



**AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL, INC.**

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Test No. 33025-A1

May 18, 2016

TO: Dae Ryun Ind Ltd
115 Wanjusandan 7-ro
Bongdong-eup, Wanju-gun, Jeon-Buk, CA REPUBLIC OF KOREA 55318

ATTN: Song Eun Jung
drair@daum.net

**SUBJECT: CONTRACT TESTING
MODEL No. DR-AF #3DD**

Attached are the test results of the subject model performed on April 04, 2016.

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



Korea Testing Certification

82, Pyeongtaekhang-ro 156 beon-gil, Poseung-eup, Pyeongtaek-si, Gyeonggi-do, Korea

Test Number

33025-A1

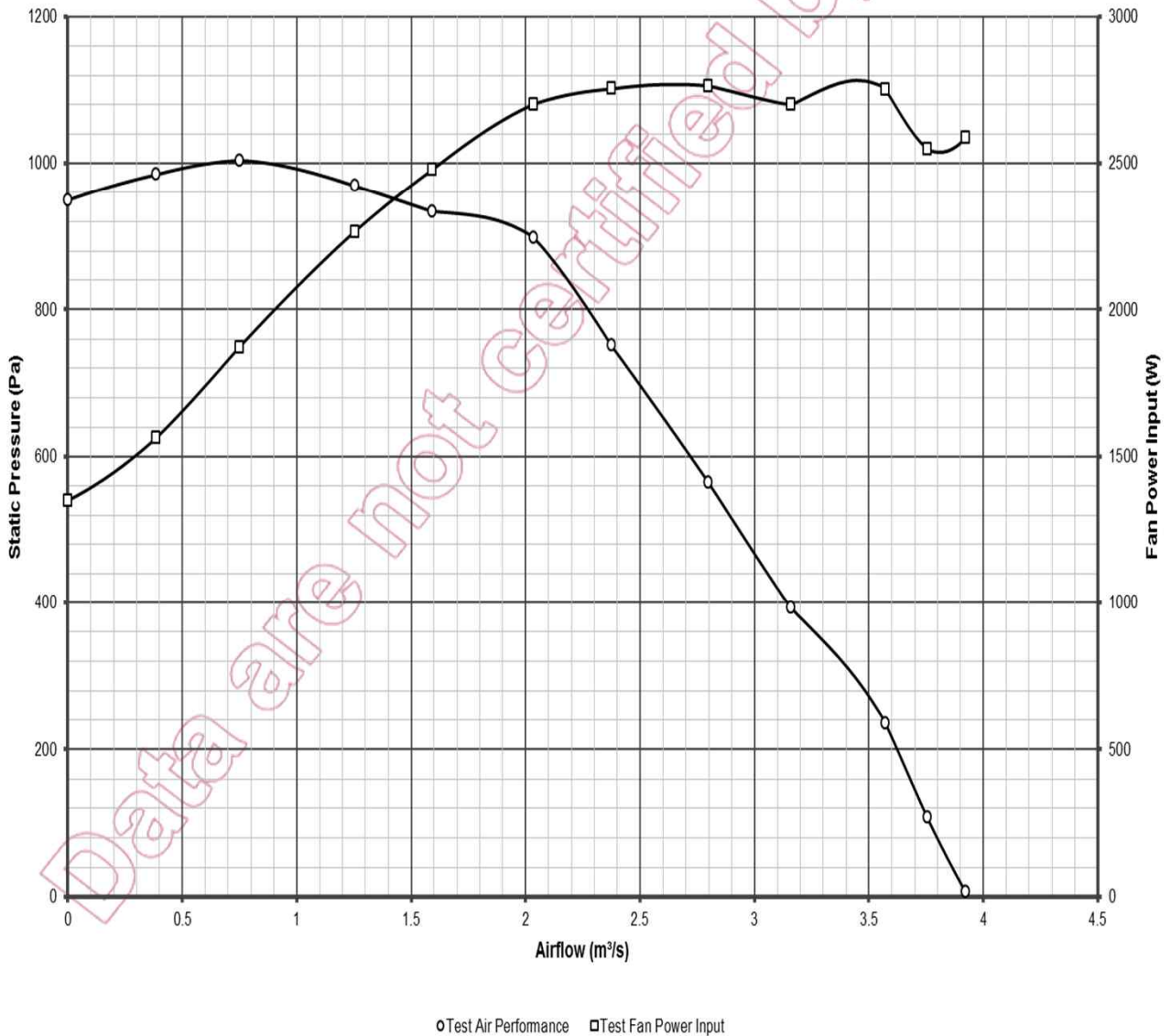
Test Unit: DWDI Centrifugal
 Manufacturer: Daeryun Ind. Ltd.
 Trade Name: DR-AF Series
 Model Number: DR-AF #3DD
 Impeller Diameter: 456 mm
 Inlet Area: 0.181 m²
 Outlet Area: 0.304 m²

Test Purpose: Contract Test
 Date of Test: April 4, 2016
 Client: Daeryun Ind. Ltd.
 Witness: No
 Personnel: KTC_HONG
 P_b: 101 kPa
 Unit System: SI

Test Method per ANSI / AMCA Standard 210-07, Figure 12 Setup, Installation Type B

Comments:

Results at Standard Air and Speed = 1800 rpm





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Comments:

Results at Test Conditions:

Det. No.	ρ (kg/m ³)	N (rpm)	P_t (Pa)	P_v (Pa)	P_s (Pa)	Q (m ³ /s)	H (W)	K_p -	η_t (%)	η_s (%)
1	1.22	1797	108.14	101.77	6.37	3.92	2620.6	1.0004	16.2%	1.0%
2	1.22	1797	202.60	93.55	109.05	3.75	2588.6	1.0000	29.3%	15.8%
3	1.22	1797	323.39	84.40	238.99	3.57	2791.7	0.9995	41.3%	30.5%
4	1.22	1797	465.59	65.87	399.72	3.15	2739.9	0.9989	53.5%	45.9%
5	1.22	1797	625.69	51.61	574.08	2.79	2805.0	0.9983	62.2%	57.1%
6	1.22	1797	800.48	37.13	763.35	2.37	2794.7	0.9977	67.8%	64.6%
7	1.22	1797	940.57	27.18	913.39	2.03	2741.4	0.9973	69.5%	67.5%
8	1.22	1797	966.40	16.63	949.77	1.59	2514.5	0.9975	60.9%	59.8%
9	1.22	1797	995.58	10.31	985.27	1.25	2299.6	0.9977	54.0%	53.5%
10	1.22	1797	1024.66	3.69	1020.97	0.75	1901.0	0.9985	40.3%	40.1%
11	1.22	1798	1003.41	0.97	1002.44	0.38	1588.6	1.0009	24.3%	24.3%
12	1.23	1798	967.13	0.00	967.13	0.00	1373.4	0.9953	0.0%	0.0%

Results at Standard Air and Speed (N) = 1800 rpm:

Det. No.	P_t (Pa)	P_v (Pa)	P_s (Pa)	Q (m ³ /s)	H (W)	K_p -	η_t (%)	η_s (%)
1	106.56	100.28	6.28	3.92	2586.6	1.0004	16.2%	1.0%
2	199.21	91.99	107.22	3.75	2549.5	1.0000	29.3%	15.8%
3	318.28	83.07	235.21	3.57	2752.2	0.9995	41.3%	30.5%
4	457.99	64.80	393.19	3.16	2699.7	0.9989	53.5%	45.9%
5	615.48	50.77	564.71	2.80	2763.9	0.9984	62.2%	57.1%
6	787.38	36.52	750.86	2.38	2753.6	0.9978	67.8%	64.6%
7	925.24	26.74	898.50	2.03	2701.2	0.9973	69.5%	67.5%
8	950.48	16.35	934.13	1.59	2477.2	0.9975	60.9%	59.8%
9	979.34	10.14	969.19	1.25	2265.8	0.9977	54.0%	53.5%
10	1007.69	3.63	1004.06	0.75	1872.6	0.9986	40.3%	40.1%
11	985.51	0.96	984.55	0.38	1562.0	1.0009	24.3%	24.3%
12	949.42	0.00	949.42	0.00	1349.7	0.9953	0.0%	0.0%



Korea Testing Certification

82, Pyeongtaekhang-ro 156 beon-gil, Poseung-eup, Pyeongtaek-si, Gyeonggi-do, Korea

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Test Method per ANSI / AMCA Standard 210-07, Figure 12 Setup, Installation Type B

Comments:

Data at Test Conditions:

Det. No.	t _{d0} (°C)	t _{wo} (°C)	t _{d2} (°C)	t _{d5} (°C)	P _{s5} (Pa)	ΔP (Pa)	t _{d7} (°C)	P _{s7} (Pa)	N (rpm)	T (N·m)
1	14.8	9.0	15.3	15.3	6.37	612.72	0.0	6.37	1797	13.9
2	14.2	8.7	15.2	15.2	109.05	563.20	0.0	109.05	1797	13.8
3	14.5	9.0	15.0	15.0	238.99	508.08	0.0	238.99	1797	14.8
4	14.3	9.0	14.9	14.9	399.72	396.58	0.0	399.72	1797	14.6
5	14.3	9.0	14.8	14.8	574.08	310.87	0.0	574.08	1797	14.9
6	14.3	8.9	14.9	14.9	763.35	223.89	0.0	763.35	1797	14.9
7	14.3	8.9	15.0	15.0	913.39	164.16	0.0	913.39	1797	14.6
8	14.3	8.9	15.0	15.0	949.77	100.71	0.0	949.77	1797	13.4
9	14.3	8.9	15.1	15.1	985.27	62.66	0.0	985.27	1797	12.2
10	14.3	8.8	15.2	15.2	1020.97	22.65	0.0	1020.97	1797	10.1
11	14.2	8.7	15.2	15.2	1002.44	6.08	0.0	1002.44	1798	8.4
12	14.1	8.6	15.0	15.0	967.13	970.96	0.0	967.13	1798	7.3

Open Nozzle Diameters (mm.):

Det. No.	Open Nozzle Diameters
1	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
2	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
3	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
4	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
5	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
6	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
7	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
8	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
9	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
10	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
11	200.0 mm, 199.9 mm, 200.0 mm, 200.0 mm
12	All nozzles closed.



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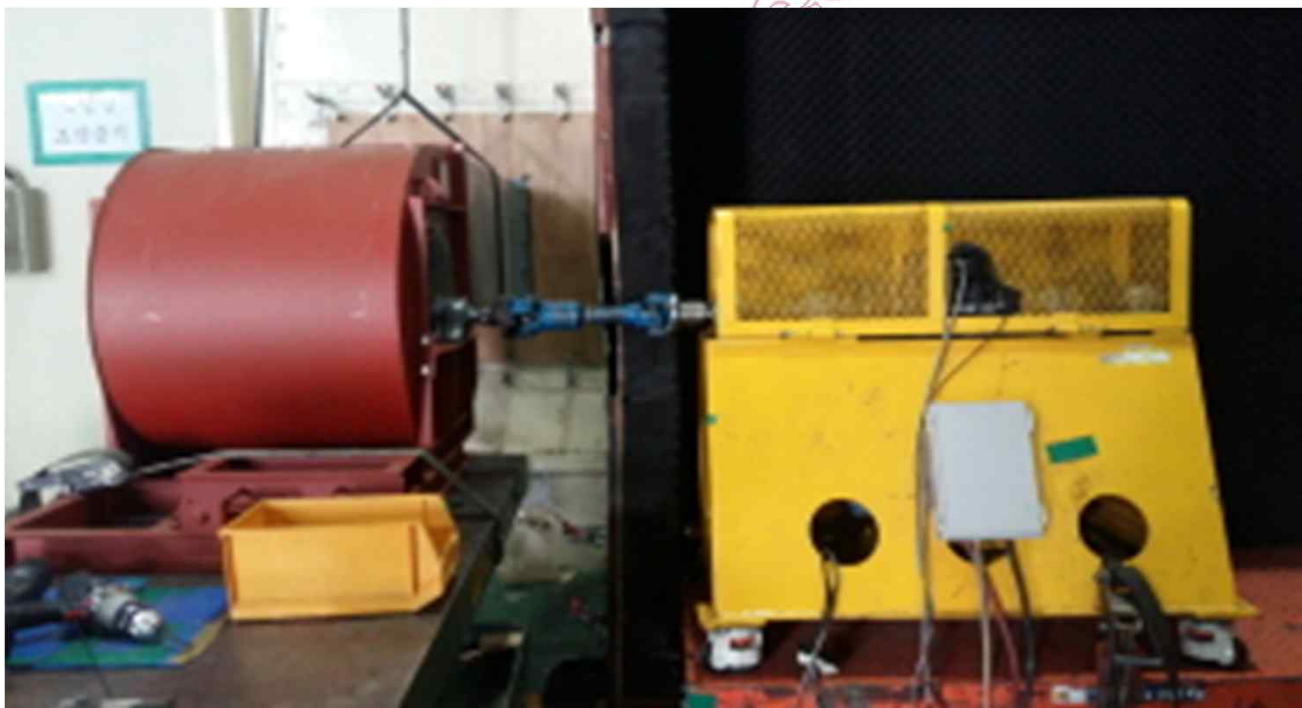
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Comments:



**KTC INSTRUMENT LIST**

Test Number: 33025-A1

Date: 04-Apr-16

Technician KTC_HONG

The following instrument, calibrated as applicable per the test standard were used for this test

Facility: KTC R 1240

Standard : AMCA 210-07

Figure : Figure 12

Pressure

Barometer									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3093-3	YOKOGAWA	UNE31-SHS2		0	6818BA030		2015-05-28	2016-05-28

Pressure Meter									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3093-33	YOKOGAWA	EJA110A	KTC R 1240	7	91G740641	-300-300 mmWg.	2015-05-28	2016-05-28
<input checked="" type="checkbox"/>	3093-34	YOKOGAWA	EJA110A	KTC R 1240	5	91G740640	0 - 300 mmWg.	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-25	YOKOGAWA	EJA110A	KTC C 1260	7	91HC23940	-300 - 700 mmWg.	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-26	YOKOGAWA	EJA110A	KTC C 1260	5	91J208748	0 - 300 mmWg.	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-18	YOKOGAWA	EJA110A	KTC L 1560	8	91HA27332	-700 - 300 mmWg.	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-19	YOKOGAWA	EJA110A	KTC L 1560	5	91J208747	0 - 300 mmWg.	2015-05-28	2016-05-28

Temperature

RTD									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3093-31	YAMARI	PT 100	KTC R 1240	5	1570329	-40-250 Celsius	2015-05-28	2016-05-28
<input type="checkbox"/>	3434-1	YAMARI	PT 100	KTC C 1260	5	1570318	-40-250 Celsius	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-20	YAMARI	PT 100	KTC L 1560	2	1570328	-40-250 Celsius	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-22	YAMARI	PT 100	KTC L 1560	8	646062	-40-250 Celsius	2015-05-28	2016-05-28
<input type="checkbox"/>	3093-27	YAMARI	PT 100	KTC L 1560	5	1570317	-40-250 Celsius	2015-05-28	2016-05-28
<input checked="" type="checkbox"/>	4375-1	YAMARI	PT 100	-	0	837680	-40-250 Celsius	2015-05-28	2016-05-28
<input checked="" type="checkbox"/>	4375-2	YAMARI	PT 100	-	0	837681	-40-250 Celsius	2015-05-28	2016-05-28

Torque

Torque									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3093-06	ONNOSOKKI	SS-201	-	-	2010359	0 - 200 Nm	2016-04-01	2016-05-01
<input type="checkbox"/>	3093-09	ONNOSOKKI	SS-501	-	-	5010499	0 - 500 Nm	2016-04-01	2016-05-01
<input type="checkbox"/>	3093-12	ONNOSOKKI	SS-102	-	-	1020158	0 - 1000 Nm	2016-04-01	2016-05-01
<input type="checkbox"/>	3336-01	ONNOSOKKI	SS-500	-	-	74302009	0 - 500 Nm	2016-04-01	2016-05-01
<input type="checkbox"/>	3338-01	ONNOSOKKI	SS-102	-	-	N/A	0 - 100 Nm	2016-04-01	2016-05-01

Torque Arm									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3421	KBR	N/A	-	-	N/A	-	2014-07-01	2016-07-01

Weights									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input type="checkbox"/>	4835	SATORIUS	MSE70200S	-	-	32602042	0-70.2 kg	2015-03-06	2016-03-06

Power									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input type="checkbox"/>	3387	HIOKI	3169-20	-	-	3890	-	2015-05-29	2016-05-29

Speed

Speed									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input checked="" type="checkbox"/>	3093-07	ONNOSOKKI	MP-981	-	-	00303009	0-6000 r/min	2016-04-01	2016-05-01
<input type="checkbox"/>	3093-10	ONNOSOKKI	MP-981	-	-	00303101	0-6000 r/min	2016-04-01	2016-05-01
<input type="checkbox"/>	3093-13	ONNOSOKKI	MP-981	-	-	10304670	0-6000 r/min	2016-04-01	2016-05-01
<input type="checkbox"/>	3336-02	ONNOSOKKI	MP-981	-	-	N/A	0-6000 r/min	2016-04-01	2016-05-01
<input type="checkbox"/>	3308-02	ONNOSOKKI	MP-981	-	-	N/A	0-6000 r/min	2016-04-01	2016-05-01
<input type="checkbox"/>	3337	B&K	4912	-	-	Y0425N	-	2015-05-28	2016-05-28

Sound

Sound Pressure Level									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input type="checkbox"/>	3218-3	B&K	4228	-	-	2484517	-	2015-08-17	2016-08-17
<input type="checkbox"/>	3218-5	B&K	4942	-	-	2518399	-	2015-08-22	2016-08-22

Sound Power level									
	Asset	Manufacturer	Model	Facility	Plane	Serial Number	Scale Range	Last Calibration	Next Calibration
<input type="checkbox"/>	3218-1	B&K	4204	-	-	250111093	-	2013-01-31	2016-01-31