1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Titration Solvent

OTHER/Generic NAMES: Chloroform/IPA/Toluene Mixture

PRODUCT USE: Solvent

MANUFACTURER: Honeywell, Burdick & Jackson

FOR MORE INFORMATION CALL: (Monday-Friday, 8:00am-5:00pm)
1-800-368-0050

IN CASE OF EMERGENCY CALL: (24 Hours/Day, 7 Days/Week)
1-800-707-4555 or Chemtrec 1-800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS NUMBER</th>
<th>WEIGHT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>67-66-3</td>
<td>33%</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>67-63-0</td>
<td>33%</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>33%</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>1%</td>
</tr>
</tbody>
</table>

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION


POTENTIAL HEALTH HAZARDS

SKIN: Irritant. Can cause dermatitis through defatting of the skin.

EYES: Irritant. Liquid and high vapor concentration will cause irritation and possible corneal damage.

INHALATION: Exposure can cause respiratory tract and throat irritation, headaches, shortness of breath and symptoms similar to intoxication. Overexposure can produce severe central nervous system depression, liver and kidney damage, coma and possibly fatal respiratory failure.
INGESTION: Severe burning of mouth and throat, pain in chest and abdomen and vomiting. May also cause loss of consciousness and liver damage.

DELAYED EFFECTS: Acute and chronic poisoning may affect the nervous system. Liver enlargement is possible. Prolonged exposures to high concentrations can cause liver, kidney and brain damage. Exposure during pregnancy may affect the growth and development of the fetus.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>NTP STATUS</th>
<th>IARC STATUS</th>
<th>OSHA LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropyl Alcohol</td>
<td>Not Listed</td>
<td>Group 3, Unclassifiable</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Chloroform</td>
<td>Anticipated</td>
<td>2B</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

SKIN: Rinse affected area with plenty of water until no evidence of chemical remains. Contact a physician.

EYES: Rinse eyes for at least 15 minutes with plenty of water. Contact a physician.

INHALATION: Remove from exposure area to fresh air. If victim is not breathing administer artificial respiration according to your level of training and obtain professional medical assistance immediately.

INGESTION: Get professional medical assistance immediately. Do not induce vomiting.

ADVICE TO PHYSICIAN: No specific antidote. Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 57°F (14°C)
FLASH POINT METHOD: Closed Cup
AUTOIGNITION TEMPERATURE: Not determined
UPPER FLAME LIMIT (volume % in air): Not determined
LOWER FLAME LIMIT (volume % in air): Not determined
FLAME PROPAGATION RATE (solids): Not Applicable
OSHA FLAMMABILITY CLASS: IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical and foam.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Vapor may travel a considerable distance to a source of ignition and flash back. Explosion may result if vapors are ignited in a confined area. Volatile and flammable. Thermal decomposition may release toxic gases, such as phosgene, hydrochloric acid and chlorine.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:
Wear self-contained breathing apparatus. Do not release runoff from fire control methods to sewers or waterways. Keep fire exposed containers cool and reduce vapors with water spray.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.) Eliminate sources of ignition. Isolate the spill area. Stop leak in a safe and practical manner. (If leak cannot be stopped easily and safely, advise trained emergency response personnel of the situation.) Using inert material (such as ground corncobs) dike the spilled solvent to prevent it from running into drains or waterways. Place absorbed material in a compatible leakproof container for disposition by persons trained in the handling of hazardous substances.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment.) Keep away from heat, open flame or other high temperature sources. Avoid contact with skin, eyes and clothing; avoid breathing vapor or mist. Use good personal hygiene and housekeeping practices.

STORAGE RECOMMENDATIONS:
Store in an area designed for storage of flammable liquids. (OSHA 29 CFR 1910.106) Protect containers from physical damage. Store in a cool, dry, well-ventilated area away from ignition sources and other fire hazards. Flammable liquid and vapor. Once liquid solvent has been completely dispensed, containers which appear “empty” should be handled in the same manner as when they were “full” of liquid solvent.
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Provide general or local exhaust ventilation systems to maintain airborne concentrations below permissible TLV levels. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:
Where liquid contact is possible impervious coveralls are recommended. To minimize the possibility in other handling and storage operations, wear appropriate PPE to include chemical resistant gloves, boots and apron.

EYE PROTECTION:
Safety glasses are considered minimum protection. Goggles or face shield may be necessary depending on quantity of material and conditions of use.

RESPIRATORY PROTECTION:
Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

ADDITIONAL RECOMMENDATIONS:
This material should be used in close proximity to eyewash station and safety shower. Use appropriate personal hygiene after handling this material. Do not smoke in the vicinity of flammable materials.

EXPOSURE GUIDELINES

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>OTHER LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>10 ppm TWA</td>
<td>2 ppm TWA</td>
<td>None</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>400 ppm TWA</td>
<td>400 ppm TWA</td>
<td>500 ppm STEL</td>
</tr>
<tr>
<td>Toluene</td>
<td>50 ppm TWA</td>
<td>100 ppm TWA</td>
<td>150 ppm STEL</td>
</tr>
</tbody>
</table>

* = Limit established by Honeywell International, Inc.
** = Workplace Environmental Exposure Level (AIHA).
*** = Biological Exposure Index (ACGIH).

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:
None
9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear, Colorless
PHYSICAL STATE: Liquid
MOLECULAR WEIGHT: Chloroform = 119.37 IPA = 60.11 Toluene = 92.14
CHEMICAL FORMULA: Mixture
ODOR: Pungent odor of toluene is first evident.
SPECIFIC GRAVITY (water = 1.0): Chloroform = 1.49 IPA = 0.785 Toluene = 0.867
SOLUBILITY IN WATER (weight %): Chloroform = 0.8% IPA = Complete Toluene = 0.074%
pH: Not Applicable
BOILING POINT: Mixture Range = 67°C to 72°C
MELTING POINT: Chloroform = -64°C IPA = -88°C Toluene = -95°C
VAPOR PRESSURE: Not determined
VAPOR DENSITY (air = 1.0): >2.1
EVAPORATION RATE: Not determined
% VOLATILES: ~100%
FLASH POINT: 57°F (14°C)
(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID):
Normally stable at room temperature in closed containers under recommended storage and handling conditions.

INCOMPATIBILITIES:
Active metals, particularly aluminum and magnesium; strong acids, strong alkaline solutions and strong oxidizers.

CONDITIONS TO AVOID:
Heat, sparks and flame. Direct sunlight.

HAZARDOUS DECOMPOSITION PRODUCTS:
Phosgene, Hydrogen Chloride, and Chlorine. Incomplete combustion can generate carbon monoxide and other hazardous gases.

HAZARDOUS POLYMERIZATION: Not expected to occur.
11. TOXICOLOGICAL INFORMATION

**CHLOROFORM**

**IMMEDIATE (ACUTE) EFFECTS:**
- Oral LD₅₀ (rat): 908 mg/Kg
- Dermal LD₅₀ (rabbit): 20 g/Kg
- Skin Irritation (rabbit): mild (500 mg/24 hours)
- Eye Irritation (rabbit): moderate (20 mg/24 hours)

**DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:**
- Inhalation (rat): liver and kidney effects (50 ppm 7/days/week for 6 months)
- Oral gavage bioassay (NCI, 1976): kidney tumors in male rats (70 g/Kg/78 weeks-I) and liver tumors in both sexes of mice (127 g/Kg/92 weeks -I)
- Drinking Water Study: kidney tumors in male rats (160 mg/Kg/day for 104 days)

**OTHER DATA:**
- Inhalation (rat): embryotoxic (30 ppm 7 hours/day during gestation days 6-15)
- Teratogenic (100 ppm 7 hours/day during gestation days 6-15)

**ISOPROPYL ALCOHOL**

**IMMEDIATE (ACUTE) EFFECTS:**
- Oral LD₅₀ (rat): 5045 mg/kg
- Skin Irritation (rabbit): 500 mg - mild
- Eye Irritation (rabbit): 10 mg - moderate; 100 mg - moderate

**DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:**
- 8000 ppm/8 hr./day for 20 weeks (intermittent) caused sensory change involving peripheral nerves.

**TOLUENE**

**IMMEDIATE (ACUTE) EFFECTS:**
- Oral LD₅₀ (rat): 5500 mg/kg
- Inhalation LC₅₀ (rat): 8800 ppm/4h

**DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:**
- Inhalation (rats) of 2500 ppm/6.5h/day for 15 weeks, produced changes in heart, liver, kidney, ureter and bladder.

**OTHER DATA:**
- Mutagenicity:
  - Non mutagenic in Ames salmonella/microsome assay
12. ECOLOGICAL INFORMATION

**CHLOROFORM**
LC$_{50}$ (rainbow trout) 43.8 µg/L/96 hours  
LC$_{50}$ (daphnia magna) 28.9 µg/L/48 hours

**ISOPROPYL ALCOHOL**
Relatively biodegradable.
LC$_{50}$ Pimephales promelas (fathead minnows) 11,160 mg/L/1/24 hr (static bioassay in Lake Superior water at 18-22 deg. C.  
LC$_{50}$ Pimephales promelas (fathead minnows) 10.4 g/L/96 hr.

**TOLUENE**
LC$_{50}$ (Fathead minnow): 36.2 mg/L (96h)  
LC$_{50}$ (Bluegill): 13 mg/L (96 h)  
LC$_{50}$ (Daphnia magna): 313 mg/L (48h)

13. DISPOSAL CONSIDERATIONS

**RCRA**

Is the unused product a RCRA hazardous waste if discarded? Yes  
If yes, the RCRA ID number is: D001, D022, U044, U220

**OTHER DISPOSAL CONSIDERATIONS:**
Dispose of material in accordance with all applicable local, state, and federal regulations.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

**US DOT PROPER SHIPPING NAME:** Flammable liquid, toxic, n.o.s.  
(Toluene, Chloroform)
**US DOT HAZARD CLASS:** 3, Flammable liquid
**US DOT ID NUMBER:** UN1992  
**US DOT PACKING GROUP:** II  
**NA EMERGENCY RESPONSE GUIDE:** 131
For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Each component of this mixture is listed on the TSCA inventory.

OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>SARA/CERCLA RQ (lb)</th>
<th>SARA EHS TPQ (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>1000</td>
<td>none</td>
</tr>
<tr>
<td>Chloroform</td>
<td>10</td>
<td>1000</td>
</tr>
</tbody>
</table>

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate, Delayed, Fire

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropyl Alcohol</td>
<td>Only persons who manufacture by the strong acid process are subject to reporting requirements.</td>
</tr>
<tr>
<td>Chloroform</td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td></td>
</tr>
</tbody>
</table>

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>WEIGHT %</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ingredients listed in this section.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ADDITIONAL REGULATORY INFORMATION:
California Proposition 65 Label Statement
Chloroform is listed on one of the California Proposition 65 lists; therefore, the following statement has been placed on the product label:
“Warning: This product contains a chemical known to the State of California to cause cancer.”

Toluene is subject to the Chemical Diversion & Trafficking Act of 1988 and subject to certain recordkeeping and reporting requirements. (21 CFR 1310 and 1313).

Toluene is listed on one of the California Proposition 65 lists; therefore, the following statement has been placed on the product label:
“Warning: This product contains a chemical known to the State of California to cause cancer.”

WHMIS CLASSIFICATION (CANADA):
Chloroform - Class D, Division 1  IPA & Toluene - Class B Division 2

FOREIGN INVENTORY STATUS:
On DSL and EINECS

16. OTHER INFORMATION

CURRENT ISSUE DATE:  June, 2000
PREVIOUS ISSUE DATE:  New Mixture, May, 1998

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:
Update to ANSI Standard. New header and footer information.

<table>
<thead>
<tr>
<th>NFPA Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health:</td>
</tr>
<tr>
<td>Flammability:</td>
</tr>
<tr>
<td>Reactivity:</td>
</tr>
</tbody>
</table>