

Figure 1. Schematic Geometry

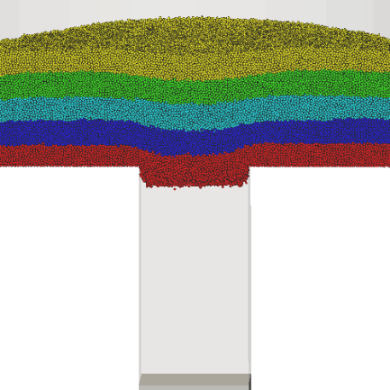
Table 1. Physical Properties

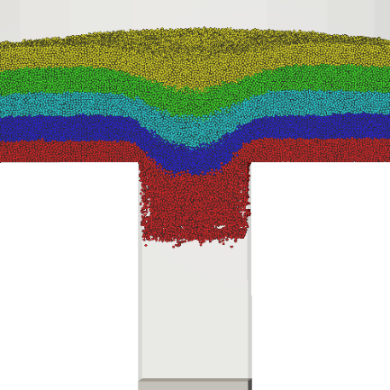
|  |  |
| --- | --- |
| Gas phase |  |
| Viscosity | 1.8×10-5 Pa・s |
| Density | 1 kg/m3 |
| Solid phase |  |
| Density | 1500 kg/m3 |
| Spring constant | 50 N/m |
| Coefficient of restitution | 0.9 |
| Coefficient of friction | 0.3 |

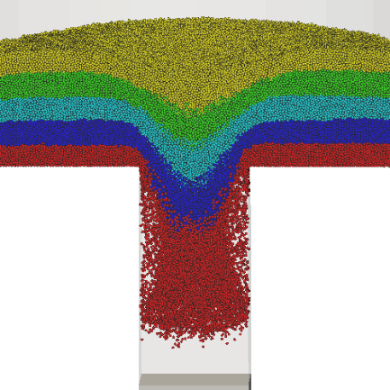
Table 2. Calculation conditions

|  |  |
| --- | --- |
| Particle diameter | 250 μm |
| Number of particles | 500,000 |
| Grid size | 0.5 mm |
| Calculation time | 0.24 s |

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 0.02 s

 0.04 s

 0.06 s

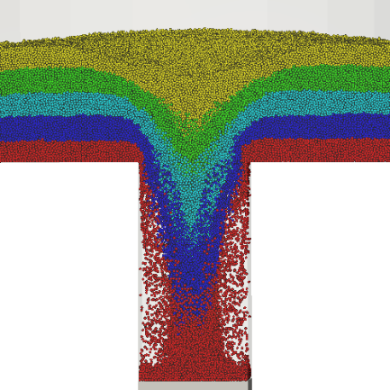
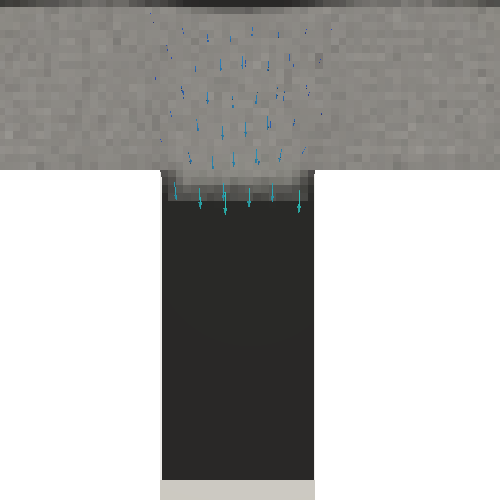
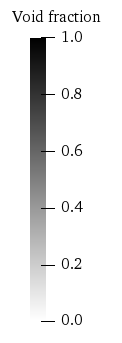
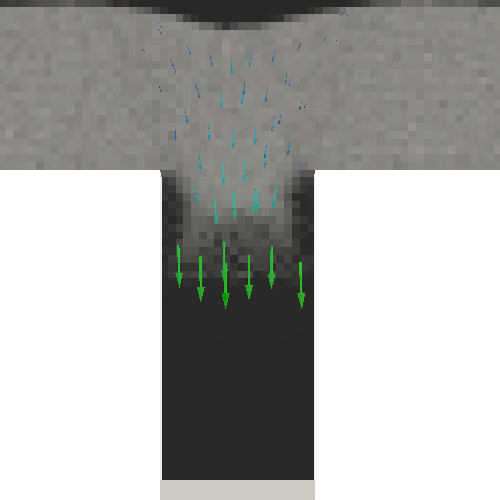
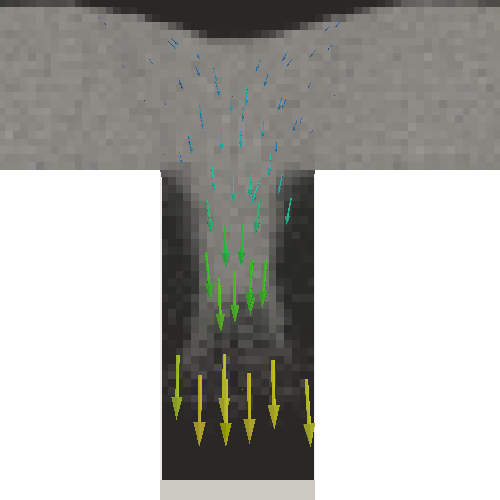
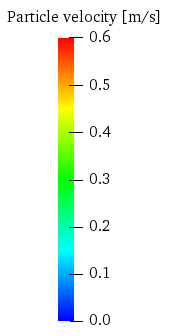
 0.08 s

Figure 2. Particle distribution

 0.02s

 0.04s

 0.06s

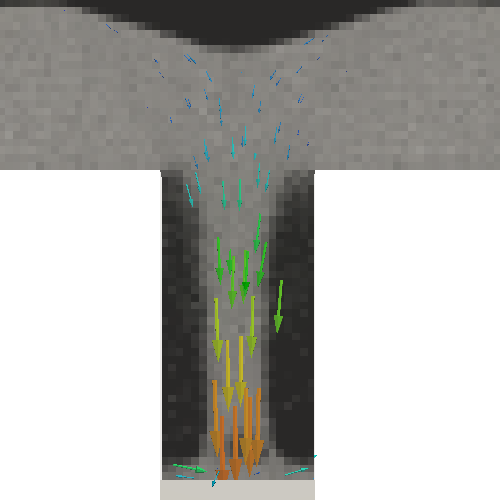
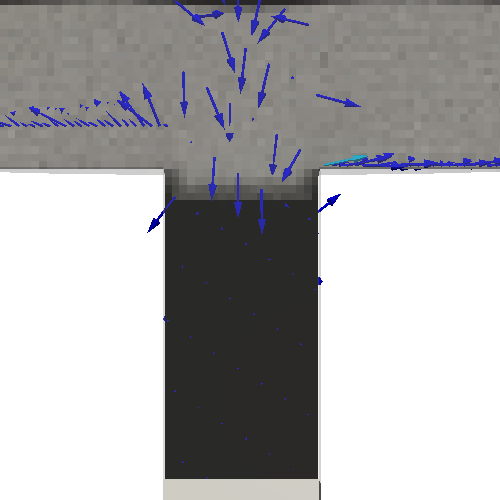
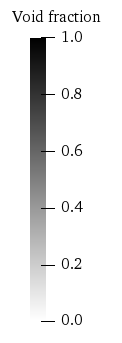
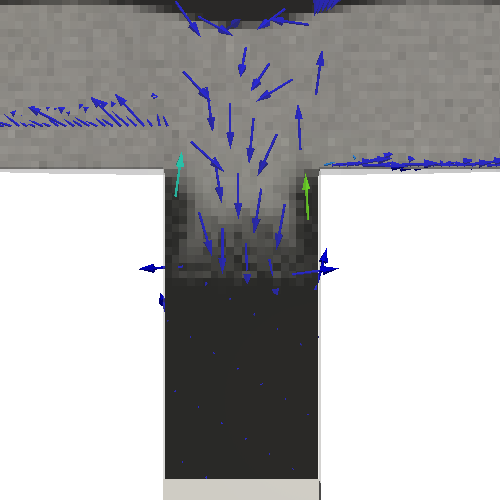
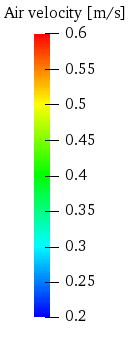
 0.08s

Figure 3. Particle velocity and void fraction rate

 0.02s

 0.04s

 0.06s

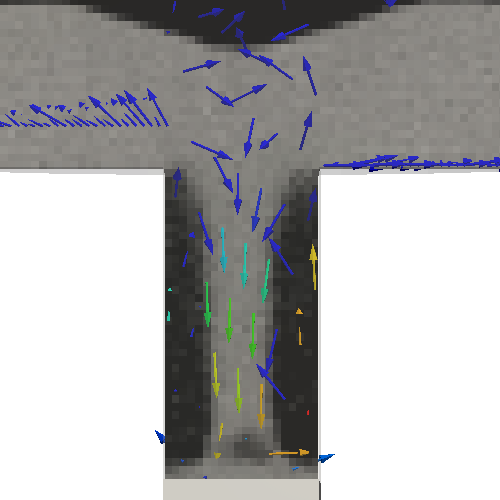
 0.08s

Figure 4. Air velocity and void fraction rate

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下杵降下速度100, 300, 500, 700 [mm/s]

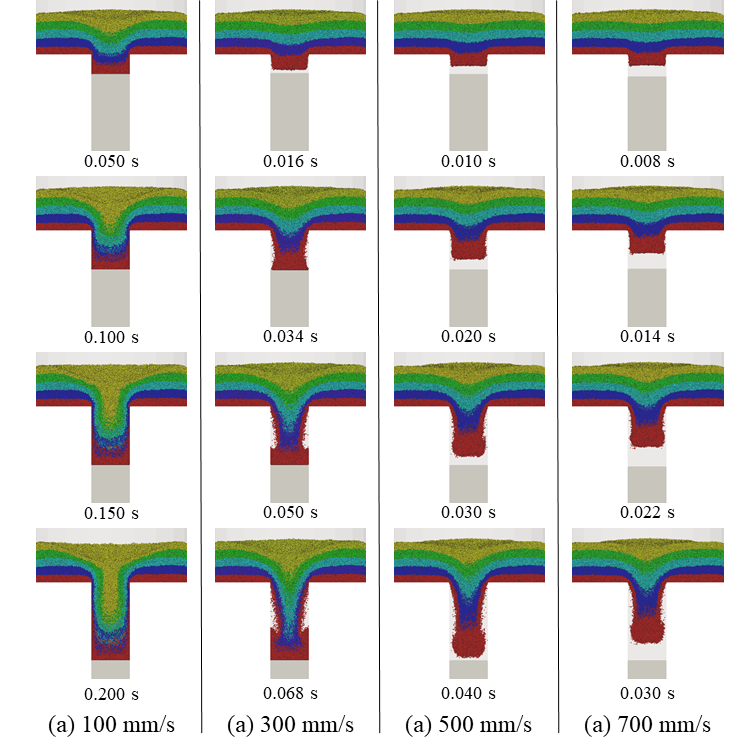


Figure 5. Particle distribution

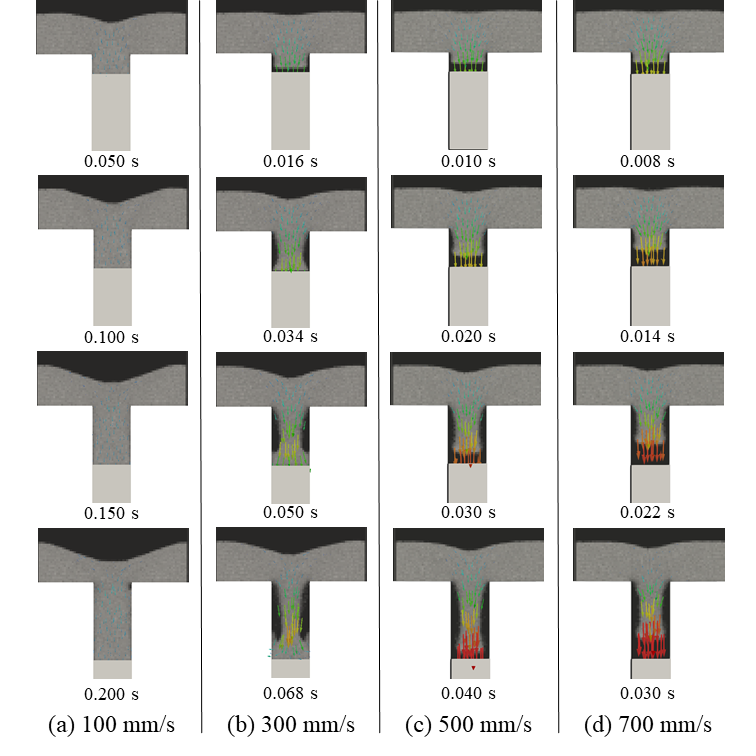
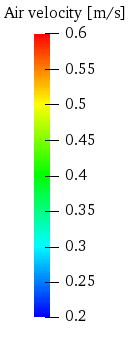
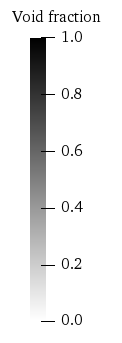
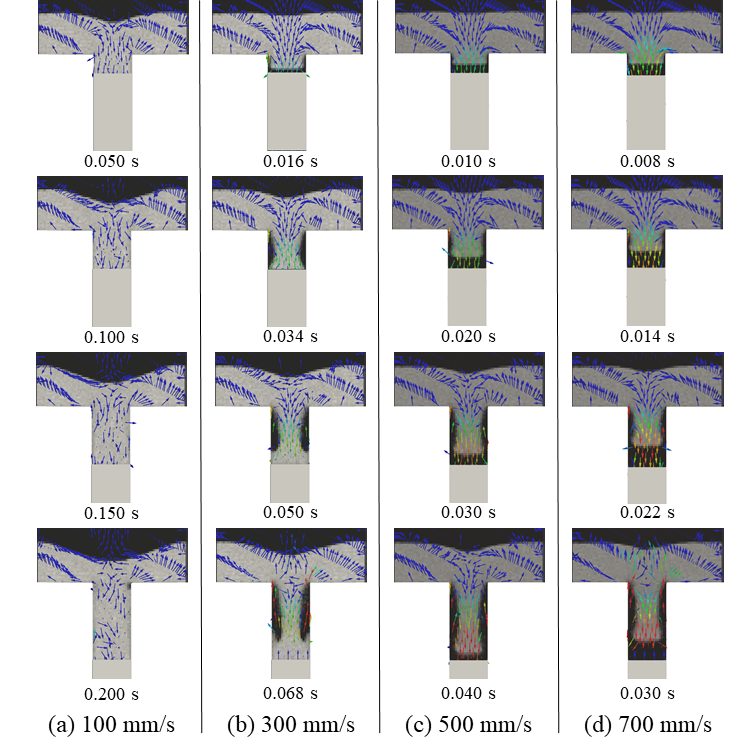
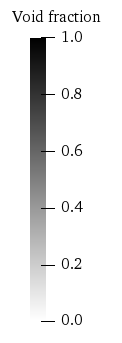
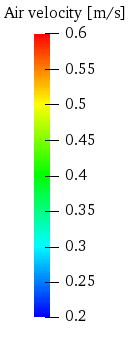


Figure 6. Particle velocity and void fraction rate



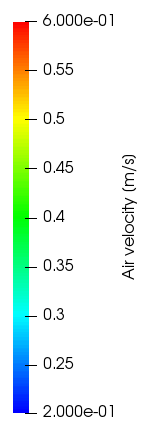


Figure 7. Air velocity and void fraction rate



Figure 8. Number of particles in die region



Figure 9. Flux of powder flow

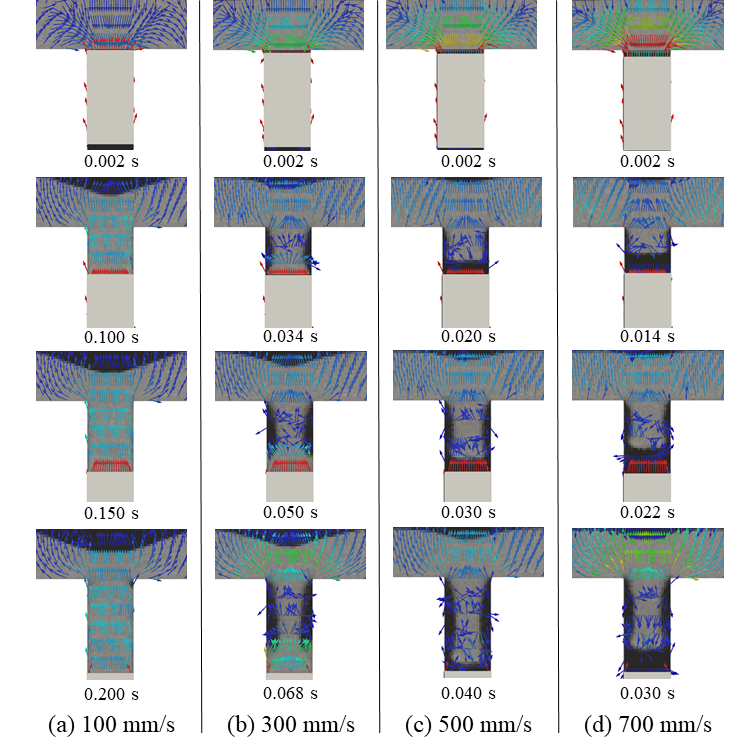
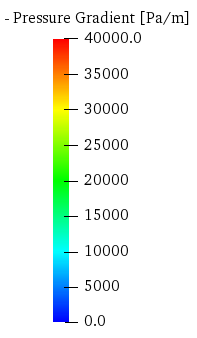
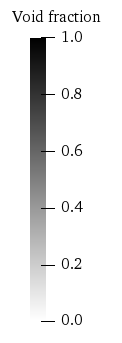
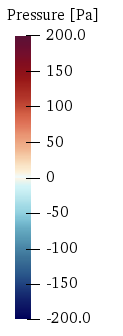


Figure 10. Pressure gradient



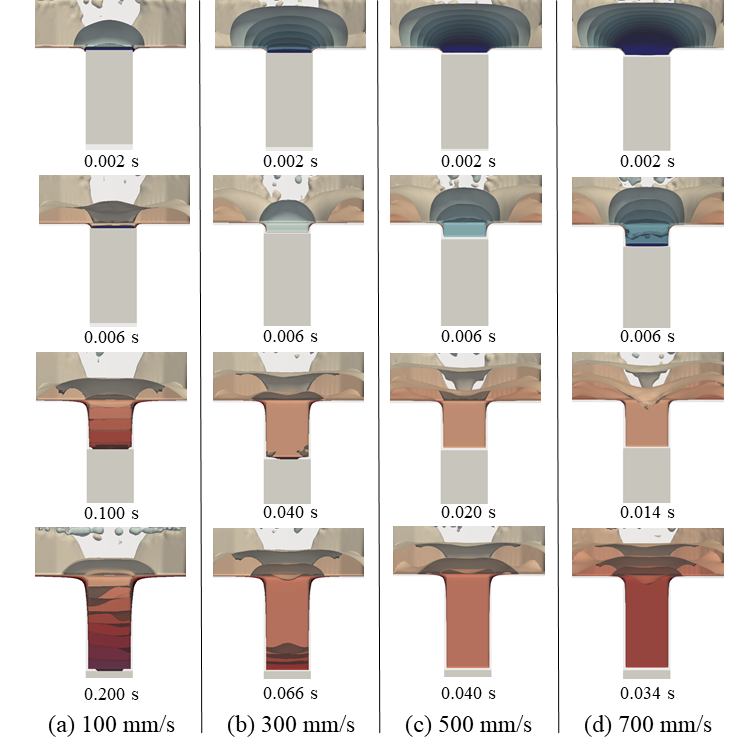
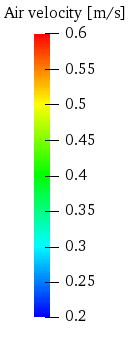
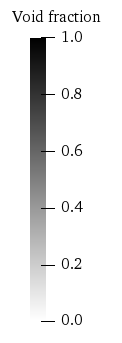


Figure 10\*. Pressure contour



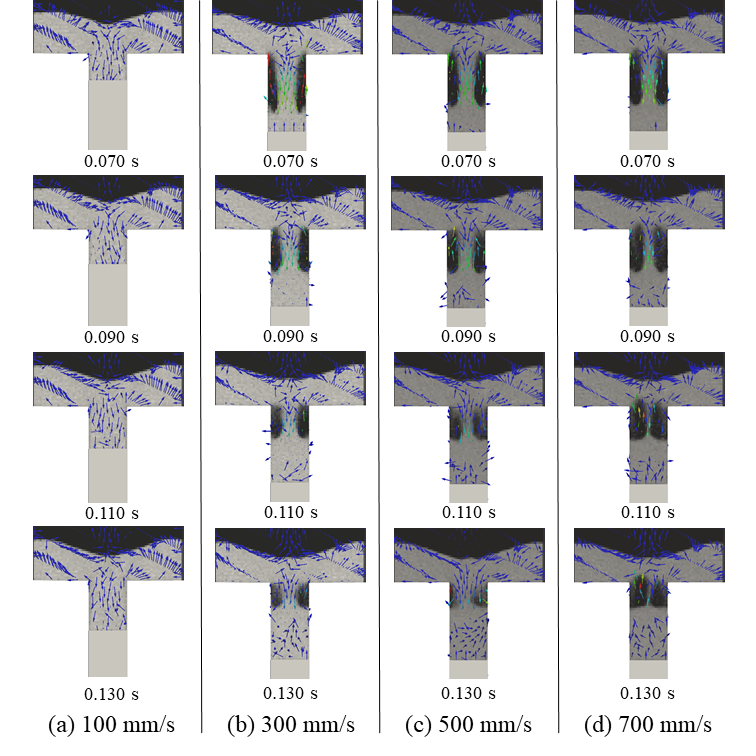


Figure 11. Bubble velocity



Figure 12. Filling time