Good Practice Sheet for Uses of Chromates

E2bis Implementing and Reporting Worker Exposure Monitoring[1]

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 purpose of this GPS is to set out the key requirements for measuring worker exposure to Cr(VI) in dusts or aerosols (also referred to as mists) and for measuring intake related to worker exposure to Cr(VI).

Need for Workplace Exposure Measurement

When Chromates are used, measurement data is needed to assess worker exposure. Worker exposure measurement data may be gathered in different ways, including personal measurements, static air measurements and biomonitoring. Static air monitoring and personal monitoring can be part of an exposure measurement program where there is potential for exposure in the workplace to dusts or aerosols containing chromates.

Biomonitoring of chromates involves the sampling and analyses of urine or blood of workers exposed to chromate. Biomonitoring is normally conducted after the worker's shift, however, background data in the same workers (see below) are also necessary to interpret the results. Urine sampling is easier, less invasive and therefore far more common than blood sampling.

The need for biomonitoring should be determined based on the findings of the risk assessment of the activity. As good practice, biomonitoring might be conducted at least annually.

Many national regulations require employers to carry out biomonitoring when workers may be exposed to chromates.

Biomonitoring based on urine sampling measures exposure of workers to all forms (not only Cr(VI)) of chromium from any source. Other sources of chromium to which workers might be typically exposed include food, water, dietary supplements or cigarettes. While urine monitoring does not differentiate between the different sources or routes of exposure, it can highlight higher levels of chromium exposure and regular biomonitoring can point to a change in exposure. Biomonitoring is therefore helpful in assessing the effectiveness of occupational hygiene and risk management measures and in identifying and assessing unknown release of chromate or other unintended exposure of workers.

Requirements for Static Air Exposure Measurements

Static air monitoring aims to evaluate how much exposure to Cr(VI) can occur at the workplace and so to help assess the potential for exposure in the course of a worker's duties. Static air monitoring provides information about the average concentration of Cr(VI) in a specific location over a defined duration. It may be useful, for example, to indicate concentrations of Cr(VI) where personal measurements are not practical (e.g. at the boundaries of a restricted access area). A purpose-designed sampling unit is fixed at the source of the emission or area in which worker exposure occurs. Ideally, the head of the sampling unit is positioned at the high of the breathing zone of the worker. Air is drawn through treated filters on the sampling unit at a specified flow rate. The filters separate the inhalable fraction of the dust and retain the Cr(VI). An accredited and certified laboratory carries out analysis to quantify the Cr(VI) captured during sampling.

Monitoring Report

The report should include:

- ✓ A full description of the process being monitored.
- ✓ A description of relevant operational conditions and risk management measures in place.
- ✓ A map showing sampling locations or a detailed description of where static sampling has been conducted.
- ✓ A description of the activities of the worker being monitored (personal exposure monitoring).
- ✓ The detailed methodology used to obtain and analyse samples.
- ✓ A complete set of results and supporting data for all types of monitoring.

[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 hydroxyoctaoxodizincatedichromate (S8).

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Requirements for Static Air Exposure Measurements *(continued)*

The LOD of the method needs to be sufficiently sensitive to quantify Cr(VI) in the workplace. A LOD should be < 1 µg/m^3 per sample or lower (if technically possible 0.025 µg/m^3), but should allow in any case that compliance to national OELs can be demonstrated.

Requirements for Personal Exposure Measurements

Personal monitoring aims to evaluate how much Cr(VI) a worker is exposed to in the course of his or her duties. A purpose-designed sampling unit is fixed on the worker in the breathing zone. Air is drawn through treated filters on the sampling unit at an appropriate flow rate (e.g. 10 l/min) selected with reference to the activity and sampling method. The filters separate the inhalable fraction of the dust and retain the Cr(VI). An accredited and certified laboratory carries out analysis to quantify the Cr(VI) captured during sampling.

The LOD of the method needs to be sufficiently sensitive to quantify Cr(VI) in the workplace. The LOD should be < 1 µg/m^3 per sample or lower (if technically possible 0.025 µg/m^3), but should allow in any case that compliance to national OELs can be demonstrated.

Requirements for Biomonitoring

Biomonitoring should be conducted by an occupational physician or adequately trained medical professional.

Frequency of Measurements

Static air exposure monitoring and personal exposure monitoring must be repeated at an appropriate frequency (at least annually) until adequate measurement data is available demonstrating worker exposure is as low as reasonably practicable. The frequency of measurement may then reduce. However, new data will normally be required when any changes to the process occurs.

Unless otherwise required by national regulations or on the basis of the findings of the risk assessment of the activity, biomonitoring of workers potentially exposed to Cr(VI) should be conducted e.g. once per year.

Guidelines and Standards

Relevant guidance and standards should be consulted when developing an exposure measurement program. A list of references is provided overleaf, but national legislation or guidance may also apply. Expert support is also advisable.

Monitoring of Workplace Exposure to Cr(VI) – Monitoring Template

The Authorization decisions require Downstream Users of hexavalent chromium (chromium (VI)) to implement monitoring programmes to assess occupational exposure to chromium (VI). Such programmes shall:

- Take place annually;
- Be based on relevant standard methodologies or protocols;
- Be representative of the range of tasks undertaken where exposure to chromium (VI) is possible, including tasks involving process, maintenance and machining operations, of the operational conditions and risk management measures typical for each of these tasks, and of the number of workers potentially exposed.

The downstream users must assess and document the results of the occupational exposure measurements and must make them available to ECHA, including the contextual information related to each set of measurements, for the first time 12 months from the date of the Authorization Decision, for transmission to the authorisation holders for the purpose of validating the specific exposure scenarios and for preparing the review report.

The information is provided to the authorisation holder in an anonymised manner - only the country of the respective downstream user is indicated by ECHA, as well as whether the notification's status has been indicated as active or inactive. ECHA forwards the information 'as is', i.e. without any translation, editing, or further anonymization. Therefore, if you may not wish to provide information regarding your contact details to the authorization holders, you should not include this in the reporting form.

ECHA has provided a Template for the reporting of the workplace monitoring results. It also contains guidance for planning and completing worker monitoring, and can be found at:

https://echa.europa.eu/de/support/dossier-submission-tools/reach-it/downstream-user-authorised-use

Downstream Users in the aerospace industry may carry out activities involving more than one substance containing Cr(VI) and/or more than one activity involving use of a Cr(VI) substance at the same time. In such cases, monitoring and reporting requirements may become very complex and expert advice is appropriate

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Applicable Guidance and Standards[2]

EN 689:2018. Workplace exposure. Measurement of exposure by inhalation to chemical agents. Strategy for testing compliance with occupational exposure limit values

https://shop.bsigroup.com/ProductDetail/?pid=000000000030394628

HSE MDHS 52/4. Hexavalent chromium in chromium plating mists. Colorimetric field method using 1,5-diphenylcarbazide and spectrophotometry or colour comparator.

http://www.hse.gov.uk/pubns/mdhs/pdfs/mdhs52-4.pdf

ISO SO 16740:2005 Workplace air -- Determination of hexavalent chromium in airborne particulate matter --Method by ion chromatography and spectrophotometric measurement using diphenyl carbazide.

https://www.iso.org/obp/ui/#iso:std:30432:en

(US) NIOSH 7605 'Chromium (Hexavalent) by Ion Chromatography.

https://www.cdc.gov/niosh/docs/2003-154/pdfs/7605.pdf

US OSHA ID-215 (version 2). Hexavalent Chromium.

https://www.osha.gov/dts/sltc/methods/inorganic/id215_v2/id215_v2.pdf

IFA-Arbeitsmappe 6665: Chrom(VI)-Verbindungen.

https://www.ifa-arbeitsmappedigital.de/IFA-AM_6665

Other Relevant Good Practice Sheets

Please also refer to GPS E3 which explains requirements in relation to environmental monitoring.

Expert Support

Occupational hygienists specialize in developing and executing worker exposure monitoring programs. Support from a suitably qualified expert is advisable in relation to the specification and delivery of any program for workplace exposure monitoring.

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[2] This list is not intended to be comprehensive.