Energy Program
WASHINGTON STATE UNIVERSITY

2018 Washington State Energy Code-Residential FAQs: Log Walls

What are WSEC 2015 and 2018 code requirements for log walls?

In both WSEC 2015 and 2018, prescriptive requirements for all homes are summarized in Table 402.1.1. Exceptions for log homes are included in the footnotes – Footnote **n** in the 2015 WSEC and Footnote **g** in the 2018 WSEC. Log walls are exempt from the R-value requirement; instead, a minimum average thickness is required.

How is thickness determined in the two code versions?

2015 WSEC

In the 2015 energy code, log and solid timber walls with a minimum average thickness of 3.5 inches are exempt from the prescriptive insulation requirement in Table 402.1.1 per footnote **n**. Pay careful attention to air sealing the log walls to ensure the home will pass the blower door testing required per Section R402.4.1.2.

2018 WSEC

In the 2018 energy code, log walls must meet the requirements of ICC 400 "Standard on the Design and Construction of Log Structures." Footnote **g** of Table 402.1.2 reads, "For log structures developed in compliance with Standard ICC 400, log walls shall meet the requirements for climate zone 5 of ICC 400."

For requirements on the minimum average thickness of log walls in ICC 400, refer to Table 305.3.1.2. A partial screenshot showing the relevant portion is provided on the next page.

- For our Climate Zone 5 and wood species with a specific gravity of 0.50 or less, the average wall-log width must be a minimum of 5 inches.
- For specific gravity greater than 0.50, the minimum average wall-log width is 7 inches.

Note: The full table includes ICC requirements for other building components, such as windows and wood-framed walls, but only the requirements for log walls are based on ICC 400. All other building requirements must meet the requirements of the 2018 WSEC.

How do I determine specific gravity for the wood species I plan to use?

To meet prescriptive requirements, ICC 400 requires values be taken from the 2018 National Design Specification (NDS) for Wood Construction. A partial screenshot of Table 12.3.3.A from that standard is provided below.

For example, if the home is to be built using Douglas Fir-Larch logs, the specific gravity from Table 12.3.3.A is 0.50. From Table 305.3.1.2 in ICC 400, the minimum average log wall thickness would be 5 inches for this species.

Log homes must also meet the other requirements of ICC 400 pertaining to log walls. For example, ICC 400 Section 306 "Infiltration" has requirements for ensuring air leakage is not excessive. Again, the home will be required to pass a blower door test so air sealing is very important.

For more information

Please visit the WSU Energy Program energy code website.
Email us at energycode@energy.wsu.edu or call (360) 956-2042.

Disclaimer

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TABLE 305.3.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	LOG WALL, W_L[h]	
1	5" min.	
2	5" min.	
3	5" min.	
4 & MARINE	5" min.	
5 EXCEPT MARINE	5" SG ≤ 0.50; 7" SG > 0.50	
6		
7 & 8		

For SI: 1 foot = 304.8 mm. Notes to Table 305.3.1.2:

h. W_L is the average wall-log width. Nominal callouts will be larger (e.g., a 5" log would be 6x or 7" diameter; a 7" would be 8x or 9" diameter). SG = specific gravity.

Source: [ICC 400 Standard on the Design and Construction of Log Structures]

Table 12.3.3A Assigned Specific Gravities

Species Combination	Specific[1] Gravity, G	
Alaska Cedar	0.47	
Alaska Hemlock	0.46	
Alaska Spruce	0.41	
Alaska Yellow Cedar	0.46	
Aspen	0.39	
Balsam Fir	0.36	
Beech-Birch-Hickory	0.71	
Coast Sitka Spruce	0.39	
Cottonwood	0.41	
Douglas Fir-Larch	0.50	
Douglas Fir-Larch (North)	0.49	
Douglas Fir-South	0.46	

Source: [2018 National Design Specification (NDS) for Wood Construction]