DHA Report Group

NFPA 660 COMBUSTIBLE DUST COMPLIANCE

SAMPLE REPORT · FICTIONAL FACILITY

DUST HAZARD ANALYSIS (DHA)

Dust Hazard Analysis Written to NFPA 660

Example Cabinet & Millwork, a fictional wood products plant created to show what your report looks like.

SAMPLE

Facility	Example Cabinet & Millwork (fictional), single building, about 48,000 sq ft
Applicable standard	NFPA 660, Standard for Combustible Dusts (2025 edition), fundamentals plus the wood chapter
Study type	Remote DHA with live video walkthrough
Study lead	Your qualified person is named here in your report
Report status	Final, after one review round

This is a sample, not a real study. The facility, equipment, measurements, dust test values, and findings in this document are invented for illustration. Nothing here describes a real plant or a real client, and none of it should be used to make decisions about your facility. Your report is written from your own documents, your own walkthrough, and lab results for your own dust.

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> **How to read this sample.** A full report for a plant this size usually runs longer than this. Sections 5 and 8 are where most of the pages go, because every process component and every building compartment gets its own evaluation. This sample shows each section at reduced length so you can see the structure and the level of detail.

Section references such as (A.24.7.3.4.1) point to where a topic sits in NFPA 660 so your team, your insurer, or your AHJ can check it against a licensed copy of the standard. This report paraphrases the standard and does not reproduce its text. NFPA 660 is published by the National Fire Protection Association and is available at nfpa.org.

SECTION 1

Executive summary

Example Cabinet & Millwork machines, sands, and assembles hardwood and MDF cabinet components. Sanding and CNC routing generate fine wood dust that is collected by one central dust collection system and returned to the building as filtered air. Lab testing of the plant's sanding dust confirmed it is combustible and can deflagrate.

This DHA evaluated 11 process components and 5 building compartments for fire, flash fire, and explosion hazards. It produced 12 findings.

3	5	4
Priority 1 findings. Address first.	Priority 2 findings. Plan and schedule.	Priority 3 findings. Program and records.

What matters most

- **The dust collector sits indoors and returns air to the building** with no deflagration protection on the collector and nothing to stop a spark or flame from reaching it or coming back through the return duct (findings F-01, F-02).
- **Dust on overhead joists in the sanding room is deeper than the plant's housekeeping threshold.** Accumulated dust overhead is the fuel for a secondary explosion, which is where most of the damage comes from (finding F-03).
- **Several duct branches run below the accepted minimum conveying velocity for wood dust,** and manual blast gates let operators unbalance the system (findings F-04, F-05).

What is already working

- Operators empty the collector's waste bin on a set schedule and log it.
- The collector fan and ductwork are bonded and grounded, with continuity checks on record.
- The plant has a hot work permit. It needs a combustible dust section (finding F-09).

> **What this report is and is not.** A DHA is analysis. It identifies hazards, documents the safeguards you have, and recommends what to change. It is not a design package and it does not size vents, suppression, or isolation devices. That work is done to NFPA 68 and NFPA 69 using the test results in Section 4. NFPA 660 does not require a PE seal on a DHA. If your insurer or AHJ asks for one, your PE reviews and seals it.

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SECTION 2

Scope, basis, and method

Scope

All areas of the building where combustible dust is generated, conveyed, collected, or can accumulate: the CNC and panel processing area, the sanding room, the assembly area, the finishing prep area, the dust collection system, and the waste handling area. The spray finishing booth is covered by a separate flammable liquids review and is outside this study, except where wood dust can reach it.

Basis

Standard	NFPA 660 (2025 edition), effective January 1, 2026. Fundamentals chapters apply to every facility. The wood processing chapter applies as the industry overlay.
Why a DHA applies here	A DHA is expected for any operation that handles combustible dust, regardless of size, and applies to existing facilities as well as new ones (A.7.1).
Who led the study	A qualified person as NFPA 660 describes one. The standard notes that a credential alone, such as PE, CSP, or CIH, does not make someone qualified. Hands-on combustible dust assessment experience does (A.7.2.2).
Plant team	Operations manager, maintenance lead, sanding room supervisor, safety coordinator.

What the plant provided

- Floor plan and dust collection duct layout, with branch diameters
- Collector and fan data sheets, and the filter change log
- Safety data sheets for MDF, hardwood lumber, and finishing materials
- Photos and a live video walkthrough of every area in scope, including above-ceiling and behind-equipment spaces
- Branch airflow readings taken by the plant's maintenance team during the walkthrough
- Housekeeping schedule, hot work permit form, and training records
- A dust sample from the collector waste bin, sent to an accredited lab

Method

The study used a what-if analysis supported by a checklist, two of the methods NFPA 660 recognizes for a DHA. Each process component was reviewed on its own: what could ignite, whether dust can be dispersed, whether it is confined, what safeguards exist, and whether they are enough. Each building compartment was then reviewed for dust accumulation and for whether a fire or deflagration could spread into it.

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SECTION 3

Facility and process description

Single-story building, steel frame with open-web roof joists, about 48,000 sq ft. Two shifts, five days a week. About 60 employees.

Process flow

Step	Area	What happens	Dust generated
1	Panel processing	Two CNC routers and a panel saw cut MDF and plywood sheets to size.	Chips and fine MDF dust
2	Machining	Moulder and shaper profile hardwood parts.	Shavings, some fines
3	Sanding room	Wide-belt sander and four downdraft sanding tables.	Very fine sanding dust
4	Assembly	Parts are assembled. Occasional hand sanding.	Light, intermittent
5	Finishing prep	Scuff sanding between coats, next to the spray booth.	Fine dust with finish residue

Dust collection system

Collector	One cartridge collector, about 18,000 CFM, located indoors along the east wall of the panel processing area.
Return air	Filtered air is returned to the building through a duct that discharges above the sanding room.
Ductwork	14 in. main trunk with 9 branches, 4 in. to 8 in. Manual blast gates on 7 branches.
Waste discharge	Rotary airlock under the hopper, discharging to a covered bin.
Explosion protection on collector	None installed.
Spark detection or abort gate	None installed.

In your report this section also includes a marked-up floor plan showing each process component and each building compartment by the same ID numbers used in Sections 5 and 6.

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SECTION 4

Materials and dust properties

A DHA is built on the properties of your actual dust. Published values are for screening, not protection design, because particle size, moisture, and composition move the numbers. The plant's sample came from the collector waste bin and was tested by an accredited lab.

ILLUSTRATIVE VALUES FOR THIS FICTIONAL SAMPLE. NOT FROM A REAL TEST.

Property	Result	What it tells you
Explosibility screening	Explosible	The dust can deflagrate when dispersed in a cloud and ignited.
Median particle size	62 µm	Fine. Consistent with sanding dust, which should be assumed deflagrable (A.24.9.4.3.1).
Moisture content	6.1%	Dry. Dry dust ignites and disperses more easily.
Kst, deflagration index	142 bar·m/s	St 1. How fast pressure rises. Used to size venting, suppression, and isolation.
Pmax, maximum pressure	8.4 bar	The peak pressure a contained explosion can reach. Far above what a standard collector housing can hold.
MEC, minimum explosible concentration	55 g/m³	The lowest cloud concentration that can propagate a flame.
MIE, minimum ignition energy	38 mJ	How little spark energy can ignite a cloud. At this level, bonding and grounding of equipment matter.

> **St 1 does not mean low risk.** St classes describe how fast pressure rises. NFPA 660 classes combustible dusts as St 1 (above 0 to 200), St 2 (201 to 300), and St 3 (above 300) (A.22.5.4.3.4). An St 1 dust can still destroy a collector and injure people nearby.

Other materials reviewed

Material	Where	Treatment in this study
Hardwood shavings and chips	Moulder, shaper	Fire hazard. Fines can separate and accumulate, so treated as contributing to the dust hazard.
MDF dust	CNC routers, panel saw	Assumed deflagrable. Blends into the same collector as the sanding dust tested above.
Scuff sanding dust with finish residue	Finishing prep	Not tested separately. See finding F-08.

SECTION 5

Process hazard evaluation

Every process component is evaluated on its own: the hazard, what could ignite it, the safeguards in place today, and whether they are adequate. Six of the eleven components are shown here.

ID	Component	Hazard and credible scenario	Safeguards today	Adequate?	Finding
P-01	Wide-belt sander	**Fire, with spark carryover.** A belt tracking fault or a metal fastener in a panel produces sparks or embers that are drawn into the duct and carried to the collector.	Belt tracking interlock. Operator pre-check for fasteners.	Partly	F-02
P-03	Downdraft sanding tables (4)	**Flash fire.** Fine dust builds inside the table plenum and around the operator. Low airflow leaves a cloud in the breathing zone.	Connected to central collector. Weekly table cleanout.	Partly	F-04
P-05	Branch ducts and blast gates	**Fire and deflagration in duct.** Closing gates changes airflow in every other branch. Velocity drops, dust settles in the duct, and a spark later finds fuel there.	None. Gates are operated at the user's choice.	No	F-04, F-05
P-06	Main trunk duct, 14 in.	**Flame propagation.** A deflagration in the collector travels back up the trunk toward the sanding room and panel area.	None.	No	F-01
P-07	Cartridge dust collector	**Explosion.** Fuel, air, dispersion from pulse cleaning, and confinement are all present inside the collector. An ember from P-01 supplies the ignition source. The housing ruptures indoors.	Bonded and grounded. Waste bin emptied on schedule.	No	F-01
P-08	Return air duct	**Fire and flame into occupied space.** Flame or burning material from a collector event is carried through the return duct and discharged above the sanding room.	None.	No	F-02

Example of a full component write-up: P-07, cartridge dust collector

Description	Cartridge collector, about 18,000 CFM, pulse-jet cleaning, indoors on the east wall. Occupied work stations within 25 ft.
Fuel	Fine wood and MDF dust. Tested explosible, St 1 (Section 4).
Dispersion	Present during every pulse cleaning cycle.
Confinement	Yes. The housing volume is well above the small-enclosure size where protection may not be needed (A.9.8.2.1).
Credible ignition sources	Sparks or embers from the wide-belt sander. Metal fasteners struck by cutters. Smoldering material in the hopper.
Consequence	Deflagration inside the collector. With no venting, suppression, or containment, the housing fails. Fireball and pressure indoors, with flame travel into the trunk and return ducts.
Existing safeguards	Bonding and grounding. Scheduled bin emptying. Neither addresses a deflagration once it starts.
Conclusion	Not adequately protected. See findings F-01 and F-02.

The four recognized protection approaches for equipment are containment, deflagration venting (NFPA 68), suppression (NFPA 69), and isolation (NFPA 69). This DHA identifies the need. Selecting and sizing the protection is a design step that uses the Kst and Pmax in Section 4.

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SECTION 6

Building compartment evaluation

Each compartment is evaluated for dust that escapes the process and settles on surfaces, including hidden and overhead spaces. The evaluation separates areas with a localized flash fire hazard from areas where a deflagration could propagate through the room, because that difference drives what personal protective equipment and controls apply.

Housekeeping threshold

NFPA 660 does not set one dust depth for every plant. The DHA sets the threshold for your dust using a recognized method. This study used the layer depth method. For wood dust, the reference depth is about 1/8 in. (3.2 mm), and the standard notes that figure carries a safety margin (A.24.7.3.4.1). The threshold for this plant is set at **1/8 in. on any surface, including overhead**.

ILLUSTRATIVE MEASUREMENTS FOR THIS FICTIONAL FACILITY.

ID	Compartment	Deepest dust found	Hazard classification	Finding
B-01	Panel processing	Under 1/32 in. on floor. About 1/16 in. on top of the collector and duct runs.	Localized flash fire hazard near the collector and CNC enclosures.	F-06
B-02	Sanding room	**About 1/4 in. on roof joists and light fixtures.** About 1/8 in. on ledges and cable trays.	**Propagating deflagration hazard.** Overhead dust across most of the room is above the threshold.	F-03
B-03	Assembly	Under 1/32 in.	No dust deflagration hazard identified at current conditions.	None
B-04	Finishing prep	About 1/16 in. on booth exterior and filters.	Localized flash fire hazard. Dust with finish residue next to a flammable liquids area.	F-08
B-05	Above-ceiling space, office mezzanine	About 1/8 in. on ductwork above the mezzanine ceiling.	Concealed accumulation. At threshold.	F-06

> **Why the overhead dust in B-02 is a Priority 1.** A small event inside equipment shakes settled dust loose from joists, ledges, and duct tops. That dust becomes a second, much larger cloud. Removing accumulated dust is often the single most effective thing a plant can do (A.7.2.1).

A separate benchmark of about 1/32 in. is used for electrical area classification. It is a different question from the housekeeping threshold above, and your report treats the two separately.

SECTION 7

Management systems review

Equipment is half of it. The other half is the set of programs that keep the equipment and the building in the condition this DHA assumes.

Program	What was found	Status	Finding
Housekeeping	Floors are swept each shift. No schedule or method for overhead surfaces. No written threshold or inspection record.	Gap	F-03, F-06
Hot work	Permit in use. It does not address combustible dust: no cleaning of the work area, no shutdown of dust collection, no check inside ducts or equipment. The reference hot work area is 35 ft (A.8.5.2).	Gap	F-09
Training	General safety orientation only. Operators and maintenance staff have not been trained on combustible dust hazards for their roles (A.8.8).	Gap	F-10
Management of change	No written process. The plant changed MDF suppliers eight months ago and added two sanding tables last year with no review of the dust collection system (A.8.11).	Gap	F-11
Incident investigation	Two small fires in the sander enclosure in the past three years were put out by operators. Neither was written up (A.8.10).	Gap	F-12
Inspection and maintenance	Filter changes and bonding checks are logged. Duct interiors are not inspected. Airflow is not checked after changes.	Partial	F-04
Bonding and grounding	Collector, fan, and metal ductwork bonded. Records current. Two flexible hose connections at the sanding tables lack a bonding jumper.	Partial	F-07

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SECTION 8

Findings and prioritized recommendations

Each finding links back to the component or compartment where it was identified. Recommendations state what needs to be achieved. Where a fix needs design work, that is noted.

How findings are ranked

Priority	Meaning
PRIORITY 1	A credible deflagration or flash fire scenario with no effective safeguard in place. Address first, and put interim measures in place until the fix is complete.
PRIORITY 2	A safeguard exists but is incomplete or can be defeated, or a condition raises the likelihood of an event. Plan, budget, and schedule.
PRIORITY 3	A program, training, or documentation gap. Close through procedures and records.

No.	Priority	Finding	Recommendation	NFPA 660
F-01	PRIORITY 1	Indoor dust collector handling explosible dust has no deflagration protection. A 14 in. trunk connects it to occupied areas with no isolation. (P-06, P-07)	Provide deflagration protection for the collector, designed to NFPA 68 or NFPA 69 using the tested Kst and Pmax. Evaluate relocating the collector outdoors, which is the simpler arrangement to protect. Provide isolation on the inlet duct. The duct does not meet the conditions under which isolation can be omitted. *Design work needed.*	A.9.8.3 Annex Q
F-02	PRIORITY 1	Filtered air returns to the building with nothing to keep sparks, embers, or flame out of the collector or out of the return duct. (P-01, P-08)	Add spark detection with extinguishing, or spark detection with a high-speed abort gate, on the duct ahead of the collector, and protect the return air path. Note that an abort gate diverts burning material and is not an isolation device. *Design work needed.*	A.24.9.4.4.6.2 A.9.4.3.3
F-03	PRIORITY 1	Dust on joists and fixtures in the sanding room is about twice the 1/8 in. threshold. (B-02)	Clean overhead surfaces now, using a method that does not put the dust into a cloud. Add overhead surfaces to the housekeeping schedule at a frequency that keeps them under the threshold. Record inspections.	A.24.7.3.4.1 A.7.2.1

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No.	Priority	Finding	Recommendation	NFPA 660
F-04	PRIORITY 2	Three of nine branches measured below the 4,000 fpm accepted minimum conveying velocity for wood dust. Lowest reading 3,150 fpm at sanding table 4. (P-03, P-05)	Rebalance the system so every branch holds minimum velocity. Document airflow at each hood so it can be checked in the field. Inspect and clean the interior of the low-velocity branches.	A.24.9.4.3.2.1(D) A.9.4.3.3
F-05	PRIORITY 2	Manual blast gates on seven branches let users change system balance. Two sanding tables were added without rebalancing. (P-05)	Remove manual gates or lock them in the balanced position. Rebalance whenever a branch is added, removed, or disconnected.	9.4.3.3 A.9.4.3.3
F-06	PRIORITY 2	Dust on top of the collector, on duct runs, and in the concealed space above the mezzanine ceiling is at or near threshold. (B-01, B-05)	Add these surfaces, including the concealed space, to the housekeeping schedule and inspection record.	A.7.3
F-07	PRIORITY 2	Two flexible hose connections at the sanding tables are not bonded across.	Install bonding jumpers and add these points to the continuity check.	A.9.6.6
F-08	PRIORITY 2	Scuff sanding dust with finish residue has not been tested and collects next to the spray booth. (B-04)	Test this dust on its own. Review whether it should be collected separately from the main system.	A.22.5.2
F-09	PRIORITY 3	Hot work permit does not cover combustible dust.	Add dust precautions to the permit: clean the area, shut down and check dust collection, check inside ducts and equipment.	A.8.5
F-10	PRIORITY 3	No combustible dust training by role.	Train operators, maintenance, and supervisors on the hazards and controls for their work. Keep records.	A.8.8
F-11	PRIORITY 3	No management of change process.	Adopt a written process covering equipment, materials, and suppliers. A new material source can change how the dust behaves.	A.8.11
F-12	PRIORITY 3	Small fires and near misses are not investigated or recorded.	Investigate and record every fire and near miss. Keep the records through the next DHA review.	A.8.10

The collector should also carry a label stating it is for wood dust only and not for metal dust or spark-producing operations (A.24.9.4.3.2.1(B)). This is noted as an observation and is closed with F-01.

SECTION 9

Keeping this DHA current

A DHA describes your plant on the day it was written. NFPA 660 expects it to be reviewed and updated **at least every five years, and whenever your process changes** (7.1.4).

Changes that should trigger a review before the five years are up

- New or relocated dust-producing equipment, or a new branch on the collection system
- A change in material, or a new supplier for the same material
- A change to the collector, the fan, the ductwork, or the return air path
- A fire, an explosion, or a near miss
- A building change that creates new surfaces or concealed spaces where dust can settle

Action tracking

Your report comes with the findings in Section 8 as a tracking list: owner, target date, status, and closure evidence for each one. A finding is closed when the evidence is on file. A recommendation that is declined should be recorded with the reason.

No.	Action	Owner	Target	Status
F-03	Clean overhead surfaces in sanding room	Maintenance lead	30 days	Open
F-01	Collector protection and inlet isolation, design and install	Operations manager	Design in 60 days	Open
F-04	Rebalance and document branch airflow	Maintenance lead	45 days	Open

Limits of this study

This DHA is based on the documents, photos, measurements, and walkthrough the plant provided, and on lab results for the sample submitted. Conditions not shown or not disclosed are outside what it can address. It is not a design package, an electrical area classification study, or a code compliance certification, and it does not replace the judgment of your authority having jurisdiction.

Sample only. Example Cabinet & Millwork is fictional. Every measurement, test value, and finding in this document was written to illustrate the format. Your DHA is written from your facility and your dust.

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