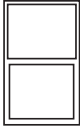
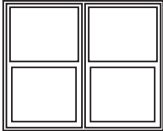
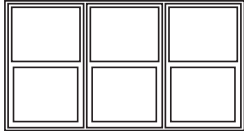




SINGLE-HUNG

SPECIAL SIZE FRAME DIMENSIONS



	1-WIDE VENT UNIT		2-WIDE VENT UNIT COMPOSITE		3-WIDE VENT UNIT COMPOSITE	
						
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
EQUAL SASH	14-1/2" W x 23-1/2" H (368 x 597)	48 Ft <sup>2</sup> (4.46m <sup>2</sup> ) 53-1/2" W x 77-1/2" H (1 359 x 1 969)	29-1/2" W x 23-1/2" H (749 x 597)	48 Ft <sup>2</sup> (4.46m <sup>2</sup> ) 95-1/2" W x 77-1/2" H (2 426 x 1 969)	44-1/2" W x 23-1/2" H (1 130 x 597)	48 Ft <sup>2</sup> (4.46m <sup>2</sup> ) 107-1/2" W x 77-1/2" H (2 731 x 1 969)
COTTAGE SASH	14-1/2" W x 28-1/2" H (368 x 724)	53-1/2" W x 65-1/2" H (1 359 x 1 664)	29-1/2" W x 28-1/2" H (749 x 724)	95-1/2" W x 65-1/2" H (2 426 x 1 664)	44-1/2" W x 28-1/2" H (1 130 x 724)	107-1/2" W x 65-1/2" H (2 731 x 1 664)
CONTEMPORARY SASH	14-1/2" W x 28-1/2" H (368 x 724)	Standard Performance 53-1/2" W x 83-1/2" H (1 359 x 2 121)	29-1/2" W x 28-1/2" H (749 x 724)	95-1/2" W x 83-1/2" H (2 426 x 2 121)	44-1/2" W x 28-1/2" H (1 130 x 724)	107-1/2" W x 83-1/2" H (2 731 x 2 121)
24" LOWER SASH	14-1/2" W x 47-5/8" H (368 x 1 210)	Standard Performance 53-1/2" W x 65-1/2" H (1 359 x 1 664)	29-1/2" W x 47-1/2" H (749 x 1 207)	95-1/2" W x 65-1/2" H (2 426 x 1 664)	44-1/2" W x 47-1/2" H (1 130 x 1 207)	107-1/2" W x 65-1/2" H (2 731 x 1 664)
30" LOWER SASH	14-1/2" W x 59-5/8" H (368 x 1 514)	Standard Performance 53-1/2" W x 65-1/2" H (1 359 x 1 664)	29-1/2" W x 59-1/2" H (749 x 1 511)	95-1/2" W x 65-1/2" H (2 426 x 1 664)	44-1/2" W x 59-1/2" H (1 130 x 1 511)	107-1/2" W x 65-1/2" H (2 731 x 1 664)

General Notes:

- Rough Opening–Frame Dimension + 1/2"
- Keep frame dimensions to the nearest 1/8" increment
- Maximum frame area = 48 ft<sup>2</sup>
- 2-Wide and 3-Wide units are composites with multiple windows in one frame with integral mullions

Equal Sash Glass Ratio	Cottage Glass Ratio	Contemporary Glass Ratio	24" Lower Sash	30" Lower Sash
50 : 50	40 : 60	60 : 40	Matches 48" Equal Sash Rough Opening (47.5" Frame Height)	Matches 60" Equal Sash Rough Opening (59.5" Frame Height)



SINGLE-HUNG

MISCELLANEOUS FORMULAS



Miscellaneous Formulas

	Actual Glass Width	Actual Glass Height	Visible Glass Width	Visible Glass Height
SINGLE UNIT	Equal Sash	$(AUGH \text{ or } ALGH = FH - 5) / 2$	AGW - 1"	AGH - 1"
	Cottage Sash	Lower Actual Glass Height = $(FH - 5) \times .6$ Upper Actual Glass Height = $(FH - 5) \times .4$		
	Contemporary	AUGW=FW - 3.25 ALGW=FW - 5.25 Lower Actual Glass Height = $(FH - 5) \times .4$ Upper Actual Glass Height = $(FH - 5) \times .6$		
	24" Lower Sash	Lower Actual Glass Height = $(47.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		
	30" Lower Sash	Lower AGH = $(59.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		
2-WIDE	Equal Sash	$(FH - 5) / 2$	AGW - 1"	AGH - 1"
	Cottage Sash	Lower Actual Glass Height = $(FH - 5) \times .6$ Upper Actual Glass Height = $(FH - 5) \times .4$		
	Contemporary	AUGW=(FW/2) - 3.25 ALGW=(FW/2) - 5.25 Lower Actual Glass Height = $(FH - 5) \times .4$ Upper Actual Glass Height = $(FH - 5) \times .6$		
	24" Lower Sash	Lower Actual Glass Height = $(47.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		
	30" Lower Sash	Lower Actual Glass Height = $(59.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		
3-WIDE EQUAL	Equal Sash	$(FH - 5) / 2$	AGW - 1"	AGH - 1"
	Cottage Sash	Lower Actual Glass Height = $(FH - 5) \times .6$ Upper Actual Glass Height = $(FH - 5) \times .4$		
	Contemporary	AUGW=(FW/3) - 3.25 ALGW=(FW/3) - 5.25 Lower Actual Glass Height = $(FH - 5) \times .4$ Upper Actual Glass Height = $(FH - 5) \times .6$		
	24" Lower Sash	Lower Actual Glass Height = $(47.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		
	30" Lower Sash	Lower Actual Glass Height = $(59.5 - 5) / 2$ Upper Actual Glass Height = $(FH - 5) - ALGH$		

Clear Opening Formulas

	COW	COH Equal Sash	COH Cottage Sash	COH Contemporary Sash	COH 24" Lower Sash	COH 30" Lower Sash
CLEAR OPENING WITH CAM LOCK	Frame Width - 4.25	$(FH / 2) - 5.536$	FH - ALGH - 8.036	FH - AUGH - 7.547	18.1875	24.1875
CLEAR OPENING WITH AUTO LOCK		$(FH / 2) - 5.536$	FH - ALGH - 8.036	FH - AUGH - 7.547	18.1875	24.1875

Clear Opening Area (ft<sup>2</sup>) =  $(COW \times COH) / 144$   
 Frame Area (ft<sup>2</sup>) =  $(\text{Frame Width} \times \text{Frame Height}) / 144$

**KEY:**  
 AGW = Actual Glass Width  
 AGH = Actual Glass Height  
 ALGH = Actual Lower Glass Height  
 AUGH = Actual Upper Glass Height  
 FW = Frame Width

FH = Frame Height  
 VGW = Visible Glass Width  
 VGH = Visible Glass Height  
 COW = Clear opening width  
 COH = Clear opening height



SINGLE-HUNG

SIZE TABLES

Equal Sash  
Single Units



1 Wide Vent	(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)
Opening	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"	4' 6"
Frame	23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"	53 1/2"
(814) (902)									
(865) (953)									
(1 067) (1 054)									
(1 168) (1 156)									
(1 219) (1 207)									
(1 321) (1 308)									
(1 372) (1 359)									
(1 524) (1 511)									
(1 575) (1 562)									
(1 676) (1 664)									
(1 823) (1 816)									
(1 981) (1 969)									

Egress Notes:

Check all applicable local codes for emergency egress requirements.

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft<sup>2</sup>.

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.

See Design Data pages in this section for clear opening dimensions.

Not to scale.



SINGLE-HUNG

SIZE TABLES

Equal Sash

2-Wide Composites with Integral Mullion



2 Wide Vent		(1 219)	(1 422)	(1 524)	(1 626)	(1 829)	(1 930)	(2 134)	(2 438)	
		(1 207)	(1 410)	(1 511)	(1 613)	(1 816)	(1 918)	(2 121)	(2 426)	
Opening		4' 0"	4' 8"	5' 0"	5' 4"	6' 0"	6' 4"	7' 0"	8' 0"	
	Frame	47 1/2"	55 1/2"	59 1/2"	63 1/2"	71 1/2"	75 1/2"	83 1/2"	95 1/2"	
(914) (902)	3' 0"	35 1/2"	4-0/3-0	4-8/3-0	5-0/3-0	5-4/3-0	6-0/3-0	6-4/3-0	7-0/3-0	8-0/3-0
(965) (953)	3' 2"	37 1/2"	4-0/3-2	4-8/3-2	5-0/3-2	5-4/3-2	6-0/3-2	6-4/3-2	7-0/3-2	8-0/3-2
(1 067) (1 054)	3' 6"	41 1/2"	4-0/3-6	4-8/3-6	5-0/3-6	5-4/3-6	6-0/3-6	6-4/3-6	7-0/3-6	8-0/3-6
(1 1168) (1 1156)	3' 10"	45 1/2"	4-0/3-10	4-8/3-10	5-0/3-10	5-4/3-10	6-0/3-10	6-4/3-10	7-0/3-10	8-0/3-10
(1 219) (1 207)	4' 0"	47 1/2"	4-0/4-0	4-8/4-0	5-0/4-0	5-4/4-0	6-0/4-0	6-4/4-0	7-0/4-0	8-0/4-0
(1 321) (1 308)	4' 4"	51 1/2"	4-0/4-4	4-8/4-4	5-0/4-4	5-4/4-4	6-0/4-4	6-4/4-4	7-0/4-4	8-0/4-4
(1 372) (1 359)	4' 6"	53 1/2"	4-0/4-6	4-8/4-6	5-0/4-6	5-4/4-6	6-0/4-6	6-4/4-6	7-0/4-6	8-0/4-6
(1 524) (1 511)	5' 0"	59 1/2"	4-0/5-0	4-8/5-0	5-0/5-0	5-4/5-0	6-0/5-0	6-4/5-0	7-0/5-0	8-0/5-0
(1 575) (1 562)	5' 2"	61 1/2"	4-0/5-2	4-8/5-2	5-0/5-2	5-4/5-2	6-0/5-2	6-4/5-2	7-0/5-2	8-0/5-2
(1 676) (1 664)	5' 6"	65 1/2"	4-0/5-6	4-8/5-6	5-0/5-6	5-4/5-6	6-0/5-6	6-4/5-6	7-0/5-6	8-0/5-6
(1 829) (1 816)	6' 0"	71 1/2"	4-0/6-0	4-8/6-0	5-0/6-0	5-4/6-0	6-0/6-0	6-4/6-0	7-0/6-0	8-0/6-0
(1 981) (1 969)	6' 6"	77 1/2"	4-0/6-6	4-8/6-6	5-0/6-6	5-4/6-6	6-0/6-6	6-4/6-6	7-0/6-6	

Egress Notes:

Check all applicable local codes for emergency egress requirements.

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

See Design Data pages in this section for clear opening dimensions.



SINGLE-HUNG

SIZE TABLES

Equal Sash

3-Wide Composites with Integral Mullion



3 Wide Vent		(1 829) (1 816)	(2 134) (2 121)	(2 286) (2 273)	(2 438) (2 426)	(2 743) (2 731)	
Opening	6' 0"	7' 0"	7' 6"	8' 0"	9' 0"		
Frame	71 1/2"	83 1/2"	89 1/2"	95 1/2"	107 1/2"		
(914) (902)	3' 0"	35 1/2"					
(965) (953)	3' 2"	37 1/2"					
(1 067) (1 054)	3' 6"	41 1/2"					
(1 168) (1 156)	3' 10"	45 1/2"					
(1 219) (1 207)	4' 0"	47 1/2"					
(1 321) (1 308)	4' 4"	51 1/2"					
(1 372) (1 359)	4' 6"	53 1/2"					
(1 524) (1 511)	5' 0"	59 1/2"					E <sub>1</sub>
(1 575) (1 562)	5' 2"	61 1/2"					E <sub>1</sub>
(1 676) (1 664)	5' 6"	65 1/2"				E <sub>1</sub>	
(1 829) (1 816)	6' 0"	71 1/2"			E <sub>1</sub>	E <sub>1</sub>	
(1 981) (1 969)	6' 6"	77 1/2"		E <sub>1</sub>	E <sub>1</sub>		

Egress Notes:

Check all applicable local codes for emergency egress requirements.

E<sub>1</sub> = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.

See Design Data pages in this section for clear opening dimensions.



SINGLE-HUNG

## SIZE TABLES

### Cottage Sash

### Single Units



#### 1 Wide Cottage Vent

	(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)		
Opening	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"	4' 6"		
Frame	23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"	53 1/2"		
(914) (902)	3' 0"	35 1/2"									
(965) (953)	3' 2"	37 1/2"									
(1 067) (1 054)	3' 6"	41 1/2"									
(1 168) (1 156)	3' 10"	45 1/2"									
(1 219) (1 207)	4' 0"	47 1/2"									
(1 321) (1 308)	4' 4"	51 1/2"									
(1 372) (1 359)	4' 6"	53 1/2"									
(1 524) (1 511)	5' 0"	59 1/2"									
(1 575) (1 562)	5' 2"	61 1/2"									
(1 676) (1 664)	5' 6"	65 1/2"									

**Egress Notes:**

Check all applicable local codes for emergency egress requirements.

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft<sup>2</sup>.

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.

Autolock hardware is not compatible with Maximum opening hardware.

See Design Data pages in this section for clear opening dimensions.

Not to scale.



SINGLE-HUNG

## SIZE TABLES

### Contemporary Sash

### Single Units



#### 1 Wide Contemporary Vent

	(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)
Opening	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"	4' 6"
Frame	23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"	53 1/2"
(914) (902)	2-0/3-0	2-4/3-0	2-6/3-0	2-8/3-0	3-0/3-0	3-2/3-0	3-6/3-0	4-0/3-0	4-6/3-0
(965) (953)	2-0/3-2	2-4/3-2	2-6/3-2	2-8/3-2	3-0/3-2	3-2/3-2	3-6/3-2	4-0/3-2	4-6/3-2
(1 067) (1 054)	2-0/3-6	2-4/3-6	2-6/3-6	2-8/3-6	3-0/3-6	3-2/3-6	3-6/3-6	4-0/3-6	4-6/3-6
(1 1168) (1 1156)	2-0/3-10	2-4/3-10	2-6/3-10	2-8/3-10	3-0/3-10	3-2/3-10	3-6/3-10	4-0/3-10	4-6/3-10
(1 219) (1 207)	2-0/4-0	2-4/4-0	2-6/4-0	2-8/4-0	3-0/4-0	3-2/4-0	3-6/4-0	4-0/4-0	4-6/4-0
(1 321) (1 308)	2-0/4-4	2-4/4-4	2-6/4-4	2-8/4-4	3-0/4-4	3-2/4-4	3-6/4-4	4-0/4-4	4-6/4-4
(1 372) (1 359)	2-0/4-6	2-4/4-6	2-6/4-6	2-8/4-6	3-0/4-6	3-2/4-6	3-6/4-6	4-0/4-6	4-6/4-6
(1 524) (1 511)	2-0/5-0	2-4/5-0	2-6/5-0	2-8/5-0	3-0/5-0	3-2/5-0	3-6/5-0	4-0/5-0	4-6/5-0
(1 575) (1 562)	2-0/5-2	2-4/5-2	2-6/5-2	2-8/5-2	3-0/5-2	3-2/5-2	3-6/5-2	4-0/5-2	4-6/5-2
(1 676) (1 664)	2-0/5-6	2-4/5-6	2-6/5-6	2-8/5-6	3-0/5-6	3-2/5-6	3-6/5-6	4-0/5-6	4-6/5-6

Not to scale.



SINGLE-HUNG

## SIZE TABLES

### Contemporary Sash

### Single Units



#### 1 Wide Contemporary Vent

	(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)
Opening	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"
Frame	23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"
(1 829) (1 816)  (1 981) (1 969)  (2 134) (2 121)	6' 0"							
	6' 6"							
	7' 0"							
	71 1/2"	77 1/2"	83 1/2"					

#### Egress Notes:

Check all applicable local codes for emergency egress requirements.

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft<sup>2</sup>.

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.

Autolock hardware is not compatible with Maximum opening hardware.

See Design Data pages in this section for clear opening dimensions.

Not to scale.





SINGLE-HUNG

**SIZE TABLES**  
24" Lower Sash  
Single Units



1 Wide Vent

	(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)
Opening	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"	4' 6"
Frame	23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"	53 1/2"
(1 219) (1 207) 4' 0"	24" (Lower Sash) 2-0/4-0	24" (Lower Sash) 2-4/4-0	24" (Lower Sash) 2-6/4-0	24" (Lower Sash) 2-8/4-0	24" (Lower Sash) 3-0/4-0	24" (Lower Sash) 3-2/4-0	24" (Lower Sash) 3-6/4-0	24" (Lower Sash) 4-0/4-0	24" (Lower Sash) 4-6/4-0
(1 321) (1 308) 4' 4"	24" (Lower Sash) 2-0/4-4	24" (Lower Sash) 2-4/4-4	24" (Lower Sash) 2-6/4-4	24" (Lower Sash) 2-8/4-4	24" (Lower Sash) 3-0/4-4	24" (Lower Sash) 3-2/4-4	24" (Lower Sash) 3-6/4-4	24" (Lower Sash) 4-0/4-4	24" (Lower Sash) 4-6/4-4
(1 372) (1 359) 4' 6"	24" (Lower Sash) 2-0/4-6	24" (Lower Sash) 2-4/4-6	24" (Lower Sash) 2-6/4-6	24" (Lower Sash) 2-8/4-6	24" (Lower Sash) 3-0/4-6	24" (Lower Sash) 3-2/4-6	24" (Lower Sash) 3-6/4-6	24" (Lower Sash) 4-0/4-6	24" (Lower Sash) 4-6/4-6
(1 524) (1 511) 5' 0"	24" (Lower Sash) 2-0/5-0	24" (Lower Sash) 2-4/5-0	24" (Lower Sash) 2-6/5-0	24" (Lower Sash) 2-8/5-0	24" (Lower Sash) 3-0/5-0	24" (Lower Sash) 3-2/5-0	24" (Lower Sash) 3-6/5-0	24" (Lower Sash) 4-0/5-0	24" (Lower Sash) 4-6/5-0
(1 575) (1 562) 5' 2"	24" (Lower Sash) 2-0/5-2	24" (Lower Sash) 2-4/5-2	24" (Lower Sash) 2-6/5-2	24" (Lower Sash) 2-8/5-2	24" (Lower Sash) 3-0/5-2	24" (Lower Sash) 3-2/5-2	24" (Lower Sash) 3-6/5-2	24" (Lower Sash) 4-0/5-2	24" (Lower Sash) 4-6/5-2
(1 676) (1 664) 5' 6"	24" (Lower Sash) 2-0/5-6	24" (Lower Sash) 2-4/5-6	24" (Lower Sash) 2-6/5-6	24" (Lower Sash) 2-8/5-6	24" (Lower Sash) 3-0/5-6	24" (Lower Sash) 3-2/5-6	24" (Lower Sash) 3-6/5-6	24" (Lower Sash) 4-0/5-6	24" (Lower Sash) 4-6/5-6
(1 829) (1 816) 6' 0"	24" (Lower Sash) 2-0/6-0	24" (Lower Sash) 2-4/6-0	24" (Lower Sash) 2-6/6-0	24" (Lower Sash) 2-8/6-0	24" (Lower Sash) 3-0/6-0	24" (Lower Sash) 3-2/6-0	24" (Lower Sash) 3-6/6-0	24" (Lower Sash) 4-0/6-0	
(1 981) (1 969) 6' 6"	24" (Lower Sash) 2-0/6-6	24" (Lower Sash) 2-4/6-6	24" (Lower Sash) 2-6/6-6	24" (Lower Sash) 2-8/6-6	24" (Lower Sash) 3-0/6-6	24" (Lower Sash) 3-2/6-6	24" (Lower Sash) 3-6/6-6	24" (Lower Sash) 4-0/6-6	
(2 134) (2 121) 7' 0"	24" (Lower Sash) 2-0/7-0	24" (Lower Sash) 2-4/7-0	24" (Lower Sash) 2-6/7-0	24" (Lower Sash) 2-8/7-0	24" (Lower Sash) 3-0/7-0	24" (Lower Sash) 3-2/7-0	24" (Lower Sash) 3-6/7-0	24" (Lower Sash) 4-0/7-0	

Not to scale.



SINGLE-HUNG

**SIZE TABLES**  
30" Lower Sash  
Single Units



1 Wide Vent

		(610) (597)	(710) (699)	(762) (749)	(813) (800)	(914) (902)	(965) (953)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)
Opening		2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	3' 2"	3' 6"	4' 0"	4' 6"
Frame		23 1/2"	27 1/2"	29 1/2"	31 1/2"	35 1/2"	37 1/2"	41 1/2"	47 1/2"	53 1/2"
(1 524) (1 511)  (1 575) (1 562)  (1 676) (1 664)  (1 829) (1 816)  (1 981) (1 969)  (2 134) (2 121)	59 1/2"									
	61 1/2"									
	65 1/2"									
	71 1/2"									
	77 1/2"									
	83 1/2"									

Not to scale.