
You shouldn't be surprised that Safe-T-Lawn has almost double the selection of the nearest competitor in plastic pop-ups and plastic or brass nozzles. Because Safe-T-Lawn was the first to build a line of plastic pop-up sprays, starting in 1967. Safe-T-Lawn has specification extras, too, such as optional ground support flanges and check valves.

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Where the grass is always greener.
Hydraulics are an asset if you understand them.

Imagine how complex and cumbersome turf equipment would be today without the hydraulic systems we take for granted. To perform the same functions, mechanical alternatives would add considerable size, weight, service requirements and operating cost.

For the operator, hydraulic systems not only have taken over most of the manual effort, they also have greatly improved and simplified control.

With just the touch of a lever on one of our sweepers, five cubic yards of debris can be raised 8-1/2 feet and discharged to a waiting truck.

Reels of many Jacobsen machines no longer rotate by traction. Hydraulic systems turn the reels at a selected rate, assuring a consistent cutting frequency independent of forward motion or wet or heavy turf.

Because of hydraulics, mower gangs on turf tractors steer with the machine and can be swiftly raised to negotiate narrow areas or for transport.

Hydraulics ease steering and the use of a three point hitch, raise and lower cutter decks and snow blades, and provide a form of automatic transmission with exceptionally simple control.

But even though hydraulic systems have become commonplace and preferred, some operators may not understand them. Knowing what they are and how they work can be a great advantage when the time comes for maintenance, troubleshooting and repair.

Advantages

The basic advantages of hydraulics over other forms of power transmission are many.

Simple Design—A simple combination of pumps, valves, motors and lines replaces more complex systems of mechanical linkages, gears, cams and levers, reducing maintenance costs and increasing reliability.

Compact Power—Hydraulic components provide more power in a smaller package than the mechanical or electrical devices that would perform the same function.

Flexibility—Because power is transmitted through tubes and hoses, hydraulic components can be located more advantageously.

Control—The power transmitted can be varied infinitely between wide limits for simple, precise and safe operator control.

Reduced Downtime—Built-in

Continues on page 44

By Tony Saiia, Chief Engineer and Ralph Sylvester, Jr., Product Training Manager, Jacobsen Division, Textron Inc.
Toro creates the ultimate low pressure, large radius Pop-Up.

“Matched Precipitation” nozzles at 1.3, 2.5 or 5.0 gpm.

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Components of a pull-behind gang mower hydraulic system include filter (upper right), tank (below filter), valve bank with controls, and the pump (lower left).

Flow control valves allow for backlapping the reels while in place.

relief valves provide overload protection keeping downtime and maintenance costs at a minimum.

Smooth & Quiet—Because force is transmitted through a fluid, hydraulic systems are exceptionally smooth and quiet in operation.

Basic definition

Basically, hydraulic power can be defined as the use of liquids under controlled pressure and flow to do work. Pressure exerts a force in the system, transmitting it in a confined liquid through hoses and piping. It is expressed in pounds per square inch. Flow causes motion. It is expressed in the number of gallons per minute that pass a given point.

System components

A basic hydraulic system is simple with fewer than a half dozen principal components.

Fluid Reservoir—The reservoir performs a variety of functions besides holding hydraulic fluid. Its walls are designed to dissipate the heat in the return oil. Baffles prevent the hot return oil from flowing directly to the outlet tube. They also help prevent turbulent flow which might allow air to mix with the oil, causing spongy operation and excess heat that could damage pumps. Often reservoirs are equipped with magnetic drain plugs and filters to capture dirt particles.

Pumps—The pump converts mechanical power into hydraulic flow under pressure. Its size, or displacement, and speed determine the amount of flow in the system which, in turn, governs the operating speed of the hydraulic motor or cylinder.

A design commonly used in systems requiring up to 3,000 pounds per square inch of pressure is the gear pump. Two meshing gears force the fluid through a discharge port and tubing to the hydraulic motor which reacts.

Valves—Valves control system pressure and flow direction. The most common type consists of a spool that slides back and forth inside a housing that has passages in it. As it moves it blocks or opens the passages, routing the fluid through tubing to and from various hydraulic motors.

Another design is the relief valve that protects the system from excessive pressure. It opens when a specific pressure is reached, allowing the fluid to return to the reservoir.

Cylinder/Motor—The hydraulic cylinders and motors convert pressure and flow into mechanical power for performing work.

A hydraulic motor is quite similar to the pump, except it works in the opposite sense. Operating at pressures up to 3,000 pounds per square inch, gear motors in turf care equipment are commonly used to power hydraulic reel mowers, rotary mowers, spreader and similar drives.

Tubing/Hoses—These connect the hydraulic components to form a system. While pipe and mild steel tubing are commonly used in mobile hydraulic systems, the latter is preferred because it is easily bent, and requires fewer sections and fittings.

Flexible hose is used where a line is subject to movement. Besides simplifying connections, it also helps absorb excess pressure within the system.

Hydrostatic transmission

One of the major applications of hydraulics is the hydrostatic transmission found in all our mowing machines except our larger turf tractors.

The heart of this transmission is its variable displacement pump of piston-type design. By simply moving a foot treadle, the pump's output flow can be varied from zero to a higher rate. The same foot control can change direction of the flow to reverse the rotation of

Continues on page 56
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