Oregon
Interpretive Ruling No. 92-15
LOG/SOLID TIMBER HOME CONSTRUCTION

Initiated By: ALAN SEYMOUR
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BUILDING CODES AGENCY

REGARDING: Energy Conservation
Chapter 53, Energy Conservation, Table numbers 53-O and 53-P
Construction Means and Methods (Log Homes)

QUESTIONS CONSIDERED

1. What are the wall insulation requirements for conventional wood frame construction when prescriptive compliance path 9 is followed?
2. How are thermal performance calculations completed for log/solid timber homes?

APPLICABLE CODE SECTION

Table No. 53-O and Footnote 3 of Table No. 53-P of the Oregon Structural Specialty Code and One and Two Family Dwelling Specialty Code.

[3]MINIMUM COMPONENT REQUIREMENTS: Walls R-15; Floors R-21; Flat Ceilings R-38; Vaults R-21; Basement Walls R-21; Slab Edge R-10; Duct Insulation R-8. R-values used in this table are nominal, for the insulation only and not for the entire assembly. Window and skylight U-values shall not exceed 0.65 (CL65). Door U-values shall not exceed 0.54 (Nominal R-2). The minimum wall component for path 9 shall be an average solid log or timber thickness of 3.5 inches.

BACKGROUND

Incorporating conventional wood-frame wall construction is a fairly common practice with log homes. Gable end walls are often framed and exposed on the interior to a vaulted ceiling or loft. Framed walls separate vaulted ceilings and attics. Sometimes the entire second floor is constructed as conventional wood-frame construction

The exterior log/solid timber wall was developed as a compromise to create Prescriptive Path 9. Although other components have higher U-values than Base Path 1 they do not entirely compensate for the reduction in wall value.

Thermal performance calculations are required if a house deviates from the requirements of a prescriptive path such as Path 9.

FINDINGS

1. **Conventional Wood-Framed Wall Construction Integrated into a Path 9 House**
   - Prescriptive Compliance Path 1 is based on cost effectiveness. Paths 2 through 7 are based on energy equivalency with Path 1 Paths 8 and 9 are compromises, established as specific alternates. Path 8 addresses entry level housing. Path 9 is for log/solid timber homes.
   - Any conventional wood-frame walls for conditioned spaces should comply with the requirements identified in Path 1.
   - Conventional wood-frame walls are assemblies which have a slope of 60 degrees or greater from the horizontal plane. Examples include, but are not limited to, gable end walls, walls separating vaulted ceiling areas and vented attics, dormer walls and second story walls.
2. **Thermal Performance Calculations (Table 53-O)**
   - The requirements for all areas, except log walls and exterior doors, were established to offset the reduced performance of the log walls. These requirements shall not be reduced through the use of thermal performance calculations.

- Provide the flexibility to exercise the option of using thermal performance calculations without compromising the elements identified in compiling the Path 9 requirements.
- Example:

BUILDING COMPONENTS[1] (Areas from Plan Take-offs in sq. ft.)		U-VALUES					
		Base Path 1		Proposed Alternative			
	Areas[2]	U-Value	Areas X U	R-Value [3]	Areas[2]	U-value[4]	Areas X U
Flat Ceilings		0.025*					
Vaulted Ceilings		0.027*					
Conventional Wood-Framed Walls		0.060					
Log/Solid Timber Walls							
Windows (Use A or B)[5]							
A. If glazing area is greater than 13% of heated space floor area:	Take-off Area	0.40*			Take-off Area		
B. If glazing is less than 13% of heated space floor area and trade-off is desired:	13% of floor area	0.40*			Take-off Area		
Skylights		0.500*					
Main entry door		0.540*					
Other exterior doors		0.540*					
Underfloor		0.028*					
Slab Edge (perimeter ft. =)		F=0.520[6]					
		CODE UA =				Proposed UA =	

*These U-values reflect the requirements of prescriptive compliance path 9-R-49 flat ceilings; R-38 vaulted ceilings; U-0.40 windows; U-0.54 all exterior doors and R-30 underfloor insulation.

DISCUSSION

Prescriptive Compliance Path 9 was developed as a compromise, to allow construction of log/solid timber homes. Path 1 is the "model" the residential energy code is based upon. Conventional wood frame exterior walls used instead of log/solid timber walls must be insulated to the requirements of Path 1. This same logic applies whenever thermal performance calculations (Table 53-O) are performed.

RULING

Conventional Wood-Framed Wall Construction Integrated into a Path 9 House

- Any conventional wood-frame exterior walls, integrated into Prescriptive Compliance Path 9 for conditioned spaces shall comply with the requirements identified in Path 1 (R-21).

Thermal Performance Calculations (Table 53-O) for Log/Solid Timber Homes

- Log wall areas are not entered in any portion of the calculation. The conventional wood-frame construction for Base Path 1 is modeled at R-21. The Proposed Alternate contains any conventional wall construction R-15 is the minimum component required for exterior walls.
- The floor, flat ceiling, vaulted ceiling, doors and windows must be modeled to Path 9 requirements for Base Path 9. Any insulation level that does not undermine the minimum component requirements can be used in the Proposed Alternate.
- Thermal Performance Calculations (Table 53-O) shall include the measures identified in the "Findings" example.

The Energy Conservation Board and Structural Code Advisory Board make this recommendation as an interpretation to the requirements in Chapter 53, Energy Conservation.

(signed August 3, 1992)
Rodger Bekooy, Chairman
Energy Conservation Board

Date

(signed July 15, 1992)
John Talbott, Chairman
Structural Code Advisory Board

Date

The recommendations and findings of the Energy Conservation Board and Structural Code Advisory Board are accepted and the interpretations are adopted as stated above.

(signed August 18, 1992)
Gary J. Wicks, Administrator
Building Codes Agency

Date