

Nord2000 in WindPRO webinar: Questions submitted during the webinar

Questions	Answers
What month is "worst case" for Nord2000	That would be the month with the hardest terrain.
Is there a way to simulate temperature inversions over large water plans on nord 2000	No.
Is it possible to calculate year-average values in the Nord-2000 noise model? Thanks.	Not in 2.9, but in 3,0 you can apply a weibull distribution and WindPRO will calculate the probability of different sound levels at the dwellings. Unfortunately that does not include differences in terrain, stability and temperature.
Is it possible to choose different wind shear values? For example, one value for the wind speed extrapolation from 10 m to hub height at turbine location and another value from hub height to 1.5 m at the receptor location.	Yes. The shear value selected on the shear tab in the calculation setup relates to the wind speed transformation from 10 m to hub height. At the receptor the roughness from the roughness map used gives the shear for the noise propagation to the receptor.
Do you have any feedback from noise measurements after building the wind farm? Does it show better results and more accurate ones than this ISO model?	We have some test cases, both with loudspeakers and actual turbines. The reports are referenced in the manual and DELTA has hosted some validation reports.
Can you use GIS CORINE land use data to specify Acoustic Hardness? Is there a standard / table that indicates Acoustic Hardness per CORINE terrain type?	If data are available as closed areas in shape file format WindPRO can read it. There is no translation table to my knowledge. Each hardness class refers to a value, but I do not know of a translation to CORINE terrain types. My suggestion would be to use the qualitative descriptor to translate the area types.
Is it really a Nord2000 thing that the sound power level of a wtg is related to wind speed at hub height?	We use hub height wind speed because it helps the translation of wind speed and thus noise level in the wind farm. Also standards are moving in the direction of adopting hub height wind speeds as reference values. In addition it is a simplification with one noise level for each wind speed instead of for each hub height provided.
Is it possible to translate this information to the wind turbine suppliers? (When to reduce the wind turbine?)	In the report and in "Results to File" you get the results for each sector. There you can identify specific sectors where noise reduction is needed. Unfortunately you cannot as yet run a noise calculation with specific noise modes in each sector.
Could it be possible in the future to calculate amplitude modulations in any way?	It would first require the academic community to agree on a method to predict it. So far it is demonstrated to exist, but not why.
New Japanese guidelines require calculation starting from 1 Hz, will this also be possible then?	The Nord2000 solver only calculates from 25 Hz. It may be possible that in the future the range will be expanded, but there are no immediate plans. Instead specific low frequency models have been implemented. In WindPRO we have a Danish model from 10 Hz and in WindPRO 3,0 there will be a Finnish model from 20 Hz.
Will the next version include specific Finnish guidelines?	Yes.
+interpolation from 10m up to hub height: is it done with standard $z_0=0.05m$?	That is the default setting.
What's the difference between ground factor and hardness?	It is essentially the same thing. Ground factor, hardness, porosity. It all describes the attenuating property of the ground. Ground factor uses a value from 0 to 1. Hardness used 7 categories.
What are the main differences between DECIBEL module and NORD2000? Is it better DECIBEL for big wind farm calculations?	All Decibel calculations are run by WindPRO on its own. They all relate to standardized models, typically described in national guidelines and statutory orders. Nord2000 uses an external solver and is an attempt to get closer to reality, but is unrealistic to guidelines and codes.
How are the Swedish codes different?	The Swedish codes freeze a number of parameters so they follow the guideline "Ljud Från Vindkraftverk". Otherwise it is similar to the direction/speed calculation.
Is there a special requirement for the turbine noise measurement - directional investigation on measurements?	The source noise used is the downwind noise level of the turbine model. This would be somewhat different at other directions, but since directivity data are usually not available we have decided to stick to downwind noise as described in the IEC standard for noise measurement. If directivity measurements become common it cannot be ruled out we will include directivity to the source noise level.
What are the limits for NORD 2000?	Calculation time and memory. Massive maps and very large numbers of receptors will take a long time and may make the computer run out of memory. When that happens is a function of computer size. We strongly recommend to limit the size of the terrain files used, especially in terms of level of detail.