1 Identification of the Substances/Preparation and of the Company/Undertaking

- **Product identifier**
- **Product name:** PX 3871
- **Relevant identified uses of the substance or mixture and uses advised against**
  Friction modifier. Not for consumer use.
- **Details of the supplier of the safety data sheet**
  **Manufacturer/Supplier:**
  Dorf Ketal Chemicals LLC
  11200 Westheimer Road
  Suite 400
  Houston, Texas 77042
  Phone: +1 713 343 2377
  Fax: +1 832 649 7615
  Email: ehss@dorketal.com
  **Emergency telephone number:**
  For Chemical Emergency ONLY (spill, leak, fire, exposure or accident) call Chemtrec at +1 (703) 527 3887 or Chemtrec India at 000-800-100-7141, DORF KETAL Emergency Control Room +91 22-65271001.

2 Hazard(s) Identification

- **Classification of the substance or mixture**
  - Skin Corr. 1B  H314 Causes severe skin burns and eye damage.
  - Skin Sens. 1  H317 May cause an allergic skin reaction.
  - Aquatic Acute 2  H401 Toxic to aquatic life.
  - Aquatic Chronic 4  H413 May cause long lasting harmful effects to aquatic life.
- **OSHA/HCS status**
  This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

- **Label elements**
  - **Hazard pictograms**
    - GHS05
    - GHS07
  - **Signal word** Danger

- **Hazard-determining components of labeling:**
  - Mixed Alkyl Borate Esters

- **Hazard statements**
  - Causes severe skin burns and eye damage.
  - May cause an allergic skin reaction.
  - Toxic to aquatic life.
  - May cause long lasting harmful effects to aquatic life.

- **Precautionary statements**
  - Do not breathe dust/fume/gas/mist/vapors/spray.
  - Wash thoroughly after handling.

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Product name: PX 3871

(Contd. of page 1)

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
- Classification system:
  - NFPA ratings (scale 0 - 4)
    Health = 3
    Fire = 1
    Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    HEALTH 3
    FIRE 1
    REACTIVITY 0

- Other hazards No information available.
- % of unknown toxicity: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substance
- Dangerous components:
  Mixed Alkyl Borate Esters
  Skin Corr. 1B, H314
  Skin Sens. 1, H317
  Aquatic Acute 2, H401; Aquatic Chronic 4, H413

Additonal information:
CAS No. and exact percentage are withheld as Proprietary Information; claimed in accordance with paragraph (i) of §1910.1200

4 First-aid measures

- Description of first aid measures
  General information:
  Take affected persons out into the fresh air.
  Do not leave affected persons unattended.
  Inhalation:
  Move exposed person to fresh air.
  If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.
  Loosen tight clothing such as a collar, tie, belt or waistband.
  Get medical attention immediately.

(Contd. on page 3)
5 Fire-fighting measures

- **Extinguishing media** In case of fire use the following suitable extinguishing agent.
- **Suitable extinguishing agents:**
  - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
  - Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- **Protective equipment:**
  - Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Wear protective clothing.
  - Keep away from ignition sources
  - Ensure adequate ventilation
  - Use respiratory protective device against the effects of fumes/dust/aerosol.
  - Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
  - Do not allow product to reach sewage system or any water course.
  - Inform respective authorities in case of seepage into water course or sewage system.
  - Do not allow to enter sewers/surface or ground water.
Methods and material for containment and cleaning up:
- Stop leak if without risk.
- Move containers from spill area.
- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

7 Handling and storage

- Handling:
  - Precautions for safe handling
    - Put on appropriate personal protective equipment.
    - Do not ingest.
    - Avoid contact with eyes, skin and clothing.
    - Avoid breathing vapour or mist.
    - Ensure good ventilation/exhaustion at the workplace.
  - Information about protection against explosions and fires:
    - Keep ignition sources away - Do not smoke.
- Conditions for safe storage, including any incompatibilities
- Requirements to be met by storerooms and receptacles: Store in a cool location.
- Further information about storage conditions: Store in cool, dry conditions in well sealed receptacles.
- Specific end use(s): No further relevant information available.

8 Exposure controls/personal protection

- Control parameters
- Components with limit values that require monitoring at the workplace: Not Established.
- Exposure controls
  - Appropriate engineering controls:
    - If there are no applicable exposure limit requirement or guidelines, general ventilation should be sufficient for most operations.
    - Local exhaust ventilation may be necessary for some operations.
  - Personal protective equipment:
    - General protective and hygienic measures:
      - Keep away from foodstuffs, beverages and feed.
      - Wash hands before breaks and at the end of work.
      - Do not inhale gases / fumes / aerosols.
      - Avoid contact with the eyes and skin.
  - Breathing equipment:
    - Where there is potential for airborne exposures, wear NIOSH approved respiratory protection.
- Protection of hands:
  - The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  - Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
  - Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

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- Material of gloves
  The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

- Penetration time of glove material
  The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- Eye protection: Goggles recommended during refilling.

- Body protection: Protective work clothing

### 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
</tr>
<tr>
<td>Appearance:</td>
</tr>
<tr>
<td>Form: Liquid</td>
</tr>
<tr>
<td>Color: Yellow</td>
</tr>
<tr>
<td>Odor: Slight</td>
</tr>
<tr>
<td>Odour threshold: No data available.</td>
</tr>
<tr>
<td>pH-value:</td>
</tr>
<tr>
<td>Melting point/Freezing Point: No data available.</td>
</tr>
<tr>
<td>Boiling point/Boiling range: 322 °C (612 °F)</td>
</tr>
<tr>
<td>Drip point</td>
</tr>
<tr>
<td>Pour point - 64 °C</td>
</tr>
<tr>
<td>Flash point: 132 °C (270 °F)</td>
</tr>
<tr>
<td>Flammability (solid, gaseous): Not applicable.</td>
</tr>
<tr>
<td>Decomposition temperature: No data available.</td>
</tr>
<tr>
<td>Auto ignition temperature: No data available.</td>
</tr>
<tr>
<td>Explosion limits:</td>
</tr>
<tr>
<td>Lower: No data available.</td>
</tr>
<tr>
<td>Upper: No data available.</td>
</tr>
<tr>
<td>Oxidizing properties:</td>
</tr>
<tr>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor pressure: No data available.</td>
</tr>
<tr>
<td>Relative density 0.93 g/cm³ (7.761 lbs/gal)</td>
</tr>
<tr>
<td>Vapour density: No data available.</td>
</tr>
<tr>
<td>Evaporation rate: No data available.</td>
</tr>
<tr>
<td>Solubility (water): Soluble.</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water): No data available</td>
</tr>
<tr>
<td>Viscosity:</td>
</tr>
<tr>
<td>Dynamic: No data available.</td>
</tr>
</tbody>
</table>

(Contd. on page 6)
10 Stability and reactivity

- **Reactivity**: Under normal conditions of storage and use, hazardous reactions will not occur.
- **Chemical stability**: The product is stable under storage at normal ambient temperature.
- **Possibility of hazardous reactions**: No dangerous reactions known.
- **Conditions to avoid**: Avoid all possible sources of ignition (spark or flame).
- **Incompatible materials**:
  - Reactive or incompatible with the following materials:
    - Strong oxidizing agents.
- **Hazardous decomposition products**:
  - Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity**:

<table>
<thead>
<tr>
<th>Mixed Alkyl Borate Esters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
</tr>
<tr>
<td>LD 50 &gt; 2000 mg/kg (Rat)</td>
</tr>
<tr>
<td>Dermal</td>
</tr>
<tr>
<td>LD 50 &gt; 2000 mg/kg (Rabbit)</td>
</tr>
<tr>
<td>Inhalative</td>
</tr>
<tr>
<td>LC 50 No end point data (Rat)</td>
</tr>
</tbody>
</table>

- **Primary irritant effect**:
  - **on the skin**: Strong caustic effect on skin and mucous membranes.
  - **on the eye**: Strong caustic effect.
- **Respiratory/Skin sensitization**: Sensitization possible through skin.
- **Germ cell mutagenicity**: No known significant effects or critical hazards.
- **Carcinogenicity**: No known significant effects or critical hazards.
- **Reproductive toxicity**: No known significant effects or critical hazards.

- **Carcinogenic categories**

  - **IARC (International Agency for Research on Cancer)**
    - Substance is not listed.
  - **NTP (National Toxicology Program)**
    - Substance is not listed.
  - **OSHA-Ca (Occupational Safety & Health Administration)**
    - Substance is not listed.

- **Single dose toxicity**: No known significant effects or critical hazards.
- **Repeated Dose toxicity**: No known significant effects or critical hazards.
- **Aspiration hazard**: No data available.

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Product name: PX 3871

Other relevant information: No data available

12 Ecological information

- Toxicity
  - Aquatic toxicity: Material is expected to be toxic to aquatic organisms. May cause long term adverse effects in the aquatic environment.
  - Persistence and degradability No further relevant information available.
  - Bioaccumulative potential No further relevant information available.
  - Mobility in soil No further relevant information available.
  - Results of PBT and vPvB assessment Not available
  - Other adverse effects No further relevant information available.

13 Disposal Information

- Waste treatment methods
  The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed off in a safe way. Dispose off surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.
  - Recommendation: Smaller quantities can be disposed of with household waste.

- Uncleaned packagings:
  - Recommendation: Disposal must be made according to official regulations.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA UN1760

- UN proper shipping name
  - DOT Corrosive liquids, n.o.s. (Mixed Alkyl Borate Esters)
  - ADR 1760 Corrosive liquids, n.o.s. (Mixed Alkyl Borate Esters)
  - IMDG, IATA CORROSIVE LIQUID, N.O.S. (Mixed Alkyl Borate Esters)
<table>
<thead>
<tr>
<th>Transport hazard class(es)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOT</strong></td>
<td></td>
</tr>
<tr>
<td>![DOT triangle]</td>
<td></td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td>8 Corrosive substances</td>
</tr>
<tr>
<td><strong>Label</strong></td>
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</tr>
<tr>
<td><strong>ADR</strong></td>
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<tr>
<td>![ADR triangle]</td>
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</tr>
<tr>
<td><strong>Class</strong></td>
<td>8 (C9) Corrosive substances</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>IMDG, IATA</strong></td>
<td></td>
</tr>
<tr>
<td>![IMDG, IATA triangle]</td>
<td></td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td>8 Corrosive substances</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
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</tr>
<tr>
<td><strong>DOT, ADR, IMDG, IATA</strong></td>
<td>II</td>
</tr>
<tr>
<td><strong>Environmental hazards:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Marine pollutant:</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Warning: Corrosive substances</td>
</tr>
<tr>
<td><strong>Danger code (Kemler):</strong></td>
<td>88</td>
</tr>
<tr>
<td><strong>EMS Number:</strong></td>
<td>F-A,S-B</td>
</tr>
<tr>
<td><strong>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Transport/Additional information:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>IMDG</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Limited quantities (LQ)</strong></td>
<td>1L</td>
</tr>
</tbody>
</table>

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EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
APF = Assigned protection factor
PBT: Persistent, Bioaccumulative and Toxic
vPoB: very Persistent and very Bioaccumulative
IOELV: Indicative Occupational Exposure Limit Values
Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Aquatic Acute 2: Hazardous to the aquatic environment - Acute Hazard, Category 2
Aquatic Chronic 4: Hazardous to the aquatic environment - Chronic Hazard, Category 4

Disclaimer:
The data and recommendations presented in this data sheet concerning the use of our product and the materials contain therein are believed to be accurate and are based on information which is considered reliable as of the date hereof. However, the customer should determine the suitability of much material for his purpose before adopting them on a commercial scale. Since the use our product by others is beyond our control, no guarantee, express or implied, is made and no responsibility assumed for the use of this material or the results to be obtained therefrom. Information on this document is furnished for the purpose of compliance with Government Health and Safety Regulations and shall not be used for any other purposes. Moreover, the recommendations contained in this Safety Data Sheet are not to be constructed as a license to operate under, or a recommendation to infringe, any existing patents, nor should they be confused with state, municipal or insurance requirements, or with national safety codes.