

C7 Chromic acid anodizing operations in an open tank with manual loading to bath with electric current

This sheet will help employers to comply with the requirements of EU Directive 2004/37 and the terms of the REACH authorizations for uses of chromium trioxide. Working with chromium trioxide may cause cancer. This sheet describes good practice to reduce exposure. It covers the points that should be followed to reduce exposure. It is important to follow all the points, or use equally effective measures. This document should be made available to all persons who may be exposed to chromium trioxide in the workplace so that they make the best use of the control measures available.

The Process

This GPS covers the industrial, anodizing of articles i.e. a creation of a protective oxide layer (for example on aluminum the layer is aluminum oxide) in one or more open tanks. This process is realized by an immersion in aqueous solutions comprising chromium trioxide and traversed by an electric current.

Equipment Design and Access

The treatment system involves one or more open tanks and is designed to support parts with varying dimensions. Workers have access to the treatment tank. Articles or parts are mounted on supports and transported through the treatment system manually.

During the oxidation process, the operator may have access to the tank.

The electrolyte remains in the tank throughout operations and the electric current to the tank is switched on when parts are lowered into the treatment tanks, and switched off when the parts are lifted from the tanks.

An open treatment system has the following features:

- Articles are mounted/dismounted to a racks or a crane/hoist in an area adjacent or separate to the treatment tanks. The rack, crane or hoist is manually operated to transfer the articles through the treatment system. ✓
- Continuous fixed LEV removes chromium trioxide mist from above the tank(s). ✓
- After immersion, rinsing takes place in separate rinsing tanks. The rinse water is treated in a waste water treatment plant or recycled. ✓

In case these features are not in place, this GPS does not apply, but another may. Measures relevant for ancillary tasks are also described in separate GPS. A full list of GPS is available at [link](#).

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Chromium Trioxide Emissions

Chromium trioxide mist or aerosols can be released from the tanks. Residual chromium trioxide on equipment surfaces is possible. Appropriate risk management measures should be adopted, as necessary.

Risk Management Measures - Workers

- Electrically interlocked control systems ensure the electric current to the treatment process can only be switched on when the extraction unit (LEV) is operating. If the exhaust system fails, the electric current to the process automatically switches off immediately.
- Electric current to the treatment tank is switched off when parts are lowered into or lifted from the tank.
- Use of a mist suppressant is recommended to minimize chromium trioxide aerosols.
- The oxidation solutions are working above room temperature (between 35°C and 60°C). A cooling system could be used on the bath to maintain temperature in this range and also allow good control on the LEV of the bath.
- Process equipment must be regularly inspected and rinsed to remove residual chromium trioxide. See GPS D4.
- Implement appropriate measures to prevent cross-contamination from equipment and PPE.

Risk Management Measures – Environment

- The air extraction system must discharge to atmosphere via a filtration or scrubber unit with State-of-the-Art chromium trioxide removal efficiency.
- Wastewater containing hexavalent chromium should not be discharged to surface or groundwater, but treated to effectively remove hexavalent chromium prior to release to the environment or managed as a hazardous waste.
- Floors, drains and equipment in process and chemical and waste storage areas should be sealed and regularly maintained to ensure integrity.

PPE

To minimize potential exposure to chromium trioxide, all persons accessing the treatment line must wear:

- P3 filter is recommended.
- Protective eye goggles or face shield.
- Protective gloves.
- Acid-resistant clothing / footwear.

GPS E7 and your supplier's extended Safety Data Sheet (SDS) provide relevant information on PPE.

Training and Supervision

All persons with access to the treatment line must be instructed about the risks of working with chromium trioxide, the safe way of handling chromium trioxide and use of PPE and other control equipment. Workers must be properly trained and equipped to carry out their duties, and to safely cease such duties as needed. Adequate supervision must be provided at all times.

Monitoring

Adequate monitoring data must be available to evidence absence of worker exposure and evaluate environmental release. GPS E1-E4 provide further information. Expert input is advisable to ensure an appropriate monitoring program that also meets regulatory requirements.

A typical worker exposure monitoring program will involve personal monitoring of all employees with access to the treatment line. Static air monitoring may also be appropriate.

Monitoring should be carried out annually until there is adequate evidence that exposure is minimized and stable. Monitoring may be reintroduced following significant changes to the system.

Other Relevant Good Practice Sheets

Other GPS are also likely to be applicable. A full list can be accessed at [link](#).