

New European Wind Atlas (NEWA) in windPRO: From Turbulent Kinetic Energy (TKE) to Turbulence Intensity (TI)

This note outlines a manual step-by-step procedure with the use of Excel to convert TKE into TI when having a NEWA time series within a meteo-object. Turbulence intensities are sometimes used as input to wake calculations or site-compliance studies. Currently – October 2021 – windPRO does not support the use of TKE as a turbulence parameter. However, if the TKE is converted into the square root of the TKE, windPRO is able to convert the value into a turbulence intensity. Follow this step-by-step procedure in windPRO 3.4 or 3.5, then you have a meteo-object with turbulence intensities within 10-15 minutes.

In windPRO 3.4 or 3.5:

1. Download NEWA data in a meteo-object and open it
2. Go-to the 'Data' tab and make sure that '100.00m -' is selected in the 'Heights' list to the right
3. Press the 'Add signal' button and for the table and line added:
 - a. Change the 'Required signal' to 'User defined'
 - b. Change the 'Based on' to 'TKE.100 (100.0m)'
 - c. Add 'TKE' as the 'Signal name'
4. Press the green button '(Re)load all files for selected height'
5. Click the 'Export' button and in the 'Time Series Export Form':
 - a. Check that the 'Export all decimals' is enabled
 - b. Use 'File format': 'Local PC localization'
 - c. Check that 'TKE' is included in the export (expand the tree to check)
 - d. Click 'Copy to clipboard'

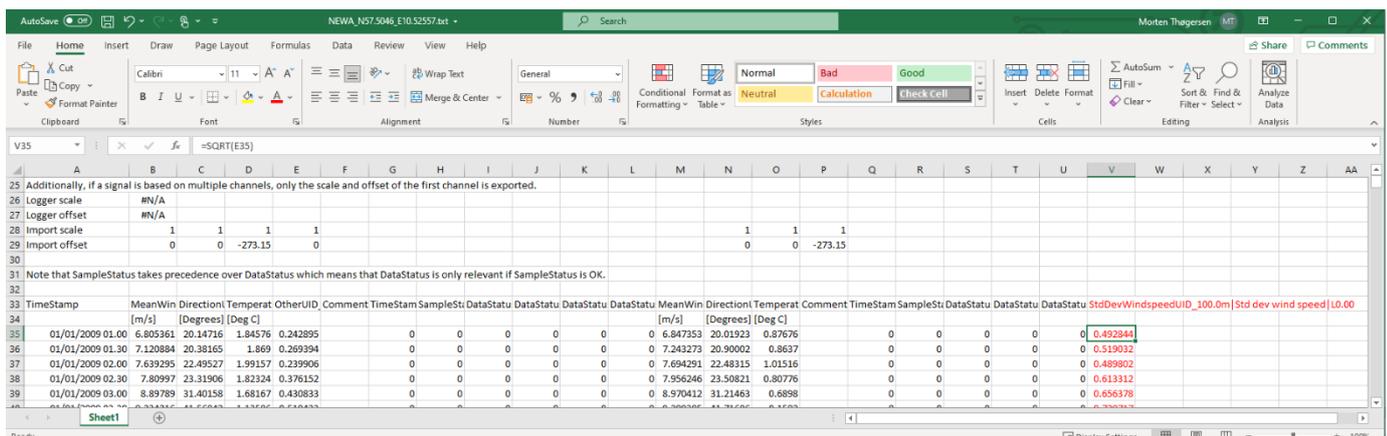
In Excel (see also the figure below):

1. Open a new blank spreadsheet in MS-Excel, then paste the data from the clipboard
2. Go-to cell V33
3. Name the column: *StdDevWindspeedUID_100.0m|Std dev wind speed|L0.00*
(do the naming in cell V33; this will enable the meteo-importer to auto-recognize the data-field)
4. Calculate the square-root of all TKE-values (column 'E') within the new column 'V'
(example: =SQRT(E35), do this for all cells in column 'V')
5. Save the file with the format: 'Text (Tab delimited) (*.txt)'.
Name it 'NEWA_N57.5046_E10.52557.txt' or similar.
6. Close Excel

In windPRO 3.4 or 3.5:

1. Make a new meteo-object on top of the 'old' one (same geographical location)
2. Select 'GO time series'
3. Press 'Add files' and select the file that you saved above (e.g. 'NEWA_N57.5046_E10.52557.txt')
4. Press 'Auto detect', and press 'Yes' when prompted
5. Select time-zone to '(UTC) Co-ordinated Universal Time'
6. Go-to the 'Data setup' (second vertical tab) and press 'Auto create' (green button)
7. Press 'Clear and load all' (green button)

Now, the turbulence-intensity data is ready to use within your new meteo-object.



TimeStamp	MeanWin [m/s]	Direction [Degrees]	Temperat [Deg C]	OtherUID	Comment	TimeStam	SampleSt	DataStatu	DataStatu	DataStatu	DataStatu	MeanWin [m/s]	Direction [Degrees]	Temperat [Deg C]	Comment	TimeStam	SampleSt	DataStatu	DataStatu	DataStatu	StdDevWindspeedUID_100.0m	Std dev wind speed L0.00	
01/01/2009 01.00	6.805361	20.14716	1.84576	0.242895		0	0	0	0	0	0	6.847353	20.01923	0.87676		0	0	0	0	0	0	0.492844	
01/01/2009 01.30	7.120884	20.38165	1.869	0.269394		0	0	0	0	0	0	7.243273	20.90002	0.8637		0	0	0	0	0	0	0.519032	
01/01/2009 02.00	7.639295	22.49527	1.99157	0.239906		0	0	0	0	0	0	7.694291	22.48315	1.01516		0	0	0	0	0	0	0.489802	
01/01/2009 02.30	7.80997	23.31906	1.82324	0.376152		0	0	0	0	0	0	7.956246	23.50821	0.80776		0	0	0	0	0	0	0.613312	
01/01/2009 03.00	8.89789	31.40158	1.68167	0.430833		0	0	0	0	0	0	8.970412	31.21463	0.6898		0	0	0	0	0	0	0.656378	

Figure: Example of NEWA data in spreadsheet.