Table 1. Specifications of 2-stroke BUSDIG engine.

Table 2. Simulation conditions.

Table 3. Injection strategies.

Figure 1. Design of the 2-stroke BUSDIG engine [37].

Figure 2. Schematic diagram of scavenge ports and combustion chamber design.

Figure 3. Piston shape designs.

Figure 4. Schematic diagram of the normalized scavenge port opening area (SA’) and exhaust valve lift profiles (EL’) profiles.

Figure 5. Boost pressure for different piston designs at different engine speeds.

Figure 6. The intake scavenging flow rate profiles with different piston shapes at 2000 rpm.

Figure 7. The RGF profiles in the cylinder and exhaust at 2000 rpm.

Figure 8. The in-cylinder RGF distributions at different RGFcylin for different piston shapes.

Figure 9. Evolution of DR with crank angle for different piston designs.

Figure 10. Evolution of TE, SE and CE with DR.

Figure 11. Effect of piston shape on the evolutions of SR, TR and CTR.

Figure 12. Impact of the piston shape on SR, TR and CTR at 340 ⁰CA with different injection strategies.

Figure 13. Impact of the piston shape on TKE in whole cylinder and spark zone at 340 ⁰CA with different injection strategies.

Figure 14. Impact of the piston shape on the fuel/air equivalence ratio (ER) with single injection at SOI of (a) 250 ⁰CA and (b) 300 ⁰CA.

Figure 15. The f/a ER distribution at 270 ⁰CA and 340 ⁰CA for SOI of 250 ⁰CA for all pistons.

Figure 16. The f/a ER distribution at 320 ⁰CA and 340 ⁰CA for SOI of 300 ⁰CA for all pistons.

Figure 17. Impact of the piston shape on the fuel/air equivalence ratio (ER) with split injections at SOI of (a) 250/300 ⁰CA, (b) 250/310 ⁰CA and (c) 250/320 ⁰CA.

Figure 18. The f/a ER distribution at 320 ⁰CA and 340 ⁰CA for split injection at 250/300 ⁰CA for all pistons.

Figure 19. The f/a ER distribution at 320 ⁰CA and 340 ⁰CA for split injection at 250/310 ⁰CA for all pistons.

Figure 20. The f/a ER distribution at 330 ⁰CA and 340 ⁰CA for split injection at 250/320 ⁰CA for all pistons.

Figure 21. The inhomogeneity of the fuel/air equivalence ratio (ER) of in-cylinder mixture at 340 ⁰CA with different pistons and injection strategies.