



# Power Curve at Different Air Densities

[3.0M122]

## General Information

## Disclaimer [USA]

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## Table of Contents

1	Introduction .....	8
2	General Data of the Power Curve .....	9
3	Power Curve Dependent on the Air Density .....	10

**Applicable Documents**

The documents referred to in the table below are included for information only. Reference to them in this product description does not make them part of the contract.

Title	Document-No.

\* If the products referred to in the table above are to be included within the project, the relevant product descriptions in their current version will be amended to the contract.

**List of Abbreviations and Units**

Abbreviations/Units	Description

# 1 Introduction

This document is intended to provide information about the power curve of the Senvion at different air densities and therefore acts only as a preliminary non-committal guide.

No rights and obligations of any nature whatever can be derived from the general information given in this document. Senvion is not responsible for any claims in conjunction with this information.

For binding information about the detailed guaranteed power curve of the Senvion please refer exclusively to the document „Power Curve Senvion ”.



## 2 General Data of the Power Curve

Rotor diameter:	122.0 m
Cut in wind speed:	approx. 3.0 m/s
Cut out wind speed:	22 m/s
Wind speed at hub height:	10 minute mean values
Blades:	clean, no ice / snow formation
Anemometer type:	Thies First Class
Power curve verification:	according to IEC 61400-12-1: 2005 <sup>1</sup>
Turbulence intensity:	6 to 20 %
Terrain:	not complex according to IEC 61400-12-1: 2005 <sup>1</sup>
Vertical wind shear coefficient (measured between hub height and hub height minus rotor diameter divided by 2):	$\leq 0.3$
Temperature range:	$\leq 35\text{ }^{\circ}\text{C}$
Power factor:	The electrical power is guaranteed for pure active power set points

*NOTE 1. For obstacle assessment according to 61400-12-1: 2005 Annex A.2 the following condition applies: Within the measurement sector of the wind turbine and the met mast in the range of 0 - 4 times the rotor diameter there must not be any obstacles higher than 1/3 times the distance between hub height minus rotor diameter divided by 2 and the ground.*

### 3 Power Curve Dependent on the Air Density

The tables below show the power curve for the Senvion 3.0M122 dependent on different air densities applicable at the medium-voltage and low-voltage side of the transformer, respectively.

#### Power curve at the medium-voltage side of the transformer (includes transformer losses)

Wind speed (at hub height) $v$ [m/s]	Electrical power $P$ [kW]							
	1.06 kg/m <sup>3</sup>	1.09 kg/m <sup>3</sup>	1.12 kg/m <sup>3</sup>	1.15 kg/m <sup>3</sup>	1.18 kg/m <sup>3</sup>	1.21 kg/m <sup>3</sup>	1.24 kg/m <sup>3</sup>	1.27 kg/m <sup>3</sup>
3	18	20	21	23	25	26	29	33
4	128	133	139	144	149	154	161	169
5	305	316	327	337	348	358	371	386
6	570	590	609	628	647	666	688	714
7	945	979	1011	1043	1075	1106	1139	1175
8	1412	1457	1501	1544	1587	1629	1673	1718
9	1937	1992	2047	2101	2153	2205	2254	2299
10	2458	2513	2567	2620	2672	2724	2759	2778
11	2825	2848	2871	2893	2915	2937	2950	2955
11.5	2919	2943	2952	2957	2962	2968	2970	2970
12	2962	2968	2970	2970	2970	2970	2970	2970
13 - 22	2970	2970	2970	2970	2970	2970	2970	2970

#### Power curve at the low-voltage side of the transformer (excludes transformer losses)

Wind speed (at hub height) $v$ [m/s]	Electrical power $P$ [kW]							
	1.06 kg/m <sup>3</sup>	1.09 kg/m <sup>3</sup>	1.12 kg/m <sup>3</sup>	1.15 kg/m <sup>3</sup>	1.18 kg/m <sup>3</sup>	1.21 kg/m <sup>3</sup>	1.24 kg/m <sup>3</sup>	1.27 kg/m <sup>3</sup>
3	24	26	28	31	33	35	38	42
4	135	141	146	151	156	161	168	176
5	313	324	335	345	356	366	379	394
6	578	598	617	636	655	674	696	722
7	954	987	1020	1052	1084	1115	1148	1184
8	1423	1468	1512	1556	1599	1641	1685	1730
9	1951	2007	2062	2116	2169	2221	2270	2315
10	2475	2531	2585	2639	2691	2743	2779	2798
11	2846	2869	2892	2915	2937	2959	2973	2980
11.5	2941	2965	2976	2983	2990	2997	3000	3000
12	2990	2997	3000	3000	3000	3000	3000	3000
13 - 22	3000	3000	3000	3000	3000	3000	3000	3000

This overview is for information only in order to illustrate the influence of the air density on the power curve of the Senvion 3.0M122.

Please note: For a power curve of the Senvion 3.0M122 out of the range of the air density given in this document special project specific considerations are required. In this case please refer to your Senvion SE sales representative.