MIOSHA

Michigan Occupational Safety and Health Administration (MIOSHA)
Department of Licensing and Regulatory Affairs (LARA)

AGENCY INSTRUCTION

DOCUMENT IDENTIFIER: MIOSHA-STD-08-4R2	DATE: May 2, 2019

SUBJECT: Substance-Specific Expanded Occupational Health Standards

I. Purpose. This instruction provides procedures to ensure consistent enforcement of the nineteen (19) substance-specific, expanded occupational health standards. It also provides common, generic inspection guidelines for the standards covered by this instruction, thereby eliminating the need to develop individual instructions for each of these standards.

II. Scope. This instruction applies agency-wide for enforcement operations related to the standards covered by this instruction.

III. References.

A. Agency Instruction MIOSHA-STD-08-1, Personal Protective Equipment (PPE) Standard, as amended.

B. Construction Safety and Health Standard Part 6. /R408.40601 et seq., Personal Protective Equipment.

C. Construction Safety and Health Standard Part 605. /R325.60501 et seq., Methylenedianiline (MDA) in Construction.

D. Construction Safety and Health Standard Part 609. /R325.60901 et seq., Cadmium in Construction.

E. General Industry and Construction Safety and Health Standard Part 304. /R325.51151 et seq., Ethylene Oxide.

F. General Industry and Construction Safety and Health Standard Part 306. /R325.51451 et seq., Formaldehyde.

G. General Industry and Construction and Safety and Health Standard Part 307. /R325.51501et seq., Acrylonitrile.

H. General Industry and Construction and Safety and Health Standard Part 308. /R325.51601 et seq., Inorganic Arsenic.

I. General Industry and Construction and Safety and Health Standard Part 311. /R325.77101 et seq., Benzene.

J. General Industry and Construction Safety and Health Standard Part 314. /R325.50101 et seq., Coke Oven Emissions.

K. General Industry and Construction and Safety and Health Standard Part 432. /R325.52101 et seq., Hazardous Waste Operations and Emergency Response.

L. General Industry Safety and Health Standard Part 302. /R325.51401 et seq., Vinyl Chloride.

M. General Industry Safety and Health Standard Part 303. /R325.50051 et seq., Methylenedianiline (MDA) in General Industry.

N. General Industry Safety and Health Standard Part 309. /R325.51851 et seq., Cadmium in General Industry.

O. General Industry Safety and Health Standard Part 310. /R325.51901 et seq., Lead in General Industry.

P. General Industry Safety and Health Standard Part 340. /R325.34001 et seq., Beryllium.

Q. General Industry Safety and Health Standard Part 433. /R325.60001 et seq., Personal Protective Equipment.

R. General Industry Safety Standard Part 33. /R408.13301 et seq., Personal Protective Equipment.

S. MIOSHA Fact Sheets for each of the following chemicals: Chromium VI; ethylene oxide; formaldehyde; and methylenedianilene.

T. MIOSHA Field Operations Manual (FOM), as amended.

U. MIOSHA Industrial Hygiene Technical Manual, as amended.

V. MIOSHA Safety and Health Management System, as amended.

W. Occupational Health Standard Part 301. /R325.51101 et seq., Air Contaminants for General Industry.

X. Occupational Health Standard Part 312. /R325.50091 et seq., 1,3- Butadiene.

Y. Occupational Health Standard Part 313. /R325.51651 et seq., Methylene Chloride.

Z. Occupational Health Standard Part 315. /R325.50141 et seq., Chromium (VI) in General Industry.

AA. Occupational Health Standard Part 451. /R325.60051 et seq., Respiratory Protection.

BB. Occupational Health Standard Part 472. /R325.47201(3), Medical Services and First Aid.

CC. Occupational Health Standard Part 590. /R325.59001 et seq., Silica in General Industry.

DD. Occupational Health Standard Part 604. /R325.51995 et seq., Chromium (VI) in Construction.

EE. Occupational Health Standard Part 690. /R325.69001 et seq., Silica in Construction.

IV. Distribution. MIOSHA Staff; Federal OSHA; S-drive Accessible; MIOSHA Messenger; and Internet Accessible.

V. Cancellations. All previous versions of this agency instruction.

VI. Next Review Date. This instruction will be reviewed in five years from date of issuance.

VII. History. History of previous versions includes:

MIOSHA-STD-08-4R1, October 31, 2012
MIOSHA-STD-08-4, October 28, 2008

VIII. Contact. Adrian Rocskay, Director, General Industry Safety and Health Division, and Lawrence Hidalgo, Director, Construction Safety and Health Division.

IX. Originator. Barton G. Pickelman, Director.

X. Significant Changes. Five substance-specific health standards were added to this instruction. The standards are Part 340 Beryllium, Part 590 Silica in General Industry, Part 605 Methylenedianiline (MDA) in Construction, Part 609 Cadmium, and Part 690 Silica in Construction.

XI. Background. The hazardous substances covered by the expanded standards in the scope of this instruction are known to either cause cancer in humans, are suspected of causing cancer in humans, or cause other life-threatening illness such as pulmonary edema, asthma, and permanent nervous system, liver or kidney damage. Federal Occupational Safety and Health Administration (OSHA) and MIOSHA have developed individual standards that address the hazards of each of these substances because employee exposures to these substances are potentially extremely harmful. This instruction briefly describes the major requirements of the substance specific expanded standards, the procedures necessary to determine whether or not compliance exists, and the recommended procedures for citing. In cases where deviations from this instruction seem to be warranted, the Industrial Hygienist (IH) shall consult with the appropriate supervisor and note the reasons for the deviations in the case file.

XII. Specific Requirements of Each Expanded Standard.

A. See Appendices A and B, Highlights of Requirements - Substance Specific Expanded Standards, for an overview of individual rules included in each substance specific, expanded standard that is listed in the scope of this instruction.

B. See also MIOSHA Fact Sheets that have been developed for some of the substances listed in the scope of this instruction. Each fact sheet provides the following information: hazards associated with exposure, industries or processes where a substance is commonly encountered in the workplace, basic requirements of the MIOSHA Standard for that substance, and a list of additional resources.

XIII. General Guidelines.

A. Citations. The classification and grouping of all citations must be in accordance with procedures described in Chapter VI of the MIOSHA Field Operations Manual (FOM), as amended.

B. Citation Classification.

1. All violations of the expanded standards covered by this instruction will normally be cited as serious.

2. Where employee exposures above the permissible exposure limits (PELs) are determined, and the employer has not complied with any of the elements described in a standard, violations of rules covering the following serious hazards should be cited.

    a) Employees exposed above the PEL(s).

    b) No exposure monitoring or exposure determination was done by the employer.

    c) No respiratory protection and/or a written respiratory protection program.

    d) No written compliance program/plan implementation (where required).

    e) No medical surveillance provided.

    f) No information and training provided.

    g) No regulated area, PPE, housekeeping, or required hygiene facilities.

3. Recordkeeping violations are normally cited as other-than-serious (OTS).

4. Where it is determined that a written compliance program/plan is not adequate, but required program elements have been implemented, a violation of the written requirement will normally be cited as OTS.

5. Where it is determined that a required written compliance program/plan has major deficiencies or has not been developed and the required elements have not been implemented, a violation of the written requirement will normally be cited as serious.

C. Citation Grouping.

1. All serious violations of related rules; i.e. multiple violations of rules describing exposure monitoring requirements or multiple violations of rules describing medical surveillance requirements are normally grouped together.

2. Normally there will be no more than four groups of serious citations.

    a) Serious citations issued for exposing employees above the PELs or the action level (AL) may be grouped with citations for exposure monitoring, failure to provide respiratory protection and/or with a citation related to engineering control violations.

    b) Serious citations for violations of medical surveillance and medical removal requirements are normally grouped together.

    c) Serious citations for violations of written compliance program requirements, labeling, posting of regulated area requirements,

PPE, and housekeeping or hygiene facility requirements are normally grouped together or grouped with other related citations.

d) Serious violations of information and training requirements may be cited as a group or grouped with other related violations on a case-by-case basis.

3. All OTS recordkeeping violations may be grouped together. On a case-by-case basis, recordkeeping violations may be grouped with the related topic; e.g., air monitoring record violations grouped with air monitoring violations.

4. Exceptions to all grouping recommendations must be discussed with the health supervisor or safety and health manager.

D. Exposure Limits.

1. These include the following three types of PELs: 8-hour time-weighted average (TWA), short-term exposure limit (STEL), and also an AL.

2. If exposures above the PELs or AL are documented, the IH must also cite all applicable major sections or requirements of the standard if the employer is not in compliance with those requirements.

3. The use of respiratory protection may be considered during penalty calculation; however, over-exposures will be determined without regard to the use of respiratory protection.

4. If MIOSHA air monitoring reveals that no employees are exposed to a hazardous substance above the AL or any PELs, normally no additional action is required on the part of the employer. If the employer has not made an exposure determination or exposure monitoring as required by a specific standard, an OTS violation would be cited. There may also be additional substance specific requirements for the provision of employee training or information. Please refer to the specific standard, Appendix A and/or a MIOSHA Fact Sheet on a specific substance for information on training requirements or other regulations that are unique to a particular expanded standard.

5. Compliance Procedures.

a) The IH must conduct personal air monitoring during all inspections related to an evaluation of employer compliance with any of the substance specific standards. The MIOSHA Laboratory Equipment and Services (LESS) Section should be contacted prior to conducting air sampling to verify requirements for all sampling methods. It may be appropriate to conduct wipe sampling for some, but not all of the chemicals covered by the substance specific standards.

b) An evaluation of all work processes/areas must be made to determine the work processes/areas where employees have the potential to be exposed to the particular hazardous substance being monitored. Copies of all safety data sheets (SDS) for chemicals that may contain the particular hazardous substance are reviewed to assist in the evaluation. Direct-reading instruments (when available) that indicate area concentrations may also be used during the evaluation.

c) Whenever possible, the IH should perform representative sampling on all exposed job descriptions, during the heaviest production shift, and on the work process(es) most likely to produce the highest employee exposure. If a process is not running on a regular or frequent basis and it would be necessary to wait for more than a month to conduct air monitoring, the inspection should normally be closed so that other serious violations that have already been identified are promptly cited and employees are adequately protected. The IH must consult with the health supervisor before doing this. Another inspection may be opened at the time the process is anticipated to be operating. The new inspection will be coded in the OSHA Information System (OIS) "Inspection" tab on the "Inspection Type" sub tab as an un-programmed related inspection if the original inspection was a complaint and as a programmed related inspection if the original inspection was a priority inspection.

d) If there is any possibility that an IH will be exposed to a hazardous substance above the AL during air monitoring or at any point in the inspection, all MIOSHA policies and procedures for wearing appropriate PPE and respiratory protection must be followed. Please refer to the MIOSHA Safety and Health Management System for additional guidance.

e) Whenever an IH enters a "regulated area" or any work area designated by the employer as requiring respiratory protection or PPE, the IH must always wear the required respirator and/or PPE.

f) An IH is not allowed to enter work areas known to have air concentrations that may be more than ten times above the PELs; e.g., entering a containment around a bridge blasting operation, without permission from the division director or designee.

g) Where a hazardous substance is present as part of a solid or liquid mixture, a bulk sample should be obtained whenever possible and submitted to LESS to verify the presence of the specific substance. Consult the Tech Manual for directions on collecting bulk samples.

h) Employer monitoring data may be used to document a past exposure, to document employer non-compliance with periodic monitoring requirements, or to document employer knowledge. However, employer monitoring data may not be used as the sole source for documenting actual employee exposures above the PELs except in the event of an exposure that occurred in the past and no longer exists, e.g. emergency spill or release. If any proposed violations are dependent upon employer monitoring data, a copy of the monitoring data must be obtained for the case file.

i) When MIOSHA air monitoring data indicates an employee has been exposed to one of the substances covered by this instruction, above a PEL or an AL, related violations are normally cited as serious.

j) TWA and STEL violations for the same hazardous air contaminant are normally grouped.

E. Reviewing Employer Documents. The following employer documents should be reviewed when employee exposures exceed PELs or ALs. If violations are proposed, copies of all employer records that document a violation, must be obtained for the case file.

1. Records of employer monitoring results.
2. Employee notification records.
3. Written respiratory protection program and related documents such as employee medical evaluations and fit-test records.
4. Written compliance plan/program (if required by the particular expanded standard).
5. Medical surveillance and/or medical removal records.
6. Employee training records.
7. Engineering control maintenance records that may be related to the over-exposure.
8. Any other records documenting a violation or documenting management knowledge of a violation.

F. Exposure Monitoring Requirements.

1. These requirements may include the following:

a) General requirements, e.g.. use of objective data to document likelihood that exposures are below the AL.

b) Initial monitoring.

c) Frequency.

d) New or additional monitoring.

e) Employee observation and notification.

f) Accuracy of sampling method.

2. Compliance Procedures.

a) The IH should review/evaluate employer monitoring records to determine the results of previous exposure monitoring, frequency of sampling required based on existing employer knowledge of exposures, and/or validity of monitoring methods.

b) The IH should interview employees to determine which employees are/were potentially exposed to a specific air contaminant and to determine if affected employees were notified of the monitoring results.

c) All violations of periodic exposure monitoring requirements are normally cited as serious if air monitoring indicates that employees were exposed above a PEL and adequate respirators were not provided and worn by employees.

d) All exposure monitoring violations should be cited as serious if employee biological monitoring or medical surveillance indicates employee health was compromised, even if no respiratory protection violations were determined. Monitoring violations should also normally be cited as serious when proper decontamination procedures are not in place. An exception to this policy would be when the IH and health supervisor are confident that the abnormal biological monitoring results are associated with ingestion or non-work related exposures.

G. Methods of Employer Compliance. These include engineering controls, work practices, a written compliance plan, and regulated areas.

1. Engineering Controls and Work Practices.

a) If over-exposures are determined, the IH should determine if all feasible engineering controls and/or work practices have been implemented.

b) In order to cite an engineering control or work practice violation, examples of additional feasible engineering controls or work practices must be documented.

c) A review of the employer's maintenance and other records, IH observations and measurements, and employee interviews should be utilized to determine if specific requirements of these subparagraphs have been violated.

d) Photographs may be used to document a lack of or inadequate engineering controls.

e) A review of industry literature/resources may be necessary to document additional types of engineering controls or work practices that can be implemented.

2. Written Compliance Plan.

a) If a written compliance program/plan is required by a substance specific standard, a review of the written program/plan must be done. IH observations, employer records, and employee interviews are utilized to determine if the written program/plan is effectively implemented.

b) If the written program/plan is inadequate, a copy of the existing program/plan should be obtained for the case file.

c) If the written program/plan is adequate, but all requirements are not implemented, a copy of the written program/plan should be obtained for the case file. Copies of other documents that provide additional evidence indicating a lack of implementation, e.g. engineering controls described in the program are not maintained or employee training has not been provided as described in the written program, should be obtained for the case file.

d) Failure to develop and implement a written compliance program/plan where required is normally cited as a serious violation.

e) If all elements of a required written program/plan are implemented but not included in a written plan, a violation for the written program/plan should be cited as OTS.

3. Regulated Areas. These include establishment, separation, signage, prohibited access; requirements for PPE and respiratory protection; and prohibition of eating.

a) If regulated areas are required to be established, the IH is to document in the case file whether or not signs are posted as required.

b) IH observations and employee interviews are used to verify that access to the regulated area is restricted, to determine whether or not only authorized employees are allowed to enter the restricted area, and to verify that respirators and required PPE are worn inside regulated areas.

c) Whenever possible, photographs must be taken to document the absence of signs, the lack or respirators or appropriate PPE, or employees who are observed eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics inside a regulated area.

H. Respiratory Protection.

1. If over-exposures are determined, respirators that are appropriate and certified by National Institute of Occupational Safety and Health (NIOSH) to protect against the specific type of hazard and concentration must be provided and worn. An IH must document the lack of respirators or inadequate respirators with photographs or other relevant documents.

2. Each substance specific expanded standard must be consulted for respiratory protection requirements and any violations related to respirators must be cited under the vertical substance specific standard rule, not under the horizontal standard, Part 451, 1910.134, Respiratory Protection. If the employer is required to provide employees with respiratory protection under the rules of a substance specific standard, a written respiratory protection program must also be implemented in compliance with all of the requirements of Part 451. The presence of an adequate written program when major required elements have not been implemented can be used to document serious violations.

   Specifically identified deficiencies in the employer's respiratory protection program may be cited under the authority of the substance specific standard.

3. Respirator violations are normally cited as serious with the exception of simple record-keeping violations when all major elements of a respiratory protection program have been implemented.

I. PPE. Types required to be provided include: laundering, removal and storage of contaminated PPE, labeling and notification to laundry, and prohibiting of shaking contaminated clothing.

1. Each of the substance specific expanded standards covered by the instruction designates required types of PPE based on the hazards of the substance and/or the circumstances surrounding specific employee exposures. Refer to Appendix B for a brief highlight of these requirements. Refer to each substance specific expanded standard for detailed PPE requirements included in a particular standard.

2. See also Agency Instruction MIOSHA-STD-08-1R2, Personal Protective Equipment (PPE) Standard, for additional information on PPE requirements specified by the individual substance specific standards as well as Part 6 Construction, Personal Protective Equipment Standard and Parts 33 and 433, General Industry Safety and Occupational Health, Personal Protective Equipment Standards.

3. The IH must interview employees, observe operations, and examine PPE to determine whether an employer has met the requirements of the standard and to determine whether or not the PPE has been effective in protecting employees.

4. When possible the IH must take photographs of the following: employees who are not wearing required PPE, PPE that is not maintained/stored as required, and/or deficiencies in labeling requirements.

5. Employer records and management/employee interviews can be used to determine compliance with laundering or disposal requirements.

6. All violations related to PPE requirements contained in the expanded standards covered by this instruction are normally cited as serious but may be cited as OTS on a case-by-case basis in consultation with the health supervisor.

J. Housekeeping. Maintaining surfaces and methods used to clean work areas such as using wet versus dry sweeping and lunch room cleanliness.

1. The IH should determine compliance with housekeeping requirements by personal observation and through employee interviews.

2. Where applicable, wipe samples should be obtained to determine whether or not surfaces are maintained as free as practicable from hazardous accumulation of dust. Wipe samples should be obtained in compliance with the methods described in the Industrial Hygiene Technical Manual and/or in consultation with LESS.

3. Housekeeping violations may be classified as serious or OTS on a case-by-case basis in consultation with the health supervisor or manager.

K. Hygiene Facilities. These include eye wash, showers, clean change rooms, and storage of street clothing where required.

1. Compliance with these requirements is normally determined by IH personal observation and by interviewing employees. The IH must supplement direct observations of violations with photographs whenever possible.

2. A violation of a substance specific standard should be cited when an eyewash or shower is not provided, if the substance specific standard requires that one be provided. If a substance specific, vertical standard does not require an eyewash or shower, Part 472, Medical Services and First Aid requirements for an eyewash or shower should be cited.

3. All violations related to hygiene facilities are normally cited as serious. However, they may be cited as OTS on a case-by-case basis in consultation with the health supervisor.

L. Medical Surveillance. Medical surveillance includes initial and periodic monitoring requirements, contents of the medical examination, requirements to provide information to the physician, written medical opinion from the physician, informing employee about results, and medical removal requirements.

1. Both employer records and employee interviews should be utilized to determine employer compliance with medical surveillance requirements.

2. If the employer's records indicate non-compliance with these requirements, a copy of these records must be obtained for the case file.

3. Violations of medical surveillance and/or medical removal requirements are normally cited as serious.

M. Employee Information and Training. These include written program requirements, contents of information and training to be provided, availability of standard to employee, and written training records where required.

1. If a written training program is required, a copy of the program shall be reviewed to determine if it includes all required information.

2. Employer training records and employee interviews should be conducted to determine if all required information was provided as well as the frequency of the training program.

3. If a training program has not been developed or implemented, a serious violation should be cited.

4. Minor or recordkeeping violations of the training program are normally cited as OTS violations.

N. Recordkeeping. These include exposure records, medical records, training records, and availability of records.

1. The IH must evaluate employer records for accuracy and compliance with the requirements of a specific standard.

2. Employee interviews must be conducted to verify accessibility and accuracy of employer records.

O. Regulations Covering Emergencies and Major Chemical Releases.

1. Not all of the expanded standards have specific regulations describing methods/procedures that employers must use to protect employees in the event of an emergency or major chemical spill/leak. Please refer to Appendix B under the column titled "Emergency Requirements" for a brief description of each standard's emergency requirements. Refer to each substance specific standard for detailed emergency requirements or rules regarding chemical leaks or spills.

2. If no specific section in an expanded standard addresses an emergency or major chemical release, Occupational Health Standard, Part 432. Hazardous Waste Operations and Emergency Response (HAZWOPER), regulations may be applicable.

3. Usually an emergency or major chemical release incident is an event that took place in the past. The IH must utilize employer records and management/employee interviews to determine whether or not the employer complied with the emergency requirements of either the

expanded standard or the applicable HAZWOPER standard, whichever is determined to be applicable.

4. Normally specific violations related to an emergency or major chemical spill/leak are cited as serious.

XIV. Additional Guidelines or Information Specific to Each Expanded Standard.

A. Part 302. Vinyl Chloride.

1. This standard applies to general industry employee exposures to vinyl chloride, however it does not apply to the handling or use of fabricated products made of polyvinyl chloride.

2. This standard contains a short non-mandatory appendix on supplementary medical information.

B. Part 303 and 605. Methylenedianiline (MDA).

1. MDA has an extremely low exposure limit in the parts per billion.

2. These standards apply to both construction and general industry. However MDA is rarely encountered in Michigan outside of a chemical manufacturing facility.

3. These standards contain non-mandatory appendices that provide information on the hazards of MDA, a summary of ways to implement the provisions of these standards, medical surveillance guidelines, and a description of recommended sampling and analytical methods.

C. Part 304. Ethylene Oxide (EtO).

1. The standard specifically states that engineering controls are generally infeasible for the following operations: collection of quality assurance sampling from sterilized materials, removal of biological indicators from sterilized materials, loading and unloading of tank cars, changing of ethylene oxide tanks or sterilizers, and vessel cleaning.

2. The standard has non-mandatory appendices that provide information on the hazards of ethylene oxide, measures that can be taken to protect employees, medical surveillance guidelines, and a description of recommended sampling and analytical methods.

D. Part 306. Formaldehyde (HCHO).

1. This standard applies to all occupational exposures in both general industry and construction.

2. This standard has non-mandatory appendices that provide information on the hazards of formaldehyde and measures that can be taken to protect employees, a description of recommended sampling strategy and analytical methods, medical surveillance guidelines, and an example of a medical disease questionnaire.

E. Part 307. Acrylonitrile (AN).

1. This standard applies to all occupational exposures except for exposures resulting solely from the processing, use, and handling of many resins containing AN in the form of finished polymers. It does not apply to AN containing materials when it has been documented that the materials are not capable of releasing AN above the AL. It also does not apply to AN containing solid materials that will not be heated above 170 degrees Fahrenheit.

2. There are non-mandatory appendices that provide information on the hazards of AN, information on ways to protect employees from AN, medical surveillance guidelines, and recommended sampling and analytical methods.

F. Part 308. Inorganic Arsenic (As).

1. This standard applies to all occupational exposures to inorganic arsenic, except that they do not apply to employee exposures in agriculture or to exposures that result from pesticide application, the treatment of wood with preservatives, or the use of arsenically preserved wood.

2. This standard contains non-mandatory appendices that provide information on the hazards of As, ways to protect employees from As, and medical surveillance guidelines.

G. Part 309 and 609. Cadmium (Cd).

1. Cadmium exposure limits are in micrograms rather than in milligrams per cubic meter.

2. There are non-mandatory appendices which provide information on Cd hazards, methods of protecting employees from exposures to Cd, a description of biological monitoring and results, an example of an employee health history questionnaire, and extremely detailed recommended sampling and analytical methods.

H. Part 310. Lead in General Industry.

1. Lead exposure limits are in micrograms rather than in milligrams per cubic meter.

2. There are non-mandatory appendices which provide extensive information on lead hazards, a summary of the requirements of this standard in non-legal language, and a description of the requirements for implementing a medical surveillance program.

I. Part 311. Benzene.

1. This standard is applicable only to specific general industry work operations. Refer to Rule 325.77101, Rule 1, of Part 311 for a list of covered processes as well as a list of excluded processes.

2. Benzene exposure limits that are listed in Part 301, Air Contaminants Standard, are applicable to processes that expose employees to benzene but are excluded from coverage under Part 311.

3. There are non-mandatory appendices that describe the hazards of benzene, measures to be used to protect employee, medical surveillance guidelines, and recommended sampling and analytical methods.

J. Part 312. 1,3- Butadiene.

1. All rules and subrules of this standard apply to both general industry and construction.

2. There are non-mandatory appendices to the standard that provide information on the hazards of butadiene, guidelines for medical screening and surveillance, recommended sampling and analytical methods, measures to protect employees, and a sample health questionnaire.

K. Part 313. Methylene Chloride.

1. All rules and subrules of this standard apply to both general industry and construction.

2. There are non-mandatory appendices to this standard. They provide detailed information on the hazards of methylene chloride (MC), protective measures, medical surveillance, and a discussion of MC as used in furniture stripping.

L. Part 314. Coke Oven Emissions.

1. Coke batteries are the only workplaces covered by this standard.

2. There are non-mandatory appendices, which include a substance information sheet and Industrial Hygiene/Medical Surveillance Guidelines.

3. Because a coke battery is a very large and complex process with the potential for high exposures for several job categories, this type of investigation will normally be conducted by a team of industrial hygienists. A team leader will coordinate and plan the inspection and sampling strategies.

M. Part 315. Chromium (VI) in General Industry.

1. There is a separate standard that addresses construction industry exposures to Chromium (VI).

2. Chromium (VI) exposures due to pesticides that are regulated by the Environmental Protection Agency or another federal agency; e.g. the treatment of wood with preservatives, or exposures due to Portland cement are not within the scope of this standard.

3. Chromium (VI) exposure limits are in micrograms and not milligrams per cubic meter.

4. There is no appendix to this standard.

N. Parts 340. and 640. Beryllium.

1. Part 340 applies to general industry and Part 640 to construction.
2. These standards do not apply to materials containing less than 0.1% beryllium by weight where the employer has objective data demonstrating that employee exposure to beryllium will remain below the action level as an 8-hour TWA under any foreseeable conditions.
3. Exposure limits for beryllium are in micrograms, not milligrams per cubic meter.
4. There are medical removal requirements in these standards.
5. Part 340 has one appendix (non-mandatory) that provides control strategies to minimize beryllium exposure in general industry operations.

O. Part 590. Silica in General Industry.

1. This standard is applicable only to general industry work activities.
2. Although this standard was adopted in February 2017, MIOSHA is following OSHA enforcement policy. Inspection procedures for Silica in General Industry Standard will remain unchanged until the compliance date for general industries begins on June 23, 2018.
3. Exposure limits for respirable crystalline silica are in micrograms, not milligrams per cubic meter.
4. Appendix A, which specifies procedures for analyzing air samples of respirable crystalline silica, is mandatory.
5. Appendix B, the list of references and the three forms of silica are non-mandatory.
6. All silica-related inspections must be coded with an OIS code in the Inspection Report.
    a) N-02 SILICA.
    b) On the Inspection Type tab, under Additional Codes, click the "Add from Reference" button, select N 02 Silica.

P. Part 604. Chromium (VI) in Construction.

1. This standard is applicable only to construction work activities. However, Chromium (VI) exposures due to pesticides regulated by the EPA or

another federal agency or exposures due to Portland cement are not covered by the scope of this standard.

2. Chromium (VI) exposure limits are in micrograms not milligrams per cubic meter.

3. There is no appendix to this standard.

Q. Part 690, Silica in Construction.

1. This standard is applicable only to construction work activities.

2. Exposure limits for respirable crystalline silica are in micrograms, not milligrams per cubic meter.

3. Appendix A, which specifies procedures for analyzing air samples of respirable crystalline silica, is mandatory.

4. Appendix B, the list of references, and the three forms of silica are non-mandatory.

APPENDIX A
Highlights of requirements—SUBSTANCE-SPECIFIC EXPANDED STANDARDS

STANDARD	EXP. LIMITS	EXP. MON.	METHODS OF COMPLIANCE	RP*	TRAINING
Part 302 Vinyl Chloride (VC)	TWA: 1 ppm STEL: 5 ppm AL: 0.5 ppm	Initial/ Periodic if initial >AL	1) Feasible engineering and work practice, and PPE controls to, at, or below the PEL. 2) Establish a regulated area where VC and PVC is manufactured, reacted, repackaged, stored, handled or used and where VC concentrations exceed the PEL . 3) Written compliance prog. to reduce exp. ≤ the PELs.	See Std	1) Each employee engaged in VC or PVC operations. 2) Review of the rule at the employee's first training and *indoctrination* program, and annually thereafter. 3) Training includes emergency procedures.
Part 303 and 605 Methylenedianiline (MDA)	TWA: 10 ppb STEL: 100 ppb AL: 5 ppb	Initial/ Periodic	1) Feasible engineering and work practice controls to, at, or below PELs. 2) Establish a regulated area where exposure exceeds or can reasonably be expected to exceed the PELs. 3) Written compliance program to reduce exp. to or below the PELs.	See Std	Provide employees with information and training at the time of their initial assignment of work that will involve exposure to MDA and at least annually thereafter. See standard for the required content of information and training and signs/label requirements.
Part 304 Ethylene Oxide (EtO)	TWA: 1 ppm STEL: 5 ppm AL: 0.5 ppm	Initial/ Periodic	1) Feasible engineering and work practice controls to or below PELs. 2) Establish a regulated area where employees exposed to airborne concentrations may exceed either of the PELs. 3) Compliance plan for exposures > TWA or STEL.	See Std	All employees potentially exposed to EtO ≥ the AL or STEL at the time of initial assignment & annually thereafter.
Part 306 Formaldehyde (HCHO)	TWA: 0.75 ppm STEL: 2 ppm AL: 0.5 ppm	Initial/ Periodic	1) Feasible engineering and work practice controls to, at, or below the TWA and the STEL. 2) Establish a regulated area where the concentration is more than either the TWA or the STEL.	See Std	All employees assigned to workplaces where there is exposure at or above 0.1 ppm—refer to the standard for the required content of the training program.
Part 307 Acrylonitrile (AN)	TWA: 2 ppm STEL: 10 ppm AL: 1 ppm	Initial/ Periodic	1) Feasible engineering and work practice controls to, at, or below PELs. 2) Regulated area where concentrations > the PELs. 3) Written program for exposures > PELs.	See Std	1) Employee exposure >AL. 2) Employee exposure controlled—engineering and work practice. 3) Employees w/potential skin/eye contact.
Part 308 Inorganic Arsenic (AS)	TWA: 10 ug/m^3 STEL: NA AL: 5 ug/m^3	Initial/ Periodic	1) Feasible engineering and work practice controls to or below PEL. 2) Establish a regulated area where exposure is > PEL 3) Written program to reduce exposures to or below the PEL.	See Std	1) All employees subject to exposure above the AL, without regard to respirators, or for whom there is a possibility of skin or eye irritation. 2) Copy of rules/appendices available.
Part 309 and 609 Cadmium (Cd)	TWA: 5 ug/m^3 STEL: NA AL: 2.5 ug/m^3	See Standard (Complex)	1) Varies depending on GI, agriculture or construction. 2) Compliance plan for exposures ≥ PEL.	See Std	1) All employees who may be exposed to Cd before or at the time of initial assignment & annually. 2) Maintain a record of the program.
Part 310 Lead in General Industry (Pb)	TWA : 50 ug/m^3 STEL: NA AL: 30 ug/m^3	Initial & periodic	1) Ventilation 2) Administrative controls 3) Written compliance program	See Std	1) Copy of rules available to all affected employees. 2) Training at initial time of assignment where potential exposure to airborne lead or when there is a possibility of skin or eye irritation from lead.

APPENDIX A
Highlights of requirements—SUBSTANCE-SPECIFIC EXPANDED STANDARDS (Continued)

STANDARD	EXP. LIMITS	EXP. MON.	METHODS OF COMPLIANCE	RP*	TRAINING
Part 311 **Benzene (C_6H_6)**	TWA: 1 ppm STEL: 5 ppm AL: 0.5 ppm	Initial/ Periodic/ After spills or leaks	1) Feasible engineering and work practice controls to, at, or below PELs. 2) Regulated area where exposure is or can reasonably be expected to be > PELs. 3) Written program for exposures > PEL.	See Std	1) Provide info and training to employees at initial assignment where benzene is present. 2) Annually if exposures >AL. 3) Explanation of contents of the rule, & App. A&B.
Part 312 **1,3-Butatdiene (BD)**	TWA: 1 ppm STEL: 5 ppm AL: 0.5 ppm	Initial/ Periodic	1) Feasible engineering and work practice controls to or below PELs. 2) Regulated area where exposure is or can reasonably be expected to exceed the PELs. 3) Compliance plan for exposures > PEL.	See Std	1) Employees potentially exposed to BD ≥ the AL or STEL prior to or at time of initial assignment & annually. 2) Maintain a record of the program.
Part 313 **Methylene Chloride (MC)**	TWA: 25 ppm STEL: 125 ppm AL: 12.5 ppm	Initial/ Periodic—where MC present.	1) Feasible engineering and work practice controls to or below PELs. 2) Establish a regulated area where exp. exceeds or can reasonably be expected to exceed TWA, PEL, or STEL. 3) NO written program required.	See Std	1) Each affected employee prior to or at the time of initial assignment to a job involving potential exposure to MC. 2) Re-train employee exposed above the AL or STEL. 3) Update training as necessary (See standard).
Part 314 **Coke Oven Emissions (COE)**	TWA: 150 ug/m^3 STEL: NA AL: NA	Employees working in regulated area.	Compliance program to reduce exposures by engineering/work practices alone.	See Std	1) For employees in the regulated area. 2) At the time of initial assignment & annually. 3) Copy of rules, the substance information sheet, air monitoring and medical surveillance guide.
Part 315 **Chromium (VI)**	TWA: 5 ug/m^3 STEL: NA AL: 2.5 ug/m^3	Initial/ Periodic	1) Feasible engineering and work practice controls to or below PEL. 2) Establish a regulated area where exposure is or can reasonably be expected to be > PEL. May not utilize employee rotation.	See Std	Demonstrate knowledge of contents of rules and the purpose and description of medical surveillance program.
Parts 340 & 640 **Beryllium**	TWA: 0.2 ug/m^3 STEL: 2.0 ug/m^3 AL: 0.1 ug/m^3	Initial/ Periodic or performance oriented	1) Written exposure control plan 2) Engineering and work practice controls 3) Prohibition of rotation	See Std	1) Each employee who has airborne exposure or dermal contact: by time of initial assignment and annually. 2) Ensure demonstration of knowledge. 3) Additional training to employees affected by change in airborne exposure. 4) Copy of rules and written exposure control plan.

STANDARD	EXP. LIMITS	EXP. MON.	METHODS OF COMPLIANCE	RP*	TRAINING
Part 604 Chromium (VI) Construction	TWA : 5.0 ug/m^3 STEL: NA AL: 2.5 ug/m^3	Initial & Periodic or performance oriented	1) Engineering and work practice controls 2) May not utilize employee rotation	See Std	Ensure each employee can demonstrate knowledge of at least the contents of the standard & the medical surveillance program. Must make a copy of standard readily available to all affected employees.
Part 590 Silica in General Industry	TWA : 50 ug/m^3 AL: 25 ug/m^3	Initial & Periodic or performance oriented	1) Engineering and work practice controls. 2) Regulated area where exposure is or can reasonably be expected in excess of the PEL. 3) Written program, irrespective of employee exposure levels. 4) Abrasive blasting requires compliance with other standards (see 1910.1053(f)(3)	See Std	1) Include respirable silica in the program established to comply with hazard communication. 2) Provide employees with information and training to ensure they can demonstrate knowledge. See standard for the required content of information and training 3) Must make a copy of the rules available to each employee without cost.
Part 690 Silica in Construction	TWA : 50 ug/m^3 AL: 25 ug/m^3	Initial & Periodic or performance oriented	1) Engineering & work practice controls.(Refer to Table 1; task specific requirements). 2) For tasks not listed in Table 1 see standard for other methods of compliance; 1926.1153(d) 3) Abrasive blasting requires compliance with other standards (see 1926.1153(d)(3)(ii)	See Std	1)Include respirable silica in the program established to comply with hazard communication. 2)Provide employees with information and training to ensure they can demonstrate knowledge. See standard for the required content of information and training 3)Must make a copy of the rules available to each employee without cost.

RP = Respiratory Protection

APPENDIX B
Highlights of requirements—SUBSTANCE-SPECIFIC EXPANDED STANDARDS

STANDARD	PPE	HOUSE-KEEPING/Hygiene	MEDICAL SURVEILLANCE	EMERGENCY REQUIREMENTS	UNIQUE ASPECTS
Part 302 Vinyl Chloride (VC)	Protective garments to prevent skin contact with liquid VC or PVC residue from vessel walls or in emergencies (Refer to Rules 8 and 9 for more information.)	No specific requirements.	1) Exposure >AL, upon initial assignment. 2) Every 6 months for employee employed in VC or PVC manufacturing for 10 years/longer. 3) Annually for all other employees.	Develop a written plan for each facility storing, handling, or using VC as a liquid or compressed gas.	Hazardous operations (i.e., entry of vessels to clean PVC residue form vessel walls)—Refer to Rule 8.
Part 303 and 605 Methylenedianiline (MDA)	Provide PPE if airborne conc. exceeds the PELs, employee is subject to dermal exposure, or liquid can be splashed in the eyes.	GI/Construction requirements differ—see Rule 12, 13 and 15.	1) Exposure >AL, 30 or more days/yr. 2) Dermal exposure for 15 or more days/yr. 3) Exposed during an emergency situation. 4) Signs/symptoms.	Develop a written plan where there is a possibility of an emergency—See definition of "Emergency".	Medical removal and benefits—see Rules 20 and 21.
Part 304 Ethylene Oxide (EtO)	If possible eye or skin contact with EtO or EtO solutions—then in accordance with R 325.6001 et seq.	No specific requirements.	Before initial assignment to a work area where exposure may be ≥AL or STEL for at least 30 days/year, and at least annually.	Written plan for each workplace where EtO is used –as prescribed in 29 CFR 1910.38.	Engineering controls are not feasible for all operations—see Rule 10.
Part 306 Formaldehyde (HCHO)	In accordance with Part 33 and Part 6. See also standard.	Change rooms and eye wash showers.	1) Exposure ≥AL or the STEL. 2) Signs/symptoms. 3) Exposed during an emergency.	Adopt and implement appropriate procedures in case of an emergency.	PM program and leak detection program—refer to Rule 15.
Part 307 Acrylonitrile (AN)	1) Skin/eye contact with liquid AN. 2) Laundering/replacement.	1) >PEL—change rooms, shower facilities. 2) Leak detection pg.	1) Exposure >AL. 2) Upon initial assignment and annually thereafter.	1) Written program liquid. AN. 2) Emergency reported to the Director within 72 hours.	If exempted from standard must document basis—See Rule 501.
Part 308 Inorganic Arsenic (AS)	Appropriate and clean PPE if possibility of skin or eye irritation—and for employees working in a regulated area.	Shower & lunch facilities and change rooms as described in Rule 4201(5).	1) Employee who is or will be exposed >AL for not less than 30 or more days/year. 2) Employees who have been exposed >AL for not less than 30 or more days/year for 10 or more years of combined employment.	Nothing specified in the standard.	Establish and implement a written housekeeping plan and maintenance plan.
Part 309 and 609 Cadmium (Cd)	For exposure >PEL or if skin or eye irritation is associated with cadmium at any level—provided appropriate PPE.	Change & lunch rooms, shower facilities—see std.	1) Construction tasks or exp. ≥ the AL 30 or more days/yr. 2) Previous exposure—see standard. 3) Medical removal—see standard.	Written plan for dealing with substantial releases of airborne cadmium.	Standard includes varying requirements for general industry vs. construction—complex.
Part 310 Lead in General Industry (Pb)	Required weekly for employees exposed above the PEL. Required to be provided daily where employees exposed above 200 micrograms per cubic meter.	Change rooms, lunch rooms, washing facilities where exposures above the PEL.	Exposure>AL for >30 days/year	None	Medical removal benefits

APPENDIX B
Highlights of requirements—SUBSTANCE-SPECIFIC EXPANDED STANDARDS (Continued)

STANDARD	PPE	HOUSE-KEEPING/Hygiene	MEDICAL SURVEILLANCE	EMERGENCY REQUIREMENTS	UNIQUE ASPECTS
Part 311 Benzene (C_6H_6)	In accordance with Part 33 and Part 433 (to prevent eye contact and limit dermal exposure to liquid benzene).	No specific requirements.	1) Employees who are or may be exposed >AL 30 or more days/yr. 2) Exposure >PELs 10 or more days/yr. 3) Medical removal may be required.	See definition of "Emergency" in the standard.	Part 301 applies if scope of Part 311 not applicable.
Part 312 1,3-Butatdiene (BD)	Where appropriate to prevent eye contact and limit dermal exposure to BD. Eye and face protection shall meet 29 CFR 1910.133.	No specific requirements.	1) Employees with exposure ≥ AL 30 or more days/year. 2) Employees who have or may have exposure ≥ PELs 10 or more days/year.	Written plan developed, or existing plan modified to contain applicable elements specified in 29 CFR 1910.38 and 29 CFR 1910.120.	1) Continued medical surveillance after transfer to non-BD exposed job. 2) Exposure goal program required for exposures >AL.
Part 313 Methylene Chloride (MC)	To prevent MC-induced skin or eye irritation. Eye/face protection shall meet 1910.133 or 1915.153.	Solutions containing >0.1% MC—See standard.	1) Exposed ≥AL 30 or more days/yr. 2) Exposed ≥PEL or STEL 10 or more days/year. 3) Exposed during an emergency.	See def. of "Emergency" in the standard. Also, leak spill procedures [Rule (f)(3)].	Med. Surv. required for employees at risk from cardiac disease.
Part 314 Coke Oven Emissions (COE)	Flame resistant jacket, pants, & gloves, and devices that insulate footwear from hot surfaces—regulated areas.	Change & lunch rooms, shower facilities—see std.	At the time of initial assignment to a regulated area and in the area for not less than 30 days/year—see standard for additional requirements.	The next coking cycle shall not begin until the cause of the emergency is determined and corrected (see exception).	Provide PAPR upon option of the employee—refer to Rule 117(3).
Part 315 Chromium (VI)	1) When hazard of skin/eye contact. 2) Removal/storage, cleaning & replacement.	Change rooms, washing facilities—see standard.	1) Exposure >AL, 30 or more days/yr. 2) Signs/symptoms. 3) Frequency—see standard.	Medical surveillance required if exposed during an emergency.	Does not apply to construction—see Part 604 for construction. Does not apply to pesticides covered by EPA or Portland cement.
Parts 340 and 640 Beryllium	1) Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; or 2) Where there is a reasonable expectation of dermal contact with beryllium.	1) Maintain all surfaces in work & regulated areas as free as practicable. 2) Washing facilities and change rooms—See std.	1) Exposure ≥ AL, 30 or more days/yr. 2) Signs/symptoms 3) Frequency—see standard.	Medical surveillance required if exposed during an emergency.	An employee is eligible for medical removal in certain circumstances. See the standard.
Part 604 Chromium (VI) Construction	Required where hazard is or is likely to be present from skin or eye contact with Chromium (VI)	Provide change rooms, washing facilities, where PPE is required. If employees consume food or drinks where Chromium (VI) is present must maintain surfaces as free as practical from Chromium (VI).	1) Exposed or may be exposed ≥ AL for > 30 days/year. 2) Employees with signs or symptoms. 3) Employees exposed in an emergency.	Provide medical surveillance to employees exposed in an emergency.	Applies only to construction. Is a separate general industry standard. Does not apply to pesticides or Portland cement.

STANDARD	PPE	HOUSE-KEEPING/Hygiene	MEDICAL SURVEILLANCE	EMERGENCY REQUIREMENTS	UNIQUE ASPECTS
Part 590 Silica in General Industry	No specific requirements.	No dry sweeping or dry brushing; or compressed air unless other methods are not feasible.	1) Exposure>AL for >30 days/year 2) At least every three years or more often if recommended by PLHCP	Nothing specified in the standard.	The standard does not apply where the employer has objective data demonstrating that employee exposure to respirable crystalline silica will remain below 25 ug/m^3 as an 8-hour TWA under any foreseeable conditions.
Part 690 Silica in Construction	No specific requirements.	No dry sweeping or dry brushing; or compressed air unless other methods are not feasible.	1) If required to use a respirator for >30 days/year 2) At least every three years or more often if recommended by PLHCP	Nothing specified in the standard.	The standard does not apply to occupational exposures to respirable crystalline silica in construction work, where employee exposure will remain below 25 ug/m^3 as an 8-hour TWA under any foreseeable conditions.