# FUEL SYSTEMS – CARBURETORS PART 1

## PRINCIPLES OF COMBUSTION

The purpose of a carburetor or a fuel injection system is to perform the job of delivering fuel to the cylinders, and to atomize the fuel on its way to the cylinders.

Because engines burn a mixture of air and fuel, the carburetor or fuel injectors must also mix the correct portion of fuel and air so that the air-fuel ratio is correct for the constantly changing operating requirements of the engine.

### Air-Fuel Ratios

Air and fuel are mixed together in different portions by weight. If the portions of air and fuel are not mixed correctly, the engine will not operate efficiently.

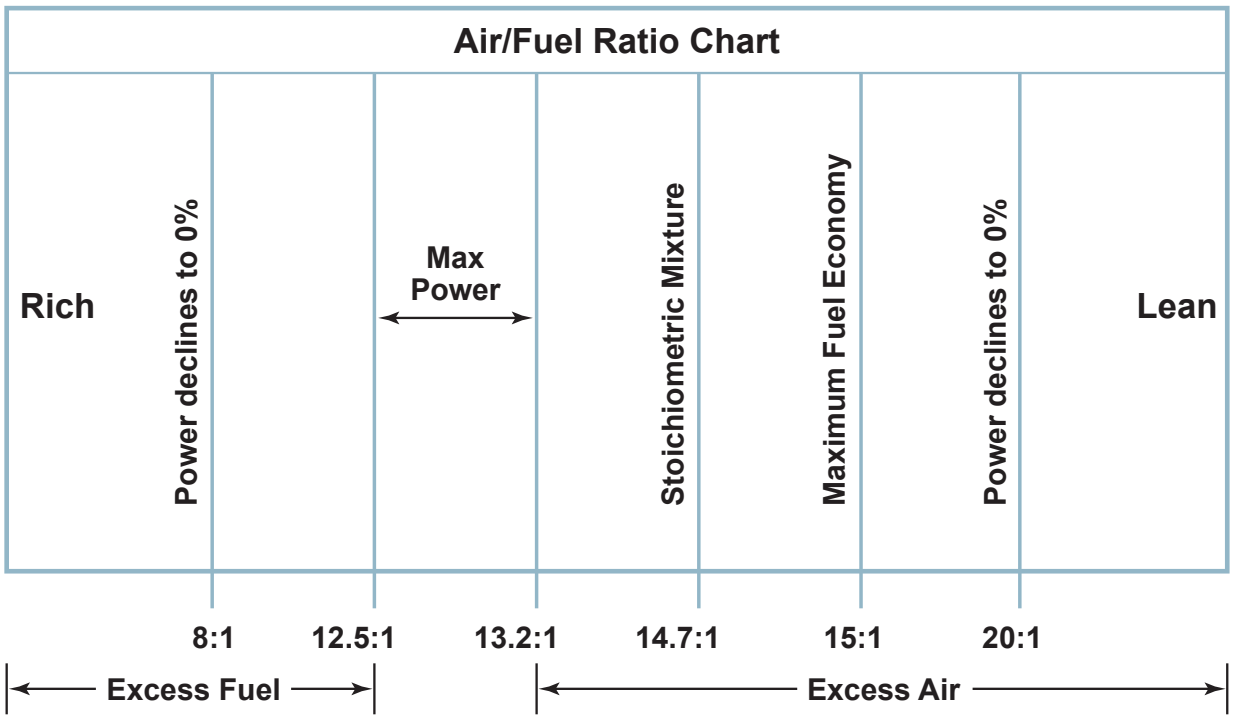
If air-fuel ratios are incorrect, the engine may not start easily, it may hesitate during acceleration, or it may not use fuel economically, and fuel is wasted.

Other indications of improper air-fuel ratios are backfiring, stalling, too fast or too slow of idle speed, engine pinging, or excessive exhaust emissions. These engine problems may be the result of the air-fuel mixture being too lean or too rich.

A lean mixture contains too much air, or too little fuel in the air-fuel ratio for the torque and horsepower the engine is requiring.

A rich mixture contains too little air, or too much fuel in the air-fuel ratio for the engine operating requirements.

An air-fuel mixture is chemically correct at 14.7 to 1. This means the weight of 14.7 parts of air to the weight of 1 part of gasoline creates a “stoichiometric” mixture.




*The stoichiometric air-fuel mixture is too lean for many operating requirements that require acceleration and power.*

The stoichiometric air-fuel ratio of 14.7 to 1 will result in all of the air combining with all of the fuel in a perfect mixture during the process of combustion. After combustion there will not be any unburned gas molecules called hydrocarbons, or any unburned oxygen molecules.

However, this does not mean that the mixture “goal” that the engine requires is the stoichiometric air-fuel ratio of 14.7 to 1. The stoichiometric air-fuel ratio is too lean for most engine requirements.

A slightly richer mixture will assure that maximum power is generated, all the oxygen is burned, and that the combustion chamber will be cooler and not get overheated from burning too lean of a mixture.

However, too much of an increase in the fuel portion of the air-fuel mix will not make more power because there is no more oxygen to burn, and power will be reduced because of lower cylinder pressures which result from lower combustion temperatures.