



Industrial Performance Services



Industrial Tubular Catalyst Services



CADMIUM & HEXAVALENT CHROMIUM PROCEDURE

V:2023.1

Cadmium & Hexavalent Chromium Procedure

January 2023

Purpose:

The purpose of this program is to establish requirements for the use and handling of materials that expose employees to cadmium and/or hexavalent chromium.

Scope

This program covers all employees.

Key Responsibilities

1 Managers/Supervisors

- Shall ensure that all employees are aware of the proper work procedures for cadmium and hexavalent chromium
- Shall ensure that initial training is conducted for all new employees and that retraining is conducted when employee behaviors suggest that retraining is warranted.
- As part of the JSEA and other hazard evaluation processes, identifies and evaluates chromium or cadmium hazards and potential exposures during planning and the conduct of work.
- Reviews and approves the Task-Specific Safety Analysis.
- As necessary, quantitatively determines the presence of chromium or cadmium in materials, substrates, and other media. This may involve the collection of samples for analysis by a qualified laboratory or field testing using acceptable test methods.
- Provides results of any chromium or cadmium survey to management/supervision, along with information regarding hazard potential and control measures. As appropriate, makes recommendations to management/supervision to maintain, modify, upgrade, or downgrade controls accordingly.
- Takes prompt corrective measures (or supports any Competent Person in this role) to eliminate hazards, such as recommending to management/supervision to implement or modify engineering, administrative, work practice, and personal protection (including respiratory protection) controls.
- Conducts periodic exposure assessment.
- As appropriate, assists management/supervision in ensuring that workers have the necessary training and medical surveillance based upon the activity and hazard.
- Ensures that medical monitoring is conducted in accordance with 29 CFR 1926.1126 (for chromium) or 29 CFR 1926.1127 (for cadmium) including imposition of work restrictions where appropriate and reviewing results of medical monitoring.
- In evaluating chromium or cadmium hazards and specifying controls for a job
 - (a) Utilizes reliable historical exposure monitoring data generated for other similar operations or activities
 - (b) Utilizes objective data, and/or
 - (c) Plans and conducts initial monitoring to determine exposures and assess the effectiveness of hazard controls.
- Conducts initial and periodic exposure monitoring in accordance with National Institute for Occupational Safety and Health (NIOSH)/OSHA methods if lacking historical or objective data.
- Maintains effective records of jobs monitored, so that a historical database can be used to specify controls and eliminate unnecessary and redundant monitoring for future activities.

- Supports project management/supervision in responding to exposures above the PEL when workers were not adequately protected.
- As appropriate, participates in pre-job and daily worker briefings regarding task-specific chromium or cadmium hazards and controls, work practices/plans (such as JSEAs), and other applicable information, including any changes that are made to controls or to the work practices or plans.

2 Employees

- Shall follow all requirements regarding the safe work procedures for cadmium and hexavalent chromium.

Cadmium Procedure

3 Compliance Program

A written compliance program shall be implemented when the PEL for cadmium is exceeded at a work site.

The following areas shall be addressed within the site compliance program:

- Potential exposure determination including a description of each operation where cadmium is omitted, machinery use, material processed, controls in place, crew size, employee job responsibilities and maintenance practices.
- Air monitoring data or developing a justification for not conducting monitoring based on previous monitoring/historical data or objective data.
- Engineering controls including the specific means that will be employed to meet compliance.
- A report of technology considered in meeting the PEL.
- A detailed schedule of implementation.
- Consideration of respiratory protection.
- Written plan for emergency situations.
- Work practice program.
- Other relevant information such as protective clothing, housekeeping, hygiene areas and practices (including consideration of shower facilities), consideration of medical surveillance, training, and recordkeeping.

The written program must be reviewed and updated annually or more often to reflect significant changes in the compliance status for Farmers Alloy.

The program shall be provided for examination and copying upon request of affected employees, their representatives or OSHA officials.

The program shall include maintenance procedures while working on ventilation systems and changing of filters to minimize employee exposure while performing such maintenance.

Construction work activities that result in exposure to chromium or cadmium may include, but are not limited to, the following:

- Demolition or salvage of structures where chromium or cadmium, or materials containing chromium or cadmium, are present.
- Removal or encapsulation of materials containing chromium or cadmium.

- New construction, alteration, repair, or renovation of structures and substrates that contain chromium or cadmium.
- Installation of products containing chromium or cadmium.
- Working with/around Portland cement (in powder or dust form – chromium only).
- Torch-cutting chromium/cadmium containing paints.

- Transportation, disposal, storage, or containment of chromium or cadmium, or materials containing chromium or cadmium.
- Maintenance operations associated with construction activities.
- Welding, cutting, burning, or grinding stainless steel, chromium-/cadmium-containing alloy steel, and chromium/cadmium containing alloys.

Note!!!Exposure to chromium (especially hexavalent chromium) has also occurred when the welding rod or wire in use contains chromium.

The permissible exposure limit (PEL) for cadmium and hexavalent chromium is five (5) micrograms calculated as an 8-hour time-weighted average over a work shift. The action level (AL) of 2.5 micrograms triggers the following requirements:

- Pre-job planning includes, as needed, a thorough identification of chromium or cadmium materials. Identification may include the product name, a Material Safety Data Sheet (SDS) with the SDS number (if available) or a sample content analysis. Sampling data includes location, sampling method, sampling dates, laboratory identification, and analytical method.
- If documentation is not feasible or has been determined by the project engineer to be unavailable or unreliable, chromium or cadmium content sufficient to exceed the action level for chromium or cadmium is assumed.

Results of bulk sampling, calculations of potential chromium or cadmium exposure, and other data that demonstrate compliance with this practice (as well as the pertinent standards) are attached to the work package.

Where chromium or cadmium exposure above the action level is suspected, and in the absence of monitoring data, interim protective measures are established that are equal to or greater than the assumed exposure level.

Hexavalent Chromium Procedure

4 Welding, Cutting, and Grinding

Certain welding and cutting activities have been shown to expose the welder/cutter, and potentially helpers, to hexavalent chromium above the action level when exhaust ventilation is not used. The activities have included the following:

- Shielded metal arc welding, Gas metal arc welding
- Flux cored arc welding, Sub arc welding
- Torch cutting through chromate-containing paints, grinding chromium-containing metals.

The types of metal involved have been stainless steel, chromium-containing alloy steel, and chromium-containing nonferrous alloys. Exposure has also occurred when the welding rod or wire in use contains chromium, and exhaust ventilation is not used.

Therefore, exhaust ventilation is always prescribed as a control measure when activities with the materials mentioned above are in use unless historical personal monitoring data performed when similar materials, using similar methods, under similar environmental conditions are used shows conclusively that the welder/cutter and helper (if applicable) are not exposed above the action level without regard to respiratory protection.

Practices and procedures shall ensure that no employee is exposed to hexavalent chromium in excess of the permissible exposure level which is 5 micrograms per cubic meter of air based on an 8-hour Time Weighted Average.

5 Plasma and Air Arc Cutting and Gouging

Plasma and air arc cutting, and gouging operations have been shown to expose the worker and helpers within 10-feet of the work to levels of hexavalent chromium above the permissible exposure limit (PEL) under most circumstances and conditions. Exhaust ventilation and respiratory protection (at least a half-face, tight-fitting respirator with a HEPA filter/cartridge) are always prescribed as control measures when activities with the materials mentioned above are in use; a higher level of respiratory protection may be prescribed, depending on conditions.

Note!!! Each discrete task must begin with ventilation and respiratory protection control measures in place. Respiratory protection may be downgraded only upon conclusive results of breathing zone monitoring of the employee(s) involved in each discrete task showing exposure to be less than 50 percent of the protection factor of the respirator relative to the concentration and PEL of hexavalent chromium. Respiratory protection may be eliminated only upon conclusive results of breathing-zone monitoring of the employee(s) involved in each discrete task showing exposure to be less than the PEL as an 8-hour time-weighted average.

Additional controls may also be appropriate to be in compliance with 29 CFR 1926.1126, depending on the results of evaluations of the materials to be used, environmental conditions, length of the work process/activity, etc.

Employees who are exposed at or above the action level 30-days or more per year are enrolled in a medical surveillance program.

Personal hygiene is very important while working with chromium or cadmium products. To avoid accidental ingestion of chromium or cadmium, employees wash thoroughly (regardless of other controls) prior to eating, chewing, smoking, or drinking.

Practices

Farmers Alloy Management/supervision supported by safety professional(s), the medical contractor and training providers conducts the following basic steps to control exposure to chromium or cadmium:

- Determine the types of projects, activities, and operations that could involve chromium or cadmium, or chromium or cadmium-containing materials. For those jobs, conduct hazard identification as part of the work design, planning, and control process.
- If chromium or cadmium materials are involved, ensure that project safety (for chromium) or a competent person (for cadmium) conducts a hazard evaluation to determine the potential exposure and to recommend initial controls.
- Develop and implement a Task-Specific Safety when exposure is or is likely to be above the PEL. The JSEA (or equal) addresses the scope of work activities; provides initial

exposure assessment; and prescribes exposure controls, air-monitoring requirements, work practices, personal protective equipment, and additional information as required.

- Incorporate recommendations from project safety for chromium or cadmium hazard control measures into any JSEA and work control documents.

6 Exposure Monitoring

Monitoring or measuring of employee exposure shall be conducted at least every 6 months if the initial monitoring shows employee exposure. Air monitoring will be performed at the beginning of each job task. If exposure monitoring results indicate exposure is above the PEL Farmers Alloy must include in the written notification to employees, the corrective action being taken to reduce exposure to or below the PEL.

- Notify each affected employee, in writing, of the results of monitoring within five (5) working days.
- Air monitoring for chromium or cadmium may be waived provided the following conditions are met:
 - Monitoring has been performed in the last 12 months.
 - Data from historical monitoring originates from work operations that closely resemble the planned work operations.
 - Workplace and environmental conditions (such as indoors or outdoors, temperature, wind speed, ventilation, and space configuration) are similar to those when the monitoring was performed.
 - The processes, types of material, control methods and work practices are similar.
 - Justification for waving initial monitoring shall be included in the Task-Specific Safety Analysis or equal. Employees involved are briefed regarding the existence of such data.

7 Surveillance

Medical surveillance shall be provided when an employee experiences signs or symptoms of the adverse health effects of Hexavalent Chromium (dermatitis, asthma, bronchitis, etc). Medical evaluations will be provided at no cost to employees. Examinations will be performed by or under the supervision of a physician or other licensed health care professional.

8 Facilities

Farmers Alloy must provide change rooms for decontamination and ensure facilities prevent cross-contamination. Washing facilities shall be readily accessible for removing chromium from the skin. Workers must wash their hands and face or any other potentially exposed skin before eating, drinking, or smoking.

9 Regulated Areas

Regulated areas shall be established when exposure to an employee is or is expected to be in excess of the PEL. Regulated areas shall be marked with warning signs to alert employees and access is restricted to authorized persons only.

10 Controls

If the exposure level is above the PEL for 30-days or more then engineering controls and work practices shall be provided to reduce exposure to the lowest feasible level. If employees can demonstrate that such controls are not feasible Farmers Alloy shall use engineering and or work controls to reduce employee exposure to the lowest levels achievable and shall

supplement them using required respiratory protection.

11 Recordkeeping

Farmers Alloy is required to maintain and make available an accurate record of all employee exposure monitoring, medical surveillance, and training records.

12 Respiratory Protection & PPE

The appropriate respirator shall be used when engineering controls and work practices cannot reduce employee exposure during work operations where engineering controls and work practices are not feasible and emergencies. Respirators shall be provided in accordance with 1910.134 (Respiratory Protection) (see Farmers Alloy Respiratory Protection Program). Specific requirements contained within 1926.1127 (Cadmium) regarding respiratory protection shall also be followed including:

- Providing employees with full face piece respirators when they experience eye irritation.
- Providing HEPA filters for powered and non-powered air-purifying respirators.
- Providing a powered air-purifying respirator instead of a negative-pressure respirator when an employee entitled to a respirator chooses to use this type of respirator and such a respirator will provide adequate protection to the employee.

PPE will be provided when there is a hazard from skin or eye contact and employees are required to use the PPE. Gloves, aprons, coveralls, goggles, foot covers and other as needed PPE shall be provided at no cost to the employee and will be removed at the end of the work shift. Farmers Alloy must clean, launder, and replace all protective clothing as needed.

13 Housekeeping

All surfaces shall be maintained as free as practicable of chromium. All spills and releases of chromium shall be cleaned promptly with approved procedures including use of HEPA filtered vacuums as the primary method, dry or wet sweeping or other methods to minimize the likelihood of exposure to chromium.

No compressed air shall be used to remove chromium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air or no alternative method is feasible.

Cleaning equipment must be handled in a manner that minimizes the reentry of chromium into the workplace.

Training

Farmers Alloy shall provide appropriate types of training for employees who are potentially exposed to chromium or cadmium prior to their initial assignment and annually thereafter. Farmers Alloy will assure employee participation and maintain a record of the training contents. This training includes:

- Hazard communication training for potentially exposed employees.
- Training specified by the applicable chromium or cadmium standard for workers exposed at the action level for any one day, or who are exposed to chromium or cadmium compounds that are skin irritants.
- Respirator training if respirators are to be used.

Competency Assessment

| No. | Questionnaire | C/NYC |
|-----|---------------|-------|
| Q1 | | |
| A1 | | |
| Q2 | | |
| A2 | | |
| Q3 | | |
| A3 | | |
| Q4 | | |
| A4 | | |
| Q5 | | |
| A5 | | |

| Enclosed Attachments | |
|---------------------------------|-------------------------------------|
| Risk Assessment | <input checked="" type="checkbox"/> |
| Environmental Aspect and Impact | <input checked="" type="checkbox"/> |
| Training and Competency | <input checked="" type="checkbox"/> |
| Measure and Evaluation Tools | <input checked="" type="checkbox"/> |

Competency Checklist

To be filled out by Trainer and signed by Employee, Assessor and Supervisor before being returned to the HSEQT Manager for recording purposes.

| Procedure | Competency | Date | Competent YES / NO | Employee Signature |
|-----------|------------|------|-----------------------|-----------------------|
| | | | | |
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| | | | | |
| | | | | |
| | | | | |

(Please tick appropriate box)

This employee is competent in performing the job.

| |
|--|
| |
| |

This employee has not attained the competency level.

*

* *If the employee has not attained all competency levels, the General Manager must assess the action to be taken, provide an extension of training or alternative action as listed below.*

Alternate action to be taken: _____

| | | | | |
|-----------|-------------------|--|-------|--|
| Signed By | Employee: | | Date: | |
| | Trainer: | | Date: | |
| | Assessor: | | Date: | |
| | Regional Manager: | | Date: | |

Environmental Aspects and Impacts

Identified Environmental Aspects and Impacts

The following table is a summary of the likely environmental aspects and impacts that may be identified during site inspections. The significance of each impact needs to be assessed using the Risk Assessment Model.

| Activity | Aspect | Impact |
|--|---|--|
| Purchasing & Administrative Work | Consumption of goods | Conservation of natural resources |
| | Consumption of energy (eg. Electrical equipment and facilities) | Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss |
| | Generation of waste (eg. Paper) | Consumption of space for waste disposal; Habitat loss |
| Climate Control | Consumption of energy | Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss |
| | Generation of noise | Disturbance to community; Habitat loss |
| Cleaning of – offices / vehicles | Storage, use and release of chemicals | Contamination of air, water or soil; Risk to human health |
| Transport (Fleet vehicles / staff travel) | Consumption of energy | Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Loss of habitat at all stages of generation; Light pollution |
| | Consumption of goods (eg. Oil) | Consumption of natural resources; Generation of waste; Habitat loss; Biodiversity impacts |
| | Generation of waste (eg. Oil) | Consumption of space for waste disposal; Potential contamination of water or soil; Habitat loss |
| | Exhaust emission | Release of greenhouse gases and atmospheric pollution |
| | Use of dangerous goods (eg. Batteries) | Potential contamination of air, water or soil; Risk to human health |
| | Generation of noise | Disturbance to community; Habitat degradation |
| Operations | | |
| | | |
| | | |

Sample only.
To be filled in

Risk Assessment

Risk Assessment // insert name here

| Step No: Logical sequence | Sequence of Basic Job Steps documented in the Procedure, Work Instruction and project plans. Break down Job into steps. Each step should be logical and accomplish a major task. | Potential Safety & Environmental Hazards/Impacts at the site of the Job Identify the actual and potential health and safety hazards and the environmental impacts associated with each step of the job. | Risk Rating Refer to the risk matrix or HSEQT.PRO.Risk Mgt | Recommended Corrective Action or Procedure <i>Determine the corrective actions necessary to reduce the risk to as low as reasonably practical (ALARP) refer to HSEQ.PRO.Risk Mgt. The risk must be reduced or controlled to ALARP before work commences.</i> Document who is responsible for implementing the controls to manage each hazard identified. | Risk Rating refer to the risk matrix or HSEQT.PRO.Risk Mgt |
|------------------------------|---|--|---|--|--|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |

Audit



| Process: insert// Procedure: Insert // | | Date: | Audited by: | |
|---|----------|-------------------------|----------------------|--|
| | | Location of Audit: | Area Mgr/Supervisor: | |
| Item | Question | Evidence Sited | Comments | Conformance Score 0,3,5 |
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| AUDITOR'S SIGNATURE: | | CONFORMANCE SCORE: / 25 | | 0 – Non-Conformance 3 – Continuous Improvement Opportunity 5 – Total Conformance |
| SAFETY REP'S SIGNATURE: | | CONFORMANCE %: | | |