Supplementary data for "Decomposition of the drag force in steady and oscillatory flow through a hexagonal sphere pack"

Volume-averaged momentum budget

For each simulation, we provide an ASCII file of comma-separated values (*.csv*) which contains the following data:

Name	*Symbol*	*Description*
`TIME`	t	simulation time
`FX`	$\boldsymbol{f} \cdot \boldsymbol{e}_x$	macroscopic pressure gradient in x-direction
`DUBULKDT`	$\frac{\mathrm{d}\langle u \rangle_\mathrm{s}}{\mathrm{d}t}$	superficial volume-averaged acceleration in x-direction
`FDRAG`	$f_{\tau_\mathrm{w} x}$	friction drag in x-direction
`PDRAG`	f_{px}	total pressure drag in x-direction
`PACC`	$f_{px}^{(a)}$	accelerative pressure drag in x-direction
`PVISC`	$f_{px}^{(v)}$	viscous pressure drag in x-direction
`PCONV`	$f_{px}^{(c)}$	convective pressure drag in x-direction

All quantities are made dimensionless with d, ν and ρ. The values are reported for every snapshot of the simulation.

Volume-averaged velocity and kinetic energy

For each simulation of the cases LF5, LF6, MF5, MF6, HF5, we provide an ASCII file of comma-separated values (*.csv*) which contains the following data:

Name	*Symbol*	*Description*
`TIME`	t	simulation time
`UBULK`	$\langle u \rangle_\mathrm{s}$	superficial volume-averaged velocity in x-direction
`VBULK`	$\langle v \rangle_\mathrm{s}$	superficial volume-averaged velocity in y-direction
`WBULK`	$\langle w \rangle_\mathrm{s}$	superficial volume-averaged velocity in z-direction
`UUBULK`	$\langle u^2 \rangle_\mathrm{s}$	superficial volume-averaged square of the velocity in x-direction
`VVBULK`	$\langle v^2 \rangle_\mathrm{s}$	superficial volume-averaged square of the velocity in y-direction
`WWBULK`	$\langle w^2 \rangle_\mathrm{s}$	superficial volume-averaged square of the velocity in z-direction

The simulations were performed with spheres of diameter $d = 1$, a fluid density $\rho = 1$ and a dynamic viscosity $\mu = 1$. The forcing is defined as $\boldsymbol{f} = f_x \sin \Omega t \, \boldsymbol{e}_x$ with the amplitudes and frequencies given as

Case	*Amplitude* f_x	*Frequency* Ω
LF5	$10^{6.5}$	10^2
LF6	10^7	10^2
MF5	$10^{6.5}$	10^3
MF6	10^7	10^3
HF5	$10^{7.5}$	10^4

For the cases LF1–LF4, MF1–MF4 and HF1–HF4, the corresponding dataset is available as supplementary data to the article

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