1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product name
TiONA® RCL-3, TiONA® RCL-9, TiONA® RCL-69, TiONA® RCL-722, TiONA® 595, TiONA® 596, TiONA® 696

Synonyms
Titanium dioxide

Recommended use of the chemical and restrictions on use

Recommended Use
Pigment

Uses advised against
For use in industrial installations only.

Details of the supplier of the safety data sheet

Supplier Address
Cristal USA Inc.
20 Wight Avenue, Suite 100
Hunt Valley, MD, USA 21030
tele: 410-229-4400

Cristal USA Inc.
6752 Baymeadow Drive
Glen Burnie, MD, USA 21060
tele: 410-762-1000
fax: 410-762-1037

For further information, please contact

E-mail address
Regulatory.query@cristal.com

24 Hour Emergency Phone Number

Emergency telephone
Chemetrec (USA) 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.122)

Label Elements

EMERGENCY OVERVIEW
None
Precautionary Statements - Prevention
Wash hands thoroughly after handling

Precautionary Statements - Response
Not applicable.

Precautionary Statements - Storage
Store in accordance with local regulations

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
Other Hazards
None.

Unknown acute toxicity
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No</th>
<th>weight-%</th>
<th>Trade secret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>&gt;80</td>
<td>*</td>
</tr>
</tbody>
</table>

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Skin contact
Wash skin with soap and water. If skin irritation persists, call a physician.

Inhalation
Remove to fresh air. If symptoms persist, call a physician.

Ingestion
Rinse mouth. Do NOT induce vomiting. If symptoms persist, call a physician.

Self-protection of the first aider
Use personal protective equipment as required.

Most important symptoms and effects, both acute and delayed

Symptoms
No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the
surrounding environment.

Unsuitable Extinguishing Media  None known based on information supplied.

Specific hazards arising from the chemical  Avoid creating dust.

Hazardous combustion products  Non-combustible.

Explosion data  
Sensitivity to Mechanical Impact  Not impact sensitive.
Sensitivity to Static Discharge  Not sensitive.

Protective equipment and precautions for firefighters  As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions  Avoid contact with eyes and skin. Avoid creating dust. Use personal protective equipment as required.
For emergency responders  Use personal protection recommended in Section 8.

Environmental Precautions

Environmental Precautions  Do not flush into surface water or sanitary sewer system. Do not allow into any sewer, on the ground or into any body of water.

Methods and material for containment and cleaning up

Methods for Containment  Cover powder spill with plastic sheet or tarp to minimize spreading.
Methods for cleaning up  Take up mechanically, placing in appropriate containers for disposal.
Prevention of secondary hazards  Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling  Avoid contact with skin, eyes or clothing. Avoid generation of dust. Ensure adequate ventilation, especially in confined areas.

Conditions for safe storage, including any incompatibilities

Storage Conditions  Keep containers tightly closed in a dry, cool and well-ventilated place.
Packaging materials  Product may be packaged in normal commercial packaging; paper or plastic material.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH</th>
<th>Alberta OEL</th>
<th>British Columbia OEL</th>
<th>Ontario TWA</th>
<th>Quebec OEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>TWA: 10 mg/m³ TWA: 15 mg/m³</td>
<td>IDLH: 5000</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 10 mg/m³</td>
</tr>
</tbody>
</table>
Appropriate engineering controls

Engineering controls
- Showers
- Eyewash stations
- Ventilation systems
- Extraction to remove dust at its source
- Ensure adequate ventilation, especially in confined areas

Individual protection measures, such as personal protective equipment

- **Eye/face Protection**: Wear safety glasses with side shields (or goggles).
- **Skin and Body Protection**: Long sleeved clothing. Protective gloves.
- **Respiratory protection**: In case of insufficient ventilation, wear suitable respiratory equipment.
- **General hygiene considerations**: Do not eat, drink or smoke when using this product. Take off all contaminated clothing and wash it before reuse. Regular cleaning of equipment, work area and clothing is recommended. Handle in accordance with good industrial hygiene and safety practice.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks - Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>solid</td>
<td>Appearance: Powder</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
<td>Color: white</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>6-9</td>
<td>10g/100ml aqueous solution</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>1830 °C</td>
<td>Melting point / melting range</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>2972 °C</td>
<td>-</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Specific gravity</td>
<td>3.7-4.1</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble in water</td>
<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>Insoluble in ether</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insoluble in common solvents</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not an explosive</td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>None known</td>
<td></td>
</tr>
</tbody>
</table>

**Other Information**
Softening point: No information available.
Molecular weight: Not applicable.
VOC content (%): None.
Density: ~ 4 kg/L.
Surface Area: No information available.
Bulk Density: No information available.

10. STABILITY AND REACTIVITY

Reactivity: None known based on information supplied.
Stability: Stable under recommended storage conditions.
Possibility of hazardous reactions: None under normal processing.
Hazardous polymerization: None under normal processing.
Conditions to Avoid: Dust formation.
Incompatible Materials: None known based on information supplied.
Hazardous decomposition products: None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information: Information in this section is a summary of the conclusions of the chemical safety assessment conducted under REACH. Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation: As a nuisance dust, prolonged exposures above recommended levels may cause adverse effects on the lung.
Eye Contact: No data available.
Skin Contact: Titanium dioxide does not penetrate either intact or abraded human skin.
Ingestion: No data available.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide 13463-67-7</td>
<td>&gt; 5000 mg/kg (Rat)</td>
<td>-</td>
<td>&gt; 6.82 mg/L (Rat) 4 h</td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms: No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation: Titanium dioxide was not classifiable as a skin corrosive or irritant based on in vivo test results for titanium dioxide submitted in the European Union (REACH) joint submission registration dossier for the substance.

Serious eye damage/eye irritation: Titanium dioxide was not classifiable as an eye irritant based on in vivo test results for titanium dioxide submitted in the European Union (REACH) joint submission registration dossier for the substance.

Sensitization: No information available.
Germ Cell Mutagenicity
Titanium dioxide was negative when tested in vitro in bacterial reverse mutation assays and in mammalian cell gene mutation and clastogenicity assays as well as when tested in vivo.

Carcinogenicity
Titanium dioxide is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. In lifetime inhalation studies of rats, airborne respirable-size titanium dioxide particles have been shown to cause lung tumors at concentrations associated with substantial particle lung burdens and consequential pulmonary overload and inflammation. However, other laboratory animals such as mice and hamsters did not develop lung tumors under similar testing with titanium dioxide. Furthermore, human epidemiology studies do not suggest an association between occupational exposure to titanium dioxide and risk for cancer.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>-</td>
<td>Group 2B</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>13463-67-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend
IARC (International Agency for Research on Cancer)
Group 2B - Possibly Carcinogenic to Humans

Reproductive Toxicity
Titanium dioxide was not classifiable as a reproductive hazard based on in vivo test results for titanium dioxide submitted in the European Union (REACH) joint submission registration dossier for the substance.

Developmental Toxicity
None known.

Teratogenicity
None known.

STOT - single exposure
Titanium dioxide is not classifiable based on a lack of significant and/or severe toxic effects in humans or in experimental animals following acute exposures.

STOT - repeated exposure
Repeated inhalation exposures in rats to poorly soluble dusts such as titanium dioxide lead to a pattern of pulmonary effects including inflammation and fibrosis that are not observed in other rodent species, nonhuman primates, or humans under similar conditions. Therefore, titanium dioxide is not classifiable for repeated exposure.

Target organ effects
No information available.

Neurological Effects
No information available.

Other adverse effects
No information available.

Aspiration Hazard
No information available.

Numerical measures of toxicity
Unknown acute toxicity
No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity
Titanium dioxide is of low acute aquatic toxicity.

Persistence and degradability
Titanium dioxide is persistent and does not bioaccumulate. Not readily biodegradable.

Bioaccumulation
Material does not bioaccumulate.

Mobility
Not mobile.

Other adverse effects
No information available.
13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging
Do not reuse container. Improper disposal or reuse of this container may be dangerous and illegal.

14. TRANSPORT INFORMATION

DOT
Proper Shipping Name
Not regulated

TDG
Proper Shipping Name
Not regulated

MEX
Proper Shipping Name
Not regulated

ICAO (air)
Proper Shipping Name
Not regulated

IATA
Proper Shipping Name
Not regulated

IMDG
Proper Shipping Name
Not regulated

15. REGULATORY INFORMATION

International Inventories
TSCA
Complies

DSL
Complies

EINECS/ELINCS
Complies

ENCS
Complies

IECSC
Complies

KECL
Complies

PICCS
Complies

AICS
Complies

NZIC
Complies

TCSI
Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIC - New Zealand Inventory of Chemicals
NZIoC - New Zealand Inventory of Chemicals
TCSI - Taiwan Chemical Substance Inventory
US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td></td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td></td>
</tr>
<tr>
<td>Fire Hazard</td>
<td></td>
</tr>
<tr>
<td>Sudden release of pressure hazard</td>
<td></td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td></td>
</tr>
</tbody>
</table>

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide - 13463-67-7</td>
<td>Carcinogen</td>
</tr>
</tbody>
</table>

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide 13463-67-7</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Prepared by: Product Stewardship Department
Issue date: 15-Apr-2009
Revision date: 12-Dec-2016
Revision note: SDS sections updated, 1, 4, 6, 8, 9
Other Information: This product is a pigment intended for industrial use. This product is not intended for consumption, cosmetic, pharmaceutical or medical end use. Cristal will not knowingly sell product for use into these applications

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet