

Flow Method: Hole Added from House to Zone

Start Press		Ending Pressure After Making Hole to from House to Zone																						Uncertainty based on 1 Pa Errors																				
H/Z																																												
Z/O	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0																					
50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10%																			
49	1		0.35	0.29	0.25	0.22	0.20	0.18	0.17	0.15	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.09	15%																			
48	2		0.68	0.54	0.45	0.39	0.35	0.32	0.29	0.27	0.25	0.23	0.22	0.21	0.20	0.19	0.18	0.17	0.17	0.16	0.15	0.15	0.14	0.14	20%																			
47	3			0.84	0.68	0.58	0.51	0.45	0.41	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.20	0.20	0.19	25%																			
46	4			1.23	0.96	0.80	0.68	0.60	0.54	0.49	0.45	0.42	0.39	0.37	0.35	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25	0.24	>26%																			
45	5				1.30	1.05	0.89	0.77	0.68	0.62	0.56	0.52	0.48	0.45	0.43	0.40	0.38	0.37	0.35	0.33	0.32	0.31	0.30	0.29																				
44	6				1.76	1.36	1.12	0.96	0.84	0.75	0.68	0.63	0.58	0.54	0.51	0.48	0.45	0.43	0.41	0.39	0.38	0.36	0.35	0.34																				
43	7					1.76	1.41	1.18	1.02	0.90	0.81	0.74	0.68	0.63	0.59	0.56	0.53	0.50	0.48	0.45	0.43	0.42	0.40	0.39																				
42	8						2.28	1.76	1.44	1.23	1.08	0.96	0.87	0.80	0.73	0.68	0.64	0.60	0.57	0.54	0.52	0.49	0.47	0.44																				
41	9							2.20	1.76	1.47	1.27	1.12	1.01	0.92	0.84	0.78	0.73	0.68	0.65	0.61	0.58	0.55	0.53	0.51	0.49																			
40	10								2.80	2.15	1.76	1.49	1.30	1.16	1.05	0.96	0.89	0.82	0.77	0.72	0.68	0.65	0.62	0.59	0.54																			
39	11									2.65	2.11	1.76	1.51	1.33	1.20	1.09	1.00	0.92	0.86	0.81	0.76	0.72	0.68	0.65	0.60																			
38	12									3.32	2.54	2.07	1.76	1.53	1.36	1.23	1.12	1.03	0.96	0.90	0.84	0.80	0.75	0.72	0.68	0.65																		
37	13									3.09	2.45	2.04	1.76	1.55	1.38	1.26	1.15	1.07	0.99	0.93	0.87	0.83	0.79	0.75	0.71																			
36	14									3.83	2.93	2.38	2.02	1.76	1.56	1.41	1.28	1.18	1.09	1.02	0.96	0.90	0.86	0.81	0.78																			
35	15									3.54	2.80	2.33	2.00	1.76	1.57	1.42	1.30	1.21	1.12	1.05	0.99	0.93	0.89	0.84																				
34	16									4.35	3.32	2.70	2.28	1.98	1.76	1.58	1.44	1.33	1.23	1.15	1.08	1.01	0.96	0.91																				
33	17										3.98	3.14	2.61	2.24	1.97	1.76	1.59	1.46	1.34	1.25	1.17	1.10	1.04	0.98																				
32	18										4.86	3.70	3.01	2.54	2.20	1.95	1.76	1.60	1.47	1.36	1.27	1.19	1.12	1.06																				
31	19											4.42	3.49	2.89	2.48	2.18	1.94	1.76	1.61	1.48	1.38	1.29	1.21	1.14																				
30	20											5.38	4.09	3.32	2.80	2.43	2.15	1.93	1.76	1.61	1.49	1.39	1.30	1.23																				
29	21											4.86	3.83	3.18	2.72	2.38	2.13	1.92	1.76	1.62	1.50	1.41	1.32																					
28	22											5.89	4.48	3.63	3.06	2.65	2.34	2.11	1.91	1.76	1.63	1.51	1.42																					
27	23	Attic Example (House in Winter Mode)												5.30	4.18	3.46	2.96	2.59	2.31	2.09	1.91	1.76	1.63	1.52																				
26	24	Attic Access Closed with Hose Running to Blower Door												6.41	4.86	3.94	3.32	2.87	2.54	2.28	2.07	1.90	1.76	1.64																				
25	25	Measure House CFM 50 (example: 2400 CFM50)												5.75	4.52	3.74	3.20	2.80	2.49	2.25	2.06	1.89	1.76																					
24	26	Measure House to Attic Pressure (Verify with Attic to Outside)												6.92	5.25	4.25	3.57	3.09	2.73	2.45	2.23	2.04	1.89																					
23	27	(example: 36 PA House to Attic)													6.19	4.86	4.02	3.44	3.01	2.68	2.42	2.20	2.03																					
22	28										7.43	5.64	4.55	3.83	3.32	2.93	2.63	2.38	2.18																									
21	29	Make Opening From House to Attic																	6.63	5.21	4.30	3.67	3.21	2.86	2.58	2.35																		
20	30	(enough for at least 6 PA Change)																		7.95	6.02	4.86	4.09	3.54	3.12	2.80	2.54																	
19	31	Measure House CFM 50 (example: 3000 CFM50)																			7.07	5.55	4.58	3.91	3.42	3.04	2.74																	
18	32	Measure House to Attic Pressure (Verify with Attic to Outside)																			8.46	6.41	5.17	4.35	3.76	3.32	2.97																	
17	33	(example: 20PA House to Attic)																				7.51	5.89	4.86	4.15	3.63	3.23																	
16	34																			8.98	6.79	5.48	4.61	3.98	3.51																			
15	35	Take 2nd Blower Door Reading (3000) - First Blower Reading (2400) = 600																		7.95	6.24	5.14	4.39	3.83																				
14	36	Look in Row with 36 H/Z and move over to Column with 20 H/Z to Find Multiplier = 1.56																		9.49	7.18	5.79	4.86	4.20																				
13	37	Take 600 X 1.56 = 936																			8.39	6.58	5.42	4.63																				
12	38	(This is Maximum CFM50 REDUCTION AVAILABLE by sealing all holes to Attic)																				10.00	7.56	6.10	5.12																			
11	39	To Determine Uncertainty Range multiply Answer by percentage in Uncertainty Table																					8.83	6.92	5.71																			
10	40	To Determine Approximate Hole Size Divide Answer by 10 (936 / 10= 94 sq in)																						10.52	7.95	6.41																		
9	41	To Determine Uncertainty Range multiply Answer by percentage in Uncertainty Table																																						9.27	7.26			
8	42	To Determine Approximate Hole Size Divide Answer by 10 (936 / 10= 94 sq in)																																							11.03	8.33		
7	43	To Determine Uncertainty Range multiply Answer by percentage in Uncertainty Table																																								9.71		
6	44	To Determine Approximate Hole Size Divide Answer by 10 (936 / 10= 94 sq in)																																									11.54	

Before Hole

CFM50

H/Z

After Hole

CFM50

H/Z

ANSWER

CFM50 Diff

Multiplier

Maximum Reduction

(total path CFM50)

ext exponent =0.65
May 25, 2006

Flow Method: Hole Added from Zone to Outside

Start Press		Ending Pressure After Making Hole from Zone to Outside																				Uncertainty based on 1 Pa Errors													
H/Z	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46		48	50											
Z/O	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4		2	0											
0	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10%										
1	49		0.35	0.29	0.25	0.22	0.20	0.18	0.17	0.15	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.09	15%										
2	48		0.68	0.54	0.45	0.39	0.35	0.32	0.29	0.27	0.25	0.23	0.22	0.21	0.20	0.19	0.18	0.17	0.17	0.16	0.15	0.15	0.15	0.14	20%										
3	47			0.84	0.68	0.58	0.51	0.45	0.41	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.20	0.20	0.19	25%										
4	46				1.23	0.96	0.80	0.68	0.60	0.54	0.49	0.45	0.42	0.39	0.37	0.35	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25	0.24	>26%									
5	45					1.30	1.05	0.89	0.77	0.68	0.62	0.56	0.52	0.48	0.45	0.43	0.40	0.38	0.37	0.35	0.33	0.32	0.31	0.30	0.29										
6	44						1.76	1.36	1.12	0.96	0.84	0.75	0.68	0.63	0.58	0.54	0.51	0.48	0.45	0.43	0.41	0.39	0.38	0.36	0.35	0.34									
7	43							1.76	1.41	1.18	1.02	0.90	0.81	0.74	0.68	0.63	0.59	0.56	0.53	0.50	0.48	0.45	0.43	0.42	0.40	0.39									
8	42								2.28	1.76	1.44	1.23	1.08	0.96	0.87	0.80	0.73	0.68	0.64	0.60	0.57	0.54	0.52	0.49	0.47	0.45	0.44								
9	41									2.20	1.76	1.47	1.27	1.12	1.01	0.92	0.84	0.78	0.73	0.68	0.65	0.61	0.58	0.55	0.53	0.51	0.49								
10	40										2.80	2.15	1.76	1.49	1.30	1.16	1.05	0.96	0.89	0.82	0.77	0.72	0.68	0.65	0.62	0.59	0.56	0.54							
11	39											2.65	2.11	1.76	1.51	1.33	1.20	1.09	1.00	0.92	0.86	0.81	0.76	0.72	0.68	0.65	0.62	0.60							
12	38												3.32	2.54	2.07	1.76	1.53	1.36	1.23	1.12	1.03	0.96	0.90	0.84	0.80	0.75	0.72	0.68	0.65						
13	37													3.09	2.45	2.04	1.76	1.55	1.38	1.26	1.15	1.07	0.99	0.93	0.87	0.83	0.79	0.75	0.71						
14	36														3.83	2.93	2.38	2.02	1.76	1.56	1.41	1.28	1.18	1.09	1.02	0.96	0.90	0.86	0.81	0.78					
15	35															3.54	2.80	2.33	2.00	1.76	1.57	1.42	1.30	1.21	1.12	1.05	0.99	0.93	0.89	0.84					
16	34																4.35	3.32	2.70	2.28	1.98	1.76	1.58	1.44	1.33	1.23	1.15	1.08	1.01	0.96	0.91				
17	33																		3.98	3.14	2.61	2.24	1.97	1.76	1.59	1.46	1.34	1.25	1.17	1.10	1.04	0.98			
18	32																			4.86	3.70	3.01	2.54	2.20	1.95	1.76	1.60	1.47	1.36	1.27	1.19	1.12	1.06		
19	31																				4.42	3.49	2.89	2.48	2.18	1.94	1.76	1.61	1.48	1.38	1.29	1.21	1.14		
20	30																					5.38	4.09	3.32	2.80	2.43	2.15	1.93	1.76	1.61	1.49	1.39	1.30	1.23	
21	29	Crawlspace Example (House in Winter Mode)											4.86	3.83	3.18	2.72	2.38	2.13	1.92	1.76	1.62	1.50	1.41	1.32											
22	28	Crawlspace Closed with Hose Running to Blower Door											5.89	4.48	3.63	3.06	2.65	2.34	2.11	1.91	1.76	1.63	1.51	1.42											
23	27	Measure House CFM 50 (example: 2800 CFM50)												5.30	4.18	3.46	2.96	2.59	2.31	2.09	1.91	1.76	1.63	1.52											
24	26	Measure House to Crawlspace Pressure													6.41	4.86	3.94	3.32	2.87	2.54	2.28	2.07	1.90	1.76	1.64										
25	25	(Verify with Crawlspace to Outside)														5.75	4.52	3.74	3.20	2.80	2.49	2.25	2.06	1.89	1.76										
26	24	(example: 14 PA House to Crawlspace)															6.92	5.25	4.25	3.57	3.09	2.73	2.45	2.23	2.04	1.89									
27	23	Make Opening From Crawlspace to Outside																6.19	4.86	4.02	3.44	3.01	2.68	2.42	2.20	2.03									
28	22	(enough for at least 6 PA Change)																	7.43	5.64	4.55	3.83	3.32	2.93	2.63	2.38	2.18								
29	21	Measure House CFM 50 (example: 3600 CFM50)																		6.63	5.21	4.30	3.67	3.21	2.86	2.58	2.35								
30	20	Measure House to Crawlspace Pressure																			7.95	6.02	4.86	4.09	3.54	3.12	2.80	2.54							
31	19	(Verify with Crawlspace to Outside)																				7.07	5.55	4.58	3.91	3.42	3.04	2.74							
32	18	(example: 38 PA House to Crawlspace)																					8.46	6.41	5.17	4.35	3.76	3.32	2.97						
33	17																							7.51	5.89	4.86	4.15	3.63	3.23						
34	16																								8.98	6.79	5.48	4.61	3.98	3.51					
35	15																									7.95	6.24	5.14	4.39	3.83					
36	14	Take 2nd Blower Door Reading (3600) - First Blower Reading (2800) = 800																								9.49	7.18	5.79	4.86	4.20					
37	13	Look in Row with 14 H/Z and move over to Column with 38 H/Z to Find Multiplier=1.09																									8.39	6.58	5.42	4.63					
38	12	Take 800 X 1.09 = 872																										10.00	7.56	6.10	5.12				
39	11	(This is Maximum CFM50 REDUCTION AVAILABLE by sealing all holes from house to crawlspace)																											8.83	6.92	5.71				
40	10																												10.52	7.95	6.41				
41	9																													9.27	7.26				
42	8	To Determine Uncertainty Range multiply Answer by percentage in Uncertainty Table																													11.03	8.33			
43	7	To Determine Approximate Hole Size Divide Answer by 10 (872 / 10 = 87 sq in)																															9.71		
44	6																																11.54		

Before Hole

CFM50

H/Z

After Hole

CFM50

H/Z

ANSWER

CFM50 Diff

Multiplier

Maximum Reduction

(total path CFM50)

ext exponent =0.65
May 25, 2006

OPEN A DOOR (ZONE PRESSURE - SERIES LEAKAGE DIAGNOSTICS)

FOR OPENING THE DOOR FROM GARAGE TO OUTSIDE

All Doors to Garage Closed (House in winter mode)

Get Blower Door to -50PA WRT Outside

- A Measure House CFM 50 for Door Closed
- B Measure Closed Door Zonal Pressure House WRT Garage
(If Closed Door Zonal Pressure greater than 25PA you should use other side of this Sheet)

Open Door from Garage to Outside

Get Blower Door Back to -50PA WRT Outside

- C Measure House CFM 50 for Door Open
Measure Zonal Pressure House WRT Garage (Should be 50)

- D CFM 50 Difference = CFM 50 Door Open - CFM 50 Door Closed

Look up Closed Door Zonal Pressure for House WRT Garage on Table

Enter Multipliers into labeled Multiplier Boxes Below

Multiply CFM 50 Difference (D) x Multiplier in each row for results

Divide CFM 50 by 10 in each row To Determine Approx. Square inches of Leakage

B	A	C	D
Closed Door Pressure House WRT Garage	CFM 50 Door Closed	CFM 50 Door Open	CFM 50 Difference (C-A)

Leakage from Garage to House

(D) CFM 50 Difference	Multiplier	CFM 50	Square Inches
	x (int)		

Leakage from Garage to Outside

(D) CFM 50 Difference	Multiplier	CFM 50	Square Inches
	x (ext)		

Total Path Leakage

(D) CFM 50 Difference	Multiplier	Maximum CFM 50 Reduction Available
	x (path)	

Open Garage Door to Outside				
closed pressure		multiply CFM50 change by...		
H/G	G/O	int	ext	path
2	48	1.14	0.14	0.14
3	47	1.19	0.20	0.19
4	46	1.24	0.25	0.24
5	45	1.29	0.31	0.29
6	44	1.34	0.37	0.34
7	43	1.39	0.43	0.39
8	42	1.44	0.49	0.44
9	41	1.49	0.56	0.49
10	40	1.54	0.63	0.54
11	39	1.60	0.70	0.60
12	38	1.65	0.78	0.65
13	37	1.71	0.87	0.71
14	36	1.78	0.96	0.78
15	35	1.84	1.06	0.84
16	34	1.91	1.17	0.91
17	33	1.98	1.29	0.98
18	32	2.06	1.42	1.06
19	31	2.14	1.56	1.14
20	30	2.23	1.71	1.23
21	29	2.32	1.88	1.32
22	28	2.42	2.07	1.42
23	27	2.52	2.27	1.52
24	26	2.64	2.50	1.64
25	25	2.76	2.76	1.76
below here you should probably use other side of card				
26	24	2.89	3.04	1.89
27	23	3.03	3.36	2.03
28	22	3.18	3.73	2.18
29	21	3.35	4.14	2.35
30	20	3.54	4.61	2.54
31	19	3.74	5.15	2.74
32	18	3.97	5.77	2.97
33	17	4.23	6.50	3.23
34	16	4.51	7.36	3.51
35	15	4.83	8.38	3.83

Garage is leakier to the house than it is to the outdoors.

OPEN A DOOR (ZONE PRESSURE - SERIES LEAKAGE DIAGNOSTICS)

FOR OPENING THE DOOR FROM GARAGE TO HOUSE

All Doors to Garage Closed (House in winter mode)

Get Blower Door to -50PA WRT Outside

- A Measure House CFM 50 for Door Closed
- B Measure Closed Door Zonal Pressure House WRT Garage
(If Closed Door Zonal Pressure less than 25PA you should use other side of this Sheet)

Open Door from Garage to House

Get Blower Door Back to -50PA WRT Outside

- C Measure House CFM 50 for Door Open
Measure Zonal Pressure House WRT Garage (Should be 0)

- D CFM 50 Difference = CFM 50 Door Open - CFM 50 Door Closed

Look up Closed Door Zonal Pressure for House WRT Garage on Table

Enter Multipliers into labeled Multiplier Boxes Below

Multiply CFM 50 Difference (D) x Multiplier in each row for results

Divide CFM 50 by 10 in each row To Determine Approx. Square inches of Leakage

B	A	C	D
Closed Door Pressure House WRT Garage	CFM 50 Door Closed	CFM 50 Door Open	CFM 50 Difference (C-A)

Leakage from Garage to House

(D) CFM 50 Difference	Multiplier	CFM 50	Square Inches
	x (int)		

Leakage from Garage to Outside

(D) CFM 50 Difference	Multiplier	CFM 50	Square Inches
	x (ext)		

Total Path Leakage

(D) CFM 50 Difference	Multiplier	Maximum CFM 50 Reduction Available
	x (path)	

Open House Door to Garage					
Check G/O	closed pressure		multiply CFM50 change by...		
	H/G	G/O	int	ext	path
48	2	0.14	1.14	0.14	
47	3	0.20	1.19	0.19	
46	4	0.25	1.24	0.24	
45	5	0.31	1.29	0.29	
44	6	0.37	1.34	0.34	
43	7	0.43	1.39	0.39	
42	8	0.49	1.44	0.44	
41	9	0.56	1.49	0.49	
40	10	0.63	1.54	0.54	
39	11	0.70	1.60	0.60	
38	12	0.78	1.65	0.65	
37	13	0.87	1.71	0.71	
36	14	0.96	1.78	0.78	
35	15	1.06	1.84	0.84	
34	16	1.17	1.91	0.91	
33	17	1.29	1.98	0.98	
32	18	1.42	2.06	1.06	
31	19	1.56	2.14	1.14	
30	20	1.71	2.23	1.23	
29	21	1.88	2.32	1.32	
28	22	2.07	2.42	1.42	
27	23	2.27	2.52	1.52	
26	24	2.50	2.64	1.64	
25	25	2.76	2.76	1.76	
below here you should probably use other side of card					
24	26	3.04	2.89	1.89	
23	27	3.36	3.03	2.03	
22	28	3.73	3.18	2.18	
21	29	4.14	3.35	2.35	
20	30	4.61	3.54	2.54	
19	31	5.15	3.74	2.74	
18	32	5.77	3.97	2.97	
17	33	6.50	4.23	3.23	
16	34	7.36	4.51	3.51	
15	35	8.38	4.83	3.83	

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