



Texaco Inc.

547 (0060 24)

7/1-0794-00117B 10084(1)

PO Box 508  
Beacon NY 12508  
914 831 3400

→ Will Perry  
9/27

September 19, 1984



FYI-94-001173  
INIT 87/14/94

Mr. Art Stern  
Acting Executive Secretary  
TSCA Interagency Testing Committee  
Environmental Protection Agency  
East Tower Room 539C  
401 M Street, SW  
Washington, D.C. 20460



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Dear Mr. Stern:

Your July 23, 1984 letter requested unpublished information on cyclohexane, which Texaco manufactures, to facilitate the Committee's review. Relevant information is summarized below.

Technical bulletins

Attached is a copy of our technical bulletin on cyclohexane. In addition to product specifications, it also lists the applications for the chemical.

Material Safety Data Sheet (MSDS)

Also attached is our latest MSDS for cyclohexane. This sheet list occupational control procedures as well as physiological effects.

Production

During 1980 to 1983 Texaco produced around 850,000 bbls/yr of cyclohexane. The process is considered a closed system.

Exposures

Approximately 48 operating, maintenance and supervisory personnel have potential for exposure to cyclohexane. The arithmetic mean for 56 personal 8-hour TWA samples was determined to be 1.77 ppm.

Mr. Art Stern

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9/19/84

Discharges

Discharges of cyclohexane go into a wastewater system which is charged to an activated sludge treating unit. Data is not available on the amount of losses. Fugitive emissions and tank evaporative losses from the cyclohexane plant account for approximately 0.2% of our production.

Please advise if additional information is required for your review.

Very truly yours,

*R. T. Richards*

R. T. RICHARDS  
Manager - Environmental  
Conservation & Toxicology

KLD:bs

Attachments

FEB  
OWR  
MES

00004



**Texaco Chemical Company**  
A Division of Texaco Inc.

## Cyclohexane

### DESCRIPTION

A colorless liquid with a characteristic odor; a very flammable cycloparaffin. Molecular weight: 84.16.

### APPLICATIONS

Raw material for adipic acid and caprolactam used to manufacture Nylon 66 and Nylon 6 respectively. An excellent solvent for many resins, oils, fats, bitumens, crude rubber, and waxes such as paraffin and carnauba. Used in paint and varnish removers.

### SPECIFICATIONS

		ASTM Test Methods
Purity, % wt	99.86 minimum	D-1016
Distillation range @ 760 mm Hg	Not greater than 1.0° C including 80.7° C	D-850
Specific gravity @ 15.56° C / 15.56° C	0.7810-0.7840	D-1298
Color	+30 minimum	D-156
Nonvolatile matter, gm/100 ml	0.0004 maximum	D-1353
Sulfur	5 ppm maximum	D-3246
Benzene, % wt	0.01 maximum	D-1017
Freezing point	6.2° C minimum	D-1015
Copper corrosion	1 maximum	D-130
Methylcyclohexane	0.03 wt % maximum	Gas chromatograph

### SHIPPING INFORMATION

Shipped in barges, tank cars, tank trucks from Port Arthur, Texas.

Flash point: Less than 10° C—ASTM D-56

Classed as flammable liquid by DOT

Shipping weight (approx.): 6.50 lb./ gal. @ 15.56° C

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TEX 4391  
10/83

While the information presented (herein) is believed to be reliable and represent the best available data on this (or these products), no guarantee, warranty or representation is made, intended or implied as to the correctness or sufficiency of any information or as to the suitability of any chemical compound for any particular use. It is recommended that each user conduct a sufficient investigation to establish the suitability of product application in any particular use. Products may be toxic and require special precautions in handling. For all products, users should obtain detailed information on toxicity, together with proper shipping, handling, and storage procedures. Nothing herein is to be construed as advising or authorizing practice of any invention covered by existing patents without license from the owners thereof.

Main offices: Texaco Chemical Company / A Division of Texaco Inc. / P.O. Box 430 / Bellaire, Texas 77401 / 713/666-8000

Technical Services Section: P.O. Box 15730 / Austin, Texas 78761 / 512/459-6543

TEXACO INC.

INDUSTRIAL HYGIENE, TOXICOLOGY, AND MATERIAL  
SAFETY DATA SHEET



NOTE: NO REPRESENTATION IS MADE AS TO THE ACCURACY OF THE INFORMATION  
HEREIN. SEE PAGE 5 FOR CONDITIONS UNDER WHICH DATA ARE FURNISHED. ATTACHMENT II

Trade Name and Synonyms  
**C7864 CYCLOHEXANE**

Manufacturer's Name  
**Texaco Chemical Company**

Emergency Telephone No.  
**(409) 722-8381**

Address  
**4800 Fournace Place P.O. Box 430 Bellaire, TX 77401**

Chemical Name and/or Family or Description  
**Alicyclic Hydrocarbon**

THIS PRODUCT IS CLASSIFIED AS:  
 **HAZARDOUS BY DEFINITION NO.(S) 1.2**  **NOT HAZARDOUS.**  
 **ON ATTACHED EXPLANATION SHEETS**

**WARNING STATEMENT:**  
**DANGER: EXTREMELY FLAMMABLE**

**OCCUPATIONAL CONTROL PROCEDURES**

Protective Equipment (Type)  
**Eyes: Chemical type goggles or face shield optional.**

**Skin: Exposed employes should exercise reasonable personal cleanliness; this includes cleansing exposed skin areas several times daily with soap and water, and laundering or dry cleaning soiled work clothing at least weekly.**

**Inhalation: Supplied air respiratory protection for cleaning large spills or upon entry into tanks, vessels, or other confined spaces.**

**Ventilation: Local exhaust ventilation recommended**

**Permissible Concentrations:**

**Air: 300 ppm (1,050 mg/cubic meter) averaged over an 8 hour daily exposure (ACGIH 1983). OSHA STEL = 375 ppm.**

**HAZARDOUS AND FIRST AID PROCEDURES**

**First Aid**  
**Eyes: As with most foreign materials, should eye contact occur, flush eyes with plenty of water.**

**Skin: None considered necessary.**

**Ingestion: Do NOT induce vomiting. Aspiration may cause chemical pneumonia.**

**Inhalation: Should symptoms noted under physiological effects occur, remove to fresh air. If not breathing, apply artificial respiration.**

**Other Instructions: None.**

N.D. - Not Determined    N.A. - Not Applicable  
< Less Than    > Greater Than

**PHYSIOLOGICAL EFFECTS:**Code No. C7864**Effects of Exposure****Acute:****Eyes:** Believed to be minimally irritating.**Skin:** Believed to be minimally irritating. May cause dermatitis on prolonged or repeated contact.**Respiratory System:** May cause symptoms of drowsiness or narcosis from inhalation of high vapor concentrations.**Chronic:** N.D.**Other:** May cause dizziness, nausea, and unconsciousness.**Sensitization Properties:**Skin: Yes  No  Unknown Respiratory: Yes  No  Unknown **Median Lethal Dose (LD<sub>50</sub> LC<sub>50</sub> XSpecies)**Oral 5.5-6.0 g/kg (rat); practically non-toxicInhalation LC50 = 18,500 ppm (rabbits)Dermal N.D.; believed to be G.T. 3 g/kg (rabbit); practically non-toxicOther N. D.**Irritation Index, Estimation of Irritation (Species)**Skin N.D.; believed to be L.T. 0.5/8.0 (rabbit); no appreciable effectEyes N.D.; believed to be L.T. 15/110 (rabbit); no appreciable effectSymptoms of Exposure N.D.; None expected other than possible minimal irritation**FIRE PROTECTION INFORMATION**Ignition Temp. F. 473Flash Point F. (Method) -4 F (TCC)Flammable Limits% Lower 1.33Upper 8.4.**Products Evolved When Subjected to Heat or Combustion:**

Carbon monoxide and carbon dioxide may be formed on burning in limited air supply.

**Recommended Fire Extinguishing Agents And Special Procedures:**

According to the National Fire Protection Association Guide 325M, use dry chemical, foam or carbon dioxide. Water may be ineffective on the flames, but water should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to provide protection for the persons attempting to stop the leak.

**Unusual or Explosive Hazards:**

Explosive air-vapor mixtures may form.



**MSDS INFORMATION AND PRECAUTIONS**

Case No. C785

**Waste Disposal Method:**

Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures and processes may change classification to non-hazardous or hazardous for reasons other than, or in addition to ignitability. (See Remarks for Waste Classification.)

**Procedures in Case of Breakage or Leakage:**

Eliminate all ignition sources including internal combustion engines and power tools. Ventilate area. Avoid breathing vapor. Use SCBA or supplied-air mask for large spills or in confined areas. Contain spill if possible. Remove with inert absorbant.

**Remarks:**

Waste Classification: Product (as presently constituted) has the RCRA characteristic of ignitability and if discarded in its purchased form would have the hazardous waste number D001.

**PRECAUTIONARY LABEL**

**DANGER: EXTREMELY FLAMMABLE**

Keep away from heat, sparks and flame.  
Keep container closed.  
Use with adequate ventilation.  
Avoid prolonged breathing of mist of vapor.  
Avoid prolonged or repeated contact with skin.

**Requirements for Transportation, Handling and Storage:**

Transport, handle and store in accordance with OSHA Regulation 1910.106 and applicable DOT regulations.

DOT Proper Shipping Name: Cyclohexane  
DOT Hazard Class (if applicable): Flammable liquid, UN1145 RQ

**CHEMICAL AND PHYSICAL PROPERTIES**

Boiling Point (°F) 179 Vapor Pressure 104 (mmHg)  
Specific Gravity 0.78 (H<sub>2</sub>O=1) Vapor Density 2.9 (Air=1)  
Appearance and Odor colorless liquid, bland odor  
pH of undiluted product N.A. Solubility Insol.  
Percent Volatile by Volume 100 Evaporation 2.6 ( )=1  
Viscosity 1.02 cP @ 17 C Other -

Hazardous Polymerizations        Occur X Do not occur  
The Material Reacts Violently With: (if others is checked below, see additional comments on page 4 for further details)  
Air        Water        Heat        Strong Oxidizers X Others        None of These       

N.D. - Not Determined N.A. - Not Applicable  
< Less Than > Greater Than



COMPOSITION		Code No.
Components Presenting a Significant hazard		C7864
Cyclohexane Benzene content is approximately 45 ppm.		100
Other Components		%
None		
<b>ADDITIONAL COMMENTS</b>		
TEXACO INTENDS TO COMPLY FULLY WITH PROVISIONS OF THE TOXIC SUBSTANCES CONTROL ACT STATE OF MICHIGAN CRITICAL MATERIALS ACT (REVISED 1983) No critical materials present.		
To determine applicability or effect of any law or regulation with respect to this product, user should consult his legal advisor or the appropriate government agency. Texaco does not undertake to furnish advice on such matters.		
By <u>F. E. Bentley</u>	Title <u>Coordinator of Product Safety</u>	
Date <u>05-17-83</u>	<input checked="" type="checkbox"/> New	<input type="checkbox"/> Revised, Supersedes

N.D. - Not Determined    N.A. - Not Applicable  
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