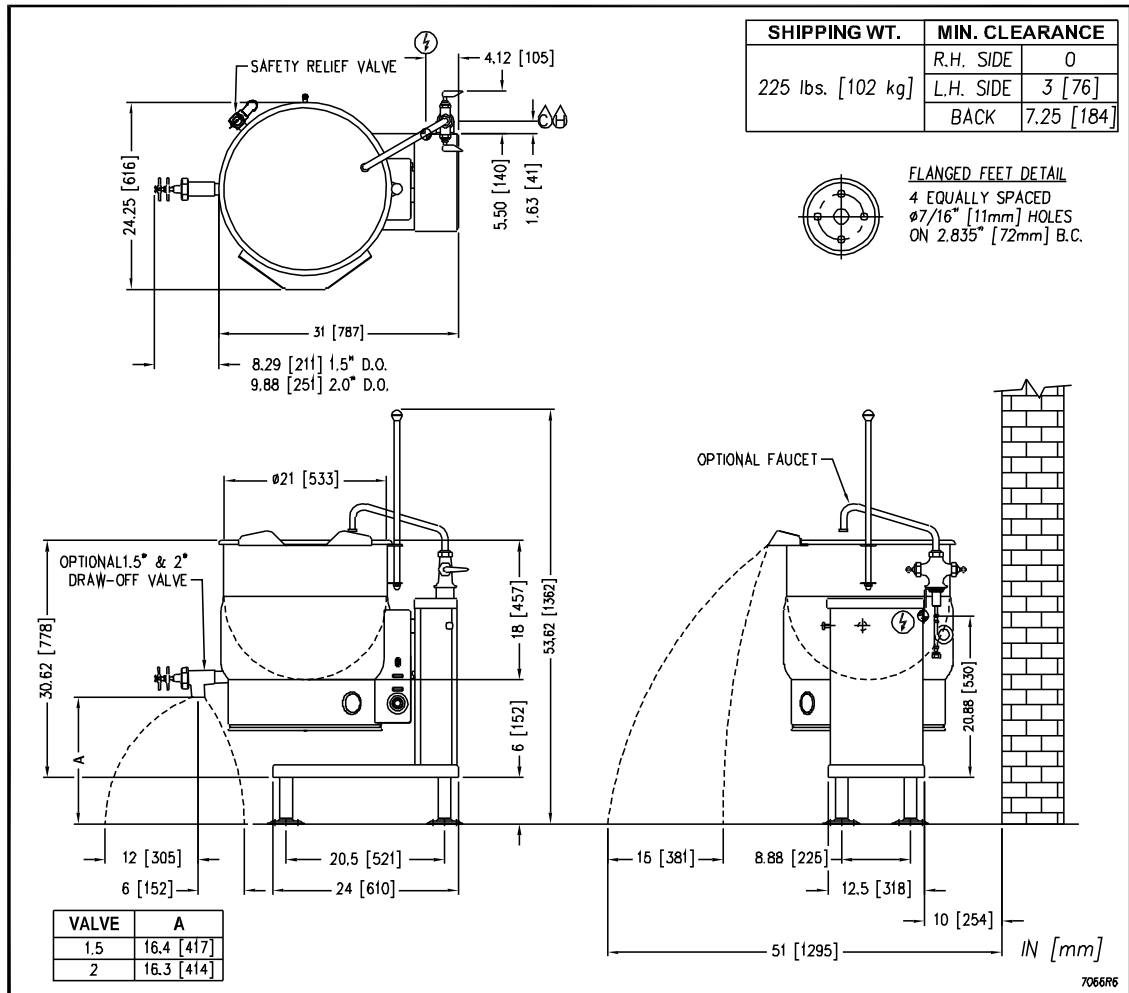
INSTALLATION AND OPERATION MANUAL, SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

SERVICE CONNECTIONS

- ⚡ - ELECTRICAL CONNECTION TO BE AS SPECIFIED ON DATA PLATE
- 💧 - COLD WATER: Compression fitting for 5/8 O.D. copper tubing or 1/2 NPSM male.
- 🔥 - HOT WATER: Compression fitting for 5/8 O.D. copper tubing or 1/2 NPSM male.

ELECTRICAL CHARACTERISTICS

MODEL	CAPACITY	kW	Phase	NOMINAL AMPS PER LINE						
				208V	220V	240V	380V	415V	480V	600V
EC-20T	20 gallons 76 litres	12	1	57,6	54.5	50,0	N/A	N/A	N/A	N/A
			3	33,4	31.5	28,9	18,3	16,7	14,5	11,5



As continued product improvement is a policy of Crown, specifications are subject to change without notice.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

1.0 INSTALLATION INSTRUCTIONS

1. Select a location to provide drainage directly below the pour path of the kettle. Position appliance to allow sufficient rear clearance from wall to tilt freely and completely without obstruction.
2. Mark hole locations through flanged adjustable feet. Remove kettle.
3. On hole locations marked, drill holes and insert expansion shields to accommodate 5/16" size lag bolts.
4. Reposition kettle. Level kettle by making necessary adjustments on flanged feet.
5. Bolt down kettle and seal with Silastic or other equivalent sealing compound. Sealant must be applied not only to bolt heads but also around flanges making contact with floor surface to fulfill NSF International requirements. Wipe off excess sealant immediately.
6. A control box with power supply equivalent to electrical rating of kettle should be located conveniently nearby.
7. A waterproof electrical connection from power supply to rear of control housing must be provided.
8. Ground kettle to terminal provided inside control housing.
9. Turn power ON and check for proper operation.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

2.0 INTRODUCTION

DESCRIPTION

Model EC-20T (20 gallon capacity) is an electrically powered, self-contained, tilting kettle. The appliance has a jacket of double-wall construction forming a sealed reservoir around the lower two-thirds of the kettle. The reservoir is charged with distilled water. Kettles are equipped with a “clean lock” to hold kettle in cooking position or 105 degrees for ease of cleaning, removable electric heating element and controls, and a low water cutoff device for protection of the heating elements.

BASIC FUNCTIONING

Self-contained kettles operate by generating steam in the kettle reservoir. The sequence of operation is as follows:

1. Operator turns the power switch to the ON position and sets the temperature control dial at the desired setting from 1 to 10 (90 degrees Fahrenheit to 285 degrees Fahrenheit, 32 degrees Celsius to 140 degrees Celsius, jacket temperature).
2. Control circuit is normally completed to the temperature control if the following conditions exist:
 - a) Water level in the kettle reservoir is adequate to prevent circuit interruption by the low water cut-off device. An activated cut-off is indicated by the amber low water light.
 - b) Kettle is in vertical position with circuit completed through the tilt interlock switch.
3. Thermostat control closes to energize contactor coils.
4. Power is supplied to the elements through closed power contactors.
5. As the temperature of water rises in the kettle reservoir, increase in steam pressure is indicated on the pressure gauge.
6. When the temperature of steam in the reservoir reaches the setting shown on the temperature control dial, the temperature control opens to shut off the heating elements. The temperature control will cycle On/Off as required to maintain set temperature.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

3.0 OPERATION INSTRUCTIONS

1. Ensure that the external electrical service to kettle is on.
2. Check pressure gauge for correct cold kettle reading. Reading should be in the green vacuum zone (25 - 30 In. Hg or 635 - 762 mm Hg of vacuum). If reading is not low enough, follow VENTING INSTRUCTIONS (Section 6.0) prior to using kettle.
3. Place power switch in ON position.
4. Preheat kettle by placing thermostat knob at Maximum Temperature. Wait until TEMPERATURE light goes off.

NOTE: Preheating should not be used when cooking milk and egg food products which adhere to hot cooking surfaces. These foods should be placed into a cold kettle.

5. Add food to be cooked into kettle.
6. Place thermostat knob at required temperature setting from 1-10 coinciding with the following table:

THERMOSTAT SETTING	APPROXIMATE (JACKET) TEMPERATURE	
1	90 Fahrenheit	30 Celsius
2	118 Fahrenheit	42 Celsius
3	138 Fahrenheit	54 Celsius
4	158 Fahrenheit	64 Celsius
5	178 Fahrenheit	76 Celsius
6	200 Fahrenheit	88 Celsius
7	220 Fahrenheit	100 Celsius
8	240 Fahrenheit	111 Celsius
9	260 Fahrenheit	122 Celsius
10	280 Fahrenheit	134 Celsius


INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

OPERATION INSTRUCTIONS (Continued)


7. When cooking is finished, place power switch in OFF position.
8. Pour finished product from kettle using tilt handle. Be careful to avoid splashing.
9. Add water to kettle for cleaning purposes.
10. Wash kettle thoroughly. See CLEANING INSTRUCTIONS.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

SAFETY VALVE MAINTENANCE AND TESTING

	<p>CAUTION! Under normal operating conditions a “try lever test” should be performed every two months. Under severe service conditions, or if corrosion and/or deposits are noticed within the valve body, testing must be performed more often. A “try lever test” should also be performed at the end of any non-service period.</p>
---	---

	<p>CAUTION! Hot, high pressure fluid may be discharged from body drain and vent during “try lever” test. Care must be taken to avoid any bodily contact.</p>
---	---

	<p>CAUTION! High sound levels may be experienced during “try lever” test. Wear proper safety equipment and exercise extreme care! Test at, or near, half of the operating pressure by holding the test lever fully open for at least two seconds to flush the valve seat free of sediment and debris. Then release lever and permit the valve to snap shut.</p> <p>If lift lever does not activate, or there is no evidence of discharge, turn off equipment immediately and contact a licensed contractor or qualified service personnel.</p>
---	---

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

4.0 CLEANING INSTRUCTIONS



WARNING: Disconnect the power supply to the appliance before cleaning or servicing.



WARNING: Never spray water into electric controls or components!



CAUTION: The equipment and its parts are hot. Use care when operating, cleaning and servicing.



CAUTION: Do not use cleaning agents that are corrosive.

Your kettle should be cleaned immediately after each use or when cooking a different product. Before cleaning, check that the kettle has cooled enough to touch it.

1. Rinse the inside of the kettle thoroughly and drain to remove any food particles.
2. Using a nylon brush, clean the kettle with a mild detergent and water. Never use steel wool or scouring powder as it will scratch stainless steel. Plain steel wool can leave small pieces of steel which can rust.
3. Rinse the inside of the kettle thoroughly with clean water. Tilt the kettle to allow the detergent and water solution to drain.
4. Wipe the exterior of the kettle with a clean, damp cloth.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

4.0 CLEANING INSTRUCTIONS (Continued)

DRAW-OFF VALVE CLEANING

NOTICE: Draw-off valve has a vulcanized rubber coated stem for better sealing. Do not over tighten. This may cause the rubber to pull away from stem and permanently damage it. This is not covered under warranty.

1. Turn the large hex nut on the draw-off valve counterclockwise until it is completely disengaged from the threads. Grasp the valve knob and slowly pull out the valve stem. Wash the valve stem, disk and handle. Insert a nylon brush, wet with detergent and water, into the valve body and tangent draw-off tube. Brush vigorously.
2. Replace the valve stem assembly and turn the hex nut until snug. Rinse the kettle with clean warm water.
3. Leave the draw-off valve open when the kettle is not in use.

WHAT TO DO IF SURFACE RUST APPEARS

Metal utensils should never be used as they will scratch the surface of the equipment and rust may begin to form. To remove surface accumulation of rust from the inadvertent use of such utensils, the following procedure may be used.



CAUTION: Improper use of this procedure may damage your appliance!

1. Use undiluted white vinegar with a non-abrasive scouring pad (plastic) or cloth on the affected area to remove the rust stain. The appliance should not be heated and remain at room temperature during the entire cleaning process.
2. If the stain resists removal, additional exposure time with vinegar may be required, to a maximum of one hour.
3. Thoroughly wash all of the vinegar away with fresh clear water. Dry the surface completely and allow one hour before using the appliance to cook.

Following daily and period maintenance procedures will prolong the life for your equipment. Climatic conditions - salt air - may require more thorough and frequent cleaning or the life of the equipment could be adversely affected.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

4.0 CLEANING INSTRUCTIONS (Continued)

STAINLESS STEEL

To remove normal dirt, grease or product residue from stainless steel, use ordinary soap and water (with or without detergent) applied with a sponge or cloth. Dry thoroughly with a clean cloth. Never use vinegar or any other corrosive cleaner.

To remove grease and food splatters or condensed vapours that have baked on the equipment, apply cleanser to a damp cloth or sponge and rub cleanser on the metal in the direction of the polishing lines. Rubbing cleanser as gently as possible in the direction of the polished lines will not mar the finish of the stainless steel. **NEVER RUB WITH A CIRCULAR MOTION.**

Soil and burn deposits which do not respond to the above procedure can usually be removed by rubbing the surface with **SCOTCH-BRITE™** scouring pads or **STAINLESS** scouring pads. **DO NOT USE ORDINARY STEEL WOOL** as any particles left on the surface will rust and further spoil the appearance of the finish. **NEVER USE A WIRE BRUSH, STEEL SCOURING PADS (EXCEPT STAINLESS), SCRAPER, FILE OR OTHER STEEL TOOLS.** Surfaces which are marred collect dirt more rapidly and become more difficult to clean. Marring also increases the possibility of corrosive attack. Refinishing may then be required.

TO REMOVE HEAT TINT: Darkened areas sometimes appear on stainless steel surfaces where the area has been subjected to excessive heat. These darkened areas are caused by thickening of the protective surface of the stainless steel and is not harmful. Heat tint can normally be removed by the foregoing, but tint which does not respond to this procedure calls for a vigorous scouring in the direction of the polish lines using **SCOTCH-BRITE™** scouring pads or a **STAINLESS** scouring pad in combination with a powdered cleanser. Heat tint action may be lessened by not applying or by reducing heat to equipment during slack periods.

All food contact surfaces must be thoroughly drained and flushed prior to cooking in the kettle.

CONTROL PANEL: The textured control panel should be cleaned with warm water and mild soap. Never use an abrasive cloth or steel wool. Never use cleaning solvents with a hydrocarbon base.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

5.0 ADDING WATER (Low water light comes on)

It may be necessary to replenish water in the jacket when the low water indicator comes on. Do so as follows:

1. Unit should be completely cold and off.
2. Lift handle of pressure relief valve to release vacuum in kettle. (Relief valve is at left rear of kettle).
3. Remove air vent nut at the rear of the unit.
4. Using pure distilled water only, pour 140 fluid oz. (4 L) into the opening or pour 376 fl. oz (11L) if completely empty. (A funnel will be helpful). Water will enter the kettle slowly, as air must escape through the same hole.
5. When sufficient water has been added, replace and tighten the nut. Be sure to seal threads with a pipe joint compound suitable for steam at 50 psi.
6. Vacuum must be re-established. (See Venting Instructions, Section 6.0).

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

6.0 VENTING INSTRUCTIONS

Check vacuum/pressure gauge when kettle is cold. Gauge should be in the green vacuum zone (25 - 30 In. Hg or 635 - 762 mm Hg of vacuum). If not, air is present which must be vented (removed) for proper heating. Use the following procedures to vent air:

1. With the kettle empty, place power switch in ON position.
2. Set temperature control thermostat to '10'. Heat kettle until heat indicator light goes off.
3. Using a 7/16" wrench, open bleed vent (rear of kettle) one full turn for 10 seconds and close.
4. Cool kettle. Check for proper vacuum in the green vacuum zone (25 - 30 In. Hg or 635 - 762 mm Hg of vacuum). If reading is not low enough, repeat steps 1 to 3.

7.0 TILTING INSTRUCTIONS

Your kettle has a standard "Clean Lock" feature and may not be tilted without disengaging the tilt knob located on the console at the top right. This feature locks the kettle in the upright position and also allows the operator to lock the kettle at 105 degrees for ease of cleaning. To tilt the kettle the full distance, the tilt lock knob must be disengaged from the cleaning position by pulling out the tilt lock knob and tilting the kettle forward the full distance. Follow these steps to tilt kettle:

1. Pull out the tilt knob at top right located on console.
2. Using kettle tilt handle pull kettle forward to desired angle of pour or until kettle locks at 105 degrees. The tilt knob can be released after the kettle has been tilted approximately 10°.
3. Kettle will lock in position at 105 degrees and may be tilted further by pulling the tilt lock knob a second time allowing the kettle to tilt the full distance.
4. To return the kettle to the upright position, pull out the tilt lock knob and tilt the kettle upward until it locks in the upright position. The kettle should not move in either direction once in the upright position.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

DOW MATERIAL SAFETY DATA SHEET

PREPARATION INFORMATION:

Prepared for use in Canada by: E H & S Product Regulatory Management Department
DOW CHEMICAL CANADA INC.
P. O. Box 1012
Sarnia, Ontario
Canada, N7T 7K7

(800) 331-6451

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

IN CASE OF EMERGENCY: Fort Saskatchewan, Alberta: (780) 998-8282
Sarnia, Ontario: (519) 339-3711
Varenes, Quebec: (450) 652-1000

THE DOW CHEMICAL COMPANY
Midland, Michigan
USA, 48674

Customer Information Center: (800) 258-2436

24-Hour Emergency Phone Number: (989) 636-4400

Product: **DOWFROST™ HD HEAT TRANSFER FLUID, DYED**

Product Code: 04632

Effective Date: 08/03/04

Date Printed: 08/04/04

MSD: 002239

2. COMPOSITION/INFORMATION ON INGREDIENTS

Propylene Glycol	CAS # 000057-55-6	94%
Dipotassium Phosphate	CAS # 007758-11-4	<5%
Deionized Water	CAS # 007732-18-5	<5%

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: **DOWFROST™ HD HEAT TRANSFER FLUID, DYED**

Product Code: 04632

Effective Date: 08/03/04, Date Printed: 08/04/04, MSD: 002239

3. **HAZARDS IDENTIFICATION**

EMERGENCY OVERVIEW

Clear yellow liquid. Odourless. Avoid temperatures above 450°F, 232°C.
--

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely. Mists may cause eye irritation.

SKIN CONTACT: Prolonged contact is essentially nonirritating to skin. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. Repeated exposures may cause flaking and softening of skin.

INGESTION: Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION: At room temperature, vapours are minimal due to physical properties. Mists may cause irritation of upper respiratory tract (nose and throat).

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Repeated excessive exposure to propylene glycol may cause central nervous system effects.

CANCER INFORMATION: Did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus.

REPRODUCTIVE EFFECTS: In animal studies, has been shown not to interfere with reproduction.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 08/03/04, Date Printed: 08/04/04, MSD: 002239

4. FIRST AID

- EYES:** Flush eyes with plenty of water.
- SKIN:** Wash off in flowing water or shower.
- INGESTION:** No adverse effects anticipated by this route of exposure incidental to proper industrial handling.
- INHALATION:** Remove to fresh air if effects occur. Consult a physician.
- NOTE TO PHYSICIAN:** No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 214°F, 107°C (based on a similar material)

METHOD USED: PMCC

AUTOIGNITION TEMPERATURE: NOT DETERMINED

FLAMMABILITY LIMITS

LFL: Not determined

UFL: Not determined

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to carbon monoxide and carbon dioxide.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 08/03/04, Date Printed: 08/04/04, MSD: 002239

5.0 FIRE FIGHTING MEASURES (Continued)

OTHER FLAMMABILITY INFORMATION: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Flammable concentrations of vapour can accumulate at temperatures above 214°F. Liquid mist of this product can burn. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. Container may rupture from gas generation in a fire situation.

EXTINGUISHING MEDIA: Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream. May spread fire.

MEDIA TO BE AVOIDED: Do not use direct water stream.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discolouration of the container. Move container from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 08/03/04, Date Printed: 08/04/04, MSD: 002239

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls/ Personal Protection.

PROTECT THE ENVIRONMENT: Avoid contamination of all waterways.

CLEAN-UP: See Section 13, Disposal Consideration.

7. HANDLING AND STORAGE

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: No special handling requirements data available.

HANDLING: See Section 8, Exposure Controls/Personal Protection.

STORAGE: See Section 10, Stability and Reactivity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use safety glasses. Safety glasses should be sufficient for most operations; however, for misty operations wear chemical goggles.

SKIN PROTECTION: Use gloves impervious to this material.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. In misty atmospheres, use an approved mist respirator.

EXPOSURE GUIDELINES: Propylene glycol: AIHA WEEL is 10 mg/m³ for total vapour and aerosol.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: **DOWFROST™ HD HEAT TRANSFER FLUID, DYED**

Product Code: 04632

Effective Date: 08/03/04, Date Printed: 08/04/04, MSD: 002239

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE:	Clear yellow liquid.
ODOUR:	Odourless
VAPOUR PRESSURE:	0.22 mmHg @ 20°C
VAPOUR DENSITY:	2.6
BOILING POINT:	320°F, 160°C
SOLUBILITY IN WATER/MISCIBILITY:	Complete
SPECIFIC GRAVITY OR DENSITY:	1.058 @ 25/25°C

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Thermally stable at typical use temperatures.

CONDITIONS TO AVOID: Avoid use temperatures above 450°F, 232°C. Product can degrade at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with oxidizing materials. Avoid contact with strong acids

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

(See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1).

SKIN: The LD50 for skin absorption in rabbits is >10,000 mg/kg.

INGESTION: The oral LD50 for rats is 20,000 - 34,000 mg/kg.

MUTAGENICITY: In vitro mutagenicity studies were negative. Animal mutagenicity studies were negative.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 04/03/04, Date Printed: 08/04/04, MSD: 002239

12. ECOLOGICAL INFORMATION

(For detailed Ecological data, write or call the address or non-emergency number shown in Section 1.)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on data for major component(s). Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

DEGRADATION AND PERSISTENCE: Based largely or completely on data for major component(s). Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Degradation is expected in the atmospheric environment within minutes to hours.

ECOTOXICITY: Based largely or completely on data for major component(s). Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/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. THE DOW CHEMICAL COMPANY HAS 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 AS DESCRIBED IN MSDS SECTION 2. (Composition/Information On Ingredients).

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 04/03/04, Date Printed: 08/04/04, MSD: 002239

13. DISPOSAL CONSIDERATIONS (Continued)

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details. (In Canada call 800-331-6451).

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): For D.O.T. regulatory information, if required, consult transportation regulations, product shipping papers, or contact your Dow representative.

CANADIAN TDG INFORMATION: For TDG regulatory information, if required, consult transportation regulations, product shipping papers, or your Dow representative.

15. REGULATORY INFORMATION

(Not meant to be all-inclusive – selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 04/03/04, Date Printed: 08/04/04, MSD: 002239

15. REGULATORY INFORMATION (Continued)

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category.

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>LIST</u>
1, 2-Propanediol	000057-55-6	PA1

PA1= Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

INSTALLATION AND OPERATION MANUAL,
SELF-GENERATING STEAM JACKETED TILTING KETTLE, EC-20T

MATERIAL SAFETY DATA SHEET

Product: DOWFROST™ HD HEAT TRANSFER FLUID, DYED

Product Code: 04632

Effective Date: 04/03/04, Date Printed: 08/04/04, MSD: 002239

15. REGULATORY INFORMATION (Continued)

CANADIAN REGULATIONS

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

This product is not a "Controlled Product" under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

This product contains one or more substances which are not listed on the Canadian Domestic Substances List (DSL). Contact your Dow representative for more information.

16. OTHER INFORMATION

MSDS STATUS: Revised Section 8 (Exposure Guidelines).

The information herein is given in good faith, but no warranty, express or implied, is made. Consult The Dow Chemical Company for further information.