

Chapter 8 MANUFACTURERS SPECIFICATIONS

8.1 Manufacturers Technical Specifications

Property	Test or Standard	Product	Value
Part Size		SF10	10" x 10" x 40"
		12VWF4	8" x 12" x 40"
		12VWF6	10" x 12" x 40"
		12VWF8	12" x 12" x 40"
		12VWF10	14" x 12" x 40"
Average EPS Wall Thickness		SF10	1.75"
		VWF	2.125"
Concrete Wall Thickness		SF10	6.5"
			3.75"
		12VWF4	
		12VWF6	5.75"
		12VWF8	7.75"
		12VWF10	9.75"
Color		EPS forms	Light gray
		VWC4	Yellow
		VWC6	Blue
		VWC8	Red
		VWC10	Black
Insulation Value	ASTM C-236 Fully grouted	SF10	0.057 U R-22 Equivalent*
	ASTM C-177 ASTM C-518	12VWF4	0.048 U R-24 Equivalent*
	ASTM C-177 ASTM C-518	12VWF6	0.047 U R-24 Equivalent*
	ASTM C-177 ASTM C-518	12VWF8	0.046 U R-24 Equivalent*
	ASTM C-177 ASTM C-518	12VWF10	0.045 U R-24 Equivalent*
STC Rating (inc. 2 layers 1/2" Gypsum drywall)		SF10 VWF4 VWF6 VWF8 VWF10	STC-52+ STC-44+ STC-55+ STC-58+ STC-59+
Flame Spread	ASTM E-84 UBC Standard 42-1		10 (5##)
Smoke Development	ASTM E-84 UBC Standard 42-1		45-125 (75##)

Property	Test or Standard	Product	Value
15 Minute Thermal Barrier	UBC Standard 17-5, 1991 UBC Section 1713(d), 1991		Compliance (UC Berkeley)
Exposure in a crawl space	UBC Section 1713(d)D, 1991		Compliance (Southwest Research Institute)

SmartBlock EPS Specifications		Value at 1.5 PCF	Value at 2.0 PCF
Flexural Strength	ASTM C-203	50psi	75psi
Compressive Strength	ASTM D-1621	25psi	33psi
Density	ASTM C-303	1.5 PCF	2.0 PCF
Shear Strength	ASTM C-273	32psi	37psi
Tensile Strength	ASTM D-1623	22psi	27psi
Water Vapor Transmission	ASTM C-355	0.7-1.4 PERM/IN	0.7-1.4 PERM/IN
Water Absorption	ASTM C-272	<2% by volume	<2% by volume
Capillarity		None	None
Coefficient of thermal expansion	ASTM D-696	0.000035 in/in/°F	0.000035 in/in/°F
Flash ignition temperature	ASTM D-1929	675 °F	675 °F
Self ignition temperature	ASTM D-1929	675 °F	675 °F
Maximum Temperature		165 °F	165 °F
BTU Content	ASTM D-2015 NFPA-259	17,000 BTU/ lb.	17,000 BTU/ lb.

*The R-value equivalent stated refers to a comparison of a SmartBlock insulating form wall versus wood framing 16" on center with the cavities filled with fiberglass batt insulation. This is the "standard" that is used when comparing R-values and thermal insulation factors for use with the various energy agencies.

8.2 Energy Analysis

The following sections describe the insulation values that are associated with the SF10 Series and the VWF Series forms.

8.2.1 SF10 Series

Because the SF10 Series form has integral EPS bridges, most of the state energy offices have required that the SF10 Series be tested in accordance with ASTM C-236. This is a total wall assembly test rather than the conventional method which tests each individual component. The wall has a tested U-value of 0.057 (A U-value is the inverse of an R-value when used as a total wall assembly.)

The U-value of 0.057 exceeds all state and local insulation requirements for the entire United States for both above and below grade applications. It is the equivalent of a wood framed wall with studs 16" on center having the cavities filled with R-22 fiberglass batt insulation. In many cases this can qualify for insulation rebates. It is recommended that you check with your local power or utility company to determine if you are eligible for insulation rebates for using SmartBlock.

8.2.2 VWF Series

Because the two side panels of the VWF Series are essentially flat pieces of EPS, ASHRAE values are used in calculating the insulation values. The value for 2.0 PCF density EPS is 4.40 R/inch. The average thickness of each panel is 2.125". Therefore, each panel has a value of 9.35 R. They are 0.048 U for the VWF4, 0.047 U for the VWF6, and 0.046 U for the VWF8.

The U-values of 0.048, 0.047, 0.046 and 0.045 exceed all state and local insulation requirements for the entire United States for both above and below grade applications. These values are the equivalent of a wood framed wall with studs 16" on center having the cavities filled with R-24 fiberglass batt insulation. In many cases this can qualify for insulation rebates. It is recommended that you check with your local power or utility company to determine if you are eligible for insulation rebates for over insulating your structure.

8.3 Sound Transmission

Because SmartBlock insulating form walls are essentially concrete, they work very well as sound walls. The ratings for these walls are stated in terms of an STC (Sound Transmission Class). The minimum STC Rating for sound walls as stated by the UBC is 45.

The ratings for SmartBlock insulating form concrete walls are as follows:

SF10	STC Rating	52+
VWF4	STC Rating	48+
VWF6	STC Rating	55+
VWF8	STC Rating	58+
VWF10	STC Rating	59+

Therefore, the SmartBlock insulating form concrete walls exceed the minimum requirements for sound walls.

8.4 Concrete Specifications

SF10 Series

Minimum Strength (ICBO)	2,000 psi.
Minimum Strength (BOCA)	2,500 psi.
Maximum Aggregate Size	3/8" pea gravel
Slump	6"

VWF Series

Minimum Strength (ICBO)	2,000 psi.
Minimum Strength (BOCA)	2,500 psi.
Maximum Aggregate Size	3/8" pea gravel
Slump	6"

8.5 Concrete Estimation

The following chart gives the estimates for concrete usage when using SmartBlock insulating forms:

	CUBIC YARDS OF CONCRETE REQUIRED					
	SMARTBLOCK STANDARD	SMARTBLOCK 12" VARIABLE FORMS				
NUMBER OF FORMS	SF10	12VWF4	12VWF6	12VWF8	12VWF10	
1	0.05	0.04	0.06	0.08	.10	
2	0.10	0.08	0.12	0.16	.20	
3	0.15	0.12	0.18	0.24	.30	
4	0.20	0.15	0.24	0.32	.40	
5	0.25	0.19	0.30	0.40	.50	
6	0.30	0.23	0.36	0.48	.60	
7	0.35	0.27	0.42	0.56	.70	
8	0.40	0.31	0.48	0.64	.80	
9	0.45	0.34	0.54	0.72	.90	
10	0.50	0.39	0.60	0.80	1.00	

NUMBER OF FORMS REQUIRING ONE CUBIC YARD OF CONCRETE:

SMARTBLOCK STANDARD

SF10

20 FORMS PER YARD

SMARTBLOCK VARIABLE

12VWF4

26 FORMS PER YARD

12VWF6

17 FORMS PER YARD

12VWF8

12.5 FORMS PER YARD

12VWF10

10 FORMS PER YARD

8.6 Block Estimation

STANDARD BLOCK SIZE: 10" X 10" X 40"
COVERAGE: 2.78 SQUARE FEET
CONCRETE CAPACITY: 1.35 CUBIC FEET OF CONCRETE

1 cubic yard of concrete fills 20 SF10 Series SmartBlock insulating forms
20 SF10 Series SmartBlock insulating forms covers 55.6 square feet
1 square foot takes .48 cubic feet of concrete

USE THE FOLLOWING FORMULA TO DETERMINE HOW MANY SMARTBLOCK INSULATING FORMS YOUR JOB WILL REQUIRE

1 course wall (10") - 0.3
2 course wall (20") - 0.6
3 course wall (30") - 0.9
4 course wall (40") - 1.2
5 course wall (50") - 1.5
6 course wall (60") - 1.8
7 course wall (70") - 2.1
8 course wall (80") - 2.4
9 course wall (90") - 2.7
10 course wall (100") - 3.0

EXAMPLE: If you had 100 lineal feet of wall going 3 courses (30") high, use the formula numbers above (in this example, 0.9) to determine how many blocks you will need:

of lineal feet x 0.9 (for a 3 course wall) = number of blocks

IF IT WERE 100 LINEAL FEET, THEN:

100 lineal feet x 0.9 = 90 blocks needed for that job

FIGURING AMOUNT OF END PIECES NEEDED

Every time you make a 90 degree corner, each corner will take one (1) end piece set per course.

Example: 3 course wall (30") would take three end pieces.

8.7 Tools and Materials

SMARTBLOCK INSULATING FORMS

TOOLS AND MATERIALS REQUIRED:

1. Rebar cutter and bender
2. Tie wire and wire cutters
3. Adobe standoffs*
4. 1" x 3" x 48" wood stakes*
5. Box clips*
6. Hand saw and keyhole saw
7. Sledgehammer*
8. Line
9. Spray glue
10. SmartBlock end pieces
11. SmartBlock insulating forms
12. Tape measure
13. Builder's level
14. 1" x 3" x 9 1/4" spreader
15. Line or boom pump with a 2" hose (and an "S" bend, if using a boom pump)
16. 3/8" pea gravel with a 6 sack mix
17. Plumb bob
18. Flag nails*
19. SmartBlock tape

* - Will probably not be necessary if the footings are pre-poured.

8.8 Radius Cut Outs

SmartBlock insulating form walls are easily manipulated to produce radiused and curved walls. By cutting out portions of the interior cell, between the bridges, a curved wall can be formed.

For inside radius cuts, the formula for determining the amount of area to cut out of each cell is as follows:

$$\text{Cut out per cell in inches} = \frac{\text{block width} \times \text{cell length (in inches)}}{\text{radius (inside)} + \text{block width (in inches)}}$$

For outside radius cuts, the formula is as follows:

$$\text{Cut out per cell inches} = \frac{\text{block width} \times \text{cell length (in inches)}}{\text{radius (outside)}}$$

It is important to remember that each block will have four cuts and that all cuts must be the same in order to achieve a smooth curved wall appearance.

The chart on the following page contains cut out dimensions (in inches) per cell based on commonly used radius amounts:

SmartBlock RADIUS CHARTS

Inside Radius Chart

INSIDE RADIUS IN FEET	SF10	VWF 4	VWF 6	VWF 8	VWF 10
4	N/A	1.38	N/A	2.07	2.41
5	1.43	1.14	1.43	1.71	2.00
6	1.22	0.98	1.22	1.46	1.70
7	1.06	0.85	1.06	1.28	1.49
8	0.94	0.75	0.94	1.13	1.32
9	0.85	0.68	0.85	1.02	1.19
10	0.77	0.62	0.77	0.92	1.08
12	0.65	0.52	0.65	0.78	0.91
14	0.56	0.45	0.56	0.67	0.79
16	0.50	0.39	0.50	0.59	0.70
18	0.44	0.35	0.44	0.53	0.62
20	0.40	0.32	0.40	0.48	0.56
22	0.36	0.29	0.36	0.44	0.51
25	0.32	0.26	0.32	0.39	0.45
30	0.27	0.22	0.27	0.32	0.38
35	0.23	0.19	0.23	0.28	0.33
40	0.20	0.16	0.20	0.24	0.29

Outside Radius Chart

INSIDE RADIUS IN FEET	SF10	VWF 4	VWF 6	VWF 8	VWF 10
4	N/A	N/A	N/A	N/A	N/A
5	N/A	1.33	N/A	N/A	N/A
6	1.39	1.11	1.39	N/A	N/A
7	1.19	0.95	1.19	1.43	N/A
8	1.04	0.93	1.04	1.25	1.46
9	0.93	0.74	0.93	1.11	1.30
10	0.83	0.67	0.83	1.00	1.17
12	0.69	0.56	0.69	0.83	0.97
14	0.60	0.48	0.60	0.71	0.83
16	0.52	0.42	0.52	0.63	0.73
18	0.46	0.37	0.46	0.56	0.65
20	0.42	0.33	0.42	0.50	0.58
22	0.38	0.30	0.38	0.45	0.53
25	0.33	0.27	0.33	0.40	0.47
30	0.28	0.22	0.28	0.33	0.39
35	0.24	0.19	0.24	0.29	0.33
40	0.21	0.17	0.21	0.25	0.29