AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

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Test No. 28024-S1

November 04, 2011

TO: Aireng Company
Plot # 08, SECTOR I-11/4
Industrial Area
Islamabad, Punjab PAKISTAN 44000

ATTN: Ahmed Saeed
saeed@airengindustries.com

SUBJECT: CONTRACT TESTING
MODEL No. 15D

Attached are the test results of the subject model performed on October 29, 2011.

If you should have any questions concerning these data, please let us know.

Sincerely,
AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL, INC.

Josh Parent
Laboratory Manager

Attachment

Copy To: saeed@airengindustries.com

TEST INFORMATION

Test Number :	28024-S1	Date of Test :	29 Oct 2011
Purpose :	Contract Test	Technician :	LTH

UNIT INFORMATION

Customer :	Aireng Company	
Unit Manufacturer :	Aireng Company	
Type :	Centrifugal	
Trade Name :	ABIC	
Model Number :	15D	
No. of Blades :	12	
Blade Setting :	NA	
No. of Stator Vanes :	NA	
Impeller Diameter :	0.384	m
Inlet Area :	0.1134	m^2
Outlet Area :	0.229	m^2
Effective Duct Diameter :	0.38	m

TEST CONFIGURATION

Setup :	AMCA Standard 300, Figure 2, Inlet Sound
Installation Type :	B - Free Inlet, Ducted Outlet
Installation Notes :	-

TEST ENVIRONMENT

Pb :	1005.9	h.Pa
tdo :	31.1	°C
two :	23.8	°C

Comments

Unit tested with AFMA built outlet duct
Air Volume taken from 28024-A1 dated 29 Oct 2011

Important Notes

Data exist where the background clearance of the test unit (L_{PM} - L_{PB}) does not meet the 6dB criteria required by AMCA Standard 300-05. These data are labeled with an asterisk (*)

RSS MEASUREMENT

Test Number	28024-S1	Date of Test	29 Oct 2011
Purpose	Contract Test	Technician	LTH

Reference Sound Source

AMCA Band Number	1			2			3			4		
Center Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630
L_{pqm}	50.6	59.8	61.0	63.5	66.5	67.6	68.4	69.6	70.2	70.1	71.0	71.5
L_{pb}	43.3	37.9	38.0	41.4	40.8	39.7	38.6	34.7	34.1	27.0	26.2	25.1
$L_{pqm} - L_{pb}$	7.3	21.9	23.0	22.1	25.7	27.9	29.9	34.9	36.2	43.1	44.8	46.4
$L_{pqm} - L_{pq}$	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pq}	49.8	59.8	60.9	63.5	66.4	67.6	68.4	69.6	70.2	70.1	71.0	71.5
L_{Wr}	77.2	78.6	78.9	79.9	79.7	80.0	80.3	80.4	80.5	80.6	80.8	81.6
$L_{Wr} - L_{pq}$	27.4	18.8	18.0	16.4	13.3	12.4	11.9	10.8	10.3	10.5	9.8	10.1

AMCA Band Number	5			6			7			8		
Center Frequency (Hz)	800	1.0K	1.3K	1.6K	2.0K	2.5K	3.2K	4.0K	5.0K	6.3K	8.0K	10.0K
L_{pqm}	73.3	74.5	75.5	75.7	75.5	73.9	72.2	72.0	71.1	69.3	66.6	63.4
L_{pb}	23.0	18.8	15.7	14.5	11.2	10.2	7.3	6.6	7.5	7.0	7.7	8.4
$L_{pqm} - L_{pb}$	50.3	55.6	59.8	61.2	64.2	63.8	64.8	65.4	63.6	62.2	58.8	55.0
$L_{pqm} - L_{pq}$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pq}	73.3	74.5	75.5	75.7	75.5	73.9	72.2	72.0	71.1	69.3	66.6	63.4
L_{Wr}	83.4	84.6	85.6	86.0	86.7	85.4	84.2	84.4	83.9	82.9	80.8	79.1
$L_{Wr} - L_{pq}$	10.1	10.1	10.1	10.3	11.2	11.5	12.0	12.4	12.8	13.6	14.2	15.7

These test data were obtained in a laboratory accredited by AMCA for AMCA Standard 300 testing. Data are not certified by AMCA.

MEASUREMENT

Test Number	28024-S1	Test Date	29 Oct 2011
Purpose	Contract Test	Technician	LTH

Determination Number 1

AMCA Band Number	1			2			3			4		
Center Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630
L_{pm}	49.4	60.1	63.0	66.4	71.3	71.3	69.4	71.1	74.1	78.3	73.8	70.5
L_{pb}	43.2	38.8	39.6	43.1	43.1	42.0	40.4	38.5	38.0	42.4	41.4	30.0
$L_{pm} - L_{pb}$	6.2	21.3	23.4	23.3	28.2	29.3	28.9	32.6	36.1	35.9	32.4	40.4
$L_{pm} - L_{pc}$	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	48.2	60.0	63.0	66.4	71.3	71.3	69.4	71.1	74.1	78.3	73.8	70.5
$L_{Wr} - L_{pq}$	27.4	18.8	18.0	16.4	13.3	12.4	11.9	10.8	10.3	10.5	9.8	10.1
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	75.6	78.9	81.0	82.8	84.5	83.7	81.2	81.9	84.4	88.8	83.6	80.6

AMCA Band Number	5			6			7			8		
Center Frequency (Hz)	800	1.0K	1.3K	1.6K	2.0K	2.5K	3.2K	4.0K	5.0K	6.3K	8.0K	10.0K
L_{pm}	73.3	69.1	69.0	68.3	67.1	66.9	63.9	62.6	58.8	58.3	50.5	47.5
L_{pb}	28.7	23.1	18.5	17.5	14.3	19.5	15.6	15.1	10.8	25.6	29.0	13.8
$L_{pm} - L_{pb}$	44.7	46.1	50.6	50.8	52.8	47.4	48.3	47.5	48.1	32.7	21.5	33.7
$L_{pm} - L_{pc}$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	73.3	69.1	69.0	68.3	67.1	66.9	63.9	62.6	58.8	58.3	50.5	47.5
$L_{Wr} - L_{pq}$	10.1	10.1	10.1	10.3	11.2	11.5	12.0	12.4	12.8	13.6	14.2	15.7
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	83.4	79.3	79.1	78.6	78.4	78.4	75.9	75.0	71.7	71.9	64.8	63.2

Test Conditions at Fan Inlet : Ps actual : 0.0 Pa density: 1.140 kg/m^3

Td1 : 31.1 °C Pb : 100590 Pa

Determination Number 2

AMCA Band Number	1			2			3			4		
Center Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630
L_{pm}	49.4	56.2	60.6	64.7	68.6	68.7	66.9	70.8	71.6	77.0	71.9	67.6
L_{pb}	42.5	38.7	38.7	42.4	42.8	40.2	40.0	37.3	34.5	27.9	25.8	23.9
$L_{pm} - L_{pb}$	7.0	17.5	21.9	22.3	25.9	28.5	26.9	33.5	37.1	49.0	46.1	43.7
$L_{pm} - L_{pc}$	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	48.5	56.1	60.5	64.7	68.6	68.7	66.9	70.8	71.6	77.0	71.9	67.6
$L_{Wr} - L_{pq}$	27.4	18.8	18.0	16.4	13.3	12.4	11.9	10.8	10.3	10.5	9.8	10.1
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	75.9	75.0	78.5	81.2	81.9	81.1	78.8	81.6	81.9	87.4	81.7	77.7

AMCA Band Number	5			6			7			8		
Center Frequency (Hz)	800	1.0K	1.3K	1.6K	2.0K	2.5K	3.2K	4.0K	5.0K	6.3K	8.0K	10.0K
L_{pm}	71.1	66.6	66.5	65.5	64.0	63.3	59.7	57.5	55.0	57.6	47.0	44.2
L_{pb}	19.2	17.2	13.1	15.2	9.8	8.7	7.3	6.7	7.3	7.0	7.7	8.4
$L_{pm} - L_{pb}$	51.9	49.4	53.4	50.4	54.2	54.6	52.4	50.8	47.7	50.6	39.3	35.8
$L_{pm} - L_{pc}$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	71.1	66.6	66.5	65.5	64.0	63.3	59.7	57.5	55.0	57.6	47.0	44.2
$L_{Wr} - L_{pq}$	10.1	10.1	10.1	10.3	11.2	11.5	12.0	12.4	12.8	13.6	14.2	15.7
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	81.2	76.7	76.6	75.8	75.2	74.8	71.7	69.9	67.8	71.2	61.3	59.9

Test Conditions at Fan Inlet : Ps actual : 374.4 Pa density: 1.140 kg/m^3

Td1 : 31.1 °C Pb : 100590 Pa

MEASUREMENT

Test Number	28024-S1	Test Date	29 Oct 2011
Purpose	Contract Test	Technician	LTH

Determination Number 3

AMCA Band Number	1			2			3			4		
Center Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630
L_{pm}	46.6	57.6	54.3	61.2	65.3	66.4	66.1	66.6	67.8	74.0	67.5	64.1
L_{pb}	42.5	38.7	38.7	42.4	42.8	40.2	40.0	37.3	34.5	27.9	25.8	23.9
$L_{pm} - L_{pb}$	4.1*	18.9	15.6	18.8	22.5	26.2	26.1	29.3	33.3	46.0	41.7	40.2
$L_{pm} - L_{pc}$	1.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	45.3	57.5	54.2	61.1	65.3	66.4	66.1	66.6	67.8	74.0	67.5	64.1
$L_{Wr} - L_{pq}$	27.4	18.8	18.0	16.4	13.3	12.4	11.9	10.8	10.3	10.5	9.8	10.1
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	72.7*	76.3	72.2	77.6	78.5	78.8	78.0	77.4	78.1	84.4	77.3	74.2

AMCA Band Number	5			6			7			8		
Center Frequency (Hz)	800	1.0K	1.3K	1.6K	2.0K	2.5K	3.2K	4.0K	5.0K	6.3K	8.0K	10.0K
L_{pm}	67.6	62.9	62.9	60.9	59.5	58.5	54.9	52.7	50.7	57.1	43.3	42.2
L_{pb}	19.2	17.2	13.1	15.2	9.8	8.7	7.3	6.7	7.3	7.0	7.7	8.4
$L_{pm} - L_{pb}$	48.4	45.7	49.8	45.7	49.7	49.7	47.5	46.0	43.3	50.1	35.5	33.7
$L_{pm} - L_{pc}$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	67.6	62.9	62.9	60.9	59.5	58.5	54.9	52.7	50.7	57.1	43.2	42.2
$L_{Wr} - L_{pq}$	10.1	10.1	10.1	10.3	11.2	11.5	12.0	12.4	12.8	13.6	14.2	15.7
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	77.7	73.0	73.0	71.2	70.7	69.9	66.9	65.1	63.5	70.7	57.5	57.9

Test Conditions at Fan Inlet : Ps actual : 727.8 Pa density: 1.140 kg/m^3

Td1 : 31.1 °C Pb : 100590 Pa

Determination Number 4

AMCA Band Number	1			2			3			4		
Center Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630
L_{pm}	53.4	60.2	64.2	65.4	70.4	70.3	68.3	69.9	72.3	73.3	69.7	66.1
L_{pb}	42.5	38.7	38.7	42.4	42.8	40.2	40.0	37.3	34.5	27.9	25.8	23.9
$L_{pm} - L_{pb}$	11.0	21.5	25.5	23.0	27.6	30.2	28.3	32.7	37.8	45.4	43.9	42.3
$L_{pm} - L_{pc}$	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	53.1	60.1	64.2	65.4	70.4	70.3	68.3	69.9	72.3	73.3	69.7	66.1
$L_{Wr} - L_{pq}$	27.4	18.8	18.0	16.4	13.3	12.4	11.9	10.8	10.3	10.5	9.8	10.1
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	80.5	79.0	82.2	81.9	83.7	82.7	80.2	80.8	82.6	83.8	79.5	76.2

AMCA Band Number	5			6			7			8		
Center Frequency (Hz)	800	1.0K	1.3K	1.6K	2.0K	2.5K	3.2K	4.0K	5.0K	6.3K	8.0K	10.0K
L_{pm}	67.0	64.6	64.1	62.1	60.8	60.7	56.9	55.1	53.0	57.4	45.7	43.8
L_{pb}	19.2	17.2	13.1	15.2	9.8	8.7	7.3	6.7	7.3	7.0	7.7	8.4
$L_{pm} - L_{pb}$	47.7	47.4	51.0	46.9	51.0	52.0	49.6	48.4	45.7	50.4	38.0	35.4
$L_{pm} - L_{pc}$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_{pc}	67.0	64.6	64.1	62.1	60.8	60.7	56.9	55.1	53.0	57.4	45.7	43.8
$L_{Wr} - L_{pq}$	10.1	10.1	10.1	10.3	11.2	11.5	12.0	12.4	12.8	13.6	14.2	15.7
E_i	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
L_{Wmi}	77.1	74.7	74.2	72.4	72.1	72.2	69.0	67.5	65.8	71.0	60.0	59.6

Test Conditions at Fan Inlet : Ps actual : 886.5 Pa density: 1.140 kg/m^3

Td1 : 31.1 °C Pb : 100590 Pa

TEST RESULTS

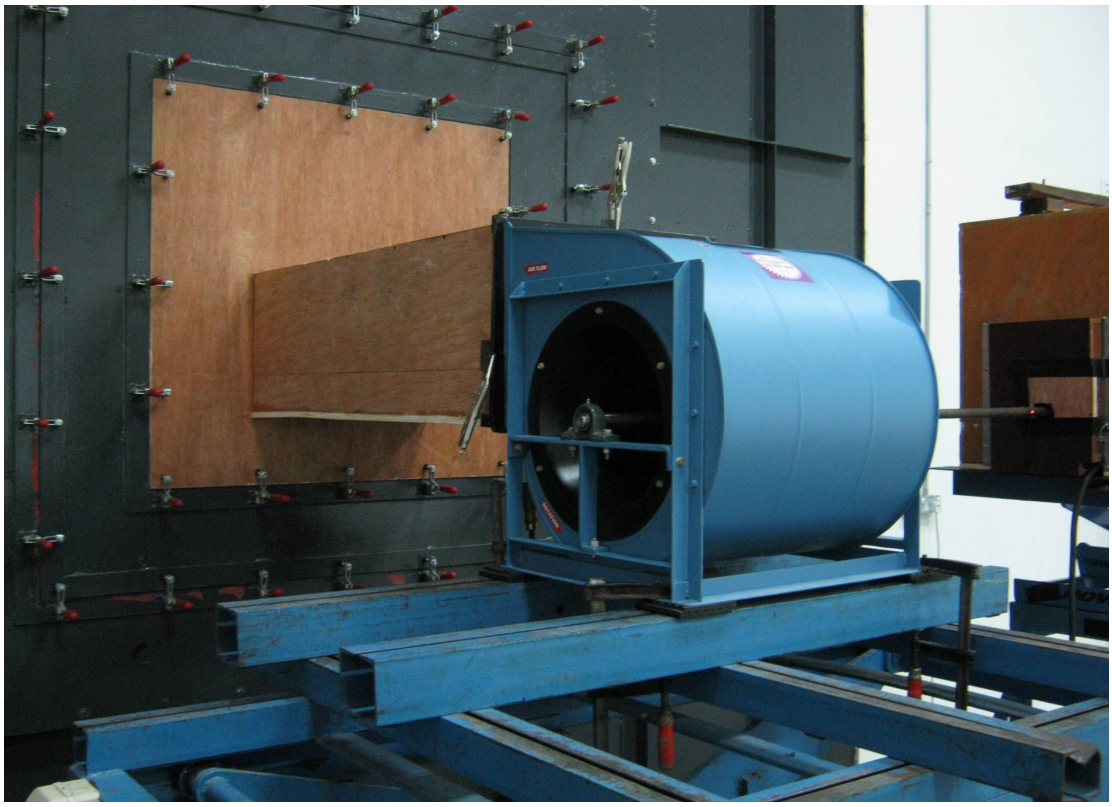
Test Number	28024-S1	Date of Test	29 Oct 2011
Purpose	Contract Test	Technician	LTH

AMCA Band Number	1	2	3	4	5	6	7	8	Point of Operation		
Center Frequency (Hz)	63	125	250	500	1.0K	2.0K	4.0K	8.0K	Ps	Q	N
									Pa	m^3/s	rpm
Det. No. : 1											
L_{Wi} (dB) :	84	89	87	90	86	83	79	73	0	2.75	2000
Det. No. : 2											
L_{Wi} (dB) :	81	86	86	89	84	80	75	72	394	2.31	2000
Det. No. : 3											
L_{Wi} (dB) :	79*	83	83	86	80	75	70	71	766	1.72	2000
Det. No. : 4											
L_{Wi} (dB) :	86	88	86	86	80	77	72	72	933	0.99	2000

These test data were obtained in a laboratory accredited by AMCA for AMCA Standard 300 testing. Data are not certified by AMCA.

TEST SETUP PICTURE

Test Unit :	Centrifugal		
Manufacturer :	Aireng Company		
Trade Name :	ABIC	Test Number :	28024-S1
Model No. :	15D	Date of Test :	29 Oct 2011



Sound Performance Test
Figure 2 Setup
Installation Type : B - Free Inlet, Ducted Outlet

INSTRUMENT LIST

Test Number: 28024-S1
Date of Test: 29 Oct 2011 Technician: LTH

The following instruments, calibrated as applicable per AMCA standards, were used for this test

PRESSURE

	Instruments	Manufacturer
☑	Static Pressure Transducer FC0332	Furness
☐	Total Pressure Transducer FC0332	Furness
☐	Static & Total Pressure Transducer FC0332	Furness
☑	Barometric Pressure Transmitter T2114	Comet

TEMPERATURE

	Instruments	Manufacturer
☐	RTD Sensor Plane 5-Fig 12	Valutemp
☐	RTD Sensor Plane 8-Fig 15	Valutemp
☑	Humidity Tranducer TH-200-HN/STH-PD150	Kimo

SPEED

	Instruments	Manufacturer
☑	Speed Meter & Diffuse Reflectiive Sensor MP5W-44 & BM200-DDT	Autonics

ELECTRIC METER

	Instruments	Manufacturer
☐	Multimeter Fluke 322	Fluke
☐	Power Meter WT230	Yokogawa

TORQUE

	Instruments	Manufacturer
☐	Torque Tranducer 1604-200 (5.5kW)	Lebow
☐	Torque Tranducer 1604-2000 (37kW)	Lebow
☐	Strain-Gauge Conditioner Type 3278 Torque Readout	Daytronics

SOUND

	Instruments	Manufacturer
☑	Pulse Data Acquisition & CPB Analysis Types 3560-B-010 & 7771-N2	Bruel & Kjaer
☑	Diffuse-field mircophone Type 4943	Bruel & Kjaer
☑	Mircrophone Preamplifier Type 2669-L	Bruel & Kjaer
☑	Rotating Boom Type 3923	Bruel & Kjaer
☑	Pistonphone for Acoustic Calibration Type 4228	Bruel & Kjaer
☑	Reference Sound Source RSS Type 4204	Bruel & Kjaer
☑	Correction Barometer Type UZ001	Bruel & Kjaer