

ONBOARD MOBILE POWER SOURCE: POWER STEERING PUMPS

Peter J. Weller, PE

This is the first in a series of blogs which discuss the power steering pump as a convenient source of hydraulic power already incorporated in the design of motor vehicles. It is often overlooked by both commercial and recreational users of motor vehicles as a power source to run accessories such as winches, plows, lift gates, and tilt bed kits for pickups, and light duty industrial truck bodies such as tow truck conversions. Instead, most accessory and body manufacturers rely on clutch pumps, PTO/pump assemblies, and DC hydraulic power packs to power their equipment, at an estimated cost of \$500 to \$1000 or more over the cost of their actual machine. The typical power steering pump is a compact, quiet, belt-driven hydraulic vane pump with built-in fluid reservoir and relief valve.

This blog looks at the potential power available from the power steering system on a typical light duty vehicle. Subsequent blogs will look at applications. As always, the author assumes no responsibility for any safety or performance issues resulting from poorly engineered or poorly modified systems. Any such modifications should be designed by an engineer qualified in hydraulics, and any modifications should be done by engine mechanics with training in vehicle hydraulic systems. (Even some good engine mechanics do not understand the power steering system.) It is probably needless to say that truck manufacturers will not accept liability for safety or performance problems with vehicles having aftermarket modifications like this, so, to be honest, the author needs to tell you to know what you're doing, because you are pretty much on your own if you tap into the power steering system hydraulics.

Data used here are for General Motors vehicles. Data for Ford and Chrysler vehicles of similar size and utility are approximately the same. The power steering relief valve in GM light duty (C/K 15, 25, and 35) trucks is set at 1425 to 1525 psig. The maximum fluid flow rate from the pump for C/K 15 pickups with GVWRs of 7200 lb is approximately 3 gallons per minute (gpm). This flow rate is 3.5 to 3.9 gpm for pickups with larger engines (6.0 L and greater) and with hydroboost brake systems. (For hydroboost brake systems, brake fluid pressure from pedal application is increased (boosted) by the power steering system, also, rather than the vacuum tapped from the engine manifold.) At 1500 psig and 3.0 gpm, a power steering pump is generating up to 2.5 HP of hydraulic power.