

Material Safety Data Sheet

Product

Plat Brown (True)

1. Information on the chemical product and company

A. Product	Plat Brown (True)
B. Recommended use and limitations of the use of the product	
Recommended use of the product	Pigment / Colorant
Limitations of the use of the product	Skin contact / Eye contact / Ingestion / Inhalation
C. Supplier information (For imported goods, state the information of domestic supplier to contact in case of emergency)	
Company name	Blossom Cloud Inc
Address	7,8F 45, Seodaegu-ro, Daegu, Republic of Korea
Emergency contact number	+82-053-291-1111

2. Hazards identification

A. Hazard/Danger classification	Skin corrosion/irritation: Class 2 Severe eye damage/eye irritation: Class 2 (2A/2B) Carcinogenicity: Class 2 Specific target organ toxicity (single exposure): Class 3 (respiratory irritation) Specific target organ toxicity (single exposure): Class 3 (respiratory irritation) Specific target organ toxicity (repeated exposures): Class 2
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B. Warning label items, including precautionary statements

Pictograms



Signal word

Warning

H315 Causes skin irritation

H319 Causes serious eye irritation

H335 May cause respiratory irritation

Hazard/danger statements

H351 Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

H373 Causes damage to organs through prolonged or repeated exposure (list all organs known to be affected). (Specify exposure paths that cause toxicity to the specific target organ (repeated exposure). However, it is limited to cases where there is conclusive evidence that toxicity to the specific target organ (repeated exposure) is not caused.)

Precautionary statements

P201 Obtain special instructions before use.

P202 Read and understand all safety precautions before handling.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

Preventive

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 Wash ... thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 IF ON SKIN: Wash it with a large amount of water/...

P304+P340 IF INHALED: Move the victim to an area with fresh air and have him or her take relaxed in a posture that allows for easy breathing.

Response

P305+P351+P338 IF IN EYES: Rinse continuously with water for several minutes.

Remove contact lenses if present and easy to do. Continue rinsing.

P308+ P308 If exposed or concerned: Get medical advice/attention.

P312 Consult with a medical institute/doctor/... if feeling uncomfortable.

	P314 Get medical advice/attention if you feel unwell.
	P321 Specific treatment
	P332+P313 If skin irritation occurs: Get medical advice/attention.
	P337+P313 If eye irritation persists: Get medical advice/attention.
	P362+P364 Take off contaminated clothing and wash it before reuse.
Storage	P403+P233 Store the material in a well-ventilated place. Keep the container tightly closed.
	P405 Store locked up.
Disposal	P501 Dispose of contents/containers according to waste-related laws and regulations.

3. Component names and amount

Material	Other name (Common name)	CAS No.	Content (%)
Titanium dioxide		13463-67-7	9
Iron oxide		1309-37-1	9
Glyceryl stearate	Octadecanoic acid, ester, 1,2,3-propanetriol contained	11099-07-3	10
C.I. pigment black 11	Iron oxide black;	12227-89-3	28
Iron oxide, yellow	C.I. pigment yellow 42	51274-00-1	24
Water	Dihydrogen oxide;	7732-18-5	20

4. First-aid measures

A. Substance in eyes	<p>Get emergency medical treatment.</p> <p>If contact with the material, wash the skin and eyes with running water for at least 20 minutes.</p> <p>Rinse eyes carefully with water for a few minutes if the eyes made contact with the substance. Remove contact lenses if possible. Keep washing.</p> <p>Seek medical treatment or advice if the eye irritation continues.</p>
B. Contact with skin	<p>In the case of hot material, immerse or flush the affected area with a large amount of cold water to dissipate heat.</p> <p>Get emergency medical treatment.</p> <p>Remove and separate the contaminated clothes and shoes and isolate the contaminated area.</p> <p>If contact with the material, wash the skin and eyes with running water for at least 20 minutes.</p> <p>Prevent the spread of the contaminated area in case of slight skin contact.</p> <p>Consult with a medical institute (doctor) if exposed to the material or feeling uncomfortable.</p> <p>Consult with a medical institute (doctor) if feeling uncomfortable.</p> <p>Seek medical treatment or advice if the skin is irritated.</p>
C. Inhaled	<p>Take off the contaminated clothing and wash it before using it again.</p> <p>If the person does not breathe, perform artificial respiration.</p> <p>Supply oxygen if the person has difficulty of breathing.</p> <p>If a person is exposed to excessive dust or fumes of the product, remove the material with clean air and seek medical attention if the victim coughs or shows any other symptoms.</p> <p>Move the person to an area with fresh air.</p> <p>Get emergency medical treatment.</p> <p>If the person does not breathe, perform artificial respiration.</p> <p>If the substance is ingested or inhaled, do not perform mouth-to-mouth artificial respiration but use appropriate respiratory medical equipment.</p> <p>Supply oxygen if the person has difficulty of breathing.</p> <p>Keep the victim warm and stable.</p> <p>Seek medical treatment or advice if exposed or concerned about being exposed.</p> <p>Consult with a medical institute (doctor) if exposed to the material or feeling uncomfortable.</p>
D. Ingested	<p>If the victim is unconscious, do not give anything by mouth.</p> <p>Get emergency medical treatment.</p>

Glyceryl stearate	<p>Maintain a safe distance when extinguishing the fire. Note that the material may be melted when transported. Dig a ditch to dispose of extinguishing water and keep material from dispersing. Move containers from the fire area if it is not dangerous. Extinguish the fire from a maximum distance or use an automatic fire extinguishing system during a tank fire. Cool the tank with a large amount of water even after the tank fire is extinguished. Immediately withdraw from the area if there is a high hissing sound from the pressure relief device, or the tank discolors during a tank fire. Stay away from the tank in flames during a tank fire. In the case of a large tank fire, use unattained fire extinguishing equipment. If it is not available, stay away and let it burn.</p>
C.I. pigment black 11	<p>Rescuers should wear appropriate protective gear. Maintain a safe distance when extinguishing the fire. Note that the material may be melted when transported. Dig a ditch to dispose of extinguishing water and keep material from dispersing. Move containers from the fire area if it is not dangerous. Extinguish the fire from a maximum distance or use an automatic fire extinguishing system during a tank fire. Cool the tank with a large amount of water even after the tank fire is extinguished. Immediately withdraw from the area if there is a high hissing sound from the pressure relief device, or the tank discolors during a tank fire. Stay away from the tank in flames during a tank fire. In the case of a large tank fire, use unattained fire extinguishing equipment. If it is not available, stay away and let it burn.</p>
Iron oxide, yellow	<p>Maintain a safe distance when extinguishing the fire. Note that the material may be melted when transported. Dig a ditch to dispose of extinguishing water and keep material from dispersing. Move containers from the fire area if it is not dangerous. Extinguish the fire from a maximum distance or use an automatic fire extinguishing system during a tank fire. Cool the tank with a large amount of water even after the tank fire is extinguished. Immediately withdraw from the area if there is a high hissing sound from the pressure relief device, or the tank discolors during a tank fire. Stay away from the tank in flames during a tank fire. In the case of a large tank fire, use unattained fire extinguishing equipment. If it is not available, stay away and let it burn.</p>
Water	<p>Cool the tank with a large amount of water even after the tank fire is extinguished. Immediately withdraw from the area if there is a high hissing sound from the pressure relief device, or the tank discolors during a tank fire. Stay away from the tank in flames during a tank fire. Water splashed from the container heated and exploded may cause burns to the skin and eyes.</p>

6. Accidental release measures

A. Personal precautions, protective equipment, and emergency procedures

Stop leakage if it is not dangerous.

Be aware of the materials and conditions to avoid.
Wipe up spills immediately, and follow preventive measures in the protective equipment section.
Do not touch or walk on exposed substances.
Remove all ignition sources.
Stop leakage if it is not dangerous.
Do not touch damaged containers or spills without wearing appropriate protective clothing.
For leaks without fire, wear full-face vapor protective clothing.
Cover the material with plastic sheets to prevent diffusion.
Be aware of the materials and conditions to avoid.
Do not inhale dust, fume, gas, mist, vapors, or spray.
Avoid inhaling dust, fume, gas, mist, vapor, or spray.

B. Environmental precautions

Leaked material can cause contamination.

Prevent inflow into waterways, sewages, basements, or sealed areas.

C. Purification or removal

Absorb the spill with inert material (e.g., dry sand or soil) and place chemical waste in a container.

Absorb the liquid and wash the contaminated area with detergent and water.

Cover the material with dry sand/soil or other inert substance and then with plastic sheets to prevent diffusion and exposure to rain.

Use a clean explosion-proof tool to collect spills and place them in a loosely covered plastic container.

7. Handling and storage

A. Safe handling

Be aware of the materials and conditions to avoid.

Refer to engineering controls and personal protective gear when working.

Be careful of the high temperature.

Follow all MSDS/label precautions since product debris may remain after emptying the container.

Carefully handle and store the material

Carefully open the cap before opening it.

Avoid long-term or continuous contact with the skin.

Do not breathe vapors generated from heated material.

Do not access the storage area if not ventilated appropriately.

Be aware of the materials and conditions to avoid.

Be aware of the materials and conditions to avoid.

Refer to engineering controls and personal protective gear when working.

Read and understand all safety precautions before handling.

Avoid inhaling dust, fume, gas, mist, vapor, or spray.

Wash the handling part thoroughly after handling the product.

Do not eat, drink, or smoke when using the product.

Use the material only outdoors or in well-ventilated areas.

B. Safe storage method

Be aware of the materials and conditions to avoid.

Fully drain empty drums and properly close them to immediately return to the drum regulator or place them adequately.

Keep away from food and beverages.

Be aware of the materials and conditions to avoid.

Thoroughly seal the container and store it in a well-ventilated area.

Store the product in an area with a locking system.

8. Exposure controls and personal protection

A. Chemical material exposure criteria, biological exposure criteria, etc.

Domestic regulation

Titanium dioxide

TWA - 10 mg/m³ carcinogenic class 2

Iron oxide

TWA - 5 mg/m³

Glyceryl stearate

No data

C.I. pigment black 11

TWA - 5 mg/m³ iron oxide

Iron oxide, yellow

No data

Water

No data

ACGIH regulation

Titanium dioxide

TWA 10 mg/m³

Iron oxide

TWA 5 mg/m³

Glyceryl stearate

No data

C.I. pigment black 11

No data

Iron oxide, yellow

No data

Water

No data

Biological exposure criteria	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	Not applicable
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	Not applicable
Other exposure criteria	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
B. Adequate engineering control	Use process isolation, local ventilation, or other engineering control measures to lower the air level to the exposure criterion or below.
B. Adequate engineering control	If the operation generates dust, fume, or mist, ventilate the area to maintain the air pollution below the exposure limit.
B. Adequate engineering control	Install an eye-washing facility and safety shower in the facility using or storing this material.
C. Personal protective gear	
Protection of the respiratory system	
Titanium dioxide	Carcinogenic class 2
Titanium dioxide	Wear respiratory protective gear suitable for the exposed particulate material's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
Titanium dioxide	If the exposure concentration is lower than 100 mg/m ³ , wear half-face respiratory protective gear equipped with an appropriate filter.
Titanium dioxide	If the exposure concentration is lower than 250 mg/m ³ , wear loose-fitting hood/helmet-type electric respiratory protective gear or continuous flow dust mask equipped with an appropriate filter.
Titanium dioxide	If the exposure concentration is lower than 500 mg/m ³ , wear full-face, electric half-face, or air-supplied continuous flow/pressure-demanding half-face respiratory protective gear equipped with an appropriate filter.
Titanium dioxide	If the exposure concentration is lower than 10000 mg/m ³ , wear a full-face or helmet/hood-type pressure-demanding air-supplied respirator equipped with an appropriate filter.
Titanium dioxide	If the exposure concentration is lower than 100000 mg/m ³ , wear SCBA (self-contained breathing apparatus) or pressure-demanding SCBA respiratory protective gear equipped with an appropriate filter.
Iron oxide	Wear respiratory protective gear suitable for the exposed particulate material's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
Iron oxide	If the exposure concentration is lower than 50 mg/m ³ , wear half-face respiratory protective gear equipped with an appropriate filter.
Iron oxide	If the exposure concentration is lower than 125 mg/m ³ , wear loose-fitting hood/helmet-type electric respiratory protective gear or continuous flow dust mask equipped with an appropriate filter.
Iron oxide	If the exposure concentration is lower than 250 mg/m ³ , wear full-face, electric half-face, or air-supplied continuous flow/pressure-demanding half-face respiratory protective gear equipped with an appropriate filter.
Iron oxide	If the exposure concentration is lower than 5000 mg/m ³ , wear a full-face or helmet/hood-type pressure-demanding air-supplied respirator equipped with an appropriate filter.
Iron oxide	If the exposure concentration is lower than 50000 mg/m ³ , wear SCBA (self-contained breathing apparatus) or pressure-demanding SCBA respiratory protective gear equipped with an appropriate filter.
Glyceryl stearate	Wear respiratory protective gear suitable for the exposed particulate material's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
Glyceryl stearate	For particulate material, the following respiratory protective gear is recommended. - The face filter-type dust mask, air-filtering dust mask (high-efficiency particulate filter material), or dust mask with electric fan (filter material for dust, mist, and fume)
Glyceryl stearate	If short of oxygen (<19.6%), wear an air-supplied mask or SBCA (self-contained breathing apparatus) respiratory protective gear.

C.I. pigment black 11	Iron oxide
C.I. pigment black 11	Wear respiratory protective gear suitable for the exposed particulate material's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
C.I. pigment black 11	If the exposure concentration is lower than 50 mg/m ³ , wear half-face respiratory protective gear equipped with an appropriate filter.
C.I. pigment black 11	If the exposure concentration is lower than 125 mg/m ³ , wear loose-fitting hood/helmet-type electric respiratory protective gear or continuous flow dust mask equipped with an appropriate filter.
C.I. pigment black 11	If the exposure concentration is lower than 250 mg/m ³ , wear full-face, electric half-face, or air-supplied continuous flow/pressure-demanding half-face respiratory protective gear equipped with an appropriate filter.
C.I. pigment black 11	If the exposure concentration is lower than 5000 mg/m ³ , wear a full-face or helmet/hood-type pressure-demanding air-supplied respirator equipped with an appropriate filter.
C.I. pigment black 11	If the exposure concentration is lower than 50000 mg/m ³ , wear SCBA (self-contained breathing apparatus) or pressure-demanding SCBA respiratory protective gear equipped with an appropriate filter.
Iron oxide, yellow	Wear respiratory protective gear suitable for the exposed particulate material's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
Iron oxide, yellow	For particulate material, the following respiratory protective gear is recommended. - The face filter-type dust mask, air-filtering dust mask (high-efficiency particulate filter material), or dust mask with electric fan (filter material for dust, mist, and fume)
Iron oxide, yellow	If short of oxygen (<19.6%), wear an air-supplied mask or SBCA (self-contained breathing apparatus) respiratory protective gear.
Water	Wear respiratory protective gear suitable for the exposed gas/liquid's physical and chemical characteristics that are certified by the Korea Occupational Safety and Health Agency or equivalent.
Water	For gas/liquid material, the following respiratory protective gear is recommended. - Separate-type full-face gas mask (organic compound use (acid gas use in case of acid gas)), separate-type half-face gas mask (organic compound use (acid gas use in case of acid gas)), direct connection-type full-face gas mask (organic compound use (acid gas use in case of acid gas)), half-face gas mask (organic compound use (acid gas use in case of acid gas)), or electric gas mask
Water	If short of oxygen (<19.5%), wear an air-supplied mask or SBCA (self-contained breathing apparatus) respiratory protective gear.
Protection of eyes	Wear protective or breathable goggles to protect your eyes from particulate material that may cause eye irritation or other health hazards.
Protection of eyes	Install emergency washing facilities (shower type) and eye-washing facilities at places where workers can easily access them.
Protection of eyes	Wear protective or breathable goggles to protect your eyes from organic compound vapors that cause eye irritation or other health hazards.
Protection of eyes	Install emergency washing facilities (shower type) and eye-washing facilities at places where workers can easily access them.
Protection of hands	Considering the chemical's physical and chemical properties, wear protective gloves made of appropriate materials.
Protection of body	Considering the chemical's physical and chemical properties, wear protective clothing made of appropriate materials.
Protection of body	Wear protective clothing for high-temperature or high-pressure splash protection as necessary.

9. Physicochemical characteristics

A. Physical state	
Appearance	No data
Color	No data
B. Odor	No data
C. Odor threshold	No data
D. pH	No data
E. Melting point/freezing point	No data
F. Initial boiling point and boiling point range	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	No data
J. Upper/lower limits of the ignition or explosion range	No data

K. Vapor pressure	No data
L. Solubility	No data
M. Vapor density	No data
N. Relative density	No data
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	No data
Titanium dioxide	
A. Physical state	
Appearance	Solid (crystal)
Color	White
B. Odor	Odorless
C. Odor threshold	No data
D. pH	7
E. Melting point/freezing point	1843°C
F. Initial boiling point and boiling point range	3000°C (ca)
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	No data
J. Upper/lower limits of the ignition or explosion range	- / -
K. Vapor pressure	No data
L. Solubility	500.6 mg/l
M. Vapor density	No data
N. Relative density	3.9 (g/cm ³)
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	79.865
Iron oxide	
A. Physical state	
Appearance	Solid (crystal, powder)
Color	Red to black
B. Odor	No data
C. Odor threshold	No data
D. pH	No data
E. Melting point/freezing point	1565°C
F. Initial boiling point and boiling point range	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	Non-flammable
J. Upper/lower limits of the ignition or explosion range	- / -
K. Vapor pressure	No data
L. Solubility	(Insoluble)
M. Vapor density	No data
N. Relative density	5.24
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	159.70
Glyceryl stearate	
A. Physical state	
Appearance	Solid
Color	No data
B. Odor	No data
C. Odor threshold	No data
D. pH	No data
E. Melting point/freezing point	No data
F. Initial boiling point and boiling point range	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	No data
J. Upper/lower limits of the ignition or explosion range	No data
K. Vapor pressure	No data
L. Solubility	No data
M. Vapor density	13
N. Relative density	No data
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	376.574

C.I. pigment black 11

A. Physical state	Solid (fine black powder)
Appearance	Black
Color	Black
B. Odor	Odorless
C. Odor threshold	No data
D. pH	No data
E. Melting point/freezing point	1527°C
F. Initial boiling point and boiling point range	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	No data
J. Upper/lower limits of the ignition or explosion range	- / -
K. Vapor pressure	No data
L. Solubility	No data
M. Vapor density	No data
N. Relative density	5.18
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	231.54

Iron oxide, yellow

A. Physical state	Solid (nano material)
Appearance	No data
Color	No data
B. Odor	Scentless
C. Odor threshold	No data
D. pH	3.5 to 7.5 (50 g/l, sediment)
E. Melting point/freezing point	> 160°C (approximately 1013 hPa)
F. Initial boiling point and boiling point range	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	Not flammable
J. Upper/lower limits of the ignition or explosion range	No data
K. Vapor pressure	No data
L. Solubility	< 1 ug/L (20°C, pH: 8)
M. Vapor density	4.26 g/cm ³ (density)
N. Relative density	4.26 (20°C)
O. n-octanol-water partition coefficient (Kow)	No data
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	159.69

Water

A. Physical state	Liquid
Appearance	Colorless (transparent)
Color	Colorless (transparent)
B. Odor	Odorless
C. Odor threshold	(Not applicable)
D. pH	7
E. Melting point/freezing point	0°C
F. Initial boiling point and boiling point range	100°C
G. Flash point	(Not applicable)
H. Evaporation rate	No data
I. Flammability (Solid and vapor)	Not applicable
J. Upper/lower limits of the ignition or explosion range	- / - (not applicable)
K. Vapor pressure	23.8 mmHg (25°C)
L. Solubility	100 g/100 ml
M. Vapor density	No data
N. Relative density	1
O. n-octanol-water partition coefficient (Kow)	-1.38
P. Spontaneous ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	18.02

10. Stability and reactivity

A. Chemical stability and the possibility of the harmful reaction

Titanium dioxide	The material can be decomposed at a high temperature and generate toxic gas.
Titanium dioxide	The container may explode when heated.
Titanium dioxide	Some may burn but are not easily ignitable.
Titanium dioxide	Non-flammable. Although the material itself does not burn, it may decompose to generate corrosive/toxic fumes when heated.

Iron oxide	The container may explode when heated.
Iron oxide	Leaked material has a risk of fire or explosion.
Iron oxide	May be reignited even after extinguishing.
Iron oxide	May ignite when in contact with moisture.
Iron oxide	Flammable/combustible material
Iron oxide	Some substances can flash and burn quickly.
Iron oxide	Some react violently with water.
Iron oxide	Some may explosively decompose when heated or under fire.
Iron oxide	Inhalation of decomposed products may lead to severe injury or death.
Iron oxide	Contact with the skin and eyes can cause severe burns.
Iron oxide	This material can generate irritating, corrosive, and toxic gas during a fire.
Glyceryl stearate	The container may explode when heated.
Glyceryl stearate	Some may burn but are not easily ignitable.
Glyceryl stearate	Non-flammable. Although the material itself does not burn, it may decompose to generate corrosive/toxic fumes when heated.
Glyceryl stearate	This material can generate irritating, corrosive, and toxic gas during a fire.
C.I. pigment black 11	The container may explode when heated.
C.I. pigment black 11	Some may burn but are not easily ignitable.
C.I. pigment black 11	Non-flammable. Although the material itself does not burn, it may decompose to generate corrosive/toxic fumes when heated.
C.I. pigment black 11	This material can generate irritating, corrosive, and toxic gas during a fire.
Iron oxide, yellow	The material can be decomposed at a high temperature and generate toxic gas.
Iron oxide, yellow	The container may explode when heated.
Iron oxide, yellow	Some may burn but are not easily ignitable.
Iron oxide, yellow	Non-flammable. Although the material itself does not burn, it may decompose to generate corrosive/toxic fumes when heated.
Water	Stable at room temperature and pressure condition
Water	The container may explode when heated.
B. Conditions to avoid	
Titanium dioxide	Ignition sources such as heat, sparks, and flames
Iron oxide	Humidity
Iron oxide	Ignition sources such as heat, sparks, and flames
Glyceryl stearate	Ignition sources such as heat, sparks, and flames
C.I. pigment black 11	Ignition sources such as heat, sparks, and flames
Iron oxide, yellow	Ignition sources such as heat, sparks, and flames
Water	Heat and pollution
C. Materials to avoid	
Titanium dioxide	Combustible and reducing materials
Iron oxide	Water
Glyceryl stearate	Combustible and reducing materials
C.I. pigment black 11	Combustible and reducing materials
Iron oxide, yellow	Combustible and reducing materials
Water	Water-reactive substances

D. Harmful materials generated during decomposition

Titanium dioxide	Corrosive/toxic fume
Titanium dioxide	Irritating, corrosive, and toxic gases
Iron oxide	Irritating, corrosive, and toxic gases
Glyceryl stearate	Corrosive/toxic fume
Glyceryl stearate	Irritating, corrosive, and toxic gases
C.I. pigment black 11	Irritating and very toxic gases may be produced by pyrolysis or combustion.
C.I. pigment black 11	Corrosive/toxic fume
Iron oxide, yellow	Corrosive/toxic fume
Iron oxide, yellow	Irritating, corrosive, and toxic gases
Water	No data

11. Toxicological information

A. Information on likely exposure paths

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

B. Information on health hazards

Acute toxicity

Orally administered

Titanium dioxide	LD50 > 2000 mg/kg Mouse (OECD TG 420)
Iron oxide	LD50 > 10000 mg/kg rat (EU Method B.1; no disturbance observed)
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	LD50 > 10000 mg/kg Rat
Iron oxide, yellow	No data
Water	LD50 90000 mg/kg Rat (LD50 > 90 ml/kg (Rat))

Transdermal

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

Inhaled

Titanium dioxide	Dust LC50 > 6.82 mg/l rat (OECD TG 403, no mortality)
Iron oxide	Dust LC50 5.05 mg/l 4 hr rat (OECD TG403, GLP)
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	Mist discriminating conc. 5.05 mg/l 4 hr rat
Iron oxide, yellow	No data
Water	No data

Skin corrosion or irritation	
Titanium dioxide	By the result of the skin corrosion/irritation test using rabbits, no irritation is observed. Erythema index = 0, OECD TG 404
Iron oxide	By the result of the OECD G404 test, the skin irritation test using rabbits, no irritation is observed. Erythema and edema irritation index 0
Glyceryl stearate	No data
C.I. pigment black 11	Short-term contact causes skin irritation.
Iron oxide, yellow	Total irritation score: 0/4, no irritation
Water	Not applicable
Severe eye damage or irritation	
Titanium dioxide	By the result of the severe eye damage/irritation test using rabbits, no irritation is observed. Conjunctival redness index =1-2, OECD TG 405, GLP
Iron oxide	By the result of the OECD G405 GLP test, the eye corrosion/irritation test using rabbits, no irritation is observed. Irritation index 0
Glyceryl stearate	No data
C.I. pigment black 11	Short-term contact causes eye irritation.
Iron oxide, yellow	No irritation. Rabbit
Water	Not applicable
Respiratory sensitization	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	Not applicable
Skin hypersensitivity	
Titanium dioxide	By the result of the skin hypersensitivity test using guinea pigs, no skin hypersensitivity is observed. OECD TG 403
Iron oxide	By the result of the hypersensitivity test using guinea pigs, it is not hypersensitive.
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	Not hypersensitive. Guinea pig
Water	Not applicable
Carcinogenicity	
Occupational Safety and Health Act	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
Public Notice by the Ministry of Employment and Labor	
Titanium dioxide	2
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

IARC	
Titanium dioxide	2B
Iron oxide	3
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
OSHA	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
ACGIH	
Titanium dioxide	A4
Iron oxide	A4
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
NTP	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
EU CLP	
Titanium dioxide	2 (only in the powder form containing 1% or more of particles with an aerodynamic diameter of 10 µm or less)
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
Germ cell mutagenicity	
Titanium dioxide	The results of the reverse mutation assay using in vitro microorganisms (OECD TG 471), the mammalian cell gene mutation test (OECD TG 476), and the chromosomal abnormality test (OECD TG 473) are negative regardless of metabolic activation. Negative by the results of the in vivo chromosomal abnormality test and the decolorization test
Iron oxide	The results of the reverse mutation assay using in vitro microorganisms and the OECD TG473 GLP test, the chromosome aberration test using mammal (Chinese hamster) cells, are negative. The result of the in vivo comet assay using rats is negative. Analog material CAS No. 1317-61-9
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	Reverse mutation test using in vitro bacteria: Negative (<i>S. typhimurium</i> TA1535, TA1537, TA98, TA100 regardless of the metabolic activation system)
Water	Not applicable

Reproductive toxicity	
Titanium dioxide	By the result of the reproductive developmental toxicity test using rats, no clinical symptoms or weight changes are observed. NOAEL= 1000 mg/kg bw/day(OECD TG 210)
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	Reverse mutation test using in vitro bacteria: Negative (S. typhimurium TA1535, TA1537, TA98, TA100 regardless of the metabolic activation system)
Water	Not applicable
Toxicity to the specific target organ (One-time exposure)	
Titanium dioxide	By the result of the acute oral toxicity test using rats, no animals are deceased, and no weight changes or no significant lesions are observed at autopsy. OECD TG 425
Iron oxide	Causes irritation to the respiratory system.
Glyceryl stearate	No data
C.I. pigment black 11	Inhaling causes irritation to the respiratory system.
Iron oxide, yellow	Inhaling: 5 male and 5 female rats (Wistars) were singly exposed to 5 mg/l CERAC- pigment (average particle size = 35 nm) for 4 hours. Their mortality, clinical signs, and weights were observed for 14 days. All animals deceased during the observation period and sacrificed at the end of test period were pathologically examined. A single snout was only exposed for inhalation to CERAC-pigment for 4 hours at an aerosol concentration of 5 mg/L; all animals could tolerate exposure. Consequently, it was considered that the MLC (median lethal concentration) exceeded 5 mg/L. (OECD TG 403)
Water	Not applicable
Toxicity to the specific target organ (Repeated exposures)	
Titanium dioxide	By the result of the repeated oral toxicity test using rats, there was no death, and no significant effect was observed. NOAEL= 24,000 mg/kg bw/day OECD TG 407 By the result of the repeated inhalation toxicity test using mice and hamsters (0, 10, 50, or 250 mg/m ³ dose, 6 hours/day, 5 days/week for 13 weeks), pulmonary inflammation, cell toxicity, lung cell proliferation, and histopathological changes were observed. NOAEC = 10 mg/m ³ . When testing animals such as rats, lung damage is observed if exposed to poorly soluble particles under overload conditions, which is considered species-specific. However, no pathological observations have been reported in similar tests on humans and other primates. In addition, no significant respiratory organ toxicity was found in epidemiologic studies in humans. Considering the above comprehensively, the data is insufficient to classify the toxicity to the specific target organ (repeated exposure).
Iron oxide	It has been reported that repeated inhalation exposure in humans may cause respiratory effects (atesia) and may cause metal fume fever.
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	Subchronic inhalation toxicity (90 days) was tested on rats (male/female). By the test result, an increase in lung and lung-associated lymph node weights was observed, but no other effects were observed. NOAEL 4.7 mg/L air (OECD TG413, GLP). Inhalation (subchronic): Rats were exposed to 3 different concentrations irregularly. The test was clearly consistent with poorly soluble particles and showed a typical result. No evidence of lung toxicity (NOAEL = 4.7 mg/m ³), rat, OECD TG 413, GLP
Water	Not applicable
Inhalation hazard	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	Not applicable

Other hazardous impacts	
Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

12. Ecological information

A. Ecological toxicity

Fish

Titanium dioxide	LC50 > 100 mg/l 96 hr <i>Carassius auratus</i> (OECD Guideline 203)
Iron oxide	LC0 ≥ 50000 mg/l 96 hr Other (<i>Danio rerio</i>)
Glyceryl stearate	LC50 47.228 mg/l 96 hr
C.I. pigment black 11	No data
Iron oxide, yellow	LC0 ≥ 100000 mg/l 96 hr <i>Danio rerio</i>
Iron oxide, yellow	(Running freshwater)
Water	No data

Shellfish

Titanium dioxide	LC50 > 500 mg/l 48 hr <i>Daphnia magna</i>
Iron oxide	EC50 > 100 mg/l 48 hr
Glyceryl stearate	LC50 318.38 mg/l 48 hr
C.I. pigment black 11	No data
Iron oxide, yellow	LC50 ≥ 100 mg/l 48 hr <i>Daphnia magna</i>
Iron oxide, yellow	(OECD TG 202, still freshwater, GLP)
Water	No data

Birds

Titanium dioxide	EC50 > 50 mg/l 72 hr <i>Selenastrum capricornutum</i>
Iron oxide	No data
Glyceryl stearate	EC50 3.72 mg/l 96 hr
C.I. pigment black 11	No data
Iron oxide, yellow	EC50 18 mg/l 72 hr <i>pseudokirchneriella subcapitata</i>
Iron oxide, yellow	(OECD TG 201)
Water	No data

B. Persistence and degradability

Persistence

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	log Kow -1.38

Degradability

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

C. Bio-accumulation

Accumulation

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

Biodegradability

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

D. Soil mobility

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

E. Other hazardous impacts

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

13. Disposal considerations

A. Method of disposal

Titanium dioxide	No data
Iron oxide	1) Treat neutralization, hydrolysis, oxidation, and reduction. 2) Incinerate or melt at a high temperature. 3) Treat solidification.
Glyceryl stearate	If specified in the Wastes Control Act, dispose of contents and containers according to the regulation.
C.I. pigment black 11	If specified in the Wastes Control Act, dispose of contents and containers according to the regulation.
Iron oxide, yellow	If specified in the Wastes Control Act, dispose of contents and containers according to the regulation.
Water	If specified in the Wastes Control Act, dispose of contents and containers according to the regulation.

B. Disposal considerations

Titanium dioxide	Dispose of contents and containers (according to the contents specified in the relevant laws).
Iron oxide	Dispose of contents and containers (according to the contents specified in the relevant laws).
Glyceryl stearate	Dispose of contents and containers (according to the contents specified in the relevant laws).
C.I. pigment black 11	Dispose of contents and containers (according to the contents specified in the relevant laws).
Iron oxide, yellow	Dispose of contents and containers (according to the contents specified in the relevant laws).
Water	Consider precautions described in the regulation if specified in the Wastes Control Act.

14. Transport information

A. UN No.

Titanium dioxide	No information is available for its UN Classification of Transport Hazardous Substances.
Iron oxide	1376
Glyceryl stearate	No information is available for its UN Classification of Transport Hazardous Substances.
C.I. pigment black 11	No information is available for its UN Classification of Transport Hazardous Substances.
Iron oxide, yellow	No information is available for its UN Classification of Transport Hazardous Substances.
Water	No information is available for its UN Classification of Transport Hazardous Substances.

B. Proper shipping name

Titanium dioxide	Not applicable
Iron oxide	Iron oxide, spent or iron oxide sponge, spent, obtained from coal gas purification
Glyceryl stearate	Aluminium calcium oxide -
C.I. pigment black 11	Not applicable
Iron oxide, yellow	4-Methyl-N-[[[4-methylphenyl]amino]carbonyl]benzenesulfonamide
Water	Not applicable

C. Transport hazard class

Titanium dioxide	Not applicable
Iron oxide	4.2
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

D. Container classification

Titanium dioxide	Not applicable
Iron oxide	III
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

E. Marine pollutant

Titanium dioxide	No data
Iron oxide	Not applicable
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

F. Particular safety measures required, or the user should be aware of related to transport or transport means

Emergency measures during a fire

Titanium dioxide	Not applicable
Iron oxide	F-G
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

Emergency measures during leaking

Titanium dioxide	Not applicable
Iron oxide	S-P
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

15. Regulatory information

A. Regulation by the Occupational Safety and Health Act

Titanium dioxide	Harmful material subject to control
Titanium dioxide	Substance subject to work environment measurement (measurement cycle: 6 months)
Titanium dioxide	Substance material to exposure criteria
Iron oxide	Harmful material subject to control
Iron oxide	Substance subject to work environment measurement (measurement cycle: 6 months)
Iron oxide	Substance subject to special health examination (diagnosis cycle: 12 months)
Iron oxide	Substance material to exposure criteria
Glyceryl stearate	No data
C.I. pigment black 11	Harmful material subject to control (iron and its compounds)
C.I. pigment black 11	Substance subject to work environment measurement (measurement cycle: (iron oxide dust and fumes))
C.I. pigment black 11	Substance subject to special health examination (diagnosis cycle: iron oxide (dust and fumes only))
C.I. pigment black 11	Substance material to exposure criteria
Iron oxide, yellow	No data
Water	No data

B. Regulation by the Toxic Chemicals Control Act

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

C. Regulation by the Act on the Safety Control of Hazardous Substances

Titanium dioxide	No data
Iron oxide	No data
Glyceryl stearate	No data
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data

D. Regulation by the Wastes Control Act	
Titanium dioxide	No data
Iron oxide	Designated waste
Glyceryl stearate	Designated waste
C.I. pigment black 11	No data
Iron oxide, yellow	No data
Water	No data
E. Other regulations by domestic and foreign laws	
Domestic regulation	
Titanium dioxide	
Iron oxide	
Glyceryl stearate	
C.I. pigment black 11	
Iron oxide, yellow	
Water	
Other domestic regulation	
Titanium dioxide	Not applicable
Iron oxide	Not applicable
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable
Foreign regulation	
US control information (OSHA regulation)	
Titanium dioxide	Not applicable
Iron oxide	Not applicable
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable
US control information (CERCLA regulation)	
Titanium dioxide	Not applicable
Iron oxide	Not applicable
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable
US control information (EPCRA 302 regulation)	
Titanium dioxide	Not applicable
Iron oxide	Not applicable
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

US control information (EPCRA 304 regulation)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
US control information (EPCRA 313 regulation)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
US control information (Rotterdam Convention)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
US control information (Stockholm Convention)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
US control information (Montreal Protocol)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
EU classification information (Finalized classification)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable
EU classification information (Hazard statement)		
Titanium dioxide		Not applicable
Iron oxide		Not applicable
Glyceryl stearate		Not applicable
C.I. pigment black 11		Not applicable
Iron oxide, yellow		Not applicable
Water		Not applicable

EU classification information (Safety statement)	
Titanium dioxide	Not applicable
Iron oxide	Not applicable
Glyceryl stearate	Not applicable
C.I. pigment black 11	Not applicable
Iron oxide, yellow	Not applicable
Water	Not applicable

16. Other information

A. Source of information

Titanium dioxide

- ECHA (Appearance)
- ECHA (Color)
- ECHA (B. Odor)
- ECHA (D. pH)
- ECHA (E. Melting point/freezing point)
- ECHA (F. Initial boiling point and boiling point range)
- ECHA (L. Solubility)
- ECHA (N. Relative density)
- ChemIDPlus (S. Molecular weight)
- ECHA (Orally administered)
- ECHA (Inhaled)
- OECD SIDS (Skin corrosion or irritation)
- ECHA (Severe eye damage or irritation)
- OECD SIDS (Skin hypersensitivity)
- OECD SIDS (Germ cell mutagenicity)
- OECD SIDS (Reproductive toxicity)
- OECD SIDS (Toxicity to the specific target organ (One-time exposure))
- OECD SIDS and ECHA (Toxicity to the specific target organ (Repeated exposures))
- ECHA (Shellfish)
- ECHA (Birds)

Iron oxide

- ICSC (Appearance)
- ICSC (Color)
- ICSC (E. Melting point/freezing point)
- HSDB (I. Flammability (Solid and vapor))
- HSDB (L. Solubility)
- ICSC (N. Relative density)
- ECHA (Orally administered)
- ECHA (Inhaled)
- ECHA (Skin corrosion or irritation)
- ECHA (Severe eye damage or irritation)
- ECHA (Skin hypersensitivity)
- ECHA (Germ cell mutagenicity)
- (Reproductive toxicity)

ICSC (Toxicity to the specific target organ (One-time exposure))

nite, icsc, gestis (Toxicity to the specific target organ (Repeated exposures))

ECHA (Fish)

ECHA (Shellfish)

Glyceryl stearate

Calculation by the molecular weight and the average molecular weight of air (M. Vapor density)

ECOSAR (Fish)

ECOSAR (Shellfish)

ECOSAR (Birds)

Lexemol T Inolex (Orally administered) | ECOSAR (Birds) | ECOSAR (Shellfish) | ECOSAR(Fish) | Calculation by the molecular weight and the average molecular weight of air (Vapor density) | ChemIDplus (Molecular weight)

C.I. pigment black 11

14303 Chemicals (Japan) (Appearance)

14303 Chemicals (Japan) (N. Relative density)

14303 Chemicals (Japan) (S. Molecular weight)

14303 Chemicals (Japan)

Iron oxide, yellow

ECHA (Appearance)

ECHA (B. Odor)

GESTIS (D. pH)

ECHA (E. Melting point/freezing point)

ECHA (I. Flammability (Solid and vapor))

ECHA (L. Solubility)

ECHA (M. Vapor density)

ECHA (N. Relative density)

ECHA (S. Molecular weight)

ECHA (Orally administered)

ECHA (Inhaled)

ECHA (Skin corrosion or irritation)

ECHA (Severe eye damage or irritation)

ECHA (Skin hypersensitivity)

ECHA (Germ cell mutagenicity)

ECHA (Toxicity to the specific target organ (One-time exposure))

ECHA (Toxicity to the specific target organ (Repeated exposures))

ECHA (Fish)

ECHA (Shellfish)

ECHA (Birds)

ECHA (D. Soil mobility)

Water

NLM

B. Initial creation date 2022-09-21

C. # of revisions and the latest revision date

of revisions times

The latest revision date 0

D. Other

○ The prepared MSDS is the edited and partially corrected data based on the MSDS data provided by the KOSHA (Korea Occupational Safety and Health Agency).