Sodium Chlorite
Technical (EPA Registered) for Chlorine Dioxide Generation

Chlorine dioxide, a powerful oxidizing agent, can be efficiently and economically generated when sodium chlorite is either chlorinated or acidified, or both, under appropriate pH and temperature conditions. The chlorine dioxide may result naturally from process conditions, or may be produced by means of an external generator. Commonly, solutions of 25% active sodium chlorite or less are used to charge chlorine dioxide generators.

OxyChem Technical Sodium Chlorite is an excellent source of chlorine dioxide. Technical Sodium Chlorite is available in dry form or as a 50% or 31.25% solution. Chemical and physical properties are given in Tables 1, 2, and 3.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Properties of Technical Sodium Chlorite</th>
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</thead>
<tbody>
<tr>
<td>Sodium Chlorite, (%)</td>
<td>80</td>
</tr>
<tr>
<td>Sodium Chloride, (%)</td>
<td>11 - 19</td>
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<tr>
<td>Water, Max. (%)</td>
<td>6</td>
</tr>
<tr>
<td>Appearance</td>
<td>white flakes</td>
</tr>
<tr>
<td>Bulk Density (lb/ft³)</td>
<td></td>
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<tr>
<td>Loose</td>
<td>53</td>
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<tr>
<td>Packed</td>
<td>69</td>
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<table>
<thead>
<tr>
<th>Table 2</th>
<th>Properties of Technical Sodium Chlorite Solution 50</th>
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<tr>
<td>Sodium Chlorite, (%)</td>
<td>37</td>
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<tr>
<td>Sodium Chloride, (%)</td>
<td>3.5</td>
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<tr>
<td>Water (%)</td>
<td>56 - 61</td>
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<tr>
<td>Appearance</td>
<td>clear, slightly yellow liquid</td>
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<tr>
<td>Density @ 35°C (lb/gal)</td>
<td>11.4</td>
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<tr>
<td>Crystallization Point (°C)</td>
<td>25</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Properties of Technical Sodium Chlorite Solution 31.25</th>
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</thead>
<tbody>
<tr>
<td>Sodium Chlorite, (%)</td>
<td>25</td>
</tr>
<tr>
<td>Sodium Chloride, Max. (%)</td>
<td>3.0</td>
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<tr>
<td>Water (%)</td>
<td>70 - 75</td>
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<tr>
<td>Appearance</td>
<td>clear, pale, yellow</td>
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<tr>
<td>Density @ 25°C (lb/gal)</td>
<td>10.1</td>
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<tr>
<td>Crystallization Point (°C)</td>
<td>-7</td>
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</table>

**EPA Registration**

When used as the parent chemical for on-site production of chlorine dioxide in pesticidal applications, sodium chlorite is governed by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended. This means that the 600-201 Sodium Chlorite 08/2018
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Chlorine dioxide is used to contain sulfite. Chlorine dioxide is ally and. Chlorine dioxide has compounds. Chlorine dioxide oxidizes these reducing bacteria that form undesirable sulfide petroleum oil. Many such mixture treat water that is or will be contaminated with Systems Bacterial Control in Oil Wells and Petroleum iron compounds, eliminating a major cause of concern. And it oxidizes soluble manganese a water, particularly where trihalomethanes are of potable water. It is also used in the disinfection of Treatment of Potable Water. Chlorine dioxide has a variety of commercial uses. In all of the following applications, sodium chlorite shall be construed as, a recommendation to infringe any existing patents or to violate any responsibility of the customer. No suggestions for use are intended as, and nothing herein will be happy to respond to questions, safe handling and use of the information. While our technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTEE OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and Occidental Chemical Corporation assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

Electrolytic Generation of Chlorine Dioxide
Chlorine dioxide may also be generated by electrolysis from a solution of sodium chlorite according to the following half-cell reactions:

Anode: $2\text{Na}^+ + 2\text{ClO}_2^- \rightarrow 2\text{Na}^+ + 2\text{ClO}_2^- + 2\text{e}^-$
Cathode: $2\text{H}_2\text{O} + 2\text{e}^- \rightarrow 2\text{OH}^- + \text{H}_2$

Combining these reactions, chlorine dioxide is formed at the anode, while sodium hydroxide is formed at the cathode.

Depending on the type of generator equipment and the sodium chlorite product used, the sodium chlorite solution may require additional dilution. The system may also require the addition of sodium chloride.

Chlorine Dioxide Applications
Chlorine dioxide has a variety of commercial uses. In all of the following applications, sodium chlorite is used to generate it.

Treatment of Potable Water. Chlorine dioxide has long been used to remove tastes and odors in potable water. It is also used in the disinfection of water, particularly where trihalomethanes are of concern. And it oxidizes soluble manganese and iron compounds, eliminating a major cause of stained sinks and fixtures.

Bacterial Control in Oil Wells and Petroleum Systems. A patented use for chlorine dioxide is to treat water that is or will be contaminated with petroleum oil. Many such mixtures contain sulfite-reducing bacteria that form undesirable sulfide compounds. Chlorine dioxide oxidizes these sulfides to sulfates, while preventing or substantially retarding the formation of colloidal sulfur.

Bacterial Slime Control in Paper Mills. Some of the major operational problems in paper and paperboard production are caused by proliferation of microbiological organisms in white water and stock systems. An oxidizing biocide, chlorine dioxide can control microbiological growths, which cause paper malodors and discoloration, deterioration of felts, equipment corrosion, fouling of pipes and showers, and paper quality problems such as spots, specks and holes.

Food Processing. Chlorine Dioxide is highly effective for microbiological control in organically contaminated flume waters. Control of microbiological growths is necessary to insure food product safety and quality. Chlorine Dioxide has also found application in cherry bleaching.

Algae Control in Cooling Towers. Chlorine dioxide efficiently and economically controls microbiological growths in industrial cooling waters under conditions unfavorable to chlorine. It is the primary microbiological control agent in systems with high pH, ammonia-nitrogen contamination, or persistent slime problems.

Treatment of Wastes. Chlorine dioxide is used to disinfect sewage and plant wastes. It destroys phenolics, simple cyanides and sulfides by oxidation.

Stripping Dyestuffs from Textiles. Chlorine dioxide removes dyestuffs from textiles with a minimum of fiber degradation. However, its effectiveness depends upon the dyestuff and the type of fabric. This method also provides a good bottom for redyeing.

Upgrading of Fats and Oils. Chlorine dioxide is effective in bleaching fats. The process is simple and low cost. And since it eliminates the need for a filter medium, it produces a higher yield than...
Basic Chemicals

other methods. (About 30% of the weight of the filter residue, which is generally discarded, is tallow.) Problems such as storage and handling of the filter medium and disposal of filter residues are eliminated as well.

Bleaching of Natural Foliage. Chlorine dioxide is used for removing color from natural foliage. The foliage can then be used in the white state or it can be dyed. Degradation of cellulosic structure is minimal.

Safety and Handling
The following summary of health and safety information is not intended to be complete. For complete information, read the current Safety Data Sheet (SDS). To obtain a SDS, contact OxyChem’s Technical Service Department.

Toxicological Properties
Sodium chlorite is toxic by ingestion. Sodium chlorite may cause anemia by oral exposure and has low toxicity by dermal exposure. OxyChem sodium chlorite has an oral LD<sub>50</sub> (rat) of 165 mg/kg. Sodium chlorite has a dermal LD<sub>50</sub> (rabit) of greater than 2 g/kg. Sodium chlorite can produce severe irritation or burns to the skin and eyes. Corneal damage can occur if not washed immediately from the eyes.

Personnel Protection
When handling sodium chlorite solutions, chemical goggles, face shield, neoprene gloves, apron, and boots should be worn. Wear a NIOSH approved acid gas respirator with a dust/mist filter if any exposure is possible. Additionally, for dry sodium chlorite, wear a chemically impervious suit. Local exhaust is required where exposure to dust or mist might occur. If sodium chlorite is spilled on clothing, remove and wash contaminated clothing at once to avoid the potential of fire.

First Aid
Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes while frequently lifting the upper and lower eyelids. Consult a physician immediately.

Skin: Remove contaminated clothing. Immediately flush exposed skin areas with large amounts of water for at least 15 minutes. Consult a physician if burning or irritation of the skin persists. Contaminated clothing must be laundered before re-use.

Ingestion: DO NOT induce vomiting. Drink large quantities of water. Consult a physician immediately. DO NOT give anything by mouth if the person is unconscious or having seizures.

Inhalation: Move patient to fresh air and monitor for respiratory distress. If cough or difficulty in breathing develops, administer oxygen, and consult a physician immediately. In the event that breathing stops, administer artificial respiration and obtain emergency medical assistance immediately.

Notes to Physician: Chlorine dioxide vapors are emitted when this product contacts acids or chlorine. If these vapors are inhaled, monitor patient closely for delayed development of pulmonary edema which may occur up to 48-72 hours post-inhalation.

Following ingestion, neutralization and use of activated charcoal is not indicated.

Storage and Handling
Do not contaminate sodium chlorite with incompatible materials such as dirt, organic matter, oxidizers, reducing agents, chemicals, soap products, solvents, acids, paint products, or combustible materials. Do not store or transport sodium chlorite with incompatible materials. Contamination may start a chemical reaction with generation of heat and emission of chlorine dioxide (a poisonous, explosive gas). A fire or explosion may result. Rinse empty containers
thoroughly with water and dispose of in accordance with label instructions.

Dry sodium chlorite. Do not expose to moisture during storage. Store in the original container, in a cool, dry, well ventilated area away from direct sunlight. Always replace cover tightly. Mix only into water using a clean, dry metal scoop reserved for this product alone. Keep away from flame or any burning material (such as a lighted cigarette). If fire occurs, extinguish with plenty of water. Cool any unopened drums near the fire by spraying water on them.

Sodium chlorite solutions. Store in clean, closed, non-translucent containers. Exposure to sunlight or ultra-violet light will reduce product strength.

Do not allow solution to evaporate to dryness; this product becomes a fire or explosion hazard if allowed to dry and can ignite in contact with combustible materials.

Spill and Leak Procedures
In the event of a spill or leak, remove all sources of ignition. Wear NIOSH approved positive pressure, self-contained breathing apparatus with a chemically impermeable, fully encapsulated suit. Follow OSHA regulations for respirator use (see 29 CFR 1910.34).

Sodium chlorite, dry, is a fire or explosion hazard if contaminated with combustible material. Clean up in a manner to avoid contamination. Spilled material should be picked up, by using a clean, dry, scoop or shovel and placed into a clean, dry, container.

Do not return spilled material to the original container. Isolate the recovery container outside or in a well-ventilated area and hold for proper waste disposal. Do not seal the container. Flush any residual material with large quantities of water.

Sodium chlorite, solution, also becomes a fire or explosion hazard if allowed to dry and can ignite on contact with combustible material. Continue to keep damp. Contain spilled material by diking or absorbing with clay, soil or non-combustible commercial absorbents. Do not return spilled material to original container. Place in a clean container and isolate outside or in a well-ventilated area. Do not seal the container. Flush any residual material with large quantities of water.

Disposal
Spill residues may be a hazardous waste as defined in 40 CFR 261. The EPA hazardous waste designation for dry sodium chlorite waste would be D001 and sodium chlorite solution waste would have the waste designation of D002. As a hazardous waste, it will be subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous waste solution or solid, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage and disposal facility.

Shipping Information
Technical Sodium Chlorite is available in 100-lb drums. Technical Sodium Chlorite Solution 50 is available in tank trucks and 330 gallon totes. Technical Sodium Chlorite Solution 31.25 is available in 55-gallon drums, 330-gallon non-returnable totes and tank trucks.

Further Information
More detailed information is available on request through the OxyChem Technical Service Department. Call or write to:

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