# University of Arizona

## Chromic Acid and Dichromate Salts Standard Operating Procedure

*[This is a template. Fill in all necessary blanks and delete all highlighted areas when complete. Add any sections necessary for your laboratory. This will be appended to your Laboratory Chemical Hygiene Plan.]*

**Title:**  **Click here to enter the title of your SOP.**

**Approval Holder (AH):** Click here to enter text **Approval #:** Click here to enter text

**Approval Holder Phone Number(s):** Click here to enter text

**Approval Safety Coordinator (ASC):** Click here to enter text

**Approval Safety Coordinator Phone Number(s):** Click here to enter text

**Department:** Click here to enter text

1. **Purpose**

This standard operating procedure (SOP) is intended to provide guidance on how to safely store, handle, use, and dispose of peroxide forming chemicals (PFCs) in Enter AH’s name’s laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before Describe the procedure or process this SOP will address. If you have questions concerning the requirements within this SOP, contact your Approval Holder (AH) or Approval Safety Coordinator (ASC).

1. **Scope**

*[Describe when this SOP applies and to whom this SOP applies.]*

1. **Hazard Description**

*[Describe the hazards presented by the procedure or process this SOP addresses. What makes it hazardous? Provide an example, if applicable.]*

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Chromic acid (H2CrO4) and its derivative, dichromate salts (M2Cr2O7 where M is a metal cation) are strong oxidants that are corrosive to human tissue and metal, as well as acutely toxic, carcinogenic, mutagenic, and teratogenic. Chromic acid is the term generally used for a solution of chromium trioxide and sulfuric acid. It is often used as a reagent for cleaning glassware or oxidizing organic compounds, particularly alcohols. Due to the toxic Cr6+ ion, all of these substances are poisonous and potentially fatal when ingested, inhaled, or absorbed through the skin. They also cause severe skin, eye and mucous membrane damage including skin ulcers. Skin contacts with this chemical can cause a sore and/or a hole in the bone dividing the inner nose, bleeding, discharge or formation of a crust.

1. **Process & Hazard Controls**

*[Describe the steps needed to set up and complete the procedure or process in safe manner following the* [*hierarchy of controls*](https://www.cdc.gov/niosh/topics/hierarchy/default.html)*. Use as much detail as is necessary to ensure all laboratory workers can complete the procedure or experiment safely.]*

* 1. **Elimination/Substitution**

*[Describe any eliminations of hazardous chemicals or processes; alternatively, any substitutions with less hazardous alternatives that could be used to accomplish the task.]*

* Substitution for chromic acid include boric-sulfuric acid anodize, sulfuric acid anodizing, and phosphoric acid anodizing.
  1. **Engineering Controls**

*[Describe any engineering controls (e.g. fume hoods, gas cabinets, local exhausts, blast shields, etc.) that are used to safely accomplish the task.]*

* Fume hoods or other RLSS approved local exhaust ventilation are required for chromic acid and dichromate salt use.
* Fume hood sashes can help to protect workers from splashes or other exposures; these should be used when working with chromic acid.
  1. **Work Practices**

*[Describe any work practices (e.g. staggering schedules, additional cleaning measures for particulates, etc.) that are used to safely accomplish the task.]*

* When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing.
* Reaction with certain metals generates flammable and potentially explosive hydrogen gas.
  1. **Personal Protective Equipment**

*[Describe the personal protective equipment needed to adequately protect laboratory workers when performing the process or procedure addressed by this SOP. Ensure to specify any personal protective equipment beyond the minimum (i.e. safety glasses, lab coat, gloves, long pants and closed-toed shoes).]*

* **Hand and Arm Protection:** Traditional white lab coat - a chemical-resistant lab apron may be appropriate when handling large quantities. A chemical resistant apron may also be used if there are concerns about potential splashes/other exposures
* **Body Protection:** Traditional white lab coat - a chemical-resistant lab apron may be appropriate when handling large quantities. A chemical resistant apron may also be used if there are concerns about potential splashes/other exposures.
* **Face and eye Protection:** Safety **goggles** are minimal standard; use face shield or additional face and eye protection as required for the task.
  1. **Transportation and Storage**

*[Describe how to safely transport and/or store (e.g. ventilated cabinet, flammable cabinet, under inert blanket, etc.) the hazardous chemical(s) or processes.]*

* Store in a cool, dry place.
* Keep away from reducing agents, such as zinc, alkaline metals, and formic acid.
* Store acids on low shelves, ideally in acid cabinets.
* **Segregate oxidizing acids from organic acids as well as flammable or combustible materials.**
* Use bottle carriers for transporting acid bottles.
* Have spill control materials available which will absorb and neutralize an acid spill.

1. **Spills, Cleanup & Disposal**

*[Describe how to safely end the procedure or process, clean up the process or spills, and/or dispose of any waste generated.]*

Spill response should always follow the [University Chemical Hygiene Plan](https://rgw.arizona.edu/sites/default/files/cs-univeristy_chemical_hygiene_plan.pdf) Section 8.2. Please find general guidance below:

All chromic acid and chromate compounds must be disposed of via Risk Management Services hazardous waste. Dispose of regularly; do not let large amounts of this waste accumulate in the laboratory. Inform RMS before pick up of these chemicals, as they are regulated more stringently by the EPA than others and may require specialty procedures from RMS.

**Exposure Response**

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| --- | --- | --- | --- |
| **Inhalation** | **Ingestion** | **Skin Contact** | **Eye Contact** |
| Remove the victim into fresh air. Immediately consult a doctor/medical service. | Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Do not induce vomiting. Immediately consult a doctor/medical service. Call Poison Control. Take the container/vomit to the doctor/hospital. Ingestion of large quantities: immediately to hospital. Do not give chemical antidote. | Wash immediately with lots of water (15 minutes)/shower. Do not apply (chemical) neutralizing agents. Remove clothing while washing. Do not remove clothing if it sticks to the skin. Cover wounds with sterile bandage. Consult a doctor/medical service. If burned surface > 10%: take victim to hospital. | Rinse immediately with plenty of water for 15 minutes. Do not apply neutralizing agents. Take victim to an ophthalmologist. |

1. **Enter Additional Section Title**

*[Add as many sections as necessary to adequately describe how to safely perform the procedure or process addressed by this SOP.]*

References:

* <https://ucla.app.box.com/s/p18smwrxgb0bkizfufwqamv1h0fqjm9p>
* <https://www.cdc.gov/niosh/docs/81-123/pdfs/0141.pdf>
* <https://www.cdc.gov/niosh/npg/npgd0138.html>
* <https://nj.gov/health/eoh/rtkweb/documents/fs/1695.pdf>
* <https://www.cdc.gov/niosh/npg/firstaid.html>