The Barn Raiser

Mid-South Engineering Company

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Code Matters

Codes ***do*** matter in the building and industrial plant world…..A lot.

by Karen Griffin, Staff Architect, MSECO Hot Springs

Question:

How many toilet fixtures do I need to have in my plant?

Referenced Codes: The International Building Code (IBC), the International Plumbing Code (IPC), Occupational Safety & Health Administration (OSHA standards 29 CFR), Title 30 Code of Federal Regulations Department of Labor, Mine Safety & Health Administration (MSHA)

To determine the number of toilet room fixtures required:

1. First, determine the occupancy classification, or combination of several types. Each classification will need to be calculated separately.

2. Next, determine your occupant load and ratio of men to women, dividing them equally, or use the number of employees working in your plant or building at highest peak shift if approved by the building official. Do not count mobile crews. Don't forget to include guests and visitors who may be there for a group training or a large meeting. The total number of employees *may not* be the same number as the building code determined number of occupants for design purposes. Your architect/engineer will be able to help determine the correct number to use.

3. Last, reference all applicable codes to determine the fixture counts and required locations of toilet rooms. If shower stalls are desired, various codes will show the required numbers. Determine the number of fixtures to be accessible for the disabled (these are different codes not addressed here). The following charts are abbreviated from the OSHA and IPC codes to get some beginning numbers for planning:

No. of employees	Minimum no. of water closets [1]
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
over 150	[2]

[1] Where toilet facilities will not be used by women, urinals may be provided instead of water closets, except that the number of water closets in such cases shall not be reduced to less than 2/3 of the minimum specified.

[2] One (1) additional fixture for each additional 40 employees.

[1]

Classification	Water Closets		Lavs		Drinking Fountain	Service Sink
	Male	Female	Male	Female		
Conference Room (assembly 'A-3')	1 per 125	1 per 65	1 per 200		1 per 500	1
Office (business 'B')	1 per 25 for the first 50		1 per 40 for the first 80		1 per 100	1
Factory ('F-1 ' & 'F-2')	1 per 100		1 per 100		1 per 400	1

[1] NOTE: This chart is abbreviated. Refer to the International Plumbing Code for the full chart and footnotes.

Did you know?

- √ Most owners of buildings and plants prefer a much higher number of toilet room fixtures than what codes require.
- √ Separate facilities for men and women are not required for total occupant load of 15 or less (IBC), 20 or less (OSHA).
- √ Areas using harmful substances, including Maintenance Shop areas, require a higher number of washing stations.
- √ MSHA states that privies are prohibited, but combustion or incinerating toilets are acceptable, as well as flush or non-flush chemical toilets (for surface mine industrial plants).
- √ Where drinking fountains are required, bottled water dispensers may be substituted for not more than 50% of the required drinking fountains(IPC)

Travel Distance or Location of Toilet Facilities:

OSHA states that an employer is expected to use reasonable judgment in evaluating the proximity of sanitary facilities to employees. MSHA uses the wording "readily accessible to workers" and "a location convenient to each surface work site". The International Plumbing Code states a maximum of 500 feet travel distance to facilities and not more than one story above or below the space required to have toilet facilities; however, it gives exception to Factories and Industrial occupancies for the required travel distance as long as the proposed location is approved by the Inspector or Reviewing Authority.

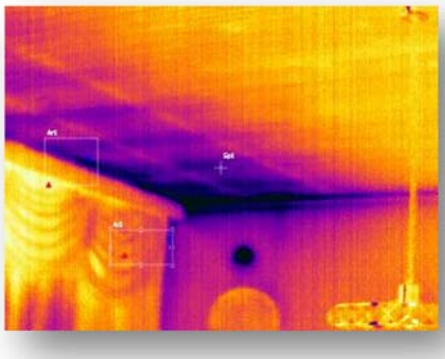
Look for Energy Losses in Commercial Buildings Using Thermal Imaging

By: Dick Angotti, ET

Small, consistent changes can make a big difference in the profitability of any facility. Find problems fast, fix them, and win by realizing the cost savings. Thermal imaging experts suggest that building owners, building managers and/or facilities engineers have the following system in their facilities inspected to identify energy losses:

Building envelope

"Building envelope" refers to the building structure as well as the climate control within it. The envelope is what separates the outside environment from the inside, and it's frequently imperfect. The problem with building envelope inspection is that the degree of temperature variance detected may often be very small, only a few degrees in some cases. So, the best time to scan the building envelope is during heating or cooling season, when there is a large difference in temperature, or Delta T, from the inside to the outside of the structure. In general the larger the Delta T between objects the better the thermal signature. While a Delta T of 18°F is typically recommended for insulation inspections, only a minimum Delta T of 3°F is recommended for air leak inspections.



This Thermal image is of an insulation issue and possible moisture intrusion of the building envelope. The black spot on the wall was from an old chimney insert that had been removed and never insulated. Further testing of the ceiling found the corner had little to no insulation. Areas were insulated and cold area was eliminated.

What to Scan:

- Roofs. Wet roofing insulation loses much of its R-rating. This means that heat can escape or enter the building much easier through wet insulating materials. In addition to looking for moisture issues, scan roof surface and follow temperature differences to possible air leak entry/exit points.
  Note: Spot repairs are less expensive than replacement, and old roofs are often a challenge to dispose of because of their contents.

- Walls between conditioned and unconditioned spaces, including outside walls. Due to the natural flow of air with different temperatures (example: hot air rises), significant air leaks tend to occur at the top and bottom of conditioned spaces, where the air either enters or escapes a structure.

- Construction joints and connections. For example, at floor slabs that extend outdoors, there are often heating and cooling losses by conduction through the slab. (un-insulated concrete that is a foot thick has an equivalent R-value of a single pane of glass.)

- Penetrations of the building envelope (pipes, conduits, chimneys, etc.). Un-insulated or unsealed gaps often exist around roof and wall penetrations.

- Doors and window frames and seals. Locate air leaks around window and doors caused by worn or missing seals. Windows and door casings should be inspected for air leaks as well. Repairs are often as simple as caulking or weather stripping.

Anticipated savings: The Department of Energy estimates that following up on the findings of an energy audit of a building's envelope saves most facilities at least 15 percent on energy bills.

Safety Hints:

Falls on stairways are a common occurrences. One fall prevention measure is easy as 1-2-3. By placing a number on each tread, a person is drawn to look at the steps and count while going up or down. Placing a number on each end is recommended – one upright for ascending, the other upright for descending. *(Idea borrowed from Kimberly Clark)*

Mid-South Engineering Company

Corporate Office
Hot Springs, Arkansas – USA
1658 Malvern Avenue - Hot Springs, AR 71901
501-321-2276 - FAX: 501-624-4214

Cary Office
Cary, North Carolina - USA
200 Mackenan Dr. Cary, NC 27511
919-481-1084 – Fax: 919-481-1184

Millinocket Office
Millinocket, Maine- USA
70 Spring St. Millinocket, ME 04462
207-723-6871 – Fax: 207-723-6872

Web Site: www.mseco.com E-mail: info@mseco.com