WAC 296-62-14533  Cotton dust.  (1) Scope and application.
   (a) This section, in its entirety, applies to the control of employee exposure to cotton dust in all workplaces where employees engage in yarn manufacturing, engage in slashing and weaving operations, or work in waste houses for textile operations.
   (b) This section does not apply to the handling or processing of woven or knitted materials; to maritime operations covered by chapters 296-56 and 296-304 WAC; to harvesting or ginning of cotton; or to the construction industry.
   (c) Only subsection (8) of this section, Medical surveillance, subsection (11)(b) of this section, Medical surveillance, subsection (11)(c) of this section, Availability, subsection (11)(d) of this section, Transfer of records, and Appendices B, C, and D of this section apply in all work places where employees exposed to cotton dust engage in cottonseed processing or waste processing operations.
   (d) This section applies to yarn manufacturing and slashing and weaving operations exclusively using washed cotton (as defined by subsection (14) of this section) only to the extent specified by subsection (14) of this section.
   (e) This section, in its entirety, applies to the control of all employees exposure to the cotton dust generated in the preparation of washed cotton from opening until the cotton is thoroughly wetted.
   (f) This section does not apply to knitting, classing or warehousing operations except that employers with these operations, if requested by WISHA, must grant WISHA access to their employees and workplaces for exposure monitoring and medical examinations for purposes of a health study to be performed by WISHA on a sampling basis.
   (2) Definitions applicable to this section:
      (a) **Blow down.** The cleaning of equipment and surfaces with compressed air.
      (b) **Blow off.** The use of compressed air for cleaning of short duration and usually for a specific machine or any portion of a machine.
      (c) **Cotton dust.** Dust present in the air during the handling or processing of cotton, which may contain a mixture of many substances including ground-up plant matter, fiber, bacteria, fungi, soil, pesticides, noncotton plant matter and other contaminants which may have accumulated with the cotton during the growing, harvesting and subsequent processing or storage periods. Any dust present during the handling and processing of cotton through the weaving or knitting of fabrics, and dust present in other operations or manufacturing processes using raw or waste cotton fibers or cotton fiber by-products from textile mills are considered cotton dust within this definition. Lubricating oil mist associated with weaving operations is not considered cotton dust.
      (d) **Director.** The director of labor and industries or their authorized representative.
      (e) **Equivalent instrument.** A cotton dust sampling device that meets the vertical elutriator equivalency requirements as described in subsection (4)(a)(iii) of this section.
      (f) **Lint-free respirable cotton dust.** Particles of cotton dust of approximately 15 microns or less aerodynamic equivalent diameter.
      (g) **Vertical elutriator cotton dust sampler** or **vertical elutriator.** A dust sampler which has a particle size cut-off at approximately 15 microns aerodynamic equivalent diameter when operating at the flow rate of 7.4 ± 0.2 liters per minute.
      (h) **Waste processing.** Waste recycling (sorting, blending, cleaning and willowing) and garnetting.
(i) **Yarn manufacturing.** All textile mill operations from opening to, but not including, slashing and weaving.

(3) Permissible exposure limits and action levels.

(a) Permissible exposure limits (PEL).

(i) The employer must ensure that no employee who is exposed to cotton dust in yarn manufacturing and cotton washing operations is exposed to airborne concentrations of lint-free respirable cotton dust greater than 200 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The employer must ensure that no employee who is exposed to cotton dust in textile mill waste house operations or is exposed in yarn manufacturing to dust from "lower grade washed cotton" as defined in subsection (14)(e) of this section is exposed to airborne concentrations of lint-free respirable cotton dust greater than 500 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The employer must ensure that no employee who is exposed to cotton dust in the textile processes known as slashing and weaving is exposed to airborne concentrations of lint-free respirable cotton dust greater than 750 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(b) Action levels.

(i) The action level for yarn manufacturing and cotton washing operations is an airborne concentration of lint-free respirable cotton dust of 100 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The action level for waste houses for textile operations is an airborne concentration of lint-free respirable cotton dust of 250 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The action level for the textile processes known as slashing and weaving is an airborne concentration of lint-free respirable cotton dust of 375 µg/m$^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(4) Exposure monitoring and measurement.

(a) General.

(i) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) The sampling device to be used must be either the vertical elutriator cotton dust sampler or an equivalent instrument.

(iii) If an alternative to the vertical elutriator cotton dust sampler is used, the employer must establish equivalency by demonstrating that the alternative sampling devices:

(A) It collects respirable particulates in the same range as the vertical elutriator (approximately 15 microns);

(B) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons; and

(C) A minimum of 100 samples over the range of 0.5 to 2 times the permissible exposure limit are collected, and ninety percent of these samples have an accuracy range of plus or minus twenty-five percent of...
the vertical elutriator reading with a ninety-five percent confidence level as demonstrated by a statistically valid protocol. (An acceptable protocol for demonstrating equivalency is described in Appendix E of this section.)

(iv) WISHA will issue a written opinion stating that an instrument is equivalent to a vertical elutriator cotton dust sampler if:

(A) A manufacturer or employer requests an opinion in writing and supplies the following information:

(I) Sufficient test data to demonstrate that the instrument meets the requirements specified in this paragraph and the protocol specified in Appendix E of this section;

(II) Any other relevant information about the instrument and its testing requested by WISHA; and

(III) A certification by the manufacturer or employer that the information supplied is accurate; and

(B) If WISHA finds, based on information submitted about the instrument, that the instrument meets the requirements for equivalency specified by this subsection.

(b) Initial monitoring. Each employer who has a place of employment within the scope of subsection (1)(a), (d) or (e) of this section must conduct monitoring by obtaining measurements which are representative of the exposure of all employees to airborne concentrations of lint-free respirable cotton dust over an eight-hour period. The sampling program must include at least one determination during each shift for each work area.

(c) Periodic monitoring.

(i) If the initial monitoring required by (4)(b) of this section or any subsequent monitoring reveals employee exposure to be at or below the permissible exposure limit, the employer shall repeat the monitoring for those employees at least annually.

(ii) If the initial monitoring required by (4)(b) of this section or any subsequent monitoring reveals employee exposure to be above the PEL, the employer must repeat the monitoring for those employees at least every six months.

(iii) Whenever there has been a production, process, or control change which may result in new or additional exposure to cotton dust, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer must repeat the monitoring and measurements for those employees affected by the change or increase.

(d) Employee notification.

(i) Within fifteen working days after the receipt of monitoring results, the employer must notify each employee in writing of the exposure measurements which represent that employee's exposure.

(ii) Whenever the results indicate that the employee's exposure exceeds the applicable permissible exposure limit specified in subsection (3) of this section, the employer must include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken to reduce exposure below the permissible exposure limit.

(5) Methods of compliance.

(a) Engineering and work practice controls. The employer must institute engineering and work practice controls to reduce and maintain employee exposure to cotton dust at or below the permissible exposure limit specified in subsection (3) of this section, except to the extent that the employer can establish that such controls are not feasible.
Whenever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer must nonetheless institute these controls to immediately reduce exposure to the lowest feasible level, and must supplement these controls with the use of respirators which must comply with the provisions of subsection (6) of this section.

(c) Compliance program.

(i) Where the most recent exposure monitoring data indicates that any employee is exposed to cotton dust levels greater than the permissible exposure limit, the employer must establish and implement a written program sufficient to reduce exposures to or below the permissible exposure limit solely by means of engineering controls and work practices as required by (a) of this subsection.

(ii) The written program must include at least the following:

(A) A description of each operation or process resulting in employee exposure to cotton dust;

(B) Engineering plans and other studies used to determine the controls for each process;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data obtained in accordance with subsection (4) of this section;

(E) A detailed schedule for development and implementation of engineering and work practice controls, including exposure levels projected to be achieved by such controls;

(F) Work practice program; and

(G) Other relevant information.

(iii) The employer's schedule as set forth in the compliance program, must project completion of the implementation of the compliance program no later than March 27, 1984 or as soon as possible if monitoring after March 27, 1984 reveals exposures over the PEL, except as provided in subsection (13)(b)(ii)(B) of this section.

(iv) The employer must complete the steps set forth in his program by the dates in the schedule.

(v) Written programs must be submitted, upon request, to the director, and must be available at the worksite for examination and copying by the director, and any affected employee or their designated representatives.

(vi) The written programs required under subsection (5)(c) of this section must be revised and updated at least every six months to reflect the current status of the program and current exposure levels.

(d) Mechanical ventilation. When mechanical ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system to control exposure, such as capture velocity, duct velocity, or static pressure must be made at reasonable intervals.

(6) Use of respirators.

(a) General. For employees who are required to use respirators by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this section. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering controls and work-practice controls;

(ii) Maintenance and repair activities for which engineering and work-practice controls are not feasible;

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limits;
(iv) Work operations specified under subsection (7)(a) of this section;
(v) Periods for which an employee requests a respirator.
(b) Respirator program.
   (i) The employer must develop, implement and maintain a respiratory protection program as required by chapter 296-842 WAC, Respirators, which covers each employee required by this chapter to use a respirator.
   (ii) Whenever a physician determines that an employee who works in an area in which the cotton-dust concentration exceeds the PEL is unable to use a respirator, including a powered air-purifying respirator, the employee must be given the opportunity to transfer to an available position, or to a position that becomes available later, that has a cotton-dust concentration at or below the PEL. The employer must ensure that such employees retain their current wage rate or other benefits as a result of the transfer.
(c) Respirator selection. The employer must:
   (i) Select and provide to employees the appropriate respirators by following requirements in this section and WAC 296-842-13005, found in the respirator rule.
   (ii) Provide employees with a powered air-purifying respirator (PAPR) when the employee chooses to use a PAPR instead of a negative-pressure air-purifying respirator, and the PAPR will provide adequate protection.
   (iii) Limit the use of filtering facepiece respirators for protection against cotton dust to concentrations less than or equal to five times (5x) the PEL.
   (iv) Provide high-efficiency particulate air (HEPA) filters or N-, R-, or P-100 series filters for powered air-purifying respirators (PAPRs) and negative-pressure air-purifying respirators when used in cotton dust concentrations greater than ten times (10x) the PEL.
(7) Work practices. Each employer must, regardless of the level of employee exposure, immediately establish and implement a written program of work practices which must minimize cotton dust exposure. The following must be included where applicable:
   (a) Compressed air "blow down" cleaning shall be prohibited, where alternative means are feasible. Where compressed air is used for cleaning, the employees performing the "blow down" or "blow off" must wear suitable respirators. Employees whose presence is not required to perform "blow down" or "blow off" must leave the area affected by the "blow down" or "blow off" during this cleaning operation.
   (b) Cleaning of clothing or floors with compressed air must be prohibited.
   (c) Floor sweeping must be performed with a vacuum or with methods designed to minimize dispersal of dust.
   (d) In areas where employees are exposed to concentrations of cotton dust greater than the permissible exposure limit, cotton and cotton waste must be stacked, sorted, baled, dumped, removed or otherwise handled by mechanical means, except where the employer can show that it is infeasible to do so. Where infeasible, the method used for handling cotton and cotton waste must be the method which reduces exposure to the lowest level feasible.
(8) Medical surveillance.
   (a) General.
      (i) Each employer covered by the standard must institute a program of medical surveillance for all employees exposed to cotton dust.
(ii) The employer must ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided without cost to the employee.

(iii) Persons other than licensed physicians, who administer the pulmonary function testing required by this section must have completed a NIOSH approved training course in spirometry.

(b) Initial examinations. The employer must provide medical surveillance to each employee who is or may be exposed to cotton dust. For new employees' this examination must be provided prior to initial assignment. The medical surveillance must include at least the following:

(i) A medical history;
(ii) The standardized questionnaire contained in WAC 296-62-14537; and
(iii) A pulmonary function measurement, including a determination of forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁), the FEV₁/FVC ratio, and the percentage that the measured values of FEV₁ and FVC differ from the predicted values, using the standard tables in WAC 296-62-14539. These determinations must be made for each employee before the employee enters the workplace on the first day of the work week, preceded by at least thirty-five hours of no exposure to cotton dust. The tests must be repeated during the shift, no less than four hours and no more than ten hours after the beginning of the work shift; and, in any event, no more than one hour after cessation of exposure. Such exposure must be typical of the employee's usual workplace exposure. The predicted FEV₁ and FVC for blacks must be multiplied by 0.85 to adjust for ethnic differences.

(iv) Based upon the questionnaire results, each employee must be graded according to Schilling's byssinosis classification system.

(c) Periodic examinations.

(i) The employer must provide at least annual medical surveillance for all employees exposed to cotton dust above the action level in yarn manufacturing, slashing and weaving, cotton washing and waste house operations. The employer must provide medical surveillance at least every two years for all employees exposed to cotton dust at or below the action level, for all employees exposed to cotton dust from washed cotton (except from washed cotton defined in subsection (9)(c) of this section), and for all employees exposed to cotton dust in cottonseed processing and waste processing operations. Periodic medical surveillance must include at least an update of the medical history, standardized questionnaire (Appendix B-11), Schilling byssinosis grade, and the pulmonary function measurements in (b)(iii) of this subsection.

(ii) Medical surveillance as required in (c)(i) of this subsection must be provided every six months for all employees in the following categories:

(A) An FEV₁ of greater than eighty percent of the predicted value, but with an FEV₁ decrement of five percent or 200 ml. on a first working day;

(B) An FEV₁ of less than eighty percent of the predicted value; or

(C) Where, in the opinion of the physician, any significant change in questionnaire findings, pulmonary function results, or other diagnostic tests have occurred.
An employee whose FEV$_1$ is less than sixty percent of the predicted value must be referred to a physician for a detailed pulmonary examination.

A comparison must be made between the current examination results and those of previous examinations and a determination made by the physician as to whether there has been a significant change.

Information provided to the physician. The employer must provide the following information to the examining physician:

(i) A copy of this regulation and its appendices;
(ii) A description of the affected employee's duties as they relate to the employee's exposure;
(iii) The employee's exposure level or anticipated exposure level;
(iv) A description of any personal protective equipment used or to be used; and
(v) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

Physician's written opinion.

(i) The employer must obtain and furnish the employee with a copy of a written opinion from the examining physician containing the following:

(A) The results of the medical examination and tests including the FEV$_1$, FVC, and FEV$_1$/FVC ratio;
(B) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to cotton dust;
(C) The physician's recommended limitations upon the employee's exposure to cotton dust or upon the employee's use of respirators including a determination of whether an employee can wear a negative pressure respirator, and where the employee cannot, a determination of the employee's ability to wear a powered air purifying respirator; and
(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.

(ii) The written opinion obtained by the employer must not reveal specific findings or diagnoses unrelated to occupational exposure.

Employee education and training.

(a) Training program.

(i) The employer must train each employee exposed to cotton dust in accordance with the requirements of this section and must ensure that each employee is informed of the following:

(A) The acute and long term health hazards associated with exposure to cotton dust;
(B) The names and descriptions of jobs and processes which could result in exposure to cotton dust at or above the PEL;
(C) The measures, including work practices required by subsection (7) of this section, necessary to protect the employee from exposures in excess of the permissible exposure limit;
(D) The purpose, proper use, limitations, and other training requirements for respiratory protection as required by subsection (6) of this section and chapter 296-842 WAC (see WAC 296-842-11005, 296-842-16005 and 296-842-19005);
(E) The purpose for and a description of the medical surveillance program required by subsection (8) of this section and other informa-
tion which will aid exposed employees in understanding the hazards of cotton dust exposure; and

(F) The contents of this standard and its appendices.

(ii) The training program must be provided prior to initial assignment and must be repeated annually for each employee exposed to cotton dust, when job assignments or work processes change and when employee performance indicates a need for retraining.

(b) Access to training materials.

(i) Each employer must post a copy of this section with its appendices in a public location at the workplace, and must, upon request, make copies available to employees.

(ii) The employer must provide all materials relating to the employee training and information program to the director upon request.

(10) Signs. The employer must post the following warning sign in each work area where the permissible exposure limit for cotton dust is exceeded:

DANGER
COTTON DUST
CAUSES DAMAGE TO LUNGS
(BYSSINOSIS)
WEAR RESPIRATORY PROTECTION IN THIS AREA

(11) Recordkeeping.

(a) Exposure measurements.

(i) The employer must establish and maintain an accurate record of all measurements required by subsection (4) of this section.

(ii) The record must include:

(A) A log containing the items listed in WAC 296-62-14535 (4)(a), and the dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

(B) The type of protective devices worn, if any, and length of time worn; and

(C) The names, Social Security number, job classifications, and exposure levels of employees whose exposure the measurement is intended to represent.

(iii) The employer must maintain this record for at least twenty years.

(b) Medical surveillance.

(i) The employer must establish and maintain an accurate medical record for each employee subject to medical surveillance required by subsection (8) of this section.

(ii) The record must include:

(A) The name and Social Security number and description of the duties of the employee;

(B) A copy of the medical examination results including the medical history, questionnaire response, results of all tests, and the physician's recommendation;

(C) A copy of the physician's written opinion;

(D) Any employee medical complaints related to exposure to cotton dust;

(E) A copy of this standard and its appendices, except that the employer may keep one copy of the standard and the appendices for all employees, provided that he references the standard and appendices in the medical surveillance record of each employee; and

(F) A copy of the information provided to the physician as required by subsection (8)(d) of this section.
(iii) The employer must maintain this record for at least twenty years.

(c) Availability.
   (i) The employer must make all records required to be maintained by subsection (11) of this section available to the director for examination and copying.
   (ii) Employee exposure measurement records and employee medical records required by this subsection must be provided upon request to employees, designated representatives, and the assistant director in accordance with chapter 296-802 WAC.

(d) Transfer of records.
   (i) Whenever the employer ceases to do business, the successor employer must receive and retain all records required to be maintained by subsection (11) of this section.
   (ii) The employer must also comply with any additional requirements involving transfer of records set forth in WAC 296-802-60005.

(12) Observation of monitoring.
   (a) The employer must provide affected employees or their designated representatives an opportunity to observe any measuring or monitoring of employee exposure to cotton dust conducted pursuant to subsection (4) of this section.
   (b) Whenever observation of the measuring or monitoring of employee exposure to cotton dust requires entry into an area where the use of personal protective equipment is required, the employer must provide the observer with and assure the use of such equipment and must require the observer to comply with all other applicable safety and health procedures.
   (c) Without interfering with the measurement, observers must be entitled to:
      (i) An explanation of the measurement procedures;
      (ii) An opportunity to observe all steps related to the measurement of airborne concentrations of cotton dust performed at the place of exposure; and
      (iii) An opportunity to record the results obtained.

(13) Washed cotton.
   (a) Exemptions. Cotton, after it has been washed by the processes described in this section is exempt from all or parts of this section as specified if the requirements of this section are met.
   (b) Initial requirements.
      (i) In order for an employer to qualify as exempt or partially exempt from this standard for operations using washed cotton, the employer must demonstrate that the cotton was washed in a facility which is open to inspection by the director and the employer must provide sufficient accurate documentary evidence to demonstrate that the washing methods utilized meet the requirements of this section.
      (ii) An employer who handles or processes cotton which has been washed in a facility not under the employer's control and claims an exemption or partial exemption under this paragraph, must obtain from the cotton washer and make available at the worksite, to the director, or their designated representative, to any affected employee, or to their designated representative the following:
         (A) A certification by the washer of the cotton of the grade of cotton, the type of washing process, and that the batch meets the requirements of this section:
         (B) Sufficient accurate documentation by the washer of the cotton grades and washing process; and
(C) An authorization by the washer that the director may inspect the washer's washing facilities and documentation of the process.

c) Medical and dyed cotton. Medical grade (USP) cotton, cotton that has been scoured, bleached and dyed, and mercerized yarn must be exempt from all provisions of this standard.

d) Higher grade washed cotton. The handling or processing of cotton classed as "low middling light spotted or better" (color grade 52 or better and leaf grade code 5 or better according to the 1993 USDA classification system) must be exempt from all provisions of the standard except requirements of subsection (8) of this section, medical surveillance; subsection (11)(b) through (d) of this section, recordkeeping-medical records, and Appendices B, C, and D of this section, if they have been washed on one of the following systems:

(i) On a continuous batt system or a rayon rinse system including the following conditions:
   (A) With water;
   (B) At a temperature of no less than 60°C;
   (C) With a water-to-fiber ratio of no less than 40:1; and
   (D) With the bacterial levels in the wash water controlled to limit bacterial contamination of the cotton.

(ii) On a batch kier washing system including the following conditions:
   (A) With water;
   (B) With cotton fiber mechanically opened and thoroughly prewetted before forming the cake;
   (C) For low-temperature processing, at a temperature of no less than 60°C with a water-to-fiber ratio of no less than 40:1; or, for high-temperature processing, at a temperature of no less than 93°C with a water-to-fiber ratio of no less than 15:1;
   (D) With a minimum of one wash cycle followed by two rinse cycles for each batch, using fresh water in each cycle; and
   (E) With bacterial levels in the wash water controlled to limit bacterial contamination of the cotton.

(e) Lower grade washed cotton. The handling and processing of cotton of grades lower than "low middling light spotted," that has been washed as specified in (d) of this subsection and has also been bleached, must be exempt from all provisions of the standard except the requirements of subsection (3)(a) of this section, Permissible exposure limits, subsection (4) of this section, Exposure monitoring and measurement, subsection (8) of this section, Medical surveillance, subsection (11) of this section, Recordkeeping, and Appendices B, C and D of this section.

(f) Mixed grades of washed cotton. If more than one grade of washed cotton is being handled or processed together, the requirements of the grade with the most stringent exposure limit, medical and monitoring requirements must be followed.

(14) Appendices.

(a) Appendix B (B-I, B-II and B-III), WAC 296-62-14537, Appendix C, WAC 296-62-14539 and Appendix D, WAC 296-62-14541 are incorporated as part of this chapter and the contents of these appendices are mandatory.

(b) Appendix A of this chapter, WAC 296-62-14535 contains information which is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

(c) Appendix E of this chapter is a protocol which may be followed in the validation of alternative measuring devices as equivalent to the vertical elutriator cotton dust sampler. Other protocols may be
used if it is demonstrated that they are statistically valid, meet the requirements in subsection (4)(a)(iii) of this section, and are appropriate for demonstrating equivalency.