

OFFICE OF THE STATE FIRE MARSHAL
STATE OF ILLINOIS

**Statute, Rule or Standard Policy Interpretation: Ventilation of Buildings Containing Indoor
Flammable or Combustible Liquid
Loading and Unloading Operations**

Title:	Storage, Transportation, Sale and Use of Gasoline and Volatile Oils: Rule and Regulations Relating to General Storage
Part:	41 Ill. Adm. Code 160
Section Number:	Multiple Sections
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Policy Number:	07-TS-005

Purpose: This instruction provides for current policy and guidance to ensure uniform enforcement of Title 41 Illinois Administrative Code Part 160 “*Storage, Transportation, Sale and Use of Gasoline and Volatile Oils: Rule and Regulations Relating to General Storage*” and specifically for the interpretation of rules to be applied to necessary ventilation for buildings used to house indoor bulk loading and unloading operations.

Scope: Statewide

Current Code: The Part 160 rules do not specifically address requirements for ventilation of buildings containing loading or unloading areas for flammable or combustible liquids. Furthermore, some sections of the Part 160 rule offer conflicting information relative to the location of pumps and equipment in relation to storage tanks and loading/unloading areas.

Policy: The OSFM has determined the following acceptable solutions for ensuring that adequate ventilation is present for enclosed or partially enclosed bulk load-out and/or load-in buildings:

1. Some structures may not be deemed “enclosures” or “buildings” whatsoever and therefore by the very nature of their design may cause no concern relative to the build up of flammable or combustible vapors from activity that occurs within the structure. Based upon definitions found in NFPA Standard #30 Section 3.3.6.3 for what does or does not constitute a “storage tank building”, the OSFM will not consider any three dimensional space that is enclosed by a roof and walls that cover less than half of the possible area of the side of the space as a building. (In other words, structures that half at least 50% of their perimeter walls open are not considered buildings and need take no further action relative to adequate ventilation).

2. The OSFM will accept ventilation rates based upon requirements found in the “Consolidated Regulations of Canada”. These regulations require that warehouses, pumphouses and all other enclosures where flammable or combustible liquids are stored or handled shall be adequately ventilated with permanently openings located near floor level. The ventilation area shall be at least 1 ft² of ventilation opening per each 50 ft² of floor space. The ventilation openings shall be equally divided between opposite walls.

3. For structures that cannot comply with either of the two above parameters based upon their design/construction, the OSFM will accept methods defined within NFPA Standard #30 Section 7.3.4 to ensure adequate ventilation. This requires that:

- a. Enclosed processing areas handling or using Class I liquids, or Class II or Class III liquids heated to temperatures at or above their flash points, shall be ventilated at a rate sufficient to maintain the concentration of vapors within the area at or below 25 percent of the lower flammable limit. These ventilation requirements shall be confirmed by sampling of the actual vapor concentration under normal operating conditions. The sampling shall be conducted at a 5 ft radius from each potential vapor source extending to or toward the bottom and the top of the enclosed processing area. The vapor concentration used to determine the required ventilation rate shall be the highest measured concentration during the sampling procedure.

Exception: Where a ventilation rate of not less than $1 \text{ ft}^3/\text{min}/\text{ft}^2$ of solid floor area is provided, the ventilation confirmation requirement described above does not apply.

- b. If mechanical ventilation is used, it shall discharge to a safe location outside the building, without recirculation of the exhaust air.

Exception: Recirculation is permitted where it is monitored continuously using a fail-safe system that is designed to automatically sound an alarm, stop recirculation, and provide full exhaust to the outside in the event that vapor-air mixtures in concentrations over one-fourth of the lower flammable limit are detected.

- c. If mechanical ventilation is used, provision shall be made for introduction of make-up air in such a manner as to avoid short-circuiting the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors can collect.

4. For structures/processes that use vapor recovery methods to reduce or limit the presence of flammable and combustible vapors, the methods described in Item #3 above need to be used to ensure that the vapor recovery operation limits vapors to safe concentrations within the structure.

5. In all of these environments, including buildings or simple weather protective structures, equipment located in proximity to flammable vapor is required to comply with National Electrical Code (NFPA 70) requirements for class and division listing to avoid electrical ignition of vapors.

Reason:

Nationally recognized codes addressing flammable and combustible liquid storage address indoor locations for bulk loading and unloading facilities for flammable and combustible liquids. The OSFM believes it reasonable, until such allowances and restrictions can be codified into administrative rules, to allow for indoor bulk truck loading and unloading if conducted according to these criteria. The requirements are taken from National Fire Protection Association Standard #30 *Flammable and Combustible Liquids Code*.

This issue results from interpretation and enforcement of various sections of Title 41 Illinois Administrative Code Part 160 “*Storage, Transportation, Sale and Use of Gasoline and Volatile Oils: Rule and Regulations Relating to General Storage*”. The Part 160 rules make it evident that the intent of the requirements is to ensure that equipment that could cause vapor ignition (e.g., motors, pumps, etc.) be located either outdoors or installed in separate buildings away from aboveground tanks, loading docks, warehouses or garages where flammable vapors may be present. This is most evident in Section 160.250 which states:

Section 160.250 Pumphouse

a) Motors and pumps shall be located in a separate building not less than ten (10) feet from tanks, loading docks, warehouses, garages and property lines, except as provided in Section 160.255.

However, the rules, at least to some degree, conflict with Federal EPA mandates for surface protection required to comply with SPCC requirements as well as with OSHA requirements for preventing slips/falls on wet/icy surfaces, and insurance company requirements for enclosure. (These standards seek to enclose bulk load out facilities to the highest degree possible in an effort to restrict rain water from entering the structures).

Furthermore, loading/unloading facilities or docks have not traditionally been inspected by the Office of the State Fire Marshal in-and-by themselves. (Although the Part 160 rules are applicable to such arrangements, the fact is that if associated storage tanks were not installed at the time of the loading/unloading facility, the site would not have been inspected by the OSFM).

Therefore, the agency is now learning of various designs of loading and unloading devices positioned within buildings or structures with the associated motors, pumps, and other appurtenances located within the same structure. This has caused concerns relative to possible violations of the Part 160 rules as well as the adequacy of ventilation being provided for flammable and/or combustible liquids in these structures.

The OSFM has attempted to examine reasonable practices as allowed by other national model codes as well as other regulatory agencies to ensure fire safety within enclosed structures that may contain flammable and/or combustible liquids while at the same time accommodating the needs of the regulated industry.

The Technical Services Unit of the Office of the Illinois State Fire Marshal has examined National Fire Protection Association (NFPA) Standard #30 Flammable and Combustible Liquid Code. (NFPA 30 is the adopted standard for flammable and combustible liquid storage used in many states and has become the industry benchmark for the design and installation of petroleum facilities). In addition, the NFPA’s technical expert on NFPA 30 was consulted. The Consolidated Code of Canada was also examined as were the regulations and allowable practices of other state and local enforcement agencies. These examinations have led to what the OSFM believes are the viable yet safe solutions enumerated in this policy.

Effective Date: July 2005