

NFPA 400 control areas MAQs and protection levels

A simple technical explanation of how the three concepts work together

20th September 2026

A control area defines where the hazardous materials (HAZMAT) is counted. The maximum allowable quantity defines how much is permitted under that arrangement. If the applicable quantity is exceeded, the hazard determines the additional protection requirements. These are connected parts of one assessment.¹

NFPA 400 CONTROL AREAS, MAQs & PROTECTION LEVELS

CONTROL AREA

Where are we counting?



MAQ

How much is permitted here?



PROTECTION LEVEL

What protection does the hazard require?



Above the applicable MAQ?

Reduce the inventory, revise the arrangement, or provide the required protection.

¹ National Fire Protection Association, *NFPA 400 HAZMATs Code* (2019 edn) paras 3.3.4.1, 3.3.63, 3.3.75 and 5.3.1.

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1. Three Concepts

Concept	Simple meaning	Question it answers
Control area	A defined building, part of a building or outdoor area in which HAZMAT quantities remain within the applicable MAQs.	Where are we counting?
MAQ	Maximum allowable quantity per control area for a particular hazard and condition. It is the threshold for additional requirements.	How much is permitted here?
Protection level	Additional building safety requirements selected for the hazard when the indoor control area limits are exceeded.	What additional protection is needed?

The essential distinction

Exceeding the MAQ does not mean that the material is prohibited everywhere. It means that the proposed inventory no longer fits the ordinary control area arrangement. The designer must change the quantity or arrangement, establish a permitted increase, or provide the applicable additional protection.

Being below the MAQ also does not mean that the material is harmless or that every fire precaution can be omitted. The general HAZMAT requirements still apply.

Code edition and scope

The code clauses, table values and calculations in this document use NFPA 400 2019. The supporting training deck identifies itself as a 2022 edition course and is used for explanation. Its slide numbers refer to the individual slides, not the PDF page numbers. The project's adopted edition and building code must govern a project submission.²

2. Control Area

Think of a control area as an identified part of the premises with its own HAZMAT inventory limit. It may be the whole building or a defined portion of it. Several rooms can form one control area.

One control area in the building: section 5.2.2.2 does not require special construction solely for that arrangement. More than one control area in the building: section 5.2.2.3 requires fire barriers between them, using Table 5.2.2.1. Other applicable room, occupancy and material requirements must still be checked.³

The purpose of subdivision is to limit the hazardous inventory within each separated area. The separation must be complete, including floors and walls where needed. Doors, penetrations, joints and ducts must maintain the required separation under the applicable construction provisions.

Floor level changes the allowance

Higher floors generally permit less material per control area and fewer control areas. The table below summarises the requirements. "First floor above grade" means the first above-ground storey in this table, commonly called the ground floor.

Location	MAQ factor per area	Maximum areas per floor	Barrier rating
First floor above grade	100%	4	1 hour
Second floor above grade	75%	3	1 hour
Third floor above grade	50%	2	1 hour
Floors 4 to 6 above grade	12.5%	2	2 hours
Floors 7 to 9 above grade	5%	2	2 hours
Above floor 9	5%	1	2 hours
First floor below grade	75%	3	1 hour
Second floor below grade	50%	2	1 hour
Lower than second below grade	Not permitted	Not permitted	Not applicable

² National Fire Protection Association, *NFPA 400 HAZMATs Code 2022 Edition* (training slides, handout dated 27 July 2026) slides 1, 155–158 and 235.

³ NFPA 400 (n 1) ss 5.2.1.1.1 and 5.2.2.1–5.2.2.3.

Apply the floor percentage after the increases permitted by the relevant MAQ table footnotes. The barrier ratings address separation between control areas; read them together with the one control area provision above. The last row concerns the control area route, rather than a blanket statement about every possible HAZMAT arrangement.⁴

A cabinet is not another control area. It may qualify for an MAQ increase, but the material inside it remains part of the inventory of the control area containing it.

3. MAQ

MAQ means maximum allowable quantity per control area. It is a code threshold for a specific hazard category and condition. It is not one universal quantity for every chemical, and it is not automatically the total allowance for the entire building.

How to find the correct MAQ

Start with the product's material safety data sheet (MSDS) and confirm its classification against NFPA 400. Identify every applicable hazard, the physical state and whether the material is stored, used in a closed system or used in an open system. A mixture must be classified as a mixture; a chemical trade name alone is insufficient.⁵

Then select the correct occupancy table. Table 5.2.1.1.3 provides the general MAQs, subject to the modifications in sections 5.2.1.2–5.2.1.5. Table 5.2.1.2.1 provides limits for occupancies other than mercantile, storage or industrial. Laboratories classified as business occupancies have the specific provision in section 5.2.1.1.2.1. A room labelled “chemical store” does not, by that label alone, establish which occupancy table applies.⁶

Condition	Simple example	What to check
Storage	Closed containers held as stock.	Storage quantity and any applicable container restrictions.
Use in a closed system	Material transferred through equipment that normally contains it.	Closed-system use limit as well as the total inventory limit.
Use in an open system	Material exposed during an open mixing or dispensing operation.	Open-system use limit, which can be much lower.

Adjustments are conditional

Where the particular table entry permits it, an approved storage cabinet or other specified enclosure can give a 100% increase. A building protected by the sprinkler system can give another 100% increase. Where both increases are permitted cumulatively, the base amount can become four times the original amount. These are not automatic credits for every material, occupancy or use condition.⁷

Next apply the floor factor. Also check any special increase expressly permitted by section 5.2.1.5, together with all of its conditions. A normal cupboard does not qualify just because it has a door.

Count the full inventory

Count relevant quantities across the whole control area, including different products within the same regulated hazard category and class. Check all applicable hazards. Storage and use are not

⁴ NFPA 400 (n 1) table 5.2.2.1, including both footnotes; ss 5.2.2.2–5.2.2.3.

⁵ NFPA 400 (n 1) ss 4.1, 4.3, 4.4 and 6.1.2.

⁶ NFPA 400 (n 1) ss 5.2.1.1.2–5.2.1.5.3.

⁷ NFPA 400 (n 1) table 5.2.1.1.3, footnotes a and b; s 6.1.18.

independent allowances that can simply be added together: the aggregate quantity in storage and use must not exceed the applicable storage limit, while the individual use limits must also be met.⁸

Read the units carefully. Use the table's stated units and conversion rules.

4. Protection Levels

When the adjusted indoor MAQ is exceeded, NFPA 400 requires the applicable protection level for the material. The level describes additional building safety requirements. It does not mean the number of sprinklers, a wall rating in hours or an NFPA 704 hazard-diamond number.⁹

Level	Hazard addressed	Simple examples or application
1	Detonation hazard An explosion involving a shock wave.	Class 4 oxidizers and detonable reactive materials.
2	Deflagration or accelerated burning Rapid combustion that can create dangerous pressure.	Class I organic peroxides, flammable gases and nondetonable pyrophoric materials.
3	Materials that readily support combustion or present a physical hazard	Flammable solids, Class 2 oxidizers and Class 2 water-reactive materials.
4	Acute health hazard	Corrosive, toxic and highly toxic materials.
5	Semiconductor fabrication	A specialised facility category where required by the building code.

The table is a guide to the categories, not a substitute for the material-specific classification. Some entries depend on the exact class, pressure or operating condition. For example, a Class 3 oxidizer can lead to Level 2 or Level 3 depending on the conditions identified in the code.¹⁰

The numbers are not a quantity ladder

A little above the MAQ does not mean Level 1, and a larger excess does not mean Level 2 or Level 3. The hazard selects the level. Level 1 is the highest additional protection and Level 4 as the lowest within that comparison. Level 5 is a separate semiconductor category, not the next step in a universal ranking.

Where a material has several hazards, address the requirements for each applicable hazard. Selecting a fire protection level does not remove a separate toxic or corrosive hazard. The code expressly requires the most restrictive requirements of both Levels 1 and 4 where both apply.¹¹

A protection level is a set of requirements

The design can involve occupancy separation, fire suppression, escape provisions, ventilation, explosion control, spill containment, process controls and emergency power, as applicable. Level 1 has dedicated single-storey detached-building provisions. Levels 2 and 3 can also require a detached building above further quantity thresholds. Level 4 includes specific provisions for highly toxic materials and gas rooms.¹²

⁸ NFPA 400 (n 1) s 4.4; table 5.2.1.1.3, note 2; table 5.2.1.2.1, note 2; s 5.2.1.2.2.

⁹ NFPA 400 (n 1) ss 3.3.75 and 5.3.1–5.3.6; annex A, s A.3.3.75.

¹⁰ NFPA 400 (n 1) ss 4.2.1.2.1–4.2.1.2.4 and 5.3.2–5.3.6; table 5.2.1.1.3; NFPA training slides (n 2) slide 235.

¹¹ NFPA 400 (n 1) ss 4.4 and 6.2.2.2.3; NFPA training slides (n 2) slide 295.

¹² NFPA 400 (n 1) ss 6.2.1–6.2.5; table 5.3.7; NFPA training slides (n 2) slides 295–296 and 302.

5. Integrated Concepts

The assessment follows a sequence: define the hazard and the area, calculate the applicable quantity limit, compare the actual inventory, then decide whether the arrangement is acceptable or needs to change.

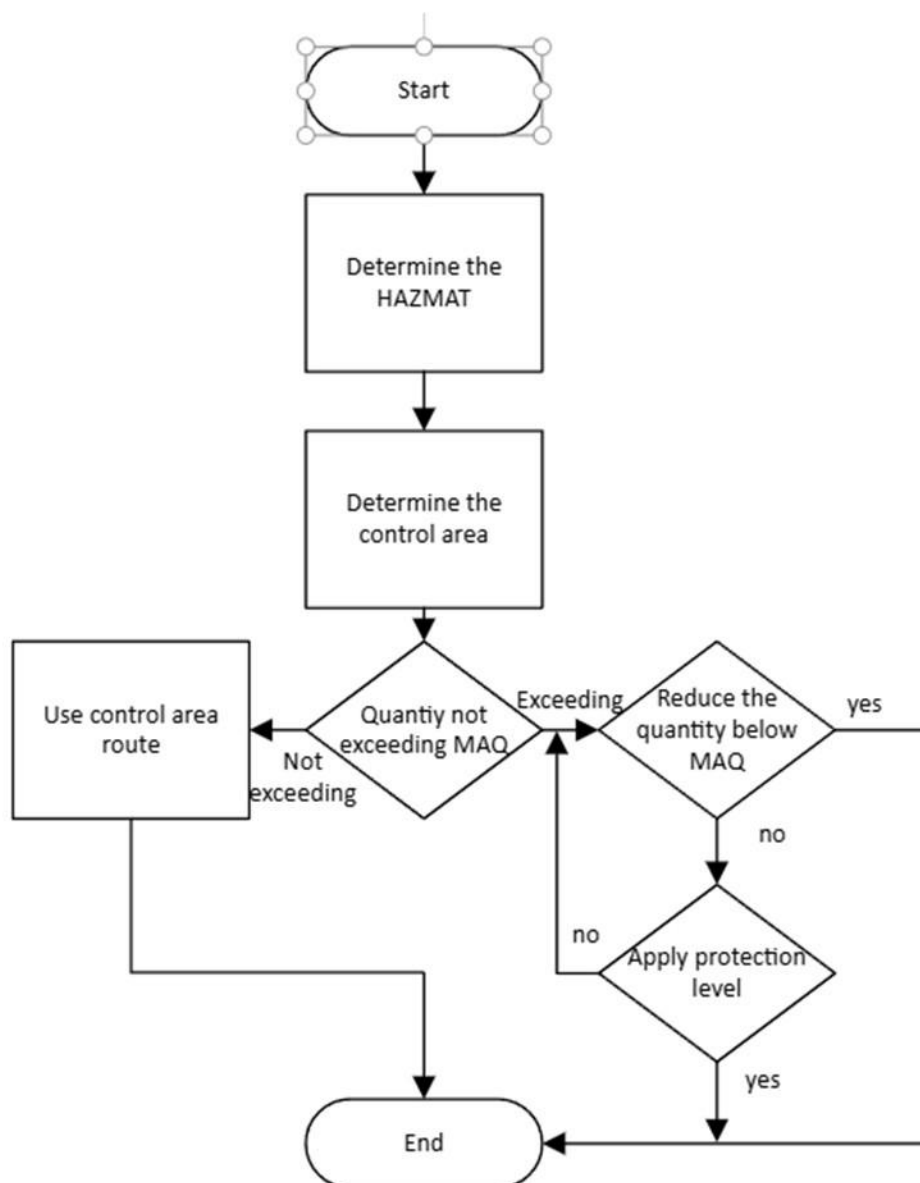


Figure 1 The indoor control area decision process

For an inventory above the initially calculated limit, the practical options are to reduce it, apply an expressly permitted increase, create additional compliant control areas where allowed, relocate it to a suitable permitted arrangement, or provide the applicable protection level. Recalculate after each design change. Do not assume that moving material outdoors removes quantity or separation requirements.¹³

At or below the MAQ

Use the control area route, maintaining the assumptions used to calculate the allowance. Section 6.1 applies to HAZMATs in any quantity, including MSDS, personnel training, ignition source control and separation of incompatible materials. Other applicable requirements remain in force.¹⁴

¹³ NFPA 400 (n 1) ss 5.1.1, 5.2.1, 5.2.2, 5.3.1 and 5.4; NFPA training slides (n 2) slides 209–216 and 234–235.

¹⁴ NFPA 400 (n 1) ss 6.1.1, 6.1.2, 6.1.4, 6.1.5 and 6.1.12.

Above the applicable MAQ

Identify the protection level and apply the relevant construction and material provisions. For storage, check Section 6.2; for use, dispensing and handling, check Section 6.3 as applicable. Check the relevant material chapter and the adopted building code. The sprinkler system must suit the actual hazard and storage arrangement; merely having sprinklers is insufficient.¹⁵

6. Worked Example (Storage)

Scenario: an industrial occupancy stores 600 lb of a solid confirmed as a Class 2 oxidizer. It is on the first floor above grade. The building is sprinkler protected. Initially, the stock is on ordinary shelving. No other materials contribute to this hazardous inventory, no other hazard controls the result, and no special increase under section 5.2.1.5 is claimed.

Table 5.2.1.1.3 gives a base storage MAQ of 250 lb for this solid. Footnotes a and b permit the applicable cabinet and sprinkler increases. The first floor factor is 100%. These examples use the table's stated conversion of 1 lb = 0.454 kg.¹⁶

Adjusted MAQ

= 250

$\times 2$ (sprinkler get twice) $\times 1$ (no increase since cabinet is not used) $\times 1$ (since on the first floor above grade)
= 500 lb

The factors are base MAQ $\times$ sprinkler factor $\times$ cabinet factor $\times$ floor factor. With ordinary shelving, the cabinet factor is 1. The proposed 600 lb exceeds the 500 lb allowance by 100 lb.

Arrangement	MAQ per control area	Result for 600 lb
Sprinklers and ordinary shelving	500 lb 227 kg	Above MAQ
Sprinklers and qualifying approved cabinet storage for all of the stock	1,000 lb 454 kg	Within MAQ
Two compliant control areas with sprinklers and ordinary shelving	500 lb in each 227 kg in each	300 lb in each is within MAQ

For the cabinet option, the revised calculation is $250 \times 2 \times 2 \times 1.00 = 1,000$ lb. Every cabinet must be suitable for the material and used within its approved capacity and conditions. This is a quantity credit, not permission to overfill a cabinet.

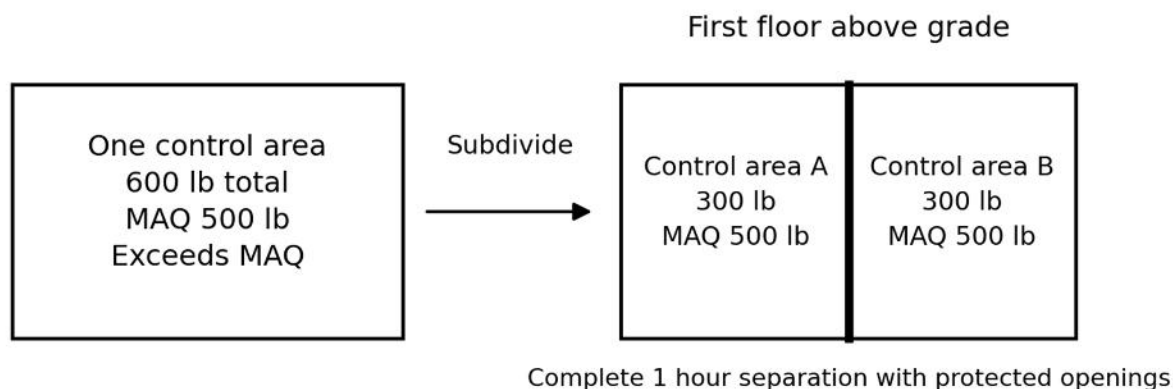


Figure 2 A first-floor subdivision example using the same 600 lb inventory

¹⁵ NFPA 400 (n 1) ss 5.3.1, 5.3.3–5.3.6, 6.1.1.1–6.1.1.2, 6.2.1.1.1 and 6.3.1.

¹⁶ NFPA 400 (n 1) table 5.2.1.1.3, Class 2 oxidizer row and footnotes a and b; table 5.2.2.1.

The two-area option needs a complete 1 hour fire rated wall including protection of openings, and must remain within the permitted control area count. Each area is assessed separately. If 600 lb remains in one area under the original 500 lb arrangement and no other permitted adjustment resolves the excess, Protection Level 3 applies to this Class 2 oxidizer.¹⁷

7. Why location and its use change the answer

The same storage on a higher floor

Keep the same Class 2 solid oxidizer, sprinkler protection and ordinary shelving from the previous example. Changing the floor changes the MAQ even though the chemical and the sprinklers remain the same.

Location	Calculation	MAQ per control area
First floor above grade	$250 \times 2 \text{ (sprinkler)} \times 100\%$	500 lb 227 kg
Second floor above grade	$250 \times 2 \text{ (sprinkler)} \times 75\%$	375 lb 170.25 kg
Fourth floor above grade	$250 \times 2 \text{ (sprinkler)} \times 12.5\%$	62.5 lb 28.375 kg

Thus, 400 lb would fit within the first floor MAQ but would exceed the second floor MAQ under these assumptions. On the fourth floor, two fully compliant control areas would together allow only 125 lb, with no more than 62.5 lb in either area. They require 2 hour fire rated wall. The first floor allowance cannot be carried upstairs unchanged.¹⁸

Storage and open use must both pass

Now return to the first floor. The building is sprinkler protected throughout, with no cabinet credit claimed. The same Class 2 solid oxidizer has these adjusted limits:

Condition	Base amount	With sprinkler increase
Storage and aggregate inventory	250 lb	500 lb
Closed-system use	250 lb	500 lb
Open-system use	50 lb	100 lb

Suppose 450 lb is in storage and 80 lb is being used in an open process (total $450 + 80 = 530$ lb). The open-use quantity of 80 lb is within 100 lb, but the total is 530 lb, which exceeds the 500 lb storage and use aggregate limit. **Both checks must pass.** On the other hand, let say an inventory of 350 lb stored plus 120 lb in open use totals only 470 lb, but the 120 lb open-use quantity exceeds its 100 lb limit.¹⁹

A different hazard leads to a different level

If the material were instead a corrosive-only liquid and its applicable adjusted MAQ were exceeded, the relevant category would be Protection Level 4. It would not become Level 3 because its excess quantity resembled the oxidizer example. Always determine the hazard first and apply its own table entry.²⁰

¹⁷ NFPA 400 (n 1) table 5.2.2.1; ss 5.2.2.3 and 5.3.5; table 5.2.1.1.3.

¹⁸ NFPA 400 (n 1) table 5.2.1.1.3 and table 5.2.2.1. Calculations apply the sprinkler increase and floor percentages to the Class 2 solid oxidizer storage entry.

¹⁹ NFPA 400 (n 1) table 5.2.1.1.3, Class 2 oxidizer row, note 2 and footnote b. The closed- and open-system entries carry footnote b, not the cabinet increase in footnote a.

²⁰ NFPA 400 (n 1) ss 4.2.1.2.4 and 5.3.6; table 5.2.1.1.3, corrosive row.

8. Design Application

A statement such as “the chemical quantity is below MAQ” should be supported by an inventory calculation and a plan showing exactly where the quantities are counted. The following is a practical review checklist.

Check	Evidence to request
Material and hazard	Product identity, concentration, current safety data sheet, physical state and every applicable NFPA 400 hazard category and class.
Maximum inventory	Peak quantities in storage, closed use and open use, including deliveries, process replenishment and relevant waste.
Control area boundary	A labelled plan showing the area, floor level, other control areas and any required complete fire-rated separation.
Applicable MAQ	Adopted edition, correct occupancy table, exact row and column, units, footnotes, permitted credits and floor percentage.
Separate and combined checks	Each applicable hazard and use limit, together with the relevant storage-and-use aggregate limit.
Protection above MAQ	The applicable level and a clause-based schedule of construction, fire protection, escape and other required safeguards.
Operating limits	An inventory limit for each area and a process for reviewing chemical substitutions, additional stock and changes in use.

Two common errors to avoid: treating every chemical room as a separately entitled control area without checking its boundaries, and treating every chemical room as automatically requiring a fire resistance rated enclosure. The correct outcome depends on the control area arrangement, the MAQ assessment and the other applicable requirements.²¹

The relationship to remember

Define the control area. Calculate its applicable MAQs. Check the inventory. If the limits are still exceeded, apply the protection required for the actual hazard.

9. References

National Fire Protection Association, *NFPA 400 HAZMATs Code* (2019 edn).

National Fire Protection Association, *NFPA 400 HAZMATs Code 2022 Edition* (training slides, handout dated 27 July 2026).

²¹ NFPA 400 (n 1) ss 5.2.2.2–5.2.2.3, 5.3.1 and 6.1.1.