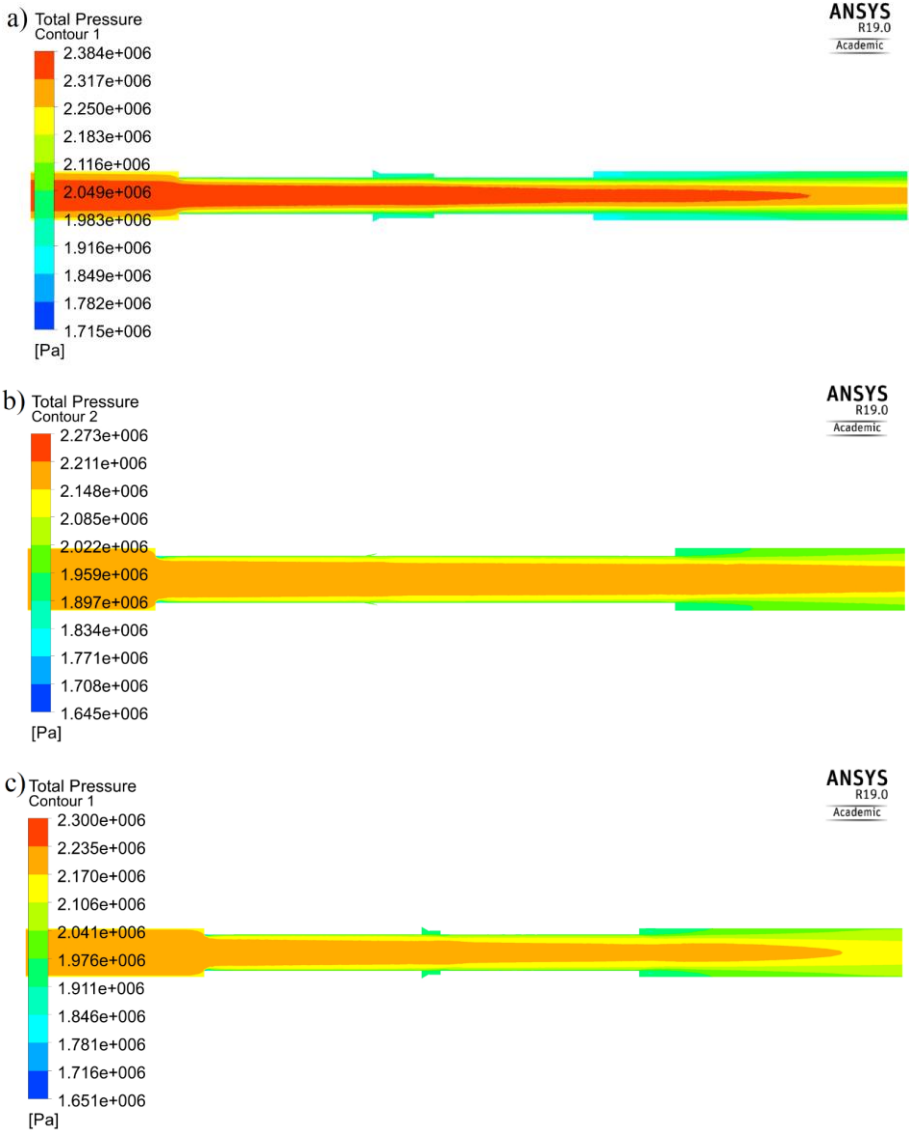
Annex A. Additional Graphical Results from the ANSYS CFD Modelling



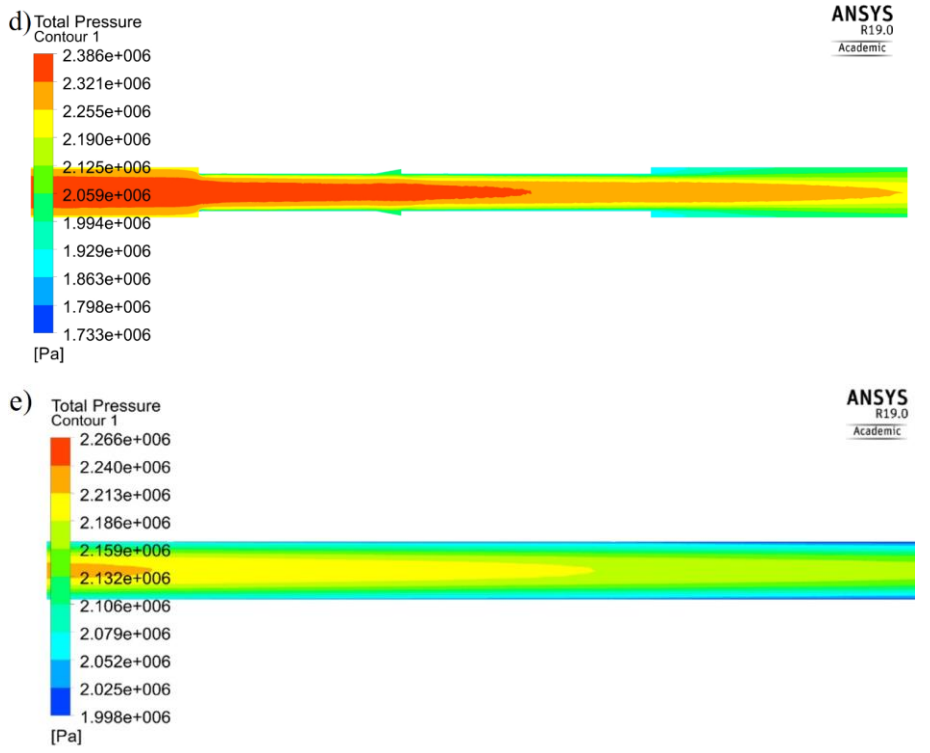
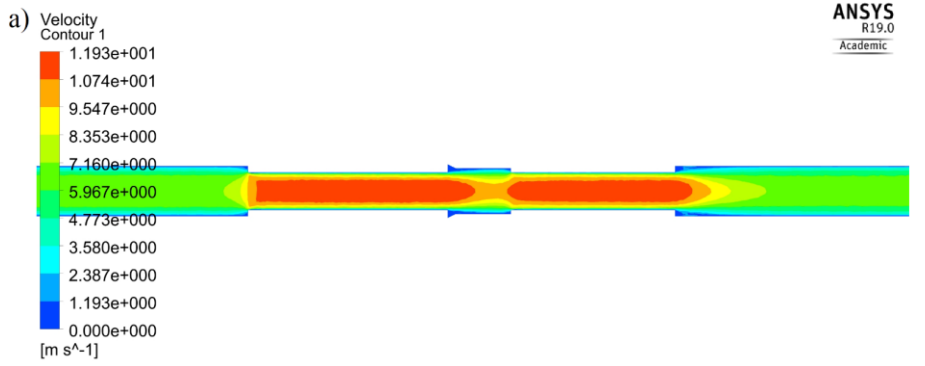
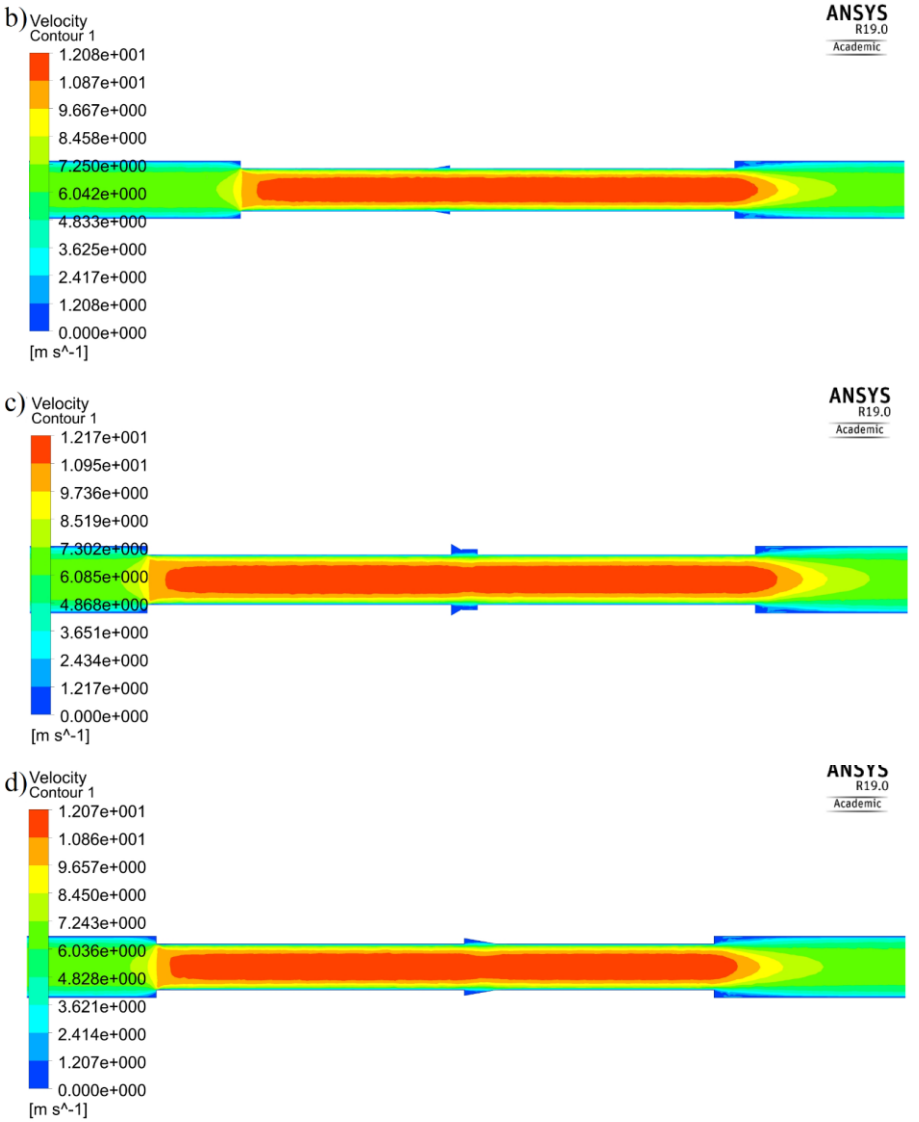


Fig. A.1. Total fluid pressure across fitting connections (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.




b) Velocity
Contour 1
1.208e+001
1.087e+001
9.667e+000
8.458e+000
7.250e+000
6.042e+000
4.833e+000
3.625e+000
2.417e+000
1.208e+000
0.000e+000
[m s^-1]
ANSYS
R19.0
Academic
c) Velocity
Contour 1
1.217e+001
1.095e+001
9.736e+000
8.519e+000
7.302e+000
6.085e+000
4.868e+000
3.651e+000
2.434e+000
1.217e+000
0.000e+000
[m s^-1]
ANSYS
R19.0
Academic
d) Velocity
Contour 1
1.207e+001
1.086e+001
9.657e+000
8.450e+000
7.243e+000
6.036e+000
4.828e+000
3.621e+000
2.414e+000
1.207e+000
0.000e+000
[m s^-1]
ANSYS
R19.0
Academic

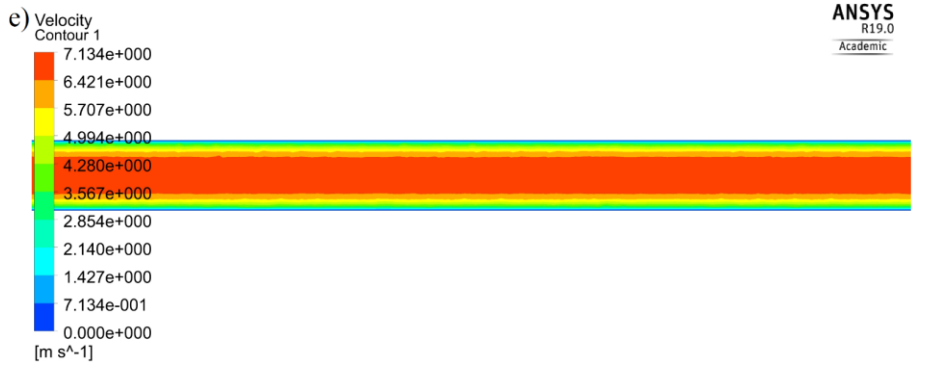
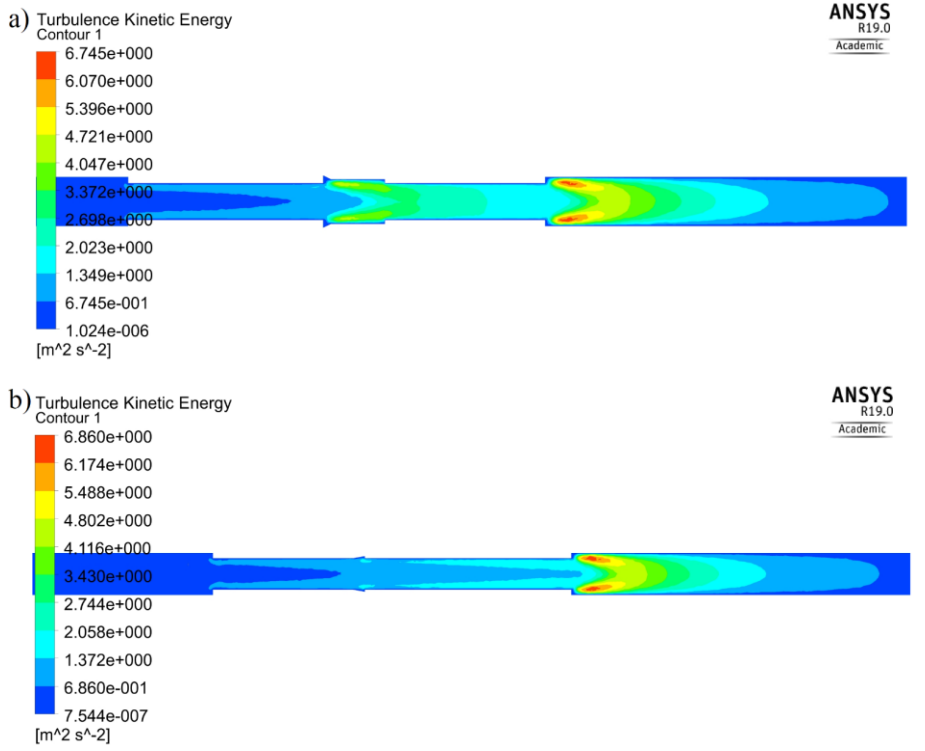


Fig. A.2. Velocity magnitude by fluid flow vectors across fitting connections (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.



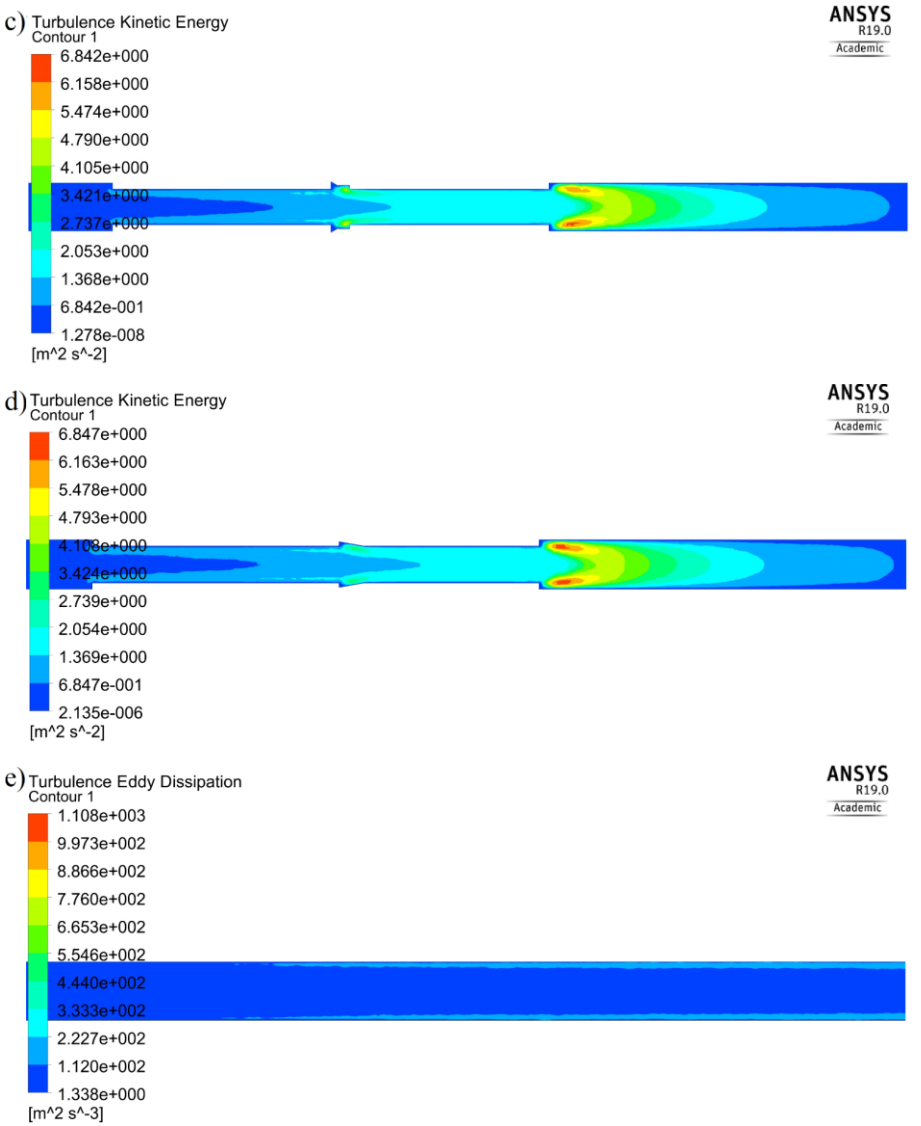
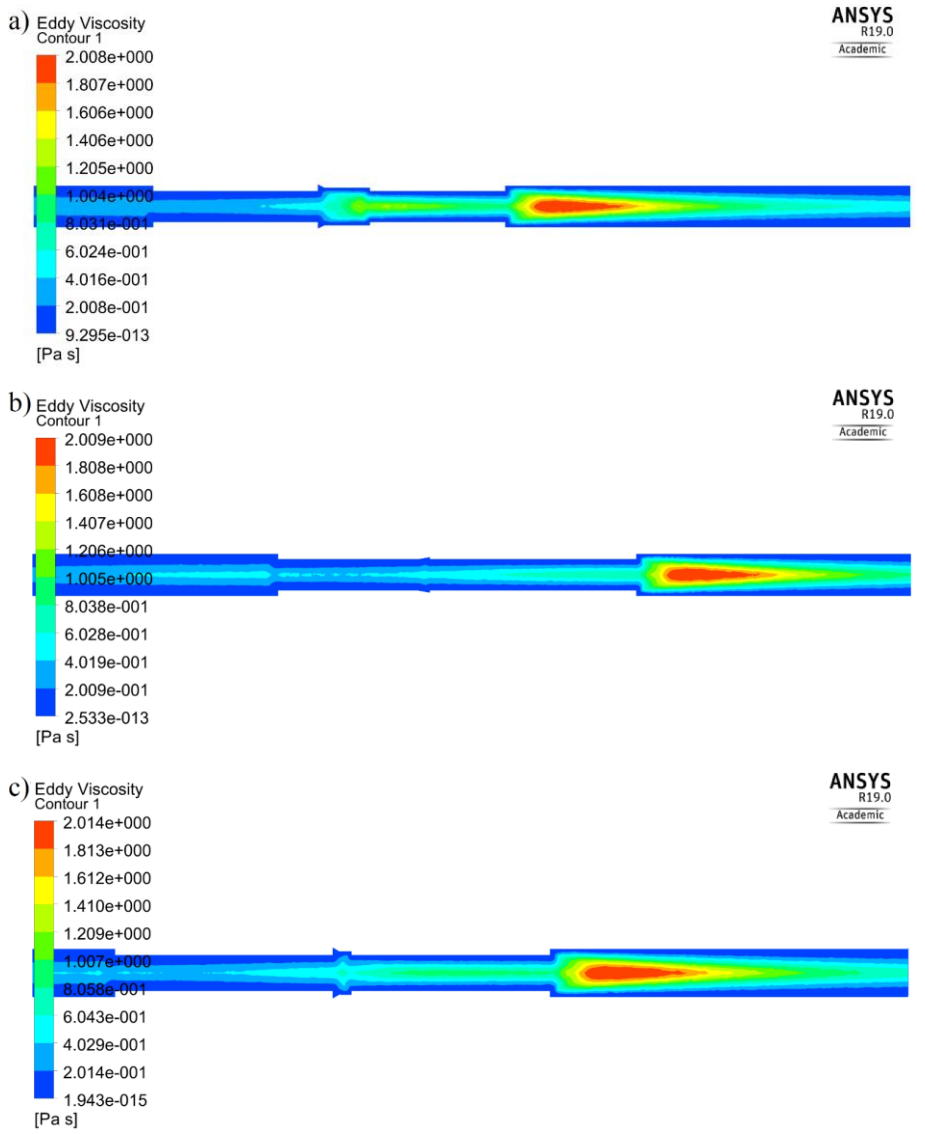


Fig. A.3. Turbulence Kinetic Energy of fluid flow across fitting connections (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.


a) Eddy Viscosity
Contour 1
2.008e+000
1.807e+000
1.606e+000
1.406e+000
1.205e+000
1.004e+000
8.031e-001
6.024e-001
4.016e-001
2.008e-001
9.295e-013
[Pa s]
ANSYS
R19.0
Academic
b) Eddy Viscosity
Contour 1
2.009e+000
1.808e+000
1.608e+000
1.407e+000
1.206e+000
1.005e+000
8.038e-001
6.028e-001
4.019e-001
2.009e-001
2.533e-013
[Pa s]
ANSYS
R19.0
Academic
c) Eddy Viscosity
Contour 1
2.014e+000
1.813e+000
1.612e+000
1.410e+000
1.209e+000
1.007e+000
8.058e-001
6.043e-001
4.029e-001
2.014e-001
1.943e-015
[Pa s]
ANSYS
R19.0
Academic

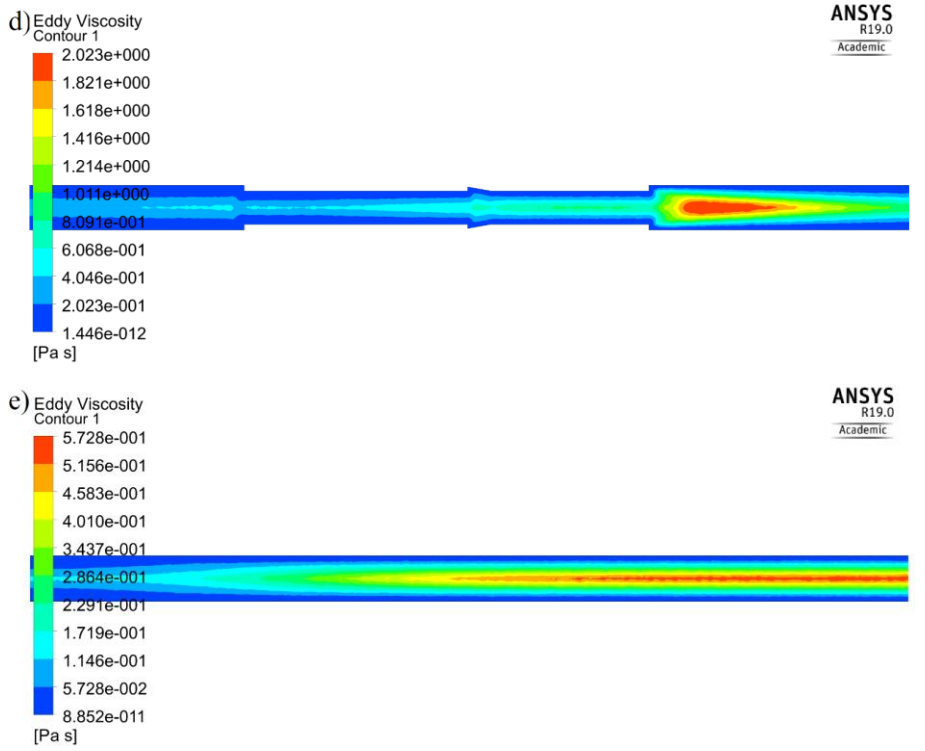
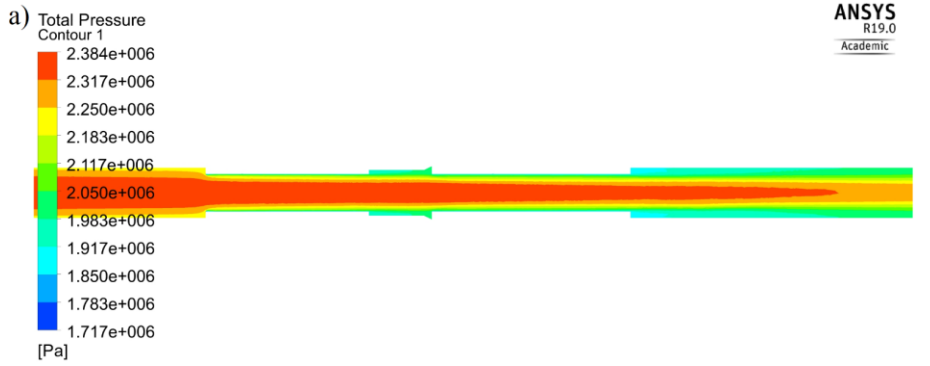
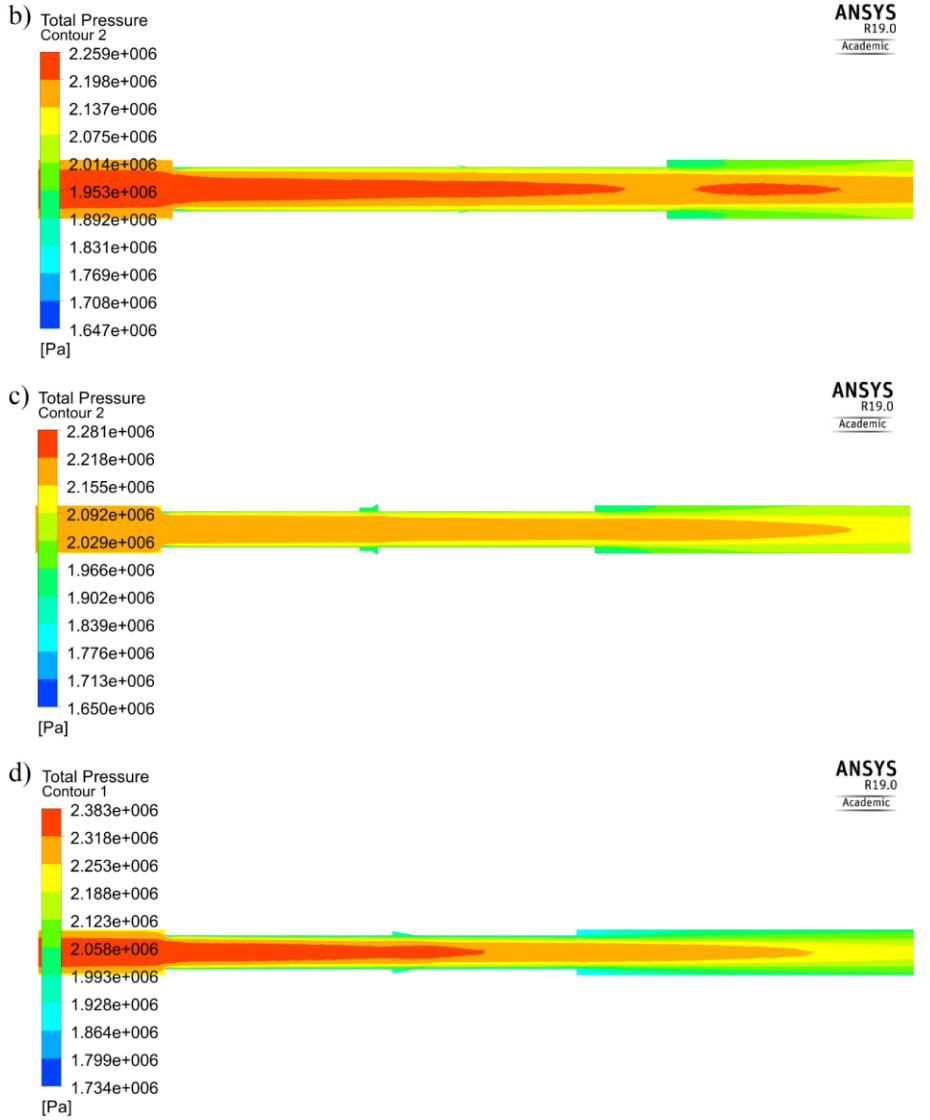


Fig. A.4. Eddy Viscosity of fluid flow across fitting connections (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection.




b)
Total Pressure
Contour 2
2.259e+006
2.198e+006
2.137e+006
2.075e+006
2.014e+006
1.953e+006
1.892e+006
1.831e+006
1.769e+006
1.708e+006
1.647e+006
[Pa]
ANSYS
R19.0
Academic
c)
Total Pressure
Contour 2
2.281e+006
2.218e+006
2.155e+006
2.092e+006
2.029e+006
1.966e+006
1.902e+006
1.839e+006
1.776e+006
1.713e+006
1.650e+006
[Pa]
ANSYS
R19.0
Academic
d)
Total Pressure
Contour 1
2.383e+006
2.318e+006
2.253e+006
2.188e+006
2.123e+006
2.058e+006
1.993e+006
1.928e+006
1.864e+006
1.799e+006
1.734e+006
[Pa]
ANSYS
R19.0
Academic

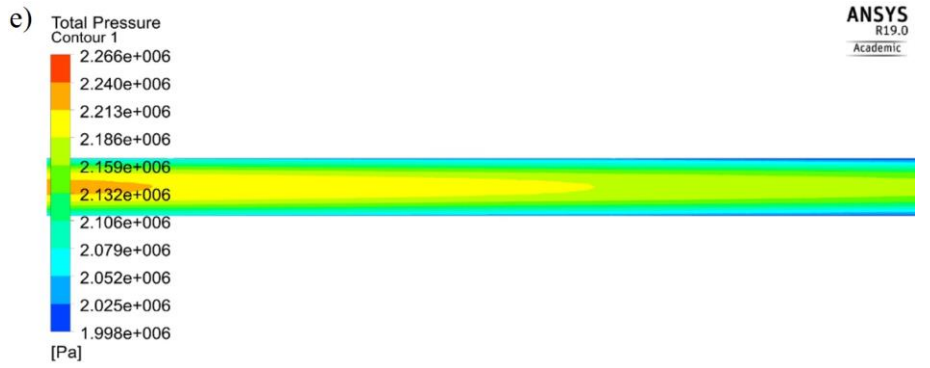
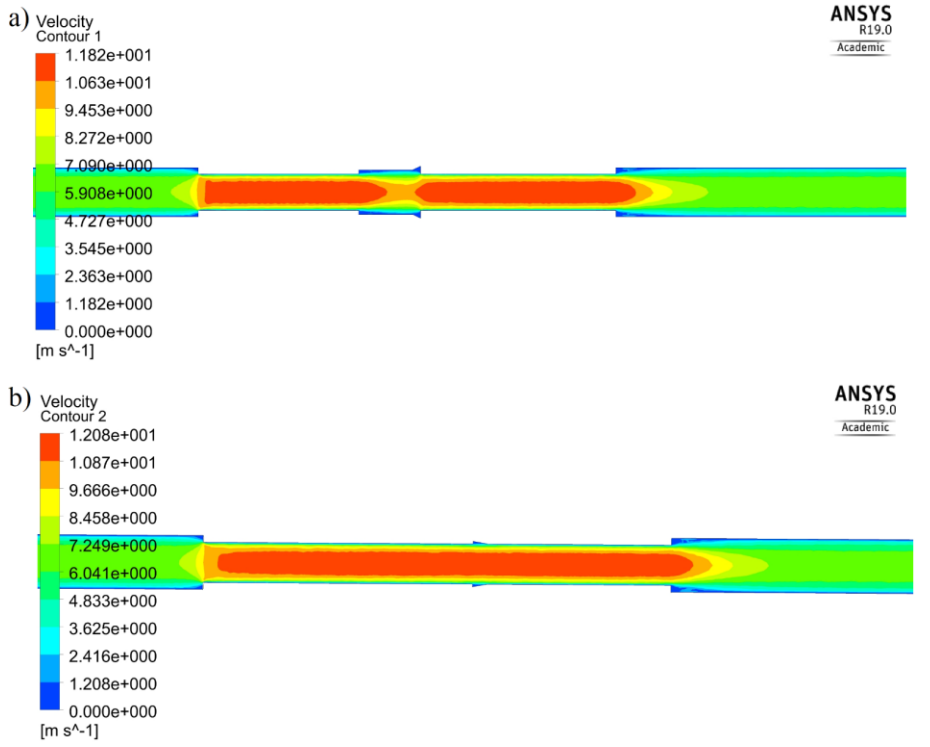


Fig. A.5. Total fluid pressure across fitting connections in backflow(by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.



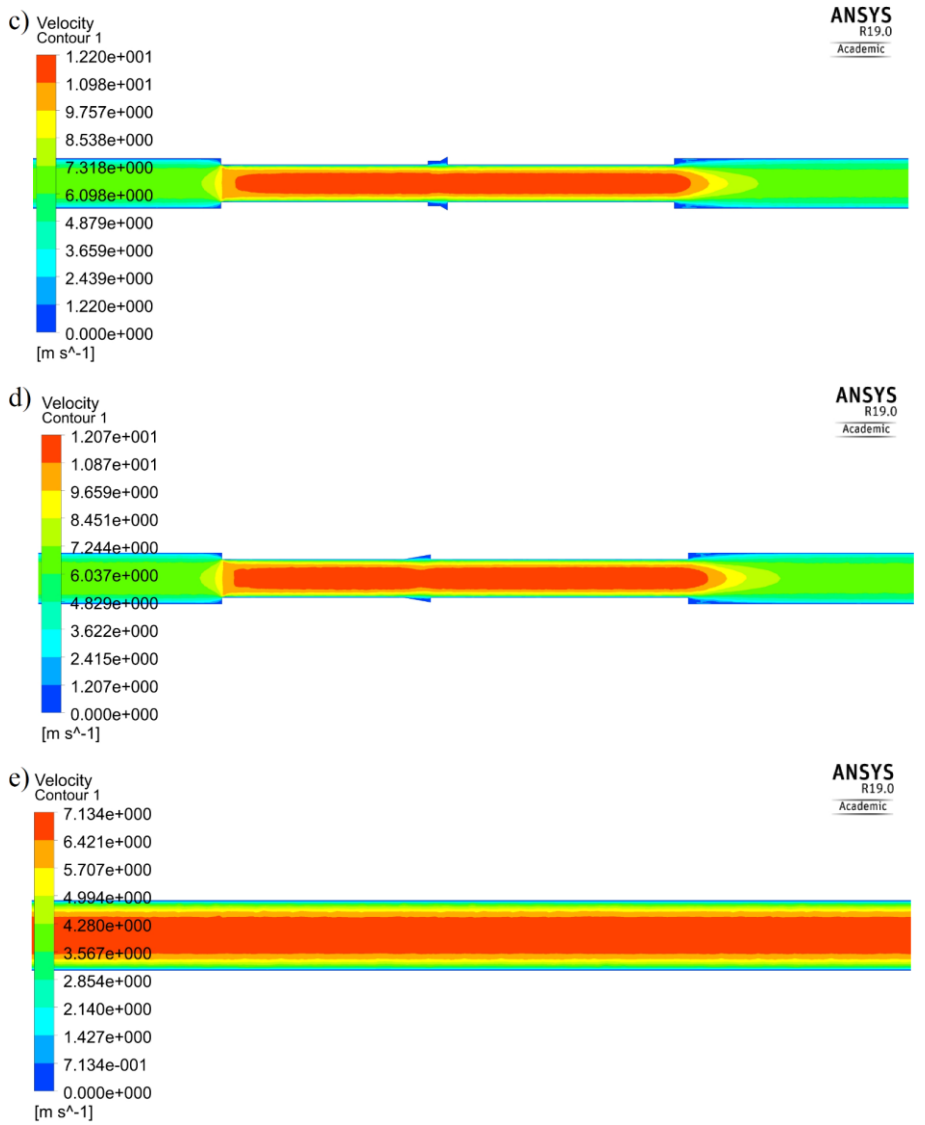
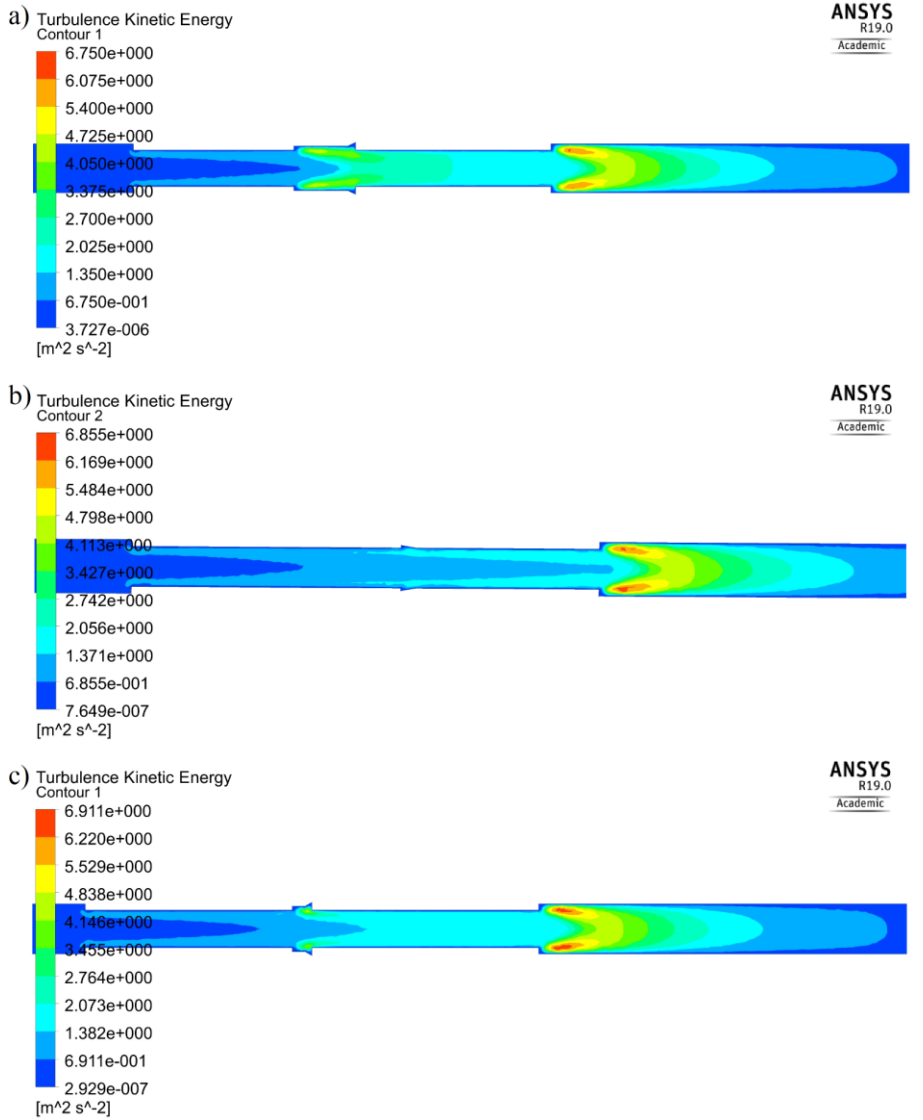


Fig. A.6. Velocity magnitude by fluid flow vectors across fitting connections in back-flow (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.


a) Turbulence Kinetic Energy
Contour 1
6.750e+000
6.075e+000
5.400e+000
4.725e+000
4.050e+000
3.375e+000
2.700e+000
2.025e+000
1.350e+000
6.750e-001
3.727e-006
[m^2 s^-2]
ANSYS
R19.0
Academic
b) Turbulence Kinetic Energy
Contour 2
6.855e+000
6.169e+000
5.484e+000
4.798e+000
4.113e+000
3.427e+000
2.742e+000
2.056e+000
1.371e+000
6.855e-001
7.649e-007
[m^2 s^-2]
ANSYS
R19.0
Academic
c) Turbulence Kinetic Energy
Contour 1
6.911e+000
6.220e+000
5.529e+000
4.838e+000
4.146e+000
3.455e+000
2.764e+000
2.073e+000
1.382e+000
6.911e-001
2.929e-007
[m^2 s^-2]
ANSYS
R19.0
Academic

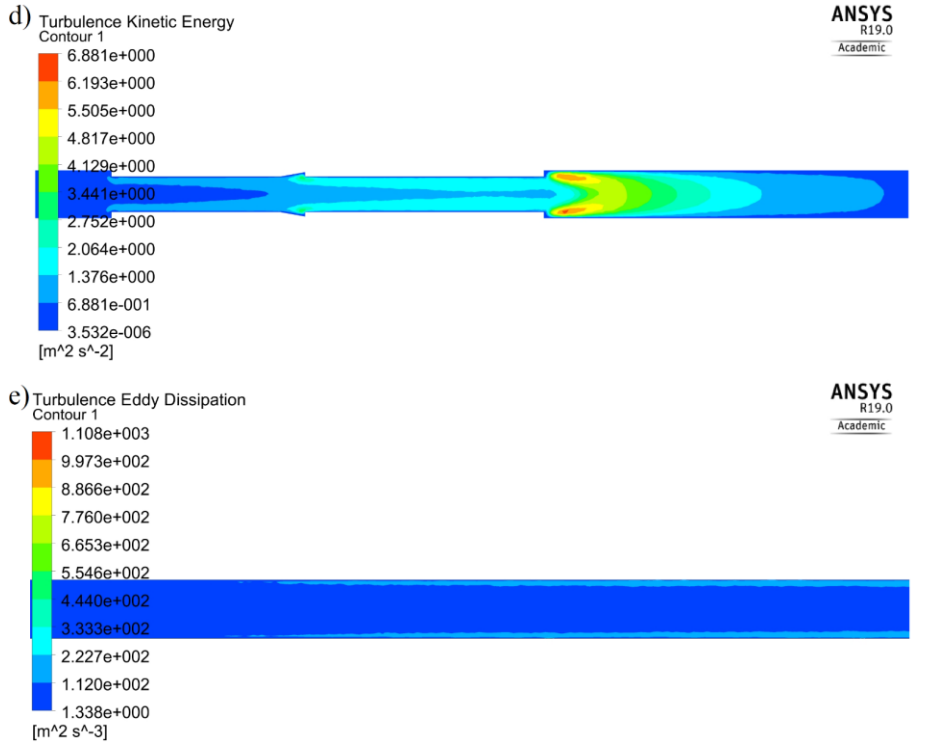
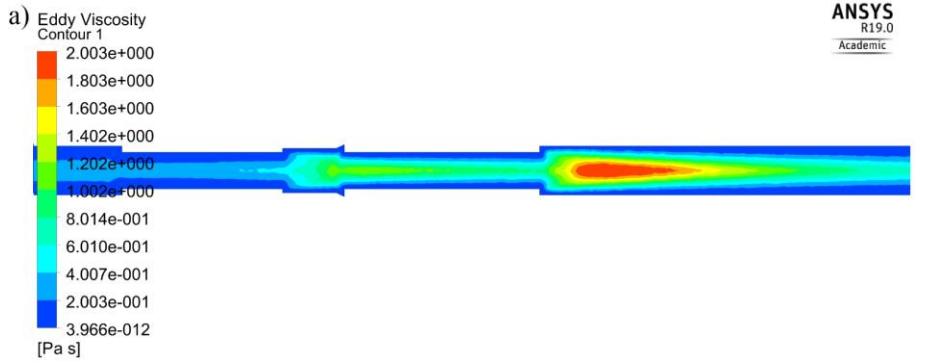
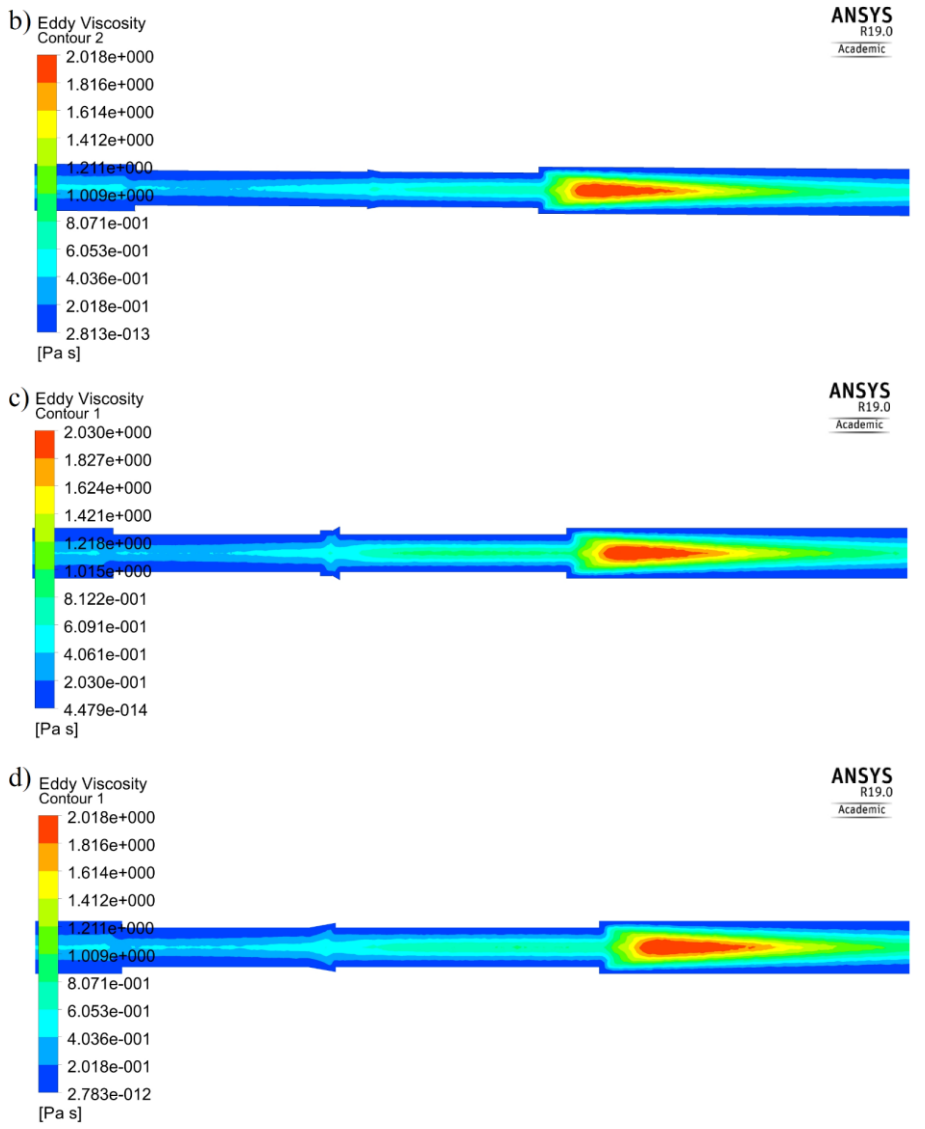


Fig. A.7. Turbulence Kinetic Energy of fluid flow across fitting connections in backflow (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection; e) equivalent length straight pipe.




b) Eddy Viscosity
Contour 2
2.018e+000
1.816e+000
1.614e+000
1.412e+000
1.211e+000
1.009e+000
8.071e-001
6.053e-001
4.036e-001
2.018e-001
2.813e-013
[Pa s]
ANSYS
R19.0
Academic
c) Eddy Viscosity
Contour 1
2.030e+000
1.827e+000
1.624e+000
1.421e+000
1.218e+000
1.015e+000
8.122e-001
6.091e-001
4.061e-001
2.030e-001
4.479e-014
[Pa s]
ANSYS
R19.0
Academic
d) Eddy Viscosity
Contour 1
2.018e+000
1.816e+000
1.614e+000
1.412e+000
1.211e+000
1.009e+000
8.071e-001
6.053e-001
4.036e-001
2.018e-001
2.783e-012
[Pa s]
ANSYS
R19.0
Academic

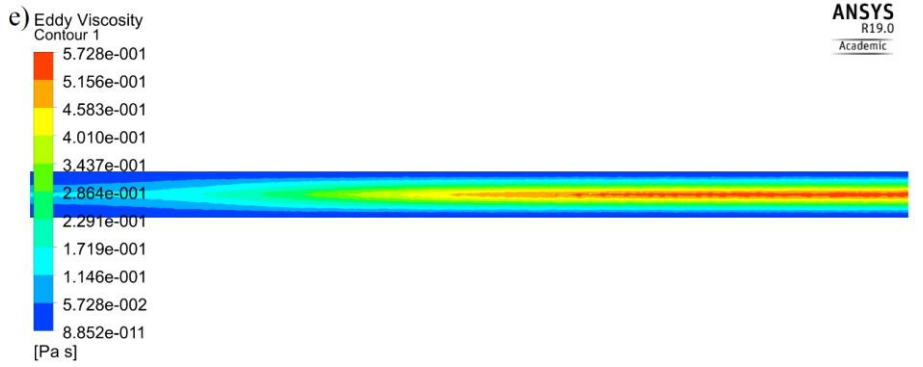


Fig. A.8. Eddy Viscosity of fluid flow across fitting connections in backflow (by Fluent modelling): a) BSP fitting connection; b) JIS fitting connection; c) DKOL fitting connection; d) ORFS fitting connection.