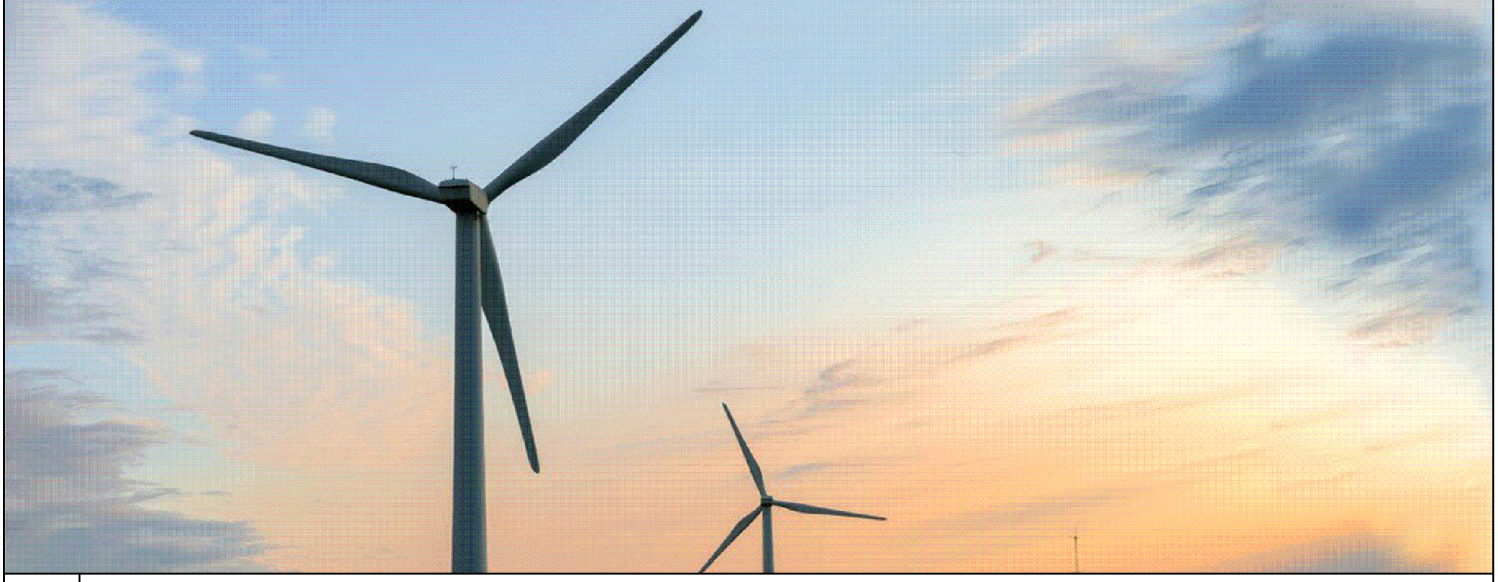
REGIONE MOLISE | COMUNE DI RICCIA | COMUNE DI CERCEMAGGIORE | PROVINCIA DI CAMPOBASSO

Progetto definitivo per la realizzazione di un parco eolico da 39,2 MW nel Comune di Riccia (CB) con opere di connessione nel Comune di Cercemaggiore (CB)



Proponente

New green energy s.r.l.
Via Diocleziano, 107
cap 80125 Napoli
Tel:081-195 66613

Progettazione

Viale Michelangelo, 71
80129 Napoli
TEL.081 579 7998
mail: tecnico.inse@gmail.com

Dottore Magistrale in Ingegneria
NICOLA GALDIERO
INGEGNERE CIVILE E AMBIENTALE
INDUSTRIALE DELL'INFORMAZIONE
- SEZIONE A -
N° ISCRIZIONE
17270
ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI NAPOLI

Arch. Francesco Di Maso
Ing. Nicola Galdiero

Collaboratori:
Geol. V.E.Iervolino
Dott. A. Ianiro
Archeol. A. Vella
Ing. V. Triunfo
Arch. C. Gaudiero
Dott.ssa M. Mauro
Ing. E. Famà

Elaborato

Nome Elaborato:

SCHEDA TECNICA DELL'AEROGENERATORE DI PROGETTO

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Performance Specification

EnVentus™ 5 MW
V150-5.6 MW 50/60 Hz

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Recipient acknowledges that (i) this Performance Specification is provided for recipient's information only, and, does not create or constitute a warranty, guarantee, promise, commitment, or other representation (Commitment) by Vestas Wind Systems or any of its affiliated or subsidiary companies (Vestas), all of which are disclaimed by Vestas and (ii) any and all Commitments by Vestas to recipient as to this Performance Specification (or any of the contents herein) are to be contained exclusively in signed written contracts between recipient and Vestas, and not within this document.

See general reservations, notes and disclaimers (including, Section 5, p. 13) to this Performance Specification.

1 General Description

The Vestas V150-5.6 MW is a wind turbine variant within the EnVentus™ 5 MW turbine range. It is a pitch regulated upwind turbine with active yaw and a three-blade rotor. The V150-5.6 MW turbine has a rotor diameter of 150 m and a rated power of 5.6 MW.

For more details, please refer to the General Description of the EnVentus™ 5MW turbine range (General Description EnVentus™ 5 MW - 0081-5017).

2 Type Approvals and Available Hub Heights

The standard turbine is type certified according to the certification standards and available hub heights listed below:

Certification	Wind Class	Hub Height
IECRE OD-501	IEC S	105 / 125 / 155 m
DIBt 2012	DIBt S	125 / 148 / 166 / 169 m

3 Operational Envelope and Performance Guidelines

Actual climate and site conditions have many variables and should be considered in evaluating actual turbine performance. The design and operating parameters set forth in this section do not constitute warranties, guarantees, or representations as to turbine performance at actual sites.

3.1 Climate and Site Conditions

The standard turbine is designed for the wind climate conditions listed below. Values refer to hub height.

Wind Climate	**IEC S**	**IEC S**	**IEC S**
Power Rating	**5.6 MW**	**5.6 MW**	**5.6 MW**
Hub Height	**105**	**125**	**155**
Average design parameters - IEC			
Wind Speed (10 min average), V_{ave}	8.5 m/s	8.5 m/s	8.0 m/s
Weibull Scale Factor, *C*	9.6 m/s	9.6 m/s	9.0 m/s
Weibull Shape Factor, *k*	2.3	2.3	2.48
I_{ref} acc. to IEC 61400-1	0.14	0.14	0.15
Turbulence Intensity acc. to IEC 61400-1, Including Wind Farm Turbulence (@15 m/s) I_{90} (90% quantile)	15.7%	15.7%	16.9 %
Wind Shear, *α*	0.20	0.20	0.30
Inflow Angle (vertical)	8°	8°	8°
Extreme design parameters - IEC			
Extr. Wind Speed (10 min average), V_{50}	37.5 m/s	37.5 m/s	40.1 m/s
Survival Wind Speed (3 s gust), V_{e50}	52.5 m/s	52.5 m/s	56.1 m/s
Turbulence Intensity, I_{V50}	11 %	11%	11 %

Wind Climate	DIBt S	DIBt S	DIBt S	DIBt S	DIBt S
Hub Height	**125 m**	**125 m**	**148 m**	**166 m**	**CHT* 166/169 m**
Power Rating	**5.6 MW**	**5.6 MW**	**5.6 MW**	**5.6 MW**	**5.6 MW**
Average design parameters - DIBt					
Wind Speed (10 min average), V_{ave}	7.0 m/s	7.5 m/s	7.3 m/s	7.5 m/s	7.5 m/s
Weibull Scale Factor, *C*	7.9 m/s	8.5 m/s	8.2 m/s	8.5 m/s	8.5 m/s
Weibull Shape Factor, *k*	2.22	2.22	2.22	2.22	2.22
I_{ref} acc. to IEC 61400-1	S	A	S	S	S
Turbulence Intensity, I_{90} (90% quant.)	S	18.0%	S	S	S
Extreme design parameters – DIBt					
Extreme Wind Speed (10 min average), V_{50}	36.1 m/s	41.2 m/s	37.0 m/s	37.6 m/s	37.6 m/s
Survival Wind Speed (3 s gust), V_{e50}	50.5 m/s	57.7 m/s	51.8 m/s	52.6 m/s	52.6 m/s
Turbulence intensity, $I_{v(z)}$	11.3%	11.3%	11.2%	11.1%	11.1%
Wind Shear, α	0.27	0.25	0.27	0.27	0.27
Inflow Angle	8°	8°	8°	8°	8°

*CHT is Concrete Hybrid Tower

NOTE The turbine is intended for low to medium wind speed sites but is also applicable on high wind speed sites, depending on site specific conditions. It is classified as IEC S and DIBt S. Please contact Vestas Wind Systems A/S for further information if needed.

3.1.1 Wind Power Plant Layout

Turbine spacing is to be evaluated site-specifically. Spacing below two rotor diameters (2D) may require sector-wise curtailment.

NOTE As evaluation of climate and site conditions is complex, consult Vestas for every project. If conditions exceed the above parameters, Vestas must be consulted.

3.2 Operational Envelope – Wind

Values refer to hub height and are determined by the sensors and control system of the turbine.

Wind Climate	**IEC S / DIBt S**	
	Mode 0, SO0	**SO2, SO3, SO4, SO5, SO6**
Cut-In, V_{in}	3 m/s	3 m/s
Cut-Out (10 min exponential avg.), V_{out}	25 m/s	20 m/s
Re-Cut In (10 min exponential avg.)	23 m/s	18 m/s

3.3 Operational Envelope – Temperature and Altitude

Values below refer to hub height and are determined by the sensors and control system of the turbine.

Operational Envelope – Temperature	
Ambient Temperature Interval (Standard Turbine)	-20° to +45°C
Ambient Temperature Interval (Low Temperature Turbine)	-30° to +45°C

NOTE The wind turbine will stop producing power at ambient temperatures above 45°C. For the low temperature options of the wind turbine consult Vestas.

The turbine is designed for use at altitudes up to 1000 m above sea level as standard and optional up to 2000 m above sea level.

3.3.1 Temperature dependent operation

Values below refer to hub height and are determined by the sensors and control system of the turbine. At ambient temperatures above the thresholds shown for each operating mode, the turbine will maintain derated production.

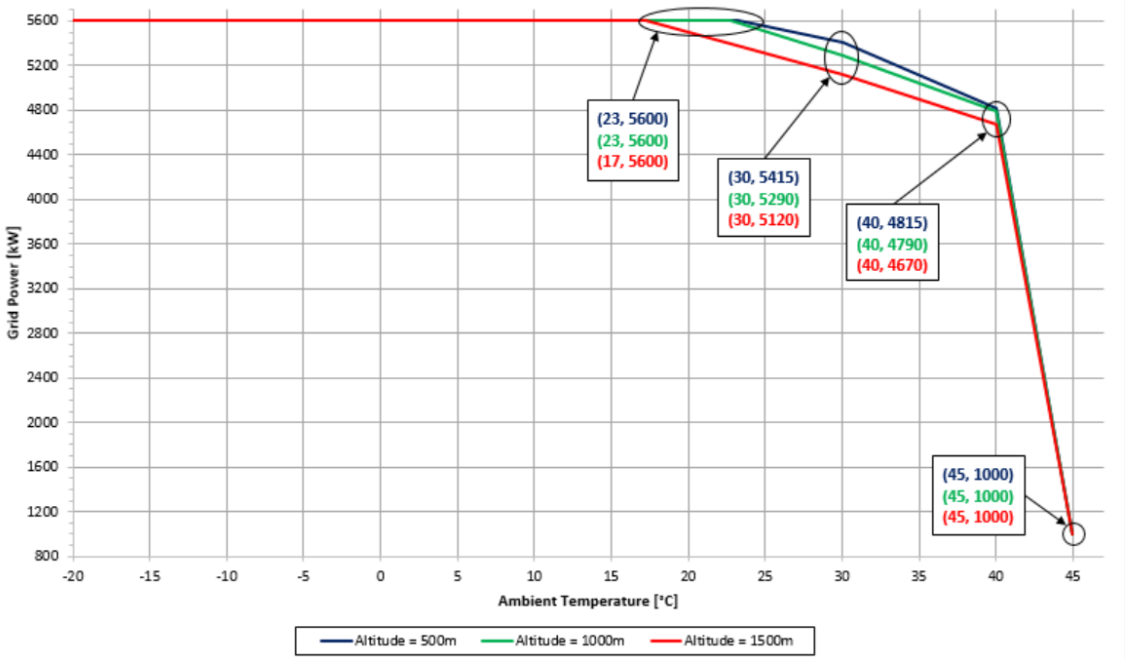


Figure 3-1: Temperature dependant derated operation.

NOTE All derating settings are preliminary and subject to change.

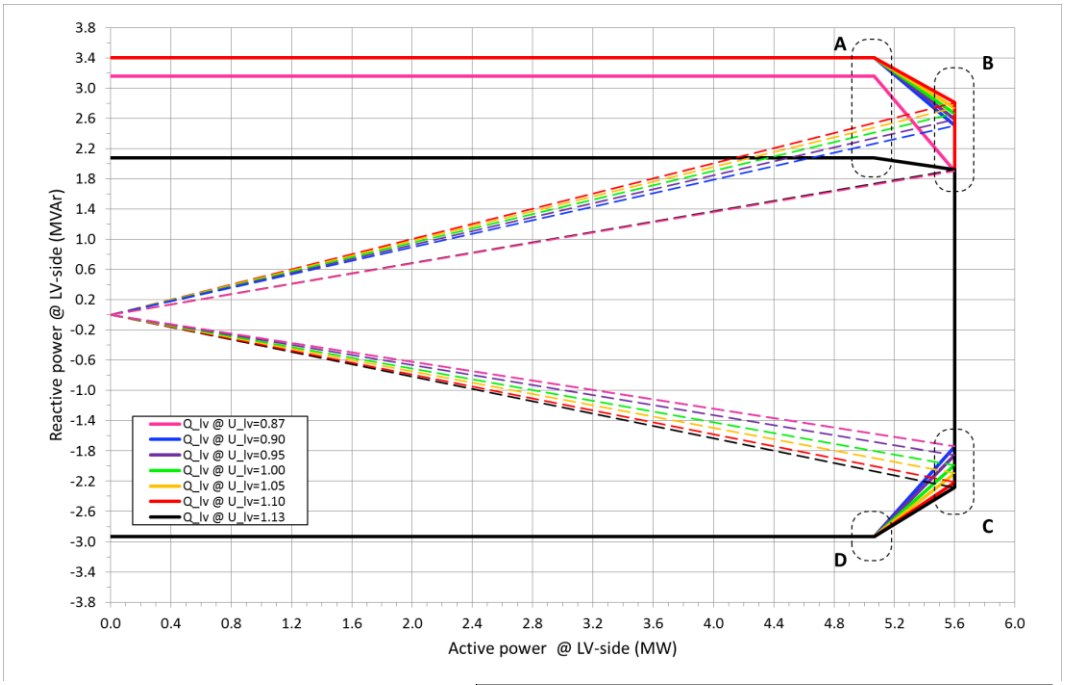
3.4 Operational Envelope – Conditions for Power Curve and Ct Values (at Hub Height)

Please consult section 6 and subsequent, for power curves and C_t values.

Conditions for Power Curve and C_t Values (at Hub Height)	
Wind Shear, *α*	0.00-0.30 (10-minute average)
Turbulence Intensity, *I*	6-12% (10-minute average)
Blades	Clean
Rain	No
Ice/Snow on Blades	No
Leading Edge	No damage
Terrain	IEC 61400-12-1
Inflow Angle (Vertical)	0 ±2°
Grid Voltage	Nominal Voltage ±2.5%
Grid Frequency	Nominal Frequency ±0.5 Hz
Grid Active Power (LV-side)	Per tabulated values in Section 6 and following sections
Grid Reactive Power (LV-side)	Power Factor 1.0

3.5 Operational Envelope – Reactive Power Capability

The turbine has a reactive power capability on the low voltage side of the HV transformer as illustrated in Figure 3-2:



		Coordinates								Power factor	
	Point:	A		B		C		D		B (Capacitive)	C (Inductive)
	Coordinate:	x (P)	y (Q)	x (P)	y (Q)	x (P)	y (Q)	x (P)	y (Q)		
	Reactive power [kVAr] @ LV side @ U_lv = 0.87 p.u. voltage	5.067	3.160	5.600	1.900	5.600	-1.739	5.067	-2.933	0.947	0.955
	Reactive power [kVAr] @ LV side @ U_lv = 0.90 p.u. voltage	5.067	3.400	5.600	2.503	5.600	-1.739	5.067	-2.933	0.913	0.955
	Reactive power [kVAr] @ LV side @ U_lv = 0.95 p.u. voltage	5.067	3.400	5.600	2.584	5.600	-1.856	5.067	-2.933	0.908	0.949
	Reactive power [kVAr] @ LV side @ U_lv = 1.00 p.u. voltage	5.067	3.400	5.600	2.664	5.600	-1.987	5.067	-2.933	0.903	0.942
	Reactive power [kVAr] @ LV side @ U_lv = 1.05 p.u. voltage	5.067	3.400	5.600	2.736	5.600	-2.093	5.067	-2.933	0.898	0.937
	Reactive power [kVAr] @ LV side @ U_lv = 1.10 p.u. voltage	5.067	3.400	5.600	2.807	5.600	-2.213	5.067	-2.933	0.894	0.930
	Reactive power [kVAr] @ LV side @ U_lv = 1.13 p.u. voltage	5.067	2.080	5.600	1.919	5.600	-2.283	5.067	-2.933	0.946	0.926

Figure 3-2: Reactive power capability.

The turbine is able to maintain the reactive power capability at low wind with no active power production.

NOTE

All reactive power capabilities are preliminary and subject to change.

3.6 Sound Modes

The sound modes listed below are available for the turbine.

Sound modes			
Mode No.	**Maximum Sound Level**	**Serrated trailing edges**	**Available hub heights**
0	104.9 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
0-0S	107.7 dBA	No (option)	105 / 125 / 148 / 155 / 166 / 169 m

In addition, Sound Optimized (SO) modes as listed below are available as options for the turbine.

Sound Optimized (SO) modes			
Mode No.	**Maximum Sound Level**	**Serrated trailing edges**	**Available hub heights**
SO0	104 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
SO2	102 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
SO3	101 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
SO4	100 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
SO5	99 dBA	Yes (standard)	105 / 125 / 148 / 155 / 166 / 169 m
SO6	98 dBA	Yes (standard)	Site specific

NOTE Sound Optimized (SO) modes are only available with serrated trailing edges on the blades. For further details on sound performance and in case of specific requests, please contact Vestas Wind Systems A/S.

4 Drawings

Overview drawings describing the wind turbines, tower and foundation are shown in these documents.

V150 HH105 – 0077-2108
V150 HH125 – 0073-8666
V150 HH148 – 0073-8667
V150 HH155 – 0079-6643
V150 HH166 – 0073-8669
V150 HH166 (CHT) – 0089-4870
V150 HH169 (CHT) – 0089-4872

NOTE For detailed drawings, please contact Vestas Wind Systems A/S.

4.1 Turbine visual impression – side view

5 General Reservations, Notes and Disclaimers

-
- The performance specifications described in this document apply to the current version of the V150-5.6 MW wind turbine. Updated versions of the V150-5.6 MW wind turbine, which may be manufactured in the future, may differ from these performance specifications. In the event that Vestas supplies an updated version of the V150-5.6 MW wind turbine, Vestas will provide an updated performance specification applicable to the updated version.
- All listed start/stop parameters (e.g. wind speeds) are equipped with hysteresis control. This can, in certain borderline situations, result in turbine stops even though the ambient conditions are within the listed operation parameters.
- This document, Performance Specification, is not an offer for sale, and does not contain any guarantee, warranty and/or verification of the power curve and sound (including, without limitation, the power curve and sound verification method). Any guarantee, warranty and/or verification of the power curve and sound (including, without limitation, the power curve and sound verification method) must be agreed to separately in writing.

6 Power Curves, Ct Values and Sound Curves, Mode 0

6.1 Power Curves, Mode 0

Air density [kg/m^3]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	190	197	204	211	218	225	232	239	245	259	266
4.5	**393**	286	296	305	315	325	335	344	354	364	373	383	403	412
5.0	**567**	421	435	448	461	474	488	501	514	527	540	553	580	593
5.5	**780**	586	603	621	639	656	674	692	710	727	745	763	798	816
6.0	**1039**	784	807	831	854	877	900	923	946	970	993	1016	1062	1086
6.5	**1345**	1021	1050	1080	1110	1139	1169	1198	1227	1257	1286	1316	1374	1404
7.0	**1704**	1299	1336	1373	1410	1447	1484	1521	1558	1594	1631	1667	1740	1777
7.5	**2114**	1618	1664	1709	1754	1800	1845	1890	1935	1980	2024	2069	2158	2203
8.0	**2579**	1982	2036	2091	2145	2200	2254	2308	2363	2417	2471	2525	2633	2687
8.5	**3102**	2390	2455	2520	2585	2650	2715	2779	2844	2909	2973	3037	3166	3230
9.0	**3673**	2839	2916	2992	3069	3145	3221	3297	3373	3449	3524	3599	3747	3821
9.5	**4250**	3320	3407	3495	3582	3670	3754	3839	3924	4008	4089	4170	4328	4405
10.0	**4781**	3806	3902	3998	4094	4190	4278	4367	4455	4544	4623	4702	4851	4920
10.5	**5183**	4269	4369	4469	4569	4669	4750	4832	4913	4995	5058	5121	5232	5282
11.0	**5452**	4685	4782	4878	4975	5072	5137	5202	5266	5331	5372	5412	5477	5503
11.5	**5553**	5032	5110	5189	5268	5347	5386	5426	5466	5506	5521	5537	5562	5570
12.0	**5586**	5275	5330	5386	5441	5496	5513	5531	5549	5566	5573	5580	5590	5594
12.5	**5598**	5429	5460	5492	5523	5554	5563	5571	5580	5589	5592	5595	5599	5600
13.0	**5600**	5508	5525	5542	5559	5576	5582	5587	5592	5597	5598	5599	5600	5600
13.5	**5600**	5538	5551	5564	5577	5590	5592	5595	5597	5599	5600	5600	5600	5600
14.0	**5600**	5559	5568	5577	5586	5595	5596	5598	5599	5600	5600	5600	5600	5600
14.5	**5600**	5570	5577	5584	5590	5597	5598	5598	5599	5600	5600	5600	5600	5600
15.0	**5600**	5573	5579	5585	5591	5597	5598	5598	5599	5600	5600	5600	5600	5600
15.5	**5600**	5578	5583	5588	5592	5597	5598	5598	5599	5600	5600	5600	5600	5600
16.0	**5600**	5582	5586	5590	5594	5598	5598	5599	5599	5600	5600	5600	5600	5600
16.5	**5600**	5586	5589	5592	5595	5598	5598	5599	5600	5600	5600	5600	5600	5600
17.0	**5597**	5579	5582	5586	5589	5592	5593	5594	5595	5596	5597	5597	5598	5598
17.5	**5562**	5494	5504	5514	5524	5534	5539	5543	5548	5552	5556	5559	5565	5568
18.0	**5428**	5301	5318	5335	5352	5368	5378	5387	5397	5406	5414	5421	5436	5443
18.5	**5222**	5054	5076	5098	5120	5143	5155	5168	5181	5193	5203	5212	5231	5240
19.0	**4993**	4788	4815	4842	4870	4897	4912	4928	4944	4959	4970	4982	5003	5013
19.5	**4760**	4538	4567	4597	4626	4655	4673	4691	4708	4726	4737	4749	4771	4782
20.0	**4532**	4306	4336	4365	4395	4425	4443	4461	4479	4498	4509	4520	4542	4552
20.5	**4301**	4084	4113	4141	4170	4198	4215	4232	4249	4266	4277	4289	4310	4320
21.0	**4069**	3881	3905	3930	3954	3979	3994	4008	4023	4038	4049	4059	4079	4089
21.5	**3838**	3684	3705	3725	3746	3766	3777	3788	3799	3810	3819	3828	3845	3853
22.0	**3600**	3482	3497	3512	3527	3542	3551	3561	3570	3580	3587	3594	3608	3616
22.5	**3352**	3269	3279	3288	3298	3308	3314	3320	3326	3332	3339	3345	3357	3362
23.0	**3114**	3057	3062	3068	3074	3079	3084	3090	3095	3100	3104	3109	3118	3123
23.5	**2871**	2828	2832	2836	2840	2844	2849	2853	2858	2863	2866	2868	2876	2881
24.0	**2635**	2595	2599	2603	2607	2610	2614	2617	2620	2624	2628	2631	2639	2642
24.5	**2380**	2349	2352	2356	2359	2362	2365	2368	2370	2373	2375	2377	2384	2388
25.0	**2122**	2081	2085	2090	2094	2098	2101	2104	2107	2110	2114	2118	2126	2130

6.2 Ct Values, Mode 0

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.884**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.794	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.793	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.790**	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.789	0.789	0.789	0.790	0.790	0.790
6.0	**0.792**	0.789	0.789	0.790	0.790	0.790	0.791	0.791	0.791	0.792	0.792	0.792	0.793	0.793
6.5	**0.795**	0.791	0.792	0.792	0.792	0.793	0.793	0.793	0.794	0.794	0.794	0.794	0.795	0.795
7.0	**0.798**	0.794	0.794	0.795	0.795	0.795	0.796	0.796	0.797	0.797	0.797	0.798	0.798	0.798
7.5	**0.802**	0.800	0.800	0.800	0.800	0.800	0.801	0.801	0.801	0.801	0.802	0.802	0.802	0.803
8.0	**0.803**	0.801	0.801	0.801	0.802	0.802	0.802	0.802	0.803	0.803	0.803	0.803	0.803	0.804
8.5	**0.797**	0.795	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.797	0.797	0.797	0.797
9.0	**0.782**	0.782	0.782	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.781	0.780
9.5	**0.745**	0.768	0.767	0.766	0.765	0.764	0.762	0.760	0.757	0.755	0.752	0.748	0.741	0.737
10.0	**0.686**	0.737	0.734	0.730	0.727	0.724	0.719	0.714	0.710	0.705	0.698	0.692	0.678	0.671
10.5	**0.611**	0.690	0.684	0.679	0.674	0.669	0.661	0.653	0.646	0.638	0.629	0.620	0.601	0.591
11.0	**0.534**	0.635	0.628	0.621	0.614	0.607	0.597	0.587	0.577	0.567	0.556	0.545	0.523	0.511
11.5	**0.456**	0.573	0.564	0.555	0.546	0.537	0.526	0.514	0.503	0.492	0.480	0.468	0.446	0.435
12.0	**0.391**	0.508	0.498	0.488	0.478	0.468	0.456	0.445	0.433	0.421	0.411	0.401	0.382	0.373
12.5	**0.339**	0.447	0.437	0.426	0.415	0.404	0.394	0.384	0.374	0.364	0.356	0.347	0.331	0.324
13.0	**0.296**	0.392	0.382	0.372	0.362	0.352	0.344	0.335	0.327	0.318	0.311	0.304	0.290	0.283
13.5	**0.262**	0.344	0.336	0.327	0.319	0.310	0.302	0.295	0.288	0.280	0.274	0.268	0.256	0.251
14.0	**0.232**	0.305	0.297	0.290	0.282	0.274	0.268	0.262	0.255	0.249	0.243	0.238	0.228	0.223
14.5	**0.208**	0.271	0.265	0.258	0.251	0.245	0.239	0.233	0.228	0.222	0.217	0.213	0.204	0.200
15.0	**0.187**	0.243	0.237	0.231	0.225	0.219	0.214	0.209	0.204	0.199	0.195	0.191	0.183	0.180
15.5	**0.169**	0.219	0.213	0.208	0.203	0.198	0.193	0.189	0.184	0.180	0.176	0.173	0.166	0.162
16.0	**0.153**	0.198	0.193	0.188	0.184	0.179	0.175	0.171	0.167	0.163	0.160	0.157	0.150	0.148
16.5	**0.140**	0.180	0.176	0.171	0.167	0.163	0.159	0.156	0.152	0.149	0.146	0.143	0.137	0.135
17.0	**0.128**	0.164	0.160	0.156	0.152	0.149	0.145	0.142	0.139	0.136	0.133	0.131	0.126	0.123
17.5	**0.117**	0.148	0.145	0.142	0.139	0.135	0.133	0.130	0.127	0.124	0.122	0.120	0.115	0.113
18.0	**0.106**	0.132	0.129	0.126	0.124	0.121	0.119	0.116	0.114	0.112	0.110	0.108	0.104	0.102
18.5	**0.094**	0.116	0.113	0.111	0.109	0.107	0.105	0.103	0.101	0.099	0.097	0.096	0.092	0.091
19.0	**0.083**	0.101	0.099	0.097	0.095	0.094	0.092	0.090	0.089	0.087	0.086	0.084	0.081	0.080
19.5	**0.073**	0.089	0.087	0.086	0.084	0.083	0.081	0.080	0.079	0.077	0.076	0.075	0.072	0.071
20.0	**0.065**	0.078	0.077	0.076	0.075	0.073	0.072	0.071	0.070	0.069	0.068	0.066	0.064	0.063
20.5	**0.058**	0.070	0.068	0.067	0.066	0.065	0.064	0.063	0.062	0.061	0.060	0.059	0.057	0.056
21.0	**0.052**	0.062	0.061	0.060	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.053	0.051	0.050
21.5	**0.046**	0.055	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.048	0.047	0.045	0.045
22.0	**0.041**	0.050	0.049	0.048	0.047	0.046	0.045	0.044	0.044	0.043	0.042	0.042	0.040	0.040
22.5	**0.036**	0.044	0.043	0.042	0.042	0.041	0.040	0.039	0.039	0.038	0.037	0.037	0.036	0.035
23.0	**0.032**	0.039	0.038	0.038	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.033	0.032	0.031
23.5	**0.028**	0.034	0.034	0.033	0.032	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.028	0.027
24.0	**0.025**	0.030	0.030	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.026	0.025	0.024	0.024
24.5	**0.021**	0.026	0.026	0.025	0.025	0.024	0.024	0.023	0.023	0.023	0.022	0.022	0.021	0.021
25.0	**0.019**	0.022	0.022	0.022	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018

6.3 Sound Curves, Mode 0

Sound Power Level at Hub Height		
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**	
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Mode 0 (Blades with serrated trailing edge)**	**Sound Power Level at Hub Height [dBA]** **Mode 0-0S (Blades without serrated trailing edge)**
3	91.3	94.1
4	91.8	94.6
5	94.1	96.9
6	96.9	99.7
7	100.0	102.8
8	102.7	105.5
9	104.0	106.8
10	104.1	106.9
11	104.9	107.7
12	104.9	107.7
13	104.9	107.7
14	104.9	107.7
15	104.9	107.7
16	104.9	107.7
17	104.9	107.7
18	104.9	107.7
19	104.9	107.7
20	104.9	107.7

7 Power Curves, Ct Values and Sound Curves, Sound Optimized Modes

7.1 Power Curves, Sound Optimized Mode SO0

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**40**	13	15	17	19	22	24	27	29	32	35	38	43	46
3.5	**137**	86	91	95	100	105	109	114	118	123	128	132	141	146
4.0	**251**	175	182	189	196	203	210	217	223	230	237	244	258	264
4.5	**391**	284	294	304	313	323	333	342	352	362	371	381	401	410
5.0	**564**	419	432	445	459	472	485	498	511	524	538	551	577	590
5.5	**777**	583	600	618	635	653	671	688	706	724	741	759	794	812
6.0	**1034**	780	803	826	850	873	896	919	942	965	988	1011	1057	1080
6.5	**1339**	1016	1045	1075	1104	1134	1163	1192	1222	1251	1280	1310	1368	1398
7.0	**1696**	1293	1330	1367	1403	1440	1477	1513	1550	1587	1623	1660	1733	1769
7.5	**2105**	1612	1657	1702	1747	1792	1836	1881	1926	1971	2015	2060	2149	2194
8.0	**2568**	1973	2028	2082	2136	2190	2244	2298	2352	2406	2460	2514	2622	2675
8.5	**3087**	2378	2443	2508	2572	2637	2702	2766	2831	2895	2959	3023	3151	3215
9.0	**3653**	2822	2898	2974	3050	3126	3202	3278	3353	3429	3504	3578	3727	3801
9.5	**4222**	3288	3376	3463	3551	3638	3723	3808	3893	3978	4060	4141	4301	4379
10.0	**4748**	3748	3846	3944	4042	4140	4231	4322	4413	4504	4585	4667	4820	4893
10.5	**5154**	4176	4283	4389	4495	4601	4689	4777	4864	4952	5020	5087	5208	5261
11.0	**5429**	4559	4666	4773	4880	4987	5062	5138	5213	5288	5335	5382	5459	5489
11.5	**5541**	4884	4978	5073	5168	5263	5315	5368	5421	5473	5496	5519	5552	5564
12.0	**5578**	5125	5202	5278	5354	5431	5460	5490	5519	5548	5558	5568	5584	5590
12.5	**5593**	5301	5355	5408	5461	5515	5530	5545	5560	5576	5581	5587	5596	5598
13.0	**5598**	5414	5448	5483	5518	5552	5561	5570	5579	5588	5592	5595	5599	5600
13.5	**5599**	5460	5487	5515	5542	5569	5576	5583	5590	5596	5597	5598	5600	5600
14.0	**5600**	5493	5515	5536	5558	5579	5584	5589	5593	5598	5599	5599	5600	5600
14.5	**5600**	5515	5532	5550	5567	5584	5588	5592	5595	5599	5599	5599	5600	5600
15.0	**5600**	5526	5541	5556	5571	5586	5589	5592	5595	5598	5598	5599	5600	5600
15.5	**5600**	5539	5551	5564	5577	5589	5591	5594	5596	5598	5599	5599	5600	5600
16.0	**5600**	5549	5559	5570	5581	5591	5593	5595	5597	5599	5599	5599	5600	5600
16.5	**5600**	5557	5566	5575	5584	5593	5595	5596	5597	5599	5599	5599	5600	5600
17.0	**5597**	5554	5563	5572	5580	5589	5591	5592	5594	5596	5596	5597	5598	5598
17.5	**5563**	5487	5499	5511	5523	5535	5539	5544	5548	5553	5556	5559	5565	5568
18.0	**5433**	5312	5328	5345	5362	5378	5387	5396	5404	5413	5420	5426	5440	5446
18.5	**5233**	5070	5092	5114	5136	5158	5170	5182	5193	5205	5215	5224	5242	5250
19.0	**5006**	4806	4833	4860	4887	4914	4928	4942	4957	4972	4983	4994	5016	5026
19.5	**4773**	4554	4583	4612	4642	4671	4688	4705	4722	4739	4750	4762	4783	4793
20.0	**4544**	4319	4349	4379	4409	4439	4456	4474	4491	4509	4520	4532	4553	4563
20.5	**4312**	4098	4126	4154	4182	4210	4228	4245	4262	4279	4290	4301	4322	4331
21.0	**4082**	3892	3917	3942	3966	3991	4006	4020	4035	4049	4060	4071	4090	4098
21.5	**3849**	3696	3716	3735	3755	3775	3787	3799	3811	3823	3832	3840	3856	3862
22.0	**3613**	3494	3509	3525	3540	3556	3565	3574	3583	3592	3599	3606	3619	3626
22.5	**3361**	3281	3291	3300	3310	3320	3326	3332	3338	3344	3350	3356	3364	3367
23.0	**3123**	3068	3074	3080	3086	3093	3097	3101	3105	3109	3114	3118	3128	3132
23.5	**2879**	2838	2843	2847	2852	2857	2860	2863	2865	2868	2872	2875	2884	2889
24.0	**2638**	2606	2609	2612	2615	2619	2621	2624	2627	2630	2632	2635	2642	2647
24.5	**2384**	2361	2364	2366	2369	2372	2373	2374	2375	2376	2379	2382	2387	2391
25.0	**2124**	2090	2093	2096	2100	2103	2106	2108	2111	2113	2117	2120	2128	2132

7.2 Ct Values, Sound Optimized Mode SO0

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.877**	0.869	0.870	0.872	0.874	0.875	0.876	0.876	0.876	0.877	0.877	0.877	0.877	0.877
3.5	**0.838**	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838
4.0	**0.800**	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
4.5	**0.790**	0.789	0.790	0.790	0.790	0.791	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.789
5.0	**0.784**	0.788	0.788	0.787	0.787	0.786	0.786	0.786	0.785	0.785	0.785	0.784	0.784	0.783
5.5	**0.785**	0.783	0.783	0.783	0.783	0.783	0.783	0.784	0.784	0.784	0.784	0.784	0.785	0.785
6.0	**0.787**	0.784	0.784	0.784	0.785	0.785	0.785	0.786	0.786	0.786	0.787	0.787	0.788	0.788
6.5	**0.790**	0.786	0.787	0.787	0.787	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.790	0.790
7.0	**0.793**	0.788	0.789	0.789	0.790	0.790	0.791	0.791	0.792	0.792	0.792	0.793	0.793	0.794
7.5	**0.798**	0.795	0.795	0.795	0.796	0.796	0.796	0.797	0.797	0.797	0.797	0.798	0.798	0.799
8.0	**0.798**	0.794	0.795	0.795	0.796	0.796	0.797	0.797	0.797	0.797	0.798	0.798	0.798	0.799
8.5	**0.788**	0.785	0.785	0.785	0.785	0.786	0.786	0.786	0.787	0.787	0.787	0.787	0.788	0.788
9.0	**0.774**	0.773	0.773	0.773	0.773	0.774	0.774	0.774	0.774	0.774	0.774	0.774	0.773	0.772
9.5	**0.739**	0.755	0.754	0.754	0.754	0.753	0.752	0.750	0.749	0.747	0.744	0.741	0.735	0.731
10.0	**0.682**	0.720	0.719	0.717	0.715	0.714	0.710	0.706	0.702	0.699	0.693	0.687	0.675	0.668
10.5	**0.610**	0.671	0.668	0.665	0.663	0.660	0.654	0.647	0.641	0.635	0.627	0.618	0.601	0.591
11.0	**0.534**	0.615	0.611	0.607	0.602	0.598	0.590	0.582	0.574	0.566	0.555	0.545	0.524	0.513
11.5	**0.457**	0.552	0.546	0.541	0.535	0.529	0.520	0.510	0.500	0.491	0.480	0.469	0.447	0.436
12.0	**0.392**	0.490	0.483	0.477	0.470	0.463	0.452	0.442	0.432	0.422	0.412	0.402	0.383	0.374
12.5	**0.340**	0.435	0.427	0.419	0.411	0.402	0.393	0.383	0.374	0.364	0.356	0.348	0.332	0.325
13.0	**0.297**	0.385	0.377	0.368	0.360	0.351	0.343	0.335	0.327	0.318	0.311	0.304	0.291	0.284
13.5	**0.262**	0.340	0.332	0.325	0.317	0.310	0.302	0.295	0.288	0.281	0.275	0.268	0.257	0.251
14.0	**0.233**	0.302	0.295	0.288	0.281	0.274	0.268	0.262	0.256	0.249	0.244	0.238	0.228	0.223
14.5	**0.208**	0.269	0.263	0.257	0.251	0.245	0.239	0.234	0.228	0.223	0.218	0.213	0.204	0.200
15.0	**0.187**	0.241	0.236	0.230	0.225	0.219	0.214	0.210	0.205	0.200	0.196	0.192	0.184	0.180
15.5	**0.169**	0.218	0.213	0.208	0.203	0.198	0.194	0.189	0.185	0.180	0.177	0.173	0.166	0.163
16.0	**0.154**	0.197	0.193	0.188	0.184	0.179	0.175	0.171	0.168	0.164	0.160	0.157	0.151	0.148
16.5	**0.140**	0.179	0.175	0.171	0.167	0.163	0.160	0.156	0.153	0.149	0.146	0.143	0.137	0.135
17.0	**0.128**	0.164	0.160	0.156	0.153	0.149	0.146	0.143	0.139	0.136	0.134	0.131	0.126	0.123
17.5	**0.118**	0.149	0.145	0.142	0.139	0.136	0.133	0.130	0.127	0.125	0.122	0.120	0.115	0.113
18.0	**0.106**	0.132	0.129	0.127	0.124	0.121	0.119	0.117	0.114	0.112	0.110	0.108	0.104	0.102
18.5	**0.094**	0.116	0.114	0.112	0.110	0.107	0.105	0.103	0.101	0.099	0.098	0.096	0.093	0.091
19.0	**0.083**	0.101	0.100	0.098	0.096	0.094	0.093	0.091	0.089	0.088	0.086	0.085	0.082	0.081
19.5	**0.074**	0.089	0.088	0.086	0.085	0.083	0.082	0.081	0.079	0.078	0.076	0.075	0.073	0.072
20.0	**0.066**	0.079	0.078	0.076	0.075	0.074	0.073	0.071	0.070	0.069	0.068	0.067	0.065	0.064
20.5	**0.058**	0.070	0.069	0.068	0.067	0.066	0.065	0.063	0.062	0.061	0.060	0.059	0.058	0.057
21.0	**0.052**	0.062	0.061	0.060	0.059	0.058	0.057	0.056	0.055	0.055	0.054	0.053	0.051	0.050
21.5	**0.046**	0.056	0.055	0.054	0.053	0.052	0.051	0.050	0.050	0.049	0.048	0.047	0.046	0.045
22.0	**0.041**	0.050	0.049	0.048	0.047	0.046	0.046	0.045	0.044	0.043	0.043	0.042	0.041	0.040
22.5	**0.036**	0.044	0.043	0.043	0.042	0.041	0.040	0.040	0.039	0.038	0.038	0.037	0.036	0.035
23.0	**0.032**	0.039	0.039	0.038	0.037	0.036	0.036	0.035	0.034	0.034	0.033	0.033	0.032	0.031
23.5	**0.028**	0.035	0.034	0.033	0.033	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.028	0.028
24.0	**0.025**	0.030	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025	0.024
24.5	**0.022**	0.026	0.026	0.025	0.025	0.024	0.024	0.023	0.023	0.023	0.022	0.022	0.021	0.021
25.0	**0.019**	0.022	0.022	0.022	0.021	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.018	0.018

7.3 Sound Curves, Sound Optimized Mode SO0

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized ModeSO0 (Blades with serrated trailing edge)**
3	91.3
4	91.8
5	94.1
6	96.9
7	100.0
8	102.6
9	103.7
10	103.9
11	104.0
12	104.0
13	104.0
14	104.0
15	104.0
16	104.0
17	104.0
18	104.0
19	104.0
20	104.0

7.4 Power Curves, Sound Optimized Mode SO2

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	191	197	204	211	218	225	232	239	246	259	266
4.5	**393**	286	295	305	315	325	334	344	354	364	373	383	403	412
5.0	**567**	421	434	448	461	474	487	501	514	527	540	553	580	593
5.5	**780**	586	603	621	639	656	674	692	709	727	745	763	798	816
6.0	**1039**	784	807	831	854	877	900	923	946	970	993	1016	1062	1085
6.5	**1345**	1021	1051	1080	1110	1139	1169	1198	1228	1257	1287	1316	1375	1404
7.0	**1705**	1300	1337	1374	1411	1448	1484	1521	1558	1595	1631	1668	1741	1778
7.5	**2112**	1618	1663	1708	1753	1798	1843	1888	1933	1978	2022	2067	2157	2202
8.0	**2570**	1974	2029	2083	2137	2192	2246	2300	2354	2408	2462	2516	2624	2678
8.5	**3042**	2342	2405	2469	2533	2597	2661	2724	2788	2852	2915	2979	3105	3168
9.0	**3565**	2750	2824	2898	2973	3047	3121	3196	3270	3344	3418	3491	3637	3710
9.5	**4097**	3176	3262	3347	3432	3517	3601	3685	3770	3854	3935	4016	4169	4241
10.0	**4513**	3566	3661	3756	3851	3946	4034	4123	4212	4300	4371	4442	4570	4626
10.5	**4761**	3910	4009	4109	4208	4307	4384	4461	4538	4615	4664	4712	4793	4824
11.0	**4892**	4210	4302	4393	4485	4576	4635	4694	4752	4811	4838	4865	4904	4917
11.5	**4924**	4434	4512	4590	4668	4746	4782	4818	4854	4890	4901	4913	4931	4937
12.0	**4940**	4602	4662	4722	4781	4841	4860	4880	4899	4919	4926	4933	4943	4947
12.5	**4947**	4711	4754	4798	4842	4886	4897	4909	4921	4933	4938	4942	4948	4950
13.0	**4949**	4773	4806	4839	4872	4905	4914	4922	4931	4940	4943	4946	4950	4951
13.5	**4950**	4799	4828	4857	4886	4915	4923	4930	4938	4946	4947	4949	4950	4951
14.0	**4950**	4826	4850	4874	4899	4923	4929	4935	4941	4947	4948	4949	4951	4951
14.5	**4950**	4847	4867	4888	4908	4928	4933	4938	4943	4948	4949	4950	4951	4951
15.0	**4950**	4863	4880	4896	4913	4930	4934	4939	4943	4948	4949	4949	4950	4951
15.5	**4950**	4877	4891	4906	4920	4934	4938	4941	4945	4948	4949	4950	4951	4951
16.0	**4950**	4884	4897	4910	4924	4937	4940	4943	4946	4949	4949	4950	4951	4951
16.5	**4951**	4885	4898	4912	4925	4938	4941	4943	4946	4949	4950	4950	4951	4951
17.0	**4950**	4884	4897	4910	4924	4937	4940	4943	4946	4949	4949	4950	4951	4951
17.5	**4951**	4864	4881	4898	4914	4931	4935	4940	4944	4948	4949	4950	4951	4951
18.0	**4950**	4863	4880	4896	4913	4930	4935	4939	4943	4948	4948	4949	4951	4951
18.5	**4946**	4842	4860	4879	4898	4916	4922	4928	4934	4940	4942	4944	4947	4948
19.0	**4885**	4722	4746	4770	4794	4818	4830	4842	4854	4866	4872	4878	4889	4894
19.5	**4740**	4531	4560	4588	4617	4645	4661	4677	4693	4709	4719	4730	4748	4755
20.0	**4532**	4306	4336	4365	4395	4425	4443	4461	4479	4498	4509	4520	4542	4551

7.5 Ct Values, Sound Optimized Mode SO2

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.885**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.792	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.790**	0.788	0.788	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.789	0.790	0.790	0.790
6.0	**0.792**	0.789	0.789	0.790	0.790	0.790	0.791	0.791	0.791	0.792	0.792	0.792	0.793	0.793
6.5	**0.796**	0.792	0.793	0.793	0.793	0.794	0.794	0.794	0.795	0.795	0.795	0.795	0.796	0.796
7.0	**0.798**	0.795	0.795	0.795	0.796	0.796	0.796	0.797	0.797	0.797	0.798	0.798	0.798	0.799
7.5	**0.797**	0.792	0.793	0.793	0.793	0.794	0.794	0.795	0.795	0.795	0.796	0.796	0.797	0.797
8.0	**0.778**	0.775	0.776	0.776	0.776	0.776	0.776	0.777	0.777	0.777	0.777	0.777	0.778	0.779
8.5	**0.733**	0.731	0.731	0.731	0.731	0.731	0.732	0.732	0.732	0.732	0.732	0.733	0.733	0.733
9.0	**0.709**	0.707	0.707	0.707	0.707	0.708	0.708	0.708	0.709	0.709	0.709	0.709	0.709	0.709
9.5	**0.690**	0.695	0.696	0.696	0.696	0.696	0.696	0.696	0.696	0.695	0.694	0.692	0.686	0.682
10.0	**0.630**	0.657	0.657	0.657	0.657	0.658	0.655	0.653	0.650	0.648	0.642	0.636	0.622	0.613
10.5	**0.545**	0.599	0.598	0.597	0.596	0.595	0.590	0.585	0.579	0.574	0.564	0.555	0.534	0.523
11.0	**0.462**	0.539	0.536	0.532	0.529	0.525	0.517	0.510	0.502	0.494	0.484	0.473	0.451	0.441
11.5	**0.392**	0.477	0.472	0.467	0.462	0.457	0.448	0.439	0.430	0.421	0.411	0.401	0.383	0.374
12.0	**0.337**	0.423	0.416	0.410	0.403	0.397	0.388	0.379	0.370	0.362	0.353	0.345	0.330	0.322
12.5	**0.294**	0.374	0.367	0.360	0.353	0.346	0.338	0.330	0.322	0.314	0.307	0.300	0.287	0.281
13.0	**0.258**	0.330	0.323	0.316	0.310	0.303	0.296	0.289	0.283	0.276	0.270	0.264	0.252	0.247
13.5	**0.228**	0.292	0.286	0.280	0.274	0.268	0.262	0.256	0.250	0.244	0.239	0.234	0.224	0.219
14.0	**0.203**	0.260	0.254	0.249	0.244	0.238	0.233	0.228	0.222	0.217	0.213	0.208	0.199	0.195
14.5	**0.182**	0.233	0.228	0.223	0.218	0.213	0.208	0.204	0.199	0.194	0.190	0.186	0.179	0.175
15.0	**0.164**	0.210	0.205	0.201	0.196	0.191	0.187	0.183	0.179	0.175	0.171	0.168	0.161	0.158
15.5	**0.149**	0.190	0.185	0.181	0.177	0.173	0.169	0.166	0.162	0.158	0.155	0.152	0.146	0.143
16.0	**0.135**	0.172	0.168	0.164	0.161	0.157	0.154	0.150	0.147	0.144	0.141	0.138	0.133	0.130
16.5	**0.123**	0.156	0.153	0.150	0.146	0.143	0.140	0.137	0.134	0.131	0.128	0.126	0.121	0.119
17.0	**0.113**	0.143	0.140	0.137	0.134	0.131	0.128	0.125	0.123	0.120	0.118	0.115	0.111	0.109
17.5	**0.104**	0.131	0.128	0.126	0.123	0.120	0.118	0.116	0.113	0.111	0.109	0.106	0.102	0.100
18.0	**0.096**	0.120	0.118	0.116	0.113	0.111	0.109	0.106	0.104	0.102	0.100	0.098	0.094	0.093
18.5	**0.089**	0.111	0.108	0.106	0.104	0.102	0.100	0.098	0.096	0.094	0.092	0.091	0.087	0.086
19.0	**0.081**	0.099	0.098	0.096	0.094	0.092	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.078
19.5	**0.073**	0.089	0.087	0.086	0.084	0.083	0.081	0.080	0.078	0.077	0.076	0.074	0.072	0.071
20.0	**0.065**	0.078	0.077	0.076	0.075	0.073	0.072	0.071	0.070	0.069	0.068	0.066	0.064	0.063

7.6 Sound Curves, Sound Optimized Mode SO2

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized Mode SO2 (Blades with serrated trailing edge)**
3	91.3
4	91.5
5	93.9
6	96.9
7	99.7
8	102.0
9	102.0
10	102.0
11	102.0
12	102.0
13	102.0
14	102.0
15	102.0
16	102.0
17	102.0
18	102.0
19	102.0
20	102.0

7.7 Power Curves, Sound Optimized Mode SO3

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	191	197	204	211	218	225	232	239	246	259	266
4.5	**393**	286	295	305	315	325	334	344	354	364	373	383	403	412
5.0	**567**	421	434	448	461	474	487	501	514	527	540	553	580	593
5.5	**780**	586	603	621	639	656	674	692	709	727	745	763	798	816
6.0	**1039**	784	807	831	854	877	900	923	946	970	993	1016	1062	1085
6.5	**1346**	1021	1051	1080	1110	1140	1169	1199	1228	1258	1287	1316	1375	1404
7.0	**1705**	1300	1337	1374	1411	1448	1485	1522	1558	1595	1632	1668	1741	1778
7.5	**2108**	1614	1659	1704	1749	1794	1839	1884	1929	1974	2018	2063	2152	2196
8.0	**2542**	1953	2007	2060	2114	2168	2221	2275	2328	2382	2435	2489	2595	2648
8.5	**2979**	2292	2355	2418	2480	2543	2605	2667	2730	2792	2854	2917	3041	3103
9.0	**3450**	2660	2732	2804	2876	2948	3020	3092	3164	3236	3307	3378	3520	3590
9.5	**3901**	3019	3100	3181	3262	3344	3424	3505	3585	3666	3744	3822	3975	4048
10.0	**4248**	3327	3416	3505	3594	3683	3769	3855	3941	4026	4100	4174	4310	4372
10.5	**4470**	3587	3682	3776	3870	3965	4047	4129	4211	4293	4352	4411	4512	4554
11.0	**4604**	3816	3910	4003	4096	4190	4261	4332	4403	4474	4518	4561	4629	4653
11.5	**4661**	4003	4090	4177	4264	4351	4409	4466	4524	4581	4608	4635	4674	4686
12.0	**4684**	4131	4212	4292	4373	4454	4499	4543	4588	4633	4650	4667	4692	4700
12.5	**4695**	4218	4292	4366	4440	4514	4550	4586	4621	4657	4670	4682	4701	4707
13.0	**4700**	4289	4355	4422	4488	4555	4584	4613	4642	4671	4681	4690	4705	4710
13.5	**4707**	4338	4397	4456	4515	4574	4601	4627	4653	4679	4688	4698	4711	4715
14.0	**4710**	4388	4441	4494	4547	4600	4622	4644	4665	4687	4695	4702	4713	4716
14.5	**4712**	4430	4477	4525	4572	4620	4638	4657	4675	4694	4700	4706	4715	4718
15.0	**4713**	4457	4500	4544	4587	4630	4646	4662	4678	4695	4701	4707	4715	4717
15.5	**4714**	4469	4510	4551	4592	4633	4649	4665	4681	4696	4702	4708	4716	4718
16.0	**4713**	4473	4513	4552	4592	4632	4648	4664	4679	4695	4701	4707	4715	4717
16.5	**4712**	4474	4514	4553	4592	4631	4646	4662	4678	4693	4700	4706	4714	4717
17.0	**4711**	4476	4514	4553	4591	4629	4645	4660	4676	4692	4698	4705	4714	4716
17.5	**4708**	4454	4493	4532	4571	4610	4629	4647	4666	4685	4692	4700	4711	4715
18.0	**4708**	4464	4501	4539	4576	4614	4632	4650	4668	4686	4693	4701	4711	4714
18.5	**4708**	4478	4514	4550	4585	4621	4638	4655	4672	4688	4695	4702	4712	4715
19.0	**4699**	4477	4511	4544	4578	4612	4628	4644	4660	4676	4683	4691	4703	4706
19.5	**4641**	4421	4453	4485	4516	4548	4564	4581	4597	4614	4623	4632	4647	4653
20.0	**4503**	4282	4312	4343	4373	4403	4420	4437	4455	4472	4482	4493	4512	4520

7.8 Ct Values, Sound Optimized Mode SO3

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.885**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.792	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.790**	0.788	0.788	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.789	0.790	0.790	0.790
6.0	**0.792**	0.789	0.789	0.790	0.790	0.790	0.791	0.791	0.791	0.792	0.792	0.792	0.793	0.793
6.5	**0.797**	0.793	0.794	0.794	0.794	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.797	0.797
7.0	**0.798**	0.795	0.795	0.795	0.795	0.796	0.796	0.796	0.797	0.797	0.797	0.797	0.798	0.798
7.5	**0.782**	0.779	0.779	0.780	0.780	0.780	0.780	0.781	0.781	0.781	0.781	0.782	0.782	0.782
8.0	**0.748**	0.746	0.746	0.747	0.747	0.747	0.747	0.748	0.748	0.748	0.748	0.748	0.749	0.749
8.5	**0.698**	0.696	0.696	0.696	0.697	0.697	0.697	0.697	0.697	0.697	0.698	0.698	0.698	0.698
9.0	**0.669**	0.666	0.667	0.667	0.667	0.667	0.668	0.668	0.668	0.668	0.668	0.669	0.669	0.668
9.5	**0.636**	0.637	0.637	0.637	0.637	0.638	0.638	0.638	0.638	0.638	0.638	0.637	0.634	0.631
10.0	**0.572**	0.583	0.583	0.584	0.584	0.584	0.583	0.583	0.582	0.582	0.579	0.575	0.567	0.563
10.5	**0.498**	0.523	0.523	0.523	0.522	0.522	0.520	0.518	0.516	0.514	0.509	0.503	0.490	0.483
11.0	**0.428**	0.468	0.467	0.466	0.464	0.463	0.459	0.455	0.451	0.448	0.441	0.434	0.420	0.411
11.5	**0.367**	0.418	0.416	0.413	0.411	0.409	0.404	0.399	0.394	0.389	0.382	0.374	0.360	0.352
12.0	**0.318**	0.371	0.368	0.365	0.362	0.359	0.354	0.349	0.343	0.338	0.331	0.325	0.311	0.305
12.5	**0.277**	0.328	0.325	0.322	0.319	0.316	0.311	0.306	0.300	0.295	0.289	0.283	0.272	0.266
13.0	**0.244**	0.292	0.289	0.286	0.283	0.279	0.274	0.270	0.265	0.260	0.255	0.249	0.239	0.234
13.5	**0.217**	0.261	0.258	0.254	0.251	0.248	0.244	0.239	0.235	0.230	0.226	0.221	0.212	0.208
14.0	**0.193**	0.235	0.231	0.228	0.225	0.222	0.218	0.214	0.210	0.206	0.201	0.197	0.190	0.186
14.5	**0.173**	0.212	0.209	0.206	0.202	0.199	0.196	0.192	0.188	0.184	0.181	0.177	0.170	0.167
15.0	**0.156**	0.191	0.189	0.186	0.183	0.180	0.176	0.173	0.169	0.166	0.163	0.160	0.153	0.150
15.5	**0.142**	0.173	0.171	0.168	0.165	0.162	0.159	0.156	0.153	0.150	0.147	0.144	0.139	0.136
16.0	**0.129**	0.157	0.155	0.152	0.150	0.147	0.145	0.142	0.139	0.136	0.134	0.131	0.126	0.124
16.5	**0.117**	0.143	0.141	0.139	0.136	0.134	0.132	0.129	0.127	0.124	0.122	0.120	0.115	0.113
17.0	**0.108**	0.131	0.129	0.127	0.125	0.123	0.120	0.118	0.116	0.114	0.112	0.110	0.106	0.104
17.5	**0.099**	0.120	0.118	0.116	0.114	0.113	0.111	0.109	0.107	0.105	0.103	0.101	0.097	0.096
18.0	**0.091**	0.111	0.109	0.107	0.105	0.104	0.102	0.100	0.098	0.097	0.095	0.093	0.090	0.088
18.5	**0.085**	0.102	0.101	0.099	0.097	0.096	0.094	0.093	0.091	0.089	0.088	0.086	0.083	0.082
19.0	**0.078**	0.094	0.093	0.091	0.090	0.088	0.087	0.085	0.084	0.082	0.081	0.079	0.077	0.075
19.5	**0.072**	0.086	0.085	0.084	0.082	0.081	0.079	0.078	0.077	0.075	0.074	0.073	0.070	0.069
20.0	**0.065**	0.078	0.077	0.076	0.074	0.073	0.072	0.071	0.069	0.068	0.067	0.066	0.064	0.063

7.9 Sound Curves, Sound Optimized Mode SO3

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized Mode SO3 (Blades with serrated trailing edge)**
3	91.3
4	91.5
5	93.9
6	96.9
7	99.7
8	101.0
9	101.0
10	101.0
11	101.0
12	101.0
13	101.0
14	101.0
15	101.0
16	101.0
17	101.0
18	101.0
19	101.0
20	101.0

7.10 Power Curves, Sound Optimized Mode SO4

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	191	197	204	211	218	225	232	239	246	259	266
4.5	**393**	286	295	305	315	325	334	344	354	364	373	383	403	412
5.0	**567**	421	434	448	461	474	487	501	514	527	540	553	580	593
5.5	**780**	586	603	621	639	656	674	692	709	727	745	763	798	816
6.0	**1039**	785	808	831	854	877	900	923	947	970	993	1016	1062	1086
6.5	**1346**	1021	1051	1080	1110	1140	1169	1199	1228	1258	1287	1317	1375	1404
7.0	**1702**	1299	1336	1373	1409	1446	1483	1520	1556	1593	1630	1666	1739	1776
7.5	**2092**	1603	1647	1692	1736	1781	1825	1870	1914	1959	2003	2048	2136	2180
8.0	**2498**	1919	1972	2025	2077	2130	2183	2236	2288	2341	2394	2446	2551	2604
8.5	**2898**	2229	2290	2351	2412	2473	2534	2594	2655	2716	2777	2837	2958	3018
9.0	**3303**	2547	2616	2685	2754	2823	2892	2960	3029	3098	3166	3235	3372	3440
9.5	**3664**	2830	2907	2983	3059	3136	3212	3288	3364	3440	3515	3589	3736	3808
10.0	**3945**	3066	3148	3230	3313	3395	3476	3558	3639	3720	3795	3870	4010	4075
10.5	**4147**	3266	3354	3441	3528	3616	3698	3780	3863	3945	4012	4080	4197	4247
11.0	**4271**	3434	3525	3616	3707	3798	3873	3948	4024	4099	4157	4214	4310	4349
11.5	**4338**	3555	3646	3736	3826	3917	3987	4057	4128	4198	4245	4292	4367	4396
12.0	**4375**	3650	3737	3824	3911	3998	4063	4127	4192	4256	4296	4336	4396	4417
12.5	**4396**	3731	3814	3898	3982	4065	4124	4182	4240	4299	4331	4364	4413	4430
13.0	**4412**	3804	3883	3962	4042	4121	4174	4227	4280	4333	4359	4386	4425	4438
13.5	**4420**	3869	3942	4016	4089	4162	4209	4256	4302	4349	4373	4396	4432	4445
14.0	**4429**	3922	3992	4061	4131	4200	4242	4284	4327	4369	4389	4409	4440	4451
14.5	**4434**	3955	4022	4088	4155	4221	4260	4300	4339	4378	4396	4415	4444	4454
15.0	**4430**	3963	4028	4094	4159	4225	4262	4300	4338	4376	4394	4412	4440	4450
15.5	**4429**	3970	4034	4099	4163	4227	4264	4301	4338	4375	4393	4411	4439	4448
16.0	**4427**	3977	4040	4103	4166	4229	4265	4301	4338	4374	4392	4409	4437	4447
16.5	**4426**	3988	4050	4111	4172	4234	4269	4304	4339	4374	4392	4409	4436	4446
17.0	**4426**	4004	4064	4124	4184	4243	4276	4310	4343	4376	4393	4410	4436	4446
17.5	**4419**	4010	4065	4120	4175	4230	4263	4296	4329	4362	4381	4400	4430	4442
18.0	**4424**	4038	4091	4143	4195	4247	4278	4309	4340	4370	4388	4406	4434	4445
18.5	**4429**	4071	4120	4169	4218	4267	4295	4324	4352	4381	4397	4413	4439	4448
19.0	**4427**	4093	4140	4188	4235	4282	4308	4334	4359	4385	4399	4413	4436	4445
19.5	**4430**	4129	4171	4214	4256	4299	4322	4345	4368	4391	4404	4417	4437	4445
20.0	**4384**	4123	4159	4196	4232	4268	4288	4309	4329	4349	4360	4372	4392	4400

7.11 Ct Values, Sound Optimized Mode SO4

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.885**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.792	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.790**	0.789	0.788	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.790	0.790	0.790	0.790
6.0	**0.794**	0.790	0.791	0.791	0.791	0.792	0.792	0.792	0.792	0.793	0.793	0.793	0.794	0.794
6.5	**0.796**	0.792	0.793	0.793	0.793	0.794	0.794	0.794	0.795	0.795	0.795	0.795	0.796	0.796
7.0	**0.791**	0.788	0.788	0.789	0.789	0.789	0.789	0.790	0.790	0.790	0.790	0.791	0.791	0.791
7.5	**0.761**	0.759	0.759	0.759	0.759	0.760	0.760	0.760	0.760	0.760	0.761	0.761	0.761	0.761
8.0	**0.717**	0.715	0.715	0.716	0.716	0.716	0.716	0.716	0.717	0.717	0.717	0.717	0.718	0.718
8.5	**0.665**	0.663	0.663	0.663	0.663	0.663	0.664	0.664	0.664	0.664	0.664	0.665	0.665	0.665
9.0	**0.626**	0.624	0.624	0.624	0.624	0.625	0.625	0.625	0.625	0.625	0.625	0.626	0.626	0.626
9.5	**0.576**	0.575	0.575	0.575	0.575	0.575	0.576	0.576	0.576	0.576	0.576	0.576	0.575	0.574
10.0	**0.512**	0.516	0.516	0.516	0.516	0.516	0.516	0.516	0.516	0.516	0.515	0.513	0.510	0.507
10.5	**0.449**	0.459	0.459	0.459	0.460	0.460	0.459	0.458	0.457	0.457	0.454	0.452	0.444	0.440
11.0	**0.390**	0.409	0.409	0.409	0.409	0.409	0.407	0.405	0.403	0.401	0.397	0.394	0.385	0.380
11.5	**0.338**	0.362	0.362	0.361	0.361	0.360	0.358	0.356	0.353	0.351	0.347	0.343	0.333	0.328
12.0	**0.295**	0.321	0.320	0.319	0.318	0.317	0.315	0.312	0.310	0.307	0.303	0.299	0.290	0.285
12.5	**0.259**	0.286	0.285	0.284	0.283	0.281	0.279	0.276	0.273	0.271	0.267	0.263	0.254	0.250
13.0	**0.229**	0.256	0.255	0.254	0.252	0.251	0.248	0.245	0.243	0.240	0.236	0.232	0.225	0.220
13.5	**0.203**	0.231	0.229	0.228	0.226	0.224	0.222	0.219	0.216	0.214	0.210	0.207	0.200	0.196
14.0	**0.182**	0.209	0.207	0.205	0.204	0.202	0.199	0.197	0.194	0.191	0.188	0.185	0.179	0.175
14.5	**0.163**	0.188	0.187	0.185	0.183	0.182	0.179	0.177	0.174	0.172	0.169	0.166	0.160	0.158
15.0	**0.147**	0.170	0.168	0.167	0.165	0.164	0.161	0.159	0.157	0.155	0.152	0.150	0.145	0.142
15.5	**0.133**	0.154	0.152	0.151	0.150	0.148	0.146	0.144	0.142	0.140	0.138	0.135	0.131	0.129
16.0	**0.121**	0.140	0.138	0.137	0.136	0.134	0.133	0.131	0.129	0.127	0.125	0.123	0.119	0.117
16.5	**0.110**	0.128	0.126	0.125	0.124	0.123	0.121	0.119	0.118	0.116	0.114	0.112	0.109	0.107
17.0	**0.101**	0.117	0.116	0.115	0.114	0.113	0.111	0.109	0.108	0.106	0.105	0.103	0.099	0.098
17.5	**0.093**	0.108	0.107	0.106	0.105	0.103	0.102	0.101	0.099	0.098	0.096	0.095	0.092	0.090
18.0	**0.086**	0.100	0.099	0.098	0.097	0.096	0.094	0.093	0.092	0.090	0.089	0.087	0.085	0.083
18.5	**0.080**	0.093	0.092	0.091	0.090	0.089	0.087	0.086	0.085	0.084	0.082	0.081	0.078	0.077
19.0	**0.074**	0.086	0.085	0.084	0.083	0.082	0.081	0.080	0.078	0.077	0.076	0.075	0.072	0.071
19.5	**0.068**	0.081	0.080	0.079	0.078	0.077	0.075	0.074	0.073	0.072	0.071	0.070	0.067	0.066
20.0	**0.063**	0.075	0.074	0.073	0.072	0.071	0.070	0.069	0.067	0.066	0.065	0.064	0.062	0.061

7.12 Sound Curves, Sound Optimized Mode SO4

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized Mode SO4 (Blades with serrated trailing edge)**
3	91.3
4	91.5
5	93.9
6	96.9
7	99.5
8	100.0
9	100.0
10	100.0
11	100.0
12	100.0
13	100.0
14	100.0
15	100.0
16	100.0
17	100.0
18	100.0
19	100.0
20	100.0

7.13 Power Curves, Sound Optimized Mode SO5

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	191	197	204	211	218	225	232	239	246	259	266
4.5	**393**	286	295	305	315	325	334	344	354	364	373	383	403	412
5.0	**567**	421	434	448	461	474	487	501	514	527	540	553	580	593
5.5	**781**	586	604	621	639	656	674	692	710	727	745	763	798	816
6.0	**1040**	785	808	831	854	878	901	924	947	970	993	1017	1063	1086
6.5	**1343**	1019	1049	1078	1108	1137	1167	1196	1225	1255	1284	1313	1372	1401
7.0	**1689**	1289	1325	1362	1398	1435	1471	1508	1544	1580	1617	1653	1726	1762
7.5	**2056**	1575	1619	1662	1706	1750	1794	1838	1881	1925	1969	2012	2100	2143
8.0	**2428**	1865	1916	1968	2019	2070	2121	2173	2224	2275	2326	2377	2480	2531
8.5	**2780**	2139	2197	2256	2314	2373	2431	2489	2548	2606	2664	2722	2838	2896
9.0	**3101**	2390	2454	2519	2584	2649	2714	2778	2843	2908	2972	3037	3166	3230
9.5	**3365**	2594	2665	2735	2805	2875	2945	3016	3086	3156	3225	3295	3434	3504
10.0	**3588**	2770	2845	2920	2995	3070	3144	3219	3293	3368	3441	3515	3659	3730
10.5	**3758**	2910	2988	3067	3145	3224	3301	3379	3456	3534	3609	3683	3828	3898
11.0	**3873**	3017	3098	3179	3260	3341	3421	3501	3581	3661	3732	3802	3936	3998
11.5	**3952**	3098	3181	3264	3347	3430	3510	3590	3669	3749	3817	3884	4009	4065
12.0	**4012**	3172	3256	3341	3426	3510	3588	3665	3743	3820	3884	3948	4064	4115
12.5	**4066**	3246	3332	3418	3504	3590	3665	3739	3814	3889	3948	4007	4113	4160
13.0	**4112**	3317	3403	3489	3575	3661	3733	3804	3876	3948	4002	4057	4155	4197
13.5	**4131**	3369	3454	3539	3623	3708	3775	3842	3910	3977	4028	4080	4169	4208
14.0	**4140**	3398	3481	3565	3648	3731	3796	3861	3926	3992	4041	4090	4176	4213
14.5	**4140**	3413	3495	3577	3659	3741	3805	3868	3931	3995	4043	4092	4176	4212
15.0	**4143**	3427	3507	3587	3667	3746	3810	3873	3936	4000	4047	4095	4177	4211
15.5	**4145**	3445	3524	3602	3680	3758	3821	3883	3945	4007	4053	4099	4178	4212
16.0	**4153**	3470	3547	3624	3700	3777	3838	3898	3959	4019	4064	4108	4184	4216
16.5	**4166**	3504	3579	3654	3729	3804	3863	3922	3980	4039	4081	4124	4196	4226
17.0	**4184**	3548	3621	3694	3768	3841	3897	3954	4010	4066	4106	4145	4211	4239
17.5	**4173**	3586	3655	3724	3793	3862	3913	3964	4015	4066	4102	4138	4200	4227
18.0	**4195**	3638	3705	3772	3838	3905	3953	4001	4049	4097	4130	4163	4219	4244
18.5	**4219**	3697	3761	3825	3889	3953	3997	4042	4086	4130	4160	4189	4240	4262
19.0	**4236**	3760	3818	3876	3934	3992	4034	4075	4117	4158	4184	4210	4254	4271
19.5	**4260**	3830	3884	3939	3993	4047	4084	4121	4157	4194	4216	4238	4276	4291
20.0	**4260**	3884	3933	3982	4031	4080	4111	4142	4173	4204	4223	4241	4273	4286

7.14 Ct Values, Sound Optimized Mode SO5

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.885**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.794	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.792	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.791**	0.789	0.789	0.789	0.789	0.789	0.790	0.790	0.790	0.790	0.791	0.791	0.791	0.792
6.0	**0.795**	0.792	0.792	0.792	0.793	0.793	0.793	0.794	0.794	0.794	0.794	0.795	0.795	0.795
6.5	**0.785**	0.782	0.783	0.783	0.783	0.784	0.784	0.784	0.784	0.785	0.785	0.785	0.785	0.786
7.0	**0.764**	0.762	0.762	0.762	0.762	0.762	0.763	0.763	0.763	0.763	0.764	0.764	0.764	0.764
7.5	**0.726**	0.724	0.724	0.724	0.724	0.725	0.725	0.725	0.725	0.725	0.726	0.726	0.726	0.726
8.0	**0.681**	0.679	0.679	0.679	0.679	0.680	0.680	0.680	0.680	0.680	0.681	0.681	0.681	0.681
8.5	**0.627**	0.626	0.626	0.626	0.626	0.626	0.626	0.627	0.627	0.627	0.627	0.627	0.628	0.628
9.0	**0.572**	0.570	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.572	0.572	0.572	0.572	0.572
9.5	**0.509**	0.508	0.508	0.508	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.510	0.510
10.0	**0.451**	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.451	0.450
10.5	**0.397**	0.398	0.398	0.398	0.398	0.398	0.398	0.398	0.398	0.398	0.398	0.397	0.396	0.395
11.0	**0.348**	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.350	0.349	0.346	0.344
11.5	**0.305**	0.309	0.309	0.309	0.309	0.309	0.309	0.309	0.309	0.308	0.307	0.306	0.303	0.300
12.0	**0.268**	0.275	0.275	0.275	0.275	0.275	0.274	0.274	0.273	0.273	0.271	0.270	0.266	0.264
12.5	**0.238**	0.246	0.246	0.246	0.246	0.246	0.245	0.244	0.244	0.243	0.241	0.240	0.236	0.234
13.0	**0.212**	0.222	0.222	0.222	0.221	0.221	0.220	0.219	0.219	0.218	0.216	0.214	0.210	0.208
13.5	**0.190**	0.200	0.200	0.200	0.199	0.199	0.198	0.197	0.196	0.195	0.193	0.191	0.188	0.186
14.0	**0.170**	0.180	0.180	0.179	0.179	0.179	0.178	0.177	0.176	0.174	0.173	0.171	0.168	0.166
14.5	**0.152**	0.162	0.162	0.161	0.161	0.161	0.160	0.159	0.158	0.157	0.155	0.154	0.151	0.149
15.0	**0.138**	0.147	0.146	0.146	0.145	0.145	0.144	0.143	0.142	0.141	0.140	0.139	0.136	0.134
15.5	**0.125**	0.133	0.133	0.133	0.132	0.132	0.131	0.130	0.129	0.128	0.127	0.126	0.123	0.122
16.0	**0.114**	0.122	0.122	0.121	0.121	0.120	0.119	0.119	0.118	0.117	0.116	0.115	0.112	0.111
16.5	**0.104**	0.112	0.112	0.111	0.111	0.110	0.110	0.109	0.108	0.107	0.106	0.105	0.103	0.102
17.0	**0.096**	0.104	0.104	0.103	0.103	0.102	0.101	0.101	0.100	0.099	0.098	0.097	0.095	0.093
17.5	**0.088**	0.097	0.096	0.096	0.095	0.095	0.094	0.093	0.092	0.091	0.090	0.089	0.087	0.086
18.0	**0.082**	0.091	0.090	0.089	0.089	0.088	0.087	0.086	0.086	0.085	0.084	0.083	0.081	0.080
18.5	**0.076**	0.085	0.084	0.084	0.083	0.082	0.082	0.081	0.080	0.079	0.078	0.077	0.075	0.074
19.0	**0.070**	0.080	0.079	0.078	0.077	0.077	0.076	0.075	0.074	0.073	0.072	0.071	0.069	0.069
19.5	**0.066**	0.075	0.074	0.074	0.073	0.072	0.071	0.070	0.070	0.069	0.068	0.067	0.065	0.064
20.0	**0.061**	0.071	0.070	0.069	0.069	0.068	0.067	0.066	0.065	0.064	0.063	0.062	0.061	0.060

7.15 Sound Curves, Sound Optimized Mode SO5

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized Mode SO5 (Blades with serrated trailing edge)**
3	91.3
4	91.5
5	93.9
6	96.9
7	98.7
8	99.0
9	99.0
10	99.0
11	99.0
12	99.0
13	99.0
14	99.0
15	99.0
16	99.0
17	99.0
18	99.0
19	99.0
20	99.0

7.16 Power Curves, Sound Optimized Mode SO6

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**42**	13	16	18	20	23	25	28	31	33	36	39	45	48
3.5	**138**	87	92	97	101	106	111	115	120	124	129	134	143	147
4.0	**252**	177	184	191	197	204	211	218	225	232	239	246	259	266
4.5	**393**	286	295	305	315	325	334	344	354	364	373	383	403	412
5.0	**567**	421	434	448	461	474	487	501	514	527	540	553	580	593
5.5	**781**	586	604	621	639	657	674	692	710	727	745	763	798	816
6.0	**1039**	785	808	831	854	877	900	923	947	970	993	1016	1062	1086
6.5	**1337**	1016	1045	1074	1104	1133	1162	1191	1221	1250	1279	1308	1366	1396
7.0	**1667**	1272	1308	1344	1380	1416	1452	1488	1524	1560	1595	1631	1702	1738
7.5	**2000**	1532	1575	1617	1660	1702	1745	1788	1830	1872	1915	1957	2042	2084
8.0	**2316**	1779	1828	1877	1926	1975	2024	2073	2121	2170	2219	2268	2365	2414
8.5	**2596**	1997	2052	2106	2161	2215	2270	2324	2378	2433	2487	2541	2650	2704
9.0	**2828**	2177	2236	2296	2355	2414	2473	2532	2591	2650	2710	2769	2887	2946
9.5	**3018**	2325	2388	2451	2514	2577	2640	2703	2766	2829	2892	2955	3081	3144
10.0	**3169**	2442	2509	2575	2641	2707	2773	2839	2905	2971	3037	3103	3234	3299
10.5	**3280**	2530	2599	2667	2735	2804	2872	2940	3009	3077	3145	3213	3347	3414
11.0	**3371**	2601	2671	2741	2812	2882	2952	3022	3092	3162	3232	3301	3437	3502
11.5	**3448**	2666	2737	2809	2881	2953	3025	3096	3168	3240	3309	3379	3511	3573
12.0	**3522**	2733	2807	2880	2954	3027	3100	3173	3246	3319	3387	3454	3582	3642
12.5	**3580**	2790	2864	2939	3014	3089	3163	3236	3310	3383	3449	3515	3637	3694
13.0	**3611**	2824	2900	2976	3052	3128	3201	3273	3346	3419	3483	3547	3665	3720
13.5	**3617**	2843	2919	2995	3070	3146	3218	3289	3361	3433	3494	3555	3668	3719
14.0	**3623**	2858	2934	3010	3085	3161	3232	3303	3373	3444	3504	3563	3673	3723
14.5	**3631**	2876	2952	3028	3104	3180	3250	3319	3389	3458	3516	3574	3681	3730
15.0	**3645**	2900	2975	3051	3126	3202	3269	3337	3404	3472	3530	3588	3694	3743
15.5	**3669**	2934	3010	3085	3160	3235	3301	3368	3434	3500	3556	3612	3716	3764
16.0	**3701**	2980	3055	3130	3205	3280	3344	3409	3474	3538	3592	3647	3747	3793
16.5	**3738**	3033	3108	3182	3256	3330	3393	3456	3519	3582	3634	3686	3781	3824
17.0	**3777**	3094	3167	3239	3312	3385	3446	3507	3568	3630	3679	3728	3818	3858
17.5	**3796**	3160	3230	3299	3369	3438	3495	3551	3608	3664	3708	3752	3831	3866
18.0	**3843**	3239	3307	3374	3441	3509	3562	3616	3670	3723	3763	3803	3874	3906
18.5	**3890**	3324	3389	3455	3520	3585	3635	3684	3734	3784	3819	3855	3917	3944
19.0	**3922**	3408	3468	3527	3587	3646	3691	3736	3781	3826	3858	3890	3946	3970
19.5	**3963**	3494	3550	3606	3662	3718	3758	3798	3839	3879	3907	3935	3982	4002
20.0	**3997**	3580	3632	3684	3736	3788	3823	3858	3893	3928	3951	3974	4013	4029

7.17 Ct Values, Sound Optimized Mode SO6

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.000**	**1.025**	**1.050**	**1.075**	**1.100**	**1.125**	**1.150**	**1.175**	**1.200**	**1.250**	**1.275**
3.0	**0.885**	0.877	0.878	0.880	0.881	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.884	0.884
3.5	**0.844**	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844
4.0	**0.806**	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.806	0.806	0.805	0.805
4.5	**0.795**	0.794	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.795	0.795	0.795	0.795
5.0	**0.789**	0.793	0.793	0.792	0.792	0.792	0.791	0.791	0.791	0.790	0.790	0.790	0.789	0.789
5.5	**0.792**	0.790	0.790	0.790	0.790	0.790	0.790	0.791	0.791	0.791	0.791	0.792	0.792	0.792
6.0	**0.793**	0.790	0.790	0.790	0.791	0.791	0.791	0.792	0.792	0.792	0.792	0.793	0.793	0.794
6.5	**0.776**	0.774	0.774	0.774	0.774	0.775	0.775	0.775	0.775	0.776	0.776	0.776	0.777	0.777
7.0	**0.740**	0.738	0.739	0.739	0.739	0.739	0.739	0.739	0.740	0.740	0.740	0.740	0.741	0.741
7.5	**0.692**	0.690	0.691	0.691	0.691	0.691	0.691	0.691	0.692	0.692	0.692	0.692	0.692	0.692
8.0	**0.639**	0.637	0.637	0.638	0.638	0.638	0.638	0.638	0.638	0.639	0.639	0.639	0.639	0.639
8.5	**0.575**	0.573	0.573	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.575	0.575
9.0	**0.505**	0.504	0.504	0.504	0.504	0.504	0.504	0.504	0.504	0.504	0.504	0.504	0.505	0.505
9.5	**0.442**	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.443	0.443
10.0	**0.387**	0.386	0.386	0.387	0.387	0.387	0.387	0.387	0.387	0.387	0.387	0.387	0.387	0.387
10.5	**0.338**	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338
11.0	**0.297**	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.296
11.5	**0.262**	0.262	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.262	0.262	0.261
12.0	**0.233**	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.234	0.234	0.233	0.232
12.5	**0.208**	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.209	0.207	0.207
13.0	**0.186**	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.187	0.186	0.185	0.184
13.5	**0.166**	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.167	0.166	0.165	0.164
14.0	**0.148**	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.150	0.150	0.149	0.147	0.146
14.5	**0.134**	0.137	0.137	0.137	0.137	0.137	0.136	0.136	0.136	0.136	0.135	0.134	0.133	0.132
15.0	**0.121**	0.124	0.124	0.124	0.124	0.124	0.124	0.123	0.123	0.123	0.122	0.122	0.120	0.119
15.5	**0.110**	0.114	0.114	0.114	0.114	0.114	0.113	0.113	0.113	0.112	0.112	0.111	0.110	0.109
16.0	**0.101**	0.105	0.105	0.105	0.105	0.105	0.104	0.104	0.104	0.103	0.103	0.102	0.101	0.100
16.5	**0.094**	0.098	0.098	0.097	0.097	0.097	0.097	0.096	0.096	0.095	0.095	0.094	0.093	0.092
17.0	**0.087**	0.091	0.091	0.091	0.091	0.090	0.090	0.090	0.089	0.089	0.088	0.087	0.086	0.085
17.5	**0.080**	0.086	0.086	0.085	0.085	0.085	0.084	0.084	0.083	0.083	0.082	0.081	0.080	0.079
18.0	**0.075**	0.081	0.081	0.080	0.080	0.080	0.079	0.078	0.078	0.077	0.077	0.076	0.074	0.074
18.5	**0.070**	0.077	0.076	0.076	0.076	0.075	0.075	0.074	0.073	0.073	0.072	0.071	0.070	0.069
19.0	**0.065**	0.073	0.072	0.072	0.071	0.070	0.070	0.069	0.068	0.068	0.067	0.066	0.065	0.064
19.5	**0.061**	0.069	0.068	0.068	0.067	0.067	0.066	0.065	0.065	0.064	0.063	0.062	0.061	0.060
20.0	**0.058**	0.066	0.065	0.064	0.064	0.063	0.062	0.062	0.061	0.060	0.059	0.059	0.057	0.056

7.18 Sound Curves, Sound Optimized Mode SO6

Sound Power Level at Hub Height	
Conditions for Sound Power Level:	**Measurement standard IEC 61400-11 ed. 3** **Maximum turbulence at hub height: 30%** **Inflow angle (vertical): 0 ±2°** **Air density: 1.225 kg/m^3**
Wind speed at hub height [m/s]	**Sound Power Level at Hub Height [dBA]** **Sound Optimized Mode SO6 (Blades with serrated trailing edge)**
3	91.3
4	91.5
5	93.9
6	96.9
7	97.8
8	98.0
9	98.0
10	98.0
11	98.0
12	98.0
13	98.0
14	98.0
15	98.0
16	98.0
17	98.0
18	98.0
19	98.0
20	98.0