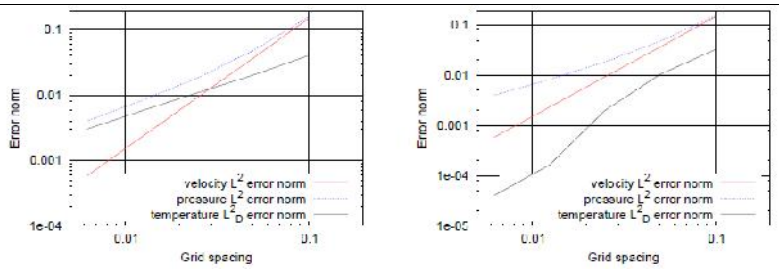
Verification type	Methodology
Database reference	MET-4
Topic / Application	Methodology Analytical Manufactured Numerical benchmark Fires Nuclear Safety
Physics	Taylor-Green Natural Convection Heated cavity
Summary	a computational code, named ISIS, dedicated to the simulation of buoyant re in a mechanically ventilated compartment, undergoes an range of verification and validation procedures, applied to buoyant flows with heat exchange (e.g. fire simulation)
Description	A new RANS code (ISIS) is developed for use in simulation of fires. Application includes nuclear safety. For the verification of the code, a wide range of techniques is employed: comparison to analytical solution for model problems, use of manufactured solution and comparison to benchmark result. The paper shows the application of each test and in all cases, convergence properties of the scheme are assessed.
Case Title	Verification and Validation of the ISIS CFD Code for Fire Simulation
Authors	S. Suard, L. Audouin, F. Babik, L. Rigollet, J.C. Latch
Year	
Online reference	ISO/TC 92/SC4 Workshop on Assessment of Calculation Methods in FSE
Case image	 Error norm for velocity pressure and temperature with upwind approximation scheme (left) and 2nd order scheme (right) in the

	transport equation.
Governing equations	$\nabla \cdot \mathbf{v} = 0$ $\frac{\partial \mathbf{v}}{\partial t} + (\mathbf{v} \cdot \nabla)\mathbf{v} = -\nabla p + \frac{1}{Re}\nabla^2 \mathbf{v} + \frac{Ra}{PrRe^2}\theta \mathbf{k} + \mathbf{S_v}$ $\frac{\partial \theta}{\partial t} + \mathbf{v} \cdot \nabla \theta = \frac{1}{PrRe}\nabla^2 \theta + S_\theta$ These NS conservation equations are solved using a MMS scheme for verification comparison
Results	