SAFETY DATA SHEET

E-Series® Catalyst RG-1

Version 1.0 Revision Date 2022-12-21

MSDS number: AA00974-0000000188

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product Name	:	E-Series® Catalyst RG-1
Material	:	1078356, 1070831, 1070922
Recommended use of the product	:	Chemical intermediate
Restrictions on use	:	None known.
Address	:	Chevron Phillips Chemical Company LP Specialty Chemicals 10001 Six Pines Drive The Woodlands, TX 77380
Address	:	CHEVRON PHILLIPS CHEMICALS ASIA PTE. LTD. C/O DONG WOO CORPORATION #B-2601,JEONGJAIL-RO, BUNDANG-GU,SEONGNAMI-SI, GYEONGGI-DO,13557 SOUTH KOREA Telephone no.: +612-9186-1132

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)
Belgium: 070 245 245 (24 hours/day, 7 days/week)

Bulgaria: +359 2 9154 233
Croatia: +3851 2348 342 (24 hours/day, 7 days/week)
Cyprus: 1401
Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402
Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212
Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Finland: 0800 147 111 09 471 977 (24 hours/day)
France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)
Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Greece: (0030) 2107793777 (24 hours/day, 7 days/week)
Hungary: +36-80-201-199 (24 hours/day, 7 days/week)
Iceland: 543 2222 (24 hours/day, 7 days/week)
Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371 67042473. (24 hours.)
Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Lithuania: +370 (85) 2362052
Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)
Malta: +356 2395 2000
The Netherlands: NVIC: +31 (0)88 755 8000
Norway: 22 59 13 00 (24 hours/day, 7 days/week)
Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Portugal: CIAV phone number: +351 800 250 250
Romania: +40213183606
Slovakia: +421 2 5477 4166
Slovenia: Phone number: 112
Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)
Sweden: 112 – ask for Poisons Information

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com
Appointees	:	회사명: 리이치 24 시코리아㈜. 주소: 서울시 서초구 헌릉로 7, 외국기업창업지원연구센터 (IKP) 908-909호 전화: + 82-1067838981

SECTION 2: Hazards identification

Hazard classification

Standards for classification and labeling of chemical substances and material safety data sheet (ministry of employment and labor public notice No. 2020-130)

Classification

: Short-term (acute) aquatic hazard, Category 1
Long-term (chronic) aquatic hazard, Category 1

Warning label elements including precautionary statements

Symbol(s) :

Signal Word : Warning

Hazard Statements : H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P273: Avoid release to the environment.
Response:
P391: Collect spillage.
Disposal:
P501: Dispose of contents and container according to wastes control act.

Other hazards which do not result in classification : None

SECTION 3: Composition/information on ingredients

Synonyms : Selective Hydrogenation Catalyst
raw pyrolysis gas catalyst
CPChem E Series
Hydrogenation Catalyst
FE E-RG-1

Molecular formula : Mixture

Common name	Synonyms	CAS-No.	Concentration	KECI Number
Aluminum Oxide	Alumina Oxide	1344-28-1	99%	KE-01012

Silver Oxide	disilver oxide	20667-12-3	0.1 % - 0.5%	KE-12270

SECTION 4: First aid measures

General advice	:	No hazards which require special first aid measures.
In case of eye contact	:	Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
In case of skin contact	:	If on skin, rinse well with water. Call a physician if irritation develops or persists.
If inhaled	:	If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.
If swallowed	:	Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

Other cautions for Doctors

Symptoms	:	No information available.
Risks	:	No information available.
Treatment	:	No information available.

SECTION 5: Firefighting measures

Flash point	:	Not applicable
Autoignition temperature	:	No data available
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in

accordance with local regulations.

Fire and explosion protection	:	Provide appropriate exhaust ventilation at places where dust is formed.
Hazardous decomposition products	:	Metal Oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Avoid dust formation.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods for cleaning up	:	Keep in suitable, closed containers for disposal.

SECTION 7: Handling and storage

Handling

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations.
Advice on protection against fire and explosion	:	Provide appropriate exhaust ventilation at places where dust is formed.

Secure storage

Requirements for storage areas and containers	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Electrical installations / working materials must comply with the technological safety standards.
Uses advised against	:	None known.
Advice on common storage	:	No materials to be especially mentioned.
Specific Use	:	Chemical intermediate

SECTION 8: Exposure controls/personal protection

KR

Components	Basis	Value	Control parameters	Note
Aluminum Oxide	KR OEL	TWA	10 mg/m3	

Chemical exposure standards, biological exposure standards, etc.

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection	:	If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as:. Air-Purifying Respirator for Dusts and Mists / P100. A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
Eye protection	:	Eye wash bottle with pure water. Safety glasses.
Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Protective suit. Safety shoes.
Hygiene measures	:	Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Physical state	:	solid
Color	:	White to off-white
Odor	:	No data available
Odor Threshold	:	No data available
pH	:	Not applicable

Pour point	:	Not applicable
Boiling point/boiling range	:	Not applicable
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	No data available
Lower explosion limit	:	Not applicable
Upper explosion limit	:	Not applicable
Vapor pressure	:	Not applicable
Solubility	:	Insoluble
Relative density	:	No data available
Density	:	70 - 80 LB/FT3
Vapor density	:	Not applicable
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	Not applicable
Molecular weight	:	Not applicable

SECTION 10: Stability and reactivity

Reactivity : Stable under recommended storage conditions.

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Hazardous reactions : Hazardous reactions: Hazardous polymerization does not occur.

Hazardous reactions: Dust may form explosive mixture in air., Reacts violently with water.

Further information: Stable under recommended storage conditions., No hazards to be specially mentioned.

Conditions to avoid : No data available.

Thermal decomposition : No data available

Hazardous decomposition products : Metal Oxides

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Information on exposure routes

E-Series® Catalyst RG-1
Acute oral toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

E-Series® Catalyst RG-1
Acute inhalation toxicity : Acute toxicity estimate: > 10 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method

E-Series® Catalyst RG-1
Acute dermal toxicity : No data available

E-Series® Catalyst RG-1
Skin corrosion or irritation : No skin irritation

E-Series® Catalyst RG-1
Eye corrosion or irritation : Product dust may be irritating to eyes, skin and respiratory system.

E-Series® Catalyst RG-1
Respiratory Sensitization : No data available

E-Series® Catalyst RG-1
Skin sensitization Did not cause sensitization on laboratory animals.
Information refers to the main ingredient.

Germ cell mutagenicity (in vitro)

Aluminum Oxide	:	Test Type: Ames test Metabolic activation: with and without metabolic activation Result: negative

Specific Target Organ Toxicity (Single Exposure)

Not classified due to data which are conclusive although insufficient for classification.

Specific Target Organ Toxicity (Repeated Exposure)

Not classified due to data which are conclusive although insufficient for classification.

E-Series® Catalyst RG-1 **Further information**	:	No data available.

SECTION 12: Ecological information

Ecological Toxicity

Toxicity to fish

Aluminum Oxide	:	NOEC: > 100 mg/l Exposure time: 96 h Species: Salmo salar (Atlantic salmon) Method: OECD Test Guideline 203
Silver Oxide		LC50: 1.2 µg/l Exposure time: 96 h Species: Pimephales promelas (fathead minnow) semi-static test

Toxicity to daphnia and other aquatic invertebrates

Aluminum Oxide	:	EC50: > 100 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: OECD Test Guideline 202
Silver Oxide		LC50: 0.22 µg/l Exposure time: 48 h

Species: Daphnia magna (Water flea)
semi-static test

Toxicity to algae

Aluminum Oxide	:	NOEC: > 100 mg/l Exposure time: 72 h Species: Selenastrum capricornutum (algae) Method: OECD Test Guideline 201
Silver Oxide		EC10: 0.54 µg/l Exposure time: 24 h Species: Chlamydomonas reinhardtii (green algae) Growth inhibition

M-Factor

disilver oxide	:	M-Factor (Acute Aquat. Tox.)	100
		M-Factor (Chron. Aquat. Tox.)	100

Persistence and degradability

Aluminum Oxide	:	The methods for determining biodegradability are not applicable to inorganic substances.
Silver Oxide	:	The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulative

Aluminum Oxide	:	This material is not expected to bioaccumulate.
Silver Oxide	:	No data available

Mobility

Aluminum Oxide	:	No data available
Silver Oxide	:	No data available

Results of PBT assessment

Aluminum Oxide	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Other adverse effects	:	Very toxic to aquatic life with long lasting effects.

Ecotoxicology Assessment

Short-term (acute) aquatic hazard

Aluminum Oxide : This material is not expected to be harmful to aquatic organisms.

Silver Oxide : Very toxic to aquatic life.

Long-term (chronic) aquatic hazard

Aluminum Oxide : This material is not expected to be harmful to aquatic organisms.

Silver Oxide : Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Disposal method : The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Disposal precaution : Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).
Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

UN Number	:	UN3077
UN Product Shipping Name	:	Environmentally Hazardous Substance, Solid, N.O.S.
Hazard Class	:	9
Packing Group	:	III - Less Hazardous Properties
Marine Pollutant	:	Not applicable
Special Safety Measures on Mode of Transport	:	No data available

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)

NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (SILVER OXIDE), 9, III, MARINE POLLUTANT, (SILVER OXIDE)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (SILVER OXIDE), 9, III

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (SILVER OXIDE), 9, III, (-)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (SILVER OXIDE), 9, III

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)

UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (SILVER OXIDE), 9, III

Maritime transport in bulk according to IMO instruments

SECTION 15: Regulatory information

National legislation

Regulation under the Occupational Safety and Health Act
A Material Safety Datasheet (MSDS) for this product is not required according to article 41 of the ISHA.

Regulation		Chemical name	Threshold limits
Harmful Substances Prohibited from Manufacturing	:	Not applicable	
		Not applicable	
Harmful Substances Required Permission for Manufacture	:	Not applicable	
		Not applicable	

Act on the Registration and Evaluation, etc. of Chemical Substances, Chemicals Control Act

Regulation		Chemical name	Threshold limits
Toxic Chemicals	:	Not applicable	
		Not applicable	
Prohibited Chemicals	:	Not applicable	
		Not applicable	
Observational chemicals	:	Not relevant	
Restricted Chemicals	:	Not applicable	
		Not applicable	
Toxic Release Inventory	:	Alumina Oxide	>= 1 %
		Alumina Oxide	>= 1 %

Dangerous Substances Safety Management Act
Dangerous Substances Safety Management Act : Not Applicable to Dangerous Materials

Regulations by the Waste Management Act : Aluminum Oxide: Designated Waste

Regulations by other domestic and foreign laws

Europe REACH : A substance or substances in this product is not registered or notified to be registered. Importation or manufacture of this product is still permitted provided that it does not exceed the REACH minimum threshold quantity of the non-regulated substances.

Switzerland CH INV : On the inventory, or in compliance with the inventory

United States of America (USA) : On or in compliance with the active portion of the

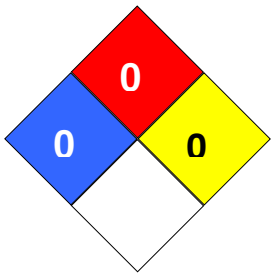
TSCA		TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
Australia AIIC	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	Not in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	A substance(s) in this product was not registered, notified to be registered, or exempted from registration by CPChem according to K-REACH regulations. Importation or manufacture of this product is still permitted provided the Korean Importer of Record has themselves notified the substance or the exported amount does not exceed the minimum threshold quantity of the non-registered substance(s).
Philippines PICCS	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

Other regulations : No data available

SECTION 16: Other information

Source of data	:	Korea. GHS based classification
Date of initial writing	:	2019-12-11
Revision number	:	1
Last revision date	:	2022-12-21

NFPA Classification : Health Hazard: 0
Fire Hazard: 0
Reactivity Hazard: 0



Other information
None.

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a

guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AIIC	Australian Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%	ATE	Acute toxicity estimate