

Safety Data Sheet

Brown-yellow colorimetric solution BY4

(EP)

Version : V2.0.0.1

Report No. : BWQ9813-2016-MSDS-US

Creation Date : 2025/11/10

Revision Date : -

***Prepared according to American OSHA HCS-2024 (29 CFR 1910.1200)**



1 Identification

Product identifier

Product Name	Brown-yellow colorimetric solution BY4 (EP)
Cat No.	BWQ9813-2016
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable

Recommended use of the product and restrictions on use

Relevant identified uses	Please consult manufacturer.
Uses advised against	Please consult manufacturer.

Details of the supplier of the Safety Data Sheet

Name of the company	Weiyel Inc
Address of the company	Hedian Light Industrial Park, Chengguan Town, Shangcheng County, Xinyang City, Henan Province, China
Post code	465350
Telephone number	010-58103678
Fax number	010-84840368
E-mail address	info@weiyel.com

Emergency phone number

Emergency phone number	010-58103678
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2 Hazard(s) identification

Hazard classification according to 29 CFR 1910.1200

According to OSHA HCS-2024, not classified as a hazardous chemical.

Label elements

Hazard pictograms	Not applicable
Signal word	Not applicable

Hazard statements

Hazard statements	Not applicable
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Precautionary statements

◆ Prevention

Prevention	Not applicable
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◆ Response

Response	Not applicable
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◆ Storage

Storage	Not applicable
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◆ Disposal

Disposal	Not applicable
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| Other hazards

	Not applicable.
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| Hazard description

◆ Physical and chemical hazards

	No information available
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◆ Health hazards

Inhaled	Inhalation of the product may produce adverse health effects or irritation of the respiratory tract following discomfort.
Ingestion	Accidental ingestion of the product may be harmful to the health of the individual.
Skin Contact	Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Eye	This product may cause temporary discomfort following direct contact with the eye.

◆ Environmental hazards

	Please refer to 12th chapter of SDS.
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3 Composition/information on ingredients

| Substance/mixture

	Mixture
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Component	CAS No.	EC No.	Concentration (wt, %)
Water	7732-18-5	231-791-2	99.95
Hydrogen chloride	7647-01-0	231-595-7	0.03
Cobalt chloride hexahydrate	7791-13-1	616-574-6	0.0016
Copper(II) sulfate pentahydrate	7758-99-8	616-477-9	0.01
Iron trichloride	7705-08-0	231-729-4	0.004

4 First-aid measures

| Description of first aid measures

General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if feel uncomfortable.

Skin contact	Take off contaminated clothing and shoes immediately. Wash off with plenty of soap and water for at least 15 minutes and consult a physician if feel uncomfortable.
Ingestion	Never give anything by mouth to an unconscious person. Call a physician or Poison Control Center immediately.
Inhalation	Move victim into fresh air. If breathing is difficult, give oxygen. Do not use mouth to mouth resuscitation if victim ingested or inhaled the substance. If not breathing, give artificial respiration and consult a physician immediately.
Protecting of first-aiders	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.

| Most important symptoms/effects, acute and delayed

1	Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
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| Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

5 Fire-fighting measures

| Extinguishing media

Suitable extinguishing media	Use extinguishing media suitable for surrounding area.
Unsuitable extinguishing media	There is no restriction on the type of extinguisher which may be used.

| Specific hazards arising from the substance or mixture

1	Development of hazardous combustion gases or vapor possible in the event of fire.
2	May expansion or decompose explosively when heated or involved in fire.

| Special protective equipment and precautions for fire-fighters

1	As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.

6 Accidental release measures

| Personal precautions, protective equipment and emergency procedures

1	Use personal protective equipment, do not breathe gas/mist/vapour/spray.
2	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
3	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

| Environmental precautions

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

| Methods and materials for containment and cleaning up

1	Cut off the source of the leak as much as possible.
2	Keep leaks in a ventilated place.

3	Absorb spilled material in dry sand or inert absorbent. In case of large amount of spillage, contain a spill by bunding.
4	Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.
5	Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container.

7 Handling and storage

Precautions for safe handling

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.
4	Keep away from heat/sparks/open flames/ hot surfaces.

Conditions for safe storage, including any incompatibilities

1	Keep containers tightly closed.
2	Keep containers in a dry, cool and well-ventilated place.
3	Keep away from heat/sparks/open flames/hot surfaces.
4	Store away from incompatible materials and foodstuff containers.

8 Exposure controls/personal protection

Control parameters

◆ Occupational exposure limit values

Component	Country/Region	Limit value - Eight hours		Limit value - Short term	
		ppm	mg/m ³	ppm	mg/m ³
Hydrogen chloride	Japan - JSOH(2024–2025)	-	-	-	-
	Permissible exposure standards for workers in the workplace	-	-	-	-
	Australia	-	-	5	7.5
	Canada - Ontario	-	-	2	-
	European Union	5	8	10	15
	USA - NIOSH	-	-	5	7
Cobalt chloride hexahydrate	Japan - JSOH(2024–2025)	-	0.05 (as Co)	-	-
	Finland	-	0.02	-	-
Copper(II) sulfate pentahydrate	Finland	-	0.02	-	-
Iron trichloride	USA - ACGIH	-	1(as Fe)	-	-

Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.

3	Use explosion-proof electrical/ventilating/lighting/equipment.
4	Set up emergency exit and necessary risk-elimination area.

Personal protection equipment

General requirement	No special requirements, please see the description below.
Eye protection	In general situation, eye protection is not needed. In the production process, when contacting with vapour or dust, tightly fitting safety goggles.
Hand protection	In general situation, hand protection is not needed.
Respiratory protection	In general situation, respiratory protection is not needed. If exposure limits are exceeded or if irritation or other symptoms are experienced, wear dust proof mask or gas defence mask.
Skin and body protection	In general situation, skin and body protection are not needed.

9 Physical and chemical properties and safety characteristics

Physical and chemical properties

Appearance (physical state, color, etc.)	Brownish yellow liquid
Odor	No information available
Odor threshold	No information available
pH	3.5~4.5 (20°C , 50g/L,Copper(II) sulfate pentahydrate)
Melting point/freezing point(°C)	110 (Decompose,Copper(II) sulfate pentahydrate)
Initial boiling point and boiling range(°C)	>35
Flash point(Closed cup,°C)	No information available
Evaporation rate	No information available
Flammability	No information available
Upper/lower explosive limits[% (v/v)]	Upper limit : No information available ; Lower limit : No information available
Vapor pressure	9.7hPa (Copper(II) sulfate pentahydrate)
Vapor density(Air = 1)	No information available
Relative density(Water=1)	2.3 (Copper(II) sulfate pentahydrate)
Solubility	317 g/L (0°C,Copper(II) sulfate pentahydrate)
n-octanol/water partition coefficient	No information available
Auto-ignition temperature(°C)	No information available
Decomposition temperature(°C)	110 (Copper(II) sulfate pentahydrate)
Kinematic viscosity	No information available

10 Stability and reactivity

Stability and reactivity

Reactivity	Contact with incompatible substances can cause decomposition or other chemical reactions.
Chemical stability	Stable under proper operation and storage conditions.
Possibility of hazardous reactions	In contact with active metals (alkali metals, Na, Ca etc.) causes a reaction and release hydrogen. In contact with magnesium, sodium, potassium, copper and

	other metals or metal acetylene may cause a fire or explosion. Mixtures with active metals are sensitive to mechanical vibration and may cause a severe explosion.
Conditions to avoid	Incompatible materials, heat, flame and spark.
Incompatible materials	Alkali, sodium, calcium, and other active metal, halogen, metal oxide, nonmetal oxide, acyl halide and metal phosphide. Magnesium, sodium, potassium, copper, oxidants, acetylene metal compounds, alcohols, alkanes, hydrogen and water. Active metal, nitric acid ester, epoxy compounds, alkenes and nitro compounds.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 Toxicological information

| Acute toxicity

Component	LD ₅₀ (oral)	LD ₅₀ (dermal)	LC ₅₀ (inhalation,4h)
Iron trichloride	450mg/kg(Rat)	No information available	No information available
Hydrogen chloride	900mg/kg(Rabbit)	No information available	1405ppmV(Rat)
Copper(II) sulfate pentahydrate	300mg/kg(Rat)	> 2000mg/kg(Rat)	No information available
Cobalt chloride hexahydrate	766mg/kg(Rat)	> 2000mg/kg(Rat)	No information available

| Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP	OSHA Carcinogen List
Water	Not Listed	Not Listed	Not Listed
Hydrogen chloride	Category 3	Not Listed	Not Listed
Cobalt chloride hexahydrate	Category 2A(Remark 1)	Not Listed	Not Listed
Copper(II) sulfate pentahydrate	Not Listed	Not Listed	Not Listed
Iron trichloride	Not Listed	Not Listed	Not Listed

Remark 1: Soluble cobalt(II) salts

| Others

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Skin corrosion/irritation	Based on available data, the classification criteria are not met
Serious eye damage/irritation	Based on available data, the classification criteria are not met
Skin sensitization	Based on available data, the classification criteria are not met
Respiratory sensitization	Based on available data, the classification criteria are not met
Reproductive toxicity	Based on available data, the classification criteria are not met
STOT-single exposure	Based on available data, the classification criteria are not met
STOT-repeated exposure	Based on available data, the classification criteria are not met
Aspiration hazard	Based on available data, the classification criteria are not met
Germ cell mutagenicity	Based on available data, the classification criteria are not met

12 Ecological information

| Acute aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
Iron trichloride	LC ₅₀ : 21mg/L (96h)(Fish)	No information available	No information available
Hydrogen chloride	LC ₅₀ : 20.5mg/L (96h)(Fish)	No information available	No information available
Copper(II) sulfate pentahydrate	LC ₅₀ : 0.31mg/L (96h)(Fish)	EC ₅₀ : 0.06mg/L (48h)(Crustaceans)	ErC ₅₀ : 0.05mg/L (96h)(Algae)
Cobalt chloride hexahydrate	LC ₅₀ : 62mg/L (96h)(Fish)	EC ₅₀ : 1.49mg/L (48h)(Crustaceans)	ErC ₅₀ : 9.02mg/L (96h)(Algae)

| Chronic aquatic toxicity

Chronic aquatic toxicity	No information available
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| Persistence and degradability

Component	Persistence (water/soil)	Persistence (air)
Cobalt chloride hexahydrate	High	High
Copper(II) sulfate pentahydrate	High	High

| Bioaccumulative potential

Component	Bioaccumulative potential	Comments
Cobalt chloride hexahydrate	Low	Log Kow=0.8494
Copper(II) sulfate pentahydrate	Low	Log Kow=-2.2002

| Mobility in soil

Component	log Koc	Remark
Cobalt chloride hexahydrate	1.375	
Copper(II) sulfate pentahydrate	0.787	

13 Disposal considerations**| Disposal considerations**

Waste chemicals	Before disposal should refer to the relevant national and local laws and regulation. Recommend the use of incineration disposal.
Contaminated packaging	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
Disposal recommendations	Refer to section waste chemicals and contaminated packaging.

14 Transport information**| Label and Mark**

Transporting Label	Not applicable
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IMDG-CODE

IMDG-CODE	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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IATA-DGR

IATA-DGR	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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UN-ADR

UN-ADR	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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Transport in bulk according to IMO instruments

◆ Transport in bulk according to Annex II of MARPOL and the IBC code

	Not Available
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◆ Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

	Not Available
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◆ Transport in bulk in accordance with the IGC Code

	Not Available
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Others

Precautions for transport	Transport vehicles should be equipped with the appropriate variety and quantity of fire equipment and emergency equipment leakage during transport. Before transport, should be preceded by checking whether container integrity, sealing. The transport unit must be placarded and marked in accordance with relevant transporting requirements.
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15 Regulatory information**International chemical inventory**

Component	A	B	C	D	E	F	G	H	I	J	K	L	M
Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydrogen chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cobalt chloride hexahydrate	✓	×	×	×	✓	✓	×	✓	×	✓	✓	✓	✓
Copper(II) sulfate pentahydrate	✓	×	×	×	✓	✓	✓	✓	×	✓	×	✓	✓
Iron trichloride	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- [A]** China Inventory of Existing Chemical Substances(IECSC)
[B] European Inventory of Existing Commercial Chemical Substances(EC inventory)
[C] United States Toxic Substances Control Act Inventory(TSCA)
[D] Canadian Domestic Substances List(DSL)
[E] New Zealand Inventory of Chemicals(NZIoC)
[F] Philippines Inventory of Chemicals and Chemical Substances(PICCS)
[G] Korea Existing Chemicals Inventory(KECL)
[H] Australian Inventory of Industrial Chemical (AIICS)
[I] Japan Inventory of Existing & New Chemical Substances(ENCS)
[J] Thailand Existing Chemicals Inventory(TECI)
[K] Mexico National Inventory of Chemical Substances (INSQ)
[L] Russia Inventory of Existing Substances (DRAFT)
[M] Inventory of Existing Chemical Substances in Taiwan, China (TCSI)

List of Chemical Substances under International Conventions

Component	A	B	C
Water	×	×	×
Hydrogen chloride	×	×	×
Cobalt chloride hexahydrate	×	×	×
Copper(II) sulfate pentahydrate	×	×	×
Iron trichloride	×	×	×

【A】 The Montreal Protocol on Substances that Deplete the Ozone Layer

【B】 Stockholm Convention on Persistent Organic Pollutants (POPs)

【C】 Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade

US chemical inventory

Component	A	B	C	D	E	F	G	H
Water	×	×	×	×	×	×	×	×
Hydrogen chloride	✓	✓	✓	✓	✓	✓	✓	×
Cobalt chloride hexahydrate	×	×	×	×	×	×	×	×
Copper(II) sulfate pentahydrate	×	×	×	×	×	×	×	×
Iron trichloride	×	×	✓	✓	✓	✓	✓	×

【A】 US Clean Air Act (CAA)- Section 112, Hazardous Air Pollutants

【B】 US SARA 302- Extremely Hazardous Substance List

【C】 US CERCLA- Hazardous Substances List

【D】 US Massachusetts Right-to-Know Substance List

【E】 US New Jersey Right to Know Hazardous Substance List

【F】 US Pennsylvania Right to Know Hazardous Substance List

【G】 US New York City Right-to-Know Hazardous Substance List

【H】 US California Proposition 65 List

Note:

“✓” Indicates that the substance included in the regulations.

“×” No data or not included in the regulations.

16 Other information

Information on revision

Creation Date	2025/11/10
Revision Date	-
Reason for revision	-

Reference

- [1] IPCS: The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>.
- [2] IARC, website: <http://www.iarc.fr/>.
- [3] OECD: The Global Portal to Information on Chemical Substances, website: <https://www.echemportal.org/echemportal/>.
- [4] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>.
- [5] NLM: ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.
- [6] EPA: Integrated Risk Information System, website: <http://cfpub.epa.gov/iris/>.
- [7] U.S. Department of Transportation: ERG, website: <http://www.phmsa.dot.gov/hazmat/library/erg>.
- [8] Germany GESTIS-database on hazard substance, website: <http://gestis-en.itrust.de/>.

Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG-CODE	International Maritime Dangerous Goods CODE
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists
LC ₅₀	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD ₅₀	Lethal Dose 50%	NTP	National Toxicology Program
EC ₅₀	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC _x	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P _{OW}	Partition coefficient Octanol: Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor	RPE	Respiratory Protective Equipment
ED	Endocrine disruptor	HCS	Hazard Communication Standard

Disclaimer

This Safety Data Sheet (SDS) was prepared according to OSHA HCS-2024. The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.