

Title	Comparison of turbulence modelling approaches in the low-velocity application including a higher velocity region
Author(s)	Karvinen, Aku
Citation	The 4th OpenFOAM User Conference 2016, 11 - 13 October 2016, Cologne, Germany
Date	2016
Rights	This pre-print version of the article may be downloaded for personal use only.

VTT
<http://www.vtt.fi>
P.O. box 1000
FI-02044 VTT
Finland

By using VTT Digital Open Access Repository you are bound by the following Terms & Conditions.

I have read and I understand the following statement:

This document is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of this document is not permitted, except duplication for research use or educational purposes in electronic or print form. You must obtain permission for any other use. Electronic or print copies may not be offered for sale.



Comparison of turbulence modelling approaches in the low-velocity application including a higher velocity region

Aku Karvinen

*VTT Technical Research Centre of Finland Ltd.
P.O. Box 1000, FI-02044 VTT, Finland
+358 40 510 2142
aku.karvinen@vtt.fi*

Four different turbulence modelling approaches are compared in the case of low-velocity case similar with indoor air case including a higher velocity jet shaped region similar with ventilation air inlets and the results are validated against measured results obtained using particle image velocimetry method (PIV). Four approaches are

1. without turbulence model (implicit large eddy simulation, ILES),
2. SST (shear stress transport) $k-\omega$,
3. SST $k-\omega$ SAS (scale adaptive simulation) and
4. WALE (wall-adapting local eddy-viscosity).

All simulations are performed as unsteady simulations. The grid resolution test is conducted using four different grids consisting from 2.8 million to 32 million cells. Results show that the both turbulent viscosity based methods (SST $k-\omega$ and SST $k-\omega$ SAS) are too dissipative and the results of both LES methods (ILES and WALE) give results very close to measured ones.