

Good Practice Sheet for Uses of Chromates

A1 Formulation – addition of solid chromates¹ to mixtures

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 chromates. Working with chromates 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 chromates in the workplace so that they make the best use of the control measures available.

The Process

This GPS covers blending of solid (dry) chromates (with or without additives) in solution or dispersion by formulators during the manufacture of proprietary products or by downstream users during preparation of solutions or dispersions prior to surface treatment.

Solid chromates are supplied in drums or bags as crystals, flakes or fine powder. Formulators blend/dissolve/disperse the chromates in a mixing vessel with water or solvent and other raw materials. After mixing and further process steps (e.g. grinding, sampling, quality control), the formulation is transferred to (ADR approved) containers or other suitable packaging.

Downstream users either dissolve the chromates directly into the mixture in the treatment tank or pre-mix it and then add the solution to the tank. The mixing vessel or treatment tank may be fed by automated loading or manually. For primers and specialty coatings, Downstream Users occasionally add small quantities of other components in a mixing vessel, using a handheld tool to achieve a good consistency.



Photograph shows open drums containing chromium trioxide flakes



Photographs show (left) chromium trioxide flakes with addition of water to reduce dust during mixing and (right) empty drums

Equipment Design and Access

Formulation is preferentially carried out in a dedicated mixing vessel.

- ✓ The mixing vessel is normally closed with an opening for addition of chromates and other raw materials.
- ✓ The mixing vessel has local exhaust ventilation (LEV), a manual or automated stirrer and a pump or other means to transfer the product to the containers.
- ✓ LEV is provided at the point at which solid chromates are weighed and added to the mixing vessel.
- ✓ The water or solvent or other liquid component supplied to the mixing tank is designed to prevent splashing of chromates.
- ✓ The speed of the mixer is sufficiently low to prevent splashing.
- ✓ Where a dedicated mixing vessel is not available, formulation may be carried out directly in the surface treatment tank or bath.
- ✓ Where a separate mixing vessel is not available, the chromates must be dosed into the surface treatment or formulation tank when it is not operational (i.e. in maintenance mode).
- ✓ LEV must be provided at the dosing point.

¹ Chromates include the following substances: Chromium Trioxide (S1), Dichromium tris(chromate) (S2), Potassium dichromate (S3), Sodium dichromate (S4), Strontium chromate (S6), Pentazinc chromate octahydroxide (S7), and Potassium hydroxyoctaoxidizincatedichromate (S8).

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Chromates Emissions

Chromates in solid form can generate dust during handling. Exposure to chromate dust is possible when drums are opened, during weighing and during transfer to the mixing vessel or treatment tank. Splashing can occur when adding water/solvent other liquid component to chromates or vice versa. Residual chromates on equipment surfaces might be possible in some systems.

Risk Management Measures - Workers

- At the mixing vessel, first add a small amount of water or solvent or other liquid component, then slowly invert the container with the chromate close to the LEV, gently releasing the contents to the mixing vessel without splashing.
- When formulating aqueous solutions, flush residues from the drum to the vessel with low pressure water. Carefully add other raw materials/solvent/water to prevent splashing.
- LEV must be regularly inspected and maintained to ensure full working order.
- Regularly inspect and rinse or wipe equipment (as appropriate) to remove residual chromates.
- 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 for the LEV must discharge to the atmosphere via a filtration or scrubber unit capable of removing chromates efficiently and consistent with best practice.
- 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 disposed of as hazardous waste.
- Floors, drains and equipment in process and chemical and waste storage areas should be sealed and regularly maintained to ensure integrity.

Personal Protective Equipment (PPE)

To minimize potential exposure to chromates, all persons accessing the formulation process must wear:

- protective eye goggles
- protective gloves
- chemical-resistant clothing / footwear, when necessary
- respiratory protection (half or full-face mask with P3 filter) when handling open drums.

GPS E1 and your supplier's extended Safety Data Sheet (SDS) provide relevant information on PPE.

Training and Supervision

All persons with access to the formulation/mixing area must be instructed about the risks of working with chromates, the safe way of handling chromates 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 that potential exposure of workers and potential environmental release are maintained to as low as reasonably practicable level. Expert input is advisable.

Monitoring should be carried out at least annually. Downstream users may reduce the frequency of measurements once it is demonstrated that exposure of humans and releases to the environment has been reduced to as low a level as technically and practically possible and that the risk management measures and operational conditions correspond to the exposure scenarios and function appropriately.

GPS E2-E3 provide further information on monitoring, including reference to relevant standards.

Other Relevant Good Practice Sheets

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

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