DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

BUREAU OF SAFETY AND REAGULATION

OCCUPATIONAL HEALTH STANDARDS COMMISSION

ACRYLONITRILE (AN)

(By authority conferred on the occupational health standards commission by section 24 of Act No. 154 of the Public Acts of 1974, as amended, being S408.1024 of the Michigan Compiled Laws)

R 325.51501 Applicability.

Rule 501. (1) These rules apply to all occupational exposures to acrylonitrile (AN), chemical abstracts service registry no. 000107131, except that these rules do not apply to exposures which result solely from the processing, use, and handling of the following materials:

(a) Acrylonitrile-butadiene-styrene resins, styrene-acrylonitrile resins, nitrile barrier resins, solid nitrile elastomers, and acrylic and modacrylic fibers in the form of finished polymers, including products fabricated from such finished polymers.

(b) Materials made from or containing AN, or both, for which objective data is reasonably relied upon to demonstrate that the material is not capable of releasing AN in airborne concentrations of more than 1 part per million (ppm) as an 8-hour, time-weighted average under the expected conditions of processing, use, and handling which cause the greatest possible release.

(c) Solid materials made from or containing AN, or both, which will not be heated above 170 degrees Fahrenheit during handling, use, or processing.

(2) An employer who relies on the exemption in subrule (1)(b) of this rule shall maintain records of the objective data supporting that exemption and of the basis of the employer's reliance on the data, as provided in R 325.51521.

History: 1980 AACS.

R 325.51502 Definitions.

Rule 502. As used in these rules:

(a) "Acrylonitrile" or "AN" means acrylonitrile monomer, chemical formula CH2=CHCN.

(b) "Act" means Act No. 154 of the Public Acts of 1974, as amended, being §408.1001 et seq. of the Michigan Compiled Laws.

(c) "Action level" means a concentration of AN of 1 ppm as an 8-hour, time-weighted average.

(d) "Authorized person" means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the opportunity to observe monitoring procedures under R 325.51526.

(e) "Decontamination" means the treating of materials and surfaces by water washdown, ventilation, or other means to assure that the materials will not

expose an employee to airborne concentrations of AN of more than 1 ppm.

(f) "Director" means the director of the Michigan department of consumer and industry services or his or her designee.

(g) "Emergency" means any occurrence, such as, equipment failure, rupture of containers, or failure of control equipment, which results in an unexpected massive release of AN.

(h) "Liquid AN" means AN monomer in liquid form and liquid or semiliquid polymer intermediates, including slurries, suspensions, emulsions, and solutions which are produced during the polymerization of AN.

(i) "O.H. rule" means an occupational health rule adopted by reference pursuant to section 14 of the act or promulgated pursuant to section 24 of the act. Copies of these rules are available from the Michigan department of

consumer and industry services.

History: 1980 AACS; 2000 AACS.

R 325.51503 Airborne concentrations; permissible employee exposure limits.

Rule 503. (1) With respect to airborne concentrations, the following limits apply:

(a) An employer shall assure that an employee is not exposed to an airborne concentration of acrylonitrile of more than 2 ppm as an 8-hour, time-weighted average.

(b) An employer shall assure that any employee is not exposed to an airborne concentration of acrylonitrile of more than 10 ppm as averaged over any 15-minute period during the working day.

(2) An employer shall assure that an employee is not exposed to skin contact or eye contact with liquid AN.

History: 1980 AACS.

R 325.51504 Regulated areas; report of information; emergency report; additional information.

Rule 504. (1) Within 30 days following the establishment of a regulated area pursuant to R 325.51506, the employer shall report all of the following information to the director:

(a) The address and location of each establishment which has 1 or more regulated areas.

(b) The locations within the establishment of each regulated area.

(c) A brief description of each process or operation which results in employee exposure to AN in a regulated area.

(d) The number of employees engaged in each process or operation within each regulated area which results in exposure to AN, and an estimate of the frequency and degree of exposure that occurs.

(2) If there is a significant change in the information required to be reported by this rule, an employer shall promptly provide the new information to the director.

(3) Emergencies, and the facts obtainable at the time of the emergency, shall be reported to the director within 72 hours of the initial occurrence. Upon request of the director, an employer shall submit additional information in writing relevant to the nature and extent of employee exposures and the measures taken to prevent future emergencies of a similar nature.

History: 1980 AACS.

R 325.51505 Employee exposure; determination of airborne exposure levels; employer monitoring of airborne concentrations; monitoring exposure below action level; monitoring exposure at or above action level; monitoring exposure of more than permissible limits; additional monitoring; written notice to employee of exposure level; measurement accuracy.

Rule 505. (1) For the purposes of these rules, employee exposure is that exposure which would occur if the employee were not using a respirator.

(2) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to AN over an 8-hour period.

(3) An employer who has a place of employment in which AN is present shall monitor each such workplace and work operation to accurately determine the airborne concentrations of AN to which an employee may be exposed.

(4) If the monitoring required by these rules reveals that employee exposure is below the action level, an employer may discontinue monitoring for that employee.

(5) If the monitoring required by these rules reveals that employee exposure is at or above the action level but below the permissible exposure limits, an employer shall repeat such monitoring for each affected employee at least once every 3 months. An employer shall continue

these quarterly measurements until not less than 2 consecutive measurements, taken not less than 7 days apart, are below the action level, and thereafter the employer may discontinue monitoring for that employee.

(6) If the monitoring required by these rules reveals that employee exposure is in excess of the permissible exposure limits, an employer shall repeat these determinations for each such employee at least once a month. An employer shall continue these monthly measurements until not

less than 2 consecutive measurements, taken not less than 7 days apart, are below the permissible exposure limits, and thereafter an employer shall monitor at least once every 3 months.

(7) If there is a production, process, control, or personnel change which may result in new or additional exposures to AN, additional monitoring that complies with this rule shall be conducted.

(8) Within 5 working days after the receipt of the results of monitoring required by these rules, an employer shall notify each employee in writing of the results which represent that employee's exposure.

(9) If the results indicate that the representative employee exposure exceeds the permissible exposure limits, an employer shall include in the written notice a statement that the permissible exposure limits were exceeded and a description of the corrective action being taken to reduce exposure to or below the permissible exposure limits.

(10) The method of measurement of employee exposure shall be accurate to a confidence level of 95% to within plus or minus 35% for concentrations of AN at or above the permissible exposure limits, and plus or minus 50% for concentrations of AN below the permissible exposure limits.

History: 1980 AACS.

R 325.51506 Regulated areas; establishment; demarcation and segregation; access; prohibited activities. Rule 506. (1) An employer shall establish a regulated area where AN concentrations are in excess of the permissible exposure limits.

(2) A regulated area shall be demarcated and segregated from the rest of the workplace in a manner that minimizes the number of persons who will be exposed to AN.

(3) Access to a regulated area shall be limited to authorized persons or to persons who are otherwise authorized by the act or rules promulgated pursuant thereto.

(4) An employer shall assure that neither food nor beverages are present or consumed, that tobacco products are not present or used, and that cosmetics are not applied, in the regulated area.

History: 1980 AACS.

R 325.51507 Engineering and work practice controls to control employee exposure.

Rule 507. (1) An employer shall institute engineering and work practice controls to reduce and maintain employee exposures to AN at or below the permissible exposure limits, except to the extent that an employer establishes that such controls are not feasible.

(2) If the engineering and work practice controls that can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limits, an employer shall nontheless use them to reduce exposures to the lowest levels achievable by these controls and shall supplement the controls by the use of respiratory protection which complies with the requirements of R 325.51509.

History: 1980 AACS.

R 325.51508 Employee exposure; written program to reduce exposure by means of engineering and work practice controls required; content; completion of program; availability; revision and update.

Rule 508. (1) An employer shall establish and implement a written program to reduce employee exposures to or below the permissible exposure limits solely by means of engineering and work practice controls, as required R 325.51507.

(2) A written program shall include, at a minimum, all of the following:

(a) A description of each operation or process resulting in employee exposure to AN above the permissible exposure limits.

(b) An outline of the nature of the engineering controls and work practices to be applied to the operation or process in question.

(c) A report of the technology considered for meeting the permissible exposure limit.

(d) A schedule for implementation of engineering and work practice controls for the operation or process. The schedule shall project completion not later than November 2, 1980.

(e) Other relevant information.

(3) An employer shall complete the steps set forth in the written program by the dates in the schedule.

(4) A written program shall be submitted to the director upon request and shall be available at the worksite for examination and copying by the director or any affected employee or representative.

(5) The written program required by this rule shall be revised and updated at least once every 6 months to reflect the current status of the program.

History: 1980 AACS.

R 325.51509 Respiratory protection.

Rule 509. (1) For employees who use respirators required by these rules, the employer shall provide respirators that comply with the requirements of this rule.

Respirators must be used during:

(a) Periods necessary to install or implement feasible engineering and work practice controls.

(b) Work operations, such as maintenance and repair activities or reactor cleaning, for which the employer establishes that engineering and work practice controls are not feasible.

(c) Work situations for which feasible engineering and work practice controls are not yet sufficient to reduce an employee's exposure to or below the permissible exposure limits.

(d) Emergencies.

(2) Respirator selection. The employer shall select the appropriate respirator from table 1 of this rule. (3) Table 1 reads as follows:

Concentration of AN or Respirator type condition of use	
(a) Less than or equal to 20 ppm.	(i) Chemical cartridge respirator with organic vapor cartridge or cartridges and halfmask facepiece or
	(ii) Supplied-air respirator with halfmask facepiece.
(b) Less than or equal to 100 ppm or maximum use concentration (MUC) of cartridges or canisters, whichever is lower.	 (i) Full facepiece respirator with any of the following: (A) organic vapor cartridges (B) organic vapor gas mask chin-style (C) organic vapor gas mask canister, front or back mounted. (ii) Supplied-air respirator with full facepiece; or (iii) Self-contained breathing apparatus with full facepiece.
(c) Less than or equal to 4,000 ppm.	Supplied-air respirator operated in the positive pressure mode with full facepiece, helmet, suit, or hood.
(d) Greater than 4,000 ppm, or unknown concentration.	(i) Supplied-air and auxiliary self-contained breathing apparatus

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	with full facepiece in positive pressure mode; or (ii) Self-contained breathing apparatus with full facepiece in positive pressure mode.
(e) Firefighting.	Self-contained breathing apparatus with full facepiece in positive pressure mode.
(f) Escape.	(i) Any organic vapor respirator, or(ii) Any self-contained breathing apparatus.

(4) The employer shall implement a respiratory protection program in accordance with 29 CFR 101.134 (b) to (d) and (f) to (m), except for (d)(1)(iii), (d)(3)(iii)(b)(1), and (2), as adopted by reference in R 325.60051 to R 325.60052.

(5) If air-purifying respirators (chemical-cartridge or chemical-canister types) are used, then:

(a) The air-purifying canister or cartridge must be replaced prior to the expiration of its service life or at the completion of each shift, whichever occurs first.

(b) A label must be attached to the cartridge or canister to indicate the date and time at which it is first installed on the respirator.

History: 1980 AACS; 2000 AACS.

R 325.51510 Emergency situations; written plans; alarms.

Rule 510. (1) A written plan for emergency situations shall be developed for each workplace where liquid AN is present. Appropriate portions of the plan shall be implemented in the event of an emergency. (2) The plan shall specifically provide that an employee who is engaged in correcting an emergency condition shall be equipped as required in R 325.51509 until the emergency has abated.

(3) An employee who is not engaged in correcting the emergency shall be evacuated from the area and shall not be permitted to return until the emergency has abated.

(4) If the possibility of employee exposure to AN in excess of the ceiling limit exists, a general alarm shall be installed and used to promptly alert employees of such occurrences.

History: 1980 AACS.

R 325.51511 Protective clothing and equipment; provision and use.

Rule 511. Where eye or skin contact with liquid AN might occur, an employer shall provide, at no cost to the employee, and shall assure that employees wear, impermeable protective clothing or other equipment to protect any area of the body that may come in contact with liquid AN. The employer shall comply with the provisions of R 408.13301 to R 408.13398 of the Michigan Administrative Code, which are administered and enforced by the Michigan department of labor.

History: 1980 AACS; 1993 AACS.

R 325.51512 Protective clothing and equipment; cleaning and replacement; decontamination; notice to laundering or cleaning persons of potentially harmful effects of exposure to AN.

Rule 512. (1) An employer shall clean, launder, maintain, or replace protective clothing and equipment required by these rules as needed to maintain their effectiveness.

(2) An employer shall assure that impermeable protective clothing that contacts or is likely to have contacted liquid AN is decontaminated before being removed by the employee.

(3) An employer shall assure that an employee whose permeable clothing becomes wetted with liquid AN immediately removes the contaminated clothing and showers. The clothing shall be decontaminated before it is removed from the regulated area.

(4) An employer shall assure that protective clothing or equipment is not removed from the change room, except for the purposes of laundering, maintenance, or disposal.

(5) An employer shall inform any person in writing who launders or cleans protective clothing or equipment of the potentially harmful effects of exposure to AN.

History: 1980 AACS.

R 325.51513 Hygiene facilities and practices; change rooms; showers.

Rule 513. (1) All surfaces shall be maintained free of visible accumulations of liquid AN.

(2) An employer shall institute a program for detecting leaks and spills of liquid AN, including regular visual inspections, for operations involving liquid AN.

(3) If a spill of liquid AN is detected, an employer shall assure that surfaces contacted by the liquid AN are decontaminated. An employee who is not engaged in decontamination activities shall leave the area of the spill and shall not be permitted in the area until decontamination is completed.

(4) AN waste, scrap, debris, bags, containers, or equipment shall be decontaminated before being incorporated in the general waste disposal system.

(5) If an employee is exposed to an airborne concentration of AN above the permissible exposure limit, or if an employee is required to wear protective clothing or equipment pursuant to R 325.51511, the facilities required by O. H. rule 4201, including clean change rooms and shower facilities, shall be provided by an employer for use by such employees, and the employer shall assure that the employees use the facilities provided.

(6) An employer shall assure that an employee who wears protective clothing or equipment for protection from skin contact with liquid AN showers at the end of the work shift.

(7) An employer shall assure that, in the event of skin or eye exposure to liquid AN, an affected employee showers immediately to minimize the danger of skin absorption.

(8) An employer shall assure that an employee working in the regulated area washes his or her hands and face before eating.

History: 1980 AACS.

R 325.51514 Medical surveillance program generally.

Rule 514. (1) An employer shall institute a program of medical surveillance for each employee who is or will be exposed to AN at or above the action level, without regard to the use of respirators, and shall provide each such employee with an opportunity for medical examinations and tests pursuant to these rules at the employer's cost.

(2) An employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

History: 1980 AACS.

R 325.51515 Medical surveillance program; initial examinations.

Rule 515. At the time of initial assignment, or upon institution of the medical surveillance program, an employer shall provide each affected employee with an opportunity for a medical examination, including, at a minimum, all of the following elements:

(a) A work history and medical history with special attention to skin, respiratory, and gastrointestinal systems, and those nonspecific symptoms, such as headache, nausea, vomiting, dizziness, weakness, or other central nervous system dysfunctions, which may be associated with acute or chronic exposure to AN.

(b) A complete physical examination with special attention to the peripheral and central nervous system, gastrointestinal system, respiratory system, skin, and thyroid.

(c) A 14-inch by 17-inch posterior-anterior chest X-ray.

(d) Further tests of the intestinal tract, including fecal occult blood screening, for all workers 40 years of age or older and other affected employees for whom, in the opinion of the physician, such testing is appropriate.

History: 1980 AACS.

R 325.51516 Medical surveillance program; periodic and additional examinations.

Rule 516. (1) An employer shall provide the examinations specified in R 325.51515 at least annually for all employees specified in R 325.51514.

(2) If an employee has not had the examination specified in R 325.51515 within 6 months preceding termination of employment, an employer shall make such examination available to the employee before termination.

(3) If for any reason an employee develops signs or symptoms which may be associated with exposure to AN, an employer shall provide an appropriate examination and emergency medical treatment.

History: 1980 AACS.

R 325.51517 Medical surveillance program; information provided to physician by employer.

Rule 517. An employer shall provide all of the following information to the examining physician:

(a) A copy of these rules and related appendices which may be obtained from the department of consumer and industry services.

(b) A description of an affected employee's duties as they relate to the employee's exposure.

(c) The employee's representative exposure level.

(d) The employee's anticipated or estimated exposure level for preplacement examinations or for cases of exposure due to an emergency.

(e) A description of any personal protective equipment used or to be used.

(f) Information from previous medical examinations of the affected employee which is not otherwise available to the examining physician.

History: 1980 AACS; 2000 AACS.

R 325.51518 Medical surveillance program; physician's written opinion.

Rule 518. (1) An employer shall obtain a written opinion from the examining physician which shall include all of the following:

(a) The results of the medical examination and tests performed.

(b) The physician's opinion as to whether an employee has any detected medical condition or conditions which would subject the employee to an increased risk of material health impairment from exposure to AN.

(c) Any recommended limitations upon the employee's exposure to AN or upon the use of protective clothing and equipment such as a respirator.

(d) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(2) An employer shall instruct the physician not to reveal specific findings or diagnoses unrelated to occupational exposure to AN in the written opinion.

(3) An employer shall provide a copy of the written opinion to the affected employee.

History: 1980 AACS.

R 325.51519 Employee information and training program; applicability; provision of information to employees; availability of rules and other materials to employees and director.

Rule 519. (1) An employer shall institute a training and information program for, and assure the participation of, all employees exposed to AN above the action level, all employees whose exposures are maintained below the action level by engineering and work practice controls, and all employees subject to potential skin or eye contact with liquid AN.

(2) Training shall be provided at the time of initial assignment or upon institution of the training program and at least once annually thereafter.

(3) The employer shall assure that each employee is informed of all of the following:

(a) The information contained in appendices A and B of these rules. Appendices A and B are available from the department of consumer and industry services.

(b) The quantity, location, manner of use, release, or storage of AN, and the specific nature of operations which could result in exposure to AN, as well as any necessary protective steps.

(c) The purpose, proper use, and limitations of respirators and protective clothing.

(d) The purpose and a description of the medical surveillance program required by these rules.

(e) The emergency procedures developed, as required by R 325.51510.

(f) Engineering and work practice controls, their function, and an employee's relationship to these controls.

(g) A review of these rules.

(4) An employer shall make a copy of these rules and appendices readily available to all affected employees.

(5) Upon request, an employer shall provide all materials relating to the employee information and training program to the director.

History: 1980 AACS; 2000 AACS.

R 325.51520 Workplace warning signs and labels; employer responsibilities.

Rule 520. (1) An employer shall post signs to clearly indicate all workplaces where AN concentrations exceed the permissible exposure limits. The signs shall bear the following legend:

DANGER ACRYLONITRILE (AN) CANCER HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS MAY BE REQUIRED

(2) An employer shall assure that signs required by this rule are illuminated and cleaned as necessary so that the legend is readily visible.

(3) An employer shall assure that precautionary labels are affixed to all containers of liquid AN and AN-based materials which are not exempted under R 325.51501 and shall assure that the labels remain affixed when the materials are sold, distributed, or otherwise leave the employer's workplace.

(4) An employer shall assure that the precautionary labels required by this rule are readily visible and legible. The labels shall bear the following legend:

DANGER CONTAINS ACRYLONITRILE (AN) CANCER HAZARD

(5) An employer shall assure that statements do not appear on or near any sign or label required by this rule which contradict or detract from the required sign or label.

(6) An employer may use labels or signs required by other statutes, rules, or ordinances in addition to, or in combination with, signs and labels required by this rule.

History: 1980 AACS.

R 325.51521 Operations exempted under R 325.51501; records of objective data required; maintenance. Rule 521. (1) If the processing, use, and handling of materials made from or containing AN are exempted pursuant to R 325.51501, an employer shall establish and maintain an accurate record of the objective data reasonably relied upon in support of the exemption which shall include, at a minimum, all of the following information:

(a) The material qualifying for exemption.

(b) The source of the objective data.

(c) The testing protocol and the results of the testing or an analysis of the material, or both, for the release of AN.

(d) A description of the operation exempted and how the data supports the exemption.

(e) Other data relevant to the operations, materials, and processing covered by the exemption.

(2) An employer shall maintain this record for the duration of the employer's reliance upon such objective data.

History: 1980 AACS.

R 325.51522 Monitoring of exposure; records; maintenance.

Rule 522. (1) An employer shall establish and maintain an accurate record of all monitoring required by R 325.51505. The exposure monitoring record shall include all of the following:

(a) The dates, number, duration, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure.

(b) A description of the sampling and analytical methods used and the data relied upon to establish that the methods used meet the accuracy and precision requirements of R 325.51505(10).

(c) Type of respiratory protective devices worn, if any.

(d) Name, social security number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.

(2) An employer shall maintain this record for not less than 40 years or for the duration of employment plus 20 years, whichever is longer.

History: 1980 AACS.

R 325.51523 Medical surveillance records; maintenance.

Rule 523. (1) An employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by R 325.51514 to R 325.51516. The medical surveillance record shall include all of the following:

(a) A copy of the physician's written opinions.

(b) Any employee medical complaints related to exposure to AN.

(c) A copy of the information provided to the physician as required by R 325.51517.

(d) A copy of the employee's medical and work history.

(2) An employer shall assure that this record is maintained for not less than 40 years or the duration of employment plus 20 years, whichever is longer.

History: 1980 AACS.

R 325.51524 Availability of records.

Rule 524. (1) Upon request, an employer shall make all records that are required to be maintained by these rules available to the director for examination and copying.

(2) Upon request, an employer shall make records that are required to be maintained by R 325.51521 to R 325.51523 available to affected employees, former employees, or their designated representatives for examination and copying in accordance with the provisions of R 325.3451 et seq. of the Michigan Administrative Code.

(3) Records that are required pursuant to the provisions of R 325.51521 shall be provided in the same manner as exposure monitoring records.

History: 1980 AACS; 1993 AACS.

R 325.51525 Retention and disposal of records; successor employer; transmittal and notice to director.

Rule 525. (1) If an employer ceases to do business, the successor employer shall receive and retain all records that are required to be maintained by these rules for the prescribed period.

(2) If an employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, then these records shall be transmitted to the director.

(3) At the expiration of the retention period for the records that are required to be maintained pursuant to these rules, an employer shall notify the director not less than 3 months before the disposal of the records and shall transmit the records to the director upon request.

(4) The transfer of records and notification to employees shall be accomplished in accordance with the provisions of R 325.3475.

History: 1980 AACS; 1993 AACS.

R 325.51526 Exposure monitoring; employee observation.

Rule 526. (1) An employer shall provide affected employees or their designated representatives with an opportunity to observe any monitoring of employee exposure to AN which is conducted pursuant to R 325.51505.

(2) If the observation of the monitoring of employee exposure to AN requires entry into an area where the use of protective clothing or equipment is required, an employer shall provide the observer with personal protective clothing and equipment required to be worn by employees working in the area, shall assure the use of such clothing and equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(3) If the monitoring is not interfered with, observers shall be entitled to all of the following:

(a) To receive an explanation of the measurement procedures.

(b) To observe all steps related to the measurement of airborne concentrations of AN performed at the place of exposure.

(c) To record the results obtained.

History: 1980 AACS.

R 325.51527 Availability of rules and appendices; permission to reproduce.

Rule 527. (1) A copy of these rules and related appendices entitled: "Appendix A--Substance Safety Data Sheet," "Appendix B--Substance Technical

Information," "Appendix C--Medical Surveillance Information for Acrylonitrile," and "Appendix D--Sampling and Analytical Methods for Acrylonitrile" are available to affected employers and employees at no cost from the Michigan Department of Consumer and Industry Services, Standards Division, P.O. Box 30643, Lansing, Michigan 48909.

(2) Permission to reproduce any of these documents in full is granted by the director.

History: 1980 AACS; 1993 AACS; 2000 AACS.