ThermalStar® One™ Climate Zones

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Why are different R-value products specified for ThermalStar One?

ThermalStar One is offered in several R-value configurations to assure that condensation is adequately addressed for long term wall durability. Simply building a wall to meet energy code requirements is only part of the solution to creating a durable thermal envelope.

Despite many efforts to seal walls and control water sources, walls can get wet, and moisture laden air can find its way into a wall cavity. When this occurs, the air in the wall is not in constant contact with conditioned interior air, and the temperature in the wall is not the same as the interior of the building. The result is a potential for water vapor to condense into liquid water, which can lead to mold, rot, and generally a lot of problems.

Continuous exterior insulation does a great job of insulating the entire wall system, allowing more energy from the interior of the building to stay inbound of the exterior insulation. This energy can then be used to partially "condition" the wall cavity, to keep any rogue water vapor from condensing into liquid and creating damage. However, this same continuous exterior insulation becomes isolated from the interior energy of the building, and the drying potential of the outside of the building is limited.

To balance the energy savings from using continuous exterior insulation, there must be sufficient R value to the outside of the stud cavity to counteract the cold conditions and guard against any condensation potential inside the wall. Current best advice from the scientific community, and in the vapor control section of the model codes (sec. 702.7 of 2012 IRC), suggests the following rules:

Climate Zone	Examples of applicable US & Canada Cities	Wall Framing	Exterior Continuous Insulation R-value	Interior Vapor Retarder Class	ThermalStar One Product Solution
Zone 4	Vancouver, Seattle, Nashville, Richmond	2 x 4	2.5	III	ThermalStar One R3
		2 x 6	3.75	III	ThermalStar One R5
Zone 5	Windsor, Denver, St Louis, Chicago, Boston	2 x 4	5	III	ThermalStar One R5
		2 x 6	7.5	III	ThermalStar One R7.5
Zone 6	Calgary, St Paul, Toronto, Milwaukee, Montreal	2 x 4	7.5	III	ThermalStar One R7.5
		2 x 6	11.25	III	NA

By selecting the correct ThermalStar One product for the climate zone / wall configuration, and assuring a Class III vapor retarder interior so any rogue moisture can dry inward, a long lasting and comfortable thermal envelope is assured.

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