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v	ersion 1
1 Identification	
Product identifier Product name: Carbonylchlorobis(triphenylphosphine)iridium(I)	
Stock number: 39413	
CAS Number: 14871-41-1	
EC number: 238-941-6	
Relevant identified uses of the substance or mixture and uses advised against. Identified use: SU24 Scientific research and development	
Details of the supplier of the safety data sheet Manufacturer/Supplier:	
Alfa Aesar Thermo Fisher Scientific Chemicals, Inc. 30 Bond Street	
Ward Hill, MA 01835-8099	
Tel: 800-343-0660 Fax: 800-322-4757	
Email: tech@alfa.com www.alfa.com	
Information Department: Health, Safety and Environmental Department Emergency telephone number:	
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.	
2 Hazard(s) identification	
Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)	
GHS06 Skull and crossbones	
Acute Tox. 3 H331 Toxic if inhaled.	
GHS07	
Acute Tox. 4 H302 Harmful if swallowed. Acute Tox. 4 H312 Harmful in contact with skin.	
Hazards not otherwise classified No information known.	
Label elements GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms	
GHS06	
Signal word Danger	
Hazard statements H302+H312 Harmful if swallowed or in contact with skin.	
H331 Toxic if inhaled. Precautionary statements	
P261 Ávoid breathing dust/fume/gas/mist/vapors/sprav	
P280 Wear protective gloves / protective clothing. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P311 Call a POISON CENTER/doctor.	
P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.	
WHMIS classification D1B - Toxic material causing immediate and serious toxic effects	
Classification system HMIS ratings (scale 0-4)	
(Hazardouš Materials Identification System)	
HEALTH 2 Health (acute effects) = 2 FIRE 1 Flammability = 1 FIRE 1 = 4	
REACTIVITY Physical Hazard = 1 Other hazards	
Results of PBT and vPvB assessment PBT: Not applicable.	
vPvB: Not applicable.	
3 Composition/information on ingredients	
Chemical characterization: Substances CAS# Description:	
14871-41-1 Carbonylchlorobis(triphenylphosphine)iridium(I) Concentration: ≤100%	
Identification number(s): EC number: 238-941-6	
	USA -

USA (Contd. on page 2)

Product name: Carbonylchlorobis(triphenylphosphine)iridium(I)

(Contd. of page 1)

4 First-aid measures Description of first aid measures After inhalation Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice. After skin contact Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice. After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor. After swallowing Seek medical treatment. Information for doctor Most important symptoms and effects, both acute and delayed Harmful if swallowed. Harmful in contact with skin. Toxic if inhaled Toxic if inhaled Indication of any immediate medical attention and special treatment needed No further relevant information available. 5 Fire-fighting measures Extinguishing media Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. Special hazards arising from the substance or mixture If this product is involved in a fire, the following can be released: Carbon monoxide and carbon dioxide Hydrogen chloride (HCI) Phosphorus oxides Iridium oxide Advice for firefighters Indum oxide Advice for firefighters Protective equipment: Wear self-contained respirator. Wear fully protective impervious suit. 6 Accidental release measures **Personal precautions, protective equipment and emergency procedures** Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation **Environmental precautions:** Do not allow product to reach sewage system or any water course. Methods and material for containment and cleaning up: Dispose of contaminated material as waste according to section 13. Dispose of contaminated material as waste according to section 13. Ensure adequate ventilation. Prevention of secondary hazards: No special measures required. Reference to other sections See Section 7 for information on safe handling See Section 8 for information on personal protection equipment. See Section 13 for disposal information. Protective Action Criteria for Chemicals PAC-1: Substance is not listed. PAC-2: Substance is not listed. PAC-3: Substance is not listed. 7 Handling and storage Handling Precautions for safe handling Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Information about protection against explosions and fires: No information known. Conditions for safe storage, including any incompatibilities Storage Requirements to be met by storerooms and receptacles: No special requirements. Information about storage in one common storage facility: Store away from oxidizing agents. Further information about storage conditions: Keep container tightly sealed. Store in cool, dry conditions in well sealed containers. **Specific end use(s)** No further relevant information available. 8 Exposure controls/personal protection Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute. Control parameters Components with limit values that require monitoring at the workplace: The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace. Additional information: No data Exposure controls Personal protective equipment Personal protective equipment General protective and hygienic measures The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin. Maintain an ergonomically appropriate working environment. Breathing equipment: Use suitable respirator when high concentrations are present. Recommended filter device for short term use: Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards. Protection of hands: Impervious gloves Impervious gloves Check protective gloves prior to each use for their proper condition. (Contd. on page 3)



(Contd. of page 2)

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The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer. **Penetration time of glove material (in minutes)** Not determined **Eye protection:** Safety glasses with side shields / NIOSH (US) or EN 166(EU) **Body protection:** Protective work clothing.

9 Physical and chemical properties	
Information on basic physical and ch General Information Appearance: Form:	
Form: Odor:	Crystalline Not determined
Odor threshold:	Not determined.
pH-value:	Not applicable.
Change in condition Melting point/Melting range: Boiling point/Boiling range: Sublimation temperature / start: Flammability (solid, gaseous) Ignition temperature: Decomposition temperature: Auto igniting:	215 °C (419 °F) (dec) Not determined Not determined Not determined Not determined Not determined Not determined
Danger of explosion: Explosion limits: Lower: Upper: Vapor pressure: Density:	Not determined. Not determined Not applicable. Not determined
Relative density Vapor density Evaporation rate Solubility in / Miscibility with Water: Partition coefficient (n-octanol/water)	Not determined. Not applicable. Not applicable. Insoluble : Not determined
Viscosity: dynamic: kinematic: Other information	Not applicable. Not applicable. No further relevant information available.
10 Stability and reactivity Reactivity No information known. Chemical stability Stable under recomm Thermal decomposition / conditions to Possibility of hazardous reactions Re Conditions to avoid No further relevant Incompatible materials: Oxidizing age Hazardous decomposition products: Carbon monoxide and carbon dioxide Hydrogen chloride (HCI) Phosphorus oxides (e.g. P2O5) Iridium oxide	mended storage conditions. to be avoided: Decomposition will not occur if used and stored according to specifications. eacts with strong oxidizing agents t information available. nts
11 Toxicological information Information on toxicological effects Acute toxicity:	
Harmful in contact with skin. Harmful if swallowed. Toxic if inhaled. Danger through skin absorption.	
LD/LC50 values that are relevant for of Skin irritation or corrosion: May cause Eye irritation or corrosion: May cause Sensitization: No sensitizing effects kno Germ cell mutagenicity: No effects kno Carcinogenicity: No classification data	e irritation e irritation own.
Reproductive toxicity: No effects know	
	- repeated exposure: No effects known.
Specific target organ system toxicity Aspiration hazard: No effects known. Subacute to chronic toxicity: No effec Additional toxicological information:	
12 Ecological information Toxicity Aquatic toxicity: No further relevant inf Persistence and degradability No furth Bioaccumulative potential No further r Mobility in soil No further relevant infor Additional ecological information: General notes: Do not allow undiluted product or large of Avoid transfer into the environment.	her relevant information available. relevant information available. rmation available. quantities to reach ground water, water course or sewage system.
Results of PBT and vPvB assessmen PBT: Not applicable. vPvB: Not applicable.	t (Contd. on pa

Disposal considerations Waste treatment methods Recommendation Consult state, local or national regulations to ensure proper disposal. Uncleaned packagings: Recommendation: Disposal must be made according to official regulations. Transport information UN-Number DOT, IMDG, IATA UN2811 UN proper shipping name DOT Toxic solids, organic, n.o.s. (Carbonylchlorobis(triphenylphosphine)iridium(l))	Other adverse effects No further relevant information a	available (Contd. of page
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Marine Pollutant (DOT): No IMDG Limited quantities (LQ) 5 kg Code: E1 Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 100 g UN "Model Regulation": UN 2811 TOXIC SOLIDS, ORGANIC, N.O.S. (CARBONYLCHLOROBIS(TRIPHENYLPHOSPHINE)/RIDIUM(I)), 6.1, III Regulatory information Safety, health and environmental regulations/legislation specific for the substance or mixture GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Warard pictograms With Skin. Wood Signal word Danger Hazard statements Hazard statements Precautionary statements Precautionary statements P11 Avoid breathing dus/fume/gas/mist/vapors/spray P280 Wear protective gloves / protective clothing. P311 Coal a POISON CENTER/doctor. P304 Flore Contents/container in accordance with local/regional/national/international regulations. P311 Call a POISON CENTER/doctor. P305 Store locked up. P304 Tokic product are listed on the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory. All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL). Substances List (NDSL). SARA Section 1313 (Specific toxic chemical listed, in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.		On passenger aircraft/rail: 100 kg
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Excepted quantities (EQ) Code: E1 Maximum net quantity per outer packaging: 30 g Maximum net quantity per outer packaging: 1000 g UN "Model Regulation": UN 2811 TOXIC SOLIDS, ORGANIC, N.O.S. (CARBONYLCHLOROBIS(TRIPHENYLPHOSPHINE)IRIDIUM(I)), 6.1, III Regulatory information Safety, health and environmental regulations/legislation specific for the substance or mixture GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms WW Word Danger Hazard statements Hazard statements Frequencial statements H302+H3712 Harmful if swallowed or in contact with skin. H301 Toxic if inhaled. Precautionary statements P260 Wear protective gloves / protective clothing. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-B340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304-B340 IF INHALED: Remove person to fresh air and keep comfortable	IMDG Limited quantities (LQ)	5 ka
Maximum net quantity per outer packaging: 1000 g UN "Model Regulation": UN 2811 TOXIC SOLIDS, ORGANIC, N.O.S. (CARBONYLCHLOROBIS(TRIPHENYLPHOSPHINE)IRIDIUM(I)), 6.1, III Regulatory information Safety, health and environmental regulations/legislation specific for the substance or mixture GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms Image: Comparison of the substance or mixture GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms Image: Comparison of the substance or mixture GHS06 Signal word Danger Hazard statements Hazard statements Hazard statements Toxic if inhaled. Precautionary statements Precautionary statements Precautionary statements P280 Wear protective gloves / protective clothing. P311 Call a POISON CENTER/doctor. P405 Store locked up. P401 Dispose of contents/container in accordance with local/regional/international regulations. National regulations All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory. All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL). SARA Section 313 (Specific toxic chemical listings) Substance is not listed.	Excepted quantities (EQ)	Code: E1
(CARBONYLCHLOROBIS(TRIPHENYLPHOSPHINE)IRIDIUM(I)), 6.1, III Regulatory information Safety, health and environmental regulations/legislation specific for the substance or mixture GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms GHS06 Signal word Danger Hazard statements H302+H312 Hamful if swallowed or in contact with skin. H31 Toxic if inhaled. Precautionary statements P261 Avoid breathing dust/fume/gas/mist/vapors/spray P280 Wear protective gloves / protective clothing. P304+P340 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P310 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and keep comfortable for breathing. P304+P304 IF INHALED. Remove person to fresh air and kee		Maximum net quantity per outer packaging: 1000 g
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All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory. All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL). SARA Section 313 (specific toxic chemical listings) Substance is not listed.	Safety, health and environmental regulations/legisla GHS label elements The product is classified and label Hazard pictograms GHS06 Signal word Danger Hazard statements H302+H312 Harmful if swallowed or in contact with skin. H331 Toxic if inhaled. Precautionary statements P261 Avoid breathing dust/fume/gas/mist/vapors/ P280 Wear protective gloves / protective clothing. P304+P340 IF INHALED: Remove person to fresh air ar P311 Call a POISON CENTER/doctor. P405 Store locked up. P501 Dispose of contents/container in accordance National regulations	led in accordance with 29 CFR 1910 (OSHA HCS) n. /spray n nd keep comfortable for breathing. ree with local/regional/national/international regulations.
SARA Section 313 (specific toxic chemical listings) Substance is not listed.	All components of this product are listed in the U.S. Env	vironmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
	All components of this product are listed on the Canadia SARA Section 313 (specific toxic chemical listings)	Substance is not listed.

Product name: Carbonylchlorobis(triphenylphosphine)iridium(l)

(Contd. of page 4)

USA

California Proposition 65 Prop 65 - Chemicals known to cause cancer Substance is not listed. Prop 65 - Developmental toxicity Substance is not listed. Prop 65 - Developmental toxicity, female Substance is not listed. Prop 65 - Developmental toxicity, male Substance is not listed. Information about limitation of use: For use only by technically qualified individuals. Other regulations, limitations and prohibitive regulations Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed. The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed. Substance is not listed.

Substance is not listed. Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed. Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department Date of preparation/Revision: Print date, revision date and version number are in the header of each page. Abbreviations and acronyms: ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) IMDG: International Martime Code for Dangerous Goods DOT: US Department of Transportation

ADK. Accord enoipeen suit et ansport des inactionaises dangereuses par Ac IMDG: International Maritime Code for Dangerous Goods DOT: US Department of Transport Association EINECS: European Inventory of Existing Commercial Chemical Substances CAS: Chemical Abstracts Service (division of the American Chemical Society) HMIS: Hazardous Materials Identification System (USA) WHMIS: Workplace Hazardous Materials Information System (Canada) LC50: Lethal concentration, 50 percent DS0: Lethal concentration, 50 percent DS0: Lethal cose, 50 percent DS0: Evistances of Very High Concern vPvB: very Persistent and very Bioaccumulative ACGIH: American Conference of Governmental Industrial Hygienists (USA) MTP: National Toxicology Program (USA) IAF: Occupational Safety and Health Administration (USA) NTP: National Toxicology Program (USA) IAFC: International Agency for Research on Cancer EPA: Environmental Protection Agency (USA) Acute Tox. 4: Acute toxicity – Category 4 Acute Tox. 3: Acute toxicity – Category 3