



SINCE 1896

# REPORT

**Intertek** ETL SEMKO

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

Order No. 3096540

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**REPORT NO. 3096540CRT-001b**

## **STATIC PRESSURE, SOUND POWER LEVEL, AREA FACTOR AND THROW TESTS ON DOUBLE DEFLECTION SUPPLY AIR REGISTERS**

**RENDERED TO**

**BEST CHOICE INDUSTRIES L.L.C.  
P. O. BOX 31567  
DUBAI, U.A.E.**

**NOTE:** Report revised to include watermark

### **INTRODUCTION**

This report gives the results of tests conducted on seven double deflection supply air registers. The test results include Static Pressure, Area Factor, Throw and Sound Power Level. The samples were selected and supplied by the client and were received at the laboratories on May 5, 2006. The samples appeared to be in new unused condition upon receipt.

### **AUTHORIZATION**

Signed Intertek Quotation No. 19932299

### **TEST METHOD**

The registers were tested in accordance with the ASHRAE 70-1991 Standard "Method of Testing for Rating the Performance of Air Outlets and Inlets", which incorporates ADC 1062: GRD-84 Test Code for Grilles, Registers and Diffusers. Acoustical data was obtained employing a Bruel & Kjaer Digital Frequency Analyzer Type 2131 and analyzed on a CompuAdd 286 Computer and Epson LQ-850 printer. The reference sound source used for this test was a calibrated Bruel & Kjaer Type 4204, which conforms to the above standard. The octave band sound power levels were plotted on graph of Noise Criteria Curves which is in the ADC Test Code. These curves are reprinted with permission from the ASHRAE Handbook and Product Directory, 1976. Each register was installed in a side wall of the facility and supplied with measured volumes of air. The static pressure was measured upstream of each register in a supply air plenum.

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**DESCRIPTION OF TEST SPECIMENS**

The registers were constructed of extruded aluminum and were equipped with airfoil designed blades for providing air deflection in both the horizontal and vertical planes. The front and back blades were 17mm deep and the grille frame was 40mm deep. The blades were spaced on 20mm centers with the horizontal blades installed in front of the vertical blades. The vertical and horizontal blades were set at 0° deflection for all tests. The register sizes, in millimeters, supplied for testing were 450 X 150, 600 X 150, 900 X 150, 450 X 200, 600 X 200, 750 X 200 and 900 X 200. An opposed blade inlet damper set in the full open position, was attached to the back of each register.

**RESULTS OF TESTS**

Octave Band Center Frequency Hertz	SAR HFB DD Size 450 mm x 200 mm Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt						
	600	700	800	900	1000	1100	1200
125	45.5*	46.0*	48.0	50.0	51.5	54.5	55.5
250	37.5	40.0	42.5	45.0	47.5	50.5	53.0
500	33.0	38.5	42.0	44.5	47.5	50.0	52.0
1000	27.5	34.5	39.0	42.5	46.0	49.0	51.0
2000	20.5*	26.5	32.0	36.5	40.5	45.0	47.5
4000	22.0*	22.0*	23.0*	26.5	31.5	36.5	40.0
8000	29.0*	29.0*	29.0*	29.0	29.0*	29.0*	30.5
Supply Air Volume, CFM	600	700	800	900	1000	1100	1200
Inlet Static Pressure, in. H <sub>2</sub> O	0.046	0.063	0.082	0.105	0.130	0.160	0.190
**Noise Criteria (NC)	16	22	27	31	35	38	40

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

Checked by: 

**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	SAR HFB DD Size 600 mm x 200 mm					
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	43.0*	46.5	43.5	46.5*	48.0*	51.5
250	37.0	40.0	41.0	42.5	47.5	51.0
500	31.5	36.5	39.0	42.0	47.0	51.5
1000	26.0	31.0	35.5	38.5	45.5	50.5
2000	20.0*	24.5*	28.0	31.5	39.5	46.0
4000	22.0*	22.0*	22.0*	22.5*	30.0	37.5
8000	29.0*	29.0*	29.0*	29.0*	29.0*	29.5*
Supply Air Volume, CFM	700	800	900	1000	1200	1400
Inlet Static Pressure, in. H <sub>2</sub> O	0.037	0.048	0.062	0.075	0.110	0.142
**Noise Criteria (NC)	<15	21	24	27	35	40

Octave Band Center Frequency Hertz	SAR HFB DD Size 750 mm x 200 mm				
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt				
125	46.0*	46.0*	49.5	52.5	55.0
250	35.0	41.0	45.0	49.5	54.0
500	30.0	38.0	45.0	50.0	54.0
1000	25.0*	34.0	42.0	48.5	53.5
2000	21.0*	26.0	35.5	43.5	50.0
4000	22.0*	22.0*	25.5*	36.5	41.5
8000	29.0*	29.0*	29.0*	32.5	30.5*
Supply Air Volume, CFM	800	1000	1250	1500	1750
Inlet Static Pressure, in. H <sub>2</sub> O	0.035	0.055	0.080	0.120	0.165
**Noise Criteria (NC)	<15	22	31	38	42

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

Checked by: 

**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	SAR HFB DD Size 900 mm x 200 mm					
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	46.0*	46.5*	49.5*	53.5	56.0	
250	38.0	43.0	47.0	51.5	54.0	
500	33.5	41.0	46.5	51.0	53.5	
1000	28.5	37.0	44.0	50.0	53.0	
2000	21.0*	29.0	37.5	44.5	49.5	
4000	22.0*	22.0*	27.5	35.5	40.5	
8000	29.0*	29.0*	29.0*	29.0*	30.5*	
Supply Air Volume, CFM	1000	1250	1500	1750	2000	
Inlet Static Pressure, in. H <sub>2</sub> O	0.038	0.060	0.085	0.118	0.150	
**Noise Criteria (NC)	17	25	33	39	42	

Octave Band Center Frequency Hertz	SAR HFB DD Size 450 mm x 150 mm					
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	45.5*	45.5*	45.5*	47.5*	51.0	53.5
250	38.0	38.5	39.0	42.5	46.0	50.0
500	27.5	37.5	40.5	46.5	49.0	51.0
1000	20.5*	28.5	31.0	40.0	47.0	53.0
2000	19.0*	21.5*	24.0*	33.5	40.5	47.5
4000	21.0*	21.0*	21.0*	24.0*	31.0	38.5
8000	28.0*	28.0*	28.0*	28.0*	28.0*	28.5*
Supply Air Volume, CFM	300	350	400	500	600	700
Inlet Static Pressure, in. H <sub>2</sub> O	0.030	0.420	0.55	0.086	0.123	0.170
**Noise Criteria (NC)	<15	22	25	32	36	42

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

Checked by: 

**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	SAR HFB DD Size 600 mm x 150 mm					
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	45.5*	45.5*	45.5*	47.0*	47.5*	50.0
250	35.0	39.0	41.5	45.0	47.0*	49.5
500	27.5	37.5	42.0	45.5	48.5	51.0
1000	21.0*	31.0	36.5	42.5	46.5	50.5
2000	18.5*	24.0*	30.5	36.5	41.5	46.0
4000	21.0*	21.0*	21.5*	27.0	32.5	37.5
8000	28.0*	28.0*	28.0*	28.0*	28.0*	28.5*
Supply Air Volume, CFM	400	500	600	700	800	900
Inlet Static Pressure, in. H <sub>2</sub> O	0.034	0.054	0.077	0.106	0.138	0.172
**Noise Criteria (NC)	<15	22	27	32	36	40

Octave Band Center Frequency Hertz	SAR HFB DD Size 900 mm x 150 mm						
	Discharge Sound Power Level dB re 10 <sup>-12</sup> Watt						
125	45.5*	45.5*	45.5*	46.5*	48.5*	53.5	53.5
250	37.0	40.5	42.5	43.5	46.0	47.0	48.5
500	30.0	34.5	39.5	43.0	46.5	48.5	50.5
1000	25.0	29.0	33.0	37.5	43.0	46.5	50.0
2000	23.0	24.5	27.0	30.5	35.5	39.0	42.0
4000	21.0*	21.0*	21.0*	22.0*	25.0*	29.0	32.5
8000	28.0*	28.0*	28.0*	28.0*	28.0*	28.0*	28.0*
Supply Air Volume, CFM	600	700	800	900	1000	1100	1200
Inlet Static Pressure, in. H <sub>2</sub> O	0.029	0.040	0.052	0.066	0.081	0.100	0.118
**Noise Criteria (NC)	15	19	24	28	32	36	40

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

Checked by: 

**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 450 mm x 200 mm**

Manufacturer: Best Choice Industries	Grill Face: 438 mm x 188 mm	Date: May 22, 2006
Throw Dir.: Side Wall Mount, Horizontal	Neck Area (Sq. Ft.): 0.886	Air Density: 0.071 lbs/ft <sup>3</sup>
Flow Meter: Nozzle Metering Station	Anemometer: Alnor Velometer Type 6000P	
	Serial Number: 6077AL	

Run Number	Readings				Calculations					
	Anemometer - (Vk, FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. Ak
	1	2	3	4						
1	950	975	975	1000	0.063	700	790	0.039	0.102	0.718
2	1250	1250	1200	1200	0.105	900	1016	0.064	0.169	0.735
3	1450	1450	1500	1500	0.160	1100	1242	0.097	0.257	0.746
										Average: 0.733

Checked by: 

**AR450X200**

Distance From Ceiling Inches	Supply Air Volume: <u>625 cfm</u>												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	30	85	210	285	275	240	200	175	165	125	115	95	70
3"	35	120	285	320	300	240	215	190	175	135	130	110	80
6"	65	280	425	395	305	225	200	180	170	130	125	110	85
9"	550	550	550	430	295	205	175	160	140	120	115	110	80
12"	550	550	455	335	240	165	130	130	110	100	100	90	75
18"	175	220	230	185	155	125	90	85	65	75	80	70	75
24"	115	70	80	95	95	90	75	65	45	60	70	55	65

Distance From Ceiling Inches	Supply Air Volume: <u>500 cfm</u>												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	25	55	145	230	195	200	160	155	130	95	85	90	70
3"	30	100	185	235	210	215	170	170	140	105	90	100	80
6"	70	225	305	255	215	205	155	165	135	105	85	110	70
9"	525	535	435	265	210	205	165	150	130	95	80	105	65
12"	550	495	385	220	180	170	150	130	115	75	70	90	60
18"	135	190	220	150	100	120	125	100	70	55	55	65	50
24"	35	55	90	95	70	90	100	70	50	45	40	55	45

Distance From Ceiling Inches	Supply Air Volume: <u>250 cfm</u>												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	45	35	85	105	135	100	100	90	65	65	60	50	45
3"	75	55	110	130	140	105	110	90	70	70	65	55	45
6"	80	110	160	150	130	95	100	80	65	65	65	45	50
9"	270	255	215	175	125	85	75	65	65	55	55	35	45
12"	305	270	185	145	100	70	55	55	60	45	45	30	35
18"	70	90	90	80	55	50	35	35	45	35	25	30	25
24"	30	25	35	40	30	35	25	20	30	35	25	20	25

Checked by: 



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 600 mm x 200 mm**

Manufacturer: Best Choice Industries      Grill Face: 588 mm x 188 mm      Date: May 19, 2006  
 Throw Dir.: Side Wall Mount, Horizontal      Neck Area (Sq. Ft.): 1.190      Air Density: 0.071 lbs/ft<sup>2</sup>  
 Flow Meter: Nozzle Metering Station      Anemometer: Alnor Velometer Type 6000P  
 Serial Number: 6077AL

Run Number	Readings				Calculations					
	Anemometer - (Vk, FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	980	1020	1000	980	0.062	900	756	0.036	0.098	0.905
2	1350	1325	1325	1300	0.110	1200	1008	0.064	0.174	0.906
3	1575	1550	1550	1575	0.142	1400	1176	0.087	0.229	0.896
									Average: 0.902	

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**SAR 600X200**  
**Supply Air Volume: 625 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	75	140	200	305	320	285	240	185	160	140	130	110	75
3"	90	200	275	345	310	265	250	195	155	150	135	125	85
6"	150	370	415	375	295	235	225	185	145	155	135	125	90
9"	420	540	505	350	250	185	190	170	120	145	130	125	100
12"	550	480	395	270	185	135	140	135	85	120	115	100	90
18"	75	120	190	155	110	95	105	85	60	90	85	85	80
24"	45	70	90	90	80	70	75	65	45	75	75	70	70

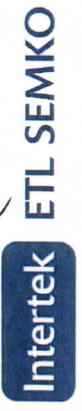
**Supply Air Volume: 500 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'	
1"	55	85	170	245	245	220	155	125	115	110	75	65	55
3"	80	130	225	260	230	210	155	130	125	110	80	70	60
6"	120	220	305	285	210	185	135	130	120	105	85	80	60
9"	265	395	350	265	180	160	110	110	105	90	80	80	60
12"	545	405	295	210	145	125	90	95	85	80	75	75	50
18"	85	110	155	130	100	85	55	70	65	60	65	65	35
24"	50	45	75	80	65	70	45	55	40	50	50	55	25

**Supply Air Volume: 350 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	45	90	150	210	185	160	135	95	85	70	70	45	50
3"	50	120	170	205	165	155	130	100	85	70	70	55	60
6"	75	175	190	170	130	125	105	95	85	70	70	55	60
9"	200	250	215	135	100	100	80	80	75	70	65	50	55
12"	410	250	175	100	70	80	60	65	60	60	55	40	45
18"	40	60	95	55	50	55	40	55	45	35	40	30	35
24"	30	30	50	35	40	40	30	55	35	30	35	30	30

Checked by: 



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 750 x 200**

**Manufacturer:** Best Choice Industries      **Grill Face:** 738 mm x 188 mm      **Date:** May 22, 2006  
**Throw Dir.:** Side Wall Mount, Horizontal      **Neck Area (Sq. Ft.):** 1.493      **Air Density:** 0.071 lbs/ft<sup>3</sup>  
**Flow Meter:** Nozzle Metering Station      **Anemometer:** Alnor Velometer Type 6000P  
**Serial Number:** 6077AL

Run Number	Readings				Calculations					
	Anemometer - ( $V_k$ , FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	880	860	880	900	0.055	1000	670	0.028	0.083	1.136
2	1150	1125	1125	1150	0.080	1250	837	0.044	0.124	1.099
3	1350	1325	1350	1375	0.120	1500	1005	0.063	0.183	1.111
									Average:	1.115

Checked by: 

**BCI SAR750X200**

Supply Air Volume: 625 cfm

Distance From Ceiling Inches	Distance From Diffuser (Ft)													
	1'	3'	5'	7'	9'	11'	13'							
1"	35	60	105	170	195	205	195							
3"	40	70	115	180	205	220	215							
6"	55	100	155	220	230	245	230							
9"	190	195	255	275	275	260	235							
12"	470	370	300	290	275	240	210							
18"	190	270	260	260	240	200	180							
24"	35	100	165	205	200	180	150							
									15'	17'	19'	21'	23'	25'
									180	180	160	120	110	115
									200	190	170	135	125	130
									230	200	170	145	130	135
									235	200	165	150	135	140
									205	175	150	135	125	125
									160	140	120	110	95	115
									130	125	100	105	85	100

Supply Air Volume: 500 cfm

Distance From Ceiling Inches	Distance From Diffuser (Ft)													
	1'	3'	5'	7'	9'	11'	13'							
1"	30	50	105	135	145	145	135							
3"	30	50	105	135	155	150	155							
6"	50	65	125	160	175	170	165							
9"	130	140	185	195	205	190	180							
12"	315	265	225	210	205	180	160							
18"	145	200	230	205	185	170	130							
24"	30	75	135	185	150	150	110							
									15'	17'	19'	21'	23'	25'
									135	135	115	110	85	85
									150	155	130	125	100	90
									160	155	135	130	105	100
									160	150	135	135	110	110
									135	130	125	115	100	105
									110	100	105	95	90	95
									95	75	90	75	85	90

Supply Air Volume: 350 cfm

Distance From Ceiling Inches	Distance From Diffuser (Ft)													
	1'	3'	5'	7'	9'	11'	13'							
1"	20	30	80	100	105	115	110							
3"	25	35	75	110	115	125	120							
6"	40	50	90	125	125	130	120							
9"	95	105	130	150	145	130	120							
12"	225	195	170	160	145	115	110							
18"	105	150	155	125	120	90	85							
24"	25	55	95	85	90	75	65							
									17'	19'	21'	23'	25'	
									105	95	90	70	65	70
									120	105	100	80	70	80
									120	105	105	80	70	90
									115	95	100	80	65	80
									105	70	80	70	55	65
									80	50	55	40	40	50
									65	40	45	35	35	40

Checked by: 



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 900 x 200**

Manufacturer: Best Choice Industries      Grill Face: 888 mm x 188 mm      Date: May 23, 2006  
 Throw Dir.: Side Wall Mount, Horizontal      Neck Area (Sq. Ft.): 1.94      Air Density: 0.071 lbs/ft<sup>2</sup>  
 Flow Meter: Nozzle Metering Station      Anemometer: Anor Velometer Type 6000P  
 Serial Number: 6077AL

Run Number	Readings				Calculations					
	Anemometer - ( $V_k$ , FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	780	800	800	800	0.038	1000	515	0.017	0.055	1.26
2	1150	1200	1250	1200	0.085	1500	773	0.037	0.122	1.25
3	1600	1625	1625	1625	0.150	2000	1031	0.062	0.212	1.24
Average: 1.25										

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**Supply Air Volume: 625 cfm**

**BCI SAR 900 x 200**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	45	90	190	235	220	185	175	145	100	100	70	65	70
3"	50	120	220	245	210	180	170	145	100	100	75	65	75
6"	140	275	280	240	170	165	150	140	110	95	80	70	70
9"	525	420	270	195	125	135	125	115	100	85	75	65	65
12"	485	315	195	145	95	110	95	85	85	70	65	60	55
18"	70	80	80	70	60	70	65	55	65	55	50	50	50
24"	40	45	50	40	40	45	50	50	55	40	40	45	40

**Supply Air Volume: 500 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	35	70	165	190	170	150	125	115	85	75	60	50	50
3"	45	100	180	185	160	150	125	115	85	75	60	55	55
6"	125	215	210	165	140	125	115	105	85	75	65	60	55
9"	400	330	205	125	110	95	95	85	80	65	60	55	55
12"	365	250	135	90	85	70	75	65	70	50	55	50	50
18"	50	55	60	45	60	45	55	45	45	35	45	40	40
24"	35	40	45	35	45	30	45	25	30	30	40	30	35

**Supply Air Volume: 350 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	25	70	135	135	130	115	95	65	60	55	35	40	45
3"	35	95	145	135	130	110	95	70	70	60	45	45	50
6"	85	160	150	135	110	90	85	65	65	60	50	50	50
9"	295	205	125	115	85	70	70	50	55	50	50	45	40
12"	275	145	80	75	60	55	50	40	45	40	40	35	30
18"	35	40	40	30	30	35	35	25	35	35	30	30	25
24"	25	40	35	25	25	20	20	25	30	30	25	25	20

Checked by: 



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 450 x 150**

Manufacturer: Best Choice Industries Grill Face: 438 mm x 138 mm Date: May 19, 2006  
 Throw Dir.: Side Wall Mount, Horizontal Neck Area (Sq. Ft.): 0.675 Air Density: 0.071 lbs/ft<sup>3</sup>  
 Flow Meter: Nozzle Metering Station Anemometer: Alnor Velometer Type 6000P  
 Serial Number: 6077AL

Run Number	Readings				Calculations					
	Anemometer - ( $V_k$ , FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	700	720	700	680	0.030	300	444	0.012	0.042	0.429
2	1000	1025	1025	1000	0.086	500	741	0.035	0.121	0.494
3	1650	1675	1650	1650	0.170	700	1037	0.067	0.237	0.423
									Average: 0.448	

Checked by: 

**BCI SAR450X150**

**Supply Air Volume: 350 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)														
	1'	3'	5'	7'	9'	11'									
1"	25	60	145	180	190	155	150	130	170	120	115	191	211	231	251
3"	50	95	190	200	190	160	165	135	130	120	115	120	115	110	85
6"	100	165	245	230	200	170	165	130	125	120	115	120	115	110	80
9"	400	315	255	215	180	160	150	125	110	120	110	120	110	110	75
12"	240	225	195	165	150	130	120	105	95	100	95	100	95	90	65
18"	35	70	80	90	80	85	95	85	75	80	80	80	80	65	50
24"	35	40	40	50	50	65	70	65	55	70	65	70	65	50	40

**Supply Air Volume: 270 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)														
	1'	3'	5'	7'	9'	11'									
1"	25	80	170	180	175	180	150	130	170	120	105	191	211	231	251
3"	25	85	170	185	175	170	155	135	130	115	100	115	100	90	60
6"	70	140	195	190	170	155	140	130	120	115	95	115	95	85	70
9"	330	250	190	175	145	130	110	110	95	100	80	100	80	75	65
12"	185	190	150	135	115	105	80	80	80	80	65	80	65	65	60
18"	50	65	70	75	65	70	45	50	55	60	50	60	50	45	45
24"	30	35	40	35	40	45	25	40	40	40	45	40	45	35	40

**Supply Air Volume: 600 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)														
	1'	3'	5'	7'	9'	11'									
1"	35	70	110	130	145	135	120	95	95	90	70	191	211	231	251
3"	40	75	110	140	145	135	120	95	90	100	75	100	75	65	55
6"	70	125	145	155	135	115	105	95	85	90	75	90	75	65	55
9"	255	185	165	135	115	95	85	80	65	85	70	85	70	60	55
12"	180	120	130	110	85	70	65	70	55	65	60	65	60	50	50
18"	50	35	55	50	45	45	45	45	40	45	50	45	50	35	45
24"	45	20	25	25	30	25	30	40	30	30	40	30	40	35	40

Checked by *[Signature]*



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 600 x 150**

Manufacturer: Best Choice Industries Grill Face: 588 mm x 138 mm Date: May 19, 2006  
 Throw Dir.: Side Wall Mount, Horizontal Neck Area (Sq. Ft.): 0.873 Air Density: 0.071 lbs/ft<sup>3</sup>  
 Flow Meter: Nozzle Metering Station Anemometer: Alnor Velometer Type 6000P  
 Serial Number: 6077AL

Run Number	Readings				Calculations					
	Anemometer - ( $V_k$ , FPM)				Static "H <sub>2</sub> O	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	820	840	840	820	0.054	500	573	0.021	0.075	0.602
2	1200	1180	1180	1220	0.106	700	802	0.040	0.146	0.586
3	1500	1550	1550	1525	0.172	900	1031	0.067	0.239	0.588
									Average: 0.592	

Checked by: 



**BCI SAR600x150**

**Supply Air Volume: 385 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	30	65	130	220	215	195	175	160	140	125	115	95	75
3"	40	85	160	215	210	190	170	160	150	130	120	105	95
6"	65	165	220	210	190	175	145	145	140	120	110	105	85
9"	465	360	250	200	175	145	120	125	125	100	105	95	75
12"	300	230	180	150	140	115	90	105	95	80	95	80	70
18"	30	55	75	85	90	70	60	65	55	60	85	70	60
24"	30	40	45	50	55	40	35	40	35	35	60	60	55

**Supply Air Volume: 310 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	30	105	215	195	175	160	135	125	115	100	90	85	75
3"	55	125	200	175	160	150	130	125	115	105	95	90	80
6"	70	190	170	140	130	125	100	110	110	105	95	80	70
9"	415	240	125	105	105	105	75	90	90	95	90	80	65
12"	230	135	85	75	70	70	55	70	75	75	80	70	65
18"	30	35	40	40	45	45	40	55	50	55	60	60	55
24"	30	30	25	20	35	25	30	40	40	50	40	50	45

**Supply Air Volume: 220 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	20	85	150	150	135	120	95	90	85	75	60	50	40
3"	25	100	145	140	120	110	95	85	75	70	65	60	50
6"	50	145	130	110	100	95	85	75	75	70	65	60	40
9"	300	165	105	85	75	70	65	60	55	50	45	40	40
12"	130	105	75	55	60	55	50	50	45	50	45	40	45
18"	20	25	30	25	25	35	35	35	40	45	45	35	35
24"	15	20	25	20	15	25	30	30	35	35	45	35	30

Checked by: 



**AREA FACTOR  $A_k$**

**FOR AIR OUTLETS AND AIR INLETS**

**Model: SAR HFB DD Size 900 x 150**

**Manufacturer:** Best Choice Industries **Grill Face:** 888 mm x 138 mm **Date:** May 19, 2006  
**Throw Dir.:** Side Wall Mount, Horizontal **Neck Area (Sq. Ft.):** 1.319 **Air Density:** 0.071 lbs/ft<sup>3</sup>  
**Flow Meter:** Nozzle Metering Station **Anemometer:** Alnor Velometer Type 6000P  
**Serial Number:** 6077AL

Run Number	Readings				Calculations					
	Anemometer - ( $V_k$ , FPM)				Static "H <sub>2</sub> O"	Q2 Flow CFM	Neck Velocity	Neck V.P.	Total Pressure	Area Fact. $A_k$
	1	2	3	4						
1	780	760	780	780	0.052	800	607	0.023	0.075	1.032
2	950	975	950	950	0.081	1000	758	0.036	0.117	1.046
3	1225	1200	1200	1225	0.118	1200	908	0.052	0.170	0.989
<b>Average: 1.022</b>										

Checked by: 



**BCI SAR900X150**

**Supply Air Volume: 640 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	130	280	345	355	315	275	240	180	150	135	130	90	75
3"	100	275	310	320	290	265	230	180	155	150	140	105	85
6"	205	365	320	290	255	225	205	165	140	140	135	100	75
9"	550	340	295	215	190	175	165	135	125	120	125	95	70
12"	465	190	200	160	135	125	130	110	105	100	95	85	55
18"	55	80	100	90	85	75	80	80	75	70	65	70	45
24"	55	55	55	55	55	40	55	50	50	55	50	55	40

**Supply Air Volume: 520 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	70	140	225	250	245	220	190	145	135	110	80	50	50
3"	55	105	205	230	225	205	185	145	140	110	90	50	60
6"	105	180	225	210	185	170	160	130	125	100	90	55	60
9"	345	305	210	175	130	125	120	105	105	85	80	55	55
12"	285	205	130	125	95	95	95	85	90	70	70	45	50
18"	30	45	50	60	50	50	60	60	55	50	55	35	50
24"	30	45	40	35	35	40	35	45	35	35	40	30	40

**Supply Air Volume: 350 cfm**

Distance From Ceiling Inches	Distance From Diffuser (Ft)												
	1'	3'	5'	7'	9'	11'	13'	15'	17'	19'	21'	23'	25'
1"	70	95	170	180	165	150	125	95	85	70	55	35	30
3"	45	85	155	160	155	135	100	95	90	70	60	35	30
6"	75	120	160	135	125	105	75	95	80	65	60	35	35
9"	235	205	135	90	85	65	55	75	65	50	55	35	35
12"	220	150	75	55	60	40	45	65	50	40	45	30	30
18"	25	30	30	30	40	25	25	40	35	35	35	30	30
24"	25	25	30	25	25	20	25	25	30	30	30	25	25

Checked by: 

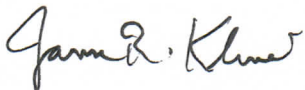


**Conclusion**

The test methods employed for these tests have no pass-fail criteria; therefore, the evaluation of the test results is left to the discretion of the client.

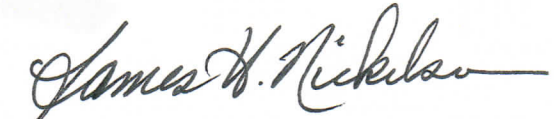
Date of Tests: May 18 through June 13, 2006

Report Approved By:



James R. Kline  
Engineer/Quality Supervisor  
Acoustical Testing

Report Reviewed By:



James H. Nickelsen  
Senior Project Engineer  
Acoustical Testing

Attachments: None