

CANON OPTRON INC.  
 SDS Number: ES18  
 Product Name: S5F

# SAFETY DATA SHEET

rev. 8.0 Date of Issue 2013/10/16  
 Revised Date 2024/3/15

## SECTION 1 Chemicals and company identification

|                            |   |
|----------------------------|---|
| Product name               | S5F   |
| Product code               | ES18  |
| Company name               | CANON OPTRON INC.                                       |
| Address                    | 1744-1, Kanakubo, Yuki-shi, Ibaraki-ken, 307-0015 Japan |
| Section name               | Sales Department  |
| Telephone number           | +81-296-21-3700   |
| Fax number                 | +81-296-21-3770   |
| Emergency telephone number | +81-296-21-3700   |
| Use                        | Vacuum deposition material                              |

## SECTION 2 Hazards identification

GHS Classification (A classification by JIS Z 7252 "classification methods such as chemical substances based on GHS")

|                  |  |                             |
|------------------|--|-----------------------------|
| Physical hazards | Explosives   | Classification not possible |
|                  | Flammable gases  | Not applicable              |
|                  | Aerosols   | Not applicable              |
|                  | Oxidizing gases  | Not applicable              |
|                  | Gas under pressure   | Not applicable              |
|                  | Flammable liquids  | Not applicable              |
|                  | Flammable solids   | Classification not possible |
|                  | Self-reactive substances and mixtures                                      | Classification not possible |
|                  | Pyrophoric liquids   | Not applicable              |
|                  | Pyrophoric solids  | Classification not possible |
|                  | Self-heating substances and mixtures                                       | Classification not possible |
|                  | Substances and mixtures which, in contact with water, emit flammable gases | Classification not possible |
|                  | Oxidizing liquids  | Not applicable              |
|                  | Oxidizing solids   | Classification not possible |
|                  | Organic peroxides  | Classification not possible |
|                  | Corrosive to metals  | Classification not possible |
| Health hazards   | Desensitize explosives   | Classification not possible |
|                  | Acute toxicity(oral)   | Classification not possible |
|                  | Acute toxicity(dermal)   | Classification not possible |
|                  | Acute toxicity (Inhalation: Gases)   | Not applicable              |
|                  | Acute toxicity (Inhalation: Vapors)  | Classification not possible |

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|                                    |   |                             |
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|                                    | Acute toxicity (Inhalation: Dusts and mists)  | Classification not possible |
|                                    | Skin corrosion/irritation   | Classification not possible |
|                                    | Serious eye damage/eye irritation   | Classification not possible |
|                                    | Respiratory sensitization   | Classification not possible |
|                                    | Skin sensitization  | Classification not possible |
|                                    | Germ cell mutagenicity  | Category 2                  |
|                                    | Carcinogenicity   | Category 1A                 |
|                                    | Reproductive toxicity   | Classification not possible |
|                                    | Reproductive toxicity, effects on or via lactation  | Classification not possible |
|                                    | Specific target organ toxicity(single exposure)   | Classification not possible |
|                                    | Specific target organ toxicity(repeated exposure)   | Category 1                  |
|                                    | Aspiration hazard   | Classification not possible |
| Environmental hazards              | Hazardous to the aquatic environment Short-term(acute)  | Classification not possible |
|                                    | Hazardous to the aquatic environment Long-term(chronic)   | Classification not possible |
|                                    | Hazardous to the ozone layer  | Classification not possible |
| Label elements                     |   |                             |
| hazard Pictograms                  | Health Hazard   |                             |
|                                    |    |                             |
| Signal word                        | Danger  |                             |
| Dangerous goods hazard information | Suspected of causing genetic defects.<br>May cause cancer.<br>Causes damage to organs through prolonged or repeated exposure Respiratory  |                             |
| Precautionary statements           |   |                             |
| 【Safety measures】                  | Obtain special instructions before use.<br>Do not handle until all safety precautions have been read and understood.<br>Do not breathe dust/fume/gas/mist/vapours/spray.<br>Wash hands thoroughly after handling.<br>Do not eat, drink or smoke when using this product.<br>Wear Protective glovess/protective clothing/eye protection/face protection. |                             |

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|                      |  |
|----------------------|--|
| 【First-aid measures】 | If exposed or concerned: Get medical advice/attention.<br>Get medical advice/attention if you feel unwell. |
| 【Storage】            | Store locked up.   |
| 【Disposal】           | Dispose of contents/container in accordance with national regulations.                                     |
| 【Other hazards】      | -  |

## SECTION 3 Composition/information on ingredients

|                                      |  |  |
|--------------------------------------|--|--|
| Substance/Mixture                    | Mixture  |  |
| Chemical name                        | Quartz   | Aluminum oxide                                   |
| Chemical formula                     | SiO <sub>2</sub> (Quartz)  | Al <sub>2</sub> O <sub>3</sub>                   |
| Concentration or concentration range | SiO <sub>2</sub> : 96.5- 98.5%<br>Al <sub>2</sub> O <sub>3</sub> : 1.5- 3.5%<br>Total = 100%                                   |  |
| CAS No.                              | 14808-60-7   | 1344-28-1  |
| TSCA Inventory                       | Quartz (SiO <sub>2</sub> )   | Aluminum oxide (Al <sub>2</sub> O <sub>3</sub> ) |
| EINECS number                        | 238-878-4  | 215-691-6  |
| Radioactive information              | Radioactive substances are not used as the material. Therefore, there is no reason that ionizing radiation would be generated. |  |

## SECTION 4 First aid measures

|   |  |
|---|--|
| Inhalation  | Remove person to fresh air and keep comfortable for breathing.<br>Get medical advice/attention if you feel unwell.   |
| Skin contact  | Take off immediately all contaminated clothing. Rinse affected areas with water/shower.<br>IF ON SKIN: Wash with plenty of soap and water.<br>If skin irritation or rash occurs: : Get medical advice/attention. |
| Eye contact   | Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>If eye irritation persists: Get medical advice/attention.                                |
| Ingestion   | Rinse mouth.<br>Get medical advice/attention.  |
| Most important symptoms and effects, both acute and delayed | No data available  |
| Protection of first aiders                                  | Rescuers, wear suitable protective equipment as the situation demands.   |
| Special precautions for physicians                          | No data available  |

## SECTION 5 Firefighting measures

|                                |                                       |
|--------------------------------|---------------------------------------|
| Suitable extinguishing media   | This product itself is not flammable. |
| Unsuitable extinguishing media | No data available                     |

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|   |  |
|---|--|
| Specific hazards                              | No data available  |
| Specific extinguishing methods                | In the case of a fire in the periphery, the portable container is quickly moved to a safe place. |
| Special protective equipment for firefighters | Wear suitable protective equipment (gloves, glasses and a mask) in fire-fighting.                |

## SECTION 6 Accidental release measures

|  |  |
|--|--|
| Personal precautions, protective equipment, and emergency procedures | Protection equipment (specified as those in which the properties of the product are suitable) worn during operation so that airborne droplets, etc., do not adhere to the skin and dusts and gases are not absorbed. |
| Environmental precautions  | The leakage may not directly flow into rivers or sewage.   |
| Methods and material for containment and cleaning up                 | The leaked material is scooped up, or swept up and gathered to be recovered in a paper bag or a drum.<br>After recovery, a small amount of the residue is absorbed in sediment, sawdust, etc.                        |
| Secondary disaster prevention measures                               | No data available  |

## SECTION 7 Handling and storage

|  |   |
|--|---|
| Precautions for safe handling                                |   |
| Technical measures   | Take measures for equipment as described in "8. Exposure controls/personal protection" and wear protective equipment. |
| Safety handling precautions                                  | Handling work must be practiced in a room where there is a local or total ventilation facility.                       |
| Avoidance of contact   | Refer to "10. Stability and reactivity."  |
| Hygiene measures   | Wash hands thoroughly after handling.<br>Do not eat, drink or smoke when using this product.                          |
| Conditions for safe storage, including any incompatibilities |   |
| Safe storage conditions                                      | Store locked up.  |
| Safety packaging material                                    | No data available   |

## SECTION 8 Exposure controls/personal protection

|                           | <u>SiO2 (Quartz)</u>   | <u>Al2O3</u>                        |
|---------------------------|--|-------------------------------------|
| Permissible concentration |  |                                     |
| ACGIH                     | TLV-TWA: 0.025 mg/m <sup>3</sup> (respiratory fraction)<br>(a crystalline silica, α-quartz and cristobalite)<br>(2015 version) | TWA 1 mg/m <sup>3</sup> (R), STEL - |

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Appropriate engineering controls Use sealed devices, equipment, or a local exhaust ventilation as much as possible.

Individual protection measures, such as personal protective equipment

|                        |                     |
|------------------------|---------------------|
| Respiratory protection | Dustproof mask      |
| Hand protection        | Protective gloves   |
| Eye/face protection    | Dust-proof glasses  |
| Skin protection        | Protective clothing |

## SECTION 9 Physical and chemical properties

## Appearance

|                |                   |
|----------------|-------------------|
| Physical state | Solid             |
| Form           | Pellets, granules |
| Colour         | White             |
| Odour          | None              |

SiO<sub>2</sub> (Quartz)Al<sub>2</sub>O<sub>3</sub>

|  |                               |   |
|--|-------------------------------|---|
| Melting point/freezing point                             | 1610°C                        | 2072°C  |
| Boiling point or initial boiling point and boiling range | 2230°C                        | 2980°C  |
| Flammability   | No data available             | No data available                                 |
| Upper/lower flammability or explosive limits             | Nonflammability (ICSC (2010)) | No data available                                 |
| Flash point  | Noncombustibility             | Noncombustibility                                 |
| Auto-ignition temperature                                | Noncombustibility             | Noncombustibility                                 |
| Decomposition temperature                                | No data available             | No data available                                 |
| pH   | No data available             | No data available                                 |
| Kinematic viscosity                                      | No data available             | No data available                                 |
| Solubility   |                               |   |
| Water  | Insoluble                     | Insoluble   |
| Other solvents   | No data available             | The slightly soluble in non-polar organic solvent |
| Partition coefficient: n-octanol/water                   | No data available             | No data available                                 |
| Vapour pressure  | 0 mmHg (20°C) (HSFS (2015))   | 0.073Pa (mp.)                                     |

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|                                 |                             |                   |
|---------------------------------|-----------------------------|-------------------|
| Density and/or relative density | No data available           | 3.97              |
| (Density)                       | ※ 1.3 ~ 1.9 (pellet) as S5F |                   |
| Relative vapor density          | No data available           | No data available |
| Particle characteristics        | No data available           | No data available |
| Other information               | No data available           | No data available |

## SECTION 10 Stability and reactivity

SiO2 (Quartz)Al2O3

|                                    |   |  |
|------------------------------------|---|--|
| Reactivity                         | No data available   | No data available                                |
| Chemical stability                 | No data available   | Stability  |
| Possibility of hazardous reactions | It produce alkali hydroxide, hydrogen fluoride, hydrofluoric acid and a dangerous reaction. | Possibility of hazardous reaction is negligible. |
| Conditions to avoid                | No data available   | Generation of dust, diffusion.                   |
| Incompatible materials             | No data available   | Not applicable                                   |
| Hazardous decomposition products   | No data available   | Not applicable                                   |

## SECTION 11 Toxicological information

SiO2 (Quartz)Al2O3

|  |                        |   |
|--|------------------------|---|
| Acute toxicity(oral)                         | No data available      | SPECIES: Rat<br>ENDPOINT: LD50<br>VALUE: > 5000 mg/kg |
| Acute toxicity(dermal)                       | No data available      | No data available                                     |
| Acute toxicity (Inhalation: Gases)           | Solid (GHS definition) | Solid (GHS definition)                                |
| Acute toxicity (Inhalation: Vapours)         | Solid (GHS definition) | No data available                                     |
| Acute toxicity (Inhalation: Dusts and mists) | No data available      | No data available                                     |
| Skin corrosion/irritation                    | No data available      | No data available                                     |
| Serious eye damage/irritation                | No data available      | No data available                                     |
| Respiratory or skin sensitization            | No data available      | No data available                                     |

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## Germ cell mutagenicity

As for in vivo, an hprt gene mutation test with alveolar epithelial cells of rats dosed by intratracheal instillation was positive, an hprt gene mutation test with the lung tissue of mice was negative though the method of administration was not specified, a micronucleus test with mice dosed intraperitoneally was negative, a chromosomal aberration test and a sister chromatid exchange test with human lymphocytes were positive though exposure methods were not specified, oxidative DNA damage tests with the lung and peripheral blood of rats were positive or negative, and DNA strand break tests with the epithelial lung cells of rats were positive (SIDS (2013), CICAD 24 (2000), DFGOT Vol. 14 (2000), IARC 68 (1997)). As for in vitro, mammalian cell gene mutation tests gave positive and negative results, micronucleus tests with mammalian cultured cells gave positive and negative results, and chromosomal aberration tests and sister chromatid exchange tests with mammalian cultured cells were negative (SIDS (2013), CICAD 24 (2000), DFGOT Vol. 14 (2000), IARC 68 (1997)). From the above, this substance was classified in Category 2 in accordance with the GHS classification guidance for the Japanese government. Besides, the genotoxicity of this substance is thought to be attributable to reactive oxygen species derived from this substance or from the inflammatory cells caused by this substance (SIDS (2013), IARC 100C (2012)).

The in vivo mutagenicity test has not been carried out, and in the in vitro mutagenicity test, we could only find the Ames test (negative). Therefore we presupposed that we could not classify it for the lack of data.

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## Carcinogenicity

In the results of many epidemiological studies, a positive correlation between occupational exposure to crystalline silica containing this substance (quartz) and an increased risk of lung cancer was found. Also, in particular, even when the results of multiple studies were pooled, and different meta-analyses were conducted, a significant increase in the relative risk was shown consistently (IARC 100C (2012), SIDS (2013)). Accordingly, it is described that there is sufficient evidence for an increased risk of lung cancer in humans by inhalation exposure to crystalline silica dust with the shape of this substance (quartz) (IARC 100C (2012)).

Meanwhile, in experimental animals, in a 2-year test in which female and male rats were exposed by inhalation to 1 mg/m<sup>3</sup> of this substance (mass median aerodynamic diameter (MMAD): 1.3 micrometers), and in a 83-week test in which female rats were exposed by nose inhalation to 12 mg/m<sup>3</sup> of this substance (MMAD: 2.24 micrometers), significant increases in lung tumors were observed in the exposed group, and there were many adenocarcinomas as the histological type. Furthermore, also in a study in which female rats were exposed by nose inhalation to 6.1 and 30.6 mg/m<sup>3</sup> of this substance (MMAD: 1.8 micrometers), a dose-dependent increase in lung tumors was observed, and squamous cell carcinoma was the most common in the histological type, and bronchiolo/alveolar epithelial carcinomas or adenomas were often observed (IARC 100C (2012)).

From the above, based on information on carcinogenicity in humans and experimental animals, in 1997, IARC classified it in Group 1 with regard to carcinogenicity in humans due to exposure to the dust of this substance, and even in a reevaluation in 2012, the classification result was not changed (IARC 68 (1997), IARC 100C (2012)). As for results of carcinogenicity classifications by other organizations, Japan Society for Occupational Health classified it in Group 1 (Recommendation of Occupational Exposure Limits (2015)), ACGIH has classified it in A2 since 2004 (ACGIH (7th, 2006)), and NTP classified Crystalline Silica (Respirable Size) as K (NTP RoC (13th, 2014)). Therefore, it was classified in Category 1A for this hazard class.

Not classified because of "A"

## Reproductive toxicity

No data available

No data available



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|   |  |  |
|---|--|--|
| Specific target organ toxicity(single exposure)   | Classification not possible due to lack of data. Besides, the data on effects on the human respiratory organs used in the previous classification was short-term exposure data and not data on single-dose acute effects.  | It was set as category 3 (respiratory irritation) from the statement of upper respiratory irritation (ICSC (2000)).                                |
| Specific target organ toxicity(repeated exposure) | In humans, in many epidemiological studies, effects on the respiratory organs (silicosis, lung cancer, pulmonary tuberculosis) due to occupational exposure to this substance were found. In addition, autoimmune diseases (scleroderma, rheumatoid arthritis, polyarthritis, mixed connective tissue disease, systemic lupus erythematosus, Sjogren's syndrome, polymyositis, fibrositis), chronic renal disease, and subclinical renal changes were also observed (SIDS (2013), CICAD 24 (2000), DFGOT vol. 14 (2000)). These kidney diseases are thought to be related to autoimmunity (SIDS (2013)). Likewise in experimental animals, fibrosis in the lung was found in repeated inhalation exposure tests with rats (SIDS (2013)). Therefore, it was classified in Category 1 (respiratory organs, immune system, kidney). | It was classified into Category 1 according the statement that by occupational exposure of aluminas, pulmonary fibrosis was occurred (EHC (1997)). |
| Aspiration hazard                                 | No data available  | No data available  |
| Other information                                 | No data available  |  |

## SECTION 12 Ecological information

SiO2 (Quartz)Al2O3

## Toxicity

|   |   |                   |
|---|---|-------------------|
| Hazardous to the aquatic environment Short-term(acute)  | From the test data on amorphous silica of 24-hour LL50 > 10,000 mg/L for crustacea (Daphnia magna) and 96-hour LL0 = 10,000 mg/L for fish (Danio rerio) (both SIDS, 2013), it was classified as "Not classified." | No data available |
| Hazardous to the aquatic environment Long-term(chronic) | No data available   | No data available |
| Persistence and degradability                           | No data available   | No data available |
| Bioaccumulative potential                               | No data available   | No data available |
| Mobility in soil  | No data available   | No data available |
| Hazard to the ozone layer                               | No data available   | No data available |
| Other adverse effects                                   | No data available   | No data available |

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## SECTION 13 Disposal considerations

|   |  |
|---|--|
| Waste treatment methods                           | Process is contracted to industrial waste disposers who received approval of a prefectural governor.   |
| Contaminated container and contaminated packaging | The container is recycled after being cleaned, or is appropriately processed according to the standards of related laws and regulations.<br>When disposing of empty containers, the contents should be completely removed. |

## SECTION 14 Transport information

|   | <u>SiO2 (Quartz)</u>  | <u>Al2O3</u>   |
|---|---|--|
| International regulation                                |   |  |
| UN number   | Not applicable  | Not applicable   |
| UN proper shipping name                                 | Not applicable  | Not applicable   |
| UN classification                                       | Not applicable  | Not applicable   |
| Transport hazard class                                  | Not applicable  | Not applicable   |
| Packing group   | Not applicable  | Not applicable   |
| Hazardous to the aquatic environment                    | No data available   | No data available  |
| Maritime transport in bulk according to IMO instruments | No data available   | No data available  |
| Japanese laws and regulations                           | Land regulation information Not applicable<br>Maritime regulatory information non-hazardous materials<br>Aviation regulatory information non-hazardous materials  | Land regulation information Not applicable<br>Maritime regulatory information non-hazardous materials<br>Aviation regulatory information non-hazardous materials |
| Special precautions for users                           | Requires retention of yellow card when transporting.<br>When transporting, protect from direct sunlight and take on cargo without breakage of container, corrosion and leakage.<br>Do not stack heavy good thereupon. | When transporting, protect from direct sunlight and take on cargo without breakage of container, corrosion and leakage.  |
| Special Provisions                                      | -   | -  |

## SECTION 15 Regulatory information (Japan)

|  | <u>SiO2 (Quartz)</u>  | <u>Al2O3</u>   |
|--|---|----------------|
| Occupational Safety and Health Law               | There is it in the case of an application or an application | Not applicable |
| PRTR Law   | Not applicable  | Not applicable |
| Poisonous and Deleterious Substances control Law | Not applicable  | Not applicable |
| Labor Standards Act                              | There is it in the case of an application or an application | Not applicable |

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|   |  |   |
|---|--|---|
| Chemical substances control Law           | Not applicable   | Not applicable  |
| Fire fighting Law                         | Not applicable   | Not applicable  |
| Air Pollution Control Act                 | Not applicable   | Not applicable  |
| Water Pollution Prevention Act            | Not applicable   | There is it in the case of an application or an application |
| Water Supply Act                          | Not applicable   | There is it in the case of an application or an application |
| Sewerage Act                              | Not applicable   | Not applicable  |
| Marine Pollution Prevention Law           | There is it in the case of an application or an application  | Not applicable  |
| Waste Management and Public Cleansing Act | Not applicable   | Not applicable  |
| Note                                      | Ensure this material in compliance with federal requirements and ensure conformity to local regulations. |   |

## SECTION 16 Other information

The Safety Data Sheet (SDS) has been prepared based on currently available materials, information and data, and may be revised based on new information. Further, the important points in the SDS are made for the purpose of normal handling.

When handling the user product in a specialized manner, take the appropriate safety measures for the application or method.

Further, Canon Optron Inc. has paid sufficient attention to the described contents of the SDS, but does not guarantee the accuracy of its contents.

The SDS prepared by our company includes all findings from our investigation for reference. Not applicable to all items listed.

## Literature Reference

[WEB site]

National Institute of Technology and Evaluation Homepage

Japan Advanced Information Center of Safety and Health Homepage

Ministry of Health, Labour and Welfare Homepage

[Regulatory review Tools]

ezCRIC+ (Japan Chemical Database Ltd)