**Lake Havasu City Fire Department**
**Fire Prevention Bureau**
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## OVERVIEW

This Fire Department specification provides an overview of the operational requirements for facilities, which create combustible dust requiring dust control systems used in manufacturing, processing, blending, conveying, and other types of processing facilities, where the process presents a fire, deflagration, or explosion hazard. Facilities, which typically produce combustible dust include, but are not limited to; general woodworking shops, furniture and mattress manufacturing factories, and cabinet shops.

## PURPOSE

To provide a reasonable level of fire safety in occupancies which engage in the insidiously hazardous process of producing combustible particulate matter (dust).

## SCOPE

The manufacturing and processing of lumber, plywood, veneers and byproducts; and all equipment, processes, and operations involving potential dust explosion hazards, must comply with the provisions of the International Fire code (IFC) and this specification.

**NOTE**: For powder coating operations, see **LHC Fire Department Specification #09 *Spraying with Flammable or Comestible Materials*.**

## DEFINITIONS

1. **Combustible Dust** – Finely divided solid materials 420 microns or less in diameter which, when dispersed in air in the proper proportions, could be ignited by flame, spark, or other source of ignition. Combustible dust will pass through a U.S. No. 40 standard sieve.

   Combustible dusts can be any particulate solid that presents a fire or deflagration hazard when suspended in air or some other oxidizing medium over a range of concentrations regardless of particle size and shape. Examples include:

   - **Wood Particles** - Sawdust, grinding and sanding dusts, shavings, etc.
   - **Foam Particles** - Foam shaping and blowing waste
   - **Metal Particles** - From sanding, grinding, polishing, sawing, wire brushing or shot blasting operations

2. **Other Finely Divided Dry Materials** – Fine powders and dry chemicals, powder coating material, plastic residues, bead blasting and sandblasting wastes, buffing wastes, linen and fabric residue, and dusts or particulate materials from the processing of grains or other foodstuffs.

3. **Combustible Particulate Material** - Any combustible solid material composed of distinct particles or pieces, regardless of size, shape, or chemical composition.

4. **Dust Collection System** - An exhaust system that is designed to capture wood dust, chips, and other particulate matter at the point of generation, usually from multiple sources, and to convey the material to a point of consolidation. A dust collection system includes the collection hood, the exhaust fan, the dust collector, and all ducts, flexible hoses, or other devices used for conveying the material.
5. **Dust Collector** - The part of the dust collection system where the materials are separated from the air stream and consolidated. Dust collectors include conventional solid-walled cyclones and baghouses, and unenclosed bag-type units.
6. **Unenclosed Bag-Type Dust Collector -** A dust collector where the filtration is accomplished by passing dust-laden air through filter media, collecting the dust on the inside of the filter media, and allowing cleaned air to exit to the surrounding area. Filter medium is not enclosed in a solid-walled container, is hand shaken and not mechanically shaken or pressure-pulsed, and under positive pressure. Removal of the dust is not continuous or mechanical.

## PERMITS

1. **Building Permits** – Mechanical, electrical, and structural building permits are required to install or modify combustible dust and particulate control equipment at a facility. Fixed dust collection systems are required to be designed by a registered mechanical engineer. Building and/or mechanical permits can be obtained by contacting the Development Services Department, Building Division at (928) 453-4149.

2. **Operational Permit** - A Fire Department Operational Permit is not required for operations that produce combustible dusts, at this time, but may be required in the future as ordered by the Lake Havasu City Fire Marshal (FM).

## REQUIREMENTS

1. **Owner Responsibility** - The owner or operator of a facility with operations that manufacture, process, blend, convey, repackage, generate or handle potentially combustible dust or combustible particulate solids shall be responsible for compliance with the provisions of the IFC and NFPA 652.
2. **Dust hazard analysis (DHA).** The requirements of NFPA 652 apply to all new and existing facilities and operations with combustible dust hazard. Existing facilities shall have a dust hazard analysis (DHA) completed in accordance with Section 7.1.2 of NFPA 652. The fire code official shall be authorized to order a dust hazard analysis to occur sooner if a combustible dust hazard has been identified in a facility that has not previously performed an analysis.
3. **Electrical wiring and equipment** - All electrical wiring and equipment must comply with NFPA 70. All systems and system components must be conductive, grounded, and bonded to reduce the possibility of static electric discharge. This includes use of conductive belts, conductive joints, and waste accumulation containers.
4. **Elimination of ignition sources** - Ignition sources must be eliminated from the immediate area of dust producing operations. These include electrical equipment not constructed to the building area's code requirements, open flames, spark-producing equipment, incompatible

materials, and sources of static electricity, smoking, or powered industrial trucks not rated for use in combustible environments. See General Maintenance and Housekeeping below.

5. **Static electricity prevention** - Static electricity must be prevented from accumulating on machines and equipment subject to static electricity buildup by permanent grounding and bonding wires or other approved means.

6. **Smoking and other sources of ignition** - Smoking or the use of heating or other devices employing an open flame, or the use of spark-producing equipment is prohibited in areas where combustible dust is generated, stored, manufactured, processed, or handled.

   a. Areas where combustible dusts are generated, accumulated, or processed or where smoking constitutes a fire hazard, the FM is authorized to order the owner or occupant to post approved "**NO SMOKING**" signs, and other signs to prevent sources of ignition, requiring the use of personal protective equipment and/or restricted entry. The FM is authorized to designate specific locations where smoking may be allowed.

## GENERAL MAINTENANCE AND HOUSEKEEPING

1. Facilities are required to develop a housekeeping protocol to ensure that fugitive dust build-up is removed from all surfaces on a timely basis, depending on the type and volume of material being processed.

2. Accumulation of combustible dust must be kept to a minimum in the interior of buildings. Accumulated combustible dust must be collected by vacuum cleaning or other means *that will not place combustible dust into suspension in air*. Forced air or similar methods are not be used to remove dust from surfaces.

3. Equipment used for the containment of dust must be maintained in a manner that minimizes the escape of dust. A lockout/block out/tag out program must be in place prior to performing maintenance activities on a dust control system or any piece of equipment within the system.

4. Provisions must be made for a systematic and thorough cleaning of the entire plant at sufficient intervals to prevent the accumulations of combustible dust. Surfaces must be cleaned in a manner that minimizes the creation of dust clouds. Walls, floors, ceilings, flat surfaces, and fire control systems must be maintained to reduce the accumulation of fugitive combustible dusts and particulate material.

7. Waste dust accumulation containers must be made of non-combustible, conductive material. Accumulation containers made of other materials are acceptable if the waste material being accumulated is not compatible with a non-combustible, conductive container.

   ***Example*:** Waste materials that are corrosive or considered wet which would corrode a metal container.

8. Waste dust and debris accumulated in air separation equipment, or in processing area where fugitive dusts accumulate, must be removed on a timely basis, and contained to prevent exposure to incompatible materials. Removal must be at least once each day, unless a different interval (longer or shorter) is warranted by the volume and type of material being collected.

9. Wastes removed from dust collection equipment must be stored to prevent exposure to:

   a. Water for water reactive materials

b. Sparks, flames or other heat sources

c. Corrosive materials

d. Other materials incompatible with the accumulated wastes

10. An inspection, testing, and maintenance program must be implemented to ensure that all process controls and required fire protection systems are maintained in proper operating condition including:

a. Fire and deflagration control equipment

b. Dust control equipment including inspection, cleaning, and maintenance of interior surfaces of dust collection equipment, air separation equipment, and air movement devices

c. Integration of changes to dust collection, air separation, and other equipment to prevent degradation of dust collection system performance

d. General housekeeping practices to prevent accumulation of dust on surfaces

e. Control of potential ignition source in dust generation and accumulation areas

f. Proper management of accumulated dust to prevent excessive build-up in the collection systems and in/on filtration devices

## PORTABLE FIRE EXTINGUISHERS & FIRE PROTECTION SYSTEMS

1. **Portable fire extinguisher requirements** may be found in **LHC Fire Department Specification #03, *Portable Fire Extinguishers***. The FM may require specialized portable "D" type fire extinguishers in areas where metal dust is generated or accumulated.

2. **Automatic sprinkler system requirements for woodworking areas** - An *automatic sprinkler system* is required to be provided throughout all Group F-1 occupancy *fire areas* that contain woodworking operations in excess of 2,500 square feet in area which generate finely divided combustible waste or which use finely divided combustible materials.

   a. The extent of sprinkler coverage is only intended to be for Group F-1 occupancies involved in woodworking activities. If the fire area is larger than 2,500 square feet, but the woodworking area is less than that area, sprinklers are not required. The intent is not to require the installation of sprinklers throughout the building, but rather in the fire area where the woodworking process may be present.

3. **Fire protection systems** installed in dust collection and air separation equipment must be specifically designed to address building protection, process equipment, and the chemical and physical properties of the material(s) being processed.

4. **Extinguishing agents** must be compatible with the air conveyance and air separator's construction materials, and with the dust materials conveyed in the system.

5. **Fire detection systems**, where installed, must be designed to incorporate safe interlocking requirements for air movement, deflection, and process operation control. This includes feed system shutdown, diversion of material flows, abort gates and dampeners, and continued operation of fire sensors and extinguishing systems.

## REFERENCES

2018 International Fire Code Ch. 09 §903.2.4.1 *Woodworking Operations and Automatic Sprinkler Systems*
2018 International Fire Code Ch. 28 *Lumber Yards… and Woodworking Facilities*
2018 International Fire Code Ch. 22 *Combustible Dust Producing Operations*
2016 National Fire Protection Agency (NFPA 662), *The Fundamentals of Combustible Dust*
2017 National Fire Protection Agency (NFPA 664), *Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*

**Note:** This FD specification is intended to be a guide only. For full installation, fire-flow, location, distribution, and maintenance requirements, refer to the references above. Where conflicts exist between this document and the applicable codes and standards, the above references must supersede.

APPROVED:  DATE: September 01, 2021

Scott Hartman, Fire Marshal