

Chapter Seven



Fig. 7-1. PA-46-350P Malibu turbo-induction system. (Courtesy of The New Piper Aircraft Company)

Turbo-supercharging (generally referred to as “turbocharging,” an operation performed by “turbochargers”) also has been around for a long time. The first experiments with turbochargers on aircraft took place in the early 1920s. Some of the more advanced World War II military airplanes had them, notably the P-47 Thunderbolt and P-38 Lightning fighters, and B-17 bombers—all of which could top 30,000 feet! Their advantages are many: light weight, compact, simple installation, and a “free” source of power.

Maintaining Sea-Level Power

In general aircraft use, the turbocharger’s role is not to increase engine power at sea level, rather it is designed to maintain sea-level power as the aircraft climbs. That’s an important distinction because a turbocharger has the ability to overboost an engine at sea level, which can result in serious engine damage.

To maintain sea-level power at higher altitudes, the turbocharger must maximize engine volumetric efficiency. Volumetric efficiency is the ratio of total cylinder volume to