BENEFICIAL MASS WALL PROVISIONS WILL REMAIN IN NORTHWEST ENERGY CODES

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NWCMA Northwest Concrete Masonry Association

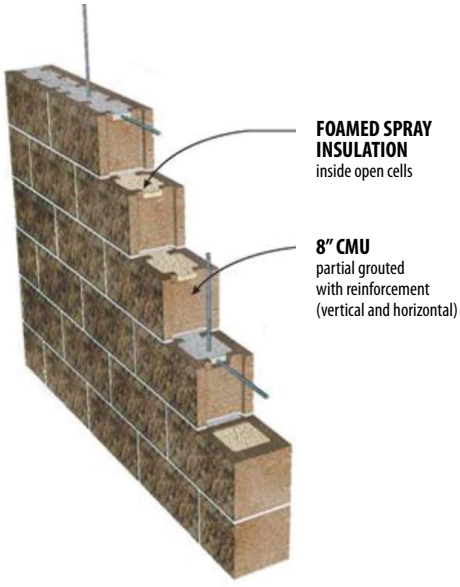

Figure 1
Integral Insulated CMU Wall

If you are designing a gymnasium, big box retail or one of several other buildings types, you can still utilize integral-insulated exposed single-wythe concrete masonry (CMU) walls for code compliance (figure 1). This cost-effective wall system remains a prescriptive path design option in the latest Washington and Oregon energy codes.

In Washington state both the mass wall U-factor requirement of 0.104 and the single-wythe **concrete masonry exception** will remain in the 2021 state energy code that runs until July 1, 2026.

The exception is listed as a footnote to prescriptive path tables C402.1.3 (R-Value method) and C402.1.4 (U-factor method). **When designing a building in accordance with the U-factor method or when utilizing the single-wythe CMU exception, continuous insulation is not required.**

The concrete masonry exception applies to the following commercial building types/uses where it is typically not cost effective to add excessive amounts of insulation to concrete masonry wall surfaces:

- Gymnasium
- Manufacturing Plant
- Warehouse (storage & retail)
- Indoor Swimming Pool
- Auditorium
- Pump Station
- Church Chapel
- Water & Waste-Water Treatment Facility
- Arena
- Storage Facility/ Storage Area
- Kennel
- Motor Vehicle Service Facility

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The masonry wall must be insulated integrally (in the unit cores) with at least 50% of the cores filled with insulation. The remaining cores can be grouted. As an example, a horizontal grout spacing of 32" on center combined with a vertical grout spacing of 24" on center equates to a grout area of 50%, leaving the remaining cores open for insulation. Greater grout spacings will comply as well.

The durable interior surface of the CMU wall can be exposed providing low maintenance costs and improved fire-safety. Additionally, construction material use is minimized with CMU avoiding the environmental impacts of manufacture, transportation, and installation of interior wall insulation and finish materials.

Other similarly operated building types may qualify for use of the CMU code exception. Consult with your local building official regarding your specific project.

The state of **Oregon** has adopted ASHRAE standard 90.1 for commercial building design under the 2021 Oregon Energy Efficiency Specialty Code. This standard has a mass wall U-factor requirement of 0.104 or 0.09 but does not contain the CMU exception described previously. However, a Statewide Alternate Method No. 21-02 is available as a design option. It provides a single-wythe concrete masonry wall exception similar to the Washington state provision. It includes all the same building types and adds mechanical and electrical structures, restrooms, and concessions.

When designing commercial masonry buildings in **Idaho** the current energy code is the International Energy Conservation Code. Although there isn't a specific concrete masonry exception, designers can use the COMcheck software program to utilize the component performance path allowing building envelope trade-offs. Another commercial compliance option, offering maximum design flexibility, is the use of simulation programs to conduct whole-building energy modeling.

The masonry (mass) wall provisions for current and upcoming Northwest energy codes offer several design options and properly recognize the benefits of thermal mass. Most common masonry wall systems will qualify as "mass walls" meeting the wall weight or heat capacity requirements. They are eligible to comply with the codes using the lower mass wall insulation requirements or CMU exception in the prescriptive compliance tables. They are not required to have continuous insulation.

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Other code compliance paths for mass walls include component performance (envelope trade off) and total building performance/whole building analysis. The whole building analysis method can accurately model thermal mass effects and allows the greatest design flexibility. It is recommended to use a comprehensive energy analysis program with hour-by-hour simulation and options for inputting custom mass wall properties.

For additional information regarding energy efficient masonry wall systems visit:

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