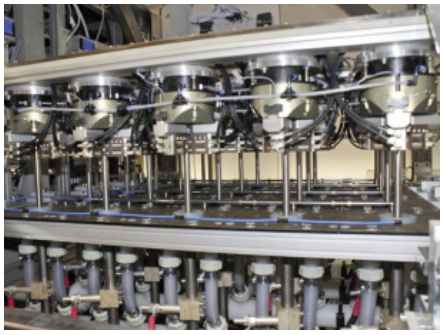
Good Practice Sheet for Use of Chromium Trioxide

B1 Chromium plating operations in closed reactor cells

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 electrochemical plating of articles with a surface layer of metallic chromium in one or more closed reactor cells. The reactor cells contain an aqueous chromium trioxide solution (electrolyte). Chromium plate is deposited on parts or articles in the cells when an electric current is applied to the system. The treated parts are rinsed following plating.



Photographs show closed reactor cells used in plating of piston rods and engine valves.

Equipment Design and Access

Closed reactor cell chromium plating systems comprise an electrolyte holding tank and several plating cells which are closed / sealed during operations. Release of chromium trioxide to the workplace is not possible. Workers have no access to chromium trioxide during plating operations. A closed reactor cell system must include all of the following features:

- The plant is designed such that workers cannot come into contact with chromium trioxide during/after plating. ✓
- The plant is designed so that there is no release of chromium trioxide to the environment (air and water). ✓
- No aerosols are generated in the process (a gas separator removes gases causing aerosols). ✓
- The tanks and reactor cells are locked (i.e. cannot be opened) during normal operations. ✓
- Whenever the electric current is on during plating, the operator has no access to the coating cell. ✓
- The chromium trioxide electrolyte is circulated between the tank and the reactor cells via a closed circuit. ✓
- The reactor cell does not contain electrolyte when open and/or when articles are inserted and removed. ✓
- Articles fixed to/removed from grippers in a separate area and automatically fed through the process. ✓
- Rinsing takes place in the closed cell. Rinsate is transferred to and from the tank via a closed circuit. ✓
- The cells are physically separated from the worker (e.g. by a wall, anti splash screen or guard). ✓

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 is completely contained within the process. There is no release of chromium trioxide electrolyte, mist / aerosol or splashing to the workplace. Residual chromium trioxide on equipment surfaces (plating cells) might be possible in some systems. Appropriate risk management measures should be adopted, as necessary.

Risk Management Measures - Workers

- Electrically interlocked control systems ensure the electric current to the plating process can only be switched on when the extraction unit is operating. If the exhaust system fails, the electric current to the process automatically switches off immediately.
- Process and extraction equipment must be regularly inspected and maintained to ensure full working order.
- Process equipment must be regularly inspected and rinsed to remove residual chromium trioxide, which appears as dark red traces on the equipment. See GPS D4.
- Implement appropriate measures to prevent cross-contamination between equipment and personal protective equipment (PPE).
- Restrict access to the process area to permitted workers only by appropriate measures.

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, equipment in process, chemicals and waste storage areas should be sealed and regularly maintained to ensure integrity.

PPE

No access to the plating line occurs during normal operations. Therefore, no special PPE to protect against exposure to chromium trioxide is required. GPS E7 and your supplier's extended SDS provide further information on PPE.

Training and Supervision

All persons with responsibility for and access to the plating 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 on monitoring. Expert input is advisable to ensure an appropriate monitoring program that also meets regulatory requirements.

A typical worker exposure monitoring program will include collection of static air measurements at 3-5 locations along the plating line (i.e. those with greatest potential for release of chromium trioxide during a normal production cycle). Personal monitoring will usually not be necessary.

Monitoring should be carried out annually until there is adequate evidence that exposure is minimised. 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.

