

## THE EFFECTS OF A VACUUM BOOSTER ON BRAKE PRESSURE

The brake pressure that comes out of the master cylinder is a result of "manual brake pressure" and "boosted brake pressure". "Manual pressure" is the pressure generated by pushing on the brake pedal with out any extra force from the booster. "Boosted brake pressure" is the pressure created by the extra force the booster sends to the master cylinder. In the case of a vacuum booster, this boost is "free pressure". The engine vacuum pulls 1 or more diaphragms that act on the master cylinder. The larger the diaphragms area the more "free pressure" the booster can provide. For example: *A driver applies 100 pounds of force on the brake pedal. The car has a pedal ratio of 7:1 and a 1" bore master cylinder. The car will make 891psi of brake pressure. If the same car were to add a 9" single diaphragm vacuum booster the brake pressure would increase by 899psi with a total brake pressure of 1790psi.* The 899psi increase is "free pressure". The following charts show the "free pressure" each size vacuum booster can provide.

*100 pounds with a 7:1 pedal ratio on a 1 1/8" bore with 23" vacuum.*

Booster size	"Manual Pressure"	"Free Pressure"	Total Brake Pressure
7"	704 psi	355 psi	1059 psi
7" Dual	704 psi	493 psi	1197 psi
8"	704 psi	507 psi	1211 psi
8" Dual	704 psi	708 psi	1412 psi
9"	704 psi	710 psi	1414 psi
11"	704 psi	973 psi	1677 psi

*100 pounds with a 7:1 pedal ratio on a 1.00" bore with 23" vacuum.*

Booster size	"Manual Pressure"	"Free Pressure"	Total Brake Pressure
7"	891 psi	449 psi	1340 psi
7" Dual	891 psi	624 psi	1515 psi
8"	891 psi	642 psi	1533 psi
8" Dual	891 psi	896 psi	1787 psi
9"	891 psi	899 psi	1790 psi
11"	891 psi	1231 psi	2122 psi

*100 pounds with a 7:1 pedal ratio on a 15/16" bore with 23" vacuum.*

Booster Size	"Manual Pressure"	"Free Pressure"	Total Brake Pressure
7"	1014 psi	511 psi	1525 psi
7" Dual	1014 psi	710 psi	1724 psi
8"	1014 psi	730 psi	1774 psi
8" Dual	1014 psi	1020 psi	2034 psi
9"	1014 psi	1023 psi	2037 psi
11"	1014 psi	1401 psi	2415 psi

Note: your results may vary due to differences in the pedal ratio, return spring, pivot bushing resistance, etc.

Unlike an engine driven hydraulic pump, there is no power loss using engine vacuum to operate the brake booster. Also, a vacuum booster only uses one hose and does not require any clamps. A hydraulic booster has a high pressure hose that must use a high pressure fitting, and a low pressure hose that has to use hose clamps to prevent fluid leaks.