

AIRFOIL FAN DOUBLE SUCTION

"TSAF-DS" Series Rev. 00

'March 2024





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INTRODUCTION &
AMCA SEAL INFORMATION



주)티에스에어테크는 공조용 및 산업용송풍기(FAN, BLOWER), 공기 조화기(AHU) 생산업체로서 1997년 설립 이래 송풍기 개발에 적극 참여하여 왔으며 그동안 축적해온 경험과 끊임없는 연구개발 및 기술 혁신을 통해 고품질의 송풍기를 고객 여러분께 제작 공급하고자 혼신의 노력을 다하고 있습니다.

주)티에스에어테크는 꾸준한 제품개발과 철저한 고객서비스로 명실상부한 송풍기(FAN)전문 메이커로서 정상에 우뚝 서고자 심혈을 기울여 최선을 다 할 것이며 끊임없는 기술개발과 철저한 품질관리로 여러분의 성원에 보답하고자 항상 노력하는 회사가 되겠습니다. 감사합니다.



(주)티에스에어테크가 획득한 TSF SERIES AIRFOIL FAN 의 AMCA seal에 대한 내용입니다.

등급표시는 AMCA 211과 AMCA 311에 의거 테스트 및 절차에 따른 것이며, AMCA 보증프로그램의 요구사항과 일치합니다.

TS Airtech Co.,Ltd certifies that the type "TSF-DS Series Airfoil Fan Double Suction shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA publication

211 and AMCA publication 311 and comply with the requirements of AMCA Certified Ratings Program

ABOUT FANS



● 구조 및 형상

날개의 끝부분이 회전방향의 뒤쪽으로 굽은 후곡형 (BACKWARD CURVE TYPE) 구조

● MODEL & TYPE

SIZE : 임펠러 깃 바깥지름 기준 (#1.5호 ~ #18호)

흡입방식 : 편흡입(Single Suction), 양흡입(Double Suction)

베어링 지지방식 : 양축지지형, 편축지지형

구동방식 : V-BELT 구동형(v-belt driven type)

직결식(direct driven type-with coupling)

재질 : STEEL, STS

옵션 : SILENCER, GUIDE VANE, FILTER CHAMBER



● AIRFOIL FAN의 특징

1) 고효율 (High Efficiency)

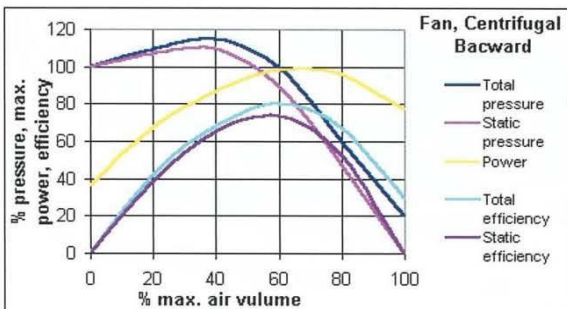
원심형 송풍기중 가장 높은효율을 가지며 50~300mmAq의 압력에 적합합니다.

2) 안전한운전 (Safety Operation)

LIMIT LOAD 특성(일정 회전수 아래에서는 소요동력에 최대점이 있으므로 그 점에서 풍량이 다시 증가해도 소요 동력은 증가하지 않거나 오히려 감소됨)이 있으므로 과부하율이 적습니다.

3) 견고성 (High strong structure)

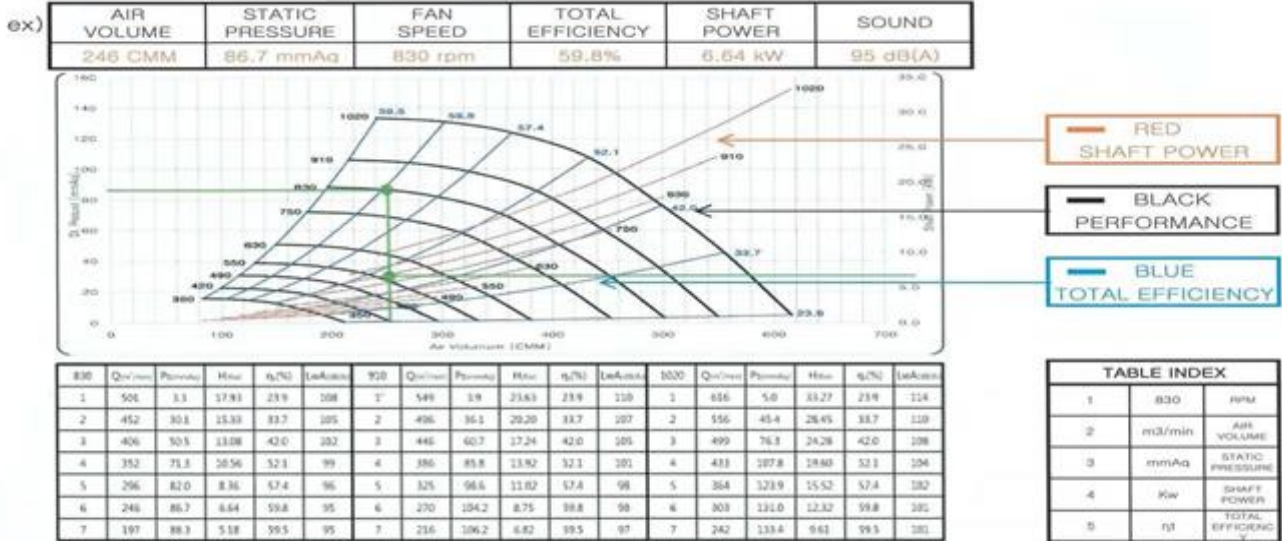
구조가 강대하면서도 견고하며, 유체역학적으로도 무리가 없으므로 높은 효율과 고속 회전이 가능합니다.



● 주요용도

- 빌딩, 공장의 냉난방, 일반 환기용, 냉동장치용, 집진용

FAN SELECT METHOD



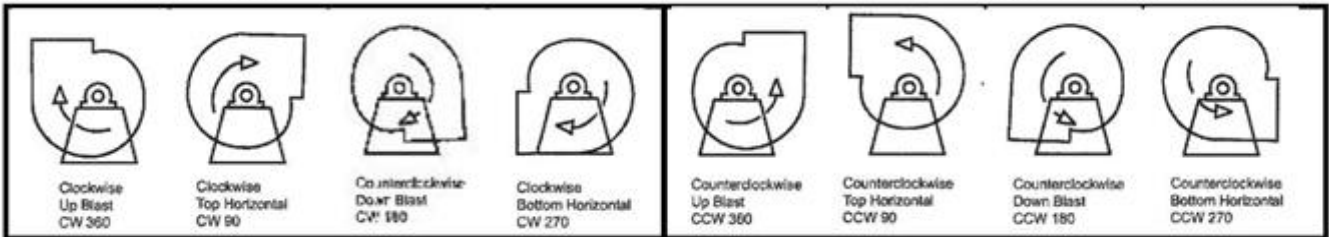
FAN 회전과 토출방향 (Fan Rotation and Discharge)

FAN의 회전과 토출방향은 AMCA표준 99-16을 기준으로 합니다.

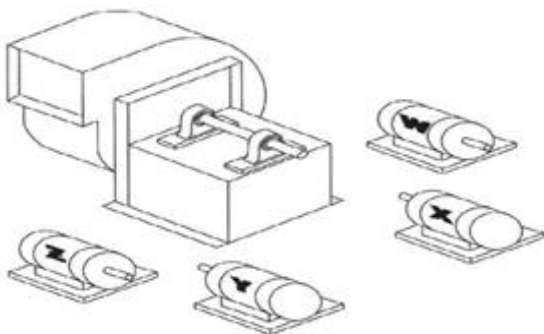
회전방향은 FAN의 구동측으로 부터 결정됩니다.

CW-clockwise rotation

CCW-center-clockwise rotation



모터 위치 (Motor Position)

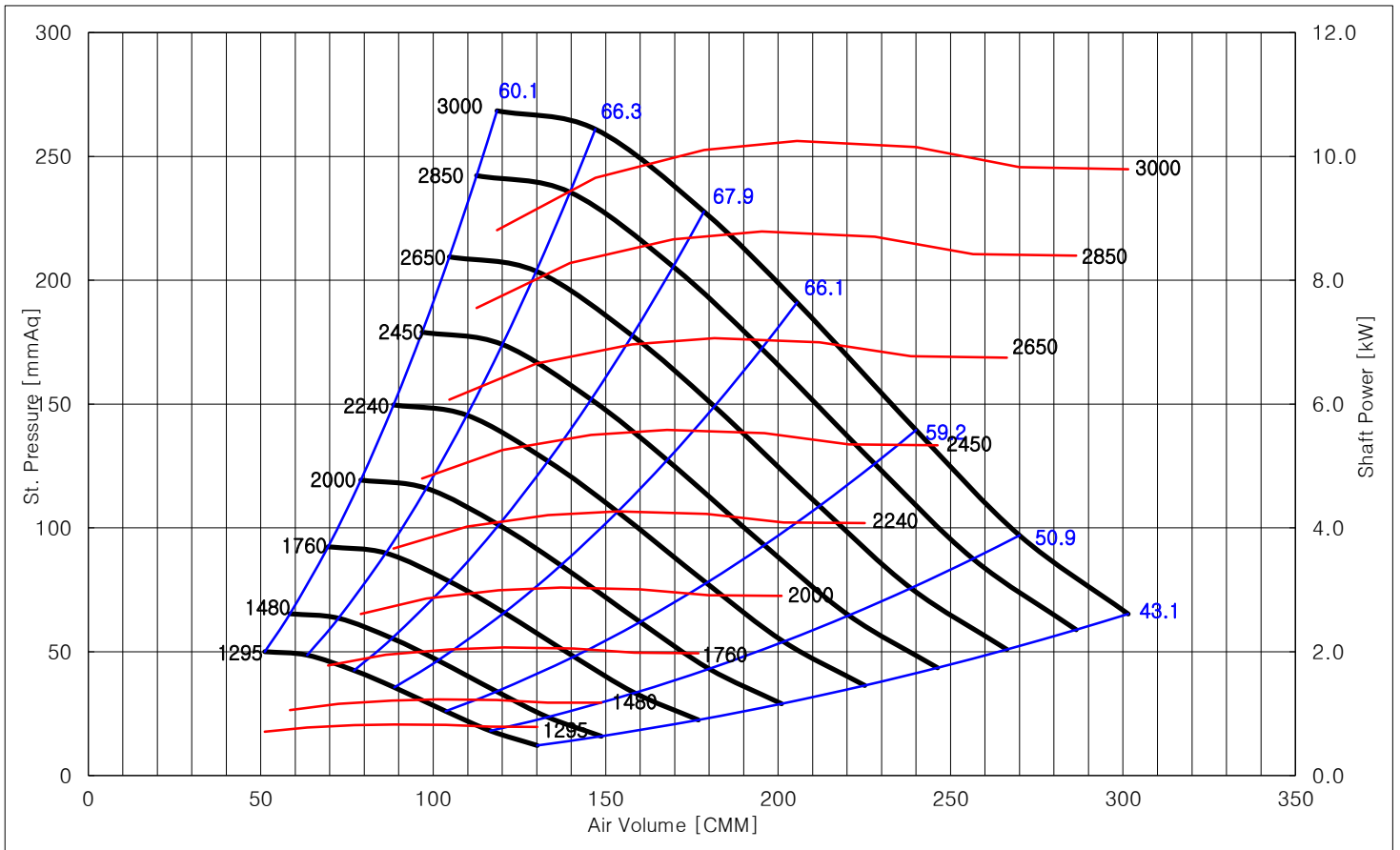


벨트구동 원심형 FAN의 모터방향은 AMCA 표준 99-16을 기준으로 합니다.

모터의 위치는 FAN의 구동측 면과 지정된 위치인 W,X,Y,Z로 결정됩니다.

The position of the motor for belt drive centrifugal fan is in accordance with AMCA Standard 99-16
Location of motor is determined by facing the drive side of fan and designating the positions by letters W, X, Y, or Z.

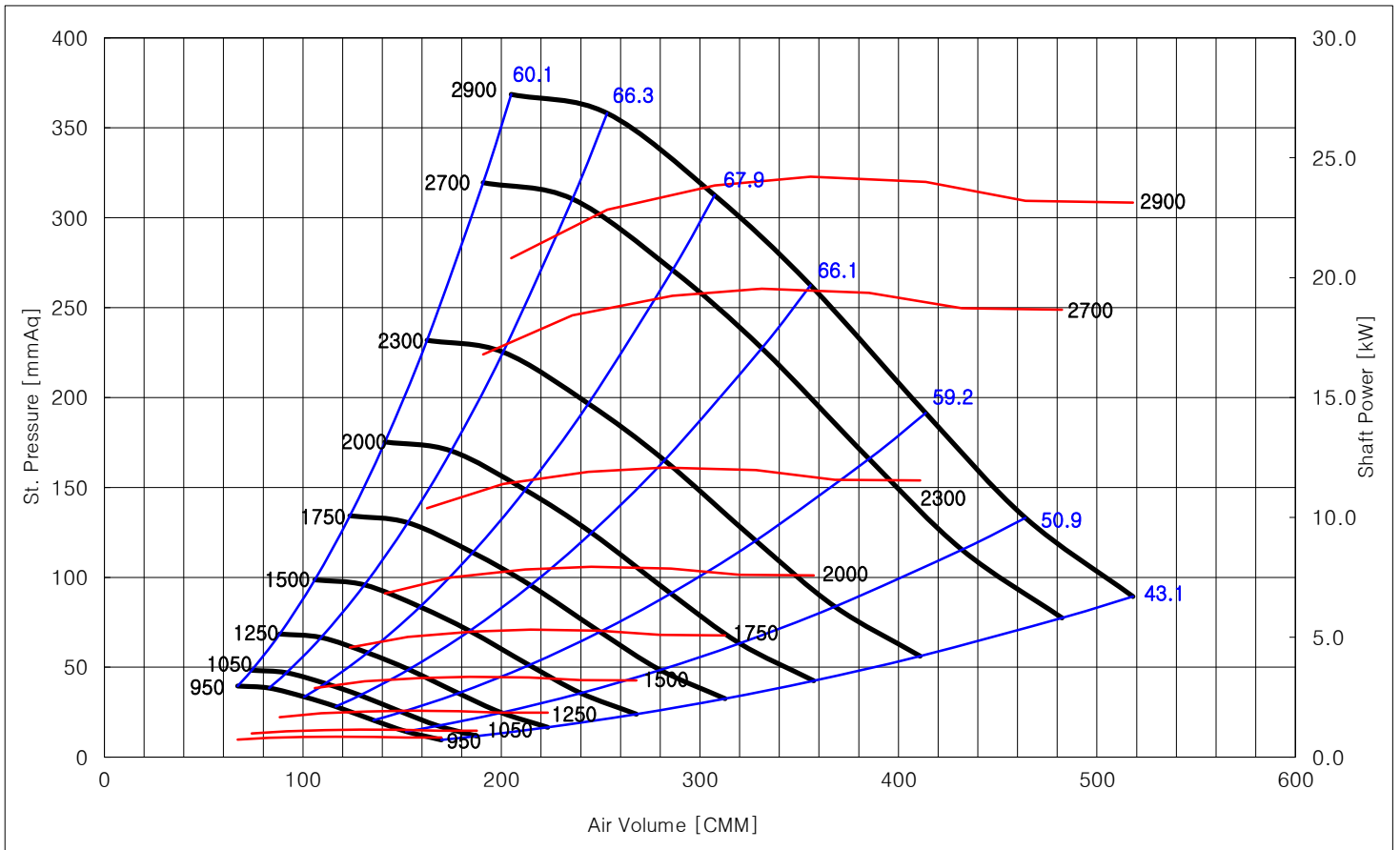
PERFORMANCE CURVES AND NOISE DATA - TSAF #3DS



1295	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	1480	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	1760	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))
1	130	12.2	0.79	43.13	85	1	149	15.9	1.18	43.13	88	1	177	22.5	1.98	43.13	92
2	117	18.1	0.79	50.91	84	2	133	23.6	1.18	50.91	87	2	158	33.4	1.98	50.91	91
3	104	26.0	0.82	59.17	83	3	118	34.0	1.22	59.17	86	3	141	48.0	2.05	59.17	91
4	89	35.6	0.82	66.05	83	4	101	46.5	1.23	66.05	86	4	121	65.7	2.07	66.05	90
5	77	42.4	0.81	67.86	83	5	88	55.4	1.21	67.86	86	5	105	78.4	2.04	67.86	90
6	63	48.6	0.78	66.28	83	6	73	63.5	1.16	66.28	86	6	86	89.8	1.95	66.28	90
7	51	50.0	0.71	60.10	83	7	58	65.3	1.06	60.10	86	7	70	92.4	1.78	60.10	90
2000	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	2240	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	2450	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))
1	201	29.0	2.90	43.13	95	1	225	36.4	4.08	43.13	98	1	246	43.5	5.33	43.13	100
2	180	43.1	2.91	50.91	94	2	202	54.1	4.09	50.91	97	2	221	64.7	5.35	50.91	99
3	160	62.0	3.01	59.17	94	3	179	77.8	4.23	59.17	97	3	196	93.0	5.53	59.17	99
4	137	84.9	3.04	66.05	93	4	153	106.5	4.27	66.05	96	4	168	127.4	5.58	66.05	99
5	119	101.2	2.99	67.86	93	5	133	126.9	4.20	67.86	96	5	146	151.9	5.50	67.86	99
6	98	116.0	2.86	66.28	94	6	110	145.5	4.02	66.28	96	6	120	174.1	5.26	66.28	99
7	79	119.3	2.61	60.10	94	7	88	149.6	3.67	60.10	97	7	97	179.0	4.80	60.10	99
2650	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	2850	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	3000	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))
1	266	50.9	6.75	43.13	102	1	286	58.9	8.40	43.13	104	1	302	65.3	9.79	43.13	106
2	239	75.7	6.77	50.91	101	2	257	87.5	8.42	50.91	103	2	270	97.0	9.82	50.91	105
3	212	108.8	7.00	59.17	101	3	228	125.9	8.70	59.17	103	3	240	139.5	10.15	59.17	104
4	182	149.1	7.06	66.05	101	4	195	172.4	8.79	66.05	102	4	206	191.0	10.25	66.05	104
5	158	177.7	6.96	67.86	101	5	170	205.5	8.66	67.86	102	5	179	227.7	10.10	67.86	104
6	130	203.7	6.66	66.28	101	6	140	235.6	8.28	66.28	103	6	147	261.0	9.66	66.28	104
7	105	209.4	6.07	60.10	101	7	113	242.3	7.55	60.10	103	7	119	268.4	8.81	60.10	104

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B-free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

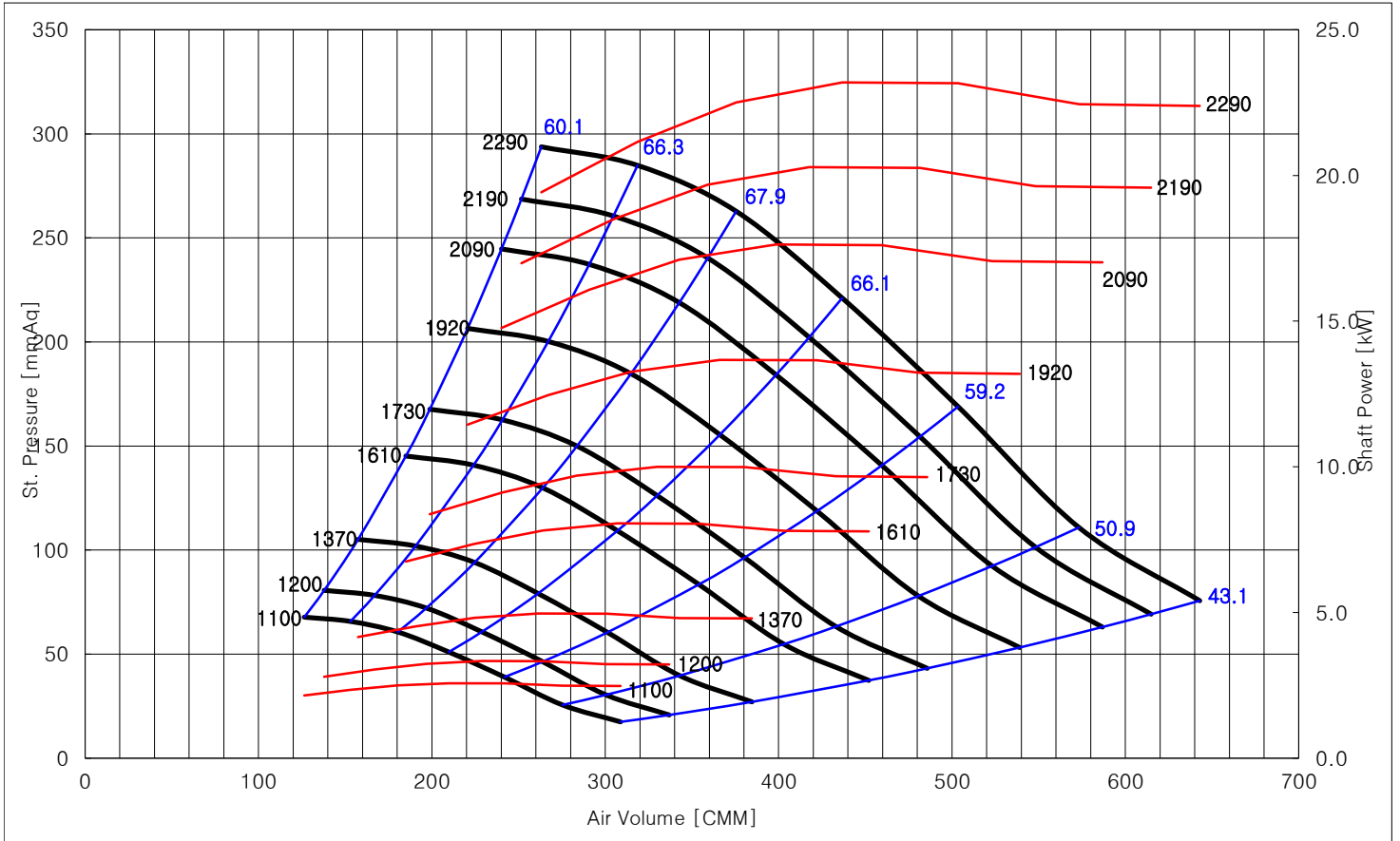
PERFORMANCE CURVES AND NOISE DATA - TSAF #3.5DS



950	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1050	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1250	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	170	9.6	0.81	43.13	83	1	188	11.7	1.10	43.13	85	1	223	16.6	1.85	43.13	89
2	152	14.3	0.82	50.91	82	2	168	17.4	1.10	50.91	84	2	200	24.7	1.86	50.91	88
3	136	20.5	0.84	59.17	81	3	150	25.1	1.14	59.17	83	3	178	35.6	1.92	59.17	88
4	117	28.2	0.85	66.05	81	4	129	34.4	1.15	66.05	83	4	153	48.8	1.94	66.05	87
5	101	33.5	0.84	67.86	81	5	111	41.0	1.13	67.86	83	5	133	58.1	1.91	67.86	87
6	83	38.4	0.80	66.28	81	6	92	46.9	1.08	66.28	83	6	109	66.5	1.83	66.28	88
7	67	39.5	0.73	60.10	81	7	74	48.3	0.99	60.10	83	7	88	68.5	1.67	60.10	88
1500	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1750	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	2000	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	268	23.9	3.20	43.13	93	1	313	32.5	5.08	43.13	98	1	357	42.5	7.59	43.13	104
2	240	35.6	3.21	50.91	93	2	280	48.5	5.10	50.91	97	2	320	63.3	7.61	50.91	103
3	214	51.2	3.32	59.17	92	3	250	69.7	5.27	59.17	96	3	285	91.0	7.87	59.17	102
4	184	70.2	3.35	66.05	92	4	215	95.6	5.32	66.05	96	4	245	124.8	7.94	66.05	102
5	159	83.6	3.30	67.86	92	5	186	113.8	5.24	67.86	96	5	212	148.6	7.82	67.86	102
6	131	95.8	3.16	66.28	92	6	153	130.4	5.02	66.28	96	6	175	170.3	7.49	66.28	102
7	106	98.6	2.88	60.10	92	7	124	134.2	4.57	60.10	96	7	141	175.3	6.83	60.10	102
2300	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	2700	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	2900	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	411	56.2	11.54	43.13	106	1	482	77.4	18.66	43.13	109	1	518	89.3	23.12	43.13	111
2	368	83.7	11.57	50.91	105	2	432	115.3	18.72	50.91	108	2	464	133.1	23.20	50.91	110
3	328	120.4	11.97	59.17	104	3	385	165.9	19.36	59.17	107	3	414	191.4	23.99	59.17	109
4	282	165.0	12.08	66.05	104	4	331	227.4	19.54	66.05	107	4	356	262.4	24.21	66.05	109
5	244	196.6	11.90	67.86	104	5	286	270.9	19.25	67.86	107	5	307	312.5	23.85	67.86	109
6	201	225.2	11.39	66.28	104	6	236	310.4	18.43	66.28	107	6	253	358.1	22.84	66.28	109
7	163	231.8	10.38	60.10	104	7	191	319.5	16.80	60.10	107	7	205	368.5	20.81	60.10	109

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet Lwi sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

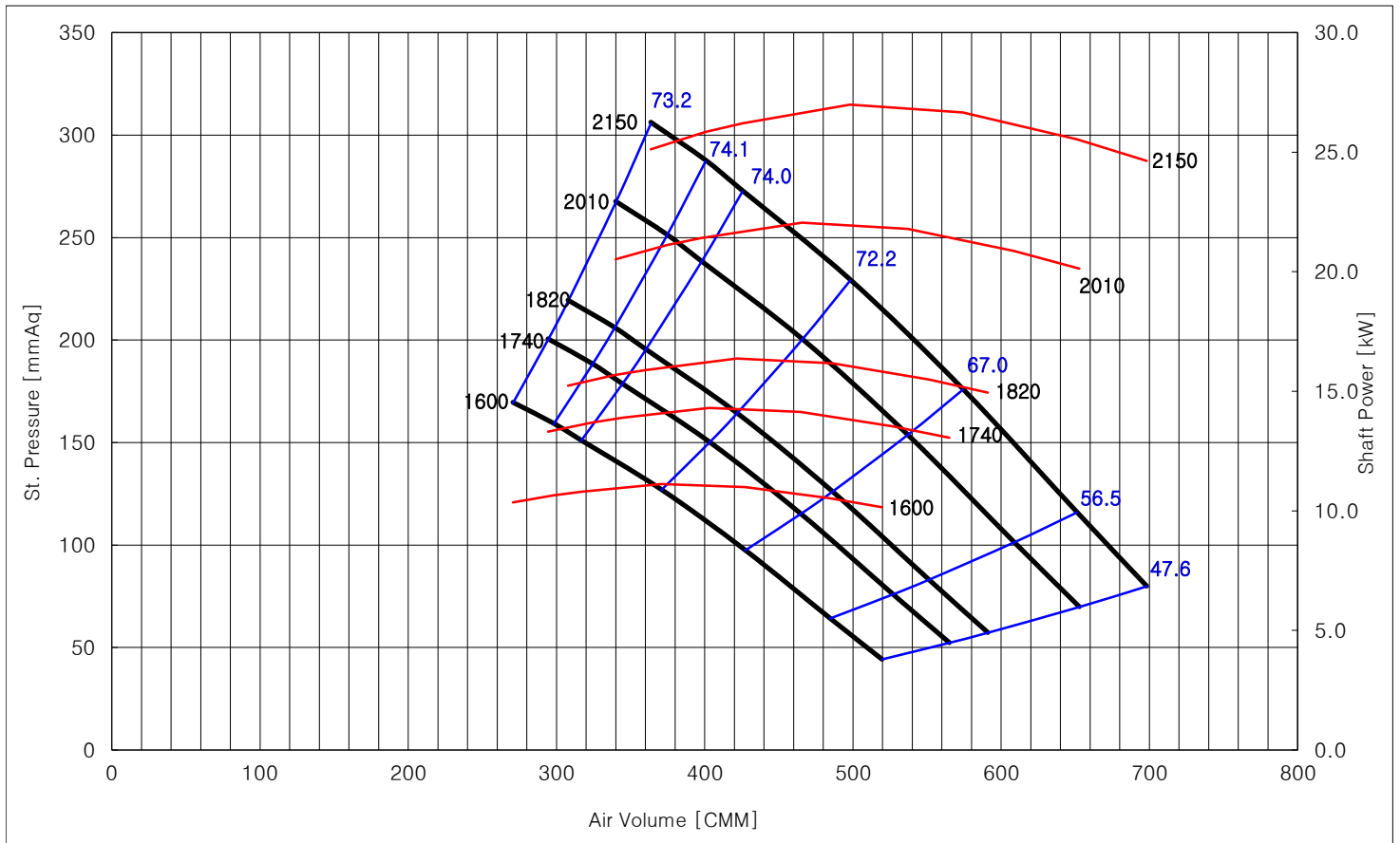
PERFORMANCE CURVES AND NOISE DATA - TSAF #4DS



1100	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1200	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1370	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	309	17.5	2.48	43.13	85	1	337	20.8	3.22	43.13	87	1	385	27.1	4.79	43.13	91
2	275	25.6	2.49	50.91	84	2	300	30.4	3.23	50.91	86	2	343	39.7	4.81	50.91	90
3	242	39.0	2.57	59.17	83	3	264	46.4	3.33	59.17	85	3	301	60.5	4.96	59.17	89
4	210	51.0	2.57	66.05	83	4	229	60.7	3.34	66.05	85	4	261	79.1	4.97	66.05	88
5	180	60.6	2.49	67.86	83	5	197	72.2	3.24	67.86	85	5	225	94.1	4.82	67.86	88
6	153	65.7	2.34	66.28	83	6	167	78.2	3.04	66.28	85	6	191	102.0	4.53	66.28	88
7	126	67.8	2.15	60.10	83	7	138	80.7	2.79	60.10	85	7	157	105.1	4.16	60.10	88
1610	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1730	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1920	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	452	37.4	7.78	43.13	95	1	486	43.2	9.65	43.13	97	1	539	53.2	13.19	43.13	99
2	403	54.8	7.80	50.91	94	2	433	63.3	9.68	50.91	96	2	481	77.9	13.23	50.91	98
3	354	83.5	8.05	59.17	93	3	380	96.4	9.99	59.17	95	3	422	118.8	13.65	59.17	97
4	307	109.3	8.06	66.05	93	4	330	126.2	10.00	66.05	94	4	366	155.4	13.67	66.05	97
5	264	129.9	7.82	67.86	92	5	284	150.0	9.70	67.86	94	5	315	184.7	13.26	67.86	97
6	224	140.8	7.35	66.28	92	6	241	162.6	9.12	66.28	94	6	267	200.2	12.47	66.28	97
7	185	145.2	6.75	60.10	92	7	199	167.7	8.37	60.10	94	7	221	206.5	11.45	60.10	97
2090	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	2190	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	2290	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	587	63.0	17.02	43.13	102	1	615	69.2	19.58	43.13	103	1	643	75.7	22.39	43.13	104
2	523	92.3	17.06	50.91	101	2	548	101.4	19.63	50.91	102	2	573	110.9	22.45	50.91	103
3	460	140.7	17.61	59.17	100	3	482	154.5	20.26	59.17	101	3	504	168.9	23.16	59.17	102
4	399	184.2	17.63	66.05	99	4	418	202.2	20.29	66.05	101	4	437	221.1	23.19	66.05	102
5	343	218.9	17.11	67.86	99	5	359	240.4	19.68	67.86	100	5	376	262.8	22.50	67.86	101
6	291	237.3	16.08	66.28	99	6	305	260.5	18.50	66.28	100	6	319	284.9	21.15	66.28	101
7	240	244.7	14.77	60.10	99	7	252	268.7	16.99	60.10	100	7	263	293.8	19.42	60.10	103

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

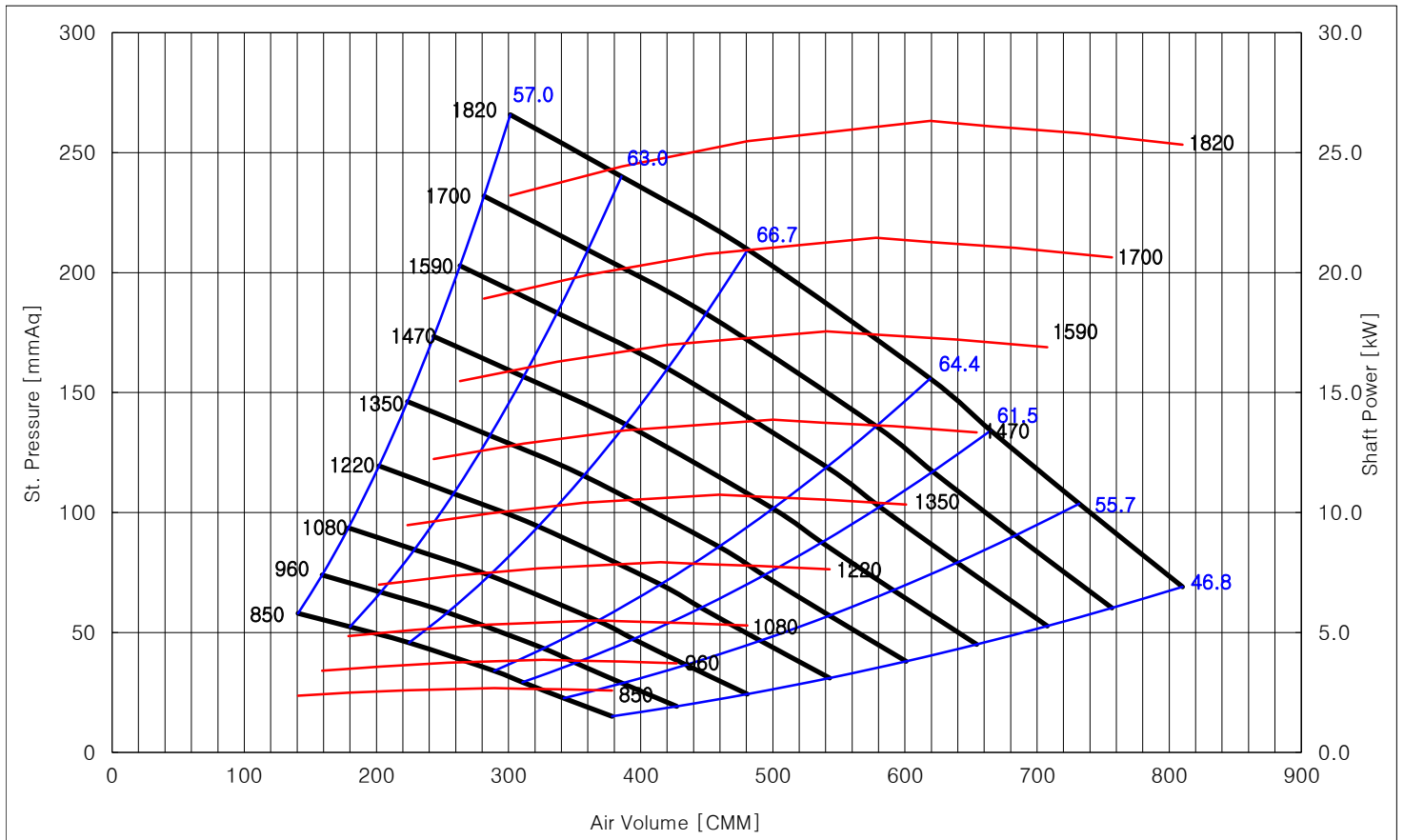
PERFORMANCE CURVES AND NOISE DATA - TSAF #4.5DS



1600	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	1740	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	1820	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))
1	520	44.3	10.15	47.6	98	1	565	52.4	13.06	47.6	100	1	591	57.3	14.94	47.6	101
2	485	64.3	10.53	56.5	97	2	527	76.1	13.54	56.5	99	2	551	83.2	15.49	56.5	100
3	427	97.6	10.99	67.0	96	3	465	115.4	14.13	67.0	98	3	486	126.2	16.18	67.0	99
4	371	127.1	11.12	72.2	95	4	403	150.3	14.31	72.2	97	4	422	164.5	16.37	72.2	99
5	317	151.2	10.80	74.0	95	5	344	178.8	13.89	74.0	97	5	360	195.6	15.89	74.0	98
6	298	159.4	10.65	74.1	95	6	324	188.5	13.70	74.1	97	6	339	206.2	15.68	74.1	98
7	270.600	169.6	10.351	73.2	95	7	294	200.6	13.31	73.2	97	7	308	219.5	15.23	73.2	98
2010	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))	2150	Q(m³/min)	Ps(mmAq)	H(kW)	ηr(%)	Lwi(dB(A))						
1	653	69.9	20.13	47.6	103	1	698	80.0	24.64	47.60	105						
2	609	101.5	20.87	56.5	102	2	651	116.1	25.54	56.50	104						
3	537	154.0	21.79	67.0	101	3	574	176.2	26.67	67.00	103						
4	466	200.6	22.05	72.2	101	4	498	229.5	26.99	72.20	103						
5	398	238.6	21.41	74.0	101	5	425	273.0	26.20	74.00	103						
6	374	251.5	21.12	74.1	101	6	401	287.8	25.84	74.10	103						
7	340	267.7	20.522	73.2	101	7	364	306.3	25.12	73.20	103						

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

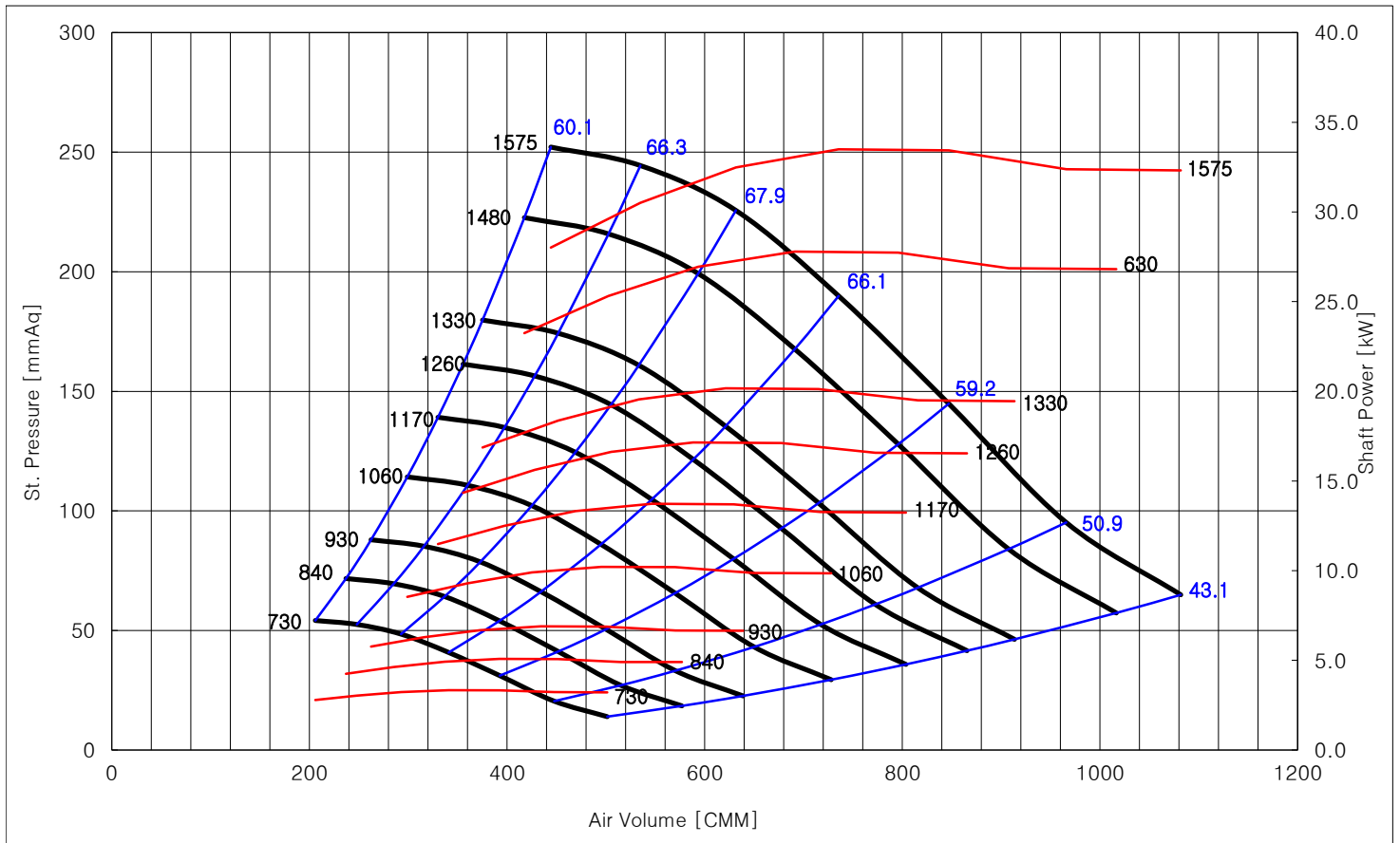
PERFORMANCE CURVES AND NOISE DATA - TSAF #5DS



850	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	960	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1080	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	378	15.1	2.58	46.75	91	1	427	19.2	3.72	46.75	94	1	481	24.3	5.29	46.75	97
2	342	22.6	2.63	55.73	89	2	386	28.8	3.79	55.73	92	2	434	36.5	5.39	55.73	95
3	311	29.3	2.66	61.50	88	3	351	37.3	3.83	61.50	91	3	395	47.2	5.45	61.50	94
4	289	34.0	2.68	64.36	88	4	327	43.4	3.86	64.36	91	4	367	54.9	5.50	64.36	94
5	225	45.7	2.60	66.73	88	5	254	58.3	3.74	66.73	91	5	285	73.8	5.33	66.73	94
6	180	52.4	2.49	62.95	88	6	203	66.8	3.58	62.95	91	6	229	84.5	5.10	62.95	94
7	141	58.0	2.36	56.96	88	7	159	74.0	3.41	56.96	91	7	179	93.6	4.85	56.96	94
1220	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1350	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1470	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	543	31.0	7.63	46.75	100	1	601	38.0	10.34	46.75	103	1	654	45.0	13.35	46.75	105
2	491	46.6	7.77	55.73	98	2	543	57.0	10.53	55.73	101	2	591	67.6	13.60	55.73	103
3	446	60.3	7.86	61.50	97	3	493	73.8	10.65	61.50	100	3	537	87.5	13.75	61.50	102
4	415	70.0	7.93	64.36	97	4	459	85.7	10.74	64.36	100	4	500	101.7	13.87	64.36	102
5	323	94.2	7.68	66.73	97	5	357	115.3	10.40	66.73	100	5	389	136.7	13.43	66.73	102
6	258	107.9	7.36	62.95	97	6	286	132.1	9.97	62.95	100	6	311	156.6	12.87	62.95	102
7	202	119.4	6.99	56.96	97	7	224	146.3	9.47	56.96	100	7	243	173.4	12.23	56.96	102
1590	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1700	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1820	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	708	52.7	16.89	46.75	107	1	757	60.2	20.64	46.75	109	1	810	69.0	25.33	46.75	111
2	639	79.1	17.21	55.73	105	2	684	90.4	21.03	55.73	107	2	732	103.7	25.81	55.73	109
3	581	102.4	17.40	61.50	104	3	621	117.0	21.27	61.50	106	3	665	134.2	26.10	61.50	108
4	541	118.9	17.55	64.36	104	4	578	136.0	21.45	64.36	106	4	619	155.8	26.32	64.36	108
5	420	160.0	16.99	66.73	104	5	449	182.9	20.77	66.73	106	5	481	209.6	25.48	66.73	108
6	337	183.2	16.29	62.95	104	6	360	209.4	19.91	62.95	106	6	385	240.1	24.43	62.95	108
7	263	202.9	15.48	56.96	104	7	281	231.9	18.92	56.96	106	7	301	265.8	23.21	56.96	108

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

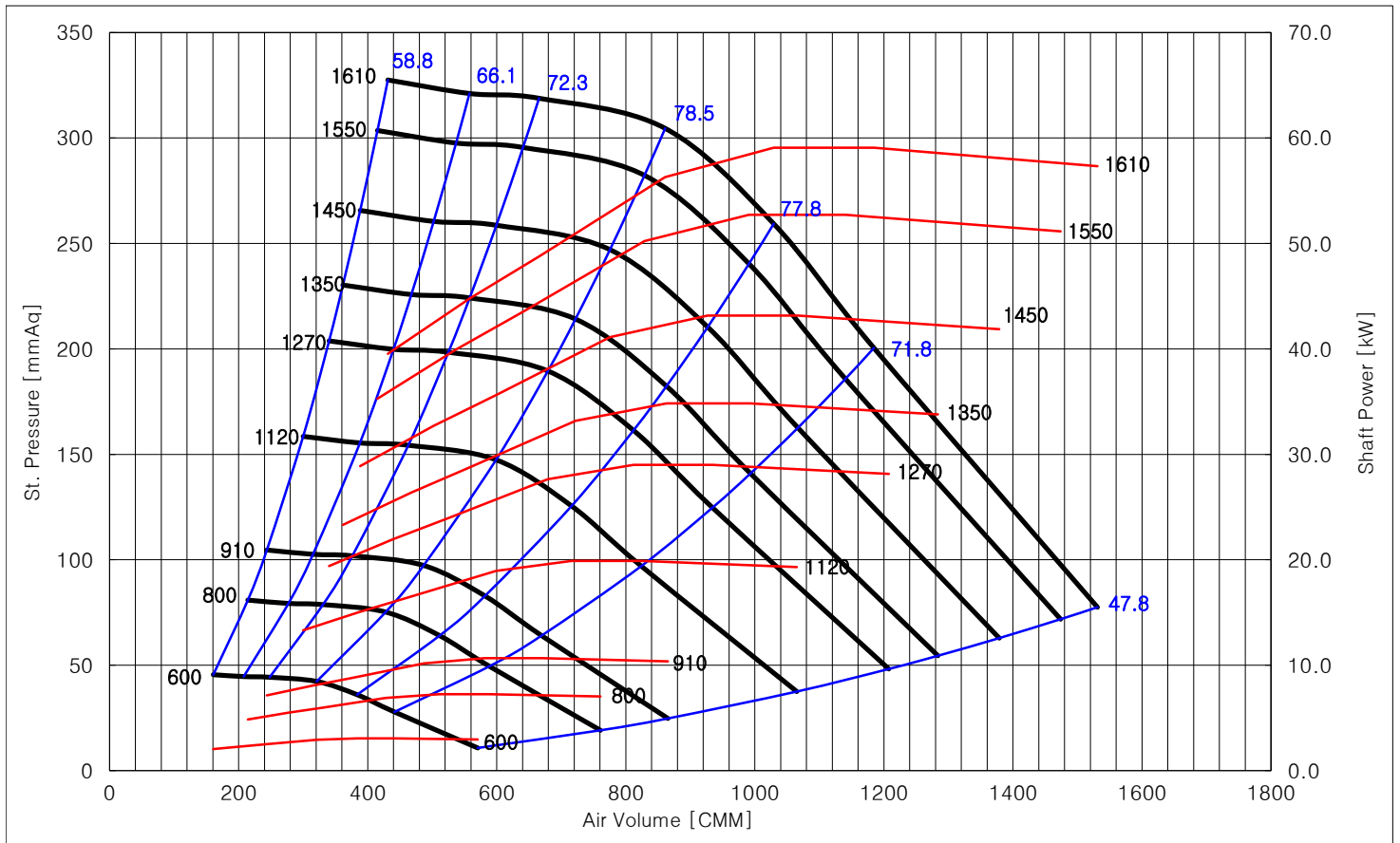
PERFORMANCE CURVES AND NOISE DATA - TSAF #5.5DS



730	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	840	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	930	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	501	13.9	3.22	43.13	84	1	577	18.5	4.90	43.13	87	1	639	22.6	6.65	43.13	90
2	448	20.4	3.22	50.91	83	2	515	27.1	4.91	50.91	86	2	570	33.2	6.67	50.91	89
3	393	31.1	3.33	59.17	82	3	452	41.2	5.07	59.17	85	3	500	50.5	6.88	59.17	88
4	341	40.8	3.33	66.05	82	4	392	54.0	5.08	66.05	85	4	434	66.2	6.90	66.05	88
5	293	48.5	3.23	67.86	82	5	337	64.2	4.93	67.86	85	5	373	78.7	6.69	67.86	88
6	248	52.5	3.04	66.28	82	6	285	69.5	4.63	66.28	85	6	316	85.2	6.28	66.28	88
7	206	54.2	2.79	60.10	82	7	237	71.7	4.25	60.10	85	7	262	87.9	5.77	60.10	88
1060	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1170	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1260	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	728	29.4	9.85	43.13	93	1	804	35.8	13.25	43.13	96	1	865	41.5	16.54	43.13	98
2	650	43.1	9.87	50.91	92	2	717	52.5	13.27	50.91	95	2	773	60.9	16.58	50.91	96
3	570	65.6	10.19	59.17	91	3	629	79.9	13.70	59.17	94	3	678	92.7	17.11	59.17	96
4	495	86.0	10.21	66.05	91	4	546	104.8	13.73	66.05	93	4	588	121.5	17.15	66.05	95
5	425	102.2	9.90	67.86	91	5	469	124.5	13.31	67.86	93	5	505	144.4	16.63	67.86	95
6	360	110.7	9.30	66.28	91	6	397	134.9	12.51	66.28	93	6	428	156.4	15.62	66.28	95
7	299	114.2	8.54	60.10	91	7	330	139.1	11.48	60.10	93	7	355	161.4	14.34	60.10	95
1330	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1480	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1575	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	913	46.3	19.46	43.13	99	1	1016	57.3	26.81	43.13	102	1	1082	64.9	32.31	43.13	103
2	816	67.9	19.50	50.91	98	2	908	84.0	26.86	50.91	101	2	966	95.2	32.38	50.91	102
3	715	103.3	20.13	59.17	97	3	796	127.9	27.74	59.17	100	3	847	144.8	33.43	59.17	101
4	621	135.4	20.17	66.05	97	4	691	167.7	27.79	66.05	100	4	735	189.9	33.49	66.05	101
5	533	160.9	19.56	67.86	97	5	593	199.2	26.95	67.86	99	5	631	225.6	32.48	67.86	101
6	452	174.3	18.37	66.28	97	6	503	215.8	25.31	66.28	99	6	535	244.4	30.51	66.28	101
7	375	179.8	16.87	60.10	97	7	417	222.6	23.24	60.10	99	7	444	252.1	28.01	60.10	101

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

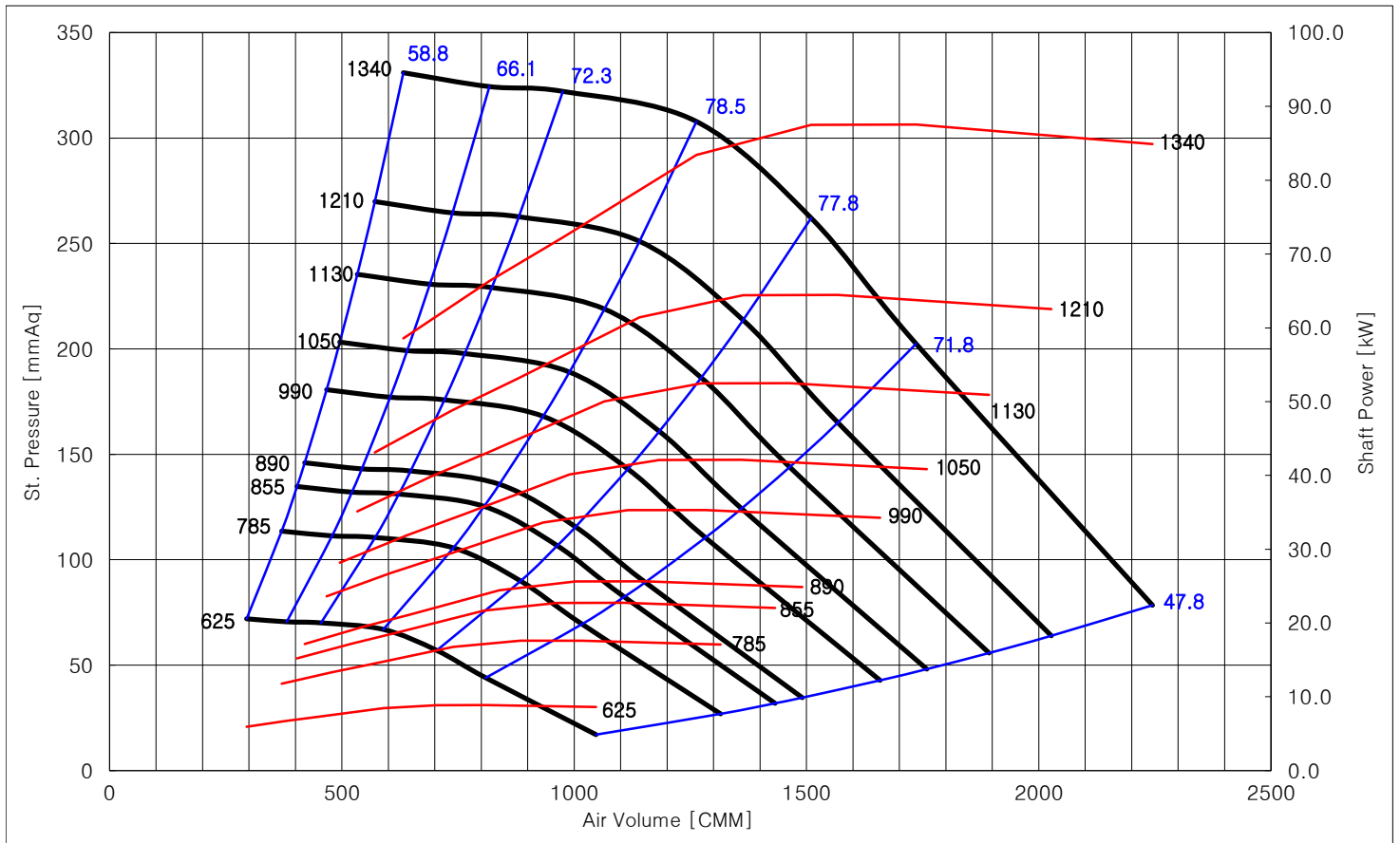
PERFORMANCE CURVES AND NOISE DATA - TSAF #6DS



600	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	800	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	910	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	571	10.8	2.97	47.82	80	1	761	19.1	7.03	47.82	88	1	865	24.8	10.35	47.82	92
2	441	27.8	3.06	71.80	77	2	589	49.5	7.25	71.80	85	2	670	64.0	10.67	71.80	88
3	384	36.0	3.06	77.84	76	3	511	64.0	7.25	77.84	84	3	582	82.8	10.67	77.84	87
4	321	42.3	2.91	78.50	75	4	428	75.2	6.91	78.50	83	4	487	97.3	10.16	78.50	86
5	248	44.3	2.52	72.34	75	5	331	78.7	5.98	72.34	83	5	376	101.9	8.81	72.34	86
6	208	44.6	2.32	66.10	75	6	277	79.3	5.49	66.10	84	6	315	102.6	8.08	66.10	87
7	161	45.5	2.05	58.80	76	7	214	80.9	4.85	58.80	84	7	244	104.6	7.14	58.80	87
1120	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1270	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1350	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	1065	37.5	19.30	47.82	97	1	1208	48.2	28.14	47.82	101	1	1284	54.5	33.80	47.82	103
2	824	97.0	19.89	71.80	94	2	934	124.7	29.00	71.80	98	2	993	140.9	34.83	71.80	99
3	716	125.5	19.89	77.84	93	3	812	161.4	29.00	77.84	97	3	863	182.3	34.83	77.84	99
4	599	147.4	18.95	78.50	92	4	679	189.5	27.63	78.50	95	4	722	214.2	33.19	78.50	97
5	463	154.3	16.42	72.34	92	5	525	198.4	23.94	72.34	96	5	558	224.2	28.76	72.34	98
6	388	155.4	15.07	66.10	93	6	440	199.8	21.97	66.10	97	6	468	225.8	26.39	66.10	99
7	300	158.5	13.31	58.80	93	7	340	203.8	19.41	58.80	97	7	362	230.3	23.31	58.80	99
1450	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1550	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1610	Q(m ³ /min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	1379	62.9	41.88	47.82	105	1	1474	71.8	51.16	47.82	107	1	1531	77.5	57.33	47.82	107
2	1067	162.6	43.16	71.80	102	2	1140	185.8	52.72	71.80	103	2	1185	200.4	59.08	71.80	104
3	927	210.4	43.16	77.84	101	3	991	240.4	52.72	77.84	103	3	1029	259.3	59.08	77.84	104
4	775	247.1	41.12	78.50	99	4	829	282.3	50.23	78.50	101	4	861	304.6	56.29	78.50	102
5	599	258.6	35.63	72.34	100	5	641	295.5	43.52	72.34	102	5	666	318.8	48.77	72.34	102
6	502	260.5	32.70	66.10	101	6	537	297.6	39.94	66.10	103	6	558	321.1	44.76	66.10	104
7	388	265.7	28.88	58.80	101	7	415	303.6	35.28	58.80	103	7	431	327.5	39.54	58.80	104

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

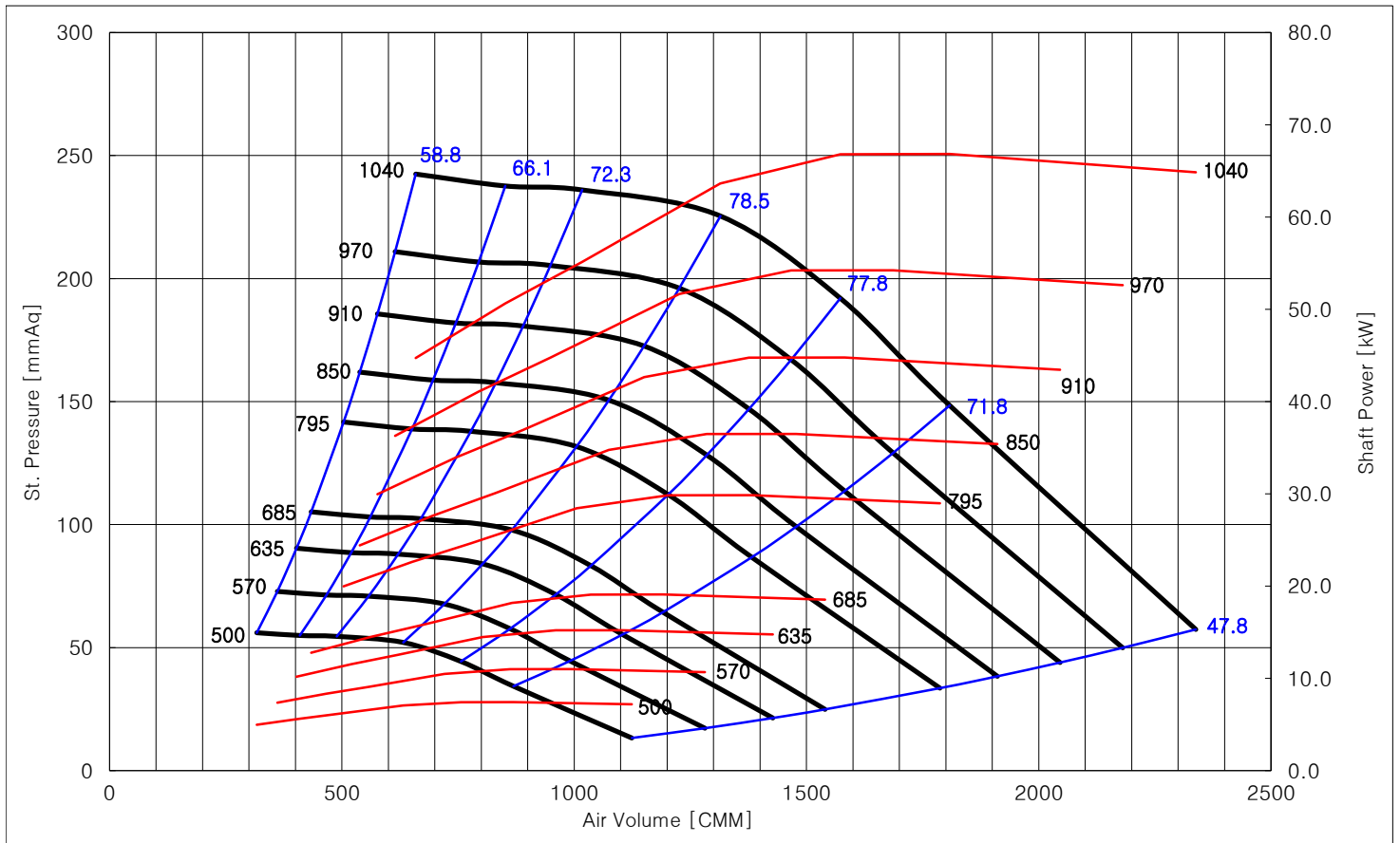
PERFORMANCE CURVES AND NOISE DATA - TSAF #7DS



625	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	785	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	855	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	1047	17.1	8.62	47.82	87	1	1315	26.9	17.07	47.82	93	1	1432	31.9	22.06	47.82	96
2	810	44.0	8.88	71.80	84	2	1017	69.5	17.60	71.80	90	2	1108	82.4	22.74	71.80	92
3	704	57.0	8.88	77.84	83	3	885	89.9	17.59	77.84	89	3	964	106.7	22.73	77.84	91
4	589	67.0	8.46	78.50	82	4	740	105.6	16.77	78.50	88	4	806	125.3	21.67	78.50	90
5	455	70.1	7.33	72.34	82	5	572	110.5	14.53	72.34	88	5	623	131.1	18.77	72.34	90
6	381	70.6	6.73	66.10	82	6	479	111.3	13.33	66.10	89	6	522	132.1	17.23	66.10	91
7	295	72.0	5.94	58.80	83	7	370	113.6	11.77	58.80	89	7	403	134.7	15.21	58.80	91
890	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	990	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1050	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	1491	34.6	24.88	47.82	97	1	1659	42.8	34.24	47.82	99	1	1759	48.2	40.86	47.82	101
2	1153	89.3	25.65	71.80	93	2	1283	110.5	35.30	71.80	96	2	1360	124.3	42.12	71.80	98
3	1003	115.6	25.64	77.84	92	3	1116	143.0	35.29	77.84	95	3	1183	160.9	42.10	77.84	97
4	839	135.8	24.44	78.50	91	4	933	168.0	33.64	78.50	94	4	990	189.0	40.13	78.50	96
5	648	142.1	21.17	72.34	91	5	721	175.8	29.14	72.34	94	5	764	197.8	34.76	72.34	96
6	543	143.1	19.43	66.10	92	6	604	177.1	26.74	66.10	95	6	641	199.2	31.91	66.10	97
7	420	146.0	17.16	58.80	93	7	467	180.7	23.62	58.80	95	7	496	203.2	28.18	58.80	97
1130	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1210	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	1340	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	1893	55.8	50.92	47.82	103	1	2027	64.0	62.52	47.82	105	1	2245	78.4	84.92	47.82	108
2	1464	144.0	52.50	71.80	100	2	1568	165.1	64.46	71.80	102	2	1736	202.4	87.55	71.80	105
3	1273	186.4	52.48	77.84	99	3	1364	213.7	64.43	77.84	101	3	1510	262.1	87.51	77.84	104
4	1065	218.9	50.02	78.50	98	4	1141	251.0	61.42	78.50	100	4	1263	307.8	83.42	78.50	103
5	823	229.1	43.33	72.34	98	5	881	262.7	53.20	72.34	100	5	976	322.1	72.25	72.34	103
6	689	230.7	39.77	66.10	99	6	738	264.5	48.83	66.10	101	6	818	324.4	66.32	66.10	104
7	533	235.4	35.12	58.80	99	7	571	269.9	43.12	58.80	101	7	632	331.0	58.57	58.80	105

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

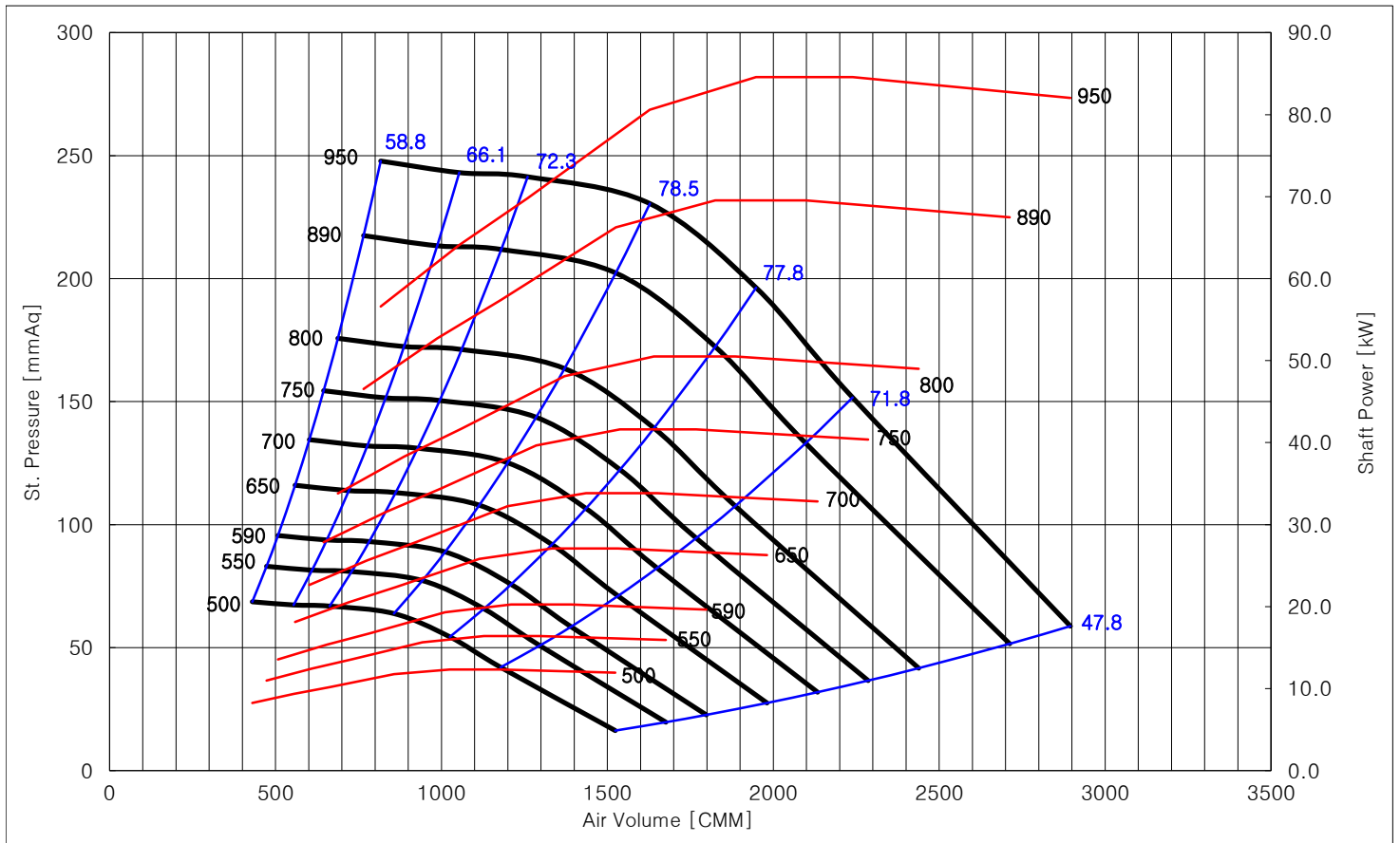
PERFORMANCE CURVES AND NOISE DATA - TSAF #8DS



500	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	570	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	635	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	1124	13.3	7.21	47.82	84	1	1281	17.2	10.68	47.82	88	1	1428	21.4	14.76	47.82	91
2	869	34.3	7.43	71.80	80	2	991	44.6	11.00	71.80	84	2	1104	55.3	15.22	71.80	87
3	756	44.4	7.42	77.84	79	3	862	57.7	11.00	77.84	83	3	960	71.6	15.21	77.84	86
4	632	52.1	7.07	78.50	78	4	721	67.7	10.48	78.50	82	4	803	84.0	14.49	78.50	85
5	489	54.6	6.13	72.34	78	5	558	70.9	9.08	72.34	82	5	621	88.0	12.55	72.34	85
6	409	54.9	5.63	66.10	79	6	467	71.4	8.34	66.10	82	6	520	88.6	11.53	66.10	86
7	317	56.0	4.97	58.80	79	7	361	72.8	7.36	58.80	83	7	402	90.4	10.18	58.80	86
685	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	795	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	850	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	1540	24.9	18.53	47.82	93	1	1787	33.5	28.97	47.82	97	1	1911	38.3	35.40	47.82	98
2	1191	64.4	19.10	71.80	89	2	1382	86.7	29.86	71.80	93	2	1478	99.2	36.49	71.80	95
3	1036	83.3	19.09	77.84	88	3	1202	112.2	29.84	77.84	93	3	1286	128.3	36.47	77.84	94
4	866	97.8	18.19	78.50	87	4	1005	131.7	28.44	78.50	91	4	1075	150.6	34.76	78.50	93
5	670	102.4	15.76	72.34	87	5	778	137.9	24.64	72.34	91	5	831	157.7	30.11	72.34	93
6	561	103.1	14.47	66.10	88	6	651	138.9	22.62	66.10	92	6	696	158.8	27.65	66.10	94
7	434	105.2	12.78	58.80	88	7	504	141.7	19.98	58.80	93	7	539	162.0	24.42	58.80	94
910	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	970	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	1040	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	2046	43.9	43.44	47.82	100	1	2181	49.9	52.62	47.82	102	1	2338	57.4	64.85	47.82	104
2	1582	113.7	44.78	71.80	97	2	1687	129.1	54.23	71.80	99	2	1808	148.4	66.84	71.80	101
3	1376	147.0	44.76	77.84	96	3	1467	167.0	54.21	77.84	98	3	1573	192.0	66.81	77.84	100
4	1150	172.6	42.65	78.50	95	4	1226	196.1	51.65	78.50	96	4	1315	225.4	63.66	78.50	98
5	890	180.7	36.95	72.34	95	5	949	205.3	44.75	72.34	97	5	1017	236.0	55.15	72.34	98
6	745	182.0	33.93	66.10	96	6	794	206.7	41.09	66.10	97	6	852	237.7	50.64	66.10	99
7	577	185.7	29.96	58.80	96	7	615	210.9	36.29	58.80	98	7	659	242.5	44.73	58.80	100

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

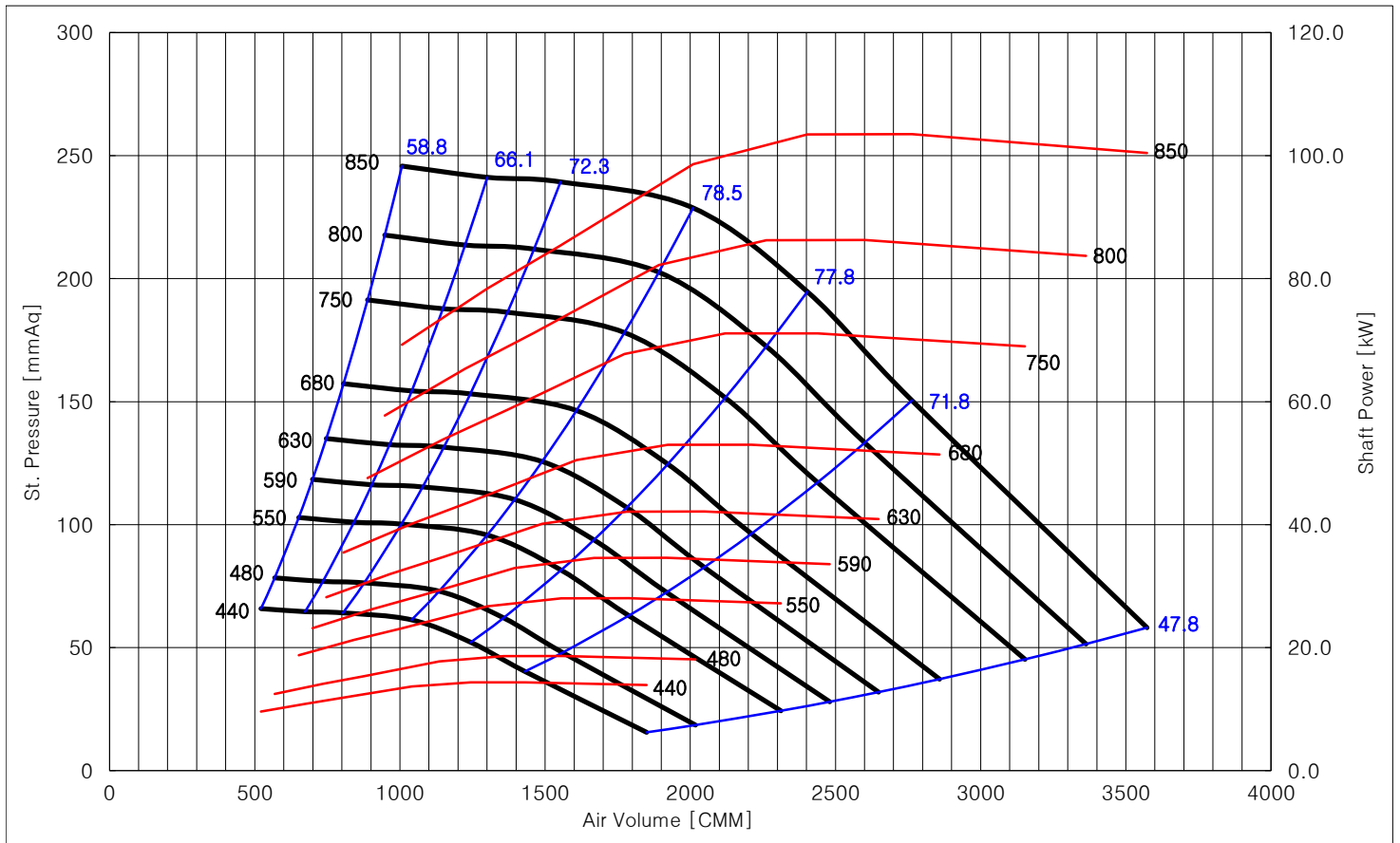
PERFORMANCE CURVES AND NOISE DATA - TSAF #9DS



500	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	550	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	590	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	1524	16.3	11.96	47.82	87	1	1676	19.7	15.92	47.82	90	1	1798	22.7	19.65	47.82	92
2	1178	42.0	12.33	71.80	83	2	1296	50.8	16.41	71.80	86	2	1391	58.5	20.26	71.80	88
3	1025	54.4	12.33	77.84	83	3	1128	65.8	16.41	77.84	85	3	1210	75.7	20.26	77.84	87
4	857	63.8	11.75	78.50	81	4	943	77.3	15.64	78.50	84	4	1011	88.9	19.30	78.50	86
5	663	66.9	10.18	72.34	81	5	729	80.9	13.55	72.34	84	5	782	93.1	16.72	72.34	86
6	555	67.3	9.34	66.10	82	6	610	81.5	12.44	66.10	84	6	654	93.8	15.35	66.10	87
7	430	68.6	8.25	58.80	82	7	473	83.1	10.98	58.80	85	7	507	95.6	13.56	58.80	87
650	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	700	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	750	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	1981	27.5	26.28	47.82	94	1	2133	31.9	32.82	47.82	96	1	2286	36.6	40.37	47.82	98
2	1532	71.0	27.09	71.80	91	2	1650	82.3	33.83	71.80	93	2	1768	94.5	41.62	71.80	95
3	1333	91.9	27.09	77.84	90	3	1436	106.6	33.83	77.84	92	3	1538	122.4	41.62	77.84	94
4	1114	107.9	25.81	78.50	89	4	1200	125.1	32.24	78.50	91	4	1285	143.7	39.65	78.50	93
5	862	113.0	22.36	72.34	89	5	928	131.1	27.93	72.34	91	5	995	150.4	34.35	72.34	93
6	721	113.8	20.53	66.10	89	6	776	132.0	25.64	66.10	92	6	832	151.5	31.54	66.10	94
7	559	116.0	18.13	58.80	90	7	602	134.5	22.64	58.80	92	7	645	154.4	27.85	58.80	94
800	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	890	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	950	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	2438	41.7	49.00	47.82	100	1	2712	51.6	67.46	47.82	103	1	2895	58.7	82.05	47.82	104
2	1886	107.6	50.51	71.80	97	2	2098	133.1	69.54	71.80	99	2	2239	151.7	84.57	71.80	101
3	1641	139.2	50.51	77.84	96	3	1825	172.3	69.54	77.84	99	3	1948	196.3	84.57	77.84	100
4	1371	163.4	48.12	78.50	94	4	1525	202.3	66.25	78.50	97	4	1628	230.5	80.58	78.50	99
5	1061	171.2	41.69	72.34	95	5	1180	211.9	57.40	72.34	97	5	1260	241.4	69.81	72.34	99
6	887	172.4	38.28	66.10	95	6	987	213.4	52.70	66.10	98	6	1054	243.1	64.09	66.10	100
7	688	175.7	33.80	58.80	96	7	765	217.5	46.54	58.80	99	7	817	247.8	56.60	58.80	100

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

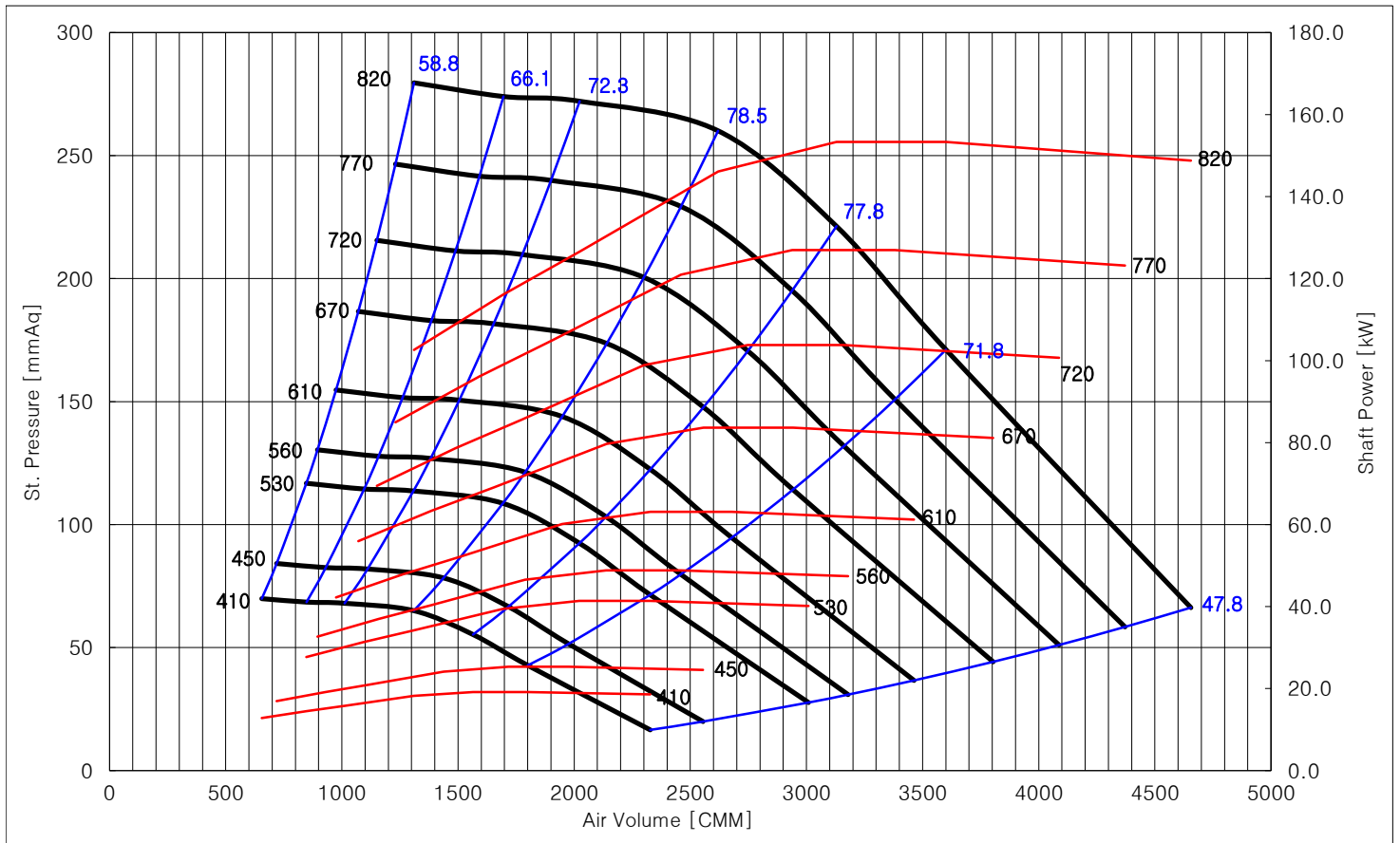
PERFORMANCE CURVES AND NOISE DATA - TSAF #10DS



440	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	480	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	550	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	1849	15.6	13.93	47.82	87	1	2018	18.5	18.08	47.82	89	1	2312	24.3	27.20	47.82	93
2	1430	40.3	14.36	71.80	83	2	1560	48.0	18.64	71.80	86	2	1788	63.0	28.04	71.80	89
3	1244	52.2	14.35	77.84	82	3	1357	62.1	18.63	77.84	85	3	1555	81.5	28.03	77.84	88
4	1040	61.3	13.67	78.50	81	4	1135	72.9	17.75	78.50	83	4	1300	95.8	26.71	78.50	87
5	804	64.1	11.85	72.34	81	5	877	76.3	15.38	72.34	83	5	1005	100.2	23.14	72.34	87
6	673	64.6	10.88	66.10	82	6	735	76.9	14.12	66.10	84	6	842	101.0	21.24	66.10	88
7	521	65.8	9.61	58.80	82	7	569	78.4	12.47	58.80	84	7	652	102.9	18.76	58.80	88
590	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	630	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	680	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	2480	28.0	33.58	47.82	95	1	2648	31.9	40.88	47.82	97	1	2858	37.2	51.41	47.82	99
2	1918	72.5	34.61	71.80	91	2	2048	82.7	42.14	71.80	93	2	2211	96.3	52.99	71.80	95
3	1668	93.8	34.60	77.84	90	3	1781	106.9	42.13	77.84	92	3	1922	124.6	52.97	77.84	95
4	1395	110.2	32.97	78.50	89	4	1490	125.6	40.14	78.50	91	4	1608	146.4	50.48	78.50	93
5	1078	115.3	28.56	72.34	89	5	1151	131.5	34.77	72.34	91	5	1242	153.2	43.72	72.34	93
6	903	116.2	26.22	66.10	90	6	964	132.5	31.92	66.10	92	6	1041	154.4	40.14	66.10	94
7	699	118.4	23.16	58.80	90	7	746	135.0	28.20	58.80	92	7	806	157.3	35.46	58.80	95
750	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	800	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	850	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	3153	45.2	68.98	47.82	102	1	3363	51.5	83.71	47.82	103	1	3573	58.1	100.41	47.82	105
2	2438	117.2	71.09	71.80	98	2	2601	133.3	86.28	71.80	100	2	2763	150.5	103.49	71.80	101
3	2120	151.6	71.07	77.84	97	3	2262	172.5	86.26	77.84	99	3	2403	194.7	103.46	77.84	101
4	1773	178.1	67.72	78.50	96	4	1892	202.6	82.19	78.50	98	4	2010	228.7	98.59	78.50	99
5	1370	186.3	58.67	72.34	96	5	1462	212.0	71.20	72.34	98	5	1553	239.3	85.40	72.34	99
6	1148	187.8	53.86	66.10	97	6	1224	213.6	65.37	66.10	99	6	1301	241.2	78.40	66.10	100
7	889	191.3	47.57	58.80	98	7	948	217.7	57.74	58.80	99	7	1007	245.7	69.25	58.80	101

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

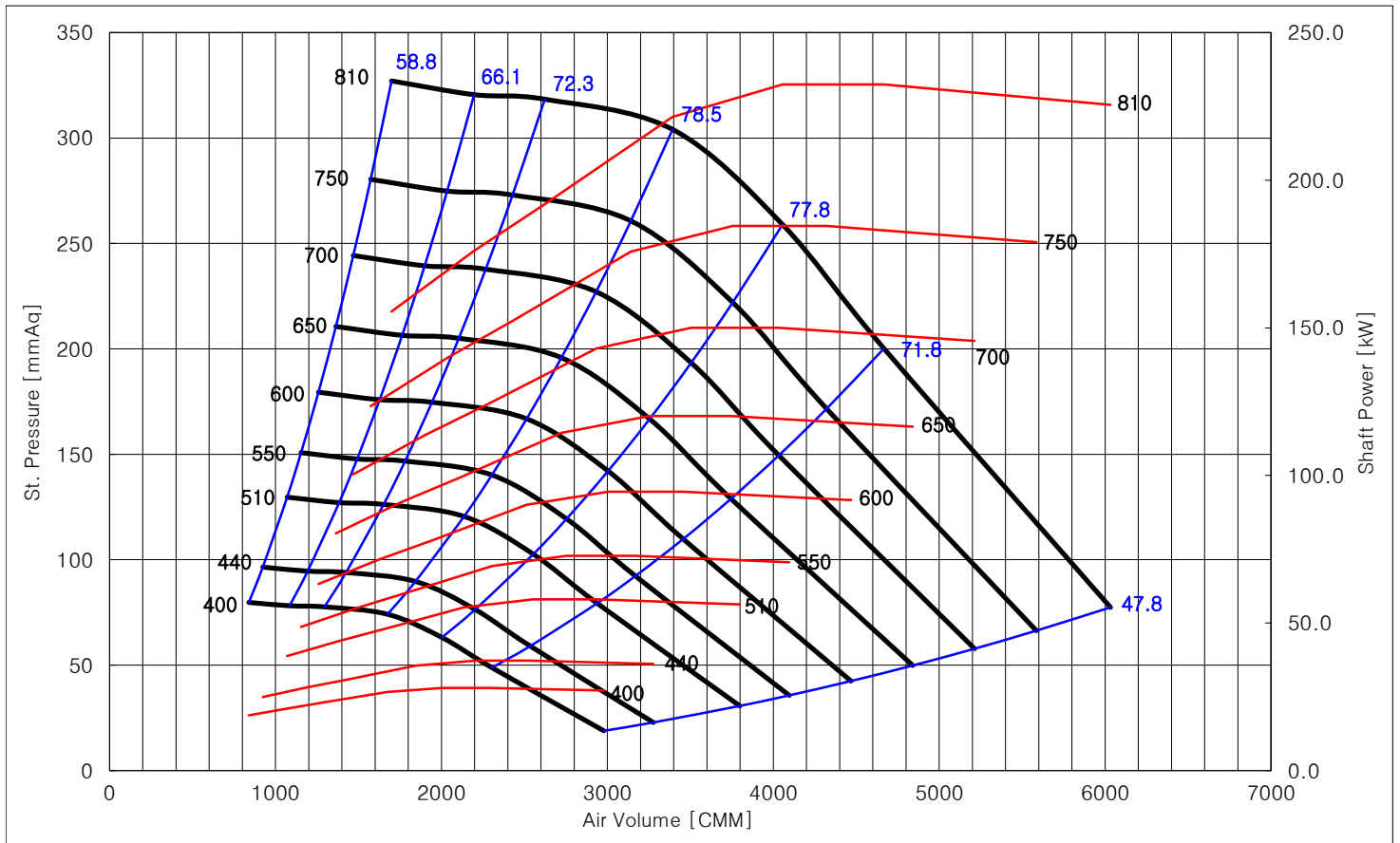
PERFORMANCE CURVES AND NOISE DATA - TSAF #11DS



410	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	450	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	530	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	2327	16.6	18.60	47.82	91	1	2555	20.0	24.59	47.82	93	1	3009	27.7	40.18	47.82	98
2	1800	42.8	19.17	71.80	87	2	1976	51.5	25.34	71.80	89	2	2327	71.5	41.40	71.80	93
3	1565	55.3	19.17	77.84	85	3	1717	66.6	25.34	77.84	88	3	2023	92.4	41.40	77.84	92
4	1310	65.0	18.26	78.50	86	4	1438	78.3	24.14	78.50	88	4	1693	108.7	39.45	78.50	92
5	1012	68.0	15.82	72.34	86	5	1111	81.9	20.92	72.34	89	5	1308	113.7	34.18	72.34	93
6	848	68.5	14.52	66.10	86	6	931	82.5	19.20	66.10	89	6	1096	114.5	31.37	66.10	93
7	655	69.9	12.83	58.80	87	7	719	84.2	16.96	58.80	89	7	847	116.8	27.71	58.80	93
560	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	610	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	670	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	3179	30.9	47.39	47.82	99	1	3463	36.7	61.25	47.82	101	1	3803	44.2	81.16	47.82	104
2	2459	79.8	48.84	71.80	95	2	2679	94.7	63.12	71.80	97	2	2942	114.2	83.64	71.80	99
3	2137	103.2	48.84	77.84	93	3	2328	122.5	63.12	77.84	96	3	2557	147.7	83.64	77.84	98
4	1789	121.3	46.53	78.50	93	4	1949	143.9	60.14	78.50	96	4	2140	173.6	79.69	78.50	98
5	1382	126.9	40.32	72.34	94	5	1505	150.6	52.11	72.34	96	5	1653	181.6	69.05	72.34	99
6	1158	127.8	37.00	66.10	94	6	1261	151.6	47.83	66.10	96	6	1385	182.9	63.37	66.10	99
7	895	130.4	32.68	58.80	95	7	975	154.7	42.24	58.80	97	7	1071	186.7	55.97	58.80	99
720	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	770	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))	820	Q(m³/min)	Ps(mmAq)	H(kW)	η_r (%)	Lwi(dB(A))
1	4087	51.1	100.72	47.82	105	1	4371	58.4	123.20	47.82	107	1	4655	66.3	148.79	47.82	109
2	3162	131.9	103.80	71.80	101	2	3381	150.9	126.96	71.80	103	2	3601	171.1	153.34	71.80	105
3	2748	170.6	103.80	77.84	100	3	2938	195.1	126.96	77.84	102	3	3129	221.3	153.34	77.84	103
4	2300	200.5	98.90	78.50	100	4	2460	229.3	120.96	78.50	102	4	2620	260.1	146.09	78.50	103
5	1777	209.8	85.69	72.34	101	5	1900	239.9	104.81	72.34	102	5	2024	272.1	126.59	72.34	104
6	1489	211.3	78.65	66.10	101	6	1592	241.6	96.20	66.10	103	6	1696	274.0	116.18	66.10	104
7	1151	215.6	69.46	58.80	101	7	1231	246.5	84.96	58.80	103	7	1311	279.6	102.61	58.80	105

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

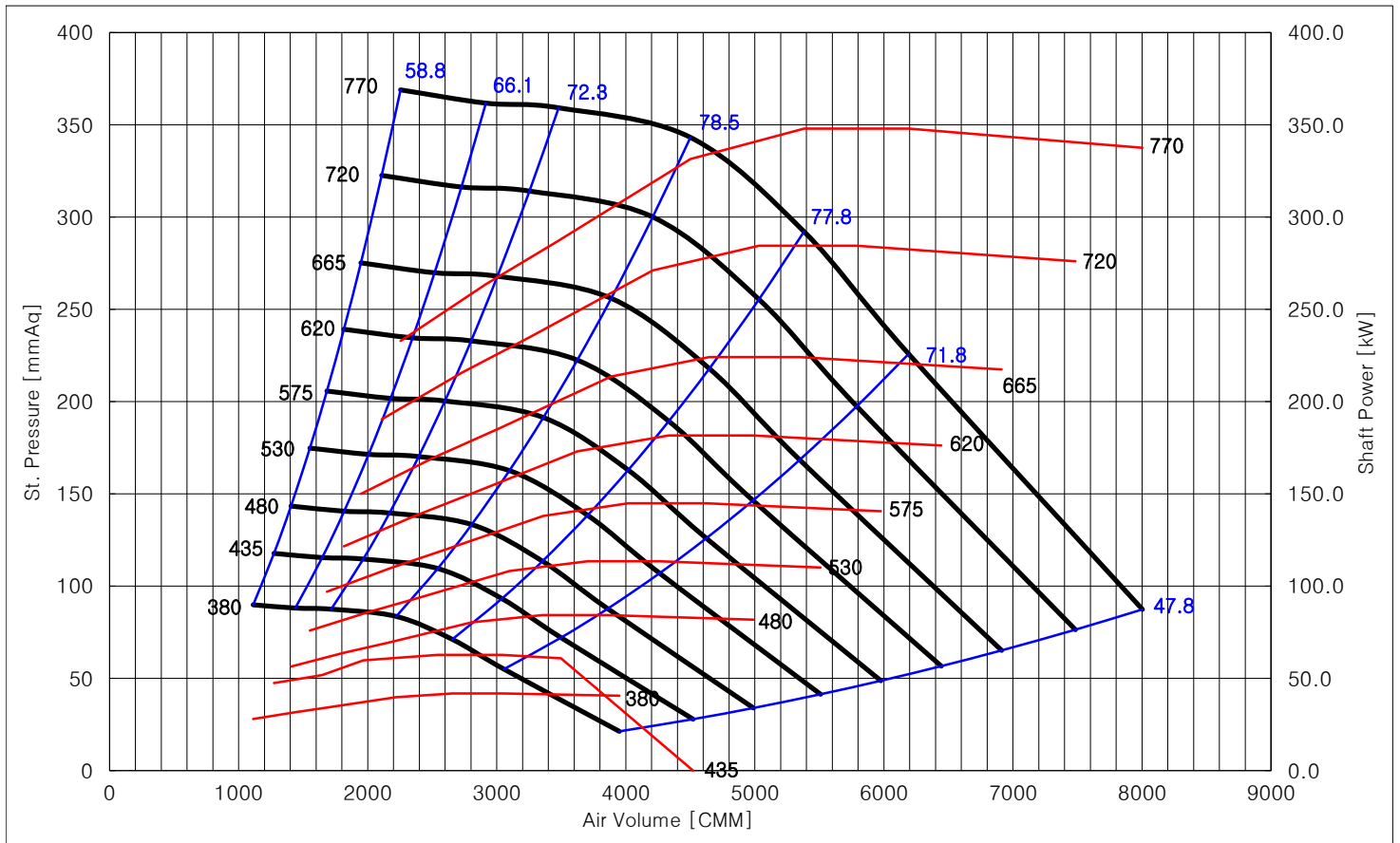
PERFORMANCE CURVES AND NOISE DATA - TSAF #12DS



400	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	440	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	510	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	2979	18.9	27.16	47.82	93	1	3277	22.8	36.15	47.82	96	1	3798	30.7	56.30	47.82	99
2	2305	48.8	27.99	71.80	89	2	2535	59.1	37.26	71.80	91	2	2939	79.4	58.02	71.80	95
3	2003	63.2	27.99	77.84	88	3	2203	76.4	37.26	77.84	90	3	2554	102.7	58.02	77.84	94
4	1676	74.2	26.67	78.50	88	4	1843	89.7	35.50	78.50	90	4	2136	120.5	55.27	78.50	94
5	1295	77.6	23.11	72.34	88	5	1425	94.0	30.76	72.34	91	5	1651	126.2	47.89	72.34	95
6	1085	78.2	21.21	66.10	89	6	1194	94.6	28.23	66.10	91	6	1383	127.1	43.96	66.10	95
7	839	79.8	18.73	58.80	89	7	923	96.5	24.93	58.80	91	7	1070	129.7	38.82	58.80	95
550	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	600	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	650	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	4096	35.7	70.61	47.82	101	1	4468	42.5	91.67	47.82	104	1	4841	49.9	116.55	47.82	106
2	3169	92.3	72.77	71.80	97	2	3457	109.8	94.47	71.80	99	2	3745	128.9	120.11	71.80	101
3	2754	119.4	72.77	77.84	96	3	3004	142.1	94.47	77.84	98	3	3255	166.8	120.11	77.84	100
4	2304	140.2	69.33	78.50	96	4	2513	166.8	90.01	78.50	98	4	2723	195.8	114.43	78.50	100
5	1781	146.8	60.07	72.34	96	5	1943	174.7	77.99	72.34	99	5	2105	205.0	99.16	72.34	101
6	1492	147.8	55.13	66.10	97	6	1628	175.9	71.58	66.10	99	6	1763	206.4	91.00	66.10	101
7	1154	150.8	48.69	58.80	97	7	1259	179.5	63.22	58.80	99	7	1364	210.6	80.38	58.80	101
700	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	750	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	810	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	5213	57.8	145.56	47.82	108	1	5585	66.4	179.04	47.82	109	1	6032	77.4	225.54	47.82	111
2	4033	149.5	150.01	71.80	103	2	4321	171.6	184.51	71.80	105	2	4667	200.2	232.43	71.80	107
3	3505	193.4	150.01	77.84	102	3	3755	222.0	184.51	77.84	104	3	4056	259.0	232.43	77.84	106
4	2932	227.1	142.92	78.50	102	4	3142	260.7	175.79	78.50	104	4	3393	304.1	221.45	78.50	106
5	2267	237.8	123.84	72.34	103	5	2429	273.0	152.32	72.34	105	5	2623	318.4	191.88	72.34	107
6	1899	239.4	113.66	66.10	103	6	2035	274.8	139.80	66.10	105	6	2197	320.6	176.11	66.10	107
7	1469	244.3	100.39	58.80	103	7	1574	280.4	123.47	58.80	105	7	1700	327.1	155.54	58.80	107

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

PERFORMANCE CURVES AND NOISE DATA - TSAF #13DS

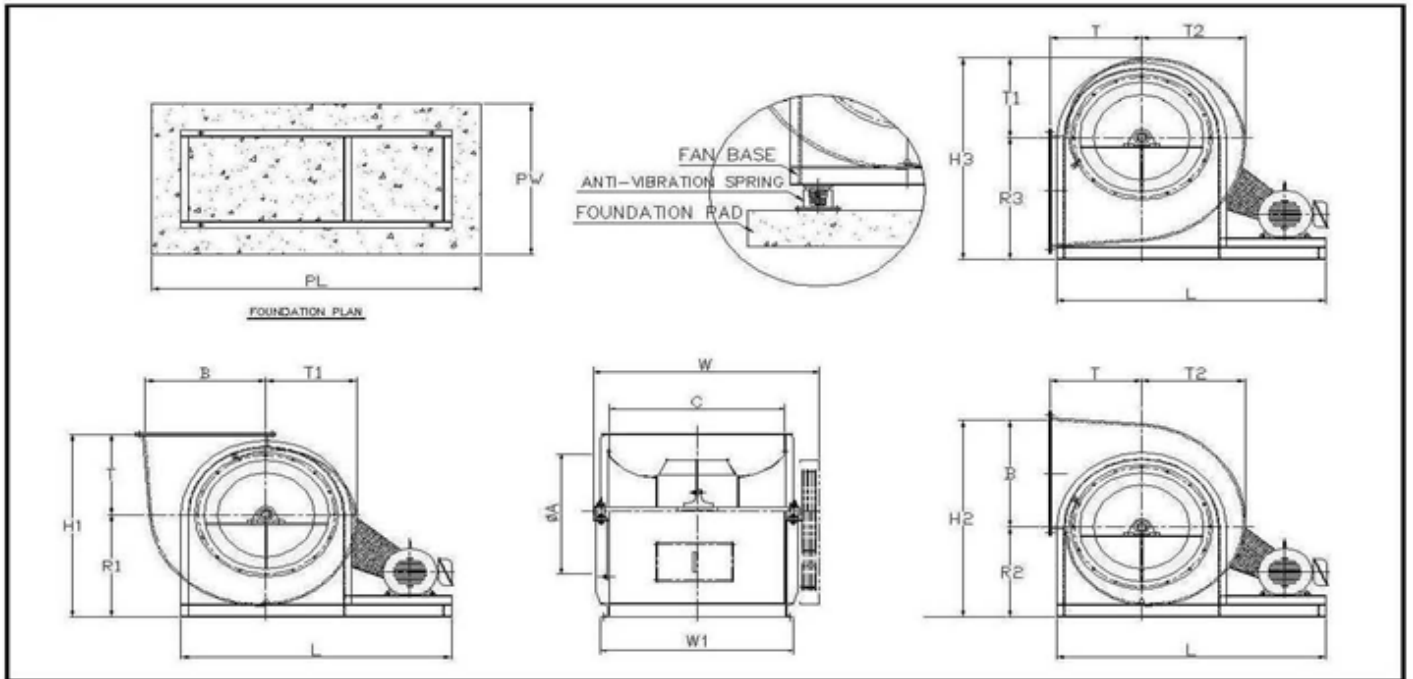


380	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	435	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	480	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	3950	21.3	40.58	47.82	95	1	4522	27.9	60.88	47.82	99	1	4989	34.0	81.79	47.82	101
2	3056	55.0	41.82	71.80	91	2	3498	72.1	62.74	71.80	94	2	3860	87.8	84.29	71.80	97
3	2656	71.1	41.82	77.84	90	3	3040	93.2	62.74	77.84	93	3	3355	113.5	84.29	77.84	95
4	2221	83.6	39.85	78.50	90	4	2543	109.5	59.77	78.50	93	4	2806	133.4	80.31	78.50	96
5	1717	87.5	34.53	72.34	91	5	1966	114.7	51.79	72.34	94	5	2169	139.6	69.59	72.34	96
6	1439	88.1	31.69	66.10	91	6	1647	115.5	47.53	66.10	94	6	1818	140.6	63.86	66.10	97
7	1113	89.9	27.99	58.80	91	7	1274	117.8	41.98	58.80	94	7	1406	143.4	56.41	58.80	97
530	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	575	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	620	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	5509	41.4	110.11	47.82	104	1	5977	48.7	140.60	47.82	106	1	6444	56.7	176.26	47.82	108
2	4262	107.0	113.47	71.80	99	2	4624	125.9	144.90	71.80	102	2	4986	146.4	181.65	71.80	103
3	3704	138.4	113.47	77.84	98	3	4018	162.9	144.90	77.84	100	3	4333	189.4	181.65	77.84	102
4	3098	162.6	108.11	78.50	98	4	3361	191.4	138.05	78.50	100	4	3624	222.5	173.06	78.50	102
5	2395	170.2	93.68	72.34	99	5	2598	200.3	119.62	72.34	101	5	2802	232.9	149.96	72.34	103
6	2007	171.4	85.97	66.10	99	6	2177	201.7	109.78	66.10	101	6	2348	234.6	137.63	66.10	103
7	1552	174.8	75.93	58.80	99	7	1684	205.7	96.96	58.80	101	7	1816	239.2	121.56	58.80	103
665	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	720	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))	770	Q(m³/min)	Ps(mmAq)	H(kW)	η _r (%)	Lwi(dB(A))
1	6912	65.2	217.49	47.82	110	1	7484	76.4	276.04	47.82	112	1	8004	87.4	337.64	47.82	113
2	5348	168.5	224.14	71.80	105	2	5790	197.5	284.48	71.80	107	2	6192	225.8	347.96	71.80	109
3	4647	217.9	224.14	77.84	104	3	5032	255.4	284.48	77.84	106	3	5381	292.1	347.96	77.84	108
4	3887	256.0	213.55	78.50	104	4	4209	300.1	271.04	78.50	106	4	4501	343.2	331.52	78.50	108
5	3005	267.9	185.04	72.34	105	5	3254	314.1	234.85	72.34	107	5	3480	359.2	287.26	72.34	109
6	2518	269.8	169.83	66.10	105	6	2726	316.3	215.54	66.10	107	6	2916	361.8	263.64	66.10	109
7	1947	275.2	149.99	58.80	105	7	2108	322.6	190.37	58.80	107	7	2255	369.0	232.85	58.80	109

- The A-Weighted sound ratings shown have been calculated per AMCA International Standard 301
 - Values shown are for inlet LwiA sound power levels for installation type B - free inlet, ducted outlet
 - Performance certified is for installation type B - free inlet, ducted outlet
 - Performance ratings do not include the effects of appurtenances(accessories), Power rating kW does not include transmission losses.

OVERALL DIMENSION

Backward Wheels (Airfoil) - "TSAF-DS" SERIES



FAN NO.		DIMENSION (TSSF SERIES)													
		# 3	# 3.5	# 4	# 4.5	# 5	# 5.5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13
Inlet	A	480	580	635	700	770	855	900	1090	1200	1325	1475	1705	1865	2085
	B	460	560	615	675	745	830	915	1105	1220	1350	1500	1660	1805	2020
Outlet	C	600	730	815	900	990	1100	1215	1470	1620	1790	1995	2200	2410	2700
	W	760	890	985	1080	1180	1325	1455	1745	1890	2090	2285	2810	2980	3270
Center Height	R1	455	525	570	660	725	775	830	975	1125	1275	1405	1625	1665	1810
	R2	415	465	515	565	650	690	780	870	1005	1135	1255	1380	1505	1610
	R3	515	590	675	770	840	910	970	1140	1315	1485	2475	1820	1965	2180
Total Height	H1	765	880	995	1120	1280	1360	1480	1685	1965	2180	2455	2795	2945	3170
	H2	865	975	1125	1245	1430	1530	1680	1920	2225	2485	2745	3040	3310	3630
	H3	825	940	1085	1205	1395	1490	1640	1870	2175	2435	2765	3060	3330	3650
Casing	T	350	410	460	510	560	610	660	740	860	1000	1130	1170	1280	1360
	T1	340	390	450	485	560	610	680	780	890	1010	1050	1240	1365	1470
	T2	385	450	520	580	660	700	790	890	1050	1160	1290	1485	1525	1670
Fan Base	L	1000	1150	1300	1400	1600	1650	1700	2000	2200	2400	2600	2750	2900	3300
	W1	680	810	895	980	1090	1200	1315	1570	1720	1920	2145	2350	2560	2850
Fan Pad	PL	1300	1450	1600	1700	1900	1950	2000	2300	2500	2700	2900	3050	3200	3600
	PW	980	1110	1195	1280	1390	1500	1615	1870	2020	2220	2445	2650	2860	3150

(All Dimensions in mm)