



Cycle-Master™ Tough Rubber Doors

Estimated Air Infiltration on the Cycle-Master Door

File: Product Design\Engineering Calculations\air-infiltration.xls

Formula;

$$V = 58 * (p * d^5 / WL)^{0.5}$$

Represents an Input cell

Where;

V = Air infiltration in cubic feet per minute (CFM)
 p = Pressure differential in pounds per square inch (psi)
 d = Inside diameter of pipe in inches (an equivalent area of leakage is substituted)
 W = weight of one cubic foot of air, 0.08073 lbs.
 L = Length of orifice in inches (3.8 in. assumed)

A = pi * r²
 For 1 sq.in. Area, r = 0.564 inches
 Therefore, for 1 sq.in. Area, d = 1.128 inches
 Reference Machinery Handbook, 22nd edition, page 2320
 velocity of air at 0.14 psi = 134 ft/sec

Area of Leakage;

Full floor seal assumed, close limit set properly
 Continuous gap across header 0.125 inches
 Continuous gap between right hand guide and curtain 0.03125 inches
 Continuous gap between left hand guide and curtain 0.03125 inches

Opening Width of Door 192 inches
 Opening Height of Door 168 inches

Estimated Leakage Area of Perimeter

Header	24	sq.in.
Right Hand Guide	5.25	sq.in.
Left Hand Guide	5.25	sq.in.
Total	34.5	sq.in.

Area of Opening: 32256 Square inches
 Area of Leakage: 34.5 Square inches

Percent seal: 99.89%

Estimated Air-infiltration per square inch	10	CFM
Estimated Total Air-infiltration	359	CFM

Pressure differential (P) 0.15 inches w/g
 Pressure differential (P) 0.005 psi

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WINDLOAD / PRESSURE CONVERSIONS

File: pressure conversion.xls

Wind Velocity MPH	Wind Velocity Km/h	Pressure					
		lbs. per sq. ft.	in. W/G	bar	Pascals	Kpascals	Kg/sq. metre
10	16	0.26	0.05	0.0001	12	0.012	1.2
20	32	1.02	0.20	0.0005	49	0.049	5.0
30	48	2.30	0.44	0.0011	110	0.110	11.2
40	64	4.10	0.79	0.0020	196	0.196	20.0
50	80	6.40	1.23	0.0031	306	0.306	31.2
60	97	9.22	1.77	0.0044	441	0.441	45.0
70	113	12.54	2.41	0.0060	600	0.600	61.2
80	129	16.38	3.15	0.0078	784	0.784	80.0
90	145	20.74	3.99	0.0099	993	0.993	101.2
100	161	25.60	4.92	0.0123	1225	1.225	125.0
110	177	30.98	5.96	0.0148	1483	1.483	151.2
120	193	36.86	7.09	0.0177	1765	1.765	180.0
130	209	43.26	8.32	0.0207	2071	2.071	211.2
140	225	50.18	9.65	0.0240	2402	2.402	245.0
150	241	57.60	11.08	0.0276	2757	2.757	281.2
160	257	65.54	12.60	0.0314	3137	3.137	319.9
170	274	73.98	14.23	0.0354	3542	3.542	361.2
180	290	82.94	15.95	0.0397	3971	3.971	404.9
190	306	92.42	17.77	0.0443	4424	4.424	451.2
200	322	102.40	19.69	0.0490	4902	4.902	499.9

Custom Conversion

88	142	19.82	3.81	0.0095	949	0.949	96.8
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← Enter a MPH windload value here

Conversion Formulas

- 1 lb/sq.ft. = 0.00256 x mph x mph
- 1 mph = 1.609 km/h
- 1 in. W/G = 5.2 lbs/sq.ft.
- 1 Kpa = 20.89 lb/sq.ft.
- 1 Kpa = 1000 pascals



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