MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Mechanical Engineering

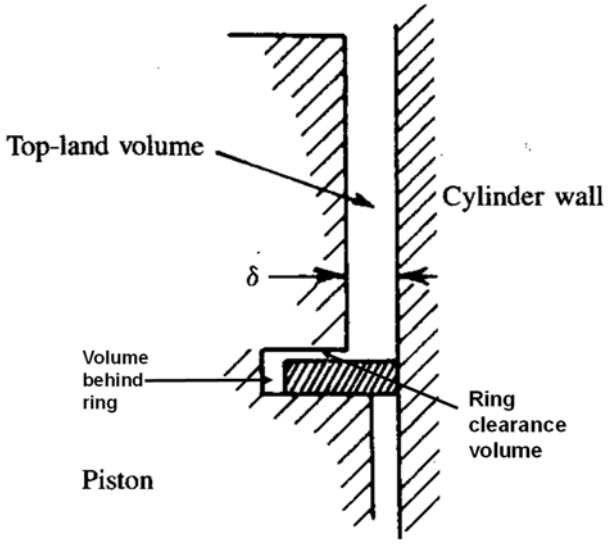
2.61 INTERNAL COMBUSTION ENGINES

Homework Set #7

Problems:

1) Problem 11.3 of text book. Interpret both the fuel and the measured HC as hydrocarbons with H/C ratio of 1.87.

2) Problem 11.9 of text book; but change the problem to reflect the values for modern engines:
- The cylinder bore is 8.6 cm; the stroke is 8.6 cm (instead of 10 cm x 10cm) so that the displacement volume per cylinder is 500 cc.
- The compression ratio is 10 (instead of 8).
- The top land height is 6 mm (instead of 9.52 mm), and the piston/bore clearance is 0.27 mm (instead of 0.3 mm.) Also the piston crevice would include the clearance volume behind the top ring and between the ring top and piston groove; so the total piston crevice volume is 1.2 times the top land clearance volume.



3) Problem 11.10 of text book. This problem gives you an idea of the time scale for NO formation under engine combustion condition. For the last part of the problem, see Eq. 4-32 and Fig. 4-17 for gas properties.

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