

**Safety data sheet**  
**According to Regulation n. 1907/2006 and Regulation 878/2020**  
**RUTHENIUM TRICHLORIDE HYDRATE**



Revision n. 7 – 09.09.2024

Replaces revision n. 6 – 02.04.2024

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

**1.1 Product identifier**

Chemical name	RUTHENIUM TRICHLORIDE HYDRATE
Product code	123
C.A.S. Registry Number	14898-67-0
EC Number	604-667-4
Molecular weight	261,47 g/mol (hydrate)
Raw Formula	$\text{RuCl}_3 \cdot n\text{H}_2\text{O}$

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Intended uses	Industrial use. Additive for electroplating
Uses advised against	None in particular

**1.3 Details of the supplier of the safety data sheet**

Name	FAGGI ENRICO S.P.A.
Address	Via Majorana, 101/103 50019 Sesto Fiorentino FI
Telephone number	055311861
Fax number	055311791
Competent person responsible for the safety data sheet	lorenzo.magaldi@faggi.it

**1.4 Emergency telephone number**

111 - Medical helpline operating in England, in Scotland (NHS 24) and in Wales (NHS Direct Wales)  
 Exempt under Article 6(1)

REACH registration number

**2. HAZARDS IDENTIFICATION**

**2.1 Classification of the substance or mixture**

Hazard classes	Category codes	Hazard statements
Met. Corr.	1	H290
Acute Tox.	4	H302
Skin Corr.	1B	H314
Eye damage	1	H318
Aquatic acute	1	H400
Aquatic chronic	1	H410

**2.2 Label elements**

**Pictograms**



**Signal words**

**DANGER**

**Hazard statements**

H290	May be corrosive to metals
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H410	Very toxic to aquatic life with long lasting effects

**Precautionary statements**

P273	Do not release into the environment
P303 + P361 + P353	IF ON SKIN (or hair): take off immediately all contaminated

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	clothing. Rinse the skin / take a shower
P305 + P351 + P338	IF IN EYES: rinse thoroughly for several minutes. Remove any contact lenses if easy to do. Continue rinsing
P301 + P330 + P331	IF SWALLOWED, rinse mouth. Do not induce vomiting
P301 + P312	IF SWALLOWED: Call a POISON CENTER / doctor if you feel unwell
P406	Store in corrosive resistant / container with a resistant inner liner.

**2.3 Other hazards**

It does NOT contain PBT / vPvB substances according to Regulation (EC) 1907/2006, annex XIII  
 It does NOT contain substances that interfere with the endocrine system in accordance with Regulation (EC) 1907/2006 art.59 paragraph 1 and in accordance with the criteria established in Regulation (EU) 2017/2100 and Regulation (EU) 2018/605.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1 Substance:** Ruthenium trichloride hydrate

CAS Number	14898-67-0
EC Number	233-167-5
Index number	Not available
ATE oral	LD50: 595 mg/kg bw (rat)
Acute toxicity M factor	1
Chronic toxicity M factor	1

**4. FIRST AID MEASURES**

**4.1 Description of first aid measures**

Inhalation	Bring the injured person to fresh air. If breathing is stopped, give artificial respiration. Consult a physician.
Ingestion	Drink a lot of water. Do not induce vomiting. Consult a physician.
Contact with skin	Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing and wash it before reuse.
Contact with eyes	Rinse with plenty of running water for at least 15 minutes Do not use eye drops or ointments. Consult a physician.

Recommendations:	YES
• Need to see a doctor immediately	YES
• Possibility of delayed effects following exposure	YES
• Move the exposed individual from the place of exposure to the open air	YES
• Remove the clothing and shoes of the exposed individual	With gloves

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- How to handle contaminated clothing YES

**4.2 Most important symptoms and effects, both acute and delayed**

Irritation

**4.3 Indication of any immediate medical attention and special treatment needed**

If you feel unwell, consult a doctor immediately. Emergency showers and eye washing systems must be available in the workplace.

**5. FIREFIGHTING MEASURES**

**5.1 Extinguishing media**

Suitable extinguishing media Carbon dioxide, foam, powder and water spray

Unsuitable extinguishing media None in particular

**5.2 Special hazards arising from the substance or mixture**

In the event of a fire, hydrochloric acid can be formed.

**5.3 Advice for firefighters**

**General information:**

Prevent the water used to extinguish the fire from flowing into the sewer, groundwater or surface water. Cool containers at risk with water.

**Equipment:**

Normal fire-fighting clothing, such as self-contained open-circuit compressed air breathing apparatus (EN137), flame retardant suit (EN469), flame retardant gloves (EN659) and firefighter boots (HOA29 or A30)

**6. ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment and emergency procedures**

**6.1.1. For non-emergency personnel**

Keep away from contaminated area

**6.1.2. For emergency responders**

Wear:

Gloves for chemical risks compliant with EN420 EN374 Standards

Complete clothing compliant with the UNI EN 13034: 2006 standard

Semi-face masks with ABEK2P3 R filters conforming to EN14387: 2004 + A1: 2008

**6.2 Environmental precautions**

Prevent infiltration into the sewer, groundwater and surface water

**6.3 Methods and material for containment and cleaning up**

**6.3.1. Advice in order to contain a spill**

Contain spill with appropriate absorbent material (sand, sawdust)

**6.3.2. Advice in order to clean-up a spill**

Wash the area with plenty of water

**6.3.3 Other information**

None

**6.4 Reference to other sections**

None

**7. HANDLING AND STORAGE**

**7.1. Precautions for safe handling**

**7.1.1. *Raccomentations in order to manipulate the substance or the mixture in a safe manner, such as containment measures and prevention of fire and aerosol and powders formation***

Keep in original sealed and labeled packaging

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**7.1.2. General recommendation on work hygiene**

Do not eat, drink and smoke in work areas. Wash your hands after use. Remove contaminated clothing and protective equipment before entering eating areas

**7.2. Conditions for safe storage, including any incompatibilities**

**Keep away from food, drink and feed for animals**

**7.2.1. Risk management associated with explosive atmospheres, corrosive conditions, flammability hazards, incompatible substances or mixtures, evaporative conditions, potential ignition sources**

Store in the original containers and close them immediately after use.

**7.2.2. Control of weather conditions, ambient pressure, temperature, sunlight, humidity, and vibration**

Store in a cool, dry place

**7.2.3. Conditions to maintain the integrity of the substance or mixture**

The packages must be well closed and labeled.

**7.2.4. Advice regarding the ventilation, specific design for storage rooms or vessels, quantity limits under storage conditions, packaging compatibilities**

Use PE and PP plastic packaging or other resistant materials.

**7.3. Specific end use(s)**

Industrial use

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.1. Control parameters**

**DNEL**

**Workers**

Systemic effects for long-term exposure – inhalation: 0.38 mg/m<sup>3</sup>

Systemic effects for short-term exposure – inhalation: no hazard identified

Local effects for long-term exposure – inhalation: medium hazard (no threshold derived)

Local effects for short-term exposure – inhalation: medium hazard (no threshold derived)

Systemic effects for long-term exposure – dermal: 0.27 mg/kg body weight per day

Systemic effects for short-term exposure – dermal: no hazard identified

Local effects for long-term exposure – dermal: medium hazard (no threshold derived)

Local effects for short-term exposure – dermal: medium hazard (no threshold derived)

Eye hazards: medium hazard (no threshold derived)

**General population**

Systemic effects for long-term exposure – inhalation: hazard unknown but no further hazard information necessary as no exposure expected

Systemic effects for short-term exposure – inhalation: hazard unknown but no further hazard information necessary as no exposure expected

Local effects for long-term exposure – inhalation: hazard unknown but no further hazard information necessary as no exposure expected

Local effects for short-term exposure – inhalation: hazard unknown but no further hazard information necessary as no exposure expected

Systemic effects for long-term exposure – dermal: hazard unknown but no further hazard information necessary as no exposure expected

Systemic effects for short-term exposure – dermal: hazard unknown but no further hazard information necessary as no exposure expected

Local effects for long-term exposure – dermal: hazard unknown but no further hazard information necessary as no exposure expected

Local effects for short-term exposure – dermal: hazard unknown but no further hazard information necessary as no exposure expected

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Systemic effects for long-term exposure – oral: hazard unknown but no further hazard information necessary as no exposure expected

Systemic effects for short-term exposure – oral: hazard unknown but no further hazard information necessary as no exposure expected

Eye hazards: hazard unknown but no further hazard information necessary as no exposure expected

**PNEC**

Freshwater: 0.244 µg/L

Marine water: 0.024 µg/L

Sewer treatment plant: 8.92 mg/L

Sediment (freshwater): 7.62 mg/kg sediment dry weight

Sediment (marine water): 0.762 mg/kg sediment dry weight

Soil: 1.55 mg/kg soil dry weight

**8.2. Exposure controls**

**8.2.1. Appropriate engineering controls**

Ventilation systems. Emergency showers and eye washing system near the work area. Periodically check the range of the extractor hood.

**8.2.2. Individual protection measures, such as personal protective equipment**

**Eye/face protection**

Protective goggles for eyes compliant with Directive 89/686 / EEC and with standard EN166: 2001

**Skin protection (hands)**

Gloves for chemical risks compliant with EN420  
EN374 NOT disposable

Glove material: material impermeable to the substance

Material thickness: 0.5 mm

Penetration time: higher than expected for contact with the substance

DIN EN374 method

**Skin protection (body)**

Complete antacid clothing compliant with the UNI EN 13034: 2006

**Respiratory protection**

Semi-face masks with ABEK2P3 R filters conforming to EN14387: 2004 + A1: 2008

**Thermal hazards**

Info not available

**8.2.3. Environmental exposure controls**

Maintain suction in all environments using localized collection systems and ambient air exchange. Convey the aspirated volumes to an abatement system and then into the atmosphere. Do not use air recirculation suction systems. Avoid any spillage into the environment.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**9.1 Information on basic physical and chemical properties**

Physical state

Solid

Colour

black / dark brown

Odour

None

Melting point/freezing point

450 ° C

Boiling point or initial boiling point and boiling range

Not available

Flammability

Not inflammable

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Lower and upper explosion limit	Not explosive
Flash point	Not inflammable
Auto-ignition temperature	Not inflammable
Decomposition temperature	Not available
pH	Not available
Kinematic viscosity	Not applicable
Solubility	140 g / L at 20 ° C and pH 0.6
Partition coefficient n-octanol/water (log value)	Log Kow: 8 to 20 ° C

Vapour pressure	Not applicable
Density and/or relative density	2.9 g / cm <sup>3</sup>
Relative vapour density	Not applicable
Particle characteristics	D <100 µm: 56.7%.

**9.2. Other information**

None

**10. STABILITY AND REACTIVITY**

**10.1 Reactivity**

No relevant information

**10.2 Chemical stability**

Stable under normal storage conditions

**10.3 Possibility of hazardous reactions**

None in particular

**10.4 Conditions to avoid**

Exposure to heat and sunlight.

**10.5 Incompatible materials**

Metals

**10.6 Hazardous decomposition products**

In case of strong heating it can develop vapors of hydrochloric acid

**11. TOXICOLOGICAL INFORMATION**

**11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008**

<b>Acute toxicity</b>	LD50 (oral) (rat): 595 mg / kg bw
<b>Skin corrosion / irritation</b>	Corrosive to the skin
<b>Serious eye damage/irritation</b>	Risk of serious eye damage.
<b>Respiratory or skin sensitization</b>	Based on available data, the classification criteria are not met
<b>Germ cell mutagenicity</b>	Based on available data, the classification criteria are not met
<b>Carcinogenicity</b>	Data not available
<b>Reproductive toxicity</b>	NOAEL (oral) (rat): 1276 mg/kg bw/day
<b>STOT – single exposure</b>	No data available

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	<b>STOT – repeated exposure</b>	NOAEL (oral)(rat): 407 mg / kg bw/day
<b>11.2</b>	<b>Information on other hazards</b>	
	None	
<b>12.</b>	<b>ECOLOGICAL INFORMATION</b>	
<b>12.1</b>	<b>Toxicity</b>	LC50 (fish)> 0.94 mg /L EC10 (algae) 0.233 mg /L
<b>12.2</b>	<b>Persistence and degradability</b>	Not applicable
<b>12.3</b>	<b>Bioaccumulative potential</b>	Not applicable
<b>12.4</b>	<b>Mobility in soil</b>	Not applicable
<b>12.5</b>	<b>Results of PBT and vPvB assessment</b>	Not applicable
<b>12.6</b>	<b>Endocrine disrupting properties</b>	No known effects
<b>12.7</b>	<b>Other adverse effects</b>	No known effects
<b>13.</b>	<b>DISPOSAL CONSIDERATIONS</b>	
<b>13.1.</b>	<b>Waste treatment methods</b>	
	The substance and its packaging must be disposed of as hazardous waste by authorized companies.	
<b>14.</b>	<b>TRANSPORT INFORMATION</b>	
<b>14.1</b>	<b>UN number or ID number</b>	1759
<b>14.2</b>	<b>Official UN shipping name</b>	
	ADR/RID/ADN/IMDG/ICAO-IATA:	Corrosive solid, n.o.s. (ruthenium trichloride hydrate)
<b>14.3</b>	<b>Transport hazard class</b>	
	ADR/RID/ADN/IMDG/ICAO-IATA: Class	8
	ADR/RID/ADN/IMDG/ICAO-IATA: Label	8 + mark environmental hazard
	ADR: Tunnel restriction code	E
	IMDG - EmS:	F-A, S-B
<b>14.4</b>	<b>Packing group</b>	II
<b>14.5</b>	<b>Dangers for the environment</b>	
	ADR/RID/ADN/ICAO-IATA:	Product dangerous for environment
	IMDG: Marine Contaminant:	YES
<b>14.6</b>	<b>Special precautions for user</b>	
	Transport must be carried out by vehicles authorized for the transport of dangerous goods according to the provisions of the current edition of the A.D.R. Agreement. and the applicable national provisions. Transport must be carried out in the original packaging and, in any case, in packaging which is made of materials which cannot be attacked by the contents, and which are not likely to generate dangerous reactions. Those responsible for loading and unloading dangerous goods must have received appropriate training on the risks presented by the preparation and on any procedures to be adopted in the event of emergency situations.	
	<b>Maritime transport in bulk according to IMO instruments</b>	
	No bulk transport is foreseen	
<b>15.</b>	<b>REGULATORY INFORMATION</b>	



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<b>15.1</b>	<b>Safety, health and environmental regulations/legislation specific for the substance or mixture</b>	<b>Applicability</b>
	Reg. (EC) 1907/2006 / EC Reach	YES
	Reg. (EC) 1272/2008 CLP and subsequent changes and additions	YES
	Reg. (CE) 2037/2000 "Substances that deplete the ozone layer"	NO
	Reg. (EC) 850/2004 "Persistent organic pollutants"	NO
	Reg. (EC) 689/2008 "export and import of dangerous chemicals"	NO
	Substance listed in Annex I of Dir. 2012/18 / EU so-called Seveso	NO
	Legislative Decree 81/2008 Consolidated Law on health and safety at work	YES
	Directive 2014/103 / EU "Adr"	YES
	Reg. (CE) 1907/2006/CE Reach art. 59 – Candidate List of Substances of Very High Concern (SVHC)	NO
	Reg. (CE) 1907/2006/CE Reach - Annex XIV – Authorisation List	NO
	Reg. (CE) 1907/2006/CE Reach - Annex XVII – Restriction List	Limited use
	<a href="https://echa.europa.eu/it/substances-restricted-under-reach">https://echa.europa.eu/it/substances-restricted-under-reach</a>	Item 75
		(check link)

**15.2 Chemical safety assessment**

A chemical safety assessment was not carried out

**16. OTHER INFORMATION**

**16.1 Changes compared to the previous edition**

Changes to sections: 1-8-14-16

**16.2 Acronim and abbreviation legend**

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

GHS: Globally Harmonized System of Classification and Labeling of Substances

EINECS: European Inventory of Chemical Substances

CAS: Chemical Abstract Service

STA: Acute Toxicity Estimate

PBT: Persistent, Bioaccumulative and Toxic.

vPvB: (very persistent and very bioaccumulative). Very persistent and very bioaccumulative

LD: lethal dose

PNEC: predicted no effect concentration

DNEL: derived no effect level

TLV (ceiling value): threshold limit value

STEL: short-term exposure limit

EU-OEL: European occupational exposure limit

TWA: time-weighted average

EC: effective concentration

NOAEL: no observed adverse effect level

LC: lethal concentration

NOEC: no observed effect concentration

LOEC: lowest observed effect concentration

Bw: body weight

Koc: organic carbon-water partition coefficient



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**16.3 Main references and data sources**

ECHA's data bank on registered substances and soon to be registered substances:

<https://chem.echa.europa.eu/>

**16.5 Adequate training for workers in order to ensure the protection of human health and the environment**

Training on Chemical Risk pursuant to Legislative Decree 81/08 Title IX dangerous substances

PPE training