

## SAFETY DATA SHEET

### 1. SUBSTANCE AND SOURCE IDENTIFICATION

#### Product Identifier

**SRM Number:** 921  
**SRM Name:** Cortisol (Hydrocortisone)  
**Other Means of Identification:** Not applicable.

#### Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended primarily for use in the calibration and standardization of procedures for cortisol determinations and for routine critical evaluation of the daily working standards used in these procedures. A unit of SRM 921 consists of 1 g of material. This SRM is for research use.

#### Company Information

National Institute of Standards and Technology  
 Standard Reference Materials Program  
 100 Bureau Drive, Stop 2300  
 Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200  
 FAX: 301-948-3730  
 E-mail: SRMMSDS@nist.gov  
 Website: <http://www.nist.gov/srm>

Emergency Telephone ChemTrec:  
 1-800-424-9300 (North America)  
 +1-703-527-3887 (International)

### 2. HAZARDS IDENTIFICATION

#### Classification

**Physical Hazard:** Not classified.  
**Health Hazard:** Reproductive Toxicity Category 2

#### Label Elements

##### Symbol



##### Signal Word

WARNING

##### Hazard Statement(s)

H361 Suspected of damaging fertility or the unborn child.

##### Precautionary Statement(s)

P201 Obtain special instructions before use.  
 P202 Do not handle until all safety precautions have been read and understood.  
 P280 Wear protective gloves, eye protection, and protective clothing.  
 P308+P313 If exposed or concerned: Get medical attention.  
 P405 Store locked up.  
 P501 Dispose of contents and container in accordance with local regulations.

**Hazards Not Otherwise Classified:** None.

**Ingredients(s) with Unknown Acute Toxicity:** None.

---

### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

---

**Substance:** Cortisol (Hydrocortisone)

**Other Designations:** 11,17,21-trihydroxypregn-4-ene-3,20-dione; anti-inflammatory hormone; hydrocortisyl; hydrocorticosterone; 17-hydroxycorticosterone

**NOTE:** Components are listed in compliance with OSHA's 29 CFR 1910.1200. For actual values, see the NIST Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Cortisol (Hydrocortisone)	50-23-7	200-020-1	99

---

### 4. FIRST AID MEASURES

---

#### Description of First Aid Measures

**Inhalation:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

**Skin Contact:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

**Eye Contact:** Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**Ingestion:** If a large amount is swallowed, get medical attention.

**Most Important Symptoms/Effects, Acute and Delayed:** Systemic poisoning and irritation.

**Indication of any immediate medical attention and special treatment needed, if necessary:** If any of the above symptoms are present, seek immediate medical attention.

---

### 5. FIRE FIGHTING MEASURES

---

**Fire and Explosion Hazards:** Slight fire hazard. Dust/air mixtures may ignite or explode. See Section 9, "Physical and Chemical Properties" for flammability properties.

#### Extinguishing Media

Suitable: Regular dry chemical, carbon dioxide, water, or regular foam.

Unsuitable: None listed.

**Specific Hazards Arising from the Chemical:** Not applicable.

**Special Protective Equipment and Precautions for Fire-Fighters:** Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2

Fire = 1

Reactivity = 0

---

### 6. ACCIDENTAL RELEASE MEASURES

---

**Personal Precautions, Protective Equipment and Emergency Procedures:** Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection". Keep out of waters supplies and sewers.

**Methods and Materials for Containment and Clean up:** Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

---

## 7. HANDLING AND STORAGE

---

**Safe Handling Precautions:** Use methods to minimize dust. See Section 8, “Exposure Controls and Personal Protection”.

**Storage and Incompatible Materials:** Keep this SRM refrigerated (4 °C) in a well-closed container away from direct sunlight. Keep separated from incompatible substances (See Section 10, “Stability and Reactivity”).

---

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

---

**Exposure Limits:** This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure. No occupational exposure limits have been established for this material. The exposure limits for Particulates Not Otherwise Regulated are applicable.

OSHA (PEL):                    15 mg/m<sup>3</sup> (TWA, total particulates)  
                                      5 mg/m<sup>3</sup> (TWA, respirable particulates)

**Engineering Controls:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Personal Protection Measures:** In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

**Respiratory Protection:** If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye Protection:** Splash resistant safety goggles and emergency eyewash are recommended.

**Skin and Body Protection:** Chemical resistant clothing and gloves are recommended.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

Properties	Cortisol (Hydrocortisone) - (99 %)
Molar Mass (g/mol)	362.5
Molecular Formula	C <sub>21</sub> H <sub>30</sub> O <sub>5</sub>
Appearance (physical state, color, etc.)	white, crystalline solid
Odor	Odorless
Odor threshold	not available
pH	not available
Evaporation rate (butyl acetate = 1)	not available
Melting point/freezing point	not available
Relative Density	not available
Vapor Pressure	not available
Vapor Density (air = 1)	not available
Viscosity	not available
Solubilities	slightly soluble in water solvent: sulfuric acid, alcohol, ether, chloroform
Partition coefficient (n-octanol/water)	not available
<b>Thermal Stability Properties</b>	
Autoignition Temperature	not available
Thermal Decomposition	211 °C to 220 °C (412 °F to 428 °F)
Initial boiling point and boiling range	not available
Explosive Limits, LEL (Volume %)	not available
Explosive Limits, UEL (Volume %)	not available
Flash Point (Closed Cup)	not available
Flammability (solid, gas)	not available

---

## 10. STABILITY AND REACTIVITY

---

**Reactivity:** Stable at normal temperatures and pressure.

**Stability:**          X   Stable               Unstable

**Possible Hazardous Reactions:** Not applicable.

**Conditions to Avoid:** Avoid heat, flames, sparks, and other sources of ignition. Minimize contact with incompatible material.

**Incompatible Materials:** Oxidizing materials.

**Hazardous Decomposition:** Oxides of nitrogen, sulfur.

**Hazardous Polymerization:** \_\_\_\_\_ Will Occur        X   Will Not Occur

---

## 11. TOXICOLOGICAL INFORMATION

---

**Route of Exposure:**      X   Inhalation        X   Skin      \_\_\_\_\_ Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Systemic poisoning and irritation.

### Potential Health Effects (Acute, Chronic, and Delayed)

**Inhalation:** Prolonged exposure may cause irritation, hoarseness and increase susceptibility to fungal infections of the mouth and throat. Systemic poisoning is possible at high dosage.

**Skin Contact:** Prolonged topical application may cause itching, erythema, dryness, epidermal and dermal atrophy manifested by thinning of the skin, possible pustulation, perioral dermatitis, impede healing of ulcers, and local hypertrichosis.

**Eye Contact:** Topical application may cause reversible mydriasis. Prolonged topical application may cause ptosis. Systemic poisoning is possible resulting in ocular effects such as increased susceptibility to fungal infections, corneal thinning, cataract formation, optic nerve damage, and blindness. Other systemic effects may occur as described in chronic ingestion.

**Ingestion:** A large single dose of corticosteroids is reported to be virtually without harmful effects. Systemic corticosteroid poisoning from chronic exposure may cause fluid retention, hypotension or shock-like reactions, muscle weakness and fatigue, osteoporosis, cardiovascular effects, pituitary and adrenal suppression, hyperglycemia, mental symptoms, acne, peptic ulcers, and increased susceptibility to infection.

### Numerical Measures of Toxicity

**Acute toxicity:** Not classified; no data available.

**Skin corrosion/irritation:** Not classified.

Human, Dermal: 0.5 %; 1 % (moderate)

**Serious eye damage/eye irritation:** Not classified; no data available.

**Respiratory sensitization:** Not classified; no data available.

**Skin sensitization:** Not classified; no data available.

**Germ Cell Mutagenicity:** Not classified; no data available.

**Carcinogenicity:** Not classified.

**Listed as a Carcinogen/Potential Carcinogen**      \_\_\_\_\_ Yes        X   No

Cortisol (Hydrocortisone) is not listed by IARC, NTP, or OSHA as a carcinogen.

Mutagenic: Human TC: 2 mmol/L (1h)

**Reproductive Toxicity:** Category 2; Effects on the embryo or fetus have been reported from ocular contact in rabbits during pregnancy. Rat, Subcutaneous TDLo: 220 mg/kg (pregnant 9 d to 19 d)

**Specific Target Organ Toxicity, Single Exposure:** Not classified; no data available.

**Specific Target Organ Toxicity, Repeated Exposure:** Not classified.

Systemic poisoning may result if therapeutic levels are exceeded for prolonged periods; see "Potential Health Effects (Acute, Chronic, and Delayed)" for information on chronic effects.

**Aspiration hazard:** Not applicable.

---

## 12. ECOLOGICAL INFORMATION

---

**Ecotoxicity Data:** No data available.

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** No data available.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

---

## 13. DISPOSAL CONSIDERATIONS

---

**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

---

## 14. TRANSPORTATION INFORMATION

---

**U.S. DOT and IATA:** This material is not regulated by DOT or IATA.

---

## 15. REGULATORY INFORMATION

---

### U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: No

CHRONIC HEALTH: No

FIRE: No

REACTIVE: No

PRESSURE: No

**State Regulations:** California Proposition 65: Not listed.

**U.S. TSCA Inventory:** Listed.

**TSCA 12(b), Export Notification:** Not listed.

**Canadian Regulations:** WHMIS Information: Not provided for this material.

---

## 16. OTHER INFORMATION

---

**Issue Date:** 03 March 2016

**Sources:** ChemADVISOR, Inc., MSDS *Hydrocortisone*, 09 December 2016.

ChemIDplus Advanced, National Institutes of Health, Department of Health & Human Services, *Hydrocortisone*, CAS# 50-23-7; available at <http://chem.sis.nlm.nih.gov/chemidplus/> (accessed Mar 2016).

**Key of Acronyms:**

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified		

**Disclaimer:** Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srmmsds@nist.gov](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.