



# COLUMBIA SHUSWAP REGIONAL DISTRICT

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## BC BUILDING CODE SECTION 9.36 ENERGY EFFICIENCY DESIGN CALCULATION WORKSHEET

**\*\* This form is to be completed and submitted with the building permit application when the drawings do not specify the design criteria \*\***

Site Address \_\_\_\_\_

Design Data for CSR D Building Regulation Locations (as per CSR D Climatic Data Sheet):

**ZONE 5 or 6** (circle)

### Construction Assemblies

HRV: **Y / N** (circle)

#### Roof Assembly – Ceiling Below Attic

Building Material		R Value = RSI x 5.678	RSI
1			
2			
3			
4			
5			
6			
7			
8			
		Required RSI	Proposed RSI
Effective Value (without HRV)		<b>8.67</b>	
Effective Value (with HRV Zone 5)		<b>6.91</b>	
Effective Value (with HRV Zone 6)		<b>8.67</b>	

#### Roof Assembly – Cathedral ceiling and flat roof Assembly

Building Material		R Value = RSI x 5.678	RSI
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
		Required RSI	Proposed RSI
Effective Value (without HRV)		<b>4.67</b>	
Effective Value (with HRV Zone 5)		<b>4.67</b>	
Effective Value (with HRV Zone 6)		<b>4.67</b>	

<b>Exterior Wall Assembly</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
	Effective Value (without HRV)	Required RSI <b>3.08</b>
	Effective Value (with HRV Zone 5)	Proposed RSI <b>2.97</b>
	Effective Value (with HRV Zone 6)	<b>2.97</b>

<b>Exterior Wall Assembly (if applicable – i.e., different cladding)</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
	Effective Value (without HRV)	Required RSI <b>3.08</b>
	Effective Value (with HRV Zone 5)	Proposed RSI <b>2.97</b>
	Effective Value (with HRV Zone 6)	<b>2.97</b>

<b>Exterior Wall Assembly (if applicable – i.e., different cladding)</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
	Effective Value (without HRV)	Required RSI <b>3.08</b>
	Effective Value (with HRV Zone 5)	Proposed RSI <b>2.97</b>
	Effective Value (with HRV Zone 6)	<b>2.97</b>

<b>Garage/Dwelling Wall Assembly</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
		<b>Required RSI</b>
	Effective Value (3.08 - 0.16) without HRV	<b>2.92</b>
	Effective Value (2.97 - 0.16) with HRV Zone 5	<b>2.81</b>
	Effective Value (2.97 - 0.16) with HRV Zone 6	<b>2.81</b>

<b>Garage / Dwelling Floor Assembly</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
		<b>Required RSI</b>
	Effective Value (4.67 - 0.16) without HRV	<b>4.51</b>
	Effective Value (4.67 - 0.16) with HRV Zone 5	<b>4.51</b>
	Effective Value (4.67 - 0.16) with HRV Zone 6	<b>4.51</b>

<b>Floors over Unheated Space Assembly</b>		
<b>Building Material</b>	<b>R Value = RSI x 5.678</b>	<b>RSI</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
		<b>Required RSI</b>
	Effective Value (without HRV)	<b>4.67</b>
	Effective Value (with HRV Zone 5)	<b>4.67</b>
	Effective Value (with HRV Zone 6)	<b>4.67</b>

Floors over Unheated Space Assembly		
Building Material	R Value = RSI x 5.678	RSI
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Effective Value (without HRV)		Required RSI
Effective Value (with HRV Zone 5)		Proposed RSI
Effective Value (with HRV Zone 6)		

Foundation Wall Assembly		
Building Material	R Value = RSI x 5.678	RSI
1		
2		
3		
4		
5		
6		
7		
8		
9		
Effective Value (with or without HRV) Zone 5 & Zone 6		Required RSI
		Proposed RSI

Foundation Wall Assembly		
Building Material	R Value = RSI x 5.678	RSI
1		
2		
3		
4		
5		
6		
7		
8		
9		
Effective Value (with or without HRV) Zone 5 & Zone 6		Required RSI
		Proposed RSI

- **Min RSI 2.6 (R14.75)** - Access Hatches
- **Min RSI 1.1 (R6)** - Doors separating a conditioned space from unconditioned space (i.e., Interior Garage Door)
- **Min RSI 0.75 (R4.25)** - Exhaust ducts that passes through or adjacent to conditioned spaces (i.e., bath fan)
- **Min RSI 3.08 (R17.5)** - HVAC equipment and ducts, Heating and Cooling Piping outside the plane of insulation or in an unconditioned space.
- **Min RSI 2.11 (R12)** - underside of rectangular ducts under an insulated floor over an unconditioned space (crawl space)
- **Min RSI 3.08 (R17.5)** - Mechanical ducts, plumbing pipes, conduits for electrical services or communication cables are placed within the insulated portion of a floor or ceiling assembly.

**Thermal Resistance (RSI) Values of Common Building Materials**  
**See Table A-9.36.2.4.(1)D for a complete list of building materials**

Building Element	RSI
Exterior Air Film (n/a to foundations)	0.03
Interior Air Film - ceiling	0.11
Interior Air Film - floor	0.16
Interior Air Film - walls	0.12
13mm air cavity - walls	0.16
21mm Stucco	0.019
Hollow backed vinyl siding over sheathing	0.11
200mm 13mm thick wood bevel siding	0.14
Hardiplank (fiber- cement) siding	0.026
Stone	0.0004/mm
Asphalt roll roofing	0.03
Asphalt shingles	0.08
Built up roofing	0.06
3/8 plywood	0.083
7/16 plywood	0.096
1/2 plywood	0.109
3/8 OSB	0.093
7/16 OSB	0.108
1/2 OSB	0.123
Permeable felt	0.011
Seal, plastic film	0.00
R12	2.11
R14	2.46
R19 (R20 compressed)	3.34
R22	3.87
R24	4.23
R28	4.93
R40	7.04
EPS (expanded polystyrene) Type 1 - 25mm	0.65
EPS (expanded polystyrene) Type 2 - 25mm	0.71
XPS (extruded polystyrene) 25mm	0.88
Loose fill cellulose	0.025/mm
Loose fill glass fibre for attics	0.01875/mm
Concrete	0.0004/mm
Structural framing SPF (0.0085/mm) 2x4	0.76
Structural framing SPF (0.0085/mm) 2x6	1.19
Structural framing SPF (0.0085/mm) 2x8	1.56
Structural framing SPF (0.0085/mm) 2x10	2.00
GWB (0.0061/mm) 1/2"	0.076
Plywood	0.0087/mm
Carpet and fibrous pad	0.370
Cork tile - 3.2mm	0.049
Tile (linoleum, vinyl, rubber)	0.009

**R value = RSI x 5.678**

**Framing and Cavity Percentages**  
**See Table A-9.36.2.4. (1)A for a complete list of typical wood frame assemblies**

Ceilings with typical trusses 24" o/c	11% framing 89% cavity
Roofs with lumber rafters 24" o/c	10% framing 90% cavity
Wood frame walls 16" o/c	23% framing 77% cavity
Wood frame walls 24" o/c	20% framing 80% cavity

**Effective RSI Values for Cavities**  
**See Table A-9.36.2.6. (1)B for a complete list of framing/cavity values**

2x4 16" o/c R12	1.49	2x6 16" o/c R19	2.36
2x4 16" o/c R14	1.62	2x6 16" o/c R22	2.55
2x4 24" o/c R12	1.55	2x6 24" o/c R19	2.45
2x4 24" o/c R14	1.70	2x6 24" o/c R22	2.67