Occupant Load Determination for 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 (Churches): One person for each 18 inches of length
- Booths (Restaurants): One person for each 24 inches of length
- Seats (typically with arm rests): One person per seat

Areas without fixed seating

Here are the common occupant load factors used in assembly settings (such as restaurants, bars, places of worship, libraries, museums, etc.) that do not have fixed seating.

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

Gross vs. Net areas

The fire and building codes measure these areas slightly 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.
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 factors. In many assembly settings, there will be more than one use. 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.
Because there are multiple uses here (chair seating, table and chair seating, waiting area, and a stage), there are multiple calculations:

**Chair seating (Yellow):**
- 30 ft x 70 ft = 2,100 sf
- 2,100 sf / 7 sf net (per person) = 300 persons

**Table and chair seating (Blue):**
- 30 ft x 70 ft = 2,100 sf
- 2,100 sf / 15 sf net (per person) = 140 persons
- 600 sf / 15 sf net (per person) = 40 persons

**Waiting / Queuing area (Green):**
- 15 ft x 20 ft = 300 sf
- 300 sf / 5 sf net (per person) = 60 persons

**Stage area (Orange):**
- 15 sf x 40 ft = 600 sf

Add the areas together for the total occupant load = 540 persons. Divide the total occupant load by 4 to get 25 percent occupancy. 540 persons / 4 = 135 persons.

For assistance, contact the Bismarck Fire Department at 701-355-1400.