Grain dust

General information sheet

Exposure to grain dust can potentially cause eye, skin and upper respiratory tract irritation, bronchitic symptoms and chronic decrements in pulmonary function.

Control measures - Ways to reduce employee exposure to grain dust

When considering preventive measures for any hazard in the workplace, one should consider the hierarchy of controls to be implemented. First, try to eliminate the hazard from the workplace by substituting the hazardous substance with one that is not or is less hazardous, if available, to be used for that purpose. Second, try to reduce the exposure to the hazard using engineering controls such as ventilation. Third, provide administrative controls and, if necessary, personal protective equipment including respiratory protection to ensure the health and safety of employees.

1 Ventilation systems

Dust collection system is the most effective control measure to allow the least possible amount of dust to escape. Dust collectors can operate at high efficiencies. The collector's efficiency can be compromised due to a damaged filter, faulty seals or sheet metal leaks, therefore, it is necessary that the equipment be tested on a regular basis for mechanical leaks, and the system's maintenance schedule be developed, including cleaning procedures to ensure the dust collection system is operating at maximum efficiency.

It is important that the ventilation **exhaust stacks** are positioned such that exhausted contaminated air does not recirculate dust back into the building and contribute to the general airborne concentration of dust.

Make-up air inlets should be located away from dust sources.

The most recent edition of the ACGIH ® Industrial Ventilation A Manual of Recommended Practice referenced in paragraph 10.17(1)(b) of the Canada Occupational Health and Safety Regulations (COHSR) can be consulted as a guide in selecting the type of dust collector and air filtration system to ensure the recirculated air does not add contaminants into the work environment.

2 Good work practices

Do not use compressed air cleaning. **Very high airborne dust concentrations can introduce the risk of explosion.**

The preferred method for cleaning dust settled on the floor is to use a **vacuum system** equipped with a proper filtration medium. The vacuum system must be appropriate for the task and be maintained as per the manufacturer's instructions.

Sweeping can be used where a vacuum system is not practical. Only **dust cloths** should be used to remove dust from equipment.

3 Personal protective equipment (PPE)

PPE should only be used when engineering controls are not reasonably practicable, e.g., during unloading grain operation, cleaning/maintenance procedures, equipment malfunction, emergencies or other known high-exposure tasks where engineering controls cannot be applied.

The selection, fit testing, maintenance and inspection of **respiratory protection** should be based on the maximum dust concentrations encountered as required by the Canadian Standard Association (CSA) Standard Z94.4, "Selection, care and use of respirators". A respiratory protection program must be in place, which includes employee training and fit testing performed on a regular basis.

Protective clothing such as gloves and coveralls should be used to minimize dermal exposure.

Eye and face protection may also be necessary during excessive dust generating operations and procedures or emergencies, as per the requirements of Part XII of the COHSR.

Measurement - Sampling requirements[1]

If there is a likelihood that the health and safety of an employee in a work place is or may be endangered by exposure to grain dust not controlled through the measures described above, the employer shall appoint a qualified person[2] to carry out a hazard investigation under section 10.4 of the COHSR.

The total grain dust samples must be taken and the concentration determined in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method No. 0500. The calculation of the exposure level using analytical data and the interpretation of the results must be done by a qualified[2].

Total grain dust is measured using the 37-mm PVC filter and supporting pad in 37-mm cassette filter holder with a personal sampling pump at the flow rate of 1.7 (+/- 0.1) L/min.

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[1] Please see the Canadian Occupational Chemical Agent Compliance Sampling Guideline. The Guideline outlines procedures to be followed in workplace hazard investigations.

[2] Qualified person is an industrial hygienist or a person who has knowledge and experience in industrial hygiene and occupational health.

Measurements are required to be made under normal working conditions, meaning conditions representative of the day after day worker exposure during the regular work activities.

The Time Weighted Average (TWA) is based on a conventional 8-hour workday and 40 hour workweek.

For unusual work schedules, exceeding 8-hour exposures, the adjusted exposure limit should be calculated based on one of the scientifically proven mathematical models used in industrial hygiene practice. One of the models is developed by the University of Montreal and the Institut de recherché Robert-Sauvé en santé et en sécurité du travail (IRRST) that uses the Haber method to calculate adjusted exposure limits based on the mean weekly hours of exposure per repetitive work cycle.

When sampling for compliance, air samples shall be taken over the full work shift, in the breathing zone of the most highly exposed employees as determined by a qualified person[3]. Personal air samples are obtained from the breathing zone of employees performing specific tasks and exposed to a specific type of dust where mingling of different types of dusts, if any, is not an issue.

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[3] Qualified person is an industrial hygienist or a person who has knowledge and experience in industrial hygiene and occupational health.