Plumbing Requirements

Presented by:
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Plumbing Inspector

OVERVIEW
• Plumbing Code
• Commercial Build-Outs
• Single and Multiple Family Residences
• Water Service Sizing – Codes
• Water Service Sizing – Process
• Summary
### Plumbing Requirements

#### COMMERCIAL BUILD-OUTS

**Drinking Fountains/Service Sinks**

- See Table 18-29-403.1

- Commercial office build-out/DF not required WHEN within these tenant spaces a kitchen or kitchenette with a kitchen sink is provided. Must be ADA accessible and disposable cups must be permanently provided.

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<table>
<thead>
<tr>
<th>18-29-403.7 Drinking fountains</th>
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<td>18-29-410.1 Approval</td>
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<td>18-29-410.2 Prohibited locations</td>
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<td>18-29-403.1 Minimum number of fixtures</td>
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Grease Interceptor

- 18-29-418.2.1 Facilities with no range oven

Hot Water Heater

- 18-29-504.8 Required pan
- 18-29-504.7.1 Discharge
- 18-29-504.7.2 Location
- 18-29-504.8.2 Pan drain termination
Hot Water Heater Article 2 Definitions

• **Receptor**: A receptacle which receives the discharge from indirect waste and is directly connected to this inlet of a properly vented trap. It shall be of cast-iron, brass, lead or aluminum and shall be of such shape and capacity as to prevent splashing or flooding. The receptor outlet and trap shall not be less than 1-1/2”.

• **Floor Drain**: A receptacle fitted with a strainer or grate, a trap or seal, and connected to the plumbing or drainage system.
Plumbing Requirements

COMMERCIAL BUILD-OUTS

Hot Water Heater

• Therefore, a mop basin is NOT an approved indirect waste receptor or a floor drain.

Condensate to Floor Drain or O.S.D.

• 18-29-802.1 Where required
• 18-29-802.1.4 Non-potable clear-water waste
• 18-29-607.1.1 Water temperature - automatic safety mixing device
• 18-29-501.8.1 Instantaneous water heaters
• 18-29-802.1.7 Sinks
**Storm Drainage**

- 18-29-1101.2.1 Roof drainage and downspouts, exceptions 1 and 2
- 18-29-1104.2 Combining storm with sanitary drainage
- 18-29-412.4.2 Sanitary waste drainage (see Area Drain under Article 2 definitions)
- 18-29-702.1 Above-ground drainage and vent pipe

**Suds Pressure Zone**

- 18-29-711.3.2 Suds pressure zone
- 18-29-712.3.2 Sump pit: material
Plumbing Requirements

WATER SERVICE SIZING

Codes

- 18-29-417.1 Showers approval
- 18-29-417.4.4 Water temperature safety
- 18-29-424.4 Shower valves
- 18-29-607.1.2 Shower compartments and shower/bath combinations

SEWER SEPARATION/REUSE OF EXISTING

Codes

- 18-29-603.2 & 18-29603.2.1
- TITLE 35(State code)
- 18-29-301.3- connections to drainage system /reuse of existing building drains and sewers.
- If there is a conflict with the main sewer, WM adjustment and or sewer replacement might be applicable.
Plumbing Requirements

WATER SERVICE SIZING/ REUSE OF EXISTING

Procedures for Calculating the Minimum Sizing of the Water Supply System (see Appendix A)

- Reuse of any fire only service is not allowed.
- Reuse of ANY water service needs to be approved by Chief Plumbing Inspector

Plumbing Requirements

TAP REQUIREMENTS FOR DEVELOPER SERVICES/SELF CERTIFICATION

- Plans must be submitted to plan desk
- Fire letter must be received
- Flow test approved
- 18-29-603.3.4 metering requirements
- Work order issued pending BES
Codes 604 Design of Building
Water Distribution Systems

• 18-29-604.3 Water distribution system design criteria

• 18-29-604.3 *Table: Water Distribution Systems Design Criteria Required Capacitors at Fixture Supply Pipe Outlets*

• 18-29-604.6 Variable street pressures set by the Department of Water (30 psi)

Sample field card with information & calculations for new 3-story SFR
Step 1

- Compute the total number of Water Supply Fixture Units from Table 18-29-604.10.1

<table>
<thead>
<tr>
<th>Fixtures</th>
<th># of</th>
<th>WSFU</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water closet</td>
<td>5 X</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Lavatory</td>
<td>7 X</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Bathtub/shower</td>
<td>5 X</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Kitchen sink</td>
<td>1 X</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>1 X</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Washing machine</td>
<td>2 X</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Bidet</td>
<td>1 X</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Total # of Fixtures = 22
Total WSFU = 42

Step 2

- Using Table 18-29-604.10.2, convert the total water demand from fixture units to gallons per minute (predominantly for flush tanks).

- Total # WSFU = 42 = 24.3 gpm
Step 3

- Determine the elevation of the highest fixture. This result is the loss in static pressure in pounds per square inch (psi). Measure from the top plate of the floor.

<p>| | |</p>
<table>
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</table>
| Water service to grade   | 5'-0"
| Grade to first floor     | 5'-5 3/4"
| First floor to second floor | 12'-0"
| Second floor to third floor | 11'-5"
| Shower                   | 5'-0"
| Total                    | 38'-10 3/4"

Step 3

- Multiply this elevation in feet by 0.434. The result is the loss in static pressure in pounds per square inch (psi).

- Highest fixture, which is the shower, temperature-controlled, is at 38’ 10-3/4” x 0.434 = 16 psi
Plumbing Requirements

WATER SERVICE SIZING

Step 4

• Refers to water supply servicing inside buildings. This step is not needed for water sizing.

Step 5

• Compute the pressure loss through the meter. For pressure losses, consult the manufacturer’s data.

• Note: City of Chicago Department of Water states a 3 psi loss.
Step 6

- Compute the available pressure to overcome friction in the piping system. First compute all losses. Determine the working pressure at the highest fixture per:

  - *Table 18-29-604.3 Water Distribution System Design Criteria Required Capacities at Fixture Supply Pipe Outlets*

  Note: For shower, temperature controlled use the fixed figure of 20 psi.

  - Height loss: 16 psi
  - Working pressure at highest fixture: 20 psi
  - Meter loss: 3 psi
  - Total loss: 39 psi
### Step 7

Compute the developed length of the basic circuit of piping from the main in the street, the house pump, the outlet side of the pressure value or other source of supply pressure to the highest and farthest outlet. Per the City of Chicago Department of Water, the distance from the water main to the property line is always 25’.

- Highest fixture: 38’-10 3/4”
- Length of building: 70’-0”
- Setback to water main: 25’-0”
- Developed length: 133’-10 3/4”

### Step 8

- For equivalent length run (or ELR), see Table 18-29-604.10.3 Allowance in Equivalent Length of Pipe for Friction loss in Valves and Threaded Fittings.
- Note: City of Chicago, Department of Water states the ELR in copper fittings = 1.3 and in galvanized fittings = 1.5. Department of Water uses galvanized fittings.
- Multiply developed length by ELR for galvanized fittings: 133’ 10-3/4” x 1.5 = 200’
Step 9
- City of Chicago Department of Water states that water working pressure in city water mains is 30 psi. Take the total pressure loss in the building (Step 6) and subtract it from the working pressure in the water main (30 psi).

\[ 30 \text{ psi} - 39 \text{ psi} = -9 \text{ psi} \]

- Two ways to proceed: one for positive results and one for negative results.

Step 9: Positive Results
- Take the developed length by ELR (Step 8). Divide the outcome of Step 9 by this number and multiply by 100 (for 100' of developed length). The resulting positive working pressure does not require a water pressure booster for your system.

\[ (\text{Working pressure}) - (\text{Developed length by ELR} \times 100) \]
\[ 9/200 = .045 \times 100 = 4.5 \]
Step 9: Negative Results

• In this example, the result is a negative working pressure (-9), which indicates that you require a water pressure booster system per: 18-29-604.7 Inadequate water pressure

Step 9: Negative Results

• Take the outcome of Step 2 (water demand from fixture units to gallons total per minute) and the outcome of Step 9 (working pressure). Per 18-29-604.10.1.2 Size of Piping When a Water Service Requires a Pump, the velocity of flow and the service shall not exceed 5 feet per second velocity
Step 9: Negative Results

- Go to Chart 11-8-540B Flow Chart for Smooth Pipe. Take 24.3 gpm on the left or right side of the chart. Go to velocity of 5 feet per second, which is the longest line on the chart running diagonally across. Put into cross hairs velocity of 5 feet per second and 24.3 gpm and your service size will be one of the numbers on the left hand side.

- In this example, the result is 1-1/2" with a 24.3 gpm booster system.

**Recent Clarification Memos**

- Pilot Program: Use of Material Authorized by the Illinois Plumbing Code in Smaller Buildings

- Use of Single-User Unisex Restrooms to Provide Separate Facilities. (Multi-user restrooms are not permitted in Illinois.)

- Number of Public Restrooms for new Food Service establishments.
Plumbing Requirements
New Chicago Building Rehab Code Section 1009

- 1009.1 Increased Demand (over 20%)
- 1009.2 Food-handling occupancies
- 1009.3 Interceptor required
- 1009.4 Chemical wastes
- 1009.5 Group I-2

Plumbing Requirements
2020 State of Illinois Requirements

- Baby changing tables will be designated to ALL bathrooms. Not just Mens or Womens etc.
- IF (2) single use bathrooms are applicable they must designated as Unisex.
Plumbing 
Requirements 
SUMMARY

• Make sure you use the new codes and requirements
• If a creative use of space is needed to achieve compliance, schedule a meeting or go through SPR. (i.e food-handling establishments.
• Contact 312-744-7060 with any questions