

RESEARCH DATA

Laminar-turbulent transition curves of single-phase and particle-laden pipe flow

Authors: [W.J. Hogendoorn](#), B. Chandra, V. Krishnan, [C. Poelma](#)

Delft University of Technology
Multiphase Systems, Faculty of Mechanical, Maritime and Materials Engineering,
Mekelweg 2
2628 CD Delft
the Netherlands

Description

This data set contains laminar-turbulent transition curves of single-phase and particle-laden pipe flow experiments performed at Delft University of Technology, as part of the ERC Consolidator Grant No. 725183 “OpaqueFlows.” The purpose of these experiments was to investigate the onset of turbulence in particle-laden pipe flows. To this end, the particle-to-pipe diameter ratio (d/D) and particle volume fraction (ϕ) were varied. The total data set consists of eight different files (.txt). Two files contain the single-phase transition curves (Re vs. f) obtained in the 10.00 ± 0.01 mm and the 19.98 ± 0.06 mm diameter pipe flow facility. The remaining files contain transition curves (Re_s vs. f) for constant d/D and increasing ϕ . Note that Reynolds number for the particle-laden cases is based on the suspension viscosity, determined using Eilers viscosity model. An overview of the data files is given in Table 1. Details about the experimental setups and measurement procedures can be found in the dissertation of W.J. Hogendoorn, available at: <http://repository.tudelft.nl/>.

This data set is being made public to serve as supplementary data for publications and the PhD dissertation of W.J. Hogendoorn. Other researchers may use this data in their own work (CC BY 4.0). The data set is available at the 4TU.Centre for Research Data via: [doi:10.4121/16586954](https://doi.org/10.4121/16586954).

Table 1: Overview of data files

filename	number of transition curves	Volume fraction (ϕ)	Pipe diame- ter (D) in m	Continuous phase
tcurve_single-phase_01.txt	1	0	0.01	Saline water
tcurve_single-phase_02.txt	1	0	0.02	Glycerin
tcurve_d_D=0.03.txt	3	0.055, 0.115, 0.1625	0.01	Glycerin
tcurve_d_D=0.053.txt	8	0.01, 0.02, 0.05, 0.08, 0.10, 0.14, 0.175, 0.20	0.01	Saline water
tcurve_d_D=0.065.txt	10	0.002, 0.005, 0.0075, 0.01, 0.015, 0.03, 0.05, 0.075, 0.10, 0.15	0.02	Glycerin
tcurve_d_D=0.088.txt	12	1.76e-04, 3.91e-04, 7.93e-04, 0.0015, 0.0050, 0.0075, 0.010, 0.020, 0.05, 0.10, 0.15, 0.20	0.02	Glycerin
tcurve_d_D=0.13.txt	9	0.001, 0.005, 0.01, 0.02, 0.05, 0.09, 0.15, 0.20, 0.25	0.01	Saline water
tcurve_d_D=0.18.txt	9	0.00025, 0.0005, 0.001, 0.0025, 0.005, 0.01, 0.02, 0.03, 0.05	0.01	Saline water