

# **Occupant Load Determination for Gyms, Health Clubs & Yoga Studios**

## **Occupant load purposes**

Occupant load factors have been established through studies showing how much space people take for activities and movement. These occupant load factors are based on how the space is being used. The state fire and building codes use occupant load calculations to establish:

- Egress provisions (such as the number of doors needed and the width of doors, stairs, aisles, and corridors).
- When fire protection systems are required (sprinklers, fire alarm systems, etc.).
- The type of occupancy (in some cases).

## **Determining the occupant load for athletic facilities**

Gyms, health clubs, yoga studios and the like are classified as assembly occupancies. The space used for exercise, whether it is a basketball court, group fitness room, spin studio, yoga or pilates studio, swimming pools, skating rinks, or large open area is calculated as follows.

- Exercise room: 50 gross sq. ft. per person
- Locker room: 50 gross sq. ft. per person
- Decks around swimming pools: 15 gross sq. ft. per person

Many facilities have other assembly spaces that shall be calculated per the information that follows. See the section below on gross verses net sq. ft.

## **Determining the occupant load in assembly spaces**

Determining the occupant load in assembly spaces is typically a little more complicated than in most other uses. The first step is to determine the type of seating: fixed or not fixed.

### **Fixed seating**

Fixed seating is typically bleachers, benches, pews, or seats that are fixed in place and cannot be moved. Here are the common measurements for fixed seating:

- Bleachers and pews: one person for each 18 inches of length.
- Booths (as in a restaurant): one person for each 24 inches of length.
- Seats (typically with arm rests): one person per seat.



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## Areas without fixed seating

Here are the common occupant load factors used in assembly settings (such as restaurants, bars, places of worship, libraries, museums, athletic clubs, etc.) that do not have fixed seating. These values come from Table 1004.5 of the 2020 Minnesota State Fire Code (MSFC):

- Table and chair seating: 15 sq. ft. per person (net area).
- Chair seating (no tables): 7 sq. ft. per person (net area).
- Standing areas and dance floors – 7 sq. ft. per person (net area).
- Waiting, queuing areas – 5 sq. ft. per person (net area).
- Exercise areas – 50 sq. ft. per person (gross area).

## Gross vs. net areas

The fire and building codes measure gross and net areas differently. For most occupancies, gross floor area is used. Gross floor area is the space bounded by the walls and includes all spaces except for shafts or courts. In Figure 1, the shaded areas represent the gross floor area. The “X” represents a shaft or court that does not get included in the measurement.

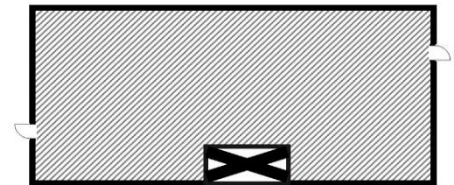


Figure 1. Gross floor area

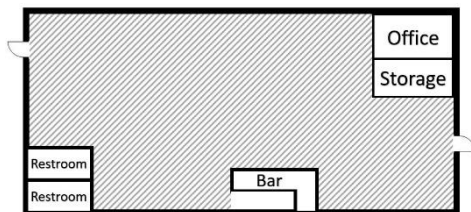


Figure 2. Net floor area

Net floor area is used where there are typically larger numbers of people. Net area is the space that can actually be occupied by people and excludes areas where people would not normally congregate (such as stairs, hallways, restrooms, mechanical rooms, etc.). In Figure 2, the shaded areas represent the net floor area. The white colored areas are not included in the measurements.

## Applying occupant load factors to buildings

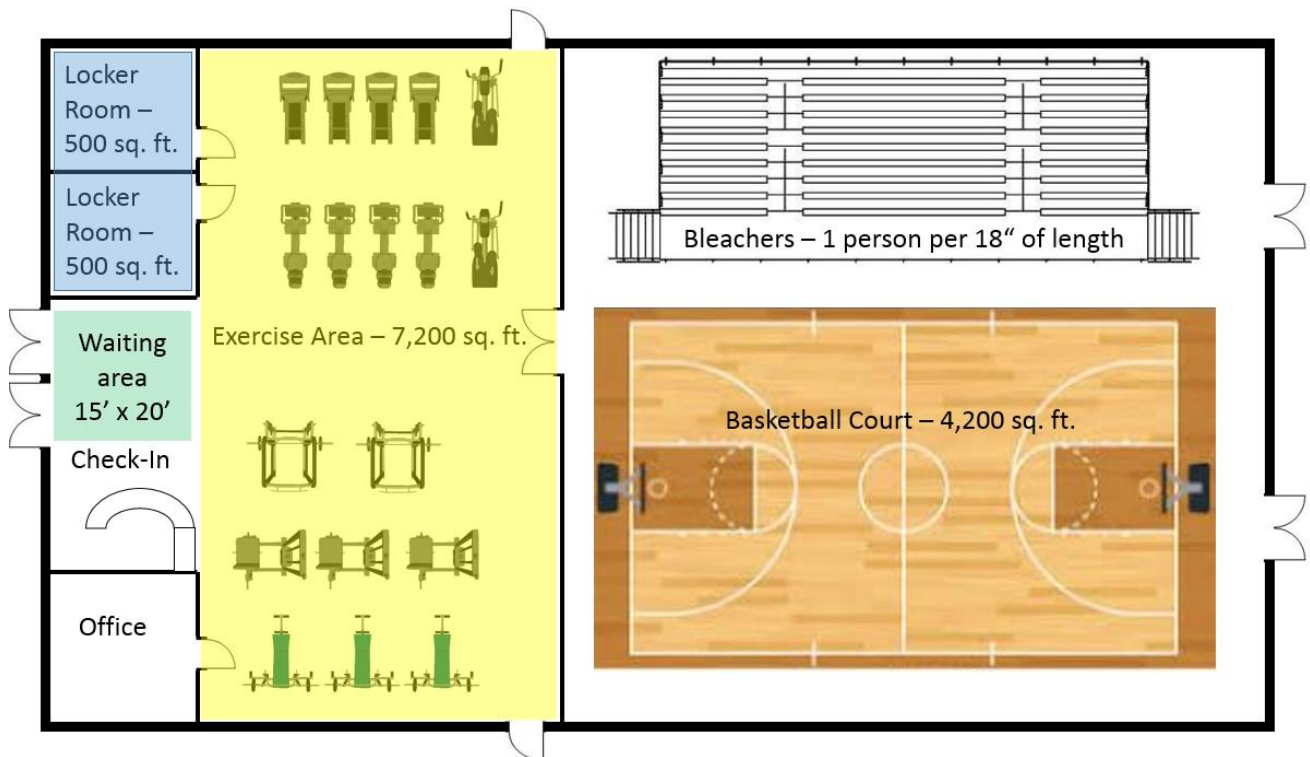
To determine the occupant load of a space, divide the size of the space by the occupant load factor(s) of Table 1004.5 of the 2020 MSFC (see common ones above). In many assembly settings, there will be more than one use. Please see the following example.

## Example of occupant load determination

The following is an example of an assembly venue with multiple uses. The occupant load is determined by measuring the areas, dividing by the occupant load factors for each area, and adding the numbers together.



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Because there are multiple uses here (basketball court, bleacher seating, locker rooms, exercise area, and waiting area), there are multiple calculations:

- Exercise area (shown in yellow):
  - 7,200 sq. ft. divided by 50 sq. ft. per person = 144 persons.
- Locker room areas (shown in blue):
  - 500 sq. ft. + 500 sq. ft. = 1,000 sq. ft.
  - 1,000 sq. ft. divided by 50 sq. ft. per person = 20 persons.
- Waiting / queuing area (shown in green):
  - 15 ft. by 20 ft. = 300 sq. ft.
  - 300 sq. ft. divided by 5 sq. ft. per person = 60 persons.
- Basketball court (shown in brown):
  - 4,200 sq. ft. divided by 50 sq. ft. per person = 84 persons.
- Bleacher seating:
  - 10 rows – 60 ft. per row = 600 ft.
  - 600 ft. divided by 1.5 ft. per person (18 inches per person) = 400 people
- Total occupant load = 708 persons (exercise = 144, locker room = 20, waiting = 60, basketball court = 84, bleachers = 400).

**Note:** If the occupant load calculations are to ensure compliance with the governor's executive order related to COVID-19 (50 percent occupancy and 6 foot social distancing — effective Mar. 15, 2021), divide the total occupant load determined above by two and round up. This is for patrons and customers; staff are not included in these limits. For more specific information go to [Stay Safe MN](https://www.dps.state.mn.us/stay-safe-mn).

**Questions:** Contact the SFMD at 651-201-7221 or by email at [fire.code@state.mn.us](mailto:fire.code@state.mn.us).

