

Product Preview Documentation Package

For Key Customers and Key Projects

Wind Turbine Class Nordex Delta4000 N149/5.X



E0004930226

Revision 01 / 2019-03-29

- Translation of the original instructions -
Document is published in electronic form.

Original document at Nordex Energy GmbH, Engineering.



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1. Introduction

The Product Preview Documentation Package is an addition to the Technical Description E0004109668 of the Delta4000 wind turbine class. This document contains the preliminary technical specifications for the N149/5.X.

All data contained in this document describes the current development status of N149/5.X and is subject to change due to continuous optimization of the turbine. In this case Nordex will provide an updated version of this document.

2. Turbine Design Information

The values below should be considered as a guideline for an indicative evaluation of site suitability of the turbine. However, the site suitability and turbine performance can only be assessed conclusively based on actual wind and site conditions. Please contact your Sales representative for a detailed wind and site assessment.

2.1 Wind and Site Conditions

The turbine is designed for a variety of wind and site conditions. The conditions listed below are exemplary for specific power modes. Please note that optimization measures or site specific solutions could increase the operational envelop further. Values refer to hub height.

Design conditions	
Extreme wind speed (10 min average), V50	≥42.0 m/s
Survival wind speed (3 s gust), Ve50	58.8 m/s
Wind Range	low to medium
Turbulence intensity, I_{ref}	IEC S @ 5.7MW / IEC A @ 5.5MW
Wind shear, α	depending on power mode and tower
Max. inflow angle (vertical)	8°

3. Technical Description

The turbine is part of the Delta4000 product series and further information can be found in the official technical description (E0004109668).

3.1 Technical Data

Design	
Design temperature	Standard -20 °C to +45 °C CCV -40 °C to +45 °C
Operating temperature range	-20 °C to +40 °C ¹⁾
Operating temperature range CCV	-30 °C to +40 °C ¹⁾
Stop	Standard: -20 °C, restart at -18 °C CCV: -30 °C, restart at -28 °C
Max. height above MSL	2000 m ²⁾
Certificate	In accordance with IEC 61400-22
Type	3-blade rotor with horizontal axis Up-wind turbine
Output control	Active single blade adjustment
Nominal power	5.0-5.X kW ¹⁾²⁾
Nominal power starting at wind speeds of (at air density of 1.225 kg/m ³)	13.0 m/s
Operating speed range of the rotor	6.24 min ⁻¹ to 12.24 min ⁻¹
Cut-in wind speed	3 m/s
Cut-out wind speed	≥20 m/s (depending on site conditions)
Calculated service life	≥20 years

¹⁾ Nominal power is reached up to defined temperature ranges. Limited project-specific operating ranges are possible. Temperature de-rating may apply for specific conditions.

²⁾ At installation altitudes above 1000 m, the nominal power is reached up to defined temperatures.

Towers	TS105	TS125	TCS164	TBD
Hub height	105 m	125 m	164 m	project-specific hub heights on request
Tip height*	179.5 m	199.5 m	238.5 m	
Number of tower sections	4	tbd	1 concrete 2 steel	

* Maximum height of building under load (incl. deflection of the rotor blades)

Rotor	
Rotor diameter	149.1 m
Swept area	17.460 m ²
Rotor shaft inclination angle	5°
Blade cone angle	3.5°

Rotor blade	
Material	Fiber glass and carbon fiber reinforced plastic
Anti-Icing system	Available as an option
Total length	72.40 m

Gearbox	
Type	3 planetary gear stages + 1 spur gear stage

Electrical system	
Nominal power P _{nG}	5.0-5.X MW
Generator type	Doubly-fed induction generator
Power factor at P _{nG}	1.00 as default setting 0.9 under excited (inductive) up to 0.9 overexcited (capacitive) possible
Frequency	50 / 60 Hz

4. Sound Performance, Power Curve and Ct Values

4.1 Sound Performance

The sound performance of the different operational modes is expected as listed below.

Sound modes		
Mode (MW)	Maximum sound level	Serrated trailing edges
5.5	104.8 dB(A)	Yes (standard)
5.7	105.6 dB(A)	Yes (standard)

4.2 Conditions for Power Curve and Ct Values

These power curve values according to IEC 61400-12-1 are based on aerodynamic calculations by Nordex Energy GmbH.

Conditions for Power Curve and Ct Values (at Hub Height)	
Verification according to:	IEC 61400-12-1
Type of anemometer:	Thies First Class (Advanced) or Vector A100
Type of LiDAR:	Windcube V2 or ZephIR V300
Measurement of power:	low voltage side
Air density:	normalization to the nearest air density shown in the table
Filter of turbulence intensity:	$9\% \leq TI \leq 20\%$
Filter of wind shear:	$0 \leq \alpha \leq 0.3$ (Hellmann exponent)
	Wind shear measurement and determination according to the requirements of MEASNET power performance measurement procedure, Version 5, December - 2009, chapter 3.3 and 3.8
Filter of inflow angle:	$-2^\circ \leq \Psi \leq +2^\circ$
Filter of temperature:	$\theta \leq 25^\circ\text{C}$
Ice / snow on the blades:	No (determined with ice detectors)
Filter of grid reactive power:	Power factor =1 .0
Status signal:	Ready for unlimited operation in the operational mode without consideration of the cut-out hysteresis (IEC 61400-12-1:2005, database B)



4.3 Power Curves 5.5 MW and 5.7 MW Mode

4.3.1 Power Curve 5.5 MW Mode

Power P_{el} [kW] at air density ρ [kg/m ³] hub height \geq 105m																	
Wind speed [m/s]	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3	2	4	5	8	10	12	13	16	18	20	23	24	26	29	31	33	34
3.5	66	70	73	77	80	84	87	91	95	98	102	105	109	113	116	120	123
4	155	161	167	173	179	185	191	197	203	209	215	221	227	233	239	246	252
4.5	264	273	283	292	301	310	319	328	337	346	355	364	374	383	392	401	410
5	396	409	421	434	447	460	472	485	498	510	523	536	549	561	574	587	600
5.5	552	569	586	603	620	637	654	671	688	705	722	739	756	773	790	807	824
6	736	758	780	802	825	847	869	891	913	935	957	979	1001	1023	1045	1068	1090
6.5	952	980	1008	1036	1065	1093	1121	1149	1177	1205	1233	1261	1289	1317	1345	1373	1401
7	1204	1239	1274	1309	1344	1379	1414	1449	1484	1519	1553	1588	1623	1658	1693	1728	1763
7.5	1493	1536	1579	1622	1665	1708	1751	1794	1836	1879	1922	1965	2008	2050	2093	2136	2178
8	1824	1875	1927	1979	2031	2083	2135	2187	2239	2290	2342	2394	2446	2497	2549	2601	2652
8.5	2187	2248	2310	2372	2434	2496	2557	2619	2681	2742	2804	2865	2927	2988	3050	3111	3173
9	2562	2635	2707	2779	2850	2922	2994	3066	3138	3210	3281	3353	3424	3496	3567	3639	3711
9.5	2936	3018	3101	3183	3265	3347	3429	3510	3592	3674	3755	3837	3919	4001	4083	4161	4240
10	3299	3391	3483	3575	3666	3758	3849	3941	4033	4125	4218	4305	4391	4477	4557	4623	4688
10.5	3644	3745	3847	3948	4048	4150	4252	4354	4448	4541	4634	4708	4780	4851	4917	4970	5022
11	3971	4081	4190	4301	4412	4517	4616	4715	4794	4871	4947	5008	5065	5122	5175	5214	5253
11.5	4283	4402	4521	4629	4733	4826	4908	4989	5054	5115	5177	5223	5266	5309	5347	5373	5399
12	4586	4699	4808	4900	4986	5062	5128	5194	5244	5290	5337	5369	5398	5427	5452	5464	5476
12.5	4846	4942	5033	5108	5178	5239	5290	5340	5375	5407	5440	5457	5472	5487	5498	5499	5499
13	5053	5132	5206	5266	5320	5365	5401	5436	5456	5474	5492	5496	5498	5500	5500	5500	5500
13.5	5213	5277	5334	5378	5417	5447	5468	5489	5494	5498	5500	5500	5500	5500	5500	5500	5500
14	5334	5381	5423	5451	5475	5490	5496	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
14.5	5419	5451	5477	5490	5498	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
15	5473	5488	5499	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
15.5	5497	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
16	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
16.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
17	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
17.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
18	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
18.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
19	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
19.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
20	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
20.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
21	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
21.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
22	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
22.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
23	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
23.5	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
24	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500

Note: Extended soft cut-out option currently under investigation



4.3.2 Power Curve 5.7 MW Mode

Power P_{el} [kW] at air density ρ [kg/m ³] hub height $\geq 105m$																	
Wind speed [m/s]	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3.0	2	4	5	8	10	12	13	16	18	20	23	24	26	29	31	33	34
3.5	66	70	73	77	80	84	87	91	95	98	102	105	109	113	116	120	123
4.0	155	161	167	173	179	185	191	197	203	209	215	221	227	233	239	246	252
4.5	264	273	283	292	301	310	319	328	337	346	355	364	374	383	392	401	410
5.0	396	409	421	434	447	460	472	485	498	510	523	536	549	561	574	587	600
5.5	552	569	586	603	620	637	654	671	688	705	722	739	756	773	790	807	824
6.0	736	758	780	802	824	847	869	891	913	935	957	979	1001	1023	1045	1068	1090
6.5	952	980	1008	1036	1065	1093	1121	1149	1177	1205	1233	1261	1289	1317	1345	1373	1401
7.0	1204	1239	1274	1309	1344	1379	1414	1449	1484	1518	1553	1588	1623	1658	1693	1728	1763
7.5	1493	1536	1579	1622	1665	1708	1751	1794	1837	1879	1922	1965	2008	2050	2093	2136	2179
8.0	1823	1875	1927	1979	2031	2083	2135	2187	2238	2290	2342	2394	2445	2497	2549	2600	2652
8.5	2195	2257	2319	2381	2443	2505	2567	2629	2691	2752	2814	2876	2938	2999	3061	3120	3178
9.0	2592	2665	2738	2810	2883	2956	3028	3101	3174	3246	3319	3391	3463	3535	3604	3665	3725
9.5	2995	3079	3163	3247	3330	3414	3497	3581	3664	3747	3830	3914	3998	4081	4150	4209	4265
10.0	3393	3487	3582	3676	3771	3865	3959	4053	4148	4243	4335	4424	4512	4599	4662	4710	4754
10.5	3777	3882	3987	4091	4196	4301	4407	4508	4604	4700	4788	4861	4934	5006	5056	5092	5124
11.0	4142	4256	4371	4487	4600	4703	4806	4897	4977	5056	5128	5187	5246	5304	5341	5364	5385
11.5	4488	4613	4730	4839	4944	5029	5114	5188	5253	5317	5374	5418	5463	5506	5530	5544	5556
12.0	4811	4925	5028	5119	5205	5274	5343	5402	5451	5500	5542	5572	5602	5632	5645	5651	5656
12.5	5078	5173	5258	5332	5402	5455	5508	5551	5585	5619	5646	5661	5677	5691	5697	5698	5698
13.0	5286	5364	5432	5489	5543	5580	5617	5645	5664	5683	5695	5697	5699	5700	5700	5700	5700
13.5	5445	5506	5558	5598	5636	5658	5680	5692	5696	5699	5700	5700	5700	5700	5700	5700	5700
14.0	5561	5605	5641	5666	5688	5693	5699	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
14.5	5640	5668	5687	5695	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
15.0	5685	5696	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
15.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
16.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
16.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
17.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
17.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
18.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
18.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
19.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
19.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
20.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
20.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
21.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
21.5	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700
22.0	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700

Note: Extended soft cut-out option currently under investigation



4.4 Ct Curve 5.5 MW and 5.7 MW Mode

4.4.1 Ct Curve 5.5 MW Mode

Thrust coefficient c_T at air density ρ [kg/m ³]																	
hub height $\geq 105m$																	
Wind speed [m/s]	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3.0	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835
3.5	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825
4.0	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815
4.5	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806
5.0	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798
5.5	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793
6.0	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
6.5	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788
7.0	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788
7.5	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784	0.784
8.0	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767
8.5	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
9.0	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.71	0.71	0.71	0.708
9.5	0.676	0.676	0.676	0.676	0.676	0.676	0.676	0.676	0.676	0.676	0.675	0.675	0.673	0.671	0.67	0.668	0.665
10.0	0.64	0.64	0.64	0.639	0.64	0.64	0.639	0.638	0.638	0.636	0.634	0.632	0.629	0.627	0.624	0.621	0.617
10.5	0.602	0.602	0.602	0.602	0.601	0.6	0.598	0.596	0.594	0.592	0.589	0.586	0.583	0.579	0.576	0.572	0.568
11.0	0.563	0.563	0.562	0.561	0.559	0.557	0.555	0.552	0.549	0.546	0.542	0.539	0.535	0.531	0.527	0.524	0.519
11.5	0.524	0.523	0.521	0.519	0.516	0.513	0.51	0.507	0.504	0.5	0.496	0.492	0.488	0.484	0.48	0.475	0.47
12.0	0.483	0.481	0.479	0.476	0.473	0.469	0.466	0.462	0.459	0.454	0.45	0.446	0.441	0.437	0.433	0.428	0.423
12.5	0.443	0.441	0.437	0.434	0.43	0.427	0.423	0.419	0.415	0.41	0.406	0.402	0.397	0.392	0.388	0.383	0.378
13.0	0.406	0.403	0.4	0.396	0.392	0.388	0.384	0.38	0.376	0.371	0.366	0.362	0.357	0.352	0.348	0.343	0.338
13.5	0.373	0.37	0.366	0.362	0.358	0.353	0.349	0.345	0.34	0.335	0.331	0.326	0.321	0.316	0.312	0.307	0.302
14.0	0.342	0.339	0.335	0.331	0.326	0.322	0.317	0.313	0.308	0.303	0.299	0.294	0.289	0.284	0.279	0.275	0.269
14.5	0.315	0.311	0.306	0.302	0.298	0.293	0.289	0.284	0.279	0.274	0.27	0.265	0.26	0.255	0.25	0.246	0.24
15.0	0.289	0.285	0.281	0.276	0.272	0.267	0.262	0.258	0.253	0.248	0.243	0.239	0.234	0.229	0.224	0.219	0.215
15.5	0.266	0.262	0.257	0.253	0.248	0.243	0.239	0.234	0.229	0.224	0.22	0.215	0.21	0.206	0.201	0.197	0.193
16.0	0.244	0.24	0.236	0.231	0.226	0.222	0.217	0.212	0.208	0.203	0.198	0.194	0.19	0.186	0.182	0.178	0.175
16.5	0.225	0.221	0.216	0.211	0.207	0.202	0.197	0.193	0.188	0.184	0.18	0.176	0.172	0.169	0.165	0.162	0.159
17.0	0.207	0.203	0.198	0.193	0.189	0.184	0.18	0.175	0.171	0.167	0.164	0.16	0.157	0.154	0.151	0.148	0.145
17.5	0.19	0.186	0.181	0.177	0.172	0.168	0.164	0.16	0.156	0.153	0.15	0.147	0.144	0.141	0.138	0.135	0.133
18.0	0.175	0.171	0.166	0.162	0.158	0.154	0.15	0.147	0.144	0.14	0.137	0.135	0.132	0.129	0.127	0.125	0.122
18.5	0.161	0.157	0.153	0.149	0.145	0.142	0.138	0.135	0.132	0.129	0.127	0.124	0.122	0.119	0.117	0.115	0.113
19.0	0.149	0.144	0.141	0.137	0.134	0.131	0.128	0.125	0.122	0.119	0.117	0.115	0.112	0.11	0.108	0.106	0.104
19.5	0.137	0.134	0.13	0.127	0.124	0.121	0.118	0.116	0.113	0.111	0.108	0.106	0.104	0.102	0.1	0.099	0.097
20.0	0.128	0.124	0.121	0.118	0.115	0.113	0.11	0.108	0.105	0.103	0.101	0.099	0.097	0.095	0.094	0.092	0.09
20.5	0.119	0.116	0.113	0.11	0.108	0.105	0.103	0.101	0.099	0.097	0.095	0.093	0.091	0.089	0.088	0.086	0.085
21.0	0.112	0.109	0.106	0.104	0.101	0.099	0.097	0.095	0.093	0.091	0.089	0.087	0.086	0.084	0.083	0.081	0.08
21.5	0.105	0.103	0.1	0.098	0.095	0.093	0.091	0.089	0.087	0.086	0.084	0.082	0.081	0.079	0.078	0.077	0.075
22.0	0.1	0.097	0.095	0.093	0.09	0.088	0.086	0.085	0.083	0.081	0.08	0.078	0.077	0.075	0.074	0.073	0.071
22.5	0.095	0.092	0.09	0.088	0.086	0.084	0.082	0.081	0.079	0.077	0.076	0.074	0.073	0.072	0.07	0.069	0.068
23.0	0.09	0.088	0.086	0.084	0.082	0.08	0.079	0.077	0.075	0.074	0.073	0.071	0.07	0.069	0.067	0.066	0.065
23.5	0.087	0.085	0.083	0.081	0.079	0.077	0.075	0.074	0.072	0.071	0.07	0.068	0.067	0.066	0.065	0.064	0.063
24.0	0.083	0.081	0.079	0.078	0.076	0.074	0.073	0.071	0.07	0.068	0.067	0.066	0.065	0.064	0.062	0.061	0.06

Note: Extended soft cut-out option currently under investigation



4.4.2 Ct Curve 5.7 MW Mode

Thrust coefficient c_T at air density ρ [kg/m ³] hub height $\geq 105m$																	
Wind speed [m/s]	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3.0	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835
3.5	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825	0.825
4.0	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815
4.5	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806	0.806
5.0	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798
5.5	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793	0.793
6.0	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
6.5	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788
7.0	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787	0.787
7.5	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786
8.0	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.775
8.5	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.757	0.753
9.0	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.731	0.731	0.73	0.73	0.73	0.73	0.727	0.721
9.5	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.698	0.698	0.697	0.694	0.693	0.691	0.687	0.68
10.0	0.665	0.665	0.665	0.665	0.665	0.665	0.664	0.663	0.661	0.659	0.657	0.655	0.652	0.649	0.646	0.641	0.634
10.5	0.629	0.629	0.629	0.628	0.627	0.626	0.624	0.622	0.619	0.616	0.613	0.609	0.606	0.602	0.598	0.593	0.585
11.0	0.592	0.591	0.59	0.588	0.586	0.584	0.58	0.578	0.574	0.57	0.567	0.563	0.558	0.554	0.55	0.545	0.537
11.5	0.553	0.551	0.549	0.546	0.543	0.54	0.536	0.533	0.529	0.524	0.52	0.516	0.511	0.506	0.502	0.496	0.488
12.0	0.512	0.51	0.507	0.503	0.5	0.496	0.492	0.488	0.483	0.479	0.474	0.47	0.464	0.46	0.455	0.449	0.441
12.5	0.472	0.468	0.465	0.461	0.457	0.453	0.448	0.444	0.439	0.434	0.43	0.425	0.419	0.414	0.41	0.404	0.396
13.0	0.432	0.428	0.424	0.42	0.416	0.411	0.407	0.402	0.397	0.392	0.387	0.382	0.377	0.372	0.367	0.361	0.353
13.5	0.396	0.392	0.387	0.383	0.378	0.374	0.369	0.364	0.359	0.354	0.349	0.344	0.338	0.333	0.328	0.322	0.315
14.0	0.363	0.358	0.354	0.349	0.344	0.34	0.335	0.33	0.324	0.319	0.314	0.309	0.304	0.298	0.293	0.288	0.281
14.5	0.333	0.328	0.323	0.319	0.314	0.309	0.304	0.299	0.293	0.288	0.283	0.278	0.272	0.267	0.262	0.257	0.251
15.0	0.305	0.3	0.296	0.291	0.286	0.281	0.275	0.271	0.265	0.26	0.255	0.25	0.244	0.239	0.234	0.229	0.224
15.5	0.28	0.275	0.27	0.265	0.26	0.255	0.25	0.245	0.24	0.234	0.229	0.224	0.219	0.214	0.21	0.206	0.201
16.0	0.257	0.252	0.247	0.242	0.237	0.232	0.227	0.222	0.217	0.211	0.207	0.202	0.198	0.193	0.19	0.186	0.182
16.5	0.236	0.231	0.226	0.221	0.216	0.211	0.206	0.201	0.196	0.191	0.187	0.183	0.179	0.176	0.172	0.169	0.165
17.0	0.217	0.212	0.207	0.202	0.197	0.192	0.187	0.182	0.178	0.174	0.17	0.167	0.163	0.16	0.157	0.154	0.151
17.5	0.199	0.194	0.189	0.184	0.179	0.175	0.171	0.167	0.163	0.159	0.156	0.153	0.149	0.146	0.144	0.141	0.138
18.0	0.183	0.178	0.173	0.169	0.164	0.16	0.157	0.153	0.149	0.146	0.143	0.14	0.137	0.135	0.132	0.13	0.127
18.5	0.169	0.164	0.16	0.156	0.152	0.148	0.145	0.141	0.138	0.135	0.132	0.13	0.127	0.125	0.122	0.12	0.118
19.0	0.156	0.152	0.148	0.144	0.141	0.137	0.134	0.131	0.128	0.126	0.123	0.121	0.118	0.116	0.114	0.112	0.11
19.5	0.146	0.142	0.138	0.135	0.131	0.128	0.125	0.123	0.12	0.117	0.115	0.113	0.111	0.109	0.107	0.105	0.103
20.0	0.137	0.133	0.13	0.126	0.123	0.12	0.118	0.115	0.113	0.11	0.108	0.106	0.104	0.102	0.1	0.098	0.097
20.5	0.129	0.125	0.122	0.119	0.116	0.114	0.111	0.109	0.107	0.104	0.102	0.1	0.098	0.097	0.095	0.093	0.092
21.0	0.122	0.119	0.116	0.113	0.11	0.108	0.106	0.103	0.101	0.099	0.097	0.095	0.093	0.092	0.09	0.088	0.087
21.5	0.116	0.113	0.11	0.108	0.105	0.103	0.101	0.099	0.096	0.095	0.093	0.091	0.089	0.088	0.086	0.085	0.083
22.0	0.111	0.108	0.106	0.103	0.101	0.099	0.096	0.094	0.092	0.091	0.089	0.087	0.086	0.084	0.082	0.081	0.08

Note: Extended soft cut-out option currently under investigation



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