SAFETY DATA SHEET

1. Identification

Product identifier: Dirko HT grey 3.1 oz. **Product No.:** 510.031
Dirko HT black 2.9 oz. 896.341

Recommended use and restriction on use

Recommended use: For research and development purposes only. **Restrictions on use:** Must be handled and used by technically qualified persons.

Manufacturer/Importer/Supplier/Distributor Information

Supplier

ElringKlinger AG
Max-Eyth-Str. 2
72581 Dettingen/Erms - Deutschland

E-Mail: det.iam.sdb@elringklinger.com

Emergency telephone number:

Giftinformationszentrum (GIZ-Nord) Zentrum Pharmakologie und Toxikologie der Universität Göttingen	Robert-Koch Strasse 40 D-37075 Göttingen	+49 551 19240 (German/English)

2. Hazard(s) identification

Hazard Classification

Health Hazards

Skin sensitizer	Category 1
Toxic to reproduction	Category 2

Label Elements

Hazard Symbol:

Signal Word: Warning

Hazard Statement: May cause an allergic skin reaction.
Suspected of damaging fertility.
Quartz: When encapsulated in a polymer, is not expected to pose a health hazard when processed under normal conditions of use.

Precautionary Statements

Prevention: Wear protective gloves/protective clothing/eye protection/face protection.

Response: IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention.

Other hazards which do not result in GHS classification: No data available.

Substance(s) formed under the conditions of use:

Chemical Identity	CAS-No.	Concentration
2-Pentanone, oxime	623-40-5	<=5%
Ethanol	64-17-5	<=1%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

3. Composition/information on ingredients

M ixtures

Chemical Identity	CAS number	Content in percent (%)*
3-Aminopropyltriethoxysilane	919-30-2	0.1 - <1%
Octamethylcyclotetrasiloxane	556-67-2	0.1 - <1%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition Comments: Mixture of polydimethylsiloxanes, silica and curing agents.

4. First-aid measures

General information: For further information refer to section 8 "Exposure-controls/personal protection".

Ingestion: Do not induce vomiting. Rinse mouth thoroughly. Get medical attention if symptoms occur.

Inhalation: Move into fresh air and keep at rest. Get medical attention if any discomfort continues.

Skin contact: Wash with soap and water. Get medical attention if symptoms occur after washing.

Eye contact: In the event of contact with the eyes, rinse thoroughly with clean water. Continue to rinse for at least 15 minutes. Get medical attention if irritation persists after washing.

Most important symptoms/effects, acute and delayed

Symptoms: None known.

Hazards: No specific recommendations.

Indication of immediate medical attention and special treatment needed

Treatment: No specific recommendations.

5. Fire-fighting measures

General Fire Hazards: No specific recommendations.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Dry chemical, alcohol resistant foam or carbon dioxide (CO2).

Unsuitable extinguishing media: Do not use water as an extinguisher.

Specific hazards arising from the chemical: Product will burn under fire conditions. Hazardous Decomposition Products : formaldehyde, oxides of carbon and silica.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Water spray should be used to cool containers.

Special protective equipment for fire-fighters: Firefighters should wear standard protective equipment and a positive pressure self-contained breathing apparatus (SCBA).

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Ventilate the area. Do not breathe vapor. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Absorb with sand or other inert absorbent and place into containers.

Notification Procedures: Caution: Contaminated surfaces may be slippery. For waste disposal, see Section 13 of the SDS.

Environmental Precautions: Collect spillage. Do not discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Avoid breathing dust/fume/gas/mist/vapors/spray. See Section 8 of the SDS for Personal Protective Equipment. For further information, refer to section 10: "Stability and Reactivity".

Conditions for safe storage, including any incompatibilities: Store in tightly closed original container in a dry, cool and well-ventilated place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Quartz: When encapsulated in a polymer, is not expected to pose a health hazard when processed under normal conditions of use.

Additional exposure limits under the conditions of use

Chemical Identity	Type	Exposure Limit Values		Source
Ethanol	REL	1,000 ppm	1,900 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2005)
	PEL	1,000 ppm	1,900 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1,000 ppm	1,900 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	STEL	1,000 ppm		US. ACGIH Threshold Limit Values (2009)

Appropriate Engineering Controls No specific recommendations.

Individual protection measures, such as personal protective equipment

General information: Provide sufficient ventilation during operations which cause vapor formation.

Eye/face protection: Wear approved chemical safety glasses with side shields or goggles.

Skin Protection

Hand Protection: Protective gloves are recommended.

Other: Wear appropriate clothing to prevent any possibility of skin contact.

Respiratory Protection: If ventilation is insufficient, suitable respiratory protection must be provided.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties:

Appearance

Physical state:	Paste
Form:	thixotropic
Color:	Grey; Black
Odor:	No data available.
Odor threshold:	No data available.
pH:	No data available.
Melting Point:	No data available.
Boiling Point:	No data available.
Flash Point:	estimated > 302 °F (> 150 °C)
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.

Density:	Approximate 1.25 kg/dm3 (68 °F (20 °C))
Solubility(ies)	
Solubility in water:	Practically Insoluble
Solubility (other):	Acetone: Very slightly soluble Alcohol: Very slightly soluble Aliphatic hydrocarbons: Dispersible Aromatic hydrocarbons: Dispersible Chlorinated solvents: Dispersible
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.
Other information	
Oxidizing properties:	According to the data on the components Not considered as oxidizing. (evaluation by structure-activity relationship)

10. Stability and reactivity

Reactivity:	No data available.
Chemical Stability:	Stable at room temperature provided it is not in contact with air.
Possibility of hazardous reactions:	Will not occur.
Conditions to avoid:	None known.
Incompatible Materials:	Strong oxidizing agents and water.
Hazardous Decomposition Products:	Thermal decomposition or combustion may liberate carbon oxides, other toxic gases or vapors and amorphous silica.

11. Toxicological information

Information on likely routes of exposure

Ingestion:	No data available.
Inhalation:	No data available.
Skin contact:	No data available.
Eye contact:	No data available.

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion:	No data available.
Inhalation:	No data available.
Skin contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: ATEmix: 8,597 mg/kg

Dermal
Product: No data available.

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Specified substance(s):
3-Aminopropyltriethoxysilane — NOAEL (Rat(Female, Male), Oral): 200 mg/kg LOAEL (Rat(Female, Male), Oral): 600 mg/kg Subchronic exposure

Specified substance(s):
Octamethylcyclotetrasiloxane — NOAEL (Rat(Female, Male), Inhalation - vapour): 1.82 mg/l Chronic exposure
NOAEL (Rabbit(Female, Male), Dermal): >= 960 mg/kg Subacute exposure

Skin Corrosion/Irritation
Product: No data available.

Specified substance(s):
3-Aminopropyltriethoxysilane — OECD 404 (Rabbit, 1 h): Corrosive.

Specified substance(s):
Octamethylcyclotetrasiloxane — Similar to OECD 404 (Rabbit): Not irritating

Serious Eye Damage/Eye Irritation
Product: No data available.

Specified substance(s):
3-Aminopropyltriethoxysilane — OECD 405 (Rabbit): Corrosive.

Specified substance(s):
Octamethylcyclotetrasiloxane — OECD 405 (Rabbit): Not irritating

Respiratory or Skin Sensitization
Product: No data available.

Specified substance(s):
Octamethylcyclotetrasiloxane , OECD 406 (Guinea Pig)Not a skin sensitizer.

Carcinogenicity

Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	Not classified

Specified substance(s):

Octamethylcyclotetrasiloxane	Not classified

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro

Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	Bacteria (OECD 471): No mutagenic effects. with and without metabolic activation Chromosomal aberration (OECD 473): No clastogenic effect. with and without metabolic activation In vitro gene mutations test on mammalian cells: (OECD 476): No mutagenic effects. with and without metabolic activation

Specified substance(s):

Octamethylcyclotetrasiloxane	Bacterial reverse mutation test (OECD 471): No mutagenic effects. with and without metabolic activation In vitro gene mutations test on mammalian cells: (Similar to OECD 476): No mutagenic effects. with and without metabolic activation In vitro mammalian chromosomal aberration test (Similar to OECD 473): No clastogenic effect. with and without metabolic activation

In vivo

Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	Mammalian erythrocyte micronucleus test (OECD 474) Intraperitoneal (Mouse, Female, Male): No mutagenic effects.

Specified substance(s):

Octamethylcyclotetrasiloxane	Mammalian bone marrow chromosomal aberration test (Similar to OECD 475) Inhalation (Rat, Female, Male): negative Rodent dominant Lethal test (Similar to OECD 478) Gavage (Oral) (Rat, Female, Male): negative

Reproductive toxicity

Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	Not classified

Specified substance(s):

Octamethylcyclotetrasilox ane	Suspected of damaging fertility.

Specific Target Organ Toxicity - Single Exposure

Product:	No data available.
Specified substance(s): 3-Am inopropyltriethoxysilan e	Not classified
Specified substance(s): Octamethylcyclotetrasilox ane	Not classified

Specific Target Organ Toxicity - Repeated Exposure

Product:	No data available.
Specified substance(s): 3-Am inopropyltriethoxysilan e	Not classified
Specified substance(s): Octamethylcyclotetrasilox ane	Not classified

Aspiration Hazard

Product:	No data available.
Specified substance(s): 3-Am inopropyltriethoxysilan e	Not classified
Specified substance(s): Octamethylcyclotetrasilox ane	Not classified

Other effects: No data available.

Additional toxicological Information under the conditions of use

Symptoms related to the physical, chemical and toxicological characteristics under the condition of use

Ingestion:	
Specified substance(s):	
2-Pentanone, oxime	No data available.
Ingestion:	
Specified substance(s):	
Ethanol	No data available.
Inhalation:	
Specified substance(s):	
2-Pentanone, oxime	No data available.
Inhalation:	
Specified substance(s):	
Ethanol	No data available.

Skin contact:
Specified substance(s):
2-Pentanone, oxime No data available.
Skin contact:
Specified substance(s):
Ethanol No data available.

Eye contact:
Specified substance(s):
2-Pentanone, oxime No data available.
Eye contact:
Specified substance(s):
Ethanol No data available.

Additional toxicological Information under the conditions of use:

Acute toxicity

OralSpecified substance(s):
2-Pentanone, oxime LD 50 (Rat, Female): 1,133 mg/kg (OECD 425) moderately toxic after single exposure Gavage (Oral)
OralSpecified substance(s):
Ethanol LD 50 (Rat): 15,010 mg/kg (OECD 401) Not classified

Dermal
Specified substance(s):
2-Pentanone, oxime No data available.
Dermal
Specified substance(s):
Ethanol LD 50 (Rabbit): 15,800 mg/kg
Not classified

Inhalation
Specified substance(s):
2-Pentanone, oxime LC 50 (Rat, Female, Male, 4 h): 1.22 mg/l (OECD 403) Not classified Vapor
Inhalation
Specified substance(s):
Ethanol LC 50 (Mouse, 1 h): 114 mg/l (OECD 403) Not classified Vapor

Repeated dose toxicitySpecified substance(s):
2-Pentanone, oxime NOAEL (Rat(Female, Male), Oral): 15 mg/kg Subacute exposure Gavage (Oral)
NOAEL (Rat(Female, Male), Inhalation): 1.25 mg/l Subacute exposure
NOAEL (Rat(Female, Male), Inhalation): 1.24 mg/l Subchronic exposure No effect observed up to the highest dose tested
Repeated dose toxicitySpecified substance(s):
Ethanol NOAEL (Mouse(Female), Oral): > 9,400 mg/kg Subchronic exposure Drinking Water (Oral)
NOAEL (Rat, Inhalation - vapour): > 20 mg/l Subacute exposure

Skin Corrosion/Irritation
Specified substance(s):
2-Pentanone, oxime OECD 404 (Rabbit): Not irritating Results obtained on a similar product.
Skin Corrosion/Irritation
Specified substance(s):
Ethanol Draize test (Human): Not irritating

Serious Eye Damage/Eye Irritation

Specified substance(s):
2-Pentanone, oxime OECD 405 (Rabbit): Irritant.
Serious Eye Damage/Eye Irritation
Specified substance(s):
Ethanol OECD 405 (Rabbit): Irritant.

Respiratory or Skin Sensitization
Specified substance(s):
2-Pentanone, oxime , OECD 406 (Guinea Pig)Not a skin sensitizer.
Respiratory or Skin Sensitization
Specified substance(s):
Ethanol No data available.

Carcinogenicity
Specified substance(s):
2-Pentanone, oxime Not classified
Carcinogenicity
Specified substance(s):
Ethanol Not classified
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
Specified substance(s):
Ethanol

US. National Toxicology Program (NTP) Report on Carcinogens:
Specified substance(s):
Ethanol Known To Be Human Carcinogen.

Germ Cell Mutagenicity
In vitro
Specified substance(s):
2-Pentanone, oxime Bacterial reverse mutation test (OECD 471): No mutagenic effects. with and without metabolic activation
In vitro mammalian cell micronucleus test (OECD 487): No clastogenic effect. with and without metabolic activation
Germ Cell Mutagenicity
In vitro
Specified substance(s):
Ethanol Bacterial reverse mutation test (OECD 471): No mutagenic effects. with and without metabolic activation
In vitro gene mutations test on mammalian cells: (OECD 476): No mutagenic effects. with and without metabolic activation
Germ Cell Mutagenicity
In vivo
Specified substance(s):
2-Pentanone, oxime Mammalian erythrocyte micronucleus test (OECD 474) Oral (Rat, Male): Results obtained on a similar product. negative
Mammalian bone marrow chromosomal aberration test (OECD 475) Inhalation (Rat, Male): negative
In vivo mammalian alkaline comet assay (OECD 489) Inhalation (Rat, Male): negative
Germ Cell Mutagenicity
In vivo
Specified substance(s):
Ethanol No data available.
Reproductive toxicity
Specified substance(s):
2-Pentanone, oxime Not classified
Reproductive toxicity

Specified substance(s):
Ethanol Not classified
Specific Target Organ Toxicity - Single Exposure
Specified substance(s):
2-Pentanone, oxime Not classified
Specific Target Organ Toxicity - Single Exposure
Specified substance(s):
Ethanol Not classified
Specific Target Organ Toxicity - Repeated Exposure
Specified substance(s):
2-Pentanone, oxime Oral: Blood, Spleen. - May cause damage to organs through prolonged or repeated exposure.
Specific Target Organ Toxicity - Repeated Exposure
Specified substance(s):
Ethanol Not classified

Aspiration Hazard
Specified substance(s):
2-Pentanone, oxime Not classified
Aspiration Hazard
Specified substance(s):
Ethanol Not classified

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	LC 50 (Danio rerio, 96 h): > 934 mg/l
Octamethylcyclotetrasiloxane	LC 50 (Oncorhynchus mykiss, 96 h): > 0.022 mg/l

Aquatic Invertebrates
Product: No data available.

Specified substance(s):

3-Aminopropyltriethoxysilane	EC 50 (Water flea (Daphnia magna), 48 h): 331 mg/l
Octamethylcyclotetrasiloxane	EC 50 (Water flea (Daphnia magna), 48 h): > 0.015 mg/l

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Specified substance(s):
Octamethylcyclotetrasiloxane NOEC (Oncorhynchus mykiss, 93 d): >= 0.0044 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s):
Octamethylcyclotetrasiloxane: NOEC (Water flea (Daphnia magna), 21 d): >= 0.015 mg/l

Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s):	
3-Aminopropyltriethoxysilane	EC 50 (Green algae (Scenedesmus subspicatus), 72 h): > 1,000 mg/l NOEC (growth rate) (Green algae (Scenedesmus subspicatus), 72 h): 1.3 mg/l
Octamethylcyclotetrasiloxane	ErC50 (Algae (Pseudokirchneriella subcapitata), 96 h): > 0.022 mg/l ErC10 (Algae (Pseudokirchneriella subcapitata), 96 h): >= 0.022 mg/l

Persistence and Degradability

Biodegradation

Product: No data available.

Specified substance(s):	
3-Aminopropyltriethoxysilane	67 % (28 d, According to a standardised method.) The product is not readily biodegradable.
Octamethylcyclotetrasiloxane	3.7 % (28 d, OECD 310) The product is not considered to be readily biodegradable.

BOD/COD Ratio

Product: No data available.

Bioaccumulative potential

Bioconcentration Factor (BCF)

Product: No data available.

Specified substance(s):	
3-Aminopropyltriethoxysilane	Common Carp, Bioconcentration Factor (BCF): 3.4 (OECD 305)
Octamethylcyclotetrasiloxane	Fathead Minnow, Bioconcentration Factor (BCF): 14,900 (OECD 305) Not bioaccumulable based on the depuration rate constant

Partition Coefficient n-octanol / water (log Kow)

Product: No data available.

Specified substance(s):	
3-Aminopropyltriethoxysilane	Log Kow: -2.9 (estimated) Results obtained on a similar product.
Octamethylcyclotetrasiloxane	Log Kow: 6.49 25 °C (OECD 123)

Mobility in soil: No data available.

Known or predicted distribution to environmental compartments

3-Aminopropyltriethoxysilane	No data available.
Octamethylcyclotetrasiloxane	No data available.

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of waste at an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. Contaminated packages should be as empty as possible.

14. Transport information

This material is not subject to transport regulations.

Environmental hazards: Not regulated.

Special precautions for user: No special precautions.

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):
None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

X Acute (Immediate) X Chronic (Delayed) ☐ Fire ☐ Reactive ☐ Pressure Generating

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification
None present or none present in regulated quantities.

SARA 313 (TRI Reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65

This product can expose you to chemicals including

Toluene: which is known to the State of California to cause birth defects or other reproductive harm.
For more information go to www.P65Warnings.ca.gov.

US. New Jersey Worker and Community Right-to-Know Act
No ingredient regulated by NJ Right-to-Know Law present.

US. Massachusetts RTK - Substance List
No ingredient regulated by MA Right-to-Know Law present.

US. Pennsylvania RTK - Hazardous Substances
No ingredient regulated by PA Right-to-Know Law present.

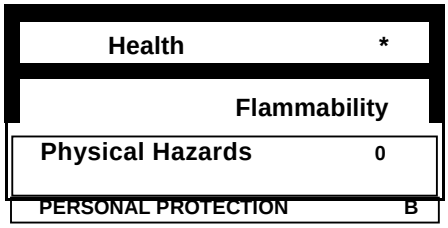
US. Rhode Island RTK
No ingredient regulated by RI Right-to-Know Law present.

Inventory Status:

US TSCA Inventory:	For research and development purposes only. This product contains a substance that is not listed on the TSCA inventory.
EINECS, ELINCS or NLP:	On or in compliance with the inventory.
New Zealand Inventory of Chemicals:	On or in compliance with the inventory.
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory.

16.Other information, including date of preparation or last revision

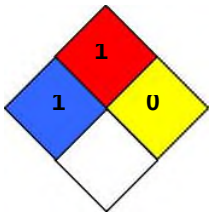
HMIS Hazard ID



B - Safety Glasses & Gloves

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	09/16/2019
Revision Date:	06/19/201908/07/201908/21/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/201909/12/2019
Version #:	1.0
Further Information:	No data available.
Disclaimer:	The information given is based on data available for the material, the components of the material, and similar materials. The information is believed to be correct. It is given in good faith. This information should be used to make an independent determination of the methods to safeguard workers and the environment.