



Double Wall Construction: the Basics

Double wall construction is a good option for a high performance wall in a cold climate.

Double walls have been built since the early days of super-insulated houses in the 1970s, and are becoming more popular as energy prices continue to climb. It's appropriate for cold climates because it slows heat loss through the walls and virtually eliminates thermal bridging.

The design is fairly simple and relies on conventional framing techniques: build two parallel stud walls (one load-bearing, one not), and fill the space between with continuous insulation. The wall system still contains elements of a traditional wall like structural sheathing, housewrap and, in cold climates, a vapor retarder.

Studs

The depth and spacing between the two walls depends on the desired R-value. In a severe cold climate like Fairbanks, Alaska Housing Finance Corp (AHFC) recommends exterior walls have a minimum R-value of 30. For a double wall filled with dense cellulose or fiberglass, this would equate to roughly a 10" wall thickness.

Double walls can be built in a variety of ways and as of yet no universally accepted design standard exists. Naturally, this leads to many ways of attaining the same goal. The bearing wall can be either the inner or outer wall – and if you are using blown in insulation this may determine whether you will be insulating from the inside or the outside. The bearing wall is usually sheathed in plywood and the location of the sheathing can hinder insulation installation from one direction.

The studs between the inner and outer walls do not necessarily need to be staggered. The main thing is that the two walls have minimal contact to reduce conductive heat losses. Typically the inner and outer walls are held apart in parallel at a set distance using plywood gussets, or by sharing the same top and bottom plates. Either 2x4 or 2x6 studs can be used, however the bearing wall must meet structural codes for stud size and spacing. Be sure that the interior finish materials and the siding are compatible with the stud spacing.

Insulation

The typical insulations used in double walls are blown-in cellulose, blown-in fiberglass, or fiberglass batts. Blown-in insulations need to be installed at product-specific densities to prevent settling. Although more cumbersome to install, blown-in insulations are popular as they completely fill all voids and spaces in the double stud wall assembly – including the spaces between inner and outer wall studs, blocking, and corners.

Both fiberglass and cellulose are sold in compressed bales. The bales are fed into a blowing machine, which breaks up the materials, and then the loose insulation is pumped into the wall via a hose attached to the blower. Most lumberyards that sell blown-in insulations also carry the blowing machines either for rent, or in some cases free if a given quantity of insulation is purchased.

Whether you are insulating from the interior or the exterior, the blown-in insulation must be contained. Insulation blown in from the exterior can be contained by house wrap and furring strips, while insulation blown in from

the interior can be contained by a fiber mesh stapled over the studs. In either case, holes are cut in the membranes in the stud bays and the hose from the blower is inserted into the bay to pump in the insulation. If the double walls are far enough apart, the insulation can also be blown in from the top, reducing and/or eliminating the need to cut holes for access through the walls.

Vapor Barrier

The same codes apply to double walls as single walls. A vapor retarder, typically 6 mil polyethylene sheeting is still required on the interior (warm-in-winter) side of the wall assembly.

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