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The use of hydraulics and pneumatics has become widespread due to the advantages a properly constructed fluid power system has in the transmission of power. Fluid power is energy transmitted by means of a pressurized fluid. The term fluid power applies to both hydraulics, as well as pneumatics. Hydraulics use pressurized liquids while pneumatics use compressed air or other natural gases. Fluid power technology is utilized extensively in an array of different industrial applications including aerospace construction, mobile equipment and power machinery. Fluid Power Systems eliminate the need for intricate systems of cams,gears and levers. Unlike mechanical parts, the fluids used are not subject to breakage or great wear and allow motion to be transferred easily without the inherent slack of solid machine parts.

The forces produced by a fluid power system are generated so rapidly that it allows the different parts of the system to be located at widely separated points with very little loss. With a very small loss in efficiency, these forces can be directed up and down or around corners. Systems can provide both rotating and straight-line power transmission that can be multiplied from a fraction of an ounce to hundreds of thousand pounds of output. Fluid power systems allow very large forces to be regulated by much smaller ones transmitted through openings and lines relatively smaller than those of solid machine parts. Fluid power systems can provide smooth, flexible, constant action without vibration. Additionally, they are quieter and generate less heat than electric actuators. Fluid power systems provide easy, accurate control. The user can easily start, stop, accelerate, decelerate, or reverse large forces with great accuracy. With fluid power, both analog and digital control is possible. One single hydraulic pump or air compressor can provide enough power and control for numerous machines when combined with fluid power manifolds and valves. The ability to provide constant force of torque is an attribute unique to fluid power. Unlike electric motors, air or hydraulic motors can produce large amounts of torque while operating at low speeds. Hydraulic and pneumatic motors can even maintain torque at a zero speed without overheating. By using accumulators to store energy, the hydraulic power unit only needs to provide slightly more than the average demand; this increases efficiencies for machines with varying load cycles.

Fluid power can also provide safety in hazardous environments. It can be used in mines, chemical plants, near explosives and in paint applications because it is inherently spark-free and can tolerate high temperatures. Fluid power systems also provide piece of mind, as an automatic release of pressure is guaranteed in the event of an overload. This ensures that the system is protected against strain or the possibility of a breakdown. The systems are economical as they are generally less expensive to build and operate.

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