

The fueling of an engine (i.e. stoichiometry) can be described six different ways; Lambda ( $\lambda$ ), AFR (air-fuel ratio), FAR (fuel-air ratio), Equivalence ratio ( $\phi$ ), %O<sub>2</sub>, and %CO.

There is a relationship between these six different quantities. The relationship is shown here for Lambda, AFR, %O<sub>2</sub>, and %CO.

Equivalence ratio is not shown since it is just the inverse of Lambda ( $1/\lambda$ ). Similarly, FAR is not shown since it is simply the inverse of AFR ( $1/AFR$ ). Note that some relationships are non-linear. For example, a %O<sub>2</sub> of 20.946% (pure air) means infinite Lambda. For this reason, it is better to report diesel stoichiometry in %O<sub>2</sub> instead of Lambda.

All piston engines sold today fit into one of three categories; Nominally stoichiometric gasoline, lean-burn gasoline, and diesel. The Lambda, etc. range of operation of these three engines is shown in Figure 1.

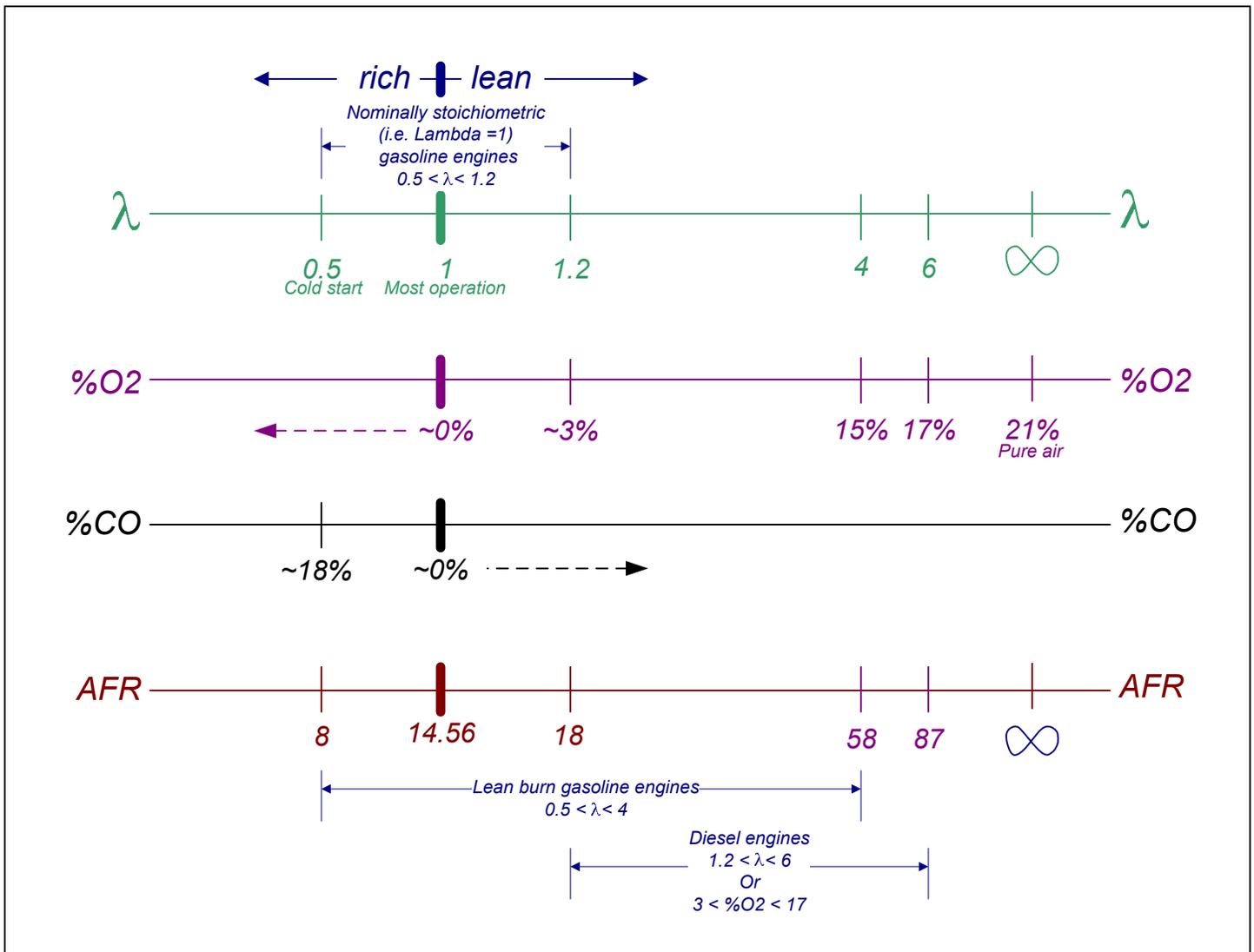


Figure 1