1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: TKO-FF
GENERAL USE: Vacuum Pump Fluid
ALTERNATE TRADE NAME(S) / PRODUCT CODE(S): TKOFFCA, TKOFFCP, TKOFFDD, TKOFFG1, TKOFFG5, TKOFFG55, TKOFFQ1

MANUFACTURER
Kurt J Lesker Company
United States
1925 Route 51
Jefferson Hills, PA 15025
E-Mail: msds@lesker.com

Service Number: 412-387-9200
Kurt J Lesker Company LTD
United Kingdom
15-16 Burgess Road
Hastings, East Sussex, TN35 4NR
England
Service Number: +44 (0) 1424 458100

24 HR. EMERGENCY TELEPHONE NUMBERS
24-Hour Emergency Response provided by
3E Global Incident Response Hotline

When calling, refer to Kurt J Lesker Company
Global Response Access Code: 333594

North America [USA, Canada, Mexico]: 1-866-519-4752
Mainland China: (+86) 4001 2001 74
Europe: {int'l call prefix}-1-760-476-3961
Asia Pacific: {int'l call prefix}-1-760-476-3960
Middle East & Africa: {int'l call prefix}-1-760-476-3959

2. HAZARDS IDENTIFICATION

HAZARD DESIGNATION
"N" - Dangerous for the environment
R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
"T" - Toxic
R45: May cause cancer.

GHS CLASSIFICATIONS

<table>
<thead>
<tr>
<th>Health</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogenicity, Category 1B</td>
<td>Chronic Hazards to the Aquatic Environment, Category 3</td>
</tr>
</tbody>
</table>

GHS LABEL

Health hazard

DANGER

H350: May cause cancer.
H412: Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENT(S)

Prevention:
P281: Use personal protective equipment as required.
P273: Avoid release to the environment.

Response:
P308+P313: IF exposed or concerned: Get medical advice/attention.

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear liquid

POTENTIAL HEALTH EFFECTS

EYES: Contact may cause eye irritation.
SKIN: May cause skin irritation.
SKIN ABSORPTION: May be harmful in contact with skin.
INGESTION: May be harmful if swallowed.
INHALATION: May be harmful if inhaled.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
SKIN: General observations of persons occupationally exposed to lubricants or mineral oils or products based on these oils indicate that higher viscosity oils can block skin pores causing an acne-like disorder. In addition, the oils or certain additives or impurities in the oils, as well as mechanical irritation from contaminants in oil based products, may cause dry cracked irritated skin (dermatitis).

The International Petroleum Industry Environmental Conservation Association (IPIECA) advises that there is sufficient read-across data to assess the skin irritancy hazard of most petroleum substances (hydrocarbons in general) may cause defatting of the skin, leading to skin dryness and cracking. It is advised to include appropriate warnings on the SDS.

ACUTE TOXICITY: Poses little or no immediate hazard.
CHRONIC EFFECTS: Not Available
CARCINOGENICITY: Not listed as a human carcinogen
MUTAGENICITY: Not Available

REPRODUCTIVE TOXICITY
REPRODUCTIVE EFFECTS: Not Available
TERATOGENIC EFFECTS: Not Available

ROUTES OF ENTRY: Inhalation, ingestion, eye contact, or skin contact.
SENSITIZATION: None expected.

PHYSICAL HAZARDS: This substance is not considered hazardous in the form supplied.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Wt.%</th>
<th>CAS</th>
<th>EINECS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral Oil</td>
<td>0 - 100</td>
<td>8042-47-5</td>
<td>232-455-8</td>
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<tr>
<td>Gasoil - Unspecified - Distillates (petroleum), Hydrotreated Middle</td>
<td>0 - 100</td>
<td>64742-46-7</td>
<td>265-148-2</td>
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<tr>
<td>Distillates, Petroleum, Hydrotreated Light</td>
<td>0 - 100</td>
<td>64742-47-8</td>
<td>265-149-8</td>
</tr>
<tr>
<td>Mineral Oil</td>
<td>0 - 100</td>
<td>64742-53-6</td>
<td>265-156-6</td>
</tr>
<tr>
<td>Distillates, Petroleum, Hydrotreated Heavy Paraffinic</td>
<td>0 - 100</td>
<td>64742-54-7</td>
<td>265-157-1</td>
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<tr>
<td>Petroleum Distillates</td>
<td>0 - 100</td>
<td>64742-55-8</td>
<td>265-158-7</td>
</tr>
<tr>
<td>Baseoil - Unspecified - Lubricating Oils (petroleum), C20-50, Hydrotreated Neutral Oil-based, High-v</td>
<td>0 - 100</td>
<td>72623-85-9</td>
<td>276-736-3</td>
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<tr>
<td>Baseoil - Unspecified - Lubricating Oils (petroleum), C15-30, Hydrotreated Neutral Oil-base</td>
<td>0 - 100</td>
<td>72623-86-0</td>
<td>276-737-9</td>
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<tr>
<td>Baseoil - Unspecified - Lubricating Oils (petroleum), C20-50, Hydrotreated Neutral Oil-based</td>
<td>0 - 100</td>
<td>72623-87-1</td>
<td>276-738-4</td>
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<tr>
<td>Hydrotreated Paraffinic Oil</td>
<td>0 - 100</td>
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<tr>
<td>Gas oils, petroleum, vacuum, hydrocracked, hydroisomerized, hydrogenated, C15-30</td>
<td>0 - 100</td>
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<tr>
<td>Gas oils, petroleum, vacuum, hydrocracked, hydroisomerized, hydrogenated, C20-40</td>
<td>0 - 100</td>
<td>178603-65-1</td>
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<td>Gas oils, petroleum, vacuum, hydrocracked, hydroisomerized, hydrogenated, C25-55</td>
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<td>178603-66-2</td>
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<td>Gas oils, petroleum, vacuum, hydrocracked, hydroisomerized, hydrogenated, C10-25</td>
<td>0 - 100</td>
<td>445411-73-4</td>
<td></td>
</tr>
</tbody>
</table>

### 4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.
SKIN: Wash with soap and water. Get medical attention if irritation develops or persists.
INGESTION: Rinse mouth. Get medical advice/attention.
INHALATION: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
5. FIRE FIGHTING MEASURES

FLASH POINT AND METHOD: > 220°C (Cleveland Open Cup ASTM D92)
AUTOIGNITION TEMPERATURE: Not Available
FLAMMABLE CLASS: Combustible.
EXTINGUISHING MEDIA: Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
FIRE FIGHTING PROCEDURES: As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective gear.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon oxides, Sulfur oxides, Nitrogen oxides.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section.
LARGE SPILL: Collect spilled material in appropriate container. Spill may be reportable . Consult section 15 for Reportable Quantities.
ENVIRONMENTAL PRECAUTIONS
WATER SPILL: This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water.
GENERAL PROCEDURES: Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Eliminate all ignition sources if safe to do so. Avoid formation of dust. Provide appropriate exhaust ventilation where dust is formed. Avoid breathing (dust, vapor, mist, gas). Practice good chemical hygiene during and after use. Avoid release to the environment.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: To avoid risks to human health and the environment, comply with the instructions for use.
HANDLING: Keep away from heat and flame. Keep container closed when not in use. Remove contaminated clothing and wash before reuse. Wash hands before eating and wash before reuse. Wash thoroughly after handling.
STORAGE: Keep container closed when not in use. Store in a cool dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
PERSONAL PROTECTIVE EQUIPMENT
EYES AND FACE: Wear safety glasses.
SKIN: Wear protective gloves.
RESPIRATORY: Not normally needed. If ventilation is inadequate and this material is handled at elevated temperatures or dusts/fumes/mists are generated a NIOSH/MSHA approved air purifying respirator with a manufacturers approved cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.
WORK HYGIENIC PRACTICES: Practice good chemical hygiene during and after use.
COMMENTS:

<table>
<thead>
<tr>
<th>Component</th>
<th>Location, Type</th>
<th>Value (mg/m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil mist</td>
<td>ACGIH TLV TWA</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ACGIH TLV STEL</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>OSHA OEL TWA</td>
<td>5</td>
</tr>
</tbody>
</table>

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Petroleum
COLOR: Clear
pH: Not Available
PERCENT VOLATILE: Not Available
VAPOR PRESSURE: < 1 Pa at 20°C
VAPOR DENSITY: > 1
BOILING POINT: Not Available
POUR POINT: -15°C
FLASH POINT AND METHOD: > 220°C (Cleveland Open Cup ASTM D92)
SOLUBILITY IN WATER: Insoluble
DENSITY: Not Available
SPECIFIC GRAVITY: Not Available
VISCOSITY #1: 7.6 cSt at 100°C
VISCOSITY #2: 55 cSt at 40°C

10. STABILITY AND REACTIVITY

STABLE: Yes
HAZARDOUS POLYMERIZATION: No
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon oxides, Sulfur oxides, Nitrogen oxides.
INCOMPATIBLE MATERIALS: Strong acids, Oxidizing materials, Halogens.

11. TOXICOLOGICAL INFORMATION

ACUTE
DERMAL LD₅₀: Not Available
SKIN ABSORPTION: Not Available
ORAL LD₅₀: Not Available
INHALATION LC₅₀: Not Available
CARCINOGENICITY
IARC: Not listed
NTP: Not listed
OSHA: Not listed
REPRODUCTIVE EFFECTS: Not Available
TERATOGENIC EFFECTS: Not Available
MUTAGENICITY: Not Available

12. ECOLOGICAL INFORMATION

BIOACCUMULATION/ACCUMULATION: Not Available
AQUATIC TOXICITY (ACUTE): Not Available
CHEMICAL FATE INFORMATION: Not Available

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of according to applicable federal, state, provincial, and local regulations.
PRODUCT DISPOSAL: Contact a licensed waste disposal company.
EMPTY CONTAINER: Follow all MSDS/label precautions even after container is emptied because it may retain product residues.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)
PROPER SHIPPING NAME: Not Regulated
ROAD AND RAIL (ADR/RID)
PROPER SHIPPING NAME: Not Regulated
ROAD AND RAIL (UK only) (CDG):
HAZARD CLASS: Not listed or controlled
AIR (ICAO/IATA)
SHIPPING NAME: Not Regulated
VESSEL (IMO/IMDG)
SHIPPING NAME: Not Regulated
CANADA TRANSPORT OF DANGEROUS GOODS
SHIPPING NAME: Not Regulated

15. REGULATORY INFORMATION
UNITED STATES
SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
311/312 HAZARD CATEGORIES: None

TSCA (TOXIC SUBSTANCE CONTROL ACT)

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<td>64742-54-7</td>
</tr>
</tbody>
</table>

TSCA STATUS: All components of this product are included in inventory, exempt, or notified

REGULATIONS
STATE REGULATIONS: Not listed
CALIFORNIA PROPOSITION 65: This product is not known to contain any components for which the State of California has found to cause cancer, birth defects or other reproductive harm.

CANADA
WHMIS HAZARD SYMBOL AND CLASSIFICATION

DOMESTIC SUBSTANCE LIST (INVENTORY): All components of this product are included in inventory, exempt, or notified

EUROPEAN COMMUNITY
EEC LABEL SYMBOL AND CLASSIFICATION

"N" - Dangerous for the environment
R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S61: Avoid release to the environment. Refer to special instructions/safety data sheets.

"T" - Toxic
R45: May cause cancer.
S53: Avoid exposure — obtain special instructions before use.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

INTERNATIONAL REGULATIONS
(WGK) CLASSIFICATION: Not listed

16. OTHER INFORMATION

APPROVED BY: EHS DEPT
PREPARED BY: E Bolton
INFORMATION CONTACT: msds@lesker.com
REVISION SUMMARY: This MSDS replaces the 7/26/2012 MSDS.

HMIS RATING

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
<th>PERSONAL PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 1</td>
<td>1</td>
<td>0</td>
<td>C</td>
</tr>
</tbody>
</table>

NFPA CODES

GENERAL STATEMENTS: The physical and toxicological properties of this material have not been thoroughly investigated.

MANUFACTURER DISCLAIMER:
Kurt J. Lesker Company ("KJLC") believes the information contained in this Material Safety Data Sheet is accurate as of the "Date of Last Revision" specified. The information relates only to typical properties of the product. Do not use the information for product performance or specification purposes. The information is for use by technically skilled persons at their own risk. KJLC MAKES NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND, INCLUDING WITHOUT LIMITATION WARRANTY OF FITNESS FOR A PARTICULAR
PURPOSE, WITH RESPECT TO THE PRODUCT OR THE INFORMATION. The information may not be valid for product use in combination with any other product or material or in any process. KJLC expressly disclaims any liability arising from any use of the product or any reliance on the information. Do not treat the information (a) as assurance that use of the product will not infringe patent or other rights or (b) as a license or grant of patent or other property rights. “KJLC” means KJLC and each of its subsidiaries.