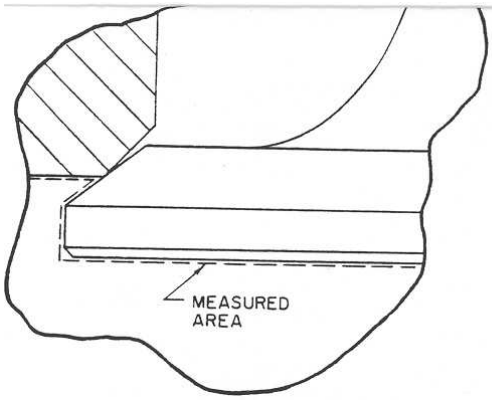

FIGURE 4—VALVE AREA

ınce Terminology

$$\text{very Ratio}^{2,3} = \frac{\text{Mass of delivered air}}{\text{Displaced volume} \times \text{Ambient density}} \quad \text{(Eq.4)}$$

$$\text{)elivered Air - Fuel Ratio} = \frac{\text{Mass of delivered air}}{\text{Mass of delivered fuel}} \quad \text{(Eq.5)}$$

$$\text{ped Air - Fuel Ratio} = \frac{\text{Mass of delivered air retained}}{\text{Mass of delivered fuel retained}} \quad \text{(Eq.6)}$$

$$\text{ıpping Efficiency}^{2} = \frac{\text{Mass of delivered air retained}}{\text{Mass of delivered air}} \quad \text{(Eq.7)}$$

fluid after the last expansion stage.

6. Valve Timing and Valve Overlap (Poppet Valves)—Valve timing events are the valve opening and closing points in the operating cycle, while valve overlap describes that part of the cycle in which both the intake and exhaust valves are open. These are illustrated in Figure 5 and further defined as follows:

6.1 Timing Events are stated in crankshaft degrees from piston top dead center, rounded to the nearest whole degree. They are based on reference valve lift points at a timing point baseline reference as follows[4]:

a. Hydraulic Lifters—Timing point baseline is at 0.15 mm (0.006 in) valve lift.

b. Mechanical Lifters—Timing point baseline is at a valve lift of 0.15 mm (0.006 in) plus the specified lash for each valve.

6.2 Valve Overlap Area is specified as two separate overlap areas expressed as degrees-mm (degrees-in) rounded to the nearest hundredth. Overlap areas are the areas bounded by the exhaust closing valve lift curve, the intake valve lift curve, and the timing point baseline from TDC to the respective opening or closing event as defined in 6.1.

6.3 The Crossover Point is defined as the angular crankshaft position at which exhaust closing valve lift and intake opening valve lift are equal.

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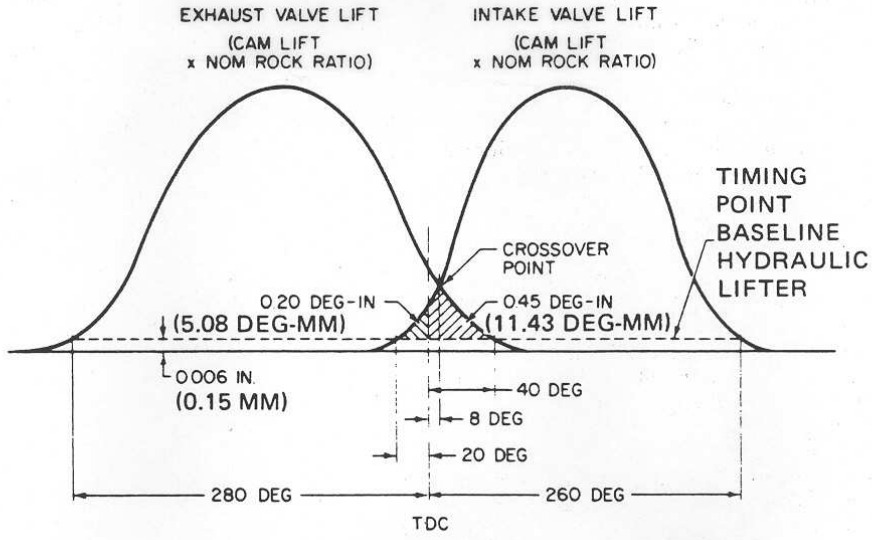
2 If scavenging is done with air-fuel mixture (example given, carburetor engine) "mixture" is to be substituted for "air" and "Mixture density at ambient pressure and temperature" is to be substituted for "Ambient density."

3 When ambient density is unknown, the density of dry air at SAE standard reference atmospheric conditions (1.1517 kg/m^3) (0.0719 lbm/ft^3) is to be used.

4 For the purpose of defining valve events, overlap, and crossover points, the valve lift curves are obtained by multiplication of the cam lift values by the nominal valve mechanism lift ratio (for example, rocker arm ratio). In the case of mechanical lifters, the specified lash is subtracted from each valve lift value.



TIMING EVENTS: EXHAUST VALVE - OPENS 280 DEG BTC, CLOSES 40 DEG ATC
INTAKE VALVE - OPENS 20 DEG BTC, CLOSES 260 DEG ATC

OVERLAP: EXHAUST AREA—0.45 DEG-IN (11.43 DEG-MM)
INTAKE AREA—0.20 DEG-IN (5.08 DEG-MM)

CROSSOVER POINT: 8 DEG ATC

TIMING EVENTS: EXHAUST VALVE—OPENS 280 DEGREES BTC, CLOSES 40 DEGREES ATC
INTAKE VALVE—OPENS 20 DEGREES BTC, CLOSES 260 DEGREES ATC

OVERLAP: EXHAUST AREA—11.43 DEGREE-MM (0.45 DEGREE-IN)
INTAKE AREA—5.08 DEGREE-MM (0.20 DEGREE-IN)

CROSSOVER POINT: 8 DEGREES ATC

FIGURE 5—TYPICAL VALVE TIMING AND OVERLAP DESIGNATION
(POPPET VALVES)