

Distance	Q1	Q2	C1	C2	Q3	C3	Q4	C4
5.6D	0.4	0.4	211	2.17	0.343	90.1	0.353	133.9
5.6D	0.211	0.206	208	1.76	0.172	87	0.177	128.1
5.6D	0.41	0.206	211	2.17	0.253	121.8	0.256	172
5.6D	0.427	0.14	211	2.17	0.232	142.6	0.232	182.2
5.6D	0.224	0.432	208	1.76	0.278	73.3	0.271	82.2
5.6D	0.224	0.432	208	1.76	0.277	71.8	0.27	80.9
5.6D	0.12	0.36	219	2.15	0.176	138.8	0.173	58.1
10D	0.203	0.206	208	1.76	0.173	99.9	0.173	117.1
10D	0.421	0.221	208	1.76	0.263	124.4	0.27	149.6
10D	0.435	0.165	208	1.76	0.254	138.2	0.25	164.3
10D	0.22	0.426	214	2.2	0.278	78.6	0.27	79.2
10D	0.143	0.432	214	2.2	0.238	62.4	0.238	60
15D	0.266	0.272	217	2.17	0.222	108.9	0.226	116.9
15D	0.431	0.218	217	2.17	0.277	140	0.258	156
15D	0.435	0.14	217	2.17	0.235	159.7	0.238	175.5
15D	0.22	0.428	217	2.17	0.268	79.5	0.27	78
15D	0.138	0.423	214	1.96	0.238	58.1	0.238	57.4
20D	0.362	0.355	216	1.66	0.3	109.9	0.301	116.6
25D	0.207	0.21	206	3.3	0.179	103.1	0.171	107.65
30D	0.239	0.241	216	2.34	0.191	109.2	0.186	112.4
70D	0.082	0.08	216	2.34	0.0673	113.9	0.0676	114.2
120D	0.07	0.072	216	2.34	0.056	113.9	0.056	113.9
130D	0.397	0.383	195.4	2.12	0.317	102.6	0.328	102.5
150D	0.397	0.383	195.4	2.12	0.312	102.5	0.347	102.4

Table S1. Experimental results for S configuration where Q is pipe flow (l/s) and C is measured conductivity ($\mu\text{S}/\text{cm}$)

Distance	Q1	Q2	C1	C2	Q3	C3	Q4	C4
5.6D	0.42	0.42	207	2.09	0.353	131.7	0.345	81
5.6D	0.199	0.21	207	2.09	0.166	124.2	0.169	82.4
5.6D	0.211	0.42	207	2.09	0.265	74.1	0.268	70.1
5.6D	0.139	0.428	207	2.09	0.242	54.8	0.241	58.3
5.6D	0.431	0.218	207	2.09	0.248	169.8	0.262	100.2
5.6D	0.427	0.144	207	2.09	0.242	186.7	0.241	125.8
10D	0.425	0.422	206	2.43	0.349	118.6	0.352	95.2
10D	0.224	0.226	206	2.43	0.185	118.3	0.187	97.5
10D	0.207	0.424	206	2.43	0.266	70.2	0.265	71.3
10D	0.135	0.428	206	2.43	0.24	52.1	0.235	54.4
10D	0.431	0.214	206	2.43	0.277	158.4	0.257	120.2
10D	0.44	0.218	204	2.1	0.27	160	0.277	119.6
10D	0.444	0.148	204	2.1	0.246	172.4	0.247	135.3
15D	0.414	0.411	204	2.1	0.346	113.9	0.343	99.2
15D	0.406	0.403	204	2.1	0.341	113.6	0.341	98.1
15D	0.207	0.424	204	2.1	0.261	71.3	0.267	71.7
15D	0.144	0.424	204	2.1	0.238	53.5	0.238	54.6
15D	0.427	0.214	204	2.1	0.268	150.6	0.267	125.1
15D	0.431	0.144	204	2.1	0.239	165.7	0.242	142.1
20D	0.41	0.403	204	2.1	0.341	110.5	0.341	101.4
25D	0.41	0.399	204	2.1	0.34	110	0.336	102
30D	0.418	0.411	197.7	1.9	0.342	106.2	0.351	99.7
70D	0.412	0.403	195.4	2.13	0.334	103	0.339	101.5
120D	0.401	0.403	218	2.13	0.323	111.7	0.332	111.8
130D	0.397	0.383	218	2.13	0.317	102.6	0.328	102.5
150D	0.412	0.403	195.4	2.13	0.317	102.5	0.341	102.6

Table S2. Experimental results for U configuration where Q is pipe flow (l/s) and C is measured conductivity ($\mu\text{S}/\text{cm}$)

Distance	Inlet flow ratio Q1/Q2	Experiment C4/C1	Passive Scalar C4/C1	Multiphase C4/C1
5.6D	1:1	0.588	0.610	0.610
5.6D	2:1	0.801	0.806	0.820
5.6D	3:1	0.857	0.870	0.880
5.6D	1:2	0.342	0.372	0.364
5.6D	1:3	0.239	0.255	0.247
10D	1:1	0.563	0.556	0.564
10D	2:1	0.719	0.737	0.750
10D	3:1	0.790	0.803	0.816
10D	1:2	0.370	0.362	0.360
10D	1:3	0.280	0.254	0.248
15D	1:1	0.539	0.532	0.534
15D	2:1	0.719	0.716	0.724
15D	3:1	0.809	0.804	0.808
15D	1:2	0.359	0.353	0.349
15D	1:3	0.286	0.249	0.245
25D	1:1	0.5	0.516	0.516

Table S3. Experimental and numerical results for S configuration

Distance	Inlet flow ratio Q1/Q2	Experiment C4/C1	Passive Scalar C4/C1	Multiphase C4/C1
5.6D	1:1	0.398	0.394	0.389
5.6D	2:1	0.484	0.515	0.496
5.6D	3:1	0.608	0.610	0.595
5.6D	1:2	0.339	0.235	0.247
5.6D	1:3	0.282	0.235	0.247
10D	1:1	0.462	0.440	0.437
10D	2:1	0.583	0.587	0.571
10D	3:1	0.663	0.673	0.661
10D	1:2	0.346	0.311	0.316
10D	1:3	0.264	0.236	0.241
15D	1:1	0.486	0.460	0.427
15D	2:1	0.613	0.611	0.600
15D	3:1	0.697	0.697	0.690
15D	1:2	0.351	0.319	0.320
15D	1:3	0.268	0.251	0.253
25D	1:1	0.5	0.4825	0.4809

Table S4. Experimental and numerical results for U configuration

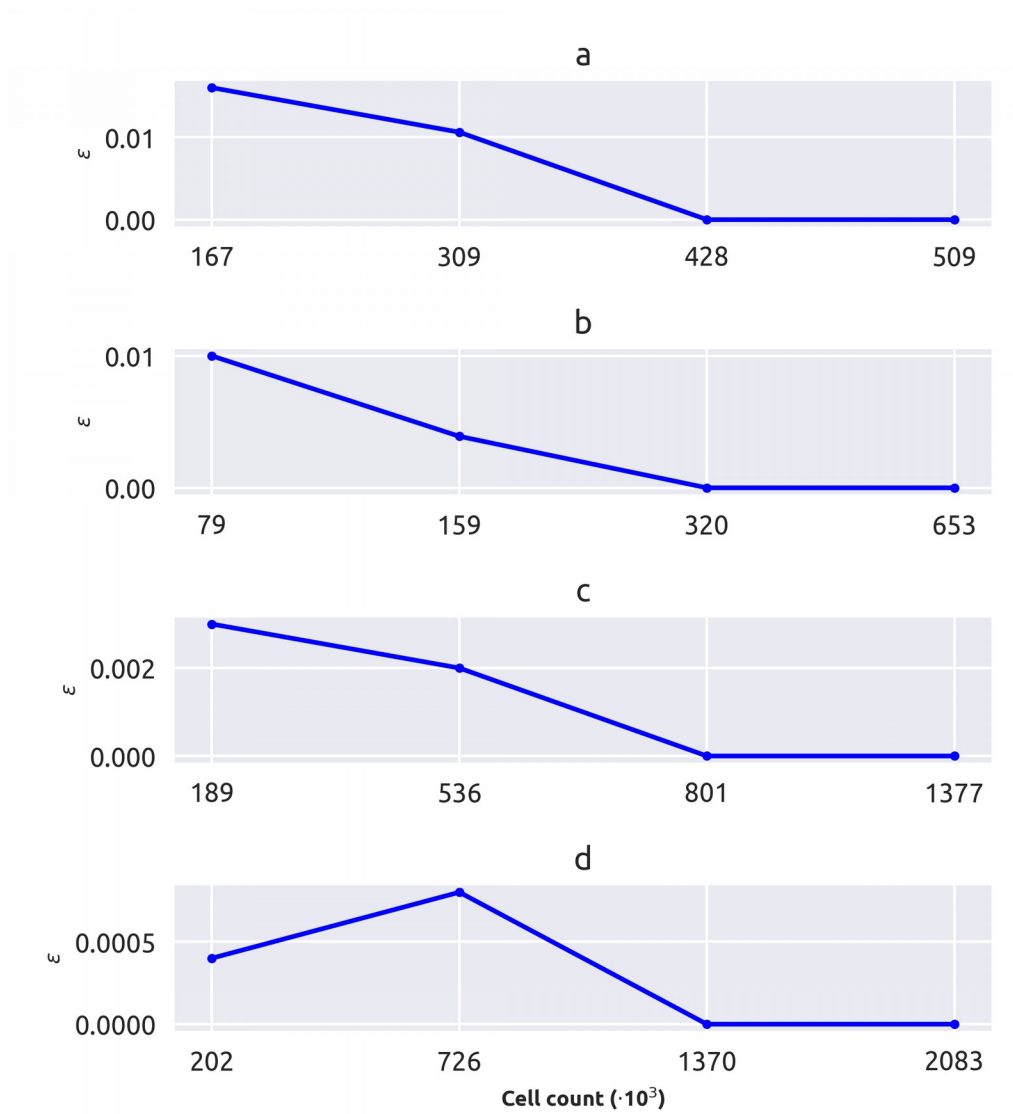


Figure S1. Mesh independence test where ϵ is the absolute error of main inlet pipe conductivity ratio Rf for every mesh size of the S configuration from the converged value of Rf for the mesh with most cells: (a) 5.6D (b) 10D (c) 15D (d) 25D