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# ***measnet***

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# **ACOUSTIC NOISE MEASUREMENT PROCEDURE**

**Version 2  
January 2005**

## **Foreword**

MEASNET is a network of measurement institutes, which have been established to harmonise wind energy related measurement procedures. The institutes of MEASNET are all actively performing wind energy related measurements. Each institute has to document the skills and quality of measurements, to apply agreed 'MEASNET measurement procedures' and to participate as required in mutual evaluation exercises.

## **1 Introduction**

The acoustic noise measurement procedure is based on the IEC 61400: Ed.2, 2002, Wind Turbine Generator Systems – Part 11 : Acoustic Noise Measurement Techniques.

## **2 Wind speed calculation**

The wind speed shall be determined according to Method 1 of the IEC document (determination of the wind speed from the electric output and the power curve), which is mandatory.

For the determination of wind speeds for data above 95 % of rated power the nacelle anemometer or the  $\bullet$ -factor shall be used. The nacelle anemometer is the preferred method. The measurements from the nacelle anemometer may be supplied from the wind turbine control system. The nacelle anemometer may not be used for background noise measurements.

## **3 Measurement of relevant wind turbine control parameters**

Relevant wind turbine control parameters such as rotor speed shall be measured and reported. These data may be obtained by online data acquisition of signals from the wind turbine controller. In that case the data have to be verified for example by using optical or acoustical counting of the blade passages during the measurements.

These parameters shall be reported as a function of active power and standardised wind speed.

## **4 Tonality**

A-weighted spectra have to be used for tonal assessment. If the A-weighting cannot be applied during the measurements, linear spectra may be converted to A-weighted spectra according to IEC 61672.

The frequency resolution shall be within the range of 1 to 3 Hz.

## **5 Apparent sound power levels**

For the determination of the value of  $L_{Aeq,k}$  at each integer wind speed, a third order regression shall be used for stall/active stall turbines and a fourth order regression shall be used for pitch regulated wind turbines.

## **6 Averaging period**

Shorter averaging times than 1 minute can be used, but not shorter than 10 s. The total measuring time and the measurement time per each integer wind speed shall not be less than stated in IEC 61400-11.

## **7 Met mast position**

For measurements especially on wind turbines with large hub heights alternative positions for the met mast may be used.