

Fire Safety for Assembly Occupancies (Including Wedding Barns & Wineries)

Assembly occupancies

The Minnesota State Fire Code (MSFC) classifies buildings used for recreation, drinking, dining, or gathering for 50 or more people as assembly occupancies. Since these buildings have lots of people in them, the MSFC contains several fire and life safety provisions.

Barns and agricultural buildings

The MSFC expects that these buildings are used to store equipment and farming supplies. Because storage of these items poses little risk to people the fire code requirements for barns and agricultural buildings are minimal.

Converting from agricultural to assembly uses

When large numbers of people and fire hazards are brought into barns and agricultural buildings that are converted to assembly occupancies, the life safety risk increases dramatically. Few of these buildings meet the minimum fire and life safety requirements of the MSFC. The following is fire safety information for agricultural buildings that have been converted to an assembly occupancy.

Number of occupants

The MSFC establishes the number of people that are allowed in the building based on its size and how it will be used. These occupant load factors have been established based on many studies about how many people are actually in these assembly buildings. Many of the other fire code requirements are based on the number of people allowed in the building. Here are the common space requirements based on the type of use:

- For seating at table and chairs: 15 square feet per person.
- For chair seating only: 7 square feet per person.
- For dance floor areas: 7 square feet per person.

For example, a building with 3,300 square feet of table seating and 700 square feet of dance floor (4,000 square feet total) would have an occupancy load of 320 people (3,300 divided by 15 = 220 people; 700 divided by 7 = 100 people; 220 + 100 = 320 people). The MSFC requires a sign indicating the maximum occupant load; these are often seen for hotel ballrooms, bars, and restaurants.

Fire sprinkler protection

The ultimate in fire safety protection is a fire sprinkler system; it is considered an “active” fire protection system because it both alerts people to a fire and actually prevents additional fire growth. Fire sprinkler systems are required for barns and similar venues that are converted to assembly occupancies where food or alcohol is served and:

- Have 100 or more people (based on the size calculations) or
- The building is more than 5,000 square feet in size.



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Fire alarm systems

A fire alarm system is required for both new and existing assembly buildings with 300 or more occupants. The fire alarm system is required to have automatic detection in areas where fires frequently start or that are not always occupied, such as kitchens, boiler/furnace rooms, mechanical rooms, electrical rooms, larger storage rooms, and laundry rooms.

Once activated, the fire alarm system is required to sound a general evacuation signal throughout the building so people are alerted and can safely leave.

Number of exit doors

A minimum of two exit doors is required when there are 50 to 500 people in your building. Three exit doors are required when there are 501 to 1,000 people in your building and four exit doors are required when there are more than 1,000 people in your building.

These exit doors must be located remotely from one another so a single fire or other emergency does not compromise more than one exit.

Exit width

Each exit must have enough width to safely accommodate the number of people. The MSFC allows each three-foot-wide exit door to serve 160 people. Examples of exit width:

- One three-foot-wide door = 160 people
- One four-foot-wide door = 230 people
- Two three-foot-wide doors together = 320 people

If the building has 320 possible occupants (as calculated in “Number of Occupants” section above) and has two 30-inch wide doors, there is not have enough exit width for the number of people that will be in the building. Additional exit width will likely need to be provided.

If, however, there is exit width capacity for 480 people (such as thee exit doors that are 3 feet wide), the facility is allowed to have that number of people even if your occupant load capacity calculates less (such as the 320 possible occupants in the previous example).

Other door requirements

There are three additional door requirements that play into egress requirements: direction of door swing, EXIT signs, and locking hardware. All exit doors must swing outward from assembly buildings. Each exit door or set of doors must have lighted EXIT signs above them. If the doors have a lock or latch on them, the lock or latch must release from the inside through a panic hardware device (simply push on this device and the door opens).

Emergency lighting

The MSFC requires a second power supply so that people can find their way to an exit should the primary power fail. This is typically accomplished with emergency lighting units or an automatic back-up generator that provides lighting during an electrical outage.



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Cooking

Cooking operations are the leading cause of fires in assembly buildings. If you are cooking raw food inside the building by frying (surface, pan, griddle, or deep fat frying), grilling, broasting, or broiling, a commercial cooking hood with a built-in suppression system is required.

Interior finish and decorations

Decorations and interior finishes are often the items ignited early in the fire that allow the fire to grow and spread. Any decorations must be kept at least 3 feet away from heat sources. The furnishings on walls and ceilings must resist ignition and fire spread. Look for materials that have a Class A or B flame-spread ratings. These include things like gypsum wallboard and solid wood paneling. Items such as carpet, plywood, particle board, plastics, and foam plastics will allow the fire to spread and prevent people from escaping.

Open flames and ignition sources

Open-flame devices, such as candles and food warming cans, should be avoided because they can easily ignite items that are close to them; electric candles are an inexpensive and safe alternative to open-flame candles.

Extreme caution should be used when placing decorations near electric lamps and open flames. Standard electric lamps (i.e. light bulbs) can get up to 900° F, which is more than sufficient to ignite ordinary combustibles (such as wood, paper, and plastics, which typically ignite around 500° F). Light emitting diode (LED) devices are good alternatives to traditional electric lamps because they operate at much cooler temperatures (plus they save energy).

Fire department access

Does the site have enough space for emergency vehicles to get to the building and operate? Fire trucks are often 30-35 feet long and need additional space to set up hoses and be operational.

Firefighting capabilities

It cannot be assumed that the fire department will have the time, equipment, and resources to save an assembly building if it is several miles from the nearest fire station. Many barn fires are impossible to control given the distances, materials, and open nature of these buildings. A building will be much more likely to survive a fire if the owner takes appropriate precautions beforehand.

Hazardous areas

Certain rooms and areas are considered an increased hazard and must be fire-separated from the areas used by people. Examples include rooms used to store vehicles, flammable or combustible liquids, rooms used for painting, rooms used for repairing equipment, and rooms having larger furnaces and boilers (over 400,000 BTU per hour input).

One-hour fire separations can be achieved with 5/8-inch gypsum wallboard on each side of a stud wall. Any doors into these spaces must be kept closed and have one-hour fire ratings (the fire ratings are shown on a label on the door). The doors can be held open if tied to a smoke detection system that will release in the event of a fire.



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Insurance considerations

If a barn is currently insured as an agricultural building, there probably is inadequate liability coverage. In many cases, insurance companies will deny any claims if the building is improperly insured for the risk (increased personal injury risk as opposed to property loss claims generally associated with an agricultural building). Owners of these buildings should check with their insurance agent to see if there is adequate coverage for assembly events.

The liability claims for the Station Nightclub fire (a bar fire in 2003 that killed 100 and injured 230 people) was over \$150 million. Treating a serious burn injury can result in a \$1-2 million claim; if an insurance company denies coverage, the property owner will probably be sued and can be held financially responsible for that. The State Fire Marshal recommends a minimum of \$5 million of liability coverage, but building owners may want to consider more based on your personal worth, finances and legal exposure. The owner's insurance agent or attorney should be consulted on the minimum amount of liability insurance needed.

