

# Material Safety Data Sheet

CircuitWorks® The Mighty Pen®

## 1. Product and company identification

<b>Product name</b>	: CircuitWorks® The Mighty Pen®
<b>Supplier</b>	: ITW Chemtronics 8125 Cobb Center Drive Kennesaw, GA 30152  Tel. 770-424-4888 or toll free 800-645-5244
<b>Synonym</b>	: CW3700 -- The Mighty Pen®
<b>Trade name</b>	: CircuitWorks® The Mighty Pen®
<b>Manufacturer</b>	: ITW Chemtronics 8125 Cobb Center Drive Kennesaw, GA 30152  Tel. 770-424-4888 or toll free 800-645-5244
<b>Code</b>	: CW3700
<b>MSDS #</b>	: 3700
<b>Validation date</b>	: 5/23/2013.
<b>Print date</b>	: 5/23/2013.
<b><u>In case of emergency</u></b>	: Chemtrec - 1-800-424-9300 or collect 703-527-3887 24/7
<b>Product type</b>	: Liquid.

## 2. Hazards identification

### Emergency overview

<b>Physical state</b>	: Liquid.
<b>Color</b>	: Colorless.
<b>Odor</b>	: Lemon-like. [Slight]
<b>Signal word</b>	: DANGER!
<b>Hazard statements</b>	: EXTREMELY FLAMMABLE LIQUID AND VAPOR. FLAMMABLE. VAPOR MAY CAUSE FLASH FIRE. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.
<b>Precautionary measures</b>	: Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep away from heat, sparks and flame. Keep container tightly closed. Wash thoroughly after handling.
<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

### Potential acute health effects

<b>Inhalation</b>	: Harmful by inhalation. At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.
<b>Ingestion</b>	: Harmful if swallowed. May be irritating to mouth, throat and stomach.
<b>Skin</b>	: Slightly irritating to the skin. May cause sensitization by skin contact.
<b>Eyes</b>	: Slightly irritating to the eyes.

### Potential chronic health effects

<b>Chronic effects</b>	: Contains material that can cause target organ damage.
<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.

## 2. Hazards identification

- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which causes damage to the following organs: eye, lens or cornea. Contains material which may cause damage to the following organs: kidneys, the nervous system, liver, mucous membranes, upper respiratory tract, skin, central nervous system (CNS).

### Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:  
dizziness/vertigo  
drowsiness/fatigue  
headache
- Ingestion** : Adverse symptoms may include the following:  
Irritating to mouth, throat and stomach.  
nausea or vomiting
- Skin** : Adverse symptoms may include the following:  
redness  
pain or irritation
- Eyes** : Adverse symptoms may include the following:  
irritation  
watering  
redness

- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

## 3. Composition/information on ingredients

Name	CAS number	%
tetrahydrofuran	109-99-9	10 - 40
(R)-p-mentha-1,8-diene	5989-27-5	60 - 90

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

## 4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- 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.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

## 4. First aid measures

- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

## 5. Fire-fighting measures

- Flammability of the product** : Extremely flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

### Extinguishing media

- Suitable** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : 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. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide
- Special protective equipment for fire-fighters** : 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** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### Methods for cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a

## 7. Handling and storage

compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

### Storage

- : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## 8. Exposure controls/personal protection

Ingredient	Exposure limits
tetrahydrofuran	<p><b>ACGIH TLV (United States, 3/2012). Absorbed through skin.</b>            STEL: 100 ppm 15 minutes.            TWA: 50 ppm 8 hours.</p> <p><b>NIOSH REL (United States, 1/2013).</b>            STEL: 735 mg/m<sup>3</sup> 15 minutes.            STEL: 250 ppm 15 minutes.            TWA: 590 mg/m<sup>3</sup> 10 hours.            TWA: 200 ppm 10 hours.</p> <p><b>OSHA PEL (United States, 6/2010).</b>            TWA: 590 mg/m<sup>3</sup> 8 hours.            TWA: 200 ppm 8 hours.</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b>            STEL: 735 mg/m<sup>3</sup> 15 minutes.            STEL: 250 ppm 15 minutes.            TWA: 590 mg/m<sup>3</sup> 8 hours.            TWA: 200 ppm 8 hours.</p>

### Recommended monitoring procedures

- : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

### Engineering measures

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

### Personal protection

#### Respiratory

- : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## 8. Exposure controls/personal protection

- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.  
When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## 9. Physical and chemical properties

- Physical state** : Liquid.
- Flash point** : Closed cup: -14°C (6.8°F)
- Color** : Colorless.
- Odor** : Lemon-like. [Slight]
- Boiling/condensation point** : 65°C (149°F)
- Vapor pressure** : 0.27 kPa (2 mm Hg) [room temperature]
- Volatility** : 100% (v/v)
- Evaporation rate** : <1 (butyl acetate = 1)

## 10. Stability and reactivity

- Chemical stability** : The product is stable.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Incompatible materials** : Highly reactive or incompatible with the following materials:  
oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

## 11. Toxicological information

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
tetrahydrofuran	LD50 Oral	Rat	1650 mg/kg	-

**Conclusion/Summary** : Not available.

### Chronic toxicity

**Conclusion/Summary** : Not available.

## 11. Toxicological information

### Irritation/Corrosion

**Conclusion/Summary** : Not available.

### Sensitizer

**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Classification

Product/ingredient name	OSHA	IARC	NTP	ACGIH	EPA	NIOSH
tetrahydrofuran	-	-	-	A3	-	None.

### Mutagenicity

**Conclusion/Summary** : Not available.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

## 12. Ecological information

**Ecotoxicity** : No known significant effects or critical hazards.

### Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
tetrahydrofuran	Acute LC50 2160000 to 2360000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 367 mg/l Fresh water	Fish - Pimephales promelas - Embryo	33 days

**Conclusion/Summary** : Not available.

### Persistence/degradability

**Conclusion/Summary** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## 13. Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

### United States - RCRA Toxic hazardous waste "U" List




Ingredient	CAS #	Status	Reference number
Tetrahydrofuran (I); Furan, tetrahydro-(I)	109-99-9	Listed	U213

## 13. Disposal considerations

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
<b>DOT Classification</b>	-	Consumer commodity ORM-D	ORM-D	-		Use ORM-D Label <b>Reportable quantity</b> 4000 lbs / 1816 kg [571.11 gal / 2161.9 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
<b>TDG Classification</b>	-	Consumer commodity ORM-D	ORM-D	-		-
<b>Mexico Classification</b>	-	Consumer commodity ORM-D	ORM-D	-		-
<b>ADR/RID Class</b>	1993	FLAMMABLE LIQUIDS, N.O.S. ((R)-p-mentha-1,8-diene)	3	II		<b>Special provisions</b> 640 (D)  <b>Tunnel code</b> (D/E)
<b>IMDG Class</b>	1993	FLAMMABLE LIQUIDS, N.O.S. ((R)-p-mentha-1,8-diene)	3	II		-Limited quantity
<b>IATA-DGR Class</b>	1993	FLAMMABLE LIQUIDS, N.O.S. ((R)-p-mentha-1,8-diene)	3	II		Excepted Quantity

PG\* : Packing group

## 15. Regulatory information

- HCS Classification** : Flammable liquid  
Target organ effects
- U.S. Federal regulations** : **TSCA 8(a) PAIR**: tetrahydrofuran  
**TSCA 8(a) CDR Exempt/Partial exemption**: Not determined  
**TSCA 12(b) one-time export**: tetrahydrofuran  
**United States inventory (TSCA 8b)**: All components are listed or exempted.
- Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed
- Clean Air Act Section 602 Class I Substances** : Not listed



## 15. Regulatory information

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** : Fire hazard  
Delayed (chronic) health hazard

#### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
tetrahydrofuran	10 - 40	Yes.	No.	No.	No.	Yes.

### State regulations

**Massachusetts** : The following components are listed: TETRAHYDROFURAN

**New York** : The following components are listed: Tetrahydrofuran

**New Jersey** : The following components are listed: TETRAHYDROFURAN; 1,4-EPOXYBUTANE

**Pennsylvania** : The following components are listed: FURAN, TETRAHYDRO-

**Canada inventory** : All components are listed or exempted.

### International regulations

#### International lists

**Australia inventory (AICS)**: All components are listed or exempted.

**China inventory (IECSC)**: All components are listed or exempted.

**Japan inventory**: All components are listed or exempted.

**Korea inventory**: All components are listed or exempted.

**Malaysia Inventory (EHS Register)**: All components are listed or exempted.

**New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.

**Philippines inventory (PICCS)**: All components are listed or exempted.

**Taiwan inventory (CSNN)**: Not determined.

**Chemical Weapons Convention List Schedule I Chemicals** : Not listed

**Chemical Weapons Convention List Schedule II Chemicals** : Not listed

**Chemical Weapons Convention List Schedule III Chemicals** : Not listed



## 16. Other information

**Label requirements** : EXTREMELY FLAMMABLE LIQUID AND VAPOR. FLAMMABLE. VAPOR MAY CAUSE FLASH FIRE. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

**Hazardous Material Information System (U.S.A.)** :

Health	2
Flammability	3
Physical hazards	1

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

**National Fire Protection Association (U.S.A.)** :



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

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**Prepared by** : Not available.

☑ Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.