

Combination
Storm / *FEMA louver / Blast Damper
ICBL-20-WR

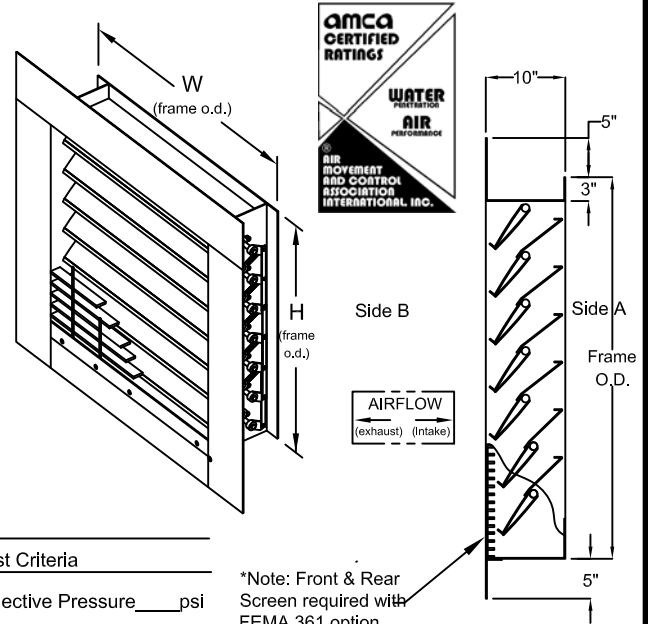
Application and Design

United Energetech has gained its position as a leader in the manufacturing of air movement and control equipment by producing high quality innovative products. In our most recent development, United Energetech teamed up with Applied Research Associates (ARA), a leading researcher in explosive dynamics, to develop a multi functional Blast Damper. The result is a damper/louver system which can withstand a high yield blast, offer AMCA ratings for water penetration and pressure drop, and complies with FEMA 361 zone IV criteria, 250 mph winds (2' x 4'); 15lbs missile impact at 100mph when ordered with the screen.

To facilitate the design, ARA examined the effects of blast loading using Finite Element Modeling and Single Degree of Freedom calculations. Their modeling replicated a close-in explosive threat, one similar to a car bomb. The simulation was a 200lb TNT surface charge at a range of 50 feet. The numerical simulation demonstrated that the damper was able to withstand the high peak incident pressure/short duration explosive load with only moderate damage. Further analysis showed that the blast overpressure downstream of the damper was greatly reduced by as much as 83%, thereby protecting equipment and personnel downstream. The ability of the Damper to reduce the downstream overpressure was accomplished by designing a blade profile and linkage system which quickly shuts at the onset of a blast pressure wave. In this simulation of a close range blast, the damper was able to close in 7 milliseconds. The ICBL-20-WR is also rated for gas/oil type and vapor cloud explosions.

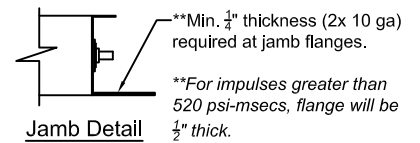
The ICBL-20-WR is ideal for protecting equipment and personnel from sudden blasts and instantaneous pressure changes. Engineers can design with confidence when specifying this product.

Note: ICBL-20-WR Not intended for horizontal mount applications



*Note: Front & Rear Screen required with FEMA 361 option

Max. Free Area Velocity: 4000 FPM



STANDARD CONSTRUCTION:

FRAME:
10" (254mm) Deep, 10 ga. *(2x thickness @ jamb flange)
Carbon Steel Frame (ASTM A-653)

BLADES:
10 ga Carbon Steel Double Skin Airfoil
(ASTM A-653)

BLADE LOCK:
Latch mechanism to lock blades in closed position after Blast

AXLES:
Ø 1" (25.4mm) solid A36 steel on 6" (152mm) centers

REAR SCREEN:
18 ga x 1/2" (12.7mm) Expanded Steel

LINKAGE:
3/16" (4.76mm) thick x 3/4" (19.05mm) wide bars

BEARINGS:
Two hole flange ball bearing (type III)

FINISH:
Powder Coated, Zinc Rich Primer
(Medium Gray, Top coat not required)

SIZE LIMITATIONS:
Minimum size: 14"w x 14"h (356mm x 356mm) O.D.
Maximum single section:
48"w x 66"h O.D.
(1219mm x 1676mm) O.D.

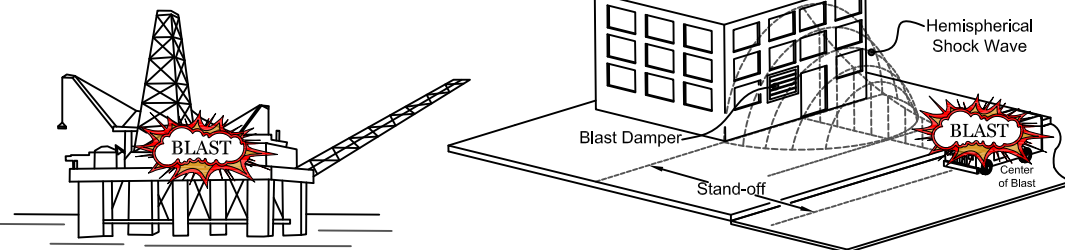
For factory assembled multi-section size limitations, consult factory

REQUIRED SPECIFICATIONS:

- | | |
|--|--|
| <u>Airflow / Volume</u> | <u>Blast Criteria</u> |
| <input type="checkbox"/> Intake <input type="checkbox"/> Exhaust | Reflective Pressure ___ psi |
| Air Volume _____ cfm | Duration _____ msec |
| <u>Adjustable Spring Tensioner location</u> | Impulse _____ psi-msec |
| <input type="checkbox"/> Accessible from Interior (Side A) -Standard | The following equation can be used to approximate impulse: |
| <input type="checkbox"/> Accessible from Exterior (Side B) -Optional | $Impulse \approx \frac{1}{2} Duration \times pressure$ |

VARIATIONS:

- 304 Stainless Steel construction (ASTM-A240,SA240,AMS 5513)
- 316 Stainless Steel frame and blades (some parts may not be 316 ss) (ASTM-A240,SA240,AMS 5513)
- Custom Finish Powder Coating, select color
- FEMA 361 Screen
- Omit Flange (in duct mount-see installation details)



*Note: Front & Rear Screen required with FEMA 361 option

Complies with FEMA 361 and ICC 500 storm shelter and safe room standards

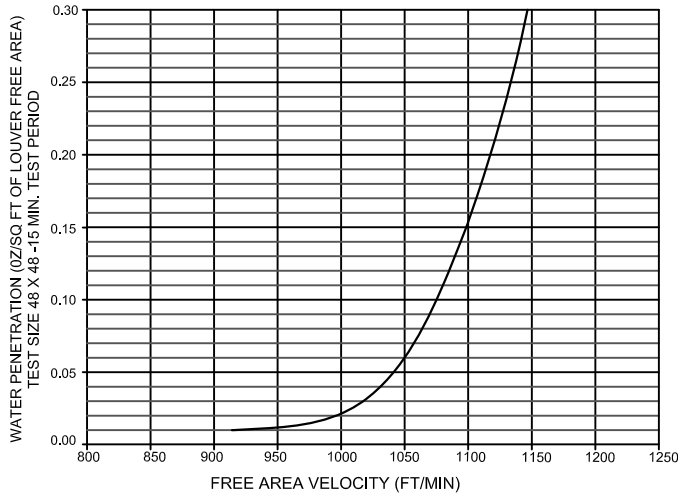
Due to continuing research, United Energetech reserves the right to change specifications without notice.

Job Name:	<input type="checkbox"/> ICBL-20-WR		
Location:			
Architect:	DRAWN BY: CLJ	DATE: February 2013	REV. DATE: September 2016
Engineer:	REV.NO.: 3	APPROVED BY: BGT	DWG NO.: A-19a
Contractor:			

ICBL-20-WR PERFORMANCE DATA

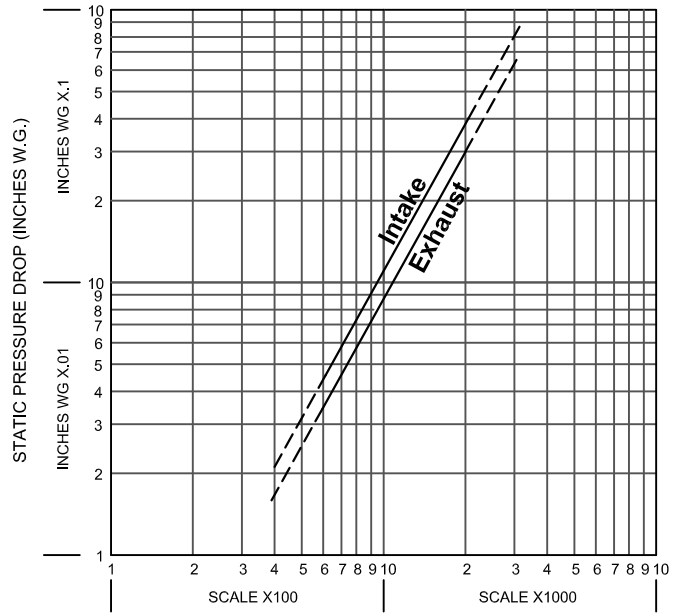
Water Penetration

Standard Air-.075 lb/ft³



Beginning point of WATER PENETRATION is 916 fpm free area velocity at .01 oz. of water penetration

Air Flow Resistance



FREE AREA VELOCITY (FT/MIN)

Based on STANDARD AIR-.075 lb. per cubic foot.

Ratings do not include the effects of screen.

Test size 48" x 48"

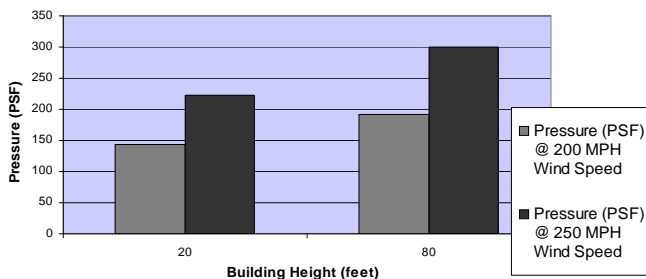
Free Area Chart (square feet):

Louver O.D. Height in Inches	Louver O.D. Width in Inches						
	14	18	24	30	36	42	48
14	0.13	0.20	0.30	0.40	0.49	0.59	0.69
18	0.17	0.26	0.38	0.51	0.64	0.77	0.89
24	0.42	0.63	0.94	1.25	1.56	1.88	2.19
30	0.58	0.88	1.31	1.75	2.19	2.63	3.06
36	0.67	1.03	1.50	2.02	2.50	3.04	3.52
42	0.76	1.15	1.72	2.29	2.86	3.44	4.01
48	0.98	1.29	1.91	2.60	3.18	3.81	4.36
54	1.12	1.68	2.51	3.35	4.18	5.03	5.27
60	1.26	1.90	2.84	3.79	4.74	5.69	6.13
66	1.38	2.05	3.18	4.13	5.16	6.19	7.03



United Enertech certifies that the ICBL-20-WR shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publications 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA certified rating seal applies to air performance ratings and water penetration ratings.

Wind Pressure Examples per ICC500



Complies with FEMA 361 and ICC 500 storm shelter and safe room standards

FEMA 361 / ICC-500 MISSILE IMPACT TEST:

MISSILE TYPE	VELOCITY IN MPH	IMPACTS
15 lb. 2"x4" (Wood grade #2 or better)	100	4