Gravity Ventilation

COOK

GRAVITY VENTILATION

Gravity Vents

Page

INTRODUCTION

LOREN COOK COMPANY Gravity Ventilation units are designed for industrial and commercial applications requiring building ventilation, either natural or mechanical. All units are produced in an ISO 9001 certified facility.

GI / GR

GI / GR

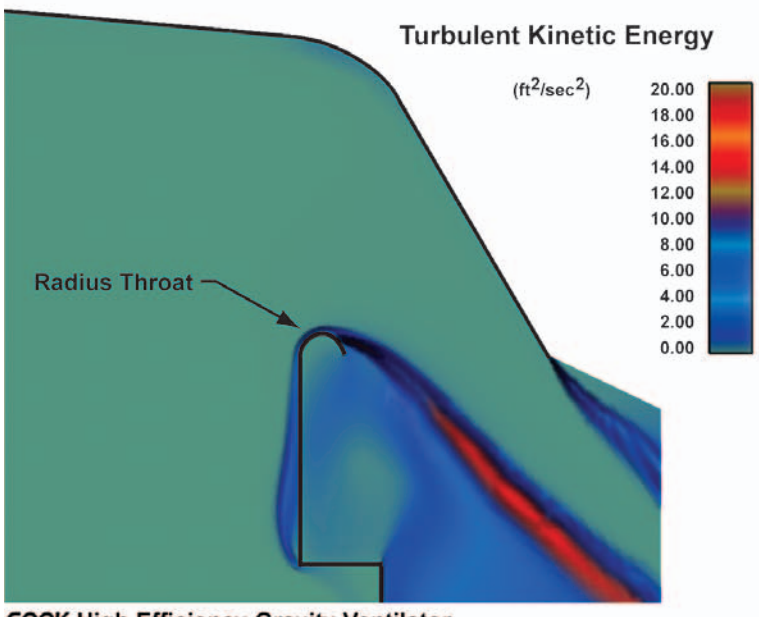
- GI and GR are high efficiency gravity roof ventilators designed using the latest Computational Fluid Dynamic (CFD) and Finite Element Analysis (FEA) software packages.
- GI and GR bases are manufactured with a rounded flange around the throat that decreases pressure losses due to turbulence. (See CFD Models Below)
- GI and GR units are available with throats in widths from 12” to 72” and unlimited length starting at 12”.
- GI and GR units come standard with integral lifting lugs.
- Tie down points are standard to allow for additional restraints to be added in the field as required.
- Rain gutters are standard to help eliminate rain infiltration.
- Roll formed hood panels provide excellent strength characteristics as well as creating a unit that is architecturally pleasing.
- GI and GR units are designed to exceed 30 lbs./ft^2 snowload rating.
- Hinged hoods are standard on GR units with less than a 73” throat length and GI units with less than a 61” throat length.

Designed with the latest in computer aided engineering software.

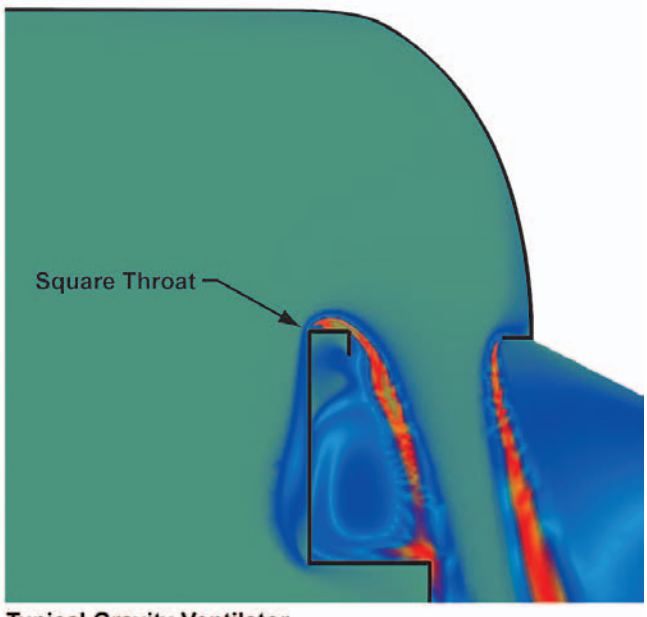
The new **COOK** GI and GR Gravity Ventilators were designed using the latest Computational Fluid Dynamics (CFD) and Finite Element Analysis (FEA) software. This allowed our engineers to optimize the geometry of the throat and hood to reduce pressure losses and increase efficiency, while maintaining structural integrity. Once the design was optimized, physical prototypes verified the performance and durability of the design. **The result is the most efficient Gravity Ventilator in the industry.**

CFD Simulation

Comparing COOK High Efficiency gravity relief ventilator with typical gravity relief ventilator.



COOK High Efficiency Gravity Ventilator



Typical Gravity Ventilator

The figures above depict the relative turbulence of each unit and illustrate the improved airflow achieved by the new **COOK** design. As can be seen in the figures, the radius throat design significantly reduces turbulence as compared to the typical square throat design.

PR

PR

- PR is a spun aluminum intake/relief ventilator designed for use in both gravity and mechanical ventilation systems.
- PR is compact, durable and efficient.
- PR bases are manufactured with a fully developed inlet to provide the most efficient and weather resistant path for both supply and exhaust applications.
- PR units are available in 9 sizes from 8 to 48 inches.

TR

TR

- TR is a spun aluminum ventilator designed for use in both gravity and mechanical ventilation systems.
- TR units provide an increased intake area by utilizing two spun aluminum tiers and therefore, provide lower intake velocities reducing the introduction of airborne particles or moisture into the building.
- TR bases are manufactured with a fully developed base venturi to provide the most efficient and weather resistant path.
- TR units are available in 9 sizes from 8 to 48 inches.

TRE

TRE

- TRE is a tiered aluminum intake/relief ventilator designed to be one of the most flexible designs on the market.
- TRE units can be tailored specifically to meet most building exhaust and intake applications.
- The tiers are constructed of high quality extruded aluminum and provide for clean lines that can meet the requirements for even the most demanding architectural applications.
- TRE units are available with throat dimensions from 12” x 12” to 60” x 120”.

LSUG

LSUG

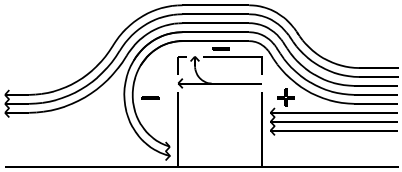
- LSUG is a low silhouette, gravity relief, upblast ventilator designed for use on vertical high velocity exhaust systems.
- LSUG units include damper doors and a high volume rain gutter to prevent water infiltration.
- LSUG units are available in 7 sizes from 24 to 60 inches.

GRAVITY VENTILATION

Gravity Ventilation (also known as natural ventilation) requires no powered ventilators to achieve air movement. It is most useful in buildings with open floor plans requiring no air conditioning, and where the primary motive for ventilation is heat removal or contaminant dilution. Gravity ventilation is achieved by strategically placing openings in the building to take advantage of prevailing winds and thermal buoyancy or stack effect.

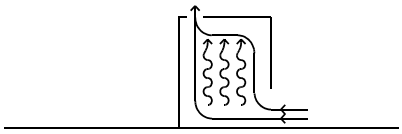
Wind Pressure

Wind moving past a building creates areas of high and low pressure. The windward side of the building is an area of high pressure and the leeward side and roof are areas of low pressure. Placing openings in both high and low pressure areas of the building envelope causes air movement through the building.



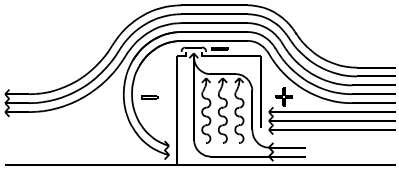
Thermal Buoyancy (Stack Effect)

Heat generated from within buildings rises to the upper part of the structure. In buildings where the structure is of significant height, this natural tendency of warm air to rise (known as thermal buoyancy or stack effect) can generate air movement in the building. By placing openings in both the highest and lowest levels of the building, hot air is allowed to rise out of the building and pull cooler air into the lower level of the building.



Placement of Openings

In order to take advantage of both wind pressure and stack effect, gravity ventilators are generally used in conjunction with doors and windows to ventilate the structure. Gravity ventilators are placed on the roof, being the highest part of the structure, to provide for exhaust of building air. Windows and doors at lower elevations provide the intake portals of the gravity ventilation system.



Gravity Ventilator Selection and Sizing

Gravity ventilators should be selected for appropriate architectural style, weather resistance, construction, and cost. When designing a gravity ventilation system it is important to allow ample intake area. The total area of doors, windows, and dampers used as intake points should be equal to or greater than the total throat area of the gravity ventilators selected. This will allow the gravity ventilators to operate as designed.

To determine the proper size and number of gravity ventilators, it is first necessary to calculate the amount of airflow required for the building.

Two of the most common parameters used to determine the required airflow in a gravity ventilation system are heat removal and contaminant dilution.

Designing For Heat Removal

Heat Load (from sunlight, lights, motors, people etc.) HL= ☐ (A) $\left(\frac{BTU}{HR}\right)$

Indoor Temperature T_i = ☐ (B) °F

Outdoor Temperature T_o = ☐ (C) °F

Temperature Difference (It is important to realize that the indoor temperature cannot be lowered below the outdoor temperature without tempering the air.) $T_i - T_o$ = ☐ (D) °F

Air Flowrate $= \frac{HL}{1.10X(T_i - T_o)} = \frac{\square\ (A)}{1.10 \quad \square\ (D)} =$ ☐ (1) CFM

Designing For Dilution Of Contaminants

Building Volume BV = ☐ (E) CFM

Air Change Frequency (Typical values for common contaminants can be found in the ***LOREN COOK*** Engineering Cookbook.) ACF = ☐ (F) MIN./CHANGE

Air Flowrate $= \frac{BV}{ACF} = \frac{\square\ (E)}{\square\ (F)} =$ ☐ (1)

Once the required air volume is known, the locations of gravity ventilators and intake openings need to be determined. It is wise to disperse gravity ventilators over the roof surface to provide even ventilation. If all intake openings are located on one side of the building, typically the gravity ventilators would be located on the opposite side of the building to provide a sweeping effect across the space.

Determining Size of Gravity Ventilators Required

1. Required Airflow (From heat removal or contaminate dilution on previous page.) Q= [ ] (1) CFM

2. Wind Velocity (Due to the fact that most wind velocity data is taken at 33 feet above ground level and that wind velocity decreases closer to the ground and with any disruption, design wind velocity should be less than meteorological data would suggest. Half of the average wind velocity is a good design value.) V= [ ] (2) MPH

3. Height Of Gravity Ventilator Above Neutral Pressure Level (The height above neutral pressure level can be assumed to be the distance above the centerline elevation of the largest opening in the side wall, usually an overhead door. If the side wall openings are evenly spaced along the height of the side wall, the height above neutral pressure level would be half the building height.) H= [ ] (3) FT

4. Indoor Dry Bulb Temperature To Be Maintained T_i = [ ] (4) °F

5. Outdoor Dry Bulb Temperature T_o = [ ] (5) °F

6. Difference Between Indoor and Outdoor Temperature $T_i - T_o$ = [ ] (6) °F

7. Gravity Ventilator Throat Velocity (TV)

$$TV = \sqrt{1936V^2 + \frac{57960H\,(T_i - T_o)}{(T_i + 460)}} = \sqrt{1936 \times (2)[\ ]^2 + \frac{57960 \times (3)[\ ] \times (6)[\ ]}{((4)[\ ] + 460)}} = [\ ]\,(7)\ \frac{FT}{MIN}$$

8. Total Gravity Ventilator Throat Area (A) $A = \frac{Q}{TV} = \frac{(1)[\ ]}{(7)[\ ]} = [\ ]\,(8)$ SQ FT

9. Determine The Number of Ventilators That Is Required To Evenly Disperse The Airflow N = [ ] (9)

10. The Throat Area For Each Gravity Roof Unit $\text{Throat Area} = \frac{A}{N} = \frac{(8)[\ ]}{(9)[\ ]} = [\ ]$ SQ FT

Example

156,000 BTU/Hr Heat Load
90×F Indoor Dry Bulb Temperature
80×F Outdoor Dry Bulb Temperature

15 ft Roof Elevation
10 ft Overhead Door (Primary Intake)

7 Gravity Ventilators
5 MPH Wind Velocity

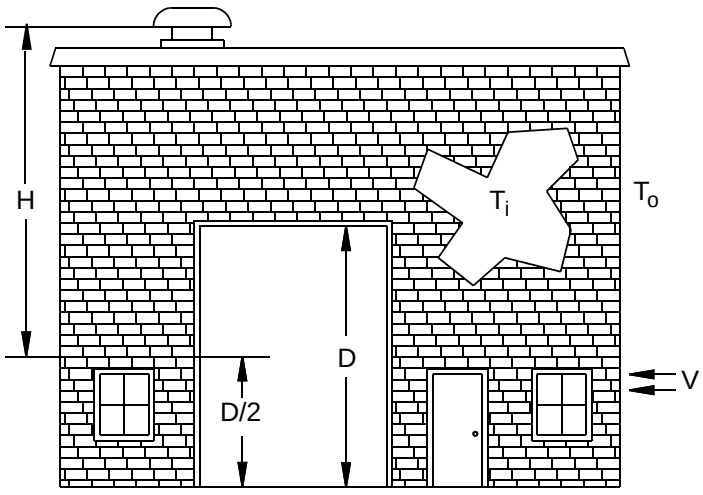
$$CFM = \frac{\frac{156,000\ BTU}{HR}}{1.10X(90-80)} = 14,181\ CFM$$

$$A = \frac{Q}{TV} = \frac{14181}{242.8} = 58.4\ SQ\ FT$$

$$TV = \sqrt{1936X\left(5^2 + \frac{57960X((15-5)X(90-80))}{90+460}\right)} = 242.8$$ FT PER MIN

$$\text{Throat Area} = \frac{A}{N} = \frac{58.4}{7} = 8.34\ SQ\ FT$$

Select (7) **LOREN COOK** Model GR 30 x 42 (8.75 ft^2 throat area).

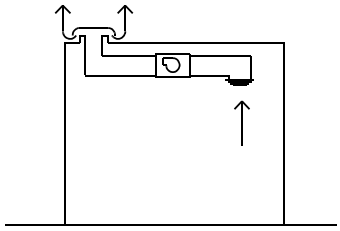


Aspect Ratio

Note that many selections are possible which will have an equivalent throat area. When making a decision on throat size, keep in mind that selections with an aspect ratio of 3:1 or less will perform the best. Aspect ratio is the ratio of the throat length to the throat width. (Example: 30 x 42 has an aspect ratio of 1.4:1 which is well below the 3:1 maximum.)

MECHANICAL VENTILATION

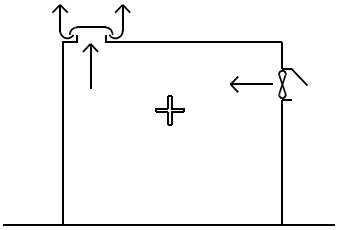
When selecting gravity ventilators for mechanical ventilation systems power ventilators will be forcing air in or out of the building through the gravity ventilators. The power ventilator may be directly connected to the gravity ventilator via ductwork or the building may constitute a plenum, the air induced to move through the gravity ventilator merely by the pressure differential created between the interior of the building and the ambient atmosphere.



Ducted Relief

Ducted Relief

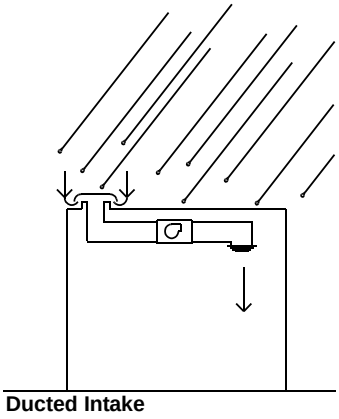
This application is the most simple of all gravity ventilator applications. The ventilators are selected based on the air volume and acceptable pressure drop along with any physical limitations which may affect the dimensions of the product.



Non-Ducted Relief

Non-Ducted Relief

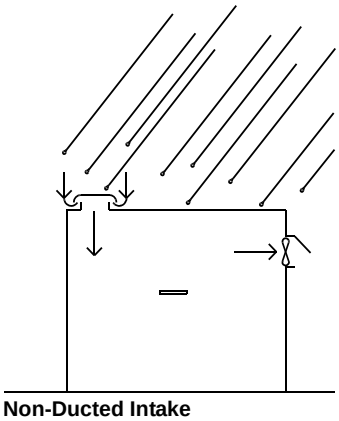
Non-ducted relief gravity ventilator applications are very similar to ducted relief applications with the exception that the pressure drop of the ventilator should be kept to a minimum. The building will be pressurized to approximately the selected pressure drop of the gravity ventilator. Selecting the ventilator for pressure drops in excess of 1/8” wg will result in problems with exit doors standing open and unwanted infiltration into any adjacent conditioned areas.



Ducted Intake

Ducted Intake

Ducted intake applications are similar to ducted relief with the additional consideration of intake velocity. Moisture carryover begins to occur at approximately 500 FPM intake velocity and gravity ventilator selections should, therefore, be kept below that threshold unless moisture containment measures are added to the system.

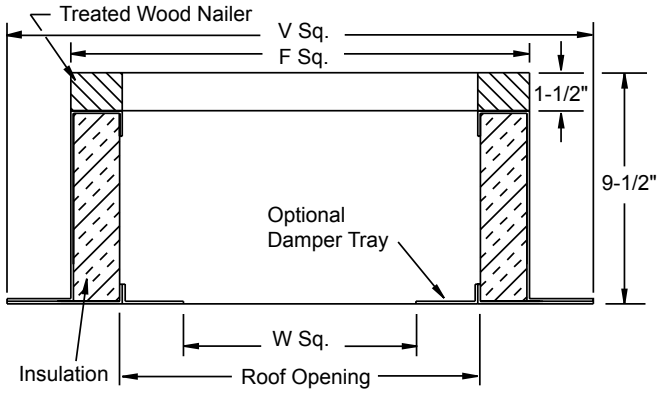


Non-Ducted Intake

Non-Ducted Intake

Although the 500 FPM intake velocity will usually limit the intake static pressure, the designer should double-check gravity ventilator pressure drop to ensure that it does not exceed 1/8” wg. If the negative pressure is excessive, it can result in difficulty opening exit doors and dangerous slamming of already open doors.

Curbs



Curb Construction Features

- Minimum 18 gauge galvanized steel (RCG) or .080 aluminum (RCA).
- 1-1/2", 3 lbs. density thermal and acoustical insulation.
- Continuously welded corners.
- Wood nailer.

Options

- Damper tray.
- No wood nailer (deduct 1-1/2" from height).
- 13-1/2" tall construction.
- 3" cant (add 4" to V Sq. dimension).

GI / GR / TRE Curb Sizing - The curb size for a unit is found by adding 4" to each dimension of the throat size. For a 24 x 30 GI, the appropriate galvanized curb would be a RCG 28 x 34. Additional information can be found in **LOREN COOK** submittals.

PR/TR/LSUG Curb Dimension Data

PR/ TR	LSUG	Catalog Number		F Sq.	V Sq.	W Sq.	Roof Opening
		Galv.	Alum.				
8	-	RCG-16	RCA-16	16-1/2	20-1/2	9-3/4	13-1/2
12	-	RCG-18	RCA-18	18-1/2	22-1/2	11-3/4	15-1/2
16	-	RCG-26	RCA-26	26-1/2	30-1/2	19-3/4	23-1/2
20	-	RCG-30	RCA-30	30-1/2	34-1/2	23-3/4	27-1/2
24	24	RCG-34	RCA-34	34-1/2	38-1/2	27-3/4	31-1/2
30	30	RCG-40	RCA-40	40-1/2	44-1/2	33-3/4	37-1/2
36	36	RCG-46	RCA-46	46-1/2	50-1/2	39-3/4	43-1/2
42	42	RCG-52	RCA-52	52-1/2	56-1/2	45-3/4	49-1/2
48	48	RCG-58	RCA-58	58-1/2	62-1/2	51-3/4	55-1/2
-	54	RCG-54	RCA-54	64-1/2	66-1/2	57-1/4	61-1/2
-	60	RCG-70	RCA-50	70-1/2	74-1/2	63-3/4	67-1/2

All dimensions in inches. When motor operated damper is used, a wood nailer is required. Sound curbs available for most sizes. Contact factory for dimensions.

Additional Accessories

- Aluminum Bird Screen
- 2" Washable Filters
- Hinged Base
- Magnetic Latches (LSUG)
- Discharge Guard (LSUG)
- Insect Screen
- Galvanized Construction (GI/GR)

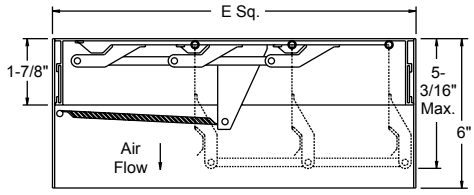
Available Coatings

- **LORENIZED**® - Standard on LSUG
- Epoxy
- Anti-condensate

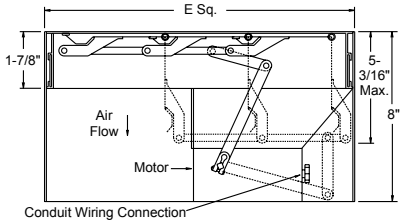
Dampers

Gravity dampers feature an extruded aluminum frame, aluminum blades and aluminum hinge pins with nylon bushings. Motorized dampers feature an extruded aluminum frame, aluminum blades and aluminum hinge pins with nylon bushings. Motors are shipped loose for field installation on motorized backdraft dampers (BDM). Motors are shipped installed on motorized intake backdraft dampers (BDMI). Available voltages include 115V, 220V and 440V.

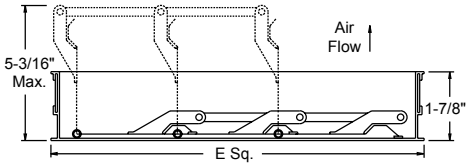
Intake Backdraft Damper



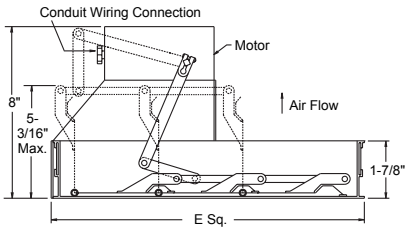
Motorized Intake Backdraft Damper



Gravity Backdraft Damper



Motorized Backdraft Damper



GI / GR Backdraft Damper Sizing - The length and width of the backdraft damper is 1/4" smaller than the length and width of the throat. The damper is designed to fit on the optional damper tray in the curb.

TRE Backdraft Damper Sizing - The length and width of the backdraft damper is 1-1/2" larger than the length and width of the TRE throat for dampers to be mounted in TRE unit. The damper is sized to fit on the integral damper tray located in the throat of the unit. The length and width of the backdraft damper is 1/4" smaller than the length and width of the throat for dampers to be curb mounted. On TRE Intake units with less than 4 tiers, TRE Relief units with less than 3 tiers, or TRE Intake units with 2" filters, a Backdraft Damper must be installed in a curb with tray. Dampers mounted in TRE for "knocked down" units require special consideration, consult factory.

PR/TR	Catalog Number				E Sq.
	BDI*	BDMI**	BD***	BDM$^{\Delta}$	
8	BDI-12	BDMI-12	BD-12	BDM-12	11-3/4
12	BDI-14	BDMI-14	BD-14	BDM-14	13-3/4
16	BDI-22	BDMI-22	BD-22	BDM-22	21-3/4
20	BDI-26	BDMI-26	BD-26	BDM-26	25-3/4
24	BDI-30	BDMI-30	BD-30	BDM-30	29-3/4
30	BDI-36	BDMI-36	BD-36	BDM-36	35-3/4
36	BDI-42	BDMI-42	BD-42	BDM-42	41-3/4
42	BDI-48	BDMI-48	BD-48	BDM-48	47-3/4
48	BDI-54	BDMI-54	BD-54	BDM-54	53-3/4

All dimensions in inches.

*BDI - Maximum operating temperature is 200° F (95° C).

**BDMI - Motors are available in 110V, 220V, or 440V, single phase. BDMI-36 and larger use two motors. Maximum operating temperature is 130° F (50° C). Wood nailer must be supplied on 9-1/2" tall curb.

***BD - Maximum operating temperature is 200° F (95° C). BD-36 to BD-66 are shipped as two panels. BD-78 is shipped as three panels.

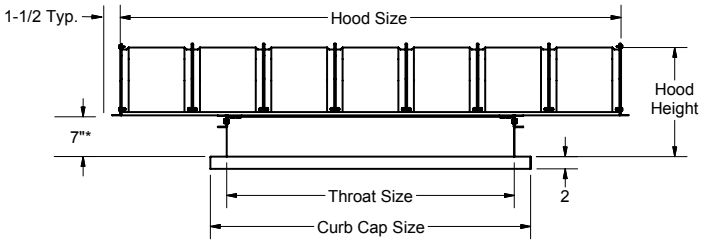
$^{\Delta}$BDM - Maximum operating temperature is 130° F (50° C). Wood nailer must be supplied on 9-1/2" tall curb. Motors are available in 110V, 220V, or 440V, single phase. BDM-36 and larger use two motors.

Gravity Ventilator

Description - Unit shall be a hooded high efficiency roof mounted gravity ventilator.

Construction - The unit shall be of bolted and welded construction utilizing corrosion resistant fasteners. The hood shall be constructed of minimum 18 gauge aluminum, bolted to a minimum 8 gauge aluminum support structure. A radius throat must be provided for optimum performance. Lifting lugs shall be provided to help prevent damage from improper lifting. A rain gutter shall be provided to prevent rain infiltration. The base shall have continuously welded curb cap corners for maximum leak protection. Birdscreen constructed of 1/2" galvanized mesh shall be mounted in the hood. Unit shall bear an engraved aluminum nameplate and shall be shipped in ISTA Certified Transit Tested Packaging.

Product - Units shall be model GI and GR as manufactured by Loren Cook Company of Springfield, Missouri.



*NOTE: Units with a throat width of 24" or less have a 4" standard throat height.

Intake Hood Velocity Notes

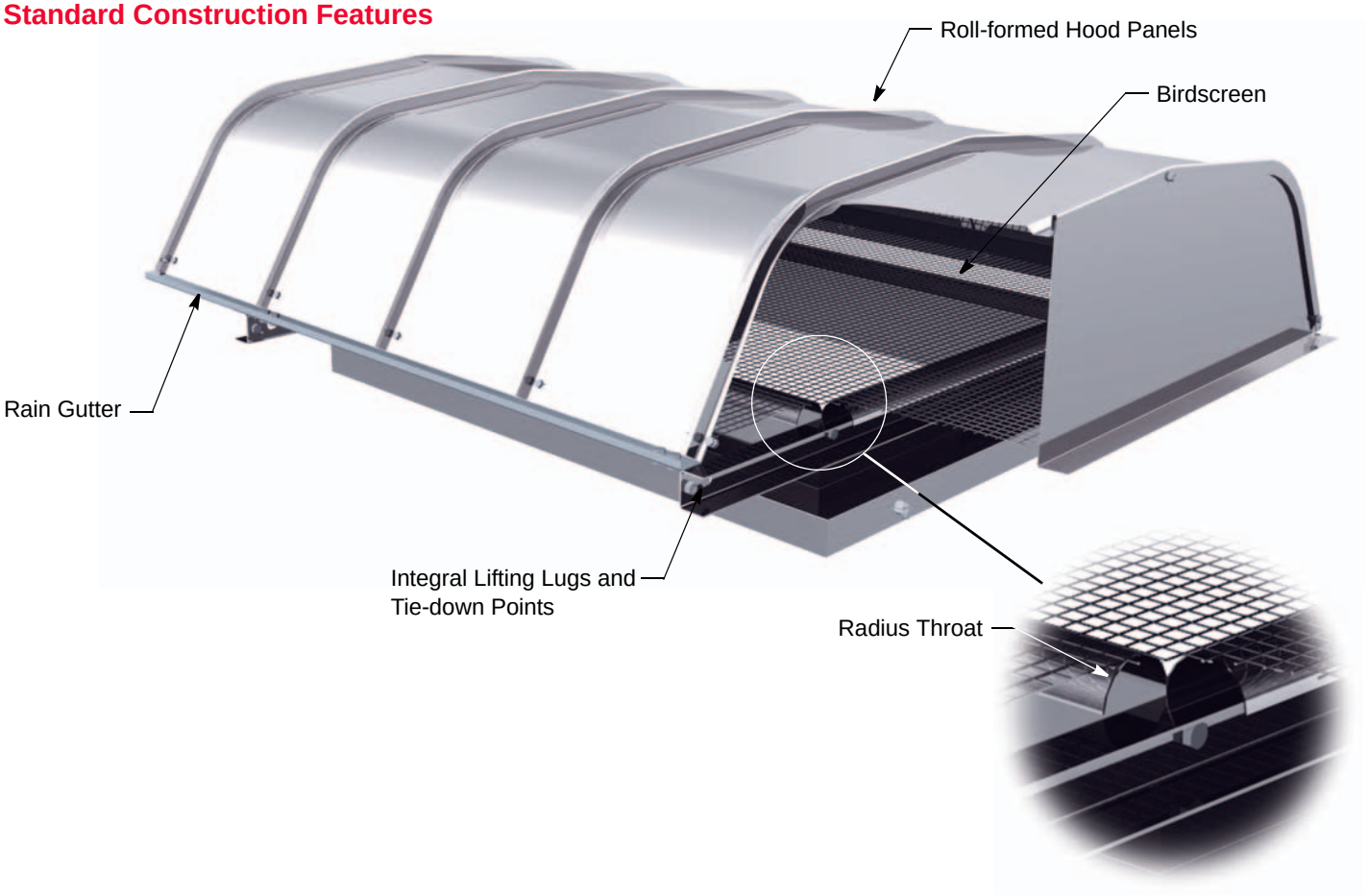
Velocity to 500 FPM - Velocity below 500 FPM provides for a level of protection against the influx of airborne mist or debris.

Velocity 500 FPM to 1000 FPM - Within this velocity range there is a possibility that fine, airborne mist will be carried into the building through the vent. Care should be taken in the location of the unit if airborne mist is a problem.

Velocity Greater Than 1000 FPM - Velocity in this range is not recommended unless special means are taken to prevent the influx of airborne matter and large droplets of moisture into the interior of the building.

Velocities shown are to be used as a guide only. Final application and conditions will be a governing factor.

Standard Construction Features



GI - Intake Performance Data

Throat Size (In.)	Hood Size (In.)	Curb Cap Size (In.)	Hood Height (In.)	Ducted / Non-Ducted				Static Pressure Drop									
								0.017	0.028	0.040	0.056	0.073	0.093	0.115	0.140	0.167	0.196
								0.044	0.063	0.085	0.110	0.139	0.170	0.205	0.243	0.284	0.328
				Throat Area	Hood Area	Shipping Wt. Galv. (lbs.)	Shipping Wt. Alum. (lbs.)	Hood Velocity									
								200	250	300	350	400	450	500	550	600	650
								CFM									
12 x 12	28 x 24	17.5 x 17.5	11	1.00	3.67	118	92	600	750	900	1050	1200	1350	1500	1650	1800	1950
12 x 18	28 x 36	17.5 x 23.5	11	1.50	5.50	143	110	900	1125	1350	1575	1800	2025	2250	2475	2700	2925
12 x 24	28 x 36	17.5 x 29.5	11	2.00	5.00	147	112	800	1000	1200	1400	1600	1800	2000	2200	2400	2600
12 x 30	29 x 48	17.5 x 35.5	12	2.50	7.17	173	131	1100	1375	1650	1925	2200	2475	2750	3025	3300	3575
12 x 36	29 x 48	17.5 x 41.5	12	3.00	6.67	182	136	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900
12 x 42	30 x 60	17.5 x 47.5	12	3.50	9.00	204	152	1383	1729	2075	2421	2767	3113	3458	3804	4150	4496
12 x 48	30 x 60	17.5 x 53.5	12	4.00	8.50	218	160	1617	2021	2425	2829	3233	3638	4042	4446	4850	5254
16 x 16	28 x 36	21.5 x 21.5	11	1.78	5.22	149	114	944	1181	1417	1653	1889	2125	2361	2597	2833	3069
16 x 18	29 x 36	21.5 x 23.5	12	2.00	5.25	134	98	900	1125	1350	1575	1800	2025	2250	2475	2700	2925
16 x 24	32 x 36	21.5 x 29.5	12	2.67	5.33	169	126	1067	1333	1600	1867	2133	2400	2667	2933	3200	3467
16 x 30	30 x 48	21.5 x 35.5	13	3.33	6.67	192	142	1333	1667	2000	2333	2667	3000	3333	3667	4000	4333
16 x 36	36 x 48	21.5 x 41.5	14	4.00	8.00	210	152	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200
16 x 42	34 x 60	21.5 x 47.5	14	4.67	9.50	233	169	1900	2375	2850	3325	3800	4275	4750	5225	5700	6175
16 x 48	38 x 60	21.5 x 53.5	14	5.33	10.50	248	177	2100	2625	3150	3675	4200	4725	5250	5775	6300	6825
16 x 54	36 x 72	21.5 x 59.5	15	6.00	12.00	277	195	2400	3000	3600	4200	4800	5400	6000	6600	7200	7800
16 x 60	40 x 72	21.5 x 65.5	15	6.67	13.33	293	204	2667	3333	4000	4667	5333	6000	6667	7333	8000	8667
16 x 66	38 x 84	21.5 x 71.5	15	7.33	14.83	321	222	2967	3708	4450	5192	5933	6675	7417	8158	8900	9642
18 x 18	29 x 36	23.5 x 23.5	12	2.25	5.00	160	121	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250
18 x 24	36 x 36	23.5 x 29.5	13	3.00	6.00	179	132	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900
18 x 30	34 x 48	23.5 x 35.5	14	3.75	7.58	204	149	1517	1896	2275	2654	3033	3413	3792	4171	4550	4929
18 x 36	41 x 48	23.5 x 41.5	14	4.50	9.17	225	161	1833	2292	2750	3208	3667	4125	4583	5042	5500	5958
18 x 42	38 x 60	23.5 x 47.5	15	5.25	10.58	248	177	2117	2646	3175	3704	4233	4763	5292	5821	6350	6879
18 x 48	43 x 60	23.5 x 53.5	15	6.00	11.92	263	186	2383	2979	3575	4171	4767	5363	5958	6554	7150	7746
18 x 54	41 x 72	23.5 x 59.5	15	6.75	13.75	296	206	2750	3438	4125	4813	5500	6188	6875	7563	8250	8938
18 x 60	45 x 72	23.5 x 65.5	16	7.50	15.00	313	215	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750
18 x 66	42 x 84	23.5 x 71.5	16	8.25	16.25	336	230	3250	4063	4875	5688	6500	7313	8125	8938	9750	10563
18 x 72	46 x 84	23.5 x 77.5	16	9.00	17.83	354	240	3567	4458	5350	6242	7133	8025	8917	9808	10700	11592
18 x 78	44 x 96	23.5 x 83.5	16	9.75	19.58	440	312	3917	4896	5875	6854	7833	8813	9792	10771	11750	12729
24 x 24	48 x 36	29.5 x 29.5	14	4.00	8.00	213	153	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200
24 x 30	45 x 48	29.5 x 35.5	15	5.00	10.00	238	170	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
24 x 36	43 x 60	29.5 x 41.5	16	6.00	11.92	263	186	2383	2979	3575	4171	4767	5363	5958	6554	7150	7746
24 x 42	50 x 60	29.5 x 47.5	17	7.00	13.83	287	200	2767	3458	4150	4842	5533	6225	6917	7608	8300	8992
24 x 48	48 x 72	29.5 x 53.5	17	8.00	16.00	324	222	3200	4000	4800	5600	6400	7200	8000	8800	9600	10400
24 x 54	54 x 72	29.5 x 59.5	18	9.00	18.00	364	251	3600	4500	5400	6300	7200	8100	9000	9900	10800	11700
24 x 60	51 x 84	29.5 x 65.5	18	10.00	19.75	375	251	3950	4938	5925	6913	7900	8888	9875	10863	11850	12838
24 x 66	57 x 84	29.5 x 71.5	18	11.00	22.25	418	282	4450	5563	6675	7788	8900	10013	11125	12238	13350	14463
24 x 72	54 x 96	29.5 x 77.5	19	12.00	24.00	443	300	4800	6000	7200	8400	9600	10800	12000	13200	14400	15600
24 x 78	59 x 96	29.5 x 83.5	19	13.00	26.33	464	311	5267	6583	7900	9217	10533	11850	13167	14483	15800	17117
24 x 84	56 x 108	29.5 x 89.5	19	14.00	28.00	495	331	5600	7000	8400	9800	11200	12600	14000	15400	16800	18200
24 x 90	60 x 108	29.5 x 95.5	19	15.00	30.00	514	339	6000	7500	9000	10500	12000	13500	15000	16500	18000	19500
30 x 30	56 x 48	35.5 x 35.5	20	6.25	12.42	294	208	2483	3104	3725	4346	4967	5588	6208	6829	7450	8071
30 x 36	54 x 60	35.5 x 41.5	21	7.50	15.00	327	230	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750
30 x 42	53 x 72	35.5 x 47.5	21	8.75	17.75	373	256	3550	4438	5325	6213	7100	7988	8875	9763	10650	11538
30 x 48	60 x 72	35.5 x 53.5	22	10.00	20.00	400	270	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
30 x 54	58 x 84	35.5 x 59.5	23	11.25	22.58	438	294	4517	5646	6775	7904	9033	10163	11292	12421	13550	14679
30 x 60	64 x 84	35.5 x 65.5	23	12.50	24.83	466	309	4967	6208	7450	8692	9933	11175	12417	13658	14900	16142
30 x 66	62 x 96	35.5 x 71.5	24	13.75	27.58	497	330	5517	6896	8275	9654	11033	12413	13792	15171	16550	17929
30 x 72	68 x 96	35.5 x 77.5	24	15.00	30.33	524	343	6067	7583	9100	10617	12133	13650	15167	16683	18200	19717
30 x 78	65 x 108	35.5 x 83.5	25	16.25	32.50	559	364	6500	8125	9750	11375	13000	14625	16250	17875	19500	21125
30 x 84	70 x 108	35.5 x 89.5	25	17.50	35.00	610	403	7000	8750	10500	12250	14000	15750	17500	19250	21000	22750
30 x 90	68 x 120	35.5 x 95.5	25	18.75	37.92	638	421	7583	9479	11375	13271	15167	17063	18958	20854	22750	24646
36 x 36	65 x 60	41.5 x 41.5	22	9.00	18.08	366	252	3617	4521	5425	6329	7233	8138	9042	9946	10850	11754
36 x 42	63 x 72	41.5 x 47.5	23	10.50	21.00	414	279	4200	5250	6300	7350	8400	9450	10500	11550	12600	13650
36 x 48	62 x 84	41.5 x 53.5	24	12.00	24.17	458	305	4833	6042	7250	8458	9667	10875	12083	13292	14500	15708
36 x 54	69 x 84	41.5 x 59.5	24	13.50	26.75	491	323	5350	6688	8025	9363	10700	12038	13375	14713	16050	17388
36 x 60	68 x 96	41.5 x 65.5	25	15.00	30.33	549	368	6067	7583	9100	10617	12133	13650	15167	16683	18200	19717
36 x 66	74 x 96	41.5 x 71.5	26	16.50	32.83	582	386	6567	8208	9850	11492	13133	14775	16417	18058	19700	21342
36 x 72	72 x 108	41.5 x 77.5	26	18.00	36.00	623	410	7200	9000	10800	12600	14400	16200	18000	19800	21600	23400
36 x 78	78 x 108	41.5 x 83.5	27	19.50	39.00	657	429	7800	9750	11700	13650	15600	17550	19500	21450	23400	25350
36 x 84	76 x 120	41.5 x 89.5	27	21.00	42.33	687	448	8467	10583	12700	14817	16933	19050	21167	23283	25400	27517
36 x 90	81 x 120	41.5 x 95.5	28	22.50	45.00	718	464	9000	11250	13500	15750	18000	20250	22500	24750	27000	29250
36 x 96	79 x 132	41.5 x 101.5	28	24.00	48.42	760	488	9683	12104	14525	16946	19367	21788	24208	26629	29050	31471

GI - Intake Performance Data Continued

Throat Size (In.)	Hood Size (In.)	Curb Cap Size (In.)	Hood Height (In.)	Throat Area	Hood Area	Shipping Wt. Galv. (lbs.)	Shipping Wt. Alum. (lbs.)	Static Pressure Drop: Ducted 0.017	0.028	0.040	0.056	0.073	0.093	0.115	0.140	0.167	0.196
								Non-Ducted 0.044	0.063	0.085	0.110	0.139	0.170	0.205	0.243	0.284	0.328
								Hood Velocity									
								200	250	300	350	400	450	500	550	600	650
								CFM									
42 x 42	74 x 72	47.5 x 47.5	24	12.25	24.75	459	304	4950	6188	7425	8663	9900	11138	12375	13613	14850	16088
42 x 48	72 x 84	47.5 x 53.5	25	14.00	28.00	529	355	5600	7000	8400	9800	11200	12600	14000	15400	16800	18200
42 x 54	81 x 84	47.5 x 59.5	26	15.75	31.50	573	380	6300	7875	9450	11025	12600	14175	15750	17325	18900	20475
42 x 60	79 x 96	47.5 x 65.5	27	17.50	35.17	610	403	7033	8792	10550	12308	14067	15825	17583	19342	21100	22858
42 x 66	77 x 108	47.5 x 71.5	28	19.25	38.50	654	428	7700	9625	11550	13475	15400	17325	19250	21175	23100	25025
42 x 72	84 x 108	47.5 x 77.5	28	21.00	42.00	712	469	8400	10500	12600	14700	16800	18900	21000	23100	25200	27300
42 x 78	82 x 120	47.5 x 83.5	29	22.75	45.58	726	469	9117	11396	13675	15954	18233	20513	22792	25071	27350	29629
42 x 84*	88 x 120	47.5 x 89.5	29	24.50	48.83	787	513	9767	12208	14650	17092	19533	21975	24417	26858	29300	31742
42 x 90*	86 x 132	47.5 x 95.5	30	26.25	52.58	834	540	10517	13146	15775	18404	21033	23663	26292	28921	31550	34179
42 x 96*	92 x 132	47.5 x 101.5	30	28.00	56.33	868	558	11267	14083	16900	19717	22533	25350	28167	30983	33800	36617
48 x 48	82 x 84	53.5 x 53.5	26	16.00	31.83	578	383	6367	7958	9550	11142	12733	14325	15917	17508	19100	20692
48 x 54	81 x 96	53.5 x 59.5	27	18.00	36.00	620	409	7200	9000	10800	12600	14400	16200	18000	19800	21600	23400
48 x 60*	90 x 96	53.5 x 65.5	28	20.00	40.00	688	455	8000	10000	12000	14000	16000	18000	20000	22000	24000	26000
48 x 66*	88 x 108	53.5 x 71.5	29	22.00	44.00	738	484	8800	11000	13200	15400	17600	19800	22000	24200	26400	28600
48 x 72*	96 x 108	53.5 x 77.5	30	24.00	48.00	784	509	9600	12000	14400	16800	19200	21600	24000	26400	28800	31200
48 x 78*	94 x 120	53.5 x 83.5	31	26.00	52.33	825	534	10467	13083	15700	18317	20933	23550	26167	28783	31400	34017
48 x 84*	92 x 132	53.5 x 89.5	31	28.00	56.33	872	560	11267	14083	16900	19717	22533	25350	28167	30983	33800	36617
48 x 90*	98 x 132	53.5 x 95.5	32	30.00	59.83	911	581	11967	14958	17950	20942	23933	26925	29917	32908	35900	38892
48 x 96	96 x 144	53.5 x 101.5	32	32.00	64.00	952	606	12800	16000	19200	22400	25600	28800	32000	35200	38400	41600
48 x 102*	102 x 144	53.5 x 107.5	33	34.00	68.00	992	628	13600	17000	20400	23800	27200	30600	34000	37400	40800	44200
48 x 108*	100 x 156	53.5 x 113.5	33	36.00	72.33	1040	653	14467	18083	21700	25317	28933	32550	36167	39783	43400	47017
48 x 114*	105 x 156	53.5 x 119.5	34	38.00	75.75	1076	673	15150	18938	22725	26513	30300	34088	37875	41663	45450	49238
54 x 54*	91 x 96	59.5 x 59.5	29	20.25	40.42	693	458	8083	10104	12125	14146	16167	18188	20208	22229	24250	26271
54 x 60*	101 x 96	59.5 x 65.5	30	22.50	44.83	749	490	8967	11208	13450	15692	17933	20175	22417	24658	26900	29142
54 x 66*	99 x 108	59.5 x 71.5	31	24.75	49.50	801	518	9900	12375	14850	17325	19800	22275	24750	27225	29700	32175
54 x 72*	97 x 120	59.5 x 77.5	31	27.00	53.83	844	545	10767	13458	16150	18842	21533	24225	26917	29608	32300	34992
54 x 78*	105 x 120	59.5 x 83.5	32	29.25	58.25	893	571	11650	14563	17475	20388	23300	26213	29125	32038	34950	37863
54 x 84*	103 x 132	59.5 x 89.5	33	31.50	62.92	947	601	12583	15729	18875	22021	25167	28313	31458	34604	37750	40896
54 x 90*	101 x 144	59.5 x 95.5	34	33.75	67.25	990	627	13450	16813	20175	23538	26900	30263	33625	36988	40350	43713
54 x 96*	108 x 144	59.5 x 101.5	34	36.00	72.00	1033	649	14400	18000	21600	25200	28800	32400	36000	39600	43200	46800
54 x 102*	106 x 156	59.5 x 107.5	35	38.25	76.58	1087	678	15317	19146	22975	26804	30633	34463	38292	42121	45950	49779
54 x 108*	112 x 156	59.5 x 113.5	35	40.50	80.83	1131	701	16167	20208	24250	28292	32333	36375	40417	44458	48500	52542
54 x 114*	110 x 168	59.5 x 119.5	36	42.75	85.58	1173	727	17117	21396	25675	29954	34233	38513	42792	47071	51350	55629
60 x 60*	100 x 108	65.5 x 65.5	31	25.00	50.00	807	521	10000	12500	15000	17500	20000	22500	25000	27500	30000	32500
60 x 66*	110 x 108	65.5 x 71.5	32	27.50	55.00	867	556	11000	13750	16500	19250	22000	24750	27500	30250	33000	35750
60 x 72*	108 x 120	65.5 x 77.5	33	30.00	60.00	911	580	12000	15000	18000	21000	24000	27000	30000	33000	36000	39000
60 x 78*	106 x 132	65.5 x 83.5	34	32.50	64.67	968	611	12933	16167	19400	22633	25867	29100	32333	35567	38800	42033
60 x 84*	115 x 132	65.5 x 89.5	35	35.00	70.42	1051	668	14083	17604	21125	24646	28167	31688	35208	38729	42250	45771
60 x 90*	113 x 144	65.5 x 95.5	35	37.50	75.50	1099	698	15100	18875	22650	26425	30200	33975	37750	41525	45300	49075
60 x 96*	120 x 144	65.5 x 101.5	36	40.00	80.00	1144	746	16000	20000	24000	28000	32000	36000	40000	44000	48000	52000
60 x 102*	118 x 156	65.5 x 107.5	37	42.50	85.33	1205	779	17067	21333	25600	29867	34133	38400	42667	46933	51200	55467
60 x 108*	116 x 168	65.5 x 113.5	37	45.00	90.33	1252	782	18067	22583	27100	31617	36133	40650	45167	49683	54200	58717
60 x 120*	120 x 180	65.5 x 125.5	38	50.00	100.00	1354	862	20000	25000	30000	35000	40000	45000	50000	55000	60000	65000
66 x 66*	109 x 120	71.5 x 71.5	33	30.25	60.58	920	587	12117	15146	18175	21204	24233	27263	30292	33321	36350	39379
66 x 72*	119 x 120	71.5 x 77.5	34	33.00	66.17	1002	666	13233	16542	19850	23158	26467	29775	33083	36392	39700	43008
66 x 78*	117 x 132	71.5 x 83.5	35	35.75	71.50	1069	679	14300	17875	21450	25025	28600	32175	35750	39325	42900	46475
66 x 84*	126 x 132	71.5 x 89.5	36	38.50	77.00	1124	734	15400	19250	23100	26950	30800	34650	38500	42350	46200	50050
66 x 90*	124 x 144	71.5 x 95.5	37	41.25	82.75	1172	760	16550	20688	24825	28963	33100	37238	41375	45513	49650	53788
66 x 96*	122 x 156	71.5 x 101.5	38	44.00	88.17	1235	795	17633	22042	26450	30858	35267	39675	44083	48492	52900	57308
66 x 102*	129 x 156	71.5 x 107.5	38	46.75	93.00	1287	823	18600	23250	27900	32550	37200	41850	46500	51150	55800	60450
66 x 108*	127 x 168	71.5 x 113.5	39	49.50	98.67	1337	853	19733	24667	29600	34533	39467	44400	49333	54267	59200	64133
66 x 120*	132 x 180	71.5 x 125.5	40	55.00	110.00	1451	913	22000	27500	33000	38500	44000	49500	55000	60500	66000	71500
72 x 72*	126 x 120	77.5 x 77.5	35	36.00	69.00	1069	704	14467	18083	21700	25317	28933	32550	36167	39783	43400	47017
72 x 78*	127 x 132	77.5 x 83.5	36	39.00	77.42	1137	741	15667	19583	23500	27417	31333	35250	39167	43083	47000	50917
72 x 84*	126 x 144	77.5 x 89.5	37	42.00	84.00	1190	772	16800	21000	25200	29400	33600	37800	42000	46200	50400	54600
72 x 90*	129 x 144	77.5 x 95.5	38	45.00	84.00	1252	806	18000	22500	27000	31500	36000	40500	45000	49500	54000	58500
72 x 96*	130 x 156	77.5 x 101.5	39	48.00	92.83	1320	842	19217	24021	28825	33629	38433	43238	48042	52846	57650	62454
72 x 102*	131 x 168	77.5 x 107.5	40	51.00	101.83	1369	870	20367	25458	30550	35642	40733	45825	50917	56008	61100	66192
72 x 108*	132 x 180	77.5 x 113.5	41	54.00	111.00	1454	927	21633	27042	32450	37858	43267	48675	54083	59492	64900	70308
72 x 120*	133 x 192	77.5 x 125.5	42	60.00	117.33	1614	1030	24000	30000	36000	42000	48000	54000	60000	66000	72000	78000
72 x 132*	135 x 204	77.5 x 137.5	43	66.00	125.25	1699	1062	26467	33083	39700	46317	52933	59550	66167	72783	79400	86017
72 x 144*	136 x 228	77.5 x 149.5	44	72.00	143.33	1847	1163	28800	36000	43200	50400	57600	64800	72000	79200	86400	93600

*Units ship knockdown, some field assembly required.

GR - Relief Performance Data

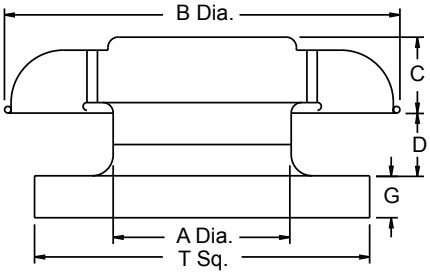
Throat Size (In.)	Hood Size (In.)	Curb Cap Size (In.)	Hood Height (In.)	Throat Area	Hood Area	Shipping Wt. Galv. (lbs.)	Shipping Wt. Alum. (lbs.)	Static Pressure Drop									
				Ducted				0.011	0.019	0.030	0.044	0.061	0.080	0.101	0.125	0.152	0.181
				Non-Ducted				0.021	0.035	0.054	0.076	0.103	0.133	0.167	0.205	0.248	0.294
								Hood Velocity									
								300	400	500	600	700	800	900	1000	1100	1200
								CFM									
12 x 12	28 x 24	17.5 x 17.5	11	1.00	3.67	118	92	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
12 x 18	28 x 36	17.5 x 23.5	11	1.50	5.50	142	110	1350	1800	2250	2700	3150	3600	4050	4500	4950	5400
12 x 24	28 x 36	17.5 x 29.5	11	2.00	5.00	145	111	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
12 x 30	28 x 48	17.5 x 35.5	11	2.50	6.83	169	128	1650	2200	2750	3300	3850	4400	4950	5500	6050	6600
12 x 36	28 x 48	17.5 x 41.5	11	3.00	6.33	171	129	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
12 x 42	28 x 60	17.5 x 47.5	11	3.50	8.17	195	147	1950	2600	3250	3900	4550	5200	5850	6500	7150	7800
12 x 48	28 x 60	17.5 x 53.5	11	4.00	7.67	198	148	1800	2400	3000	3600	4200	4800	5400	6000	6600	7200
16 x 16	28 x 36	21.5 x 21.5	11	1.78	5.22	147	112	1417	1889	2361	2833	3306	3778	4250	4722	5194	5667
16 x 18	28 x 36	21.5 x 23.5	11	2.00	5.00	131	96	1350	1800	2250	2700	3150	3600	4050	4500	4950	5400
16 x 24	28 x 36	21.5 x 29.5	11	2.67	4.33	150	114	1150	1533	1917	2300	2683	3067	3450	3833	4217	4600
16 x 30	28 x 48	21.5 x 35.5	11	3.33	6.00	176	132	1600	2133	2667	3200	3733	4267	4800	5333	5867	6400
16 x 36	28 x 48	21.5 x 41.5	11	4.00	5.33	179	134	1400	1867	2333	2800	3267	3733	4200	4667	5133	5600
16 x 42	28 x 60	21.5 x 47.5	11	4.67	7.00	204	152	1850	2467	3083	3700	4317	4933	5550	6167	6783	7400
16 x 48	28 x 60	21.5 x 53.5	11	5.33	6.33	208	153	1650	2200	2750	3300	3850	4400	4950	5500	6050	6600
16 x 54	29 x 72	21.5 x 59.5	11	6.00	8.50	233	172	2100	2800	3500	4200	4900	5600	6300	7000	7700	8400
16 x 60	29 x 72	21.5 x 65.5	12	6.67	7.83	239	174	2050	2733	3417	4100	4783	5467	6150	6833	7517	8200
16 x 66	29 x 84	21.5 x 71.5	12	7.33	9.58	273	196	2525	3367	4208	5050	5892	6733	7575	8417	9258	10100
18 x 18	28 x 36	23.5 x 23.5	11	2.25	4.75	152	115	1425	1900	2375	2850	3325	3800	4275	4750	5225	5700
18 x 24	28 x 36	23.5 x 29.5	11	3.00	4.00	156	117	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
18 x 30	28 x 48	23.5 x 35.5	11	3.75	5.58	182	135	1675	2233	2792	3350	3908	4467	5025	5583	6142	6700
18 x 36	28 x 48	23.5 x 41.5	11	4.50	4.83	189	140	1550	2067	2583	3100	3617	4133	4650	5167	5683	6200
18 x 42	29 x 60	23.5 x 47.5	12	5.25	6.83	215	158	2050	2733	3417	4100	4783	5467	6150	6833	7517	8200
18 x 48	29 x 60	23.5 x 53.5	12	6.00	6.08	219	160	1825	2433	3042	3650	4258	4867	5475	6083	6692	7300
18 x 54	29 x 72	23.5 x 59.5	12	6.75	7.75	245	179	2325	3100	3875	4650	5425	6200	6975	7750	8525	9300
18 x 60	30 x 72	23.5 x 65.5	12	7.50	7.50	257	184	2250	3000	3750	4500	5250	6000	6750	7500	8250	9000
18 x 66	30 x 84	23.5 x 71.5	12	8.25	9.25	278	199	2425	3233	4042	4850	5658	6467	7275	8083	8892	9700
18 x 72	31 x 84	23.5 x 77.5	12	9.00	9.08	292	206	2725	3633	4542	5450	6358	7267	8175	9083	9992	10900
18 x 78	30 x 96	23.5 x 83.5	13	9.75	10.25	393	291	2875	3833	4792	5750	6708	7667	8625	9583	10542	11500
24 x 24	34 x 36	29.5 x 29.5	11	4.00	4.50	174	128	1350	1800	2250	2700	3150	3600	4050	4500	4950	5400
24 x 30	34 x 48	29.5 x 35.5	12	5.00	6.33	202	147	1900	2533	3167	3800	4433	5067	5700	6333	6967	7600
24 x 36	36 x 48	29.5 x 41.5	12	6.00	6.00	210	152	1800	2400	3000	3600	4200	4800	5400	6000	6600	7200
24 x 42	34 x 60	29.5 x 47.5	13	7.00	7.17	233	168	2150	2867	3583	4300	5017	5733	6450	7167	7883	8600
24 x 48	38 x 60	29.5 x 53.5	13	8.00	7.83	248	177	2350	3133	3917	4700	5483	6267	7050	7833	8617	9400
24 x 54	36 x 72	29.5 x 59.5	14	9.00	9.00	270	192	2700	3600	4500	5400	6300	7200	8100	9000	9900	10800
24 x 60	40 x 72	29.5 x 65.5	14	10.00	10.00	293	203	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
24 x 66	38 x 84	29.5 x 71.5	14	11.00	11.17	321	222	3350	4467	5583	6700	7817	8933	10050	11167	12283	13400
24 x 72	41 x 84	29.5 x 77.5	14	12.00	11.92	332	227	3575	4767	5958	7150	8342	9533	10725	11917	13108	14300
24 x 78	39 x 96	29.5 x 83.5	14	13.00	13.00	355	244	3900	5200	6500	7800	9100	10400	11700	13000	14300	15600
24 x 84	42 x 96	29.5 x 89.5	15	14.00	14.00	368	250	4200	5600	7000	8400	9800	11200	12600	14000	15400	16800
24 x 90	40 x 108	29.5 x 95.5	15	15.00	15.00	394	268	4500	6000	7500	9000	10500	12000	13500	15000	16500	18000
30 x 30	40 x 48	35.5 x 35.5	16	6.25	7.08	230	164	2125	2833	3542	4250	4958	5667	6375	7083	7792	8500
30 x 36	45 x 48	35.5 x 41.5	16	7.50	7.50	249	175	2250	3000	3750	4500	5250	6000	6750	7500	8250	9000
30 x 42	42 x 60	35.5 x 47.5	17	8.75	8.75	271	190	2625	3500	4375	5250	6125	7000	7875	8750	9625	10500
30 x 48	48 x 60	35.5 x 53.5	18	10.00	10.00	292	202	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
30 x 54	45 x 72	35.5 x 59.5	18	11.25	11.25	325	222	3375	4500	5625	6750	7875	9000	10125	11250	12375	13500
30 x 60	50 x 72	35.5 x 65.5	18	12.50	12.50	344	231	3750	5000	6250	7500	8750	10000	11250	12500	13750	15000
30 x 66	47 x 84	35.5 x 71.5	19	13.75	13.67	372	249	4100	5467	6833	8200	9567	10933	12300	13667	15033	16400
30 x 72	51 x 84	35.5 x 77.5	19	15.00	14.75	389	258	4425	5900	7375	8850	10325	11800	13275	14750	16225	17700
30 x 78	49 x 96	35.5 x 83.5	19	16.25	16.42	414	275	4925	6567	8208	9850	11492	13133	14775	16417	18058	19700
30 x 84	53 x 96	35.5 x 89.5	19	17.50	17.83	454	305	5350	7133	8917	10700	12483	14267	16050	17833	19617	21400
30 x 90	50 x 108	35.5 x 95.5	20	18.75	18.75	459	301	5625	7500	9375	11250	13125	15000	16875	18750	20625	22500
36 x 36	54 x 48	41.5 x 41.5	17	9.00	9.00	288	204	2700	3600	4500	5400	6300	7200	8100	9000	9900	10800
36 x 42	50 x 60	41.5 x 47.5	18	10.50	10.33	298	206	3100	4133	5167	6200	7233	8267	9300	10333	11367	12400
36 x 48	58 x 60	41.5 x 53.5	19	12.00	12.17	339	235	3650	4867	6083	7300	8517	9733	10950	12167	13383	14600
36 x 54	54 x 72	41.5 x 59.5	19	13.50	13.50	376	257	4050	5400	6750	8100	9450	10800	12150	13500	14850	16200
36 x 60	60 x 72	41.5 x 65.5	20	15.00	15.00	399	268	4500	6000	7500	9000	10500	12000	13500	15000	16500	18000
36 x 66	57 x 84	41.5 x 71.5	20	16.50	16.75	432	289	5025	6700	8375	10050	11725	13400	15075	16750	18425	20100
36 x 72	54 x 96	41.5 x 77.5	20	18.00	18.00	458	308	5400	7200	9000	10800	12600	14400	16200	18000	19800	21600
36 x 78	59 x 96	41.5 x 83.5	21	19.50	19.83	479	318	5950	7933	9917	11900	13883	15867	17850	19833	21817	23800
36 x 84	63 x 96	41.5 x 89.5	21	21.00	21.00	500	330	6300	8400	10500	12600	14700	16800	18900	21000	23100	25200
36 x 90	60 x 108	41.5 x 95.5	21	22.50	22.50	530	348	6750	9000	11250	13500	15750	18000	20250	22500	24750	27000
36 x 96	64 x 108	41.5 x 101.5	21	24.00	24.00	552	359	7200	9600	12000	14400	16800	19200	21600	24000	26400	28800

GR -Relief Performance Data Continued

Throat Size (In.)	Hood Size (In.)	Curb Cap Size (In.)	Hood Height (In.)	Throat Area	Hood Area	Shipping Wt. Galv. (lbs.)	Shipping Wt. Alum. (lbs.)	Static Pressure Drop									
				Ducted				0.011	0.019	0.030	0.044	0.061	0.080	0.101	0.125	0.152	0.181
				Non-Ducted				0.021	0.035	0.054	0.076	0.103	0.133	0.167	0.205	0.248	0.294
								Hood Velocity									
								300	400	500	600	700	800	900	1000	1100	1200
								CFM									
42 x 42	59 x 60	47.5 x 47.5	19	12.25	12.33	342	237	3700	4933	6167	7400	8633	9867	11100	12333	13567	14800
42 x 48	56 x 72	47.5 x 53.5	19	14.00	14.00	384	261	4200	5600	7000	8400	9800	11200	12600	14000	15400	16800
42 x 54	63 x 72	47.5 x 59.5	20	15.75	15.75	412	277	4725	6300	7875	9450	11025	12600	14175	15750	17325	18900
42 x 60	60 x 84	47.5 x 65.5	21	17.50	17.50	445	296	5250	7000	8750	10500	12250	14000	15750	17500	19250	21000
42 x 66	66 x 84	47.5 x 71.5	21	19.25	19.25	472	311	5775	7700	9625	11550	13475	15400	17325	19250	21175	23100
42 x 72	63 x 96	47.5 x 77.5	22	21.00	21.00	500	330	6300	8400	10500	12600	14700	16800	18900	21000	23100	25200
42 x 78	68 x 96	47.5 x 83.5	22	22.75	22.58	522	341	6775	9033	11292	13550	15808	18067	20325	22583	24842	27100
42 x 84	65 x 108	47.5 x 89.5	22	24.50	24.25	557	362	7275	9700	12125	14550	16975	19400	21825	24250	26675	29100
42 x 90	70 x 108	47.5 x 95.5	23	26.25	26.25	583	376	7875	10500	13125	15750	18375	21000	23625	26250	28875	31500
42 x 96	67 x 120	47.5 x 101.5	23	28.00	27.83	608	393	8350	11133	13917	16700	19483	22267	25050	27833	30617	33400
48 x 48	64 x 72	53.5 x 53.5	20	16.00	16.00	416	279	4800	6400	8000	9600	11200	12800	14400	16000	17600	19200
48 x 54	72 x 72	53.5 x 59.5	21	18.00	18.00	448	296	5400	7200	9000	10800	12600	14400	16200	18000	19800	21600
48 x 60	69 x 84	53.5 x 65.5	22	20.00	20.25	486	319	6075	8100	10125	12150	14175	16200	18225	20250	22275	24300
48 x 66	75 x 84	53.5 x 71.5	22	22.00	21.75	512	332	6525	8700	10875	13050	15225	17400	19575	21750	23925	26100
48 x 72	72 x 96	53.5 x 77.5	23	24.00	24.00	542	352	7200	9600	12000	14400	16800	19200	21600	24000	26400	28800
48 x 78	78 x 96	53.5 x 83.5	23	26.00	26.00	571	368	7800	10400	13000	15600	18200	20800	23400	26000	28600	31200
48 x 84	75 x 108	53.5 x 89.5	24	28.00	28.25	607	388	8475	11300	14125	16950	19775	22600	25425	28250	31075	33900
48 x 90	80 x 108	53.5 x 95.5	24	30.00	30.00	634	402	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000
48 x 96	77 x 120	53.5 x 101.5	24	32.00	32.17	663	422	9650	12867	16083	19300	22517	25733	28950	32167	35383	38600
48 x 102	82 x 120	53.5 x 107.5	25	34.00	34.33	689	434	10300	13733	17167	20600	24033	27467	30900	34333	37767	41200
48 x 108	79 x 132	53.5 x 113.5	25	36.00	36.42	754	484	10925	14567	18208	21850	25492	29133	32775	36417	40058	43700
48 x 114	83 x 132	53.5 x 119.5	25	38.00	38.08	803	522	11425	15233	19042	22850	26658	30467	34275	38083	41892	45700
54 x 54	81 x 72	59.5 x 59.5	22	20.25	20.25	484	316	6075	8100	10125	12150	14175	16200	18225	20250	22275	24300
54 x 60	77 x 84	59.5 x 65.5	22	22.50	22.42	522	339	6725	8967	11208	13450	15692	17933	20175	22417	24658	26900
54 x 66	74 x 96	59.5 x 71.5	23	24.75	24.58	551	357	7375	9833	12292	14750	17208	19667	22125	24583	27042	29500
54 x 72	81 x 96	59.5 x 77.5	24	27.00	27.00	585	375	8100	10800	13500	16200	18900	21600	24300	27000	29700	32400
54 x 78	78 x 108	59.5 x 83.5	24	29.25	29.25	625	398	8775	11700	14625	17550	20475	23400	26325	29250	32175	35100
54 x 84	84 x 108	59.5 x 89.5	25	31.50	31.50	675	434	9450	12600	15750	18900	22050	25200	28350	31500	34650	37800
54 x 90	81 x 120	59.5 x 95.5	25	33.75	33.75	713	461	10125	13500	16875	20250	23625	27000	30375	33750	37125	40500
54 x 96*	86 x 120	59.5 x 101.5	26	36.00	35.67	767	501	10700	14267	17833	21400	24967	28533	32100	35667	39233	42800
54 x 102	83 x 132	59.5 x 107.5	26	38.25	37.83	805	523	11350	15133	18917	22700	26483	30267	34050	37833	41617	45400
54 x 108*	88 x 132	59.5 x 113.5	26	40.50	40.17	836	540	12050	16067	20083	24100	28117	32133	36150	40167	44183	48200
54 x 114*	86 x 144	59.5 x 119.5	27	42.75	43.25	872	563	12975	17300	21625	25950	30275	34600	38925	43250	47575	51900
60 x 60*	86 x 84	65.5 x 65.5	23	25.00	25.17	580	378	7550	10067	12583	15100	17617	20133	22650	25167	27683	30200
60 x 66	83 x 96	65.5 x 71.5	24	27.50	27.83	613	399	8350	11133	13917	16700	19483	22267	25050	27833	30617	33400
60 x 72*	90 x 96	65.5 x 77.5	25	30.00	30.00	647	417	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000
60 x 78*	87 x 108	65.5 x 83.5	25	32.50	32.75	723	474	9825	13100	16375	19650	22925	26200	29475	32750	36025	39300
60 x 84*	93 x 108	65.5 x 89.5	26	35.00	34.75	757	493	10425	13900	17375	20850	24325	27800	31275	34750	38225	41700
60 x 90*	90 x 120	65.5 x 95.5	26	37.50	37.50	789	513	11250	15000	18750	22500	26250	30000	33750	37500	41250	45000
60 x 96*	96 x 120	65.5 x 101.5	27	40.00	40.00	824	532	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000
60 x 102*	93 x 132	65.5 x 107.5	27	42.50	42.75	869	558	12825	17100	21375	25650	29925	34200	38475	42750	47025	51300
60 x 108*	98 x 132	65.5 x 113.5	28	45.00	44.83	898	572	13450	17933	22417	26900	31383	35867	40350	44833	49317	53800
60 x 120*	92 x 156	65.5 x 125.5	28	50.00	49.67	971	616	14900	19867	24833	29800	34767	39733	44700	49667	54633	59600
66 x 66*	91 x 96	71.5 x 71.5	25	30.25	30.42	652	420	9125	12167	15208	18250	21292	24333	27375	30417	33458	36500
66 x 72*	99 x 96	71.5 x 77.5	25	33.00	33.00	725	474	9900	13200	16500	19800	23100	26400	29700	33000	36300	39600
66 x 78*	95 x 108	71.5 x 83.5	26	35.75	35.50	768	499	10650	14200	17750	21300	24850	28400	31950	35500	39050	42600
66 x 84*	92 x 120	71.5 x 89.5	27	38.50	38.17	801	519	11450	15267	19083	22900	26717	30533	34350	38167	41983	45800
66 x 90*	99 x 120	71.5 x 95.5	27	41.25	41.25	841	541	12375	16500	20625	24750	28875	33000	37125	41250	45375	49500
66 x 96*	96 x 132	71.5 x 101.5	28	44.00	44.00	887	567	13200	17600	22000	26400	30800	35200	39600	44000	48400	52800
66 x 102*	102 x 132	71.5 x 107.5	28	46.75	46.75	925	588	14025	18700	23375	28050	32725	37400	42075	46750	51425	56100
66 x 108*	99 x 144	71.5 x 113.5	29	49.50	49.50	957	607	14850	19800	24750	29700	34650	39600	44550	49500	54450	59400
66 x 120*	102 x 156	71.5 x 125.5	30	55.00	55.50	1042	654	16650	22200	27750	33300	38850	44400	49950	55500	61050	66600
72 x 72*	108 x 96	77.5 x 77.5	26	36.00	36.00	771	500	10800	14400	18000	21600	25200	28800	32400	36000	39600	43200
72 x 78*	104 x 108	77.5 x 83.5	27	39.00	39.00	818	526	11700	15600	19500	23400	27300	31200	35100	39000	42900	46800
72 x 84*	101 x 120	77.5 x 89.5	28	42.00	42.17	855	550	12650	16867	21083	25300	29517	33733	37950	42167	46383	50600
72 x 90*	108 x 120	77.5 x 95.5	28	45.00	45.00	894	569	13500	18000	22500	27000	31500	36000	40500	45000	49500	54000
72 x 96*	105 x 132	77.5 x 101.5	29	48.00	48.25	943	597	14475	19300	24125	28950	33775	38600	43425	48250	53075	57900
72 x 102*	111 x 132	77.5 x 107.5	29	51.00	50.75	982	618	15225	20300	25375	30450	35525	40600	45675	50750	55825	60900
72 x 108*	108 x 144	77.5 x 113.5	30	54.00	54.00	1016	638	16200	21600	27000	32400	37800	43200	48600	54000	59400	64800
72 x 120*	111 x 156	77.5 x 125.5	31	60.00	60.25	1105	687	18075	24100	30125	36150	42175	48200	54225	60250	66275	72300
72 x 132*	113 x 168	77.5 x 137.5	32	66.00	65.83	1207	758	19750	26333	32917	39500	46083	52667	59250	65833	72417	79000
72 x 144*	115 x 180	77.5 x 149.5	32	72.00	71.75	1291	803	21525	28700	35875	43050	50225	57400	64575	71750	78925	86100

*Units ship knockdown, some field assembly required.

Spun Aluminum Gravity Ventilator



Description - Unit shall be a spun aluminum, roof mounted gravity ventilator.

Construction - The unit shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The spun aluminum baffle shall have a rolled bead for added strength. Birdscreen constructed of 1/2" mesh shall be mounted across the air opening. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

Product - Unit shall be model PR as manufactured by Loren Cook Company of Springfield, Missouri.

PR Dimension Data

Size	A Dia.	B Dia.	C	D	G	T Sq.	Roof Opening	Approx. Ship Wt.-Lbs.
8	8-1/2	18-1/4	4-5/8	3-1/2	2	18	13-1/2	20
12	12-1/2	28-1/4	4-13/16	3-1/2	2	20	15-1/2	30
16	16-1/2	28-1/4	5-1/8	5-1/2	2	28	23-1/2	35
20	20-1/2	36-1/2	6-3/4	4-7/8	2	32	27-1/2	80
24	24-3/4	42-1/4	7-3/4	6-1/4	3	36	31-1/2	105
30	30-3/4	52-1/2	17	6-1/4	3	42	37-1/2	140
36	36-3/4	62-1/2	17-1/2	7-1/2	3	48	43-1/2	170
42	42-3/4	73	14	8	3	54	50-1/2	205
48	48-3/4	73	14	8	3	60	56-1/2	260

All dimensions in inches.

PR Gravity Application

Temperature Difference* (°F)		10				10				20				20			
Wind Speed** (MPH)		5				10				5				10			
Height*** (Ft.)		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40
Size	Throat Area (Sq. Ft.)	CFM				CFM				CFM				CFM			
8	0.394	96	104	111	118	178	182	187	191	104	118	131	143	182	191	200	208
12	0.852	207	224	241	256	385	395	404	413	224	256	284	310	395	413	431	449
16	1.485	360	391	420	446	671	688	704	721	391	446	495	540	688	721	752	782
20	2.292	556	604	648	689	1035	1062	1087	1112	604	689	764	833	1062	1112	1161	1207
24	3.341	811	880	944	1004	1509	1548	1585	1621	880	1004	1114	1215	1548	1621	1692	1760
30	5.157	1251	1358	1457	1550	2330	2389	2446	2503	1358	1550	1720	1875	2389	2503	2611	2716
36	7.366	1787	1940	2081	2213	3328	3412	3494	3575	1940	2213	2457	2678	3412	3575	3730	3879
42	9.968	2419	2625	2816	2995	4503	4617	4728	4837	2625	2995	3325	3624	4617	4837	5048	5250
48	12.962	3145	3413	3662	3895	5856	6004	6149	6290	3413	3895	4323	4713	6004	6290	6564	6827

*Allowable temperature rise of indoor temperature above outdoor temperatures. **Consult local weather station for average wind speed. Use 1/2 average wind speed. If average is over 20 MPH, consult gravity ventilation application section (pages 4-5) for calculation of performance. ***See gravity ventilation application section (pages 4-5) for explanation of height.

PR - Intake Performance Data

Size	Throat Area (Sq. Ft.)	Face Area (Sq. Ft)	CFM at 500 FPM Face Velocity	Pressure Drop (in WG)							
				0.05	0.1	0.125	0.15	0.2	0.25	0.3	0.375
				CFM							
8	.394	1.38	690	252	356	398	436	503	543	617	689
12	.852	2.04	1020	529	749	837	917	1059	1142	1297	1450
16	1.485	3.08	1540	936	1324	1480	1621	1872	2019	2293	2563
20	2.292	5.31	2655	1452	2054	2296	2516	2905	3132	3558	3977
24	3.341	7.92	3960	2091	2958	3307	3622	4183	4510	5123	5728
30	5.157	10.77	5385	3247	4592	5134	5624	6494	7002	7953	8892
36	7.366	14.87	7435	4706	6655	7440	8150	9411	10149	11527	12887
42	9.968	19.67	9835	6307	8919	9971	10923	12613	13601	15448	17271
48	12.962	20.53	10,265	8282	11712	13095	14344	16563	17861	20286	22680

PR - Relief Performance Data

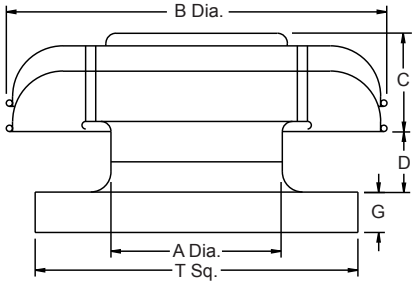
Size	Throat Area (Sq. Ft.)	Face Area (Sq. Ft.)	Pressure Drop (in WG)								
			0.05	0.1	0.125	0.15	0.2	0.25	0.3	0.375	0.5
			CFM								
8	.394	1.38	212	299	334	366	423	473	518	579	669
12	.852	2.04	445	629	703	770	889	994	1089	1218	1406
16	1.485	3.08	786	1112	1243	1362	1573	1758	1926	2154	2487
20	2.292	5.31	1220	1726	1929	2114	2440	2729	2989	3342	3859
24	3.341	7.92	1757	2485	2778	3043	3514	3929	4304	4812	5557
30	5.157	10.77	2728	3858	4313	4725	5456	6100	6682	7471	8626
36	7.366	14.87	3954	5591	6251	6848	7907	8840	9684	10827	12502
42	9.968	19.67	5299	7493	8378	9177	10597	11848	12979	14511	16755
48	12.962	20.53	6958	9840	11002	12052	13916	15559	17044	19055	22003

Spun Aluminum Tiered Gravity Ventilator

Description - Unit shall be a tiered spun aluminum, roof mounted gravity ventilator.

Construction - The unit shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The spun aluminum baffle shall have a rolled bead for added strength. Birdscreen constructed of 1/2" mesh shall be mounted across the air opening. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

Product - Unit shall be model TR as manufactured by Loren Cook Company of Springfield, Missouri.



TR Dimension Data

Size	A Dia.	B Dia.	C	D	G	T Sq.	Roof Opening	Approx. Ship Wt.-Lbs.
8	8-1/2	18-1/4	7-1/4	3-1/2	2	18	13-1/2	20
12	12-1/2	28-1/4	9	3-1/2	2	20	15-1/2	30
16	16-1/2	28-1/4	9	5-1/2	2	28	23-1/2	40
20	20-1/2	36-1/2	12	4-7/8	2	32	27-1/2	90
24	24-3/4	42-1/4	14	6-1/4	3	36	31-1/2	120
30	30-3/4	52-1/2	31	6-1/4	3	42	37-1/2	160
36	36-3/4	62-1/2	33	7-1/2	3	48	43-1/2	205
42	42-3/4	73	25	8	3	54	50-1/2	240
48	48-3/4	73	25	8	3	60	56-1/2	295

All dimensions in inches.

TR Gravity Application

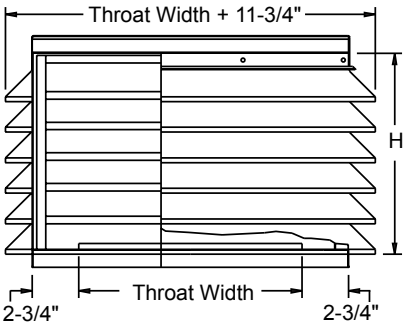
Temperature Difference* (°F)		10				10				20				20			
Wind Speed** (MPH)		5				10				5				10			
Height*** (Ft.)		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40
Size	Throat Area (Sq. Ft.)	CFM				CFM				CFM				CFM			
8	0.394	96	104	111	118	178	182	187	191	104	118	131	143	182	191	200	208
12	0.852	207	224	241	256	385	395	404	413	224	256	284	310	395	413	431	449
16	1.485	360	391	420	446	671	688	704	721	391	446	495	540	688	721	752	782
20	2.292	556	604	648	689	1035	1062	1087	1112	604	689	764	833	1062	1112	1161	1207
24	3.341	811	880	944	1004	1509	1548	1585	1621	880	1004	1114	1215	1548	1621	1692	1760
30	5.157	1251	1358	1457	1550	2330	2389	2446	2503	1358	1550	1720	1875	2389	2503	2611	2716
36	7.366	1787	1940	2081	2213	3328	3412	3494	3575	1940	2213	2457	2678	3412	3575	3730	3879
42	9.968	2419	2625	2816	2995	4503	4617	4728	4837	2625	2995	3325	3624	4617	4837	5048	5250
48	12.962	3145	3413	3662	3895	5856	6004	6149	6290	3413	3895	4323	4713	6004	6290	6564	6827

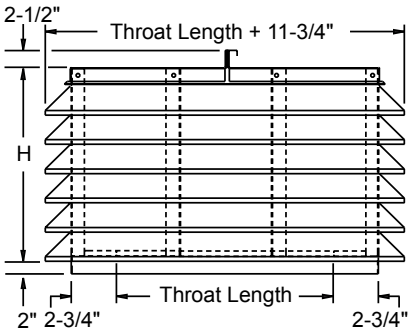
*Allowable temperature rise of indoor temperature above outdoor temperatures.
**Consult local weather station for average wind speed. Use 1/2 average wind speed. If average is over 20 MPH, consult gravity ventilation application section (pages 4-5) for calculation of performance.
***See gravity ventilation application section (pages 4-5) for explanation of height.

TR - Intake Performance Data

Size	Throat Area (Sq. Ft.)	Face Area (Sq. Ft.)	CFM at 500 FPM Face Velocity	Pressure Drop (in WG)							
				0.05	0.1	0.125	0.15	0.2	0.25	0.3	0.375
				CFM							
8	.394	2.07	1035	302	463	517	567	655	706	802	896
12	.852	3.11	1555	688	973	1088	1192	1376	1484	1685	1884
16	1.485	4.62	2310	1217	1721	1924	2107	2434	2624	2980	3332
20	2.292	7.97	3985	1888	2670	2985	3270	3776	4072	4625	5171
24	3.341	11.88	5940	2719	3845	4299	4709	5438	5864	6660	7446
30	5.157	16.15	8075	4221	5969	6674	7311	8442	9103	10339	11559
36	7.366	22.31	11,155	6117	8651	9672	10596	12235	13193	14984	16753
42	9.968	29.5	14,750	8198	11594	12963	14200	16397	17681	20082	22452
48	12.962	30.8	15,400	10766	15226	17023	18648	21532	23219	26372	29485

Extruded Tiered Gravity Ventilator





Description - Unit shall be an extruded aluminum, roof mounted gravity ventilator.

Construction - The unit shall be manufactured of 0.081 gauge extruded aluminum tiers welded to a minimum 8 gauge aluminum support structure. The aluminum hood shall be constructed of minimum 0.063 aluminum and provided with a layer of anti-condensate coating. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. Birdscreen constructed of 1/2" galvanized mesh shall be mounted across the relief opening. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

Product - Unit shall be model TRE as manufactured by Loren Cook Company of Springfield, Missouri.

Intake Hood Velocity Notes

Velocity to 500 FPM - Velocity below 500 FPM provides for a level of protection against the influx of airborne mist or debris.

Velocity 500 FPM to 1000 FPM - Within this velocity range there is a possibility that fine, airborne mist will be carried into the building through the vent. Care should be taken in the location of the unit if airborne mist is a problem.

Velocity Greater Than 1000 FPM - Velocity in this range is not recommended unless special means are taken to prevent the influx of airborne matter and large droplets of moisture into the interior of the building. Velocities shown are to be used as a guide only. Final application and conditions will be a governing factor.

TRE - Intake Performance Data

Throat Size (In.)	No. of Tiers	Hood Size (In.)	Ht. (In.)	Curb Cap Size (In)	Throat Area (FT^2)			Static Pressure Drop									
						Ducted		0.020	0.055	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.500
						Non-Ducted		0.028	0.068	0.134	0.198	0.264	0.325	0.390	0.455	0.520	0.645
						Hood Area	Shipping Weight	CFM									
12 x 12	2	23.75 x 23.75	9	17.5 x 17.5	1.0	2.3	47	324	513	725	888	1026	1147	1256	1357	1451	1622
12 x 14	2	23.75 x 25.75	9	17.5 x 19.5	1.2	2.4	50	365	577	817	1000	1155	1291	1414	1528	1633	1826
12 x 16	2	23.75 x 27.75	9	17.5 x 21.5	1.3	2.5	52	404	638	902	1105	1276	1427	1563	1688	1805	2018
12 x 18	2	23.75 x 29.75	9	17.5 x 23.5	1.5	2.6	54	440	696	984	1205	1391	1556	1704	1841	1968	2200
12 x 24	2	23.75 x 35.75	9	17.5 x 29.5	2.0	3.0	61	541	856	1210	1482	1711	1913	2096	2264	2420	2706
14 x 14	2	25.75 x 25.75	9	19.5 x 19.5	1.4	2.5	52	409	646	913	1119	1292	1444	1582	1709	1827	2043
14 x 16	2	25.75 x 27.75	9	19.5 x 21.5	1.6	2.6	54	449	710	1004	1229	1420	1587	1739	1878	2008	2245
14 x 18	2	25.75 x 29.75	9	19.5 x 23.5	1.8	2.7	56	487	770	1089	1334	1540	1722	1886	2038	2178	2435
14 x 24	2	25.75 x 35.75	9	19.5 x 29.5	2.3	3.1	63	592	936	1323	1621	1872	2092	2292	2476	2647	2959
14 x 30	2	25.75 x 41.75	12.5	19.5 x 35.5	2.9	5.1	69	855	1352	1912	2342	2704	3023	3312	3577	3824	4275
16 x 16	2	27.75 x 27.75	9	21.5 x 21.5	1.8	2.7	56	491	776	1098	1345	1553	1736	1901	2054	2196	2455
16 x 18	2	27.75 x 29.75	9	21.5 x 23.5	2.0	2.8	58	530	838	1186	1452	1677	1875	2054	2218	2372	2652
16 x 24	2	27.75 x 35.75	9	21.5 x 29.5	2.7	3.2	65	638	1008	1426	1746	2016	2254	2469	2667	2851	3188
16 x 30	3	27.75 x 41.75	12.5	21.5 x 35.5	3.3	5.3	83	932	1474	2085	2554	2949	3297	3611	3901	4170	4662
16 x 32	3	27.75 x 43.75	12.5	21.5 x 37.5	3.6	5.4	86	978	1547	2187	2679	3093	3458	3788	4092	4374	4891
18 x 18	2	29.75 x 29.75	9	23.5 x 23.5	2.3	3.0	61	571	902	1276	1563	1804	2017	2210	2387	2552	2853
18 x 24	2	29.75 x 35.75	9	23.5 x 29.5	3.0	3.3	67	680	1975	1520	1861	2149	2403	2632	2843	3039	3398
18 x 30	3	29.75 x 41.75	12.5	23.5 x 35.5	3.8	5.4	86	1004	1587	2244	2748	3174	3548	3887	4198	4488	5018
18 x 32	3	29.75 x 43.75	12.5	23.5 x 37.5	4.0	5.6	88	1051	1661	2350	2878	3323	3715	4070	4396	4699	5254
18 x 36	3	29.75 x 47.75	12.5	23.5 x 41.5	4.5	5.9	93	1143	1807	2555	3129	3614	4040	4426	4780	5110	5714
24 x 24	3	35.75 x 35.75	12.5	29.5 x 29.5	4.0	5.4	86	1033	1634	2311	2830	3268	3653	4002	4323	4621	5167
24 x 30	3	35.75 x 41.75	12.5	29.5 x 35.5	5.0	5.9	93	1191	1884	2664	3263	3768	4213	4615	4984	5329	5957

TRE - Intake Performance Data Continued

Throat Size (In.)	No. of Tiers	Hood Size (In.)	Ht. (In.)	Curb Cap Size (In)	Throat Area (FT^2)			Static Pressure Drop									
						Ducted		0.020	0.055	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.500
						Non-Ducted		0.028	0.068	0.134	0.198	0.264	0.325	0.390	0.455	0.520	0.645
						Hood Area	Shipping Weight	CFM									
24 x 32	3	35.75 x 43.75	12.5	29.5 x 37.5	5.3	6.1	96	1241	1963	2776	3400	3926	4389	4808	5193	5552	6207
24 x 36	4	35.75 x 47.75	16	29.5 x 41.5	6.0	8.6	116	1594	2520	3564	4365	5040	5635	6172	6667	7127	7968
24 x 42	4	35.75 x 53.75	16	29.5 x 47.5	7.0	9.2	125	1779	2812	3977	4871	5624	6288	6888	7440	7954	8893
24 x 48	4	35.75 x 59.75	16	29.5 x 53.5	8.0	9.9	134	1957	3094	4376	5359	6188	6918	7579	8186	8751	9784
30 x 30	3	41.75 x 41.75	12.5	35.5 x 35.5	6.3	6.4	101	1355	2143	3031	3712	4286	4792	5250	5670	6062	6777
30 x 32	3	41.75 x 43.75	12.5	35.5 x 37.5	6.7	6.6	104	1407	2224	3146	3853	4449	4974	5449	5885	6292	7034
30 x 36	4	41.75 x 47.75	16	35.5 x 41.5	7.5	9.2	125	1829	2892	4090	5009	5784	6467	7084	7652	8180	9145
30 x 42	4	41.75 x 53.75	16	35.5 x 47.5	8.8	9.9	134	2023	3198	4523	5540	6397	7152	7835	8462	9047	10114
30 x 48	4	41.75 x 59.75	16	35.5 x 53.5	10.0	10.6	143	2209	3492	4939	6049	6984	7809	8554	9239	9877	11043
30 x 54	5	41.75 x 65.75	19.5	35.5 x 59.5	11.3	14.0	171	2765	4372	6183	7573	8744	9776	10710	11568	12336	13826
30 x 60	6	41.75 x 71.75	23	35.5 x 65.5	12.5	17.8	201	3318	5246	7419	9086	10492	11731	12850	13880	14838	16589
32 x 32	3	43.75 x 43.75	12.5	37.5 x 37.5	7.1	6.8	106	1459	2306	3261	3994	4612	5157	5649	6102	6523	7293
32 x 36	4	43.75 x 47.75	16	37.5 x 41.5	8.0	9.5	128	1902	3008	4523	5209	6015	6725	7367	7957	8507	9511
32 x 42	4	43.75 x 53.75	16	37.5 x 47.5	9.3	10.1	137	2098	3318	4692	5746	6635	7418	8126	8777	9383	10491
32 x 48	4	43.75 x 59.75	16	37.5 x 53.5	10.7	10.8	146	2286	3614	5111	6260	7228	8081	8853	9562	10222	11429
32 x 54	5	43.75 x 65.75	19.5	37.5 x 59.5	12.0	14.3	174	2869	4536	6415	7857	9072	10143	11111	12002	12830	14345
32 x 60	6	43.75 x 71.75	23	37.5 x 65.5	13.3	18.2	205	3450	5456	7715	9449	10911	12199	13363	14434	15431	17252
32 x 72	7	43.75 x 83.75	26.5	37.5 x 77.5	16.0	23.5	251	4314	6822	9648	11816	13644	15254	16710	18049	19295	21572
36 x 36	4	47.75 x 47.75	16	41.5 x 41.5	9.0	9.9	134	2043	3230	4567	5594	6459	7222	7911	8545	9135	10213
36 x 42	4	47.75 x 53.75	16	41.5 x 47.5	10.5	10.6	143	2242	3545	5014	6140	7090	7927	8684	9380	10027	11211
36 x 48	5	47.75 x 59.75	19.5	41.5 x 53.5	12.0	14.0	171	2834	4481	6337	7761	8962	10019	10976	11855	12674	14169
36 x 54	5	47.75 x 65.75	19.5	41.5 x 59.5	13.5	14.9	181	3066	4847	6855	8396	9695	10839	11873	12825	13710	15329
36 x 60	6	47.75 x 71.75	23	41.5 x 65.5	15.0	18.8	213	3701	5852	8276	10136	11704	13086	14335	15483	16552	18506
36 x 72	7	47.75 x 83.75	26.5	41.5 x 77.5	18.0	24.3	259	4633	7325	10360	12688	14651	16380	17944	19381	20719	23165
42 x 42	5	53.75 x 53.75	19.5	47.5 x 47.5	12.3	14.0	171	2855	4514	6384	7819	9028	10094	11057	11943	12768	14275
42 x 48	5	53.75 x 59.75	19.5	47.5 x 53.5	14.0	14.9	181	3103	4906	6938	8497	9812	10970	12017	12979	13876	15513
42 x 54	5	53.75 x 65.75	19.5	47.5 x 59.5	15.8	15.7	191	3341	5282	7470	9148	10564	11810	12938	13970	14939	16703
42 x 60	6	53.75 x 71.75	23	47.5 x 65.5	17.5	19.8	224	4049	6403	9055	11090	12805	14317	15683	16940	18110	20247
42 x 72	7	53.75 x 83.75	26.5	47.5 x 77.5	21.0	25.5	271	5072	8019	11341	13890	16039	17932	19643	21217	22682	25359
42 x 84	8	53.75 x 95.75	30	47.5 x 89.5	24.5	31.8	369	6160	9739	13774	16869	19479	21778	23856	25768	27547	30799
48 x 48	5	59.75 x 59.75	19.5	53.5 x 53.5	16.0	15.7	191	3356	5306	7504	9190	10612	11865	12997	14039	15008	16779
48 x 54	6	59.75 x 65.75	23	53.5 x 59.5	18.0	19.8	224	4089	6465	9143	11198	12930	14456	15836	17105	18286	20444
48 x 60	6	59.75 x 71.75	23	53.5 x 65.5	20.0	20.8	235	4374	6915	9780	11978	13831	15463	16939	18296	19560	21868
48 x 72	7	59.75 x 83.75	26.5	53.5 x 77.5	24.0	26.6	283	5476	8659	12245	14998	17318	19362	21210	22909	24491	27382
48 x 84	8	59.75 x 95.75	30	53.5 x 89.5	28.0	33.1	384	6654	10521	14879	18223	21042	23526	25771	27836	29758	33271
48 x 96	9	59.75 x 107.8	33.5	53.5 x 102	32.0	40.2	464	7898	12488	17661	21630	24976	27924	30589	33040	35321	39490
54 x 54	6	65.75 x 65.75	23	59.5 x 59.5	20.3	20.8	235	4391	6942	9818	12024	13884	15523	17005	18367	19635	21953
54 x 60	6	65.75 x 71.75	23	59.5 x 65.5	22.5	21.8	246	4681	7401	10467	12819	14802	16549	18129	19582	20934	23404
54 x 72	7	65.75 x 83.75	26.5	59.5 x 77.5	27.0	27.8	296	5856	9259	13095	16038	18519	20704	22681	24498	26189	29281
54 x 84	8	65.75 x 95.75	30	59.5 x 89.5	31.5	34.4	399	7115	11249	15909	19485	22499	25155	27555	29763	31818	35574
54 x 96	9	65.75 x 107.8	33.5	59.5 x 102	36.0	41.7	481	8448	13358	18891	23136	26716	29869	32720	35341	37782	42241
54 x 108	10	65.75 x 119.8	37	59.5 x 114	40.5	49.7	587	9848	15571	22021	26971	31143	34819	38142	41198	44043	49241
60 x 60	7	71.75 x 71.75	26.5	65.5 x 65.5	25.0	26.6	283	5551	8777	12412	15202	17554	19626	21499	23221	24825	27755
60 x 72	7	71.75 x 83.75	26.5	65.5 x 77.5	30.0	29.0	308	6218	9831	13903	17028	19662	21983	24081	26011	27807	31089
60 x 84	8	71.75 x 95.75	30	65.5 x 89.5	35.0	35.7	414	7550	11938	16883	20677	23876	26694	29242	31585	33766	37751
60 x 96	9	71.75 x 107.8	33.5	65.5 x 102	40.0	43.2	498	8965	14175	20046	24552	28350	31696	34721	37503	40093	44825
60 x 108	10	71.75 x 119.8	37	65.5 x 114	45.0	51.3	633	10454	16529	23376	28630	33059	36961	40489	43733	46752	52271
60 x 120	12	71.75 x 131.8	44	65.5 x 126	50.0	65.6	729	12656	20010	28299	34659	40021	44744	49015	52942	56598	63278

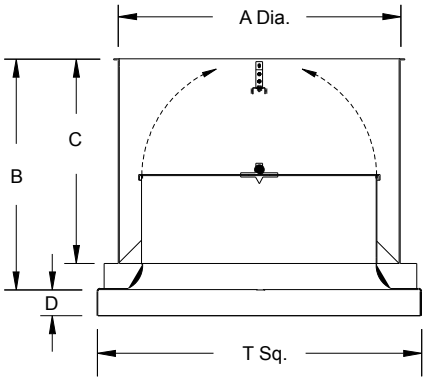
TRE - Relief Performance Data

Throat Size (In.)	No. of Tiers	Hood Size (In.)	Ht. (In.)	Curb Cap Size (In)	Throat Area (FT^2)			Static Pressure Drop									
						Ducted		0.020	0.055	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.500
						Non-Ducted		0.028	0.068	0.134	0.198	0.264	0.325	0.390	0.455	0.520	0.645
						Hood Area	Shipping Weight	CFM									
12 x 12	2	23.75 x 23.75	9	17.5 x 17.5	1.0	2.3	47	304	481	680	833	962	1076	1178	1273	1361	1521
12 x 14	2	23.75 x 25.75	9	17.5 x 19.5	1.2	2.4	50	339	537	759	929	1073	1200	1314	1420	1518	1697
12 x 16	2	23.75 x 27.75	9	17.5 x 21.5	1.3	2.5	52	372	588	832	1019	1177	1316	1441	1557	1664	1860
12 x 18	2	23.75 x 29.75	9	17.5 x 23.5	1.5	2.6	54	403	637	901	1104	1274	1425	1561	1686	1802	2015
12 x 24	2	23.75 x 35.75	9	17.5 x 29.5	2.0	3.0	61	488	772	1091	1337	1543	1726	1890	2042	2183	2440
14 x 14	2	25.75 x 25.75	9	19.5 x 19.5	1.4	2.5	52	376	594	841	1030	1189	1329	1456	1573	1681	1880
14 x 16	2	25.75 x 27.75	9	19.5 x 21.5	1.6	2.6	54	410	648	916	1122	1296	1449	1587	1714	1833	2049
14 x 18	2	25.75 x 29.75	9	19.5 x 23.5	1.8	2.7	56	442	698	987	1209	1396	1561	1710	1847	1975	2208
14 x 24	2	25.75 x 35.75	9	19.5 x 29.5	2.3	3.1	63	528	835	1181	1447	1671	1868	2046	2210	2363	2642
14 x 30	2	25.75 x 41.75	12.5	19.5 x 35.5	2.9	3.1	69	783	1238	1751	2144	2476	2768	3033	3276	3502	3915

TRE - Relief Performance Data Continued

Throat Size (In.)	No. of Tiers	Hood Size (In.)	Ht. (In.)	Curb Cap Size (In)	Throat Area (FT^2)	Ducted / Non-Ducted		Static Pressure Drop									
						Ducted		0.020	0.055	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.500
						Non-Ducted		0.028	0.068	0.134	0.198	0.264	0.325	0.390	0.455	0.520	0.645
						Hood Area	Shipping Weight	CFM									
16 x 16	2	27.75 x 27.75	9	21.5 x 21.5	1.8	2.7	56	444	703	994	1217	1405	1571	1721	1859	1988	2222
16 x 18	2	27.75 x 29.75	9	21.5 x 23.5	2.0	2.8	58	477	754	1066	1306	1507	1685	1846	1994	2132	2384
16 x 24	2	27.75 x 35.75	9	21.5 x 29.5	2.7	3.2	65	565	893	1262	1546	1785	1996	2186	2362	2525	2823
16 x 30	3	27.75 x 41.75	12.5	21.5 x 35.5	3.3	5.3	83	846	1338	1892	2317	2675	2991	3277	3539	3784	4230
16 x 32	3	27.75 x 43.75	12.5	21.5 x 37.5	3.6	5.4	86	885	1399	1979	2423	2798	3128	3427	3702	3957	4424
18 x 18	2	29.75 x 29.75	9	23.5 x 23.5	2.3	3.0	61	509	805	1139	1395	1611	1801	1973	2131	2278	2547
18 x 24	2	29.75 x 35.75	9	23.5 x 29.5	3.0	3.3	67	598	945	1337	1637	1891	2114	2315	2501	2674	2989
18 x 30	3	29.75 x 41.75	12.5	23.5 x 35.5	3.8	5.4	86	904	1429	2020	2474	2857	3195	3499	3780	4041	4518
18 x 32	3	29.75 x 43.75	12.5	23.5 x 37.5	4.0	5.6	88	943	1491	2109	2583	2983	3335	3653	3945	4218	4716
18 x 36	3	29.75 x 47.75	12.5	23.5 x 41.5	4.5	5.9	93	1020	1613	2282	2794	3227	3607	3952	4268	4563	5102
24 x 24	3	35.75 x 35.75	12.5	29.5 x 29.5	4.0	5.4	86	925	1463	2069	2533	2925	3271	3583	3870	4137	4625
24 x 30	3	35.75 x 41.75	12.5	29.5 x 35.5	5.0	5.9	93	1055	1667	2358	2888	3335	3729	4084	4412	4716	5273
24 x 32	3	35.75 x 43.75	12.5	29.5 x 37.5	5.3	6.1	96	1096	1732	2450	3000	3464	3873	4243	4583	4899	5478
24 x 36	4	35.75 x 47.75	16	29.5 x 41.5	6.0	8.6	116	1433	2266	3204	3925	4532	5067	5550	5995	6409	7165
24 x 42	4	35.75 x 53.75	16	29.5 x 47.5	7.0	9.2	125	1588	2511	3551	4350	5022	5615	6151	6644	7103	7941
24 x 48	4	35.75 x 59.75	16	29.5 x 53.5	8.0	9.9	134	1738	2784	3886	4760	5496	6145	6731	7270	7772	8690
30 x 30	3	41.75 x 41.75	12.5	35.5 x 35.5	6.3	6.4	101	1187	1876	2654	3250	3753	4196	4596	4965	5307	5934
30 x 32	3	41.75 x 43.75	12.5	35.5 x 37.5	6.7	6.6	104	1228	1942	2747	3364	3884	4343	4757	5139	5493	6142
30 x 36	4	41.75 x 47.75	16	35.5 x 41.5	7.5	9.2	125	1624	2568	3631	4447	5135	5741	6289	6793	7262	8119
30 x 42	4	41.75 x 53.75	16	35.5 x 47.5	8.8	9.9	134	1784	2820	3989	4885	5641	6307	6909	7462	7977	8919
30 x 48	4	41.75 x 59.75	16	35.5 x 53.5	10.0	10.6	143	1937	3063	4332	5306	6127	6850	7504	8105	8665	9687
30 x 54	5	41.75 x 65.75	19.5	35.5 x 59.5	11.3	14.0	171	2458	3886	5495	6730	7772	8689	9518	10281	10991	12288
30 x 60	6	41.75 x 71.75	23	35.5 x 65.5	12.5	17.8	201	2983	4717	6670	8170	9433	10547	11553	12479	13341	14915
32 x 32	3	43.75 x 43.75	12.5	37.5 x 37.5	7.1	6.8	106	1270	2008	2840	3478	4016	4490	4919	5313	5680	6350
32 x 36	4	43.75 x 47.75	16	37.5 x 41.5	8.0	9.5	128	1683	2661	3764	4610	5323	5951	6519	7041	7527	8416
32 x 42	4	43.75 x 53.75	16	37.5 x 47.5	9.3	10.1	137	1844	2916	4124	5050	5832	6520	7142	7715	8247	9221
32 x 48	4	43.75 x 59.75	16	37.5 x 53.5	10.7	10.8	146	1999	3160	4469	5474	6321	7067	7741	8361	8939	9994
32 x 54	5	43.75 x 65.75	19.5	37.5 x 59.5	12.0	14.3	174	2540	4017	5681	6957	8034	8982	9839	10627	11361	12702
32 x 60	6	43.75 x 71.75	23	37.5 x 65.5	13.3	18.2	205	3090	4885	6909	8462	9771	10924	11967	12925	13818	15449
32 x 72	7	43.75 x 83.75	26.5	37.5 x 77.5	16.0	23.5	251	3889	6150	8697	10651	12299	13751	15063	16270	17394	19447
36 x 36	4	47.75 x 47.75	16	41.5 x 41.5	9.0	9.9	134	1797	2842	4019	4922	5683	6354	6961	7518	8037	8986
36 x 42	4	47.75 x 53.75	16	41.5 x 47.5	10.5	10.6	143	1960	3099	4383	5368	6198	6930	7591	8199	8765	9800
36 x 48	5	47.75 x 59.75	19.5	41.5 x 53.5	12.0	14.0	171	2505	3961	5602	6861	7923	8858	9704	10481	11205	12527
36 x 54	5	47.75 x 65.75	19.5	41.5 x 59.5	13.5	14.9	181	2698	4265	6032	7388	8531	9538	10448	11285	12064	13488
36 x 60	6	47.75 x 71.75	23	41.5 x 65.5	15.0	18.8	213	3291	5204	7359	9013	10408	11636	12747	13768	14719	16456
36 x 72	7	47.75 x 83.75	26.5	41.5 x 77.5	18.0	24.3	259	4145	6554	9269	11352	13108	14656	16054	17341	18538	20726
42 x 42	5	53.75 x 53.75	19.5	47.5 x 47.5	12.3	14.0	171	2520	3985	5635	6901	7969	8910	9760	10542	11270	12600
42 x 48	5	53.75 x 59.75	19.5	47.5 x 53.5	14.0	14.9	181	2723	4305	6088	7457	8610	9626	10545	11390	12177	13614
42 x 54	5	53.75 x 65.75	19.5	47.5 x 59.5	15.8	15.7	191	2918	4614	6525	7992	9228	10317	11302	12207	13050	14591
42 x 60	6	53.75 x 71.75	23	47.5 x 65.5	17.5	19.8	224	3571	5647	7985	9780	11293	12626	13831	14939	15971	17856
42 x 72	7	53.75 x 83.75	26.5	47.5 x 77.5	21.0	25.5	271	4497	7110	10056	12316	14221	15899	17417	18812	20111	22485
42 x 84	8	53.75 x 95.75	30	47.5 x 89.5	24.5	31.8	369	5492	8684	12281	15040	17367	19417	21270	22975	24561	27460
48 x 48	5	59.75 x 59.75	19.5	53.5 x 53.5	16.0	15.7	191	2928	4630	6548	8020	9260	10353	11341	12250	13096	14642
48 x 54	6	59.75 x 65.75	23	53.5 x 59.5	18.0	19.8	224	3598	5689	8046	9854	11378	12721	13936	15052	16091	17991
48 x 60	6	59.75 x 71.75	23	53.5 x 65.5	20.0	20.8	235	3833	6060	8570	10496	12120	13550	14844	16033	17140	19163
48 x 72	7	59.75 x 83.75	26.5	53.5 x 77.5	24.0	26.6	283	4822	7624	10781	13204	15247	17047	18674	20170	21563	24108
48 x 84	8	59.75 x 95.75	30	53.5 x 89.5	28.0	33.1	384	5888	9309	13165	16124	18618	20816	22803	24630	26330	29438
48 x 96	9	59.75 x 107.8	33.5	53.5 x 102	32.0	40.2	464	7024	11105	15705	19235	22210	24832	27202	29382	31410	35118
54 x 54	6	65.75 x 65.75	23	59.5 x 59.5	20.3	20.8	235	3844	6078	8595	10527	12156	13591	14888	16081	17191	19220
54 x 60	6	65.75 x 71.75	23	59.5 x 65.5	22.5	21.8	246	4081	6453	9126	11177	12907	14430	15807	17074	18253	20407
54 x 72	7	65.75 x 83.75	26.5	59.5 x 77.5	27.0	27.8	296	5127	8107	11465	14042	16214	18128	19858	21449	22930	25636
54 x 84	8	65.75 x 95.75	30	59.5 x 89.5	31.5	34.4	399	6257	9893	13991	17135	19786	22121	24232	26174	27981	31284
54 x 96	9	65.75 x 107.8	33.5	59.5 x 102	36.0	41.7	481	7463	11800	16688	20439	23601	26387	28905	31221	33377	37316
54 x 108	10	65.75 x 119.8	37	59.5 x 114	40.5	49.7	587	8740	13819	19543	23935	27638	30900	33850	36562	39086	43700
60 x 60	7	71.75 x 71.75	26.5	65.5 x 65.5	25.0	26.6	283	4872	7704	10895	13343	15408	17226	18870	20382	21790	24361
60 x 72	7	71.75 x 83.75	26.5	65.5 x 77.5	30.0	29.0	308	5420	8569	12118	14842	17138	19161	20990	22671	24237	27098
60 x 84	8	71.75 x 95.75	30	65.5 x 89.5	35.0	35.7	414	6607	10446	14773	18094	20893	23359	25588	27638	29547	33034
60 x 96	9	71.75 x 107.8	33.5	65.5 x 102	40.0	43.2	498	7877	12455	17614	21572	24909	27849	30508	32952	35227	39385
60 x 108	10	71.75 x 119.8	37	65.5 x 114	45.0	51.3	633	9224	14584	20625	25261	29168	32611	35724	38586	41250	46119
60 x 120	12	71.75 x 131.8	44	65.5 x 126	50.0	65.6	729	11295	17859	25256	30932	35717	39933	43745	47250	50512	56474

Low Silhouette Upblast Roof Gravity Unit



Description - Unit shall be a low silhouette gravity upblast ventilator.

Construction - The unit shall be of bolted and welded construction utilizing corrosion resistant fasteners. The fan housing and base shall be minimum 14 gauge and the baffle shall be a minimum 18 gauge steel. Unit shall have built-in butterfly dampers of aluminum or steel construction (aluminum on sizes 24-36, steel 42-60). Curb cap corners shall be continuously welded for maximum leak protection. The wind band shall be continuously seam welded with rolled flanges on each end for strength.

Coating - All steel fan components shall be Lorenized® with an electrostatically applied, baked polyester powder coating. Each component shall be subject to a five stage environmentally friendly wash system, followed by a minimum 2 mil thick baked powder finish. Paint must exceed 1,000 hour salt spray under ASTM B117 test method.

Product - Unit shall be model LSUG as manufactured by Loren Cook Company of Springfield, Missouri.

Model LSUG - Model LSUG, low silhouette gravity relief unit, is an upblast ventilator designed for use as a weatherproof outlet on vertical high velocity exhaust systems. For CFM requirements to open the dampers see CFM minimum table and pressure drop table below.

LSUG Dimension Data

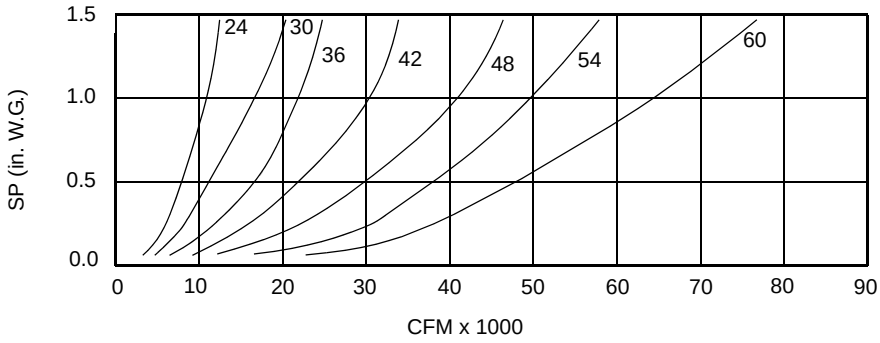
Fan Size	A Dia.	B	C	D	T Sq.	Steel Gauge			Roof Opening Square	Approx. Ship Wt.-Lbs.
						Base	Housing	Baffle		
24	31-1/4	28	26	3	36	14	14	18	31-1/2	200
30	37-1/4	34	32	3	42	14	14	18	37-1/2	260
36	43-1/4	38	36	3	48	14	14	18	43-1/2	310
42	49-1/4	45	43	3	54	14	14	18	49-1/2	380
48	55-1/4	50	48	3	60	14	14	18	55-1/2	445
54	61-1/4	46	44	3	66	14	14	16	61-1/2	480
60	67-1/4	51	49	3	72	14	14	16	67-1/2	540

All dimensions in inches.

Minimum CFM to Open Dampers

Fan Size	Damper Material	
	Aluminum	Steel
24	3950	5220
30	6050	7130
36	7620	11000
42	11050	13550
48	12820	16420
54	16500	18650
60	19120	22740

Pressure Ratings for Dampers



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