

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
			Revision Date:	Initial Version
Chapter 40-Hexavalent Chromium			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 1 of 8

PURPOSE

The purpose of this program is to ensure that the hazards of hexavalent chromium are evaluated and the information concerning its hazards is communicated.

SCOPE

This procedure applies to all operations involving Midland Engineering Co., Inc.

REFERENCES

1910.1026, Hazard Communication Safety Program, Personal Protective Equipment Safety Program and Respiratory Protection Safety Program

INTRODUCTION

Hexavalent chromium is essential to a number of industrial applications: chromate pigments are used in dyes, ink and plastics, chromic acid is used in chrome plating and chromates are used to prevent corrosion in paints and other coatings. While these compounds can be very beneficial, they can also be harmful or lethal to those employees exposed to them. This program discusses the safe work practices these workers must follow to avoid exposures to this hazardous substance. Topics include characteristics and properties of hexavalent chromium, effects of exposures, engineering and work practice controls, medical surveillance, the respiratory protection program, protective clothing and equipment, proper housekeeping and responding to exposures.

DEFINITIONS

Action level means a concentration of airborne chromium (VI) of 2.5 micrograms per cubic meter of air (2.5 µg/m³) calculated as an 8-hour time-weighted average (TWA).

Chromium (VI) [hexavalent chromium or Cr(VI)] means chromium with a valence of positive six, in any form and in any compound.

Emergency means any occurrence that results, or is likely to result, in an uncontrolled release of chromium (VI). If an incidental release of chromium (VI) can be controlled at the time of release by employees in the immediate release area, or by maintenance personnel, it is not an emergency.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 2 of 8

Employee exposure means the exposure to airborne chromium (VI) that would occur if the employee were not using a respirator.

High-efficiency particulate air [HEPA] filter means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter or larger.

Regulated area means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of chromium (VI) exceeds, or can reasonably be expected to exceed, the PEL.

CHARACTERISTICS & PROPERTIES OF HEXAVALENT CHROMIUM

Chromium is an element which may have various valence states. A valence state refers to how many electrons are available to bond with other elements and compounds. Hexavalent chromium compounds are almost always man-made and are used in a variety of industries. Some of the prominent uses of hexavalent chromium in industry include chromate pigments in dyes, inks, and plastics, chrome-plating in which chromium metal is deposited on a surface using chromic acid and chromates used to prevent corrosion in paints, primers and other coatings.

In addition, hexavalent chromium can also be found as a byproduct of industrial processes and maintenance operations. In fact, OSHA estimates that 48 percent of all workers affected by hexavalent chromium will be welders. Welders can be exposed to chromium 6 when fumes are released while welding stainless steels, chromium alloys and chrome-coated metal. Particles may also be released during smelting of ferro-chromium ore and trace amounts may also be found in portland cement.

Chromium 6 compounds are essential in many industrial applications; however they can be harmful or lethal to those employees who are exposed to them. This is why it's so important to understand the hazards, routes of entry and exposure symptoms of hexavalent chromium.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 3 of 8

EXPOSURE

Full shift personal samples shall be representative of the employee's regular, daily exposure to hexavalent chromium. An employee's exposure to hexavalent chromium shall not exceed the 8-hour Time Weighted Average (TWA) given for that substance any 8-hour work shift of a 40-hour work week. Employees shall not be exposed in excess of the permissible exposure level of 5 micrograms per cubic meter of air as an 8-hour TWA.

The company shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. Where an employer does representative sampling instead of sampling all employees in order to meet this requirement, the employer shall sample the employee(s) expected to have the highest chromium (VI) exposures.

If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

If monitoring reveals employee exposures to be at or above the action level, the employer shall perform periodic monitoring at least every six months.

If monitoring reveals employee exposures to be above the PEL, the employer shall perform periodic monitoring at least every three months.

If periodic monitoring indicates that employee exposures are below the action level, and the result is confirmed by the result of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

The company shall perform additional monitoring when there has been any change in the production process, raw materials, equipment, personnel, work practices, or control methods that may result in new or additional exposures to chromium (VI), or when the employer has any reason to believe that new or additional exposures have occurred.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 4 of 8

REGULATED AREAS

Regulated areas must be established when an employee's exposure is or is expected to be in excess of the PEL. Regulated areas shall be marked with warning signs to alert employees. Access is restricted to "authorized persons".

Demarcation- The company shall ensure that regulated areas are demarcated from the rest of the workplace in a manner that adequately establishes and alerts employees of the boundaries of the regulated area.

Access- The company shall limit access to regulated areas to:

- Persons authorized by the employer and required by work duties to be present in the regulated area;
- Any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring procedures under paragraph (d) of this section; or
- Any person authorized by the Occupational Safety and Health Act or regulations issued under it to be in a regulated area.

Do not drink, eat, smoke or apply cosmetics in regulated areas. If fact, do not even bring food, drinks, cigarettes or similar items into these areas at all; they can easily become contaminated

ENGINEERING AND WORK PRACTICE CONTROLS

Midland Engineering Co., Inc. will implement effective engineering and work practice controls if the exposure level is above the permissible limit for more than 30 days per year. The company shall use engineering and work practice controls to reduce and maintain employee exposure to chromium (VI) to or below the PEL unless the employer can demonstrate that such controls are not feasible.

Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall use them to reduce employee exposure to the lowest levels achievable, and shall supplement them by the use of respiratory protection that complies with the requirements of Midland Engineering Co., Inc. Respiratory Protection Safety Program.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 5 of 8

MEDICAL SURVEILLANCE

When the action level is reached, a program of medical surveillance is implemented. Medical surveillance is the process by which an employee is examined to a) determine if he or she can be exposed to chromium 6 without experiencing adverse health effects; b) identify chromium 6 related adverse health effects, so appropriate intervention measures can be taken; and c) determine the employee's fitness to use personal protective equipment such as respirators. Medical evaluations will be provided at no cost to employees.

These tests, which must be conducted by a physician or other licensed health care professional, will be provided to employees who are exposed at or above the action level for 30 days or more per year, experiencing signs or symptoms of adverse health effects associated with hexavalent chromium or involved in significant and unexpected exposures such as an emergency. The medical exam will consist of a medical work history that focuses on the employee's past, present and anticipated future exposure to chromium 6 and any health problems that could be compounded by exposure. The employee will undergo an examination of their skin and respiratory tract as well as any additional tests the health care professional deems appropriate.

After the exam, a written medical opinion will be issued within 30 days to the company. This written opinion will include whether the employee has a medical condition which places them at increased risk of impaired health from further exposure to chromium 6; any medical conditions related to chromium 6 exposure that require further evaluation or treatment; and, any recommended limitations that should be placed on the employee's exposure to chromium 6 or any limitations in the use of a respirator or other PPE. The written medical opinion, by law, will not reveal to the company findings or diagnoses unrelated to occupational exposure to chromium 6. The employee will be provided with a written copy of the opinion within two weeks of it being received by the company; however, the health care professional will also explain the results to the employee in person.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 6 of 8

PERSONAL PROTECTIVE EQUIPMENT

Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. The company shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Employee owned equipment is NOT permitted, except for safety toe footwear and prescription safety glasses. Midland Engineering Co., Inc. is still responsible for the assurance of its adequacy, maintenance and sanitation of those two items. All PPE issued shall be at no cost to the employee. All employees will know and follow the procedures outlined in this Program.

Contaminated PPE will be removed at the end of the work shift. The company shall clean, launder, repair and replace protective clothing as needed. Reference Midland Engineering Co., Inc. Personal Protective Equipment Safety Program.

Respirators must be selected based upon measured exposure levels and the assigned protection factor of respirators. The company shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the company cannot identify or reasonably estimate the employee exposure, the company shall consider the atmosphere to be IDLH.

Reference Midland Engineering Co., Inc. Respiratory Protection Program.

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 7 of 8

SAFE REMOVAL OF CONTAMINATED CLOTHING

After coming in contact with chromium while performing a job task, don't attempt to blow or shake it off of equipment or clothing. This can disperse it into the air or onto your body. The company will set aside a specific area or change room for removing contaminated clothing in order to prevent cross contamination. Make sure to place contaminated items in the lockers or containers as designated. After removing contaminated clothing, the employee should go to an approved washing facility to cleanse any areas where skin contact has occurred. Make sure to thoroughly wash hands and face. Remove any contaminated clothing and decontaminate yourself before entering any areas where food or drinks are consumed or smoking occurs. Workers must wash their hands and face or any other potentially exposed skin before eating, drinking or smoking.

HEALTH EFFECTS

EFFECTS OF INHALATION

There are several ways chromium 6 can enter our bodies; these are called "routes of entry". Inhalation is the primary route of entry. Employees can inhale dusts, mists and fumes containing chromium 6 while performing tasks such as welding on stainless steel or applying paints and coatings containing chromates. Repeated or prolonged exposure to the inhalation of hexavalent chromium can lead to harmful health effects including bronchitis, pneumonia, asthma, and lung cancer. Some symptoms of inhalation exposure to chromium 6 include a runny nose, sneezing, coughing, itching and a burning sensation. Chronic exposure may also produce sores in the nose, nosebleeds and in severe cases a perforation of the wall separating the nasal passages.

EFFECTS OF SKIN EXPOSURES

Direct skin contact with hexavalent chromium can lead to a variety of ailments. Some employees who come in contact with hexavalent chromium may develop an allergic reaction known as allergic contact dermatitis. When an employee becomes allergic, brief skin contact causes swelling and a red, itchy rash; allergic contact dermatitis becomes longer-lasting and more severe with repeated skin exposure. Direct skin contact with chromatic substances can also lead to skin ulcers. These are small crusted skin sores that heal slowly and leave scars. These are commonly referred to as "chrome holes."

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEXCHROM
			Initial Issue Date	12/08/15
Chapter 40-Hexavalent Chromium			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	12/08/16
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 8 of 8

OTHER EXPOSURES

Direct eye contact with chromate dust or chromic acid can cause permanent eye damage. Dust particles of chromium can contaminate clothing, hands, food and other items and lead to ingestion by employees. Damage to the liver, kidneys and gastrointestinal system has been experienced by individuals who have ingested high levels of hexavalent chromium. Some symptoms of chromium 6 ingestion include severe abdominal pain, vomiting and hemorrhaging.

HOUSEKEEPING

When dealing with chromium 6, proper housekeeping is critical to minimize exposure. Chromium 6 that settles on ledges, equipment, floors and other surfaces should be removed as soon as possible to prevent it from becoming airborne and to minimize the risk of skin contact. Surfaces shall be maintained as free as practicable of accumulation of chromium. All spills and releases of chromium shall be cleaned promptly. Clean surfaces contaminated with Chromium 6 with a HEPA-filtered vacuum or by wet sweeping or wet scrubbing. Dry brushing, sweeping and using compressed air are usually prohibited because they disperse chromium into the air.

TRAINING, RECORDS, & COMPLIANCE

Training shall be provided on chromium hazards, control methods and medical surveillance. Midland Engineering Co., Inc. shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area.

Periodic refreshers training is required as deemed necessary by the company Safety Director or OSHA directives.

Midland Engineering Co., Inc. will maintain and make available an accurate record of all employee exposure monitoring, medical surveillance and training records.