

EC Safety Data Sheet

BEGO Bremer Goldschlägerei Wilh. Herbst GmbH & Co.

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1. Product and company identification

Data on product

Name of product: **Wirolyt**

Data on manufacturer/supplier

Manufacturer/supplier: BEGO Bremer Goldschlägerei Wilh. Herbst GmbH & Co.
Street/P.O. box: Wilhelm-Herbst-Strasse 1
Nat. postal code/town: D-28359 Bremen
Country: Germany
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Dept. providing information: Material Development
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2. Composition / information on components

Chemical characterization of specific substance

Designation	CAS No.	EC No.	EC Index No.
Ethylene glycol	107-21-1	203-473-3	603-027-00-1
Sulphuric acid	7664-93-9	231-639-5	016-020-00-8

Component	Hazard symbols	R provisions	Total formula
Ethylene glycol	Xn	R 22	C ₂ H ₆ O ₂
Sulphuric acid	C	R 35	H ₂ SO ₄

Chemical characterization of product

Description: Ethylene glycol with diluted sulphuric acid
Hazardous components: Ethylene glycol (1,2-dihydroxyethane, 1,2-ethandiol, ethane 1,2-diol, ethylene alcohol, ethylene hydrate, glycol alcohol, monoethylene glycol, MEG)
Sulphuric acid (hydrogen sulphate, electrolyte acid, oil of vitriol, dilute sulphuric acid, battery acid)

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Component	Concentration	Hazard symbols	R provisions
Ethylene glycol	> 25%	Xn	R22
Sulphuric acid	5-10%	Xi	R 36/38

3. Possible risks

Designation of hazards

Hazard identification: Xn harmful to health
Xi irritating

Special indications of risk for people and environment

Harmful to health if swallowed. Irritating to eyes and skin.

Specific risks

Possible harmful impact on people and possible symptoms:

Processing vapours may irritate the respiratory tracts, skin and eyes. Skin contact and inhalation of aerosols/vapours of the preparation should be avoided. In the case of skin contact, there is a risk of intake of harmful ethylene glycol via the skin damaged by sulphuric acid. During work wear suitable protective clothing, safety gloves and safety goggles / face screen.

4. First aid measures

General instructions

Take person out of the danger zone and lay him/her down. Remove dirty, soaked clothing immediately. In the event of contact with the eyes, rinse thoroughly with water and consult a physician. In the case of an accident or indisposition, call in a physician at once (if possible, show this label). A medical expertise is necessary even if intoxication is merely suspected. Symptoms of intoxication may not appear until hours later; therefore, medical observation necessary for at least 48 hours.

After inhalation

In the event of inhalation, remove the person to fresh air and obtain medical advice. If vapours are inhaled, symptoms of intoxication may not appear until hours later, it is therefore absolutely necessary to see a physician. Supply fresh air or oxygen; obtain medical assistance. If there is a risk of unconsciousness, place and transport person in lateral recovery position. In case of cessation of breathing: place person in dorsal position, overstretch head, carry out mouth-to-nose respiration or artificial respiration. Do not carry out mouth-to-mouth respiration. In the case of difficulty of breathing, oxygen administration if necessary.

After skin contact

In case of contact with the skin, wash off with plenty of water and soap at once and rinse well. Remove contaminated clothing.

After eye contact

In the event of contact with the eyes, rinse eyes under running water with eyelids open for at least 15 minutes. Consult an eye doctor at once.

After swallowing

Do not induce vomiting. Immediately rinse mouth thoroughly with water. Have person drink plenty of water (at least 0.5 l) in small sips (dilution effect). Obtain medical assistance at once.

5. Fire-fighting measures

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Suitable extinguishing agents

CO₂, fire extinguishing powder or water spray jet. Adapt fire-fighting measures to surroundings. Suppress vapours with spray jet. Fight larger fire with water spray jet or alcohol-resistant foam.

Special risk due to substance or the product itself, its products of combustion or resulting gases, further information

The product itself is not combustible. Vapours are heavier than air. Hazardous conflagration gases or vapours may form due to ambient fire. In the event of fire, sulphuric acid vapours, sulphur dioxide and sulphur trioxide may be released. In case of contact with light metals, hydrogen gas may form (risk of explosion).

Special protective equipment for fire fighting

Use suitable breathing apparatus that is independent of ambient air. Use protective clothing for fire-fighting so as to avoid skin and eye contact. Stay in the danger zone only with suitable, impervious chemical protection suit.

Other instructions

Cool endangered containers with water spray jet. Suppress vapours with water spray jet. Avoid penetration of fire-fighting water in surface waters or groundwater.

6. Measures in the event of unintentional release

Personal precautionary measures

Keep unprotected persons away. Increased risk of slipping due to leaking or spilt product. Provide for adequate fresh air. Formation of explosive mixtures with air possible. Keep away sources of ignition. Avoid contact with substance. Do not pick up with unprotected hands. Avoid contact with skin and eyes. Do not inhale vapours/aerosols. Wear protective clothing in accordance with section 8 of this safety data sheet.

Environmental protection measures

Do not allow to enter subsoil/earth. Do not allow to enter sewer system / surface waters / groundwater.

Cleaning/collection procedure

Wear rubber gloves. Neutralize with diluted caustic soda or by throwing on lime, lime sand or soda. Collect with liquid-binding material (e.g. sand, clay mineral, diatomaceous earth, vermiculite, universal binder). Put leaky receptacles, residues and contaminated material in identified and sealable containers. If necessary, clean again and air thoroughly. Disposal as waste in accordance with section 13 of this safety data sheet.

7. Handling and storage

Handling – instructions for safe handling

Keep containers tightly sealed. Only use in well ventilated areas. Avoid contact with eyes and skin. Do not inhale gas/smoke/vapour/aerosol.

Handling – instructions regarding fire and explosion protection

The product is not combustible. Keep away from ignition sources – do not smoke.

Storage – storeroom and container requirements

Keep under lock and key. Keep containers tightly sealed and store in a cool, dry and well ventilated place. Suitable material for containers/equipment: material, solvent-resistant. The floor should be tight, have no

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joints and be non-absorbent. VCI storage class: LGK10 – Flammable liquids (not LGK 3A or 3B, but flammable liquids that can be mixed with water, have a flash point of more than 50°C and a maximum vapour pressure of 3 bar at 50°C).

8. Exposure control and personal protective equipment

Components with workplace-related or biological limit values that must be monitored

Workplace limits:

EC: ethylene glycol
Air limit values: 20 ml/m³, 52 mg/m³
Skin resorption: H¹⁾

TRGS 900:	Ethylene glycol	Sulphuric acid
Air limit values:	10 ml/m ³ , 26 mg/m ³	1 mg/m ³ inhalable aerosols
Peak limitation:	= 1 = ²⁾	= 1 = ²⁾
Embryotoxic:	Y ³⁾	

- 1) Risk of skin resorption
- 2) Concentration may not exceed maximum concentration limit
- 3) Substances with which one need not fear a risk of injury to the embryo given compliance with maximum workplace concentration and biological workplace tolerance value (BAT).

Limitation and monitoring of exposure

See section 7. No measures beyond that are necessary.

Personal protective equipment

Respiratory protection

Not necessary given proper use. Respiratory protection is necessary if vapours/aerosols occur and there is increased concentration in the air.

Type of mask: full mask (DIN EN 136) or half-mask (DIN EN 140).
Respiratory protection filter: filter class E 2 (acid gases) or A2 (organic gases).

Hand protection

Use solvent-resistant safety gloves made of NBR (nitrile rubber) or butyl (butyl rubber) with at least 10 cm long sleeve.

Eye protection

Tightly sealing safety goggles with lenses made of safety glass.

Body protection

Wear acid-resistant protective work clothing, e.g. made of chemical-resistant cotton fabrics. Protective aids for the body are to be selected depending on the concentration and amount of hazardous substance and according to the specific workplace. Pay attention to chemical resistance of the protective aids (suppliers).

General safety and hygienic measures

Avoid contact with eyes, skin and clothing. Do not inhale gases/vapours/aerosols. Remove contaminated and/or soaked clothing at once. Keep away from food. Do not eat, drink, smoke or take snuff during work.

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Wash hands before breaks and at the end of work. Preventive skin protection by means of protective skin ointment. Further suitable skin care measures according to code of practice "Skin protection" of the employer's liability insurance association (e.g. BG Chemie [employer's liability insurance association for chemical industry] No. M 042). Minimum standards for protective measures when handling working substances are listed in TRGS 500 (Technical Rules for Hazardous Substances).

9. Physical and chemical properties

Appearance

State:	liquid
Colour:	colourless
Odour:	odourless

Important data on health and environmental protection and on safety

Product:

pH value:	1 (100% aqueous solution)
Flash point:	not applicable
Risk of explosion:	formation of explosive vapour-air mixtures possible
Vapour pressure:	0.13 g/m ³ (at 20°C)
Density:	1.2 g/cm ³ (20°C)
Aqueous solubility:	can be mixed without restriction

Individual substances:

	<i>Ethylene glycol</i>	<i>Sulphuric acid</i>
Dynamic viscosity:	21 mPas (20°C)	26.9 mPas (20°C)
Melting temperature:	-13°C	approx. -15°C
Boiling point:	197.6°C (101.3 kPa)	approx. 310°C
Inflammation point:	410°C	not applicable
Flash point:	111°C	not applicable
Explosion limits:	1.8% by vol. (l) 12.8% by vol. (u)	not applicable
Vapour pressure:	5.3 Pa (20°C)	approx. 0.01 Pa (20°C)
Relative vapour density:	2.14	approx. 3.4
Density:	1.11 g/cm ³ (20°C)	1.84 g/cm ³ (20°C)
Solubility:		
- in water	1000 g/l mixable (20°C)	soluble (20°C)
- in ethanol	slightly soluble	soluble
- in ether	low solubility	
Thermal decomposition:	> 200-250°C	approx. 338°C

10. Stability and reactivity

Conditions to be avoided

No hazardous reactions given proper use and proper storage and handling. The product is stable. Do not heat. Protect against moisture. Do not put into contact with water. No further data available.

Substances to be avoided

Acetylides; aldehydes; caustic alkali, alkaline metals and compounds; aluminium; ammonia; aniline; combustible substances, carbides; chromyl chloride; alkaline earth metals and compounds; halogen and halogen oxygen compounds; hydrides; alkaline solutions; lithium silicide; metals; metal alloys; nitrates; nitrides; nitriles; organic solvents; organic nitro compounds; perchloric acid; permanganates; peroxides;

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phosphorus; phosphorus oxides; picrates; acids; strong oxidation agents; water

In the case of contact with metals and light metals (e.g. iron, zinc, aluminium), formation of hydrogen (risk of explosion!).

Hazardous decomposition products

No decomposition known given proper use. Decomposition products in event of fire: sulphur dioxide, sulphur trioxide, carbon monoxide (see section 5).

Further information

The product is combustible and hygroscopic. Exothermic solution reaction with water. Corrosive effect on metals. Incompatible with metals, various plastics, glass, animal/plant fibres. Explosive with air in vapour / gaseous state.

11. Toxicological information

The product has a harmful and irritating effect on the mucous membranes of the eyes and the respiratory organs. Sensitizing effects are not known. Swallowing larger amounts may cause intoxication and acid burns in mouth / stomach / gastrointestinal area. Harmful if swallowed. Irritating to eyes and skin.

Acute toxicity

<i>Individual substances:</i>	<i>Ethylene glycol</i>	<i>Sulphuric acid</i>
LDL ₀ (oral, human):	788 mg/kg	135 mg/kg
LD ₅₀ (oral, rat):	4700 mg/kg	2140 mg/kg (25% solution)
LD ₅₀ (oral, mouse):	5500 mg/kg	
LD ₅₀ (inhalational, rat):		510 g/m ³ / 2 h (pure substance)
LD ₅₀ (inhalational, mouse):		320 g/m ³ / 2 h

<i>Primary irritating effect:</i>	<i>Ethylene glycol</i>	<i>Sulphuric acid</i>
Eye, rat	12 g/m ³ / 3 d	
Skin, rabbit	555 mg	0.25 mg
Eye, rabbit	100 mg / 1 h, 500 mg / 24 h 12 mg/m ³ / 3 d	5 mg/30 s

Specific symptoms in animal experiment

<i>Individual substances:</i>	<i>Ethylene glycol</i>	<i>Sulphuric acid</i>
Skin irritation, rabbit:	slight irritations	acid burns
Eye irritation, rabbit:	slight irritations	acid burns

Subacute to chronic toxicity

In animal experiments it was determined that long-term exposure to ethylene glycol above the limits can lead to reproduction disorders.

<i>Individual substances:</i>	<i>Ethylene glycol</i>	<i>Sulphuric acid</i>
Injury to embryo:	not a concern ¹⁾	negative in animal experiment
Bacterial mutagenicity:		Ames test: negative

¹⁾ given compliance with occupational safety limit

Further toxicological information

After inhalation

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Causes acid burns to the mucous membrane and may be harmful if inhaled. Inhalation of aerosols may lead to spasms, inflammation and oedema of larynx and bronchial tubes, chemical pneumonia and pulmonary oedema. Damaging effect on the tissue of the mucous membranes and upper respiratory tracts as well as on eyes and skin.

After skin contact

Severe irritation. Intake possible via the skin (risk of skin resorption). Causes poorly healing wounds.

After eye contact

Severe irritation. Risk of acid burns and corneal damage. Risk of blindness!

After swallowing

Risk of acid burns and is harmful if swallowed in the mouth, throat, oesophagus and gastrointestinal tract.

After resorption

Ethylene glycol is metabolized into glycoaldehyde, glycolic acid and glyoxal during metabolism and converted into the secondary products glyoxylic acid, formic acid and oxalic acid. The metabolic products display a far higher toxicity than ethylene glycol itself. Glycolic acid, which causes acute as well as reproductive and development toxicity in the case of exposure to ethylene glycol, is regarded as the metabolite primarily responsible for the toxicity. Tissue damage, severe pains, agitation, heat sensation, spasms, shock, cardiac dysrhythmia, shortness of breath, difficulty in breathing, cessation of breathing, unconsciousness, coughing, headache, nausea, vomiting, diarrhoea and central nervous system disorders. Risk of perforation for oesophagus and stomach. After a latency period of several weeks pyloric stenosis possible. Systemic effects after latency period: fatigue, ataxia (disorders of motion coordination), unconsciousness, damage to kidneys.

Organs affected

Central nervous system, kidneys, liver, eyes, teeth, cardiovascular system

Further information

The product must be handled with the usual care in connection with chemicals.

12. Ecological information

Ecotoxic effects

Harmful effect on water organisms. Toxic effect on fish and algae. Harmful effect due to pH shift. In spite of dilution, still forms caustic mixtures with water. Causes only low biological oxygen depletion. Neutralization possible in treatment plants. Hazardous for drinking water in the event of penetration of larger amounts into the soil and/or waterbodies. Do not allow to enter waterbodies, sewer system or soil!

Biological effects – data for ethyl glycol

Fish toxicity:	Onchorhynchus mykiss	LC ₅₀ = 18500 mg/l / 96 h
	Leuciscus idus	LC ₅₀ = 10000 mg/l / 48 h
Daphnia toxicity:	Daphnia magna	EC ₅₀ = 74000 mg/l / 24 h
Bacterial toxicity:	Photobacterium phosph.	EC ₅₀ = 112000 mg/l / 5 min (Microtox text)

Biological effects – data for sulphuric acid

Daphnia toxicity:	Daphnia magna	EC ₅₀ = 29 mg/l / 24 h
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Further ecological information – biological effects for ethylene glycol

Toxic concentration limit:

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Algae toxicity:	Scenedesmus quadric.	IC ₅ > 10000 mg/l / 7 d
Bacterial toxicity:	Pseudomonas putida	EC ₅ > 10000 mg/l / 16 h
	Microcystis aeruginosa	EC ₅ = 2000 mg/l 8 d
Protozoa toxicity:	Entosiphon sulcatum	EC ₅ > 10000 mg/l / 72 h

Biological degradability

Ethylene glycol is easily biodegradable. Methods for determination of biodegradability are not applicable for inorganic substances.

Biological degradability – data for ethylene glycol

BOD ₅	0.81 g/g
COD	1.29 g/g
ThOD	1.26 g/g

Behaviour in the environment

Accumulation in organisms is not expected (low bioaccumulation potential). There is no fear of any ecological problems given proper handling and use.

13. Disposal considerations

Product

Uniform regulations on disposal of chemicals in the Member States of the EU do not exist. In Germany the requirement of recycling is stipulated by the Closed Substance Cycle and Waste Management Act. The waste producer has to differentiate between “wastes for recycling” and “wastes for disposal” and carry out waste determination according to defined rules. This determination is geared to the material characteristics and in particular to the origin of the wastes. Furthermore, additional special features regarding the implementation of disposal are regulated by the German *Länder*. It is recommended that contact be made with the authorities and/or waste management companies and further information be obtained on recycling or disposal.

Residues

Fill used product back into original container. Bright plating or polishing baths contain heavy metal ions. Do not dispose of as wastewater. Dispose of contaminated packaging together with used product properly or empty completely and clean. Water is recommended for cleaning contaminated packaging, after addition of cleaning agents if necessary. Neutralization of the washing water is necessary.

Waste regulations according to Ordinance on the List of Wastes (AVV)

Due to the hazardous components, the wastes require special monitoring. Accountability for disposal. Proposals for waste determination:

Waste group 07 07	Wastes from production, preparation, distribution and use of fine chemicals and chemicals not otherwise specified
Waste group 11 01	Wastes from chemical surface treatment and coating of metals and other materials (e.g. electroplating, galvanized coating, pickling, etching, phosphatizing, alkaline degreasing and electrolytic oxidation)
Waste key	Waste designation
07 07 04*	other organic solvents, washing liquids and mother liquors
11 01 05*	acid pickling solutions

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Packaging

Disposal according to the provisions of the waste law. Packaging contaminated with the product is considered to be waste requiring special monitoring.

Waste key	Waste designation
15 01 10*	Packaging that contains residues of hazardous substances or is contaminated with hazardous substances.

If not expressly stipulated, cleaned and non-contaminated packaging can be recycled without documentary proof.

14. Transport information

Overland transport: Road transport ADR/GGVSE and rail transport RID/GGVSE

UN no.:	3264
Designation of product:	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)
Class:	8
Classification code:	C1
Packaging group:	III
Hazard label:	8
Hazard identification no.:	80
Remark:	Product contains predominantly inorganic components.

Inland shipping transport (ADNI/ADNR)

UN no.:	3264
Designation of product:	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)
Class:	8
Classification code:	C1
Packaging group:	III
Hazard label:	8
Remark:	Product contains predominantly inorganic components.

Maritime shipping transport (IMDG code)

UN no.:	3264
Proper Shipping Name:	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)
Class:	8
Packaging group:	III
EmS no.:	8-15
Marine pollutant:	No
Hazard identification:	8
Remark:	Product contains predominantly inorganic components.

Air transport (ICAO-TI/IATA-DGR)

UN / ID no.:	3264
Designation of product:	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)
Proper Shipping Name:	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)
Class:	8
Packaging group:	III
Hazard identification:	corrosive (RCM)
Remark:	Product contains predominantly inorganic components.

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Further information

The product is approved for postal delivery in accordance with the packaging and labelling regulations for hazardous substances in composite packaging with a maximum of 1 l in the inner packaging and a maximum of 4 l in the entire package.

15. Regulatory information

The product was classified according to the specifications of the Dangerous Substance Directive (EC Directive 67/548/EEC, Annex I). Hazard-determining components for labelling: ethylene glycol (harmful to health, Xn), sulphuric acid (caustic C).

Labelling according to EC directives

Hazard symbols:	Xn	Harmful to health
	Xi	Irritating
R provisions:	R 22	Harmful if swallowed.
	R 36/38	Irritating to eyes and skin.
S provisions:	S (1/2)	Keep under lock and key such that inaccessible to children (if designed for the general public).
	S 26	In the event of contact with the eyes, rinse thoroughly with water at once and consult a physician.
	S 45	In event of accident or indisposition call in physician immediately (show this label if possible).
Small quantities:		If the packaging does not contain more than 125 ml, one may dispense with the specifications in the R and S provisions.

German regulations

The national legal regulations must additionally be observed!

Employment restriction:	Comply with Section 22 of Youth Employment Protection Law (JarbSchG) and Section 5 of Maternity protection Guideline Regulation (MuSchRiV)!
Hazardous Incident Ordinance:	Product is not subject to Hazardous Incident Ordinance.
Classification acc. to VbF:	Product is not subject to VbF.
Clean Air Directive:	Not applicable.
Water hazard class:	WGK 1 (low degree of water endangerment) classification of the components in accordance with Administrative Regulation on the Classification of Substances Hazardous to Waters (VwVwS), Annex 2 Ethylene glycol (identification no. 105: WGK 1) Sulphuric acid (identification no. 182: WGK 1)

Other national regulations

Swiss toxin class: 4

Miscellaneous regulations, restrictions and prohibitory regulations

VCI storage class:	LGK10 – Flammable liquids (not LGK 3A or 3B, but flammable liquids that can be mixed with water, have a flash point of more than 50°C and a maximum vapour pressure of 3 bar at 50°C).
BG-Chemie codes of practice:	M004 Irritating substances / caustic substances M017 Solvents

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Application restrictions:	M050 Handling harmful substances M051 Hazardous chemical substances The product may be used exclusively for electrolytic polishing of cobalt-chrome alloys in a polishing unit of the make "Eltropol" in the dental laboratory.
16. Other information	
Data sheet issued by:	Material Development Department
Contact person:	Dr. Thomas Wiest
Reasons for change:	Complete revision
Revised on:	20.12.2002
Replaces issue dated:	15.03.2000
The data are based on the current level of our knowledge. They are intended in particular to describe our product with regard to the hazards related to its use and the safety precautions to be taken. They do not represent any guarantee of product and quality characteristics.	