REGIONE PUGLIA

PROVINCIA di FOGGIA

COMUNE di TROIA

Proponente

e2i energie speciali Srl

Via Dante n°15 - 20121 MILANO

Progettazione e Coordinamento

VEGA sas LANDSCAPE ECOLOGY & URBAN PLANNING
Via delli Carri, 48 - 71121 Foggia - Tel. 0881.756251 - Fax 1784412324
mail: info@studiovega.org - website: www.studiovega.org

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Studio Ambientali e Paesaggistico

Arch. Antonio Demaio
Via N. delli Carri, 48 - 71121 Foggia (FG)
Tel. 0881.756251 | Fax 1784412324
E-Mail: sit.vega@gmail.com

.....

Studio Acustico

Arch. Marianna Denora
Via Savona, 3 - 70022 Altamura (BA)
Tel. Fax 080 3147468
E-Mail: info@studioprogettazioneacustica.it

.....

Studio Incidenza Ambientale Flora fauna ed ecosistema

Dott. Forestale Luigi Lupo
Corso Roma, 110 - 71121 Foggia
E-Mail: luigilupo@libero.it

.....

Studio Geologico e Idraulico

Studio di Geologia Tecnica & Ambientale
Dott.sa Geol. Giovanna Amedei
Via Pietro Nenni, 4 - 71012 Rodi Garganico (Fg)
Tel./Fax 0884.965793 | Cell. 347.6262259
E-Mail: giovannaamedei@tiscali.it

.....

Studio Archeologico

ARCHEO LOGICA srl

Dott. Vincenzo Ficco
Tel. 0881.750334
E-Mail: info@archeologicasrl.com

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Studio Agronomico

Dott. Agr. Emiddio Ursitti
Tel. 339.5239845
E-Mail: emidioursitti@libero.it

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Opera

Impianto Eolico composto da n.10 aerogeneratori da 4,2 MW per una potenza complessiva di 42 MW nel Comune di Troia (FG) alla Località "Montalvino - Cancarro"

Oggetto

Folder:
PROGETTO - Parte A

Nome Elaborato:
8HW7PE8_ARCH_DOC_A10

Descrizione Elaborato:
Piano di manutenzione dell'impianto

00	Luglio 2019	Emissione per progetto definitivo	Vega	Arch. A. Demaio	e2i Srl
Rev.	Data	Oggetto della revisione	Elaborazione	Verifica	Approvazione

Scala: Fs

Formato:

Codice Pratica 8HW7PE8

INDICE

INDICE FIGURE

A. PARTE GENERALE

A.1 Componenti dell'impianto

L'impianto eolico Poggio d'Oro presenta i seguenti componenti principali:

- 10 aerogeneratori di grande taglia
- 1 cavidotto interrato di impianto a 30 kV
- 2 cabine di raccolta delle linee di impianto
- 1 cavidotto interrato di collegamento tra cabine e sottostazione costituito da due o più terne da 30 kV
- 1 stallo produttore di trasformazione 30-150 kV
- 1 cavidotto da 150kV per il collegamento tra stallo produttore e sottostazione di Cancarro

La gestione e la manutenzione dell'impianto devono contemplare tutti i componenti elencati. Inoltre, per eseguire la corretta manutenzione sull'aerogeneratore, la piazzola deve essere sempre accessibile con i mezzi normalmente necessari (furgoni, cestello, gru,…) e quindi anche le vie di accesso devono essere correttamente manutenute mantenendo il fondo praticabile anche nella stagione avversa e organizzando lo sgombero neve nel caso di precipitazioni di tal tipo.

A.2 Schede Tecniche dei Componenti dell'impianto

AEROGENERATORE

Le macchine proposte hanno le seguenti caratteristiche:

- grande taglia con diametro rotore fino a 150m;
- altezza mozzo fino a 105 m, comunque altezza complessiva, altezza mozzo più pala, non superiore a 180m)

L'aerogeneratore di riferimento è Vestas modello V150 da 4,2MW di potenza nominale, con altezza mozzo pari a 105 m. Tale turbina descrive e riassume le caratteristiche del gruppo di turbine idonee al sito.

In allegato 1 è riportata la scheda tecnica del Costruttore VESTAS con tutte le caratteristiche funzionali principali.

Lo schema costruttivo rimane quello classico, in cui la navicella è progettata con struttura portante saldata. Al suo interno sono alloggiati il sistema di trasmissione con moltiplicatore di giri, il generatore elettrico e i dispositivi ausiliari.

L'avvio della turbina avviene con un vento di 3m/s, a passo massimo.

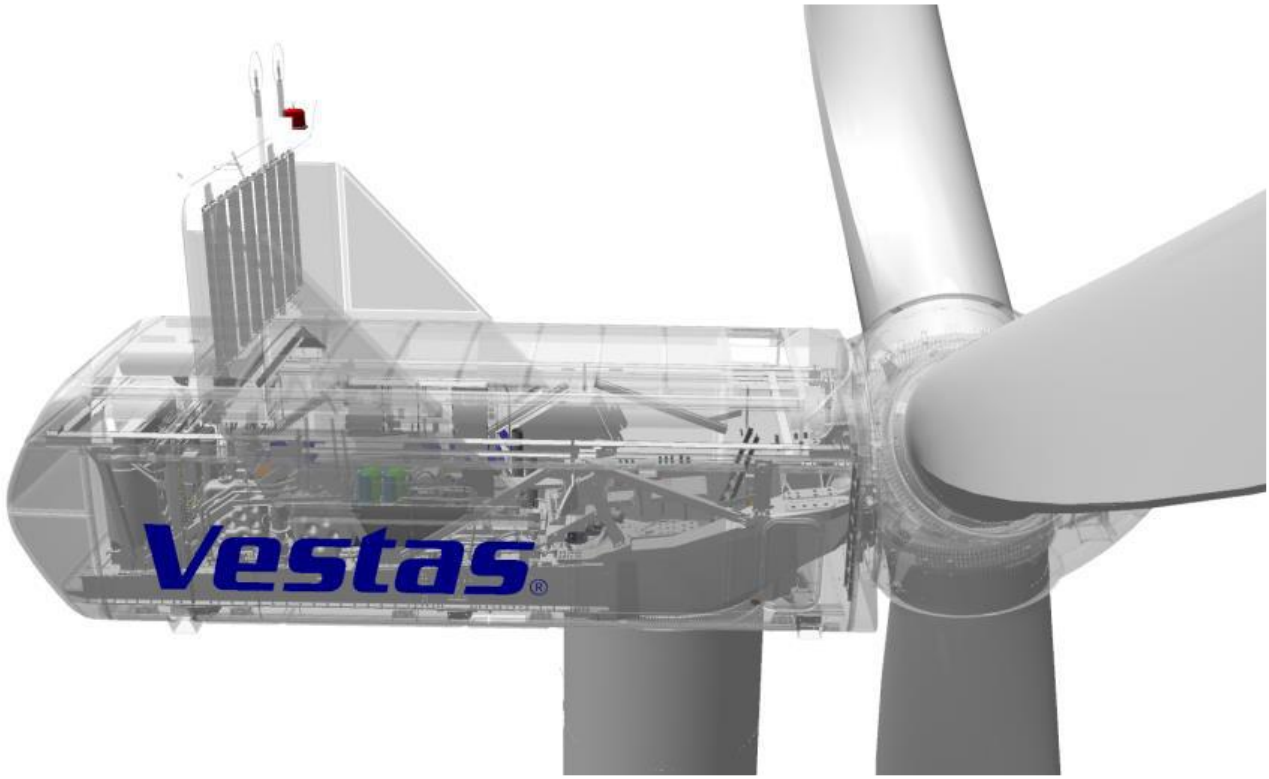

Figura 1 - Navicella Vestas V150

Al crescere del vento il rotore può aumentare la sua velocità fino a quella nominale, variando il passo delle pale e regolando il generatore.

A velocità del vento alte, oltre quella di raggiungimento della potenza nominale, il sistema di regolazione del passo e quello del generatore mantengono la potenza al valore prefissato, indipendentemente da variazioni di velocità del vento, di carico, di temperatura o di densità dell'aria.

Quando necessario, l'aerogeneratore frena aerodinamicamente mettendo le pale completamente in bandiera.

Tutte le funzioni dell'aerogeneratore sono monitorate e controllate da diverse unità di controllo basate su microprocessori.

Le pale del rotore, aventi forte influenza sull'output della turbina e sull'emissione sonora, sono di materiale a base epossidica rinforzato da fibre di vetro e di carbonio, quindi caratterizzate da durevolezza, resistenza all'abrasione e alta resistenza ai fattori chimici e alle radiazioni solari. Hanno inoltre un rivestimento di protezione contro i fattori atmosferici.

Il profilo alare si estende fino alla navicella, ottimizzando così l'andamento delle linee di corrente per l'intera lunghezza della pala.

COMPONENTI PRINCIPALI DELLA TURBINA

Pale:

- Numero: 3
- Lunghezza: 75 m
- Materiale: materiale composito a matrice epossidica rinforzata con fibra di vetro e carbonio

Rotore:

- Diametro 150 m
- Area spazzata 17.671 m2

Sistema di controllo del passo (pitch control):

- Sistema idraulico
- massima affidabilità grazie al sistema di gestione della turbina
- Manutenzione meccanica e del software

Mozzo:

- design compatto ideale per la trasmissione dei carichi
- integrazione degli azionamenti delle pale

Generatore e convertitore di frequenza:

- generatore asincrono a doppia alimentazione.
- regime di rotazione variabile per un ottimo rendimento
- temperatura contenuta del generatore anche a temperature ambientali molto elevate; le aree a temperatura più elevata sono costantemente monitorate da numerosi sensori

Sistema di imbardata (yaw control):

- azionamento mediante motoriduttori
- grazie allo scarso attrito del cuscinetto e la completa ventilazione dei freni, lo sforzo dei motoriduttori durante la rotazione è ridotto al minimo

CAVI ELETTRICI

I cavi elettrici unipolari a 30 kV di riferimento sono i Prysmian. La relativa scheda tecnica, "Medium Voltage Systems" – Prysmian Cavi e Sistemi Energia Srl, è allegata [2].

Tutti i collegamenti elettrici, tra gli aerogeneratori e alla sottostazione, sono realizzati per mezzo di cavidotti interrati: questa soluzione permette di minimizzare l'emissione elettromagnetica ed elimina del tutto il problema della visibilità delle linee aeree e il relativo impatto sull'avifauna.

SOTTOSTAZIONE MT/AT

Lo schema elettrico dell'impianto è descritto dall'unifilare di tav. 8HW7PE8_ARCH_TAV_B18_schema unifilare. La produzione elettrica del parco eolico, costituito da 10 aerogeneratori, viene raccolta con due differenti cabine. La sottostazione dell'impianto è nel Comune di Troia.

I lavori prevedono la presenza di un trasformatore 30/150 kV, la strumentazione di misura e tutti i vari servizi ausiliari. Per la componentistica si veda la Relazione "8HW7PE8_ARCH_DOC_A03_RelazioneImpianti".

La sottostazione verrà collegata con cavo AT a 150kV con la stazione elettrica di Troia. Per la stazione utente si rimanda alla tav. 8HW7PE8_ARCH_TAV_B17_SSE_trasformazione

A.3 Schemi di Funzionamento dell'impianto

I sistemi di controllo per la gestione dell'aerogeneratore sono il pitch control e lo yaw control.

Il primo, pitch control, di cui è dotata ciascuna pala in modo indipendente, esegue la rotazione delle pale intorno al loro asse principale e permette la riduzione della potenza al suo valore nominale, evitando così l'utilizzo di freni meccanici. Gli angoli aerodinamici e costruttivi sono costantemente monitorati, in modo da permettere veloci regolazioni in funzione del vento. Il vento è misurato in continuo con anemometro di macchina.

Il carico elettrico è costantemente monitorato ed in caso di caduta di rete, ovvero mancanza di carico, si ha un arresto di emergenza del rotore tramite frenatura aerodinamica e stazionamento meccanico. Stessa procedura in caso di grave guasto e incendio.

Il secondo, yaw control detto anche imbardata, modifica l'orientamento della navicella, allineando la macchina rispetto alla direzione del vento e garantendo, indipendentemente dalla direzione del vento, la migliore esposizione del rotore ovvero perpendicolare alla direzione del vento in posizione sopravento rispetto alla torre.

La direzione del vento è costantemente monitorato da apposita banderuola di macchina. Per gli schemi di funzionamento dell'impianto far riferimento alle seguenti tavole di progetto:

- 8HW7PE8_ARCH_TAV_B18_schema unifilare

B. SISTEMA DI MANUTENZIONE DELL'IMPIANTO

L'aerogeneratore è dotato di un sistema di controllo remoto che permette di monitorarne costantemente lo stato, e in caso di anomalie, opportuni sensori trasmettono gli allarmi relativi consentendo tempestivi interventi anche per manutenzione non programmata.

Relativamente alla manutenzione dell'aerogeneratore la progettazione dello stesso ha raccolto le esigenze degli operatori sviluppando una macchina con le seguenti caratteristiche:

- ✓ accesso alla navicella dall'interno della torre con utilizzo di ascensore;
- ✓ montacarichi esterno
- ✓ notevole disponibilità di spazio nella navicella per interventi facili ed ergonomici
- ✓ accesso al mozzo agevole direttamente dalla navicella
- ✓ facilità nel raggiungere tutti i componenti
- ✓ sicurezza durante la manutenzione grazie alla protezione di tutte le parti rotanti
- ✓ in caso di necessità, la macchina consente lo smontaggio di molti componenti

Il programma di manutenzione generale programmata è suddiviso in tre categorie:

- ✓ Manutenzione visiva e con rilevamento di rumori anomali;
- ✓ Manutenzione meccanica con verifica livelli lubrificanti;
- ✓ Manutenzione elettrica.

C. MANUALE D'USO DI TUTTI I COMPONENTI DELL'IMPIANTO

Le turbine eoliche sono macchine nel pieno senso e quindi ricadono nel campo di applicazione della direttiva Macchine UE98/37 con successivi aggiornamenti e norme collegate.

La normativa di riferimento per la progettazione e la sicurezza è la CEI-EN 61400-1 ed.3 "Turbine eoliche – Parte 1: Prescrizioni per la progettazione" del febbraio 2006 (recepimento della IEC 61400-1 ed.3 del novembre 2005 "Wind Turbines – Part 1: Design requirements) e norme collegate.

Le turbine vengono progettate, costruite, collaudate, secondo le normative di cui sopra, e vengono sottoposte nel loro complesso all'esame di enti indipendenti di certificazione, che in caso di esito positivo, emettono differenti certificati. Il più completo, che riassume anche gli altri, è la certificazione di tipo (Type Certificate). Prima di questa vengono verificati il progetto, il sistema e l'organizzazione di costruzione, i materiali.

Per questo motivo il "Manuale d'Uso e Manutenzione" dell'aerogeneratore è un requisito essenziale che raccoglie in dettaglio tutte le operazioni di manutenzione ordinaria e straordinaria di tutti i componenti. La complessità della macchina ed il numero dei vari componenti incorporati rende il documento complessivo così articolato che solo alla consegna del WTG viene fornita la copia specifica per il tipo di macchina.

D. PROGRAMMA DI MANUTENZIONE

Il programma di manutenzione generale programmato prevede scadenze regolari con intervallo variabile a seconda della tipologia di controllo. Gli intervalli previsti sono:

- ✓ Manutenzione iniziale – ad 1 mese dall'entrata in funzione;
- ✓ Manutenzione semestrale;
- ✓ Manutenzione annuale (o secondo multipli di anno);

In tal modo si ottiene un ottimale livello di efficienza dell'impianto, garantendo costantemente adeguati livelli di sicurezza.

In particolare, le principali azioni riguardanti la torre sono:

- verifica della coppia di serraggio dei bulloni (cadenza annuale);

- controllo visivo dello stato delle lamiere (primo controllo dopo tre anni, successivi con cadenza annuale);

- misura dello spessore della vernice in diverse parti della torre (primo controllo dopo cinque anni e successivi dopo due anni).

Risulta evidente che grazie alla presenza di una squadra di manutenzione sulla macchina ogni semestre, vi sia la possibilità di segnalare eventuali anomalie riscontrate.

Per i collegamenti in AT e le sottostazioni AT/AT e AT/AAT si rimanda al progetto relativo alle Infrastrutture richieste da TERNA tramite STMG.

E. ALLEGATI

[1] 0067-7067_V09 - Performance Specification V150-4.0_4.2MW

[2] "Medium Voltage Systems" – Prysmian Cavi e Sistemi Energia Srl

Foggia, Agosto 2019

Il tecnico

Arch. Antonio Demaio

Restricted
Document no.: 0067-7067 V09
2018-09-25

Performance Specification

V150-4.0/4.2 MW 50/60 Hz

Vestas Wind Systems A/S · Hedeager 42 · 8200 Aarhus N · Denmark · www.vestas.com

Table of contents

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See general reservations, notes and disclaimers (including, Section 5, p. 11) to this Performance Specification.

1 General Description

The Vestas V150-4.0/4.2 MW wind turbine is a pitch regulated upwind turbine with active yaw and a three-blade rotor. The Vestas V150-4.0/4.2 MW turbine has a rotor diameter of 150 m and a rated power of 4.0 MW.

Vestas offers an optional Power Optimized (PO) mode at 4.2 MW for the V150-4.0 MW variant.

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**		
Tower type		**Standard**	**Large diameter (split)**	**Large diameter (non-split)** [1]
IEC61400-22	IEC IIIB/IEC S	105 m		155 m
DIBt 2012	WZ2(S), GK2	123 m	145 / 166 m	

Table 2-1: Type approval data and available hub heights

[1]: These towers require special transport conditions as the bottom diameter is above 5 m and are not available as standard to the US/Canadian market, but can be evaluated on a case-by-case basis.

The hub height can be increased by up to 3 m by use of raised foundation. Use of raised foundation is subject to site-specific evaluation and is not available for all soil conditions.

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 IIIB**	**IEC S**
Hub Height	**105/155m**	**105/155m**
Power Rating	**4.0MW**	**4.2MW**
Extr Wind Speed (10 min average), V_{50}	37.5 m/s	37.5 m/s
Survival Wind Speed (3 s gust), V_{e50}	52.5 m/s	52.5 m/s
Turbulence Intensity, I_{V50}	11%	11%

Table 3-1: Extreme design parameters – IEC

Wind Climate	IEC IIIB	IEC S
Hub Height	**105/155m**	**105/155m**
Power Rating	**4.0MW**	**4.2MW**
Wind Speed (10 min average), V_{ave}	7.5 m/s	7.0 m/s
Weibull Scale Factor, *C*	8.5 m/s	7.9 m/s
Weibull Shape Factor, *k*	2.0	2.0
I_{ref} acc. to IEC 61400-1	0.14	0.14
Turbulence Intensity acc. to IEC 61400-1, Including Wind Farm Turbulence (@15 m/s) I_{90} (90% quantile)	15.7%	15.7%
Wind Shear, α	0.20	0.20
Inflow Angle (vertical)	8°	8°

Table 3-2: Average design parameters – IEC

Wind Climate	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)
Hub Height	**123 m**	**123 m**	**145 m**	**145 m**	**166 m**	**166 m**
Power Rating	**4.0MW**	**4.2MW**	**4.0MW**	**4.2MW**	**4.0MW**	**4.2MW**
Extr Wind Speed (10 min average), V_{50}	37.45 m/s	37.45 m/s	37.50 m/s	37.50 m/s	37.50 m/s	37.50 m/s
Survival Wind Speed (3 s gust), V_{e50}	52.43 m/s	52.43 m/s	52.50 m/s	52.50 m/s	52.50 m/s	52.50 m/s
Turbulence intensity, $I_{v(z)}$	12.7%	12.7%	12.4%	12.4%	12.1%	12.1%

Table 3-3: Extreme design parameters – DIBt

Wind Climate	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)	WZ2(S)
Hub Height	**123 m**	**123 m**	**145 m**	**145 m**	**166 m**	**166 m**
Power Rating	**4.0MW**	**4.2MW**	**4.0MW**	**4.2MW**	**4.0MW**	**4.2MW**
Wind Speed (10 min average), V_{ave}	7.4 m/s	7.0 m/s	7.5 m/s	7.0 m/s	7.05 m/s	7.0 m/s
I_{ref} acc. to IEC 61400-1	0.14	0.14	0.14	0.14	0.14	0.14
Turbulence Intensity, I_{90} (90% quant.)	15.7%	15.7%	15.7%	15.7%	15.7%	15.7%

Table 3-4: Average design parameters – DIBt

3.1.1 Complex Terrain

Classification of complex terrain according to IEC 61400-1:2005 Chapter 11.2. For sites classified as complex, appropriate measures are to be included in site assessment. Positioning of each turbine must be verified via Vestas Site Check.

3.1.2 Altitude

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.

3.1.3 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 IIIB/ IEC S**
Hub Height	**105 / 155 m**
Cut-In, V_{in}	3 m/s
Cut-Out (10 min exponential avg.), V_{out}	24.5 m/s
Re-Cut In (10 min exponential avg.)	22.5 m/s

Table 3-5: Operational envelope – wind – IEC

Wind climate	**WZ2(S)**
Hub height	**123 / 145 / 166 m**
Cut-In, V_{in}	3 m/s
Cut-Out (10 min exponential avg.), V_{out}	24.5 m/s
Re-Cut In (10 min exponential avg.)	22.5 m/s

Table 3-6: Operational envelope – wind – DIBt

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

Consult Section 6 and following sections, p. 12 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

Table 3-7: Conditions for power curve and Ct values

3.4 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 / 123 / 145 / 155 / 166 m
0-0S	108.0 dBA	No (option)	105 / 123 / 145 / 155 / 166 m
PO1	104.9 dBA	Yes (standard)	105 / 123 / 145 / 155 / 166 m
PO1-0S	108.0 dBA	No (option)	105 / 123 / 145 / 155 / 166 m

Table 3-8: Available sound performance

NOTE The turbine is as standard equipped with serrated trailing edges on the blades. Optionally, Mode 0-0S can be offered without serrated trailing edges mounted on the blades.

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**
SO1	103.4 dBA	Yes	105 / 123 / 155 / 166 m
SO2	102.0 dBA	Yes	105 / 123 / 166 m
SO3	99.5 dBA	Yes	105 / 123 / 145 / 155 / 166 m
SO11	99.2 dBA	Yes	105 m
SO12	99.9 dBA	Yes	105 m
SO13	97.0 dBA	Yes	105 m

Table 3-9: Available Sound Optimized modes

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 for sound modes per tower, please contact Vestas Wind Systems A/S.

3.5 Load Modes

The Load Optimized (LO) modes listed below are available for the turbine.

Load Optimized (LO) modes				
Mode No.	**Power**	**Maximum Sound Level**	**Serrated trailing edges**	**Available hub heights**
LO1	3.8 MW	104.9 dBA	Yes	105 / 123 / 145 / 155 / 166 m
LO2	3.6 MW	104.9 dBA	Yes	105 / 123 / 155 / 166 m

Table 3-10: Available Load Optimized modes

NOTE Load Optimized (LO) modes are only available with serrated trailing edges mounted on the blades.

4 Drawings

4.1 Structural Design – Illustration of Outer Dimensions

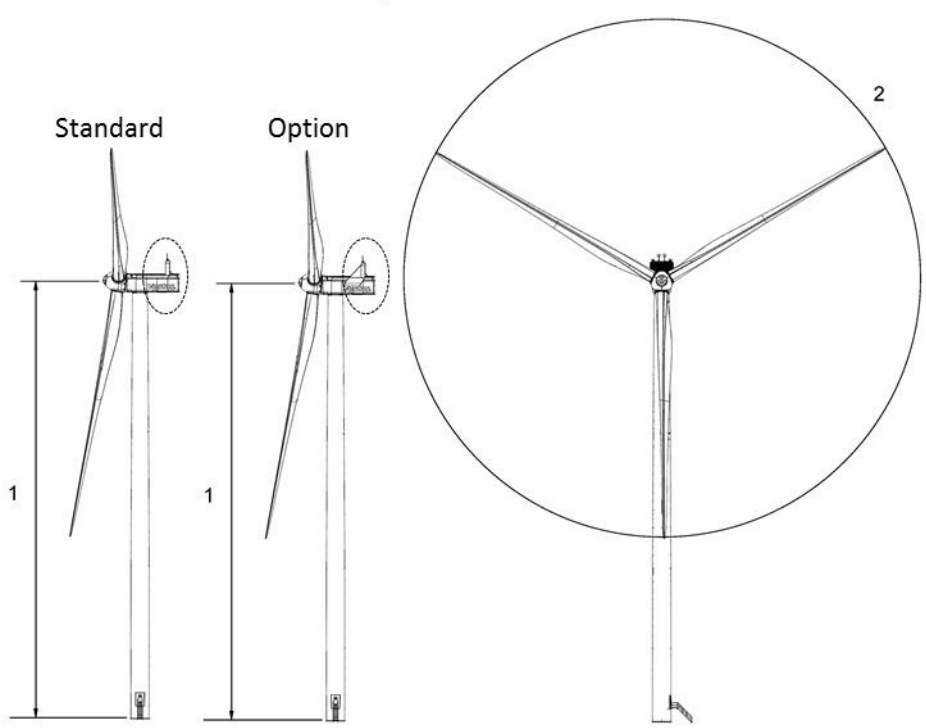


Figure 4-1: Illustration of outer dimensions – structure.

1 Hub height:
105/123/145/155/166 m

2 Diameter:
150 m

NOTE The turbine to the right is shown with side panels on the cooler top (Option).

5 General Reservations, Notes and Disclaimers

-
- The performance specifications described in this document apply to the current version of the V150-4.0/4.2 MW wind turbine. Updated versions of the V150-4.0/4.2 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 V150-4.0/4.2 MW wind, 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 0/0-0S

6.1 Power Curves, Mode 0/0-0S

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	415	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	792	827	844
6.0	**1062**	813	835	858	881	904	926	949	972	994	1017	1040	1085	1108
6.5	**1361**	1045	1074	1103	1131	1160	1189	1218	1246	1275	1304	1332	1389	1418
7.0	**1709**	1317	1353	1389	1425	1460	1496	1532	1568	1603	1638	1674	1744	1779
7.5	**2101**	1628	1671	1715	1759	1802	1845	1888	1931	1974	2016	2058	2143	2185
8.0	**2545**	1982	2034	2085	2137	2189	2240	2292	2343	2394	2444	2495	2594	2644
8.5	**3014**	2375	2435	2496	2556	2617	2675	2733	2791	2848	2904	2959	3067	3120
9.0	**3458**	2791	2856	2921	2986	3052	3112	3172	3232	3292	3348	3403	3510	3561
9.5	**3778**	3181	3246	3312	3378	3444	3498	3552	3606	3660	3699	3739	3807	3836
10.0	**3934**	3543	3596	3650	3704	3758	3789	3821	3852	3884	3901	3917	3944	3953
10.5	**3981**	3807	3835	3864	3892	3921	3932	3943	3954	3965	3971	3976	3984	3987
11.0	**3999**	3953	3962	3970	3979	3987	3990	3992	3995	3997	3998	3998	4000	4000
11.5	**4000**	3990	3992	3994	3996	3998	3999	3999	3999	4000	4000	4000	4000	4000
12.0	**4000**	3998	3999	3999	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
12.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
13.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
13.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
14.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
14.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
15.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
15.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
16.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
16.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
17.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
17.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
18.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
18.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
19.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
19.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
20.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
20.5	**3995**	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995
21.0	**3742**	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742
21.5	**3309**	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309
22.0	**2730**	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730
22.5	**2154**	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154
23.0	**1805**	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805
23.5	**1526**	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
24.0	**1284**	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1283	1283
24.5	**1116**	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116

Table 6-1: Power curve, Mode 0/0-0S

6.2 Ct Values, Mode 0/0-0S

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.849	0.848	0.848	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.824	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.821	0.820	0.819	0.819
6.0	**0.815**	0.821	0.820	0.820	0.819	0.819	0.818	0.818	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.809**	0.817	0.816	0.815	0.815	0.814	0.813	0.813	0.812	0.811	0.810	0.810	0.808	0.807
7.0	**0.803**	0.812	0.811	0.810	0.809	0.809	0.808	0.807	0.806	0.806	0.805	0.804	0.802	0.801
7.5	**0.794**	0.807	0.805	0.804	0.803	0.802	0.801	0.800	0.799	0.798	0.797	0.796	0.793	0.792
8.0	**0.786**	0.801	0.800	0.799	0.798	0.796	0.795	0.793	0.792	0.790	0.789	0.787	0.784	0.782
8.5	**0.758**	0.797	0.794	0.792	0.789	0.786	0.783	0.779	0.775	0.772	0.767	0.763	0.754	0.749
9.0	**0.697**	0.767	0.761	0.755	0.749	0.743	0.737	0.730	0.724	0.717	0.711	0.704	0.691	0.684
9.5	**0.615**	0.707	0.700	0.693	0.685	0.678	0.669	0.661	0.653	0.644	0.634	0.625	0.604	0.594
10.0	**0.523**	0.645	0.635	0.625	0.615	0.605	0.593	0.582	0.570	0.559	0.547	0.535	0.511	0.500
10.5	**0.439**	0.574	0.561	0.548	0.535	0.522	0.510	0.497	0.485	0.472	0.461	0.450	0.429	0.419
11.0	**0.372**	0.499	0.486	0.472	0.458	0.445	0.434	0.422	0.411	0.400	0.391	0.381	0.364	0.356
11.5	**0.319**	0.426	0.414	0.402	0.391	0.379	0.370	0.360	0.351	0.342	0.334	0.327	0.312	0.306
12.0	**0.277**	0.366	0.356	0.346	0.337	0.327	0.319	0.311	0.304	0.296	0.290	0.283	0.271	0.266
12.5	**0.243**	0.318	0.310	0.301	0.293	0.285	0.278	0.272	0.265	0.259	0.253	0.248	0.238	0.233
13.0	**0.214**	0.279	0.272	0.265	0.258	0.251	0.245	0.239	0.234	0.228	0.224	0.219	0.210	0.206
13.5	**0.191**	0.247	0.240	0.234	0.228	0.222	0.217	0.213	0.208	0.203	0.199	0.195	0.187	0.184
14.0	**0.171**	0.219	0.214	0.209	0.204	0.198	0.194	0.190	0.186	0.181	0.178	0.174	0.167	0.164
14.5	**0.153**	0.197	0.192	0.187	0.183	0.178	0.174	0.170	0.167	0.163	0.160	0.157	0.151	0.148
15.0	**0.139**	0.177	0.173	0.169	0.165	0.160	0.157	0.154	0.150	0.147	0.144	0.141	0.136	0.134
15.5	**0.126**	0.160	0.156	0.153	0.149	0.145	0.142	0.139	0.136	0.133	0.131	0.128	0.124	0.121
16.0	**0.115**	0.145	0.142	0.139	0.135	0.132	0.129	0.127	0.124	0.121	0.119	0.117	0.113	0.111
16.5	**0.105**	0.133	0.130	0.127	0.124	0.121	0.118	0.116	0.113	0.111	0.109	0.107	0.103	0.101
17.0	**0.096**	0.121	0.119	0.116	0.113	0.111	0.108	0.106	0.104	0.102	0.100	0.098	0.095	0.093
17.5	**0.089**	0.112	0.110	0.107	0.105	0.102	0.100	0.098	0.096	0.094	0.092	0.091	0.088	0.086
18.0	**0.082**	0.103	0.101	0.099	0.096	0.094	0.092	0.091	0.089	0.087	0.085	0.084	0.081	0.080
18.5	**0.076**	0.095	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.079	0.078	0.075	0.074
19.0	**0.071**	0.088	0.086	0.084	0.082	0.081	0.079	0.077	0.076	0.074	0.073	0.072	0.069	0.068
19.5	**0.066**	0.082	0.080	0.078	0.077	0.075	0.073	0.072	0.071	0.069	0.068	0.067	0.065	0.064
20.0	**0.061**	0.076	0.075	0.073	0.071	0.070	0.069	0.067	0.066	0.065	0.064	0.063	0.060	0.059
20.5	**0.057**	0.071	0.070	0.068	0.067	0.065	0.064	0.063	0.062	0.060	0.059	0.058	0.057	0.056
21.0	**0.051**	0.063	0.061	0.060	0.059	0.058	0.057	0.056	0.055	0.053	0.053	0.052	0.050	0.049
21.5	**0.043**	0.052	0.051	0.050	0.049	0.048	0.047	0.047	0.046	0.045	0.044	0.043	0.042	0.041
22.0	**0.034**	0.041	0.040	0.040	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.033	0.033
22.5	**0.025**	0.031	0.031	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025
23.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.020
23.5	**0.018**	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
24.0	**0.015**	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013

Table 6-2: C_t values, Mode 0/0-0S

6.3 Sound Curves, Mode 0/0-0S

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	91.1	93.4
4	91.3	94.0
5	93.2	97.1
6	96.4	100.5
7	99.9	103.8
8	103.3	106.6
9	104.9	108.0
10	104.9	108.0
11	104.9	108.0
12	104.9	108.0
13	104.9	108.0
14	104.9	108.0
15	104.9	108.0
16	104.9	108.0
17	104.9	108.0
18	104.9	108.0
19	104.9	108.0
20	104.9	108.0

Table 6-3: Sound curves, Mode 0/0-0S

7 Power Curves, Ct Values and Sound Curves, Power Optimized Mode PO1/PO1-0S

7.1 Power Curves, Power Optimized Mode PO1/PO1-0S

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	415	434	444
5.0	**597**	452	465	478	492	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	757	774	792	827	844
6.0	**1062**	813	835	858	881	904	926	949	972	995	1017	1040	1085	1108
6.5	**1361**	1045	1074	1103	1131	1160	1189	1218	1247	1275	1304	1332	1389	1418
7.0	**1709**	1317	1353	1389	1425	1461	1496	1532	1568	1603	1639	1674	1744	1779
7.5	**2101**	1628	1671	1715	1758	1802	1845	1888	1931	1974	2016	2058	2143	2185
8.0	**2545**	1982	2034	2086	2137	2189	2240	2292	2343	2394	2444	2494	2594	2644
8.5	**3014**	2375	2435	2496	2556	2616	2674	2732	2790	2848	2904	2959	3067	3120
9.0	**3458**	2791	2856	2921	2986	3052	3112	3172	3232	3292	3348	3403	3510	3562
9.5	**3807**	3180	3246	3312	3377	3443	3499	3556	3613	3669	3715	3761	3845	3884
10.0	**4038**	3543	3602	3662	3722	3781	3824	3866	3909	3951	3980	4009	4059	4079
10.5	**4143**	3842	3884	3926	3969	4012	4035	4059	4083	4107	4119	4131	4150	4158
11.0	**4191**	4055	4078	4100	4122	4145	4154	4162	4171	4180	4184	4187	4193	4195
11.5	**4199**	4152	4160	4168	4176	4185	4188	4190	4193	4196	4197	4198	4199	4200
12.0	**4200**	4185	4188	4191	4194	4198	4198	4199	4199	4200	4200	4200	4200	4200
12.5	**4200**	4197	4197	4198	4199	4200	4200	4200	4200	4200	4200	4200	4200	4200
13.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
13.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
14.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
14.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
15.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
15.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
16.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
16.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
17.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
17.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
18.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
18.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
19.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
19.5	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
20.0	**4200**	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
20.5	**4186**	4186	4186	4186	4186	4186	4186	4186	4186	4186	4186	4186	4186	4186
21.0	**3870**	3870	3870	3870	3870	3870	3870	3870	3870	3870	3870	3870	3870	3870
21.5	**3373**	3373	3373	3373	3373	3373	3373	3373	3373	3373	3373	3373	3373	3373
22.0	**2745**	2745	2745	2745	2745	2745	2745	2745	2745	2745	2745	2745	2745	2744
22.5	**2154**	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154
23.0	**1805**	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805
23.5	**1526**	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
24.0	**1283**	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283
24.5	**1116**	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116

Table 7-1: Power curve, Power Optimized Mode PO1/PO1-0S

7.2 Ct Values, Power Optimized Mode PO1/PO1-0S

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.847**	0.853	0.852	0.851	0.850	0.850	0.849	0.849	0.848	0.847	0.847	0.847	0.847	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.827	0.826	0.826	0.825	0.825	0.824	0.824	0.824	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.822	0.821	0.821	0.820	0.819	0.819
6.0	**0.815**	0.821	0.820	0.820	0.819	0.819	0.818	0.817	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.809**	0.817	0.816	0.815	0.815	0.814	0.813	0.813	0.812	0.811	0.810	0.810	0.808	0.807
7.0	**0.803**	0.812	0.811	0.810	0.810	0.809	0.808	0.807	0.806	0.806	0.805	0.804	0.802	0.801
7.5	**0.795**	0.806	0.805	0.804	0.803	0.802	0.801	0.800	0.799	0.798	0.797	0.796	0.793	0.792
8.0	**0.785**	0.802	0.800	0.799	0.798	0.797	0.795	0.794	0.792	0.791	0.789	0.787	0.783	0.781
8.5	**0.759**	0.797	0.794	0.792	0.789	0.786	0.783	0.779	0.775	0.772	0.767	0.763	0.754	0.749
9.0	**0.698**	0.767	0.761	0.755	0.749	0.743	0.737	0.730	0.724	0.718	0.711	0.704	0.691	0.684
9.5	**0.621**	0.707	0.700	0.692	0.685	0.678	0.670	0.662	0.654	0.646	0.638	0.629	0.612	0.603
10.0	**0.540**	0.645	0.636	0.627	0.619	0.610	0.600	0.590	0.580	0.570	0.560	0.550	0.530	0.520
10.5	**0.460**	0.581	0.570	0.559	0.548	0.537	0.526	0.515	0.504	0.493	0.482	0.471	0.450	0.441
11.0	**0.393**	0.515	0.503	0.491	0.479	0.466	0.455	0.444	0.433	0.422	0.412	0.402	0.384	0.376
11.5	**0.337**	0.447	0.435	0.424	0.412	0.400	0.390	0.380	0.371	0.361	0.353	0.345	0.330	0.322
12.0	**0.292**	0.386	0.376	0.366	0.355	0.345	0.337	0.329	0.320	0.312	0.305	0.299	0.286	0.280
12.5	**0.255**	0.336	0.327	0.318	0.309	0.300	0.293	0.287	0.280	0.273	0.267	0.261	0.250	0.245
13.0	**0.225**	0.294	0.286	0.279	0.271	0.264	0.258	0.252	0.246	0.240	0.235	0.230	0.221	0.216
13.5	**0.200**	0.260	0.253	0.247	0.240	0.234	0.229	0.224	0.218	0.213	0.209	0.205	0.196	0.193
14.0	**0.179**	0.231	0.225	0.220	0.214	0.208	0.204	0.199	0.195	0.190	0.187	0.183	0.176	0.172
14.5	**0.161**	0.207	0.202	0.197	0.192	0.187	0.183	0.179	0.175	0.171	0.168	0.164	0.158	0.155
15.0	**0.145**	0.186	0.182	0.177	0.173	0.168	0.165	0.161	0.158	0.154	0.151	0.148	0.143	0.140
15.5	**0.132**	0.168	0.164	0.160	0.156	0.152	0.149	0.146	0.143	0.140	0.137	0.134	0.129	0.127
16.0	**0.120**	0.153	0.149	0.146	0.142	0.139	0.136	0.133	0.130	0.127	0.125	0.122	0.118	0.116
16.5	**0.110**	0.139	0.136	0.133	0.130	0.126	0.124	0.121	0.119	0.116	0.114	0.112	0.108	0.106
17.0	**0.101**	0.127	0.124	0.122	0.119	0.116	0.114	0.111	0.109	0.107	0.105	0.103	0.099	0.097
17.5	**0.093**	0.117	0.115	0.112	0.110	0.107	0.105	0.103	0.101	0.098	0.097	0.095	0.091	0.090
18.0	**0.086**	0.108	0.106	0.103	0.101	0.099	0.097	0.095	0.093	0.091	0.089	0.088	0.085	0.083
18.5	**0.080**	0.100	0.098	0.096	0.093	0.091	0.089	0.088	0.086	0.084	0.083	0.081	0.078	0.077
19.0	**0.074**	0.092	0.090	0.088	0.086	0.084	0.083	0.081	0.079	0.078	0.076	0.075	0.072	0.071
19.5	**0.069**	0.086	0.084	0.082	0.080	0.078	0.077	0.075	0.074	0.072	0.071	0.070	0.067	0.066
20.0	**0.064**	0.080	0.078	0.076	0.075	0.073	0.072	0.070	0.069	0.067	0.066	0.065	0.063	0.062
20.5	**0.060**	0.074	0.073	0.071	0.069	0.068	0.067	0.065	0.064	0.063	0.062	0.061	0.059	0.058
21.0	**0.052**	0.065	0.063	0.062	0.061	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051
21.5	**0.043**	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046	0.046	0.045	0.044	0.043	0.042
22.0	**0.034**	0.041	0.041	0.040	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.033	0.033
22.5	**0.026**	0.031	0.031	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025
23.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.020
23.5	**0.018**	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
24.0	**0.015**	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.012

Table 7-2: C_t values, Power Optimized Mode PO1/PO1-0S

7.3 Sound Curves, Power Optimized Mode PO1/PO1-0S

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]** **Power Optimized Mode PO1 (Blades with serrated trailing edge)**	**Sound Power Level at Hub Height [dBA]** **Power Optimized Mode PO1-0S (Blades without serrated trailing edge)**
3	91.1	93.4
4	91.3	94.0
5	93.2	97.1
6	96.4	100.5
7	99.9	103.8
8	103.3	106.6
9	104.9	108.0
10	104.9	108.0
11	104.9	108.0
12	104.9	108.0
13	104.9	108.0
14	104.9	108.0
15	104.9	108.0
16	104.9	108.0
17	104.9	108.0
18	104.9	108.0
19	104.9	108.0
20	104.9	108.0

Table 7-3: Sound curves, Power Optimized Mode PO1/PO1-0S

8 Power Curves, Ct Values and Sound Curves, Load Mode LO1

8.1 Power Curves, Load Mode LO1

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	415	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	792	827	844
6.0	**1062**	813	835	858	881	904	926	949	972	994	1017	1040	1085	1108
6.5	**1361**	1045	1074	1103	1131	1160	1189	1218	1246	1275	1304	1332	1389	1418
7.0	**1709**	1317	1353	1389	1425	1460	1496	1532	1568	1603	1638	1674	1744	1779
7.5	**2101**	1628	1671	1715	1759	1802	1845	1888	1931	1974	2016	2058	2143	2185
8.0	**2545**	1982	2034	2085	2137	2189	2240	2292	2343	2394	2444	2495	2594	2644
8.5	**3012**	2375	2435	2496	2556	2617	2675	2732	2790	2848	2903	2958	3065	3117
9.0	**3428**	2791	2855	2920	2985	3050	3108	3166	3224	3282	3331	3380	3468	3508
9.5	**3648**	3174	3231	3289	3346	3404	3444	3485	3526	3566	3593	3621	3668	3689
10.0	**3750**	3482	3521	3559	3597	3635	3656	3678	3699	3720	3730	3740	3757	3764
10.5	**3786**	3670	3688	3706	3724	3742	3750	3758	3765	3773	3777	3781	3788	3791
11.0	**3800**	3766	3772	3778	3784	3790	3792	3794	3796	3798	3798	3799	3800	3800
11.5	**3800**	3791	3793	3795	3797	3798	3799	3799	3800	3800	3800	3800	3800	3800
12.0	**3800**	3799	3799	3799	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
12.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
13.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
13.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
14.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
14.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
15.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
15.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
16.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
16.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
17.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
17.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
18.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
18.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
19.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
19.5	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
20.0	**3800**	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800	3800
20.5	**3797**	3797	3797	3797	3797	3797	3797	3797	3797	3797	3797	3797	3797	3797
21.0	**3598**	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598
21.5	**3226**	3225	3225	3225	3225	3226	3226	3226	3226	3226	3226	3226	3226	3226
22.0	**2697**	2697	2697	2697	2697	2697	2697	2697	2697	2697	2697	2697	2697	2697
22.5	**2152**	2152	2152	2152	2152	2152	2152	2152	2152	2152	2152	2152	2152	2152
23.0	**1805**	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805
23.5	**1526**	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
24.0	**1284**	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1283	1283
24.5	**1116**	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116

Table 8-1: Power curve, Load Mode LO1

8.2 Ct Values, Load Mode LO1

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.849	0.848	0.848	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.824	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.821	0.820	0.819	0.819
6.0	**0.815**	0.821	0.820	0.820	0.819	0.819	0.818	0.818	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.809**	0.817	0.816	0.815	0.815	0.814	0.813	0.813	0.812	0.811	0.810	0.810	0.808	0.807
7.0	**0.803**	0.812	0.811	0.810	0.809	0.809	0.808	0.807	0.806	0.806	0.805	0.804	0.802	0.801
7.5	**0.794**	0.807	0.805	0.804	0.803	0.802	0.801	0.800	0.799	0.798	0.797	0.796	0.793	0.792
8.0	**0.786**	0.801	0.800	0.799	0.798	0.796	0.795	0.793	0.792	0.790	0.789	0.787	0.784	0.782
8.5	**0.758**	0.797	0.794	0.792	0.789	0.786	0.783	0.779	0.775	0.771	0.767	0.762	0.753	0.748
9.0	**0.689**	0.767	0.761	0.755	0.749	0.743	0.736	0.729	0.722	0.715	0.706	0.698	0.679	0.669
9.5	**0.588**	0.705	0.696	0.686	0.677	0.667	0.656	0.645	0.634	0.623	0.611	0.599	0.576	0.565
10.0	**0.492**	0.631	0.618	0.605	0.592	0.580	0.567	0.554	0.541	0.528	0.516	0.504	0.481	0.470
10.5	**0.413**	0.548	0.534	0.520	0.506	0.492	0.480	0.468	0.456	0.444	0.434	0.424	0.404	0.395
11.0	**0.351**	0.469	0.456	0.443	0.431	0.418	0.407	0.397	0.387	0.377	0.368	0.360	0.343	0.336
11.5	**0.302**	0.400	0.389	0.379	0.368	0.357	0.348	0.340	0.331	0.323	0.316	0.309	0.295	0.289
12.0	**0.262**	0.345	0.336	0.327	0.318	0.309	0.301	0.294	0.287	0.280	0.274	0.268	0.257	0.252
12.5	**0.230**	0.300	0.292	0.285	0.277	0.270	0.263	0.257	0.251	0.245	0.240	0.235	0.226	0.221
13.0	**0.204**	0.264	0.257	0.251	0.244	0.237	0.232	0.227	0.222	0.217	0.212	0.208	0.200	0.196
13.5	**0.181**	0.234	0.228	0.222	0.217	0.211	0.206	0.202	0.197	0.193	0.189	0.185	0.178	0.175
14.0	**0.162**	0.208	0.203	0.198	0.193	0.188	0.184	0.180	0.176	0.172	0.169	0.166	0.159	0.156
14.5	**0.146**	0.187	0.182	0.178	0.174	0.169	0.166	0.162	0.159	0.155	0.152	0.149	0.143	0.141
15.0	**0.132**	0.168	0.164	0.160	0.157	0.153	0.149	0.146	0.143	0.140	0.137	0.135	0.130	0.127
15.5	**0.120**	0.152	0.149	0.145	0.142	0.138	0.136	0.133	0.130	0.127	0.125	0.122	0.118	0.116
16.0	**0.109**	0.138	0.135	0.132	0.129	0.126	0.123	0.121	0.118	0.116	0.114	0.111	0.107	0.106
16.5	**0.100**	0.126	0.123	0.121	0.118	0.115	0.113	0.110	0.108	0.106	0.104	0.102	0.098	0.097
17.0	**0.092**	0.116	0.113	0.111	0.108	0.105	0.103	0.101	0.099	0.097	0.095	0.094	0.090	0.089
17.5	**0.085**	0.107	0.104	0.102	0.100	0.097	0.096	0.094	0.092	0.090	0.088	0.087	0.084	0.082
18.0	**0.079**	0.098	0.096	0.094	0.092	0.090	0.088	0.086	0.085	0.083	0.082	0.080	0.077	0.076
18.5	**0.073**	0.091	0.089	0.087	0.085	0.083	0.082	0.080	0.078	0.077	0.076	0.074	0.072	0.071
19.0	**0.068**	0.084	0.082	0.080	0.079	0.077	0.075	0.074	0.073	0.071	0.070	0.069	0.066	0.065
19.5	**0.063**	0.078	0.076	0.075	0.073	0.072	0.070	0.069	0.068	0.066	0.065	0.064	0.062	0.061
20.0	**0.059**	0.073	0.071	0.070	0.068	0.067	0.066	0.064	0.063	0.062	0.061	0.060	0.058	0.057
20.5	**0.055**	0.068	0.067	0.065	0.064	0.062	0.061	0.060	0.059	0.058	0.057	0.056	0.054	0.053
21.0	**0.049**	0.061	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048
21.5	**0.042**	0.051	0.050	0.049	0.048	0.047	0.046	0.046	0.045	0.044	0.043	0.043	0.041	0.041
22.0	**0.033**	0.041	0.040	0.039	0.038	0.038	0.037	0.036	0.036	0.035	0.034	0.034	0.033	0.032
22.5	**0.025**	0.031	0.031	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025
23.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.020
23.5	**0.018**	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
24.0	**0.015**	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013

Table 8-2: C_t values, Load Mode LO1

8.3 Sound Curves, Load Mode LO1

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]** **Load Mode LO1 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	93.2
6	96.4
7	99.9
8	103.3
9	104.9
10	104.9
11	104.9
12	104.9
13	104.9
14	104.9
15	104.9
16	104.9
17	104.9
18	104.9
19	104.9
20	104.9

Table 8-3: Sound curves, Load Mode LO1

9 Power Curves, Ct Values and Sound Curves, Load Mode LO2

9.1 Power Curves, Load Mode LO2

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	415	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	792	827	844
6.0	**1062**	813	835	858	881	904	926	949	972	994	1017	1040	1085	1108
6.5	**1361**	1045	1074	1103	1131	1160	1189	1218	1246	1275	1304	1332	1389	1418
7.0	**1709**	1317	1353	1389	1425	1460	1496	1532	1568	1603	1638	1674	1744	1779
7.5	**2101**	1628	1672	1715	1759	1802	1845	1888	1931	1974	2016	2058	2143	2185
8.0	**2548**	1983	2035	2087	2139	2191	2243	2294	2345	2397	2447	2497	2597	2647
8.5	**3015**	2375	2435	2496	2557	2618	2676	2734	2793	2851	2906	2960	3065	3115
9.0	**3380**	2783	2848	2913	2978	3043	3097	3152	3206	3260	3300	3340	3409	3438
9.5	**3521**	3145	3195	3244	3294	3343	3374	3406	3437	3468	3486	3504	3532	3542
10.0	**3576**	3399	3427	3455	3483	3511	3523	3535	3546	3558	3564	3570	3580	3584
10.5	**3595**	3528	3539	3549	3560	3570	3575	3579	3584	3589	3591	3593	3597	3598
11.0	**3600**	3584	3587	3590	3594	3597	3598	3598	3599	3600	3600	3600	3600	3600
11.5	**3600**	3596	3597	3598	3599	3600	3600	3600	3600	3600	3600	3600	3600	3600
12.0	**3600**	3599	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
12.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
13.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
13.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
14.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
14.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
15.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
15.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
16.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
16.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
17.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
17.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
18.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
18.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
19.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
19.5	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
20.0	**3600**	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
20.5	**3598**	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598	3598
21.0	**3448**	3448	3448	3448	3448	3448	3448	3448	3448	3448	3448	3448	3448	3448
21.5	**3132**	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132
22.0	**2657**	2657	2657	2657	2657	2657	2657	2657	2657	2657	2657	2657	2657	2657
22.5	**2150**	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150
23.0	**1805**	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805
23.5	**1526**	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
24.0	**1284**	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1283	1283
24.5	**1116**	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116

Table 9-1: Power curve, Load Mode LO2

9.2 Ct Values, Load Mode LO2

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.849	0.848	0.848	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.824	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.821	0.820	0.819	0.819
6.0	**0.815**	0.821	0.820	0.820	0.819	0.819	0.818	0.818	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.809**	0.817	0.816	0.815	0.815	0.814	0.813	0.813	0.812	0.811	0.810	0.810	0.808	0.807
7.0	**0.803**	0.812	0.811	0.810	0.809	0.809	0.808	0.807	0.806	0.806	0.805	0.804	0.802	0.801
7.5	**0.795**	0.807	0.806	0.805	0.804	0.803	0.801	0.800	0.799	0.798	0.797	0.796	0.793	0.792
8.0	**0.790**	0.805	0.804	0.803	0.801	0.800	0.799	0.797	0.796	0.795	0.793	0.791	0.788	0.786
8.5	**0.761**	0.800	0.798	0.795	0.793	0.790	0.786	0.783	0.779	0.776	0.771	0.766	0.755	0.748
9.0	**0.675**	0.769	0.763	0.757	0.751	0.745	0.736	0.727	0.718	0.709	0.698	0.686	0.662	0.649
9.5	**0.559**	0.701	0.689	0.677	0.665	0.654	0.640	0.627	0.613	0.600	0.586	0.573	0.546	0.533
10.0	**0.462**	0.614	0.599	0.584	0.569	0.554	0.540	0.526	0.512	0.498	0.486	0.474	0.451	0.441
10.5	**0.387**	0.522	0.507	0.493	0.478	0.463	0.452	0.440	0.428	0.417	0.407	0.397	0.379	0.370
11.0	**0.328**	0.441	0.429	0.416	0.404	0.392	0.382	0.372	0.362	0.353	0.345	0.336	0.321	0.314
11.5	**0.283**	0.376	0.365	0.355	0.345	0.335	0.327	0.319	0.311	0.303	0.296	0.290	0.277	0.271
12.0	**0.246**	0.324	0.315	0.307	0.298	0.290	0.283	0.276	0.270	0.263	0.258	0.252	0.242	0.237
12.5	**0.216**	0.282	0.275	0.268	0.261	0.253	0.248	0.242	0.236	0.231	0.226	0.221	0.212	0.208
13.0	**0.192**	0.248	0.242	0.236	0.230	0.224	0.219	0.214	0.209	0.204	0.200	0.196	0.188	0.184
13.5	**0.171**	0.220	0.215	0.209	0.204	0.199	0.194	0.190	0.186	0.182	0.178	0.174	0.168	0.164
14.0	**0.153**	0.196	0.192	0.187	0.182	0.178	0.174	0.170	0.166	0.163	0.159	0.156	0.150	0.147
14.5	**0.138**	0.176	0.172	0.168	0.164	0.160	0.156	0.153	0.150	0.146	0.143	0.141	0.135	0.133
15.0	**0.125**	0.159	0.155	0.151	0.148	0.144	0.141	0.138	0.135	0.132	0.130	0.127	0.122	0.120
15.5	**0.113**	0.144	0.140	0.137	0.134	0.131	0.128	0.125	0.123	0.120	0.118	0.115	0.111	0.109
16.0	**0.103**	0.131	0.128	0.125	0.122	0.119	0.116	0.114	0.112	0.109	0.107	0.105	0.101	0.100
16.5	**0.094**	0.119	0.117	0.114	0.111	0.109	0.106	0.104	0.102	0.100	0.098	0.096	0.093	0.091
17.0	**0.087**	0.109	0.107	0.104	0.102	0.100	0.098	0.096	0.094	0.092	0.090	0.088	0.085	0.084
17.5	**0.080**	0.101	0.099	0.097	0.094	0.092	0.090	0.088	0.087	0.085	0.083	0.082	0.079	0.078
18.0	**0.074**	0.093	0.091	0.089	0.087	0.085	0.083	0.082	0.080	0.078	0.077	0.076	0.073	0.072
18.5	**0.069**	0.086	0.084	0.082	0.081	0.079	0.077	0.076	0.074	0.073	0.071	0.070	0.068	0.067
19.0	**0.064**	0.079	0.078	0.076	0.074	0.073	0.071	0.070	0.069	0.067	0.066	0.065	0.063	0.062
19.5	**0.059**	0.074	0.072	0.071	0.069	0.068	0.066	0.065	0.064	0.063	0.062	0.061	0.058	0.058
20.0	**0.056**	0.069	0.067	0.066	0.065	0.063	0.062	0.061	0.060	0.059	0.058	0.057	0.055	0.054
20.5	**0.052**	0.064	0.063	0.062	0.060	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.051	0.050
21.0	**0.047**	0.058	0.057	0.056	0.054	0.053	0.052	0.051	0.050	0.050	0.049	0.048	0.046	0.046
21.5	**0.041**	0.050	0.049	0.048	0.047	0.046	0.045	0.044	0.043	0.043	0.042	0.041	0.040	0.039
22.0	**0.033**	0.040	0.039	0.039	0.038	0.037	0.036	0.036	0.035	0.034	0.034	0.033	0.032	0.032
22.5	**0.025**	0.031	0.031	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025
23.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.020
23.5	**0.018**	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
24.0	**0.015**	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013

Table 9-2: C_t values, Load Mode LO2

9.3 Sound Curves, Load Mode LO2

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] Load Mode LO2 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	93.2
6	96.4
7	99.9
8	103.1
9	103.7
10	103.7
11	103.7
12	103.7
13	103.7
14	103.7
15	103.7
16	103.7
17	103.7
18	103.7
19	103.7
20	103.7

Table 9-3: Sound curves, Load Mode LO2

10 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO1

10.1 Power Curves, Sound Optimized Mode SO1

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	414	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	791	826	844
6.0	**1062**	812	835	858	881	904	926	949	972	994	1017	1039	1085	1107
6.5	**1361**	1045	1074	1102	1131	1160	1189	1217	1246	1275	1303	1332	1389	1418
7.0	**1706**	1316	1351	1387	1423	1458	1494	1530	1565	1601	1636	1671	1742	1776
7.5	**2076**	1610	1653	1696	1739	1782	1824	1866	1909	1951	1993	2035	2118	2159
8.0	**2461**	1920	1970	2019	2069	2119	2168	2217	2266	2316	2364	2412	2509	2557
8.5	**2862**	2243	2300	2357	2415	2472	2528	2584	2640	2697	2752	2807	2915	2968
9.0	**3257**	2587	2652	2716	2781	2846	2907	2968	3030	3091	3146	3202	3308	3358
9.5	**3540**	2968	3032	3096	3159	3223	3273	3323	3373	3423	3462	3501	3570	3599
10.0	**3712**	3352	3398	3444	3490	3536	3566	3597	3628	3658	3676	3694	3724	3735
10.5	**3793**	3634	3658	3680	3704	3726	3738	3749	3760	3771	3778	3786	3797	3802
11.0	**3842**	3798	3805	3813	3821	3828	3831	3834	3837	3839	3840	3841	3843	3843
11.5	**3866**	3851	3854	3857	3860	3863	3864	3864	3865	3866	3866	3866	3866	3866
12.0	**3888**	3884	3884	3885	3886	3887	3887	3888	3888	3888	3888	3888	3887	3887
12.5	**3905**	3904	3904	3905	3905	3905	3905	3905	3905	3905	3905	3905	3905	3905
13.0	**3916**	3916	3916	3916	3916	3916	3916	3916	3916	3916	3916	3916	3915	3915
13.5	**3924**	3925	3925	3925	3925	3925	3925	3924	3924	3924	3924	3924	3923	3923
14.0	**3934**	3937	3937	3936	3936	3936	3936	3935	3935	3935	3934	3934	3934	3933
14.5	**3946**	3949	3949	3949	3949	3948	3948	3948	3948	3947	3947	3946	3946	3946
15.0	**3955**	3958	3957	3957	3957	3957	3956	3956	3956	3956	3956	3955	3955	3955
15.5	**3964**	3967	3967	3966	3966	3966	3966	3965	3965	3965	3964	3964	3964	3963
16.0	**3975**	3979	3978	3978	3978	3978	3977	3977	3976	3976	3976	3975	3974	3974
16.5	**3986**	3989	3988	3988	3988	3988	3988	3987	3987	3987	3986	3986	3985	3985
17.0	**3993**	3995	3995	3995	3994	3994	3994	3994	3994	3994	3994	3993	3993	3992
17.5	**3998**	3999	3999	3998	3998	3998	3998	3998	3998	3998	3998	3998	3998	3998
18.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	3999
18.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
19.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
19.5	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
20.0	**4000**	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
20.5	**3995**	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995	3995
21.0	**3742**	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742	3742
21.5	**3309**	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309	3309
22.0	**2730**	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730
22.5	**2154**	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154	2154
23.0	**1805**	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805	1805
23.5	**1526**	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
24.0	**1284**	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1283	1283
24.5	**1116**	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116	1116

Table 10-1: Power curve, Sound Optimized Mode SO1

10.2 Ct Values, Sound Optimized Mode SO1

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.848	0.848	0.847	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.823	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.820	0.820	0.819	0.819
6.0	**0.814**	0.821	0.820	0.820	0.819	0.819	0.818	0.817	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.808**	0.816	0.815	0.815	0.814	0.813	0.813	0.812	0.811	0.811	0.810	0.809	0.808	0.807
7.0	**0.796**	0.805	0.804	0.803	0.802	0.802	0.801	0.800	0.799	0.798	0.797	0.797	0.795	0.794
7.5	**0.758**	0.768	0.767	0.766	0.766	0.765	0.764	0.763	0.762	0.761	0.760	0.759	0.757	0.756
8.0	**0.706**	0.716	0.715	0.715	0.714	0.713	0.712	0.711	0.710	0.709	0.708	0.707	0.705	0.704
8.5	**0.659**	0.670	0.669	0.668	0.667	0.666	0.665	0.664	0.663	0.662	0.661	0.660	0.658	0.656
9.0	**0.613**	0.632	0.631	0.630	0.629	0.628	0.626	0.625	0.623	0.621	0.619	0.616	0.609	0.605
9.5	**0.550**	0.608	0.604	0.601	0.597	0.594	0.588	0.582	0.576	0.570	0.564	0.557	0.542	0.534
10.0	**0.479**	0.583	0.574	0.565	0.556	0.547	0.537	0.528	0.518	0.508	0.498	0.489	0.469	0.459
10.5	**0.411**	0.536	0.523	0.511	0.498	0.485	0.474	0.462	0.451	0.440	0.430	0.420	0.402	0.393
11.0	**0.354**	0.475	0.462	0.448	0.435	0.422	0.412	0.401	0.391	0.380	0.371	0.363	0.346	0.338
11.5	**0.306**	0.408	0.397	0.386	0.374	0.363	0.355	0.346	0.337	0.328	0.321	0.313	0.300	0.293
12.0	**0.268**	0.354	0.344	0.335	0.325	0.316	0.308	0.301	0.293	0.286	0.280	0.274	0.262	0.257
12.5	**0.236**	0.309	0.301	0.293	0.285	0.277	0.271	0.264	0.258	0.252	0.246	0.241	0.231	0.227
13.0	**0.209**	0.272	0.265	0.258	0.251	0.245	0.239	0.234	0.228	0.223	0.218	0.214	0.205	0.201
13.5	**0.187**	0.241	0.235	0.229	0.224	0.218	0.213	0.208	0.203	0.199	0.195	0.191	0.183	0.180
14.0	**0.167**	0.216	0.210	0.205	0.200	0.195	0.191	0.186	0.182	0.178	0.175	0.171	0.164	0.161
14.5	**0.151**	0.194	0.189	0.185	0.180	0.175	0.172	0.168	0.164	0.161	0.157	0.154	0.148	0.146
15.0	**0.137**	0.175	0.171	0.167	0.163	0.159	0.155	0.152	0.149	0.145	0.143	0.140	0.134	0.132
15.5	**0.125**	0.159	0.155	0.151	0.148	0.144	0.141	0.138	0.135	0.132	0.130	0.127	0.122	0.120
16.0	**0.114**	0.145	0.141	0.138	0.135	0.131	0.129	0.126	0.123	0.121	0.118	0.116	0.112	0.110
16.5	**0.104**	0.132	0.129	0.126	0.123	0.120	0.118	0.115	0.113	0.111	0.109	0.106	0.103	0.101
17.0	**0.096**	0.121	0.119	0.116	0.113	0.110	0.108	0.106	0.104	0.102	0.100	0.098	0.094	0.093
17.5	**0.089**	0.112	0.110	0.107	0.105	0.102	0.100	0.098	0.096	0.094	0.092	0.091	0.087	0.086
18.0	**0.082**	0.103	0.101	0.099	0.096	0.094	0.092	0.091	0.089	0.087	0.085	0.084	0.081	0.080
18.5	**0.076**	0.095	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.079	0.078	0.075	0.074
19.0	**0.071**	0.088	0.086	0.084	0.082	0.081	0.079	0.077	0.076	0.074	0.073	0.072	0.069	0.068
19.5	**0.066**	0.082	0.080	0.078	0.077	0.075	0.073	0.072	0.071	0.069	0.068	0.067	0.065	0.064
20.0	**0.061**	0.076	0.075	0.073	0.071	0.070	0.069	0.067	0.066	0.065	0.064	0.063	0.060	0.059
20.5	**0.057**	0.071	0.070	0.068	0.067	0.065	0.064	0.063	0.062	0.060	0.059	0.058	0.057	0.056
21.0	**0.051**	0.063	0.061	0.060	0.059	0.058	0.057	0.056	0.055	0.053	0.053	0.052	0.050	0.049
21.5	**0.043**	0.052	0.051	0.050	0.049	0.048	0.047	0.047	0.046	0.045	0.044	0.043	0.042	0.041
22.0	**0.034**	0.041	0.040	0.040	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.033	0.033
22.5	**0.025**	0.031	0.031	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.025
23.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.020
23.5	**0.018**	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
24.0	**0.015**	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013

Table 10-2: C_t values, Sound Optimized Mode SO1

10.3 Sound Curves, Sound Optimized Mode SO1

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 SO1 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	93.2
6	96.4
7	99.9
8	102.7
9	103.3
10	103.3
11	103.3
12	103.3
13	103.4
14	103.4
15	103.4
16	103.4
17	103.4
18	103.4
19	103.4
20	103.4

Table 10-3: Sound curves, Sound Optimized Mode SO1

11 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO2

11.1 Power Curves, Sound Optimized Mode SO2

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	414	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	791	826	844
6.0	**1062**	812	835	858	881	904	926	949	972	994	1017	1039	1085	1107
6.5	**1360**	1045	1074	1103	1131	1160	1189	1218	1246	1275	1303	1332	1388	1417
7.0	**1699**	1317	1353	1389	1424	1460	1495	1530	1566	1601	1633	1666	1730	1760
7.5	**2034**	1627	1670	1712	1754	1796	1834	1872	1909	1946	1976	2005	2055	2076
8.0	**2241**	1969	2008	2046	2085	2124	2145	2167	2188	2210	2220	2231	2248	2256
8.5	**2303**	2220	2234	2249	2263	2278	2283	2289	2294	2300	2301	2302	2303	2303
9.0	**2336**	2326	2328	2330	2332	2335	2335	2335	2335	2336	2336	2336	2335	2335
9.5	**2383**	2380	2381	2382	2383	2384	2384	2384	2384	2384	2383	2383	2383	2382
10.0	**2418**	2422	2422	2422	2421	2421	2420	2420	2420	2419	2419	2418	2417	2417
10.5	**2442**	2454	2453	2452	2451	2450	2449	2447	2446	2445	2444	2443	2441	2440
11.0	**2506**	2552	2547	2542	2537	2532	2528	2524	2520	2516	2512	2509	2502	2499
11.5	**2578**	2693	2675	2658	2640	2622	2615	2608	2601	2593	2588	2583	2574	2570
12.0	**2644**	2754	2742	2730	2717	2705	2696	2687	2678	2668	2660	2652	2640	2635
12.5	**2674**	2767	2756	2746	2736	2726	2717	2709	2701	2692	2686	2680	2670	2666
13.0	**2683**	2764	2754	2745	2735	2725	2718	2710	2702	2695	2691	2687	2681	2678
13.5	**2753**	2860	2847	2833	2819	2806	2797	2789	2780	2772	2765	2759	2748	2743
14.0	**2854**	2970	2956	2941	2926	2912	2903	2895	2886	2878	2870	2862	2847	2840
14.5	**2987**	3082	3070	3058	3047	3035	3027	3020	3012	3005	2999	2993	2982	2977
15.0	**3123**	3166	3163	3159	3155	3151	3147	3144	3140	3136	3132	3128	3119	3115
15.5	**3215**	3255	3252	3248	3245	3242	3238	3235	3231	3228	3224	3219	3210	3206
16.0	**3334**	3365	3363	3360	3358	3356	3353	3350	3348	3345	3341	3338	3329	3325
16.5	**3415**	3431	3430	3429	3429	3428	3426	3425	3423	3421	3419	3417	3412	3410
17.0	**3461**	3468	3468	3468	3468	3468	3468	3467	3466	3465	3464	3462	3459	3458
17.5	**3470**	3478	3477	3477	3476	3476	3475	3474	3474	3473	3472	3471	3469	3468
18.0	**3484**	3494	3494	3492	3492	3490	3490	3489	3488	3487	3486	3485	3483	3482
18.5	**3507**	3517	3516	3516	3515	3514	3513	3512	3511	3510	3509	3508	3506	3504
19.0	**3532**	3534	3535	3535	3535	3535	3535	3534	3534	3534	3533	3532	3530	3529
19.5	**3555**	3556	3556	3556	3557	3557	3557	3557	3557	3556	3556	3556	3554	3554
20.0	**3573**	3570	3570	3571	3572	3573	3574	3574	3574	3574	3574	3574	3573	3573
20.5	**3583**	3575	3577	3578	3579	3580	3581	3582	3582	3583	3583	3583	3583	3583
21.0	**3297**	3296	3297	3297	3297	3297	3297	3297	3297	3297	3297	3297	3297	3297
21.5	**2623**	2630	2628	2627	2626	2625	2624	2624	2624	2623	2623	2623	2623	2623
22.0	**2011**	2019	2019	2018	2018	2018	2016	2015	2014	2012	2012	2011	2010	2010
22.5	**1594**	1596	1596	1596	1596	1596	1596	1596	1596	1596	1595	1595	1594	1594
23.0	**1502**	1502	1502	1502	1502	1502	1502	1502	1502	1502	1502	1502	1502	1502
23.5	**1400**	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
24.0	**1252**	1252	1252	1252	1252	1252	1252	1252	1252	1252	1252	1252	1252	1252
24.5	**1112**	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112

Table 11-1: Power curve, Sound Optimized Mode SO2

11.2 Ct Values, Sound Optimized Mode SO2

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.848	0.848	0.847	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.823	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.820	0.820	0.819	0.819
6.0	**0.814**	0.821	0.820	0.820	0.819	0.819	0.818	0.817	0.817	0.816	0.816	0.815	0.814	0.813
6.5	**0.808**	0.816	0.816	0.815	0.815	0.814	0.813	0.812	0.812	0.811	0.810	0.809	0.807	0.805
7.0	**0.789**	0.812	0.811	0.810	0.809	0.808	0.806	0.804	0.803	0.801	0.797	0.793	0.783	0.778
7.5	**0.736**	0.806	0.803	0.800	0.797	0.795	0.788	0.782	0.776	0.770	0.758	0.747	0.722	0.708
8.0	**0.616**	0.790	0.777	0.765	0.752	0.739	0.721	0.704	0.686	0.668	0.651	0.633	0.601	0.585
8.5	**0.490**	0.686	0.665	0.644	0.623	0.602	0.585	0.568	0.551	0.533	0.519	0.505	0.478	0.466
9.0	**0.401**	0.554	0.536	0.519	0.501	0.483	0.470	0.457	0.444	0.431	0.421	0.411	0.392	0.383
9.5	**0.342**	0.460	0.447	0.433	0.420	0.407	0.397	0.387	0.377	0.367	0.358	0.350	0.335	0.328
10.0	**0.293**	0.387	0.377	0.366	0.356	0.345	0.337	0.329	0.321	0.313	0.306	0.299	0.287	0.281
10.5	**0.253**	0.331	0.322	0.314	0.305	0.297	0.290	0.283	0.276	0.270	0.264	0.258	0.248	0.243
11.0	**0.223**	0.294	0.287	0.279	0.271	0.263	0.257	0.251	0.245	0.239	0.234	0.229	0.219	0.214
11.5	**0.200**	0.269	0.261	0.253	0.245	0.237	0.231	0.225	0.219	0.214	0.209	0.205	0.196	0.192
12.0	**0.180**	0.240	0.234	0.227	0.220	0.214	0.208	0.203	0.198	0.193	0.188	0.184	0.176	0.173
12.5	**0.161**	0.212	0.207	0.201	0.195	0.190	0.185	0.181	0.176	0.172	0.168	0.164	0.158	0.154
13.0	**0.143**	0.188	0.183	0.178	0.173	0.168	0.164	0.160	0.156	0.153	0.150	0.146	0.141	0.138
13.5	**0.131**	0.173	0.168	0.164	0.159	0.154	0.151	0.147	0.144	0.140	0.137	0.134	0.129	0.126
14.0	**0.122**	0.161	0.156	0.152	0.148	0.143	0.140	0.137	0.133	0.130	0.127	0.125	0.120	0.117
14.5	**0.115**	0.150	0.146	0.142	0.138	0.134	0.131	0.128	0.125	0.122	0.120	0.117	0.113	0.110
15.0	**0.108**	0.139	0.136	0.133	0.129	0.126	0.123	0.121	0.118	0.115	0.113	0.111	0.106	0.104
15.5	**0.101**	0.130	0.127	0.124	0.121	0.118	0.115	0.113	0.110	0.108	0.106	0.103	0.099	0.098
16.0	**0.096**	0.122	0.119	0.116	0.113	0.111	0.108	0.106	0.104	0.101	0.100	0.098	0.094	0.092
16.5	**0.090**	0.113	0.111	0.108	0.106	0.103	0.101	0.099	0.097	0.095	0.093	0.091	0.088	0.086
17.0	**0.083**	0.105	0.103	0.100	0.098	0.096	0.094	0.092	0.090	0.088	0.087	0.085	0.082	0.081
17.5	**0.077**	0.097	0.095	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.079	0.076	0.075
18.0	**0.072**	0.090	0.088	0.086	0.084	0.082	0.081	0.079	0.078	0.076	0.075	0.073	0.071	0.070
18.5	**0.067**	0.084	0.082	0.080	0.078	0.077	0.075	0.074	0.072	0.071	0.070	0.068	0.066	0.065
19.0	**0.063**	0.078	0.076	0.075	0.073	0.071	0.070	0.069	0.067	0.066	0.065	0.064	0.062	0.061
19.5	**0.059**	0.073	0.071	0.070	0.068	0.067	0.066	0.064	0.063	0.062	0.061	0.060	0.058	0.057
20.0	**0.055**	0.068	0.067	0.065	0.064	0.063	0.061	0.060	0.059	0.058	0.057	0.056	0.054	0.053
20.5	**0.052**	0.064	0.062	0.061	0.060	0.059	0.058	0.057	0.056	0.054	0.054	0.053	0.051	0.050
21.0	**0.045**	0.056	0.054	0.053	0.052	0.051	0.050	0.049	0.049	0.048	0.047	0.046	0.045	0.044
21.5	**0.035**	0.043	0.042	0.041	0.040	0.040	0.039	0.038	0.038	0.037	0.036	0.036	0.035	0.034
22.0	**0.027**	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026
22.5	**0.020**	0.024	0.024	0.024	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.021	0.020	0.020
23.0	**0.018**	0.022	0.022	0.021	0.021	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018
23.5	**0.017**	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.016	0.016
24.0	**0.015**	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.012

Table 11-2: C_t values, Sound Optimized Mode SO2

11.3 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	91.1
4	91.3
5	93.2
6	96.4
7	99.9
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

Table 11-3: Sound curves, Sound Optimized Mode SO2

12 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO3

12.1 Power Curves, Sound Optimized Mode SO3

Air density [kg/m^3]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**285**	210	217	224	231	238	244	251	258	265	272	278	292	299
4.5	**424**	318	328	337	347	357	366	376	386	395	405	415	434	443
5.0	**597**	452	465	478	491	505	518	531	544	557	571	584	610	623
5.5	**809**	616	633	651	669	686	704	721	739	756	774	792	827	844
6.0	**1062**	813	835	858	881	904	926	949	972	994	1017	1040	1084	1107
6.5	**1338**	1045	1073	1101	1130	1158	1185	1212	1239	1266	1290	1314	1359	1379
7.0	**1517**	1305	1334	1362	1391	1419	1436	1454	1471	1488	1498	1507	1523	1528
7.5	**1546**	1493	1502	1512	1521	1531	1534	1537	1541	1544	1544	1545	1546	1546
8.0	**1546**	1543	1544	1545	1545	1546	1546	1546	1546	1546	1546	1546	1546	1546
8.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
9.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
9.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
10.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
10.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
11.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
11.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
12.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
12.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
13.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
13.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
14.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
14.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
15.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
15.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
16.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
16.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
17.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
17.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
18.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
18.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
19.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
19.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
20.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
20.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
21.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
21.5	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
22.0	**1546**	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
22.5	**1545**	1545	1545	1545	1545	1545	1545	1545	1545	1545	1545	1545	1545	1545
23.0	**1511**	1511	1511	1511	1511	1510	1511	1511	1511	1511	1511	1511	1511	1511
23.5	**1414**	1415	1415	1415	1415	1415	1415	1415	1415	1414	1414	1414	1414	1414
24.0	**1264**	1264	1264	1264	1264	1264	1264	1264	1264	1264	1264	1264	1264	1264
24.5	**1115**	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115

Table 12-1: Power curve, Sound Optimized Mode SO3

12.2 Ct Values, Sound Optimized Mode SO3

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.849	0.848	0.848	0.847	0.847	0.846	0.847
4.0	**0.830**	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.830	0.831	0.830	0.830	0.830	0.830
4.5	**0.828**	0.831	0.831	0.830	0.830	0.830	0.830	0.830	0.830	0.829	0.829	0.829	0.828	0.828
5.0	**0.823**	0.828	0.827	0.827	0.826	0.826	0.826	0.825	0.825	0.824	0.824	0.824	0.823	0.822
5.5	**0.820**	0.824	0.824	0.823	0.823	0.823	0.822	0.822	0.821	0.821	0.821	0.820	0.819	0.819
6.0	**0.814**	0.821	0.820	0.820	0.819	0.819	0.818	0.818	0.817	0.816	0.815	0.815	0.813	0.812
6.5	**0.778**	0.818	0.817	0.815	0.814	0.812	0.809	0.805	0.801	0.798	0.791	0.784	0.768	0.759
7.0	**0.633**	0.799	0.788	0.776	0.765	0.754	0.737	0.719	0.702	0.685	0.668	0.651	0.617	0.601
7.5	**0.476**	0.672	0.651	0.630	0.609	0.588	0.571	0.553	0.536	0.519	0.505	0.490	0.464	0.452
8.0	**0.373**	0.515	0.499	0.482	0.466	0.449	0.437	0.426	0.414	0.402	0.392	0.383	0.365	0.357
8.5	**0.303**	0.404	0.393	0.382	0.370	0.359	0.351	0.342	0.333	0.325	0.318	0.310	0.297	0.291
9.0	**0.252**	0.330	0.321	0.313	0.304	0.296	0.289	0.282	0.275	0.269	0.263	0.257	0.247	0.242
9.5	**0.213**	0.277	0.270	0.263	0.256	0.250	0.244	0.238	0.233	0.227	0.223	0.218	0.209	0.205
10.0	**0.182**	0.235	0.229	0.223	0.218	0.212	0.207	0.203	0.198	0.194	0.190	0.186	0.179	0.175
10.5	**0.157**	0.201	0.197	0.192	0.187	0.182	0.178	0.175	0.171	0.167	0.164	0.160	0.154	0.151
11.0	**0.137**	0.174	0.170	0.166	0.162	0.158	0.155	0.151	0.148	0.145	0.142	0.139	0.134	0.132
11.5	**0.120**	0.152	0.149	0.145	0.142	0.138	0.135	0.133	0.130	0.127	0.124	0.122	0.118	0.115
12.0	**0.106**	0.134	0.131	0.128	0.125	0.122	0.119	0.117	0.114	0.112	0.110	0.108	0.104	0.102
12.5	**0.094**	0.119	0.116	0.113	0.111	0.108	0.106	0.104	0.102	0.099	0.098	0.096	0.092	0.091
13.0	**0.084**	0.106	0.103	0.101	0.099	0.096	0.095	0.093	0.091	0.089	0.087	0.086	0.083	0.081
13.5	**0.076**	0.095	0.093	0.091	0.089	0.087	0.085	0.083	0.082	0.080	0.078	0.077	0.074	0.073
14.0	**0.068**	0.085	0.084	0.082	0.080	0.078	0.077	0.075	0.074	0.072	0.071	0.070	0.067	0.066
14.5	**0.062**	0.077	0.076	0.074	0.072	0.071	0.069	0.068	0.067	0.065	0.064	0.063	0.061	0.060
15.0	**0.057**	0.070	0.069	0.067	0.066	0.064	0.063	0.062	0.061	0.060	0.059	0.058	0.056	0.055
15.5	**0.052**	0.064	0.063	0.061	0.060	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.051	0.050
16.0	**0.048**	0.059	0.058	0.056	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046
16.5	**0.044**	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046	0.045	0.045	0.043	0.043
17.0	**0.041**	0.050	0.049	0.048	0.047	0.046	0.045	0.044	0.044	0.043	0.042	0.041	0.040	0.040
17.5	**0.038**	0.046	0.046	0.045	0.044	0.043	0.042	0.041	0.041	0.040	0.039	0.039	0.038	0.037
18.0	**0.036**	0.043	0.042	0.042	0.041	0.040	0.039	0.039	0.038	0.037	0.037	0.036	0.035	0.035
18.5	**0.033**	0.040	0.039	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.032
19.0	**0.031**	0.037	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.032	0.032	0.032	0.031	0.030
19.5	**0.029**	0.035	0.034	0.034	0.033	0.033	0.032	0.032	0.031	0.031	0.030	0.030	0.029	0.028
20.0	**0.028**	0.033	0.032	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.028	0.028	0.027	0.027
20.5	**0.026**	0.031	0.030	0.030	0.029	0.029	0.028	0.028	0.028	0.027	0.027	0.026	0.026	0.025
21.0	**0.025**	0.029	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.026	0.025	0.025	0.024	0.024
21.5	**0.023**	0.028	0.027	0.027	0.026	0.026	0.025	0.025	0.025	0.024	0.024	0.024	0.023	0.023
22.0	**0.022**	0.026	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.023	0.022	0.022	0.021	0.021
22.5	**0.020**	0.024	0.023	0.023	0.023	0.022	0.022	0.022	0.021	0.021	0.021	0.020	0.020	0.019
23.0	**0.018**	0.022	0.022	0.021	0.021	0.021	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018
23.5	**0.017**	0.020	0.020	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.016
24.0	**0.015**	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.014	0.014
24.5	**0.013**	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.012

Table 12-2: C_t values, Sound Optimized Mode SO3

12.3 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	91.1
4	91.3
5	93.2
6	96.3
7	99.5
8	99.5
9	99.5
10	99.5
11	99.5
12	99.5
13	99.5
14	99.5
15	99.5
16	99.5
17	99.5
18	99.5
19	99.5
20	99.5

Table 12-3: Sound curves, Sound Optimized Mode SO3

13 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO11

13.1 Power Curves, Sound Optimized Mode SO11

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**277**	210	217	224	231	237	243	250	256	262	267	272	282	286
4.5	**403**	318	327	337	346	356	363	371	379	387	392	398	406	409
5.0	**579**	452	465	478	491	504	516	528	540	552	561	570	585	590
5.5	**740**	615	632	648	664	681	692	703	713	724	730	735	743	745
6.0	**861**	800	811	822	833	845	848	851	855	858	859	860	861	862
6.5	**982**	966	969	973	976	979	980	980	981	982	982	982	982	982
7.0	**1103**	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103
7.5	**1218**	1218	1218	1218	1218	1218	1218	1218	1218	1218	1218	1218	1218	1218
8.0	**1334**	1334	1334	1334	1334	1334	1334	1334	1334	1334	1334	1334	1334	1334
8.5	**1458**	1458	1458	1458	1458	1458	1458	1458	1458	1458	1458	1458	1458	1458
9.0	**1584**	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584
9.5	**1690**	1690	1690	1690	1690	1690	1690	1690	1690	1690	1690	1690	1690	1690
10.0	**1769**	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769
10.5	**1811**	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
11.0	**1841**	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
11.5	**1873**	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873
12.0	**1902**	1902	1902	1902	1902	1902	1902	1902	1902	1902	1902	1902	1902	1902
12.5	**1921**	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
13.0	**1933**	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933
13.5	**1944**	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944
14.0	**1952**	1952	1952	1952	1952	1952	1952	1952	1952	1952	1952	1952	1952	1952
14.5	**1960**	1960	1960	1960	1960	1960	1960	1960	1960	1960	1960	1960	1960	1960
15.0	**1972**	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972
15.5	**1984**	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
16.0	**1995**	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995
16.5	**2005**	2005	2005	2005	2005	2005	2005	2005	2005	2005	2005	2005	2005	2005
17.0	**2013**	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
17.5	**2022**	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022
18.0	**2031**	2031	2031	2031	2031	2031	2031	2031	2031	2031	2031	2031	2031	2031
18.5	**2039**	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039
19.0	**2047**	2047	2047	2047	2047	2047	2047	2047	2047	2047	2047	2047	2047	2047
19.5	**2054**	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054
20.0	**2061**	2061	2061	2061	2061	2061	2061	2061	2061	2061	2061	2061	2061	2061
20.5	**2068**	2068	2068	2068	2068	2068	2068	2068	2068	2068	2068	2068	2068	2068
21.0	**2049**	2049	2049	2049	2049	2049	2049	2049	2049	2049	2049	2049	2049	2049
21.5	**1853**	1853	1853	1853	1853	1853	1853	1853	1853	1853	1853	1853	1853	1853
22.0	**1421**	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421
22.5	**950**	950	950	950	950	950	950	950	950	950	950	950	950	950
23.0	**816**	816	816	816	816	816	816	816	816	816	816	816	816	816
23.5	**758**	758	758	758	758	758	758	758	758	758	758	758	758	758
24.0	**683**	683	683	683	683	683	683	683	683	683	683	683	683	683
24.5	**614**	614	614	614	614	614	614	614	614	614	614	614	614	614

Table 13-1: Power curve, Sound Optimized Mode SO11

13.2 Ct Values, Sound Optimized Mode SO11

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.89	0.89	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.85	0.85	0.849	0.848	0.848	0.847	0.847	0.846	0.845	0.845
4.0	**0.774**	0.83	0.829	0.828	0.827	0.826	0.82	0.814	0.808	0.802	0.793	0.784	0.76	0.746
4.5	**0.723**	0.831	0.828	0.825	0.822	0.819	0.808	0.797	0.786	0.775	0.758	0.74	0.704	0.686
5.0	**0.755**	0.829	0.827	0.825	0.823	0.822	0.815	0.808	0.802	0.795	0.782	0.768	0.736	0.717
5.5	**0.669**	0.824	0.818	0.811	0.805	0.799	0.782	0.765	0.748	0.731	0.711	0.69	0.649	0.628
6.0	**0.549**	0.782	0.76	0.737	0.715	0.692	0.67	0.647	0.624	0.602	0.584	0.566	0.534	0.519
6.5	**0.468**	0.677	0.652	0.627	0.603	0.578	0.56	0.543	0.525	0.507	0.494	0.481	0.457	0.445
7.0	**0.406**	0.564	0.545	0.527	0.508	0.489	0.476	0.463	0.45	0.437	0.426	0.416	0.397	0.388
7.5	**0.356**	0.481	0.467	0.452	0.438	0.424	0.414	0.403	0.392	0.382	0.373	0.365	0.348	0.341
8.0	**0.316**	0.42	0.409	0.397	0.386	0.374	0.365	0.356	0.347	0.338	0.331	0.323	0.31	0.303
8.5	**0.285**	0.375	0.365	0.355	0.345	0.335	0.327	0.32	0.312	0.304	0.298	0.291	0.279	0.273
9.0	**0.258**	0.337	0.329	0.32	0.311	0.303	0.296	0.289	0.282	0.275	0.269	0.264	0.253	0.248
9.5	**0.234**	0.304	0.296	0.289	0.281	0.273	0.267	0.261	0.255	0.249	0.244	0.239	0.229	0.225
10.0	**0.209**	0.27	0.264	0.257	0.25	0.244	0.238	0.233	0.228	0.222	0.218	0.214	0.205	0.201
10.5	**0.185**	0.237	0.231	0.226	0.22	0.214	0.21	0.205	0.201	0.196	0.192	0.188	0.181	0.178
11.0	**0.163**	0.208	0.204	0.199	0.194	0.189	0.185	0.181	0.177	0.173	0.17	0.166	0.16	0.157
11.5	**0.145**	0.185	0.18	0.176	0.172	0.168	0.164	0.161	0.157	0.154	0.151	0.148	0.142	0.14
12.0	**0.13**	0.165	0.161	0.157	0.153	0.15	0.147	0.144	0.141	0.138	0.135	0.132	0.127	0.125
12.5	**0.116**	0.147	0.144	0.141	0.137	0.134	0.131	0.128	0.126	0.123	0.121	0.119	0.114	0.112
13.0	**0.104**	0.132	0.129	0.126	0.123	0.12	0.118	0.115	0.113	0.11	0.108	0.106	0.103	0.101
13.5	**0.094**	0.119	0.116	0.113	0.111	0.108	0.106	0.104	0.102	0.1	0.098	0.096	0.093	0.091
14.0	**0.085**	0.107	0.105	0.102	0.1	0.098	0.096	0.094	0.092	0.09	0.089	0.087	0.084	0.082
14.5	**0.078**	0.097	0.095	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.08	0.079	0.076	0.075
15.0	**0.071**	0.088	0.087	0.085	0.083	0.081	0.079	0.078	0.076	0.075	0.074	0.072	0.07	0.069
15.5	**0.065**	0.081	0.079	0.078	0.076	0.074	0.073	0.072	0.07	0.069	0.068	0.066	0.064	0.063
16.0	**0.06**	0.074	0.073	0.071	0.07	0.068	0.067	0.066	0.065	0.063	0.062	0.061	0.059	0.058
16.5	**0.056**	0.069	0.067	0.066	0.064	0.063	0.062	0.061	0.06	0.059	0.058	0.057	0.055	0.054
17.0	**0.052**	0.063	0.062	0.061	0.06	0.058	0.057	0.056	0.055	0.054	0.053	0.053	0.051	0.05
17.5	**0.048**	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051	0.05	0.049	0.048	0.047
18.0	**0.045**	0.055	0.054	0.053	0.052	0.051	0.05	0.049	0.048	0.047	0.047	0.046	0.044	0.044
18.5	**0.042**	0.051	0.05	0.049	0.048	0.047	0.047	0.046	0.045	0.044	0.044	0.043	0.042	0.041
19.0	**0.04**	0.048	0.047	0.046	0.045	0.044	0.044	0.043	0.042	0.041	0.041	0.04	0.039	0.038
19.5	**0.037**	0.045	0.044	0.043	0.042	0.042	0.041	0.04	0.04	0.039	0.038	0.038	0.037	0.036
20.0	**0.035**	0.042	0.041	0.041	0.04	0.039	0.039	0.038	0.037	0.037	0.036	0.036	0.035	0.034
20.5	**0.033**	0.04	0.039	0.038	0.038	0.037	0.036	0.036	0.035	0.035	0.034	0.034	0.033	0.032
21.0	**0.031**	0.037	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.032	0.032	0.032	0.031	0.03
21.5	**0.027**	0.032	0.032	0.031	0.031	0.03	0.03	0.029	0.029	0.028	0.028	0.028	0.027	0.026
22.0	**0.021**	0.025	0.024	0.024	0.023	0.023	0.023	0.022	0.022	0.022	0.022	0.021	0.021	0.02
22.5	**0.015**	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015
23.0	**0.013**	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013
23.5	**0.012**	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.012	0.012	0.012
24.0	**0.011**	0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.01	0.01
24.5	**0.009**	0.011	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.009	0.009

Table 13-2: C_t values, Sound Optimized Mode SO11

13.3 Sound Curves, Sound Optimized Mode SO11

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 SO11 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	93.0
6	94.4
7	95.6
8	96.8
9	98.0
10	98.8
11	99.0
12	99.2
13	99.2
14	99.2
15	99.2
16	99.2
17	99.2
18	99.2
19	99.2
20	99.2

Table 13-3: Sound curves, Sound Optimized Mode SO11

14 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO12

14.1 Power Curves, Sound Optimized Mode SO12

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	81	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	172	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	278	210	217	224	231	237	243	250	256	262	267	272	282	286
4.5	405	318	327	337	347	356	364	373	381	389	394	400	409	413
5.0	580	452	465	478	491	504	516	528	540	552	562	571	586	592
5.5	766	616	633	650	667	684	698	713	727	741	749	758	771	775
6.0	934	810	829	848	867	886	896	906	916	926	929	931	935	936
6.5	1108	1029	1044	1059	1074	1090	1093	1097	1101	1105	1106	1107	1108	1108
7.0	1301	1270	1278	1285	1293	1300	1300	1301	1301	1301	1301	1301	1301	1301
7.5	1516	1508	1510	1512	1514	1516	1516	1516	1516	1516	1516	1516	1516	1516
8.0	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695
8.5	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1809	1809
9.0	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884
9.5	1936	1936	1936	1936	1936	1936	1936	1936	1936	1936	1936	1936	1936	1936
10.0	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976
10.5	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
11.0	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
11.5	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035
12.0	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
12.5	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057
13.0	2066	2066	2066	2066	2066	2066	2066	2066	2066	2066	2066	2066	2066	2066
13.5	2078	2078	2078	2078	2078	2078	2078	2078	2078	2078	2078	2078	2078	2078
14.0	2092	2092	2092	2092	2092	2092	2092	2092	2092	2092	2092	2092	2092	2092
14.5	2108	2108	2108	2108	2108	2108	2108	2108	2108	2108	2108	2108	2108	2108
15.0	2123	2123	2123	2123	2123	2123	2123	2123	2123	2123	2123	2123	2123	2123
15.5	2132	2132	2132	2132	2132	2132	2132	2132	2132	2132	2132	2132	2132	2132
16.0	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140
16.5	2148	2148	2148	2148	2148	2148	2148	2148	2148	2148	2148	2148	2148	2148
17.0	2158	2158	2158	2158	2158	2158	2158	2158	2158	2158	2158	2158	2158	2158
17.5	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168
18.0	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179
18.5	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188
19.0	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197
19.5	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205
20.0	2212	2212	2212	2212	2212	2212	2212	2212	2212	2212	2212	2212	2212	2212
20.5	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
21.0	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190
21.5	1951	1951	1951	1951	1951	1951	1951	1951	1951	1951	1951	1951	1951	1951
22.0	1460	1460	1460	1460	1460	1460	1460	1460	1460	1460	1460	1460	1460	1460
22.5	951	951	951	951	951	951	951	951	951	951	951	951	951	951
23.0	816	816	816	816	816	816	816	816	816	816	816	816	816	816
23.5	758	758	758	758	758	758	758	758	758	758	758	758	758	758
24.0	683	683	683	683	683	683	683	683	683	683	683	683	683	683
24.5	614	614	614	614	614	614	614	614	614	614	614	614	614	614

Table 14-1: Power curve, Sound Optimized Mode SO12

14.2 Ct Values, Sound Optimized Mode SO12

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.848	0.848	0.847	0.847	0.846	0.845	0.845
4.0	**0.776**	0.830	0.829	0.828	0.827	0.826	0.820	0.814	0.809	0.803	0.794	0.785	0.762	0.747
4.5	**0.732**	0.831	0.829	0.827	0.825	0.823	0.813	0.803	0.793	0.783	0.766	0.749	0.713	0.695
5.0	**0.760**	0.829	0.827	0.826	0.824	0.823	0.816	0.810	0.804	0.798	0.785	0.772	0.741	0.722
5.5	**0.712**	0.825	0.822	0.819	0.816	0.813	0.802	0.792	0.782	0.771	0.751	0.732	0.691	0.670
6.0	**0.618**	0.815	0.805	0.794	0.783	0.773	0.751	0.729	0.707	0.685	0.663	0.640	0.600	0.583
6.5	**0.548**	0.785	0.762	0.740	0.717	0.695	0.671	0.648	0.624	0.601	0.583	0.565	0.533	0.518
7.0	**0.495**	0.738	0.709	0.679	0.650	0.620	0.600	0.579	0.559	0.538	0.524	0.509	0.483	0.471
7.5	**0.459**	0.669	0.643	0.616	0.590	0.564	0.547	0.530	0.514	0.497	0.484	0.472	0.448	0.438
8.0	**0.414**	0.580	0.560	0.540	0.520	0.500	0.487	0.473	0.460	0.446	0.436	0.425	0.405	0.396
8.5	**0.362**	0.489	0.475	0.460	0.446	0.431	0.420	0.409	0.399	0.388	0.379	0.370	0.354	0.346
9.0	**0.312**	0.414	0.403	0.391	0.380	0.369	0.360	0.351	0.342	0.334	0.326	0.319	0.306	0.299
9.5	**0.271**	0.355	0.346	0.337	0.327	0.318	0.311	0.304	0.296	0.289	0.283	0.277	0.266	0.260
10.0	**0.235**	0.305	0.298	0.290	0.282	0.275	0.269	0.263	0.256	0.250	0.245	0.240	0.231	0.226
10.5	**0.205**	0.264	0.257	0.251	0.245	0.238	0.233	0.228	0.223	0.217	0.213	0.209	0.201	0.197
11.0	**0.179**	0.230	0.224	0.219	0.213	0.208	0.203	0.199	0.194	0.190	0.186	0.183	0.176	0.172
11.5	**0.158**	0.201	0.196	0.192	0.187	0.182	0.179	0.175	0.171	0.167	0.164	0.161	0.155	0.152
12.0	**0.140**	0.178	0.173	0.169	0.165	0.161	0.158	0.155	0.151	0.148	0.145	0.142	0.137	0.135
12.5	**0.124**	0.158	0.154	0.150	0.147	0.143	0.140	0.138	0.135	0.132	0.129	0.127	0.122	0.120
13.0	**0.111**	0.141	0.138	0.134	0.131	0.128	0.126	0.123	0.120	0.118	0.116	0.114	0.109	0.107
13.5	**0.100**	0.126	0.124	0.121	0.118	0.115	0.113	0.111	0.108	0.106	0.104	0.102	0.099	0.097
14.0	**0.091**	0.114	0.112	0.109	0.107	0.104	0.102	0.100	0.098	0.096	0.095	0.093	0.090	0.088
14.5	**0.083**	0.104	0.102	0.100	0.097	0.095	0.093	0.091	0.090	0.088	0.086	0.085	0.082	0.080
15.0	**0.076**	0.095	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.079	0.077	0.075	0.074
15.5	**0.070**	0.087	0.085	0.083	0.081	0.080	0.078	0.077	0.075	0.074	0.072	0.071	0.069	0.068
16.0	**0.064**	0.080	0.078	0.076	0.075	0.073	0.072	0.070	0.069	0.068	0.066	0.065	0.063	0.062
16.5	**0.059**	0.073	0.072	0.070	0.069	0.067	0.066	0.065	0.064	0.062	0.061	0.060	0.058	0.057
17.0	**0.055**	0.068	0.066	0.065	0.064	0.062	0.061	0.060	0.059	0.058	0.057	0.056	0.054	0.053
17.5	**0.051**	0.063	0.062	0.061	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051	0.050
18.0	**0.048**	0.059	0.058	0.056	0.055	0.054	0.053	0.052	0.051	0.050	0.050	0.049	0.047	0.047
18.5	**0.045**	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046	0.046	0.044	0.044
19.0	**0.042**	0.051	0.050	0.049	0.048	0.047	0.046	0.046	0.045	0.044	0.043	0.043	0.041	0.041
19.5	**0.040**	0.048	0.047	0.046	0.045	0.044	0.044	0.043	0.042	0.041	0.041	0.040	0.039	0.038
20.0	**0.037**	0.045	0.044	0.043	0.042	0.042	0.041	0.040	0.040	0.039	0.038	0.038	0.037	0.036
20.5	**0.035**	0.042	0.042	0.041	0.040	0.039	0.039	0.038	0.037	0.037	0.036	0.036	0.035	0.034
21.0	**0.033**	0.039	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.032	0.032
21.5	**0.028**	0.034	0.033	0.033	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.029	0.028	0.028
22.0	**0.021**	0.025	0.025	0.024	0.024	0.024	0.023	0.023	0.023	0.022	0.022	0.022	0.021	0.021
22.5	**0.015**	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015
23.0	**0.013**	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013
23.5	**0.012**	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.012	0.012	0.012
24.0	**0.011**	0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.010
24.5	**0.009**	0.011	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.009

Table 14-2: C_t values, Sound Optimized Mode SO12

14.3 Sound Curves, Sound Optimized Mode SO12

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 SO12 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	93.0
6	94.9
7	96.9
8	98.9
9	99.6
10	99.9
11	99.9
12	99.9
13	99.9
14	99.9
15	99.9
16	99.9
17	99.9
18	99.9
19	99.9
20	99.9

Table 14-3: Sound curves, Sound Optimized Mode SO12

15 Power Curves, Ct Values and Sound Curves, Sound Optimized Mode SO13

15.1 Power Curves, Sound Optimized Mode SO13

Air density [kg/m³]														
Wind speed [m/s]	**1.225**	**0.95**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**81**	51	54	57	60	62	65	68	70	73	76	79	84	87
3.5	**172**	123	127	132	136	141	145	150	154	159	163	168	177	181
4.0	**277**	210	217	224	231	237	244	250	256	262	267	272	281	286
4.5	**378**	317	326	334	342	351	356	362	367	373	374	376	378	379
5.0	**440**	426	429	432	436	439	439	439	439	440	440	440	440	440
5.5	**465**	464	464	464	465	465	465	465	465	465	465	465	465	465
6.0	**506**	506	506	506	506	506	506	506	506	506	506	506	506	506
6.5	**597**	597	597	597	597	597	597	597	597	597	597	597	597	597
7.0	**705**	705	705	705	705	705	705	705	705	705	705	705	705	705
7.5	**804**	804	804	804	804	804	804	804	804	804	804	804	804	804
8.0	**923**	923	923	923	923	923	923	923	923	923	923	923	923	923
8.5	**1069**	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069
9.0	**1200**	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
9.5	**1290**	1290	1290	1290	1290	1290	1290	1290	1290	1290	1290	1290	1290	1290
10.0	**1355**	1355	1355	1355	1355	1355	1355	1355	1355	1355	1355	1355	1355	1355
10.5	**1409**	1409	1409	1409	1409	1409	1409	1409	1409	1409	1409	1409	1409	1409
11.0	**1455**	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455
11.5	**1480**	1480	1480	1480	1480	1480	1480	1480	1480	1480	1480	1480	1480	1480
12.0	**1492**	1492	1492	1492	1492	1492	1492	1492	1492	1492	1492	1492	1492	1492
12.5	**1499**	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499
13.0	**1505**	1505	1505	1505	1505	1505	1505	1505	1505	1505	1505	1505	1505	1505
13.5	**1512**	1512	1512	1512	1512	1512	1512	1512	1512	1512	1512	1512	1512	1512
14.0	**1522**	1522	1522	1522	1522	1522	1522	1522	1522	1522	1522	1522	1522	1522
14.5	**1535**	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535
15.0	**1547**	1547	1547	1547	1547	1547	1547	1547	1547	1547	1547	1547	1547	1547
15.5	**1555**	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555	1555
16.0	**1560**	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560
16.5	**1568**	1568	1568	1568	1568	1568	1568	1568	1568	1568	1568	1568	1568	1568
17.0	**1577**	1577	1577	1577	1577	1577	1577	1577	1577	1577	1577	1577	1577	1577
17.5	**1587**	1587	1587	1587	1587	1587	1587	1587	1587	1587	1587	1587	1587	1587
18.0	**1595**	1595	1595	1595	1595	1595	1595	1595	1595	1595	1595	1595	1595	1595
18.5	**1599**	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
19.0	**1603**	1603	1603	1603	1603	1603	1603	1603	1603	1603	1603	1603	1603	1603
19.5	**1610**	1610	1610	1610	1610	1610	1610	1610	1610	1610	1610	1610	1610	1610
20.0	**1618**	1618	1618	1618	1618	1618	1618	1618	1618	1618	1618	1618	1618	1618
20.5	**1629**	1629	1629	1629	1629	1629	1629	1629	1629	1629	1629	1629	1629	1629
21.0	**1636**	1636	1636	1636	1636	1636	1636	1636	1636	1636	1636	1636	1636	1636
21.5	**1550**	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
22.0	**1276**	1276	1276	1276	1276	1276	1276	1276	1276	1276	1276	1276	1276	1276
22.5	**941**	941	941	941	941	941	941	941	941	941	941	941	941	941
23.0	**816**	816	816	816	816	816	816	816	816	816	816	816	816	816
23.5	**758**	758	758	758	758	758	758	758	758	758	758	758	758	758
24.0	**683**	683	683	683	683	683	683	683	683	683	683	683	683	683
24.5	**614**	614	614	614	614	614	614	614	614	614	614	614	614	614

Table 15-1: Power curve, Sound Optimized Mode SO13

15.2 Ct Values, Sound Optimized Mode SO13

Air density kg/m³														
Wind speed [m/s]	**1.225**	**0.950**	**0.975**	**1.0**	**1.025**	**1.05**	**1.075**	**1.1**	**1.125**	**1.15**	**1.175**	**1.2**	**1.25**	**1.275**
3.0	**0.888**	0.893	0.893	0.892	0.892	0.891	0.891	0.891	0.890	0.890	0.889	0.889	0.888	0.888
3.5	**0.846**	0.853	0.852	0.851	0.850	0.850	0.849	0.848	0.848	0.847	0.847	0.846	0.845	0.845
4.0	**0.774**	0.830	0.829	0.828	0.827	0.826	0.820	0.814	0.809	0.803	0.793	0.783	0.759	0.745
4.5	**0.642**	0.825	0.816	0.808	0.799	0.791	0.772	0.753	0.734	0.715	0.690	0.666	0.622	0.602
5.0	**0.490**	0.724	0.698	0.671	0.644	0.618	0.597	0.576	0.555	0.534	0.519	0.505	0.479	0.467
5.5	**0.369**	0.505	0.490	0.474	0.458	0.442	0.431	0.419	0.408	0.396	0.387	0.378	0.361	0.353
6.0	**0.298**	0.395	0.384	0.373	0.363	0.352	0.344	0.336	0.327	0.319	0.312	0.305	0.292	0.286
6.5	**0.270**	0.355	0.345	0.336	0.327	0.317	0.310	0.303	0.296	0.288	0.282	0.276	0.265	0.259
7.0	**0.251**	0.328	0.319	0.311	0.303	0.294	0.288	0.281	0.274	0.268	0.262	0.256	0.246	0.241
7.5	**0.230**	0.299	0.291	0.284	0.276	0.269	0.263	0.257	0.251	0.245	0.240	0.235	0.225	0.221
8.0	**0.215**	0.279	0.272	0.265	0.258	0.251	0.246	0.240	0.235	0.229	0.224	0.220	0.211	0.207
8.5	**0.206**	0.267	0.260	0.254	0.247	0.240	0.235	0.230	0.225	0.219	0.215	0.211	0.202	0.198
9.0	**0.194**	0.250	0.244	0.238	0.232	0.226	0.221	0.216	0.211	0.206	0.202	0.198	0.190	0.187
9.5	**0.178**	0.229	0.223	0.218	0.212	0.207	0.202	0.198	0.194	0.189	0.185	0.182	0.175	0.171
10.0	**0.160**	0.205	0.200	0.195	0.190	0.186	0.182	0.178	0.174	0.170	0.167	0.163	0.157	0.154
10.5	**0.144**	0.183	0.179	0.175	0.171	0.166	0.163	0.159	0.156	0.152	0.150	0.147	0.141	0.139
11.0	**0.129**	0.164	0.161	0.157	0.153	0.149	0.146	0.143	0.140	0.137	0.134	0.132	0.127	0.125
11.5	**0.115**	0.146	0.143	0.140	0.136	0.133	0.130	0.128	0.125	0.122	0.120	0.118	0.113	0.111
12.0	**0.103**	0.130	0.127	0.124	0.121	0.118	0.116	0.113	0.111	0.109	0.107	0.105	0.101	0.099
12.5	**0.092**	0.116	0.113	0.111	0.108	0.105	0.103	0.101	0.099	0.097	0.095	0.094	0.090	0.089
13.0	**0.082**	0.103	0.101	0.099	0.097	0.094	0.093	0.091	0.089	0.087	0.085	0.084	0.081	0.080
13.5	**0.074**	0.093	0.091	0.089	0.087	0.085	0.084	0.082	0.080	0.079	0.077	0.076	0.073	0.072
14.0	**0.068**	0.084	0.083	0.081	0.079	0.077	0.076	0.074	0.073	0.071	0.070	0.069	0.067	0.066
14.5	**0.062**	0.077	0.075	0.074	0.072	0.071	0.069	0.068	0.067	0.065	0.064	0.063	0.061	0.060
15.0	**0.057**	0.071	0.069	0.068	0.066	0.065	0.064	0.062	0.061	0.060	0.059	0.058	0.056	0.055
15.5	**0.052**	0.065	0.063	0.062	0.061	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051
16.0	**0.048**	0.059	0.058	0.057	0.056	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047
16.5	**0.045**	0.055	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046	0.046	0.044	0.044
17.0	**0.042**	0.051	0.050	0.049	0.048	0.047	0.046	0.045	0.045	0.044	0.043	0.042	0.041	0.041
17.5	**0.039**	0.048	0.047	0.046	0.045	0.044	0.043	0.043	0.042	0.041	0.041	0.040	0.039	0.038
18.0	**0.037**	0.045	0.044	0.043	0.042	0.041	0.041	0.040	0.039	0.038	0.038	0.037	0.036	0.036
18.5	**0.034**	0.042	0.041	0.040	0.039	0.039	0.038	0.037	0.037	0.036	0.036	0.035	0.034	0.034
19.0	**0.032**	0.039	0.038	0.037	0.037	0.036	0.035	0.035	0.034	0.034	0.033	0.033	0.032	0.031
19.5	**0.030**	0.037	0.036	0.035	0.035	0.034	0.033	0.033	0.032	0.032	0.031	0.031	0.030	0.030
20.0	**0.029**	0.034	0.034	0.033	0.033	0.032	0.032	0.031	0.031	0.030	0.030	0.029	0.028	0.028
20.5	**0.027**	0.033	0.032	0.031	0.031	0.030	0.030	0.029	0.029	0.029	0.028	0.028	0.027	0.027
21.0	**0.026**	0.031	0.030	0.030	0.029	0.029	0.028	0.028	0.027	0.027	0.027	0.026	0.026	0.025
21.5	**0.024**	0.028	0.027	0.027	0.027	0.026	0.026	0.025	0.025	0.025	0.024	0.024	0.023	0.023
22.0	**0.019**	0.023	0.022	0.022	0.022	0.021	0.021	0.021	0.020	0.020	0.020	0.020	0.019	0.019
22.5	**0.015**	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.015
23.0	**0.013**	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013
23.5	**0.012**	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.012	0.012	0.012
24.0	**0.011**	0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.010
24.5	**0.009**	0.011	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.009

Table 15-2: C_t values, Sound Optimized Mode SO13

15.3 Sound Curves, Sound Optimized Mode SO13

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 SO13 (Blades with serrated trailing edge)**
3	91.1
4	91.3
5	91.9
6	92.1
7	93.1
8	94.2
9	95.8
10	96.5
11	96.9
12	97.0
13	97.0
14	97.0
15	97.0
16	97.0
17	97.0
18	97.0
19	97.0
20	97.0

Table 15-3: Sound curves, Sound Optimized Mode SO13

PRYSMIAN
CABLES & SYSTEMS

Medium Voltage Systems

System Solution and Innovation

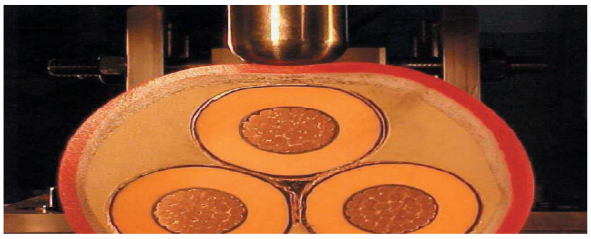
Prysmian is one of the worldwide leading players in the energy cable systems market, thanks to its innovative technological approach and to its capability in maintaining cost leadership, together with a strong commitment to Research and Development.

Extensive research has been conducted by Prysmian to provide solutions, which fully meet customers' requirements, with a strong focus on the development of competitive and reliable underground systems.

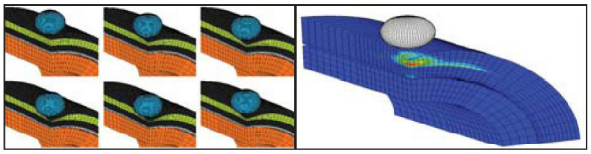
Prysmian dominates the technology scenario in all phases of power circuits development - engineering, design, production, installation and maintenance - with a turnkey approach, which covers the asset's entire lifetime and provides customers with the benefits of a lower total cost of ownership of the system.

Major Utilities are currently installing Pirelli power distribution solutions and exploiting their benefits.

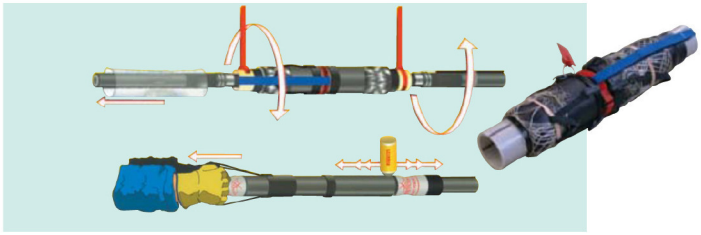
> AIR BAG™ Cable System



Prysmian has patented an innovative polymeric mechanical protection for cables, which, extended to accessories and installation aspects, has resulted into a new full system approach. This fully polymeric protection employed in the **Air Bag**™ cables absorbs impacts and reduces the risk of permanent deformations and damage to the sensitive underlying cable layers. Generally, **Air Bag**™ cable designs have reduced weights and dimensions, compared to traditional cables. This provides for significant economic advantages in terms of total system cost, allowing easier handling, longer delivery lengths and, therefore, a reduced need for joints. Another key advantage of the **Air Bag**™ Cable System is related to installation: **Air Bag**™ perfectly combines the new technologies applied to cables and accessories to exploit its innovative installation solutions at their best. **Air Bag**™ Cable Systems can be installed in simplified compact trenches with no need for sand, backfill selection and/or special external protections like tiles and pipes, thanks to its superior mechanical properties. Also mechanised installation technologies benefit of the exceptional robustness of **Air Bag**™, which allows quicker and more efficient operations.



> Elaspeed™ V1.2



Following the success of the original **Elaspeed**™ range, Prysmian has developed the second generation of these products, to further improve and speed up installation operations.

The new **Elaspeed**™ 1.2 joints adopt the well proven cold-shrink technique, combined with the acknowledged leadership of Prysmian EPDM rubber technology, and enhanced with innovative features:

- The new self-ejecting tube reduces risks of errors during the installation.
- The standardised mastic pads ensure correct positioning and optimal water tightness.
- The inner part of the joint body is pre-greased with silicone lubricant and allows a cleaner installation and better electrical performances.
- The new textile straps allow easier handling.

Most importantly, **Elaspeed**™ 1.2 joints allow checking and monitoring any single jointing operation, and ensure superior quality and reliability of the installation.
Elaspeed™ 1.2 joints are suitable for most applications and cable constructions, including transition jointing. They are available in **Air Bag**™ configuration to ensure full system mechanical protection and compatibility. All joints are 100% factory tested and comply with the strictest national and international standards.

YOUR ENERGY... OUR SYSTEMS... ANYWHERE

> Microtunnelling

Environmental and social issues are nowadays putting strong pressure on the growing need for upgrading and renewing power distribution and transmission grids. In this scenario Prysmian dedicates its efforts to the development of new cable designs, which allow for optimised installation techniques. A typical example of this is **Air Bag**™ Microtunneling. The **Air Bag**™ Microtunnelling technique consists of two phases. Horizontal drilling is carried out by means of a drilling head with a remote control sensor placed inside of it. Constant radar monitoring allows to precisely track even highly complex routes. The **Air Bag**™ cable is laid with no additional protection pipes or ducts, which would instead be required by a standard cable, and installation time is reduced by up to 30 percent. This type of installation does not require to open trenches in the carriageway, thus minimising disruption inconveniences, and, thereby, cuts down all costs related to restoration of road surfaces and removal of excavation debris. Installation works are carried out with the same equipment commonly used for pipelines laying and require limited resources for handling. The **Air Bag**™ Microtunnelling technology proves to be very fast, easy and effective. Thanks to its minimum environmental impact, the system proposed by Prysmian is the perfect solution for the installation of power distribution lines in densely populated urban areas or in protected rural environments, such as parks and reserves. For installation operations carried out with innovative techniques and systems, such as Microtunnelling, Prysmian may offer to its customers full turn-key project consulting and supervision.

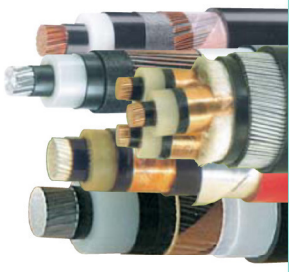
> New Services

In addition to the innovative products resulted from our strong industrial background and technical expertise, we also offer to our customers fully integrated supply chain services.

The range includes:

- Cut-to-length
- Delivery to site
- Drum management
- Vendor Managed Inventory
- Order tracking
- E-business

All service packages are tailored to the real customer needs in order to optimise efficiencies and to continuously improve our relationship.



PRYSMIAN
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About us

Prysmian Cables & Systems is a world-class multinational company. Founded in 1872 as "Ditta Pirelli & C.", it has achieved a leading position for more than a century of operations in its two key international markets - "Energy Cables & Systems" and "Telecom Cables & Systems".

Prysmian Cables and Systems is one of the worldwide leading manufacturer of power and telecommunications cables, with 52 manufacturing facilities in 21 countries in five continents and a market share in excess of 10%.

Prysmian Energy Cables and Systems is a global solutions provider, offering a wide range of integrated solutions, such as cable systems, system design and engineering, project management, installation and post-sale services.

Prysmian Energy Cables and Systems concentrates on continuous product innovation and on achieving a competitive edge by focusing on research and development. This is done through Prysmian's own R&D centres and by co-operating with universities, scientific institutions and above all, our customers. Prysmian's world-wide organisation makes and delivers advanced technological solutions to customers anywhere in the world.

Global
Solutions Provider

The energy market has been changing dramatically in recent years, as a result of deregulation and privatisation. To face the challenge of competition, energy transmission and distribution operators are driven towards an optimum use of their existing resources and new investments.

To support its customers, Prysmian has evolved over the years from the traditional role of cable manufacturer to that of a **Global Solution Provider**. Prysmian focuses on a total system approach, to give its customers the lowest cost of ownership of their new and installed cable networks.

This "Total System" approach is, at all voltages, the ultimate solution to provide power utilities with real advantages in terms of asset optimisation. Besides an increasing activity on product innovation to lower investment costs, Prysmian is developing additional pre and post sales services for its customers – e.g. network services, enhanced logistics, engineering studies – to optimise asset management and give the best possible exploitation of transmission and distribution networks.

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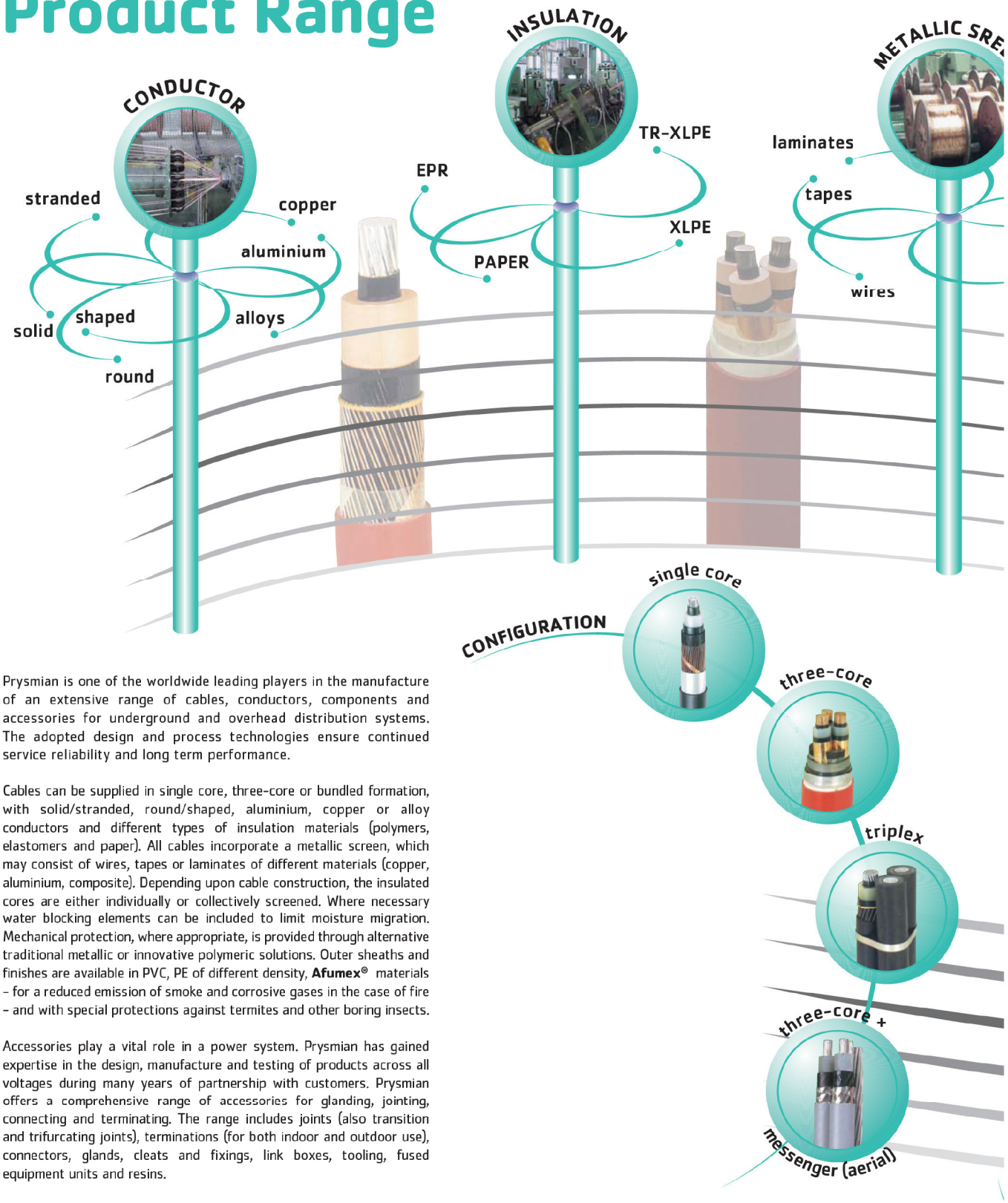
Product Range



Prysmian is one of the worldwide leading players in the manufacture of an extensive range of cables, conductors, components and accessories for underground and overhead distribution systems. The adopted design and process technologies ensure continued service reliability and long term performance.

Cables can be supplied in single core, three-core or bundled formation, with solid/stranded, round/shaped, aluminium, copper or alloy conductors and different types of insulation materials (polymers, elastomers and paper). All cables incorporate a metallic screen, which may consist of wires, tapes or laminates of different materials (copper, aluminium, composite). Depending upon cable construction, the insulated cores are either individually or collectively screened. Where necessary water blocking elements can be included to limit moisture migration. Mechanical protection, where appropriate, is provided through alternative traditional metallic or innovative polymeric solutions. Outer sheaths and finishes are available in PVC, PE of different density, **Afumex®** materials – for a reduced emission of smoke and corrosive gases in the case of fire – and with special protections against termites and other boring insects.

Accessories play a vital role in a power system. Prysmian has gained expertise in the design, manufacture and testing of products across all voltages during many years of partnership with customers. Prysmian offers a comprehensive range of accessories for glanding, jointing, connecting and terminating. The range includes joints (also transition and trifurcating joints), terminations (for both indoor and outdoor use), connectors, glands, cleats and fixings, link boxes, tooling, fused equipment units and resins.

Prysmian also provides engineering services capable of fulfilling any power system specification or requirement and of delivering customised solutions.

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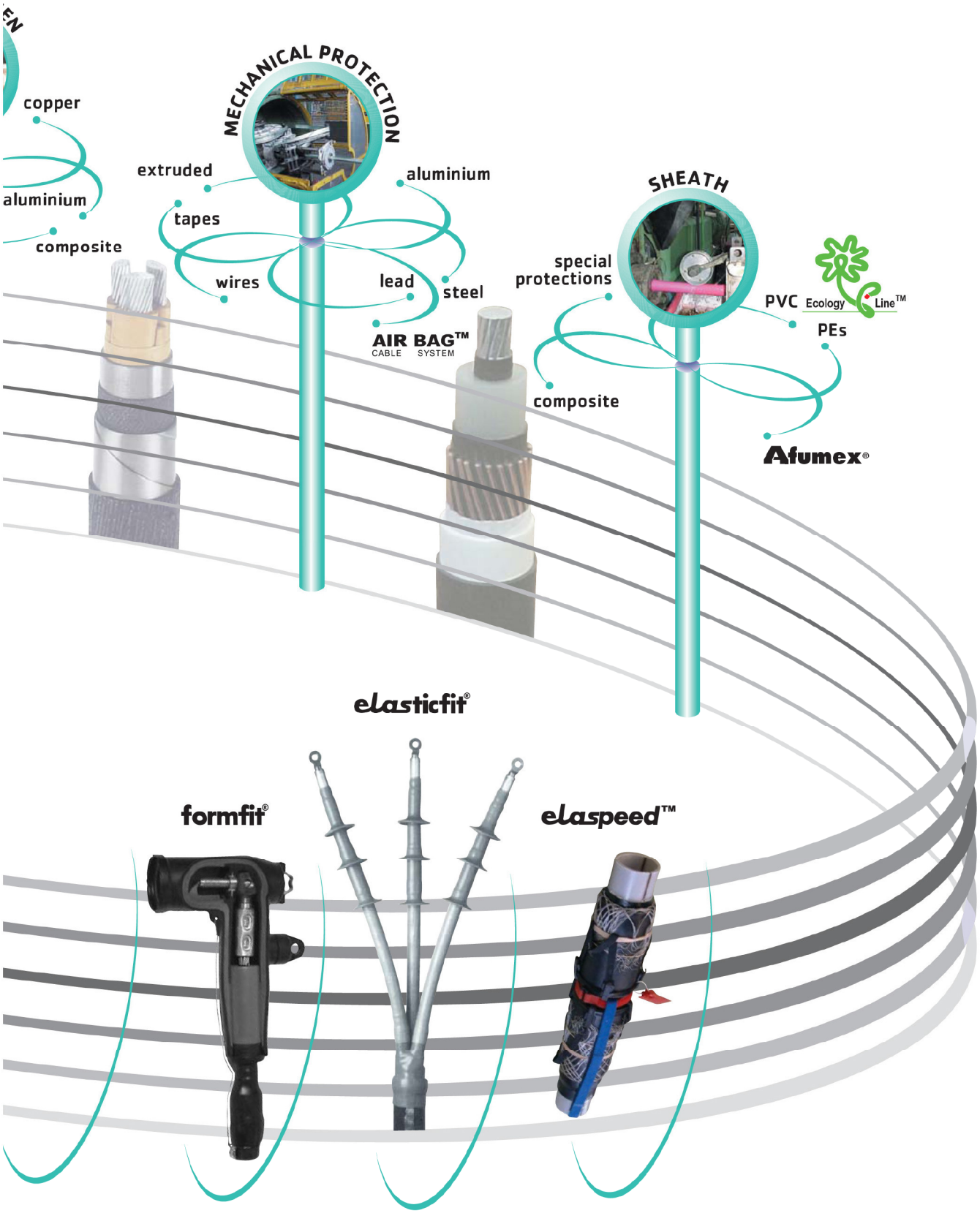

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