



Self-Study Worksheet HI03

Compare Hydraulic, Pneu, Electric

Explore Hydraulics

Email:

Course:

Provider:

Learning Objectives/Expected Outcomes: (60 mins)

1. To know why hydraulic technology is used in preference to pneumatic or electrical system.
2. To appreciate how hydraulic, mechanical advantage is used to lift heavy loads.
3. To appreciate the power to weight advantages that hydraulic equipment provides.
4. To appreciate how hydraulic actuators can be placed where need, e.g. away from the power source.

Previous Knowledge Required:

No previous knowledge is required. Students already working with hydraulic equipment including hydraulic pumps, actuators, and control valves, etc. may not require this worksheet.

Terminology:

Fluid power, hydraulics, pneumatics, electrical drives, energy, pressure, power.

Record of Achievement:

Record progress, times, scores, etc. on this training record sheet and keep together with any additional written work or sample calculations.

Coursework investigations

<p>Approx. Power Unit Size Comparison</p> <p>130 kW (170hp) 110 kW (147hp) 132 kW (175hp)</p> <p>340 mm (13.4 in) 1045 mm (41 in) 1078 mm (42.5 in)</p> <p>Hydraulic pump Electric motor Diesel engine</p>	<p>Compare the size and power of hydraulic, electrical, and petrol power supplies.</p> <p>Show how versatile hydraulics is as actuators are placed where required and connected to a power supply by small pipes and flexible hose.</p> <p>See www.e4training.com/hyd_newbie/compare1.php</p>
<p>Submit notes</p> <p>Linear Drives Comparison</p> <p>30 kN 25 kN 1400 kN</p> <p>7 bar air 120 mm/sec 200 bar</p> <p>150 mm stroke 8500 mm stroke 500 mm/sec</p> <p>500 mm stroke 6000 mm stroke</p> <p>Pneumatic Electric Hydraulic</p>	<p>Look at examples of hydraulic, electrical, and pneumatic linear drives. Compare the maximum force capabilities or try to quantify the work they do.</p>



Practical exercises



Raise and lower heavy objects safely with a hydraulic jack. Calculate the forces involved at www.e4training.com/hyd_formula/pressure1.php
Understand mechanical advantage by using a ruler or wood seesaw, pivoting off centre. See how a small mass can lift a large mass with the appropriate pivot point.

Submit notes

Complete



Make simple calculations to compare the size and load capability of hydraulic, pneumatic, and electrical actuators.
Make basic load and energy approximations to compare the power of pneumatics, electrical, hydraulic systems.

Submit notes

Complete

And Finally:

Complete this worksheet and keep for your records. Submit any written coursework etc. to your training course provider.

Follow-on Course Worksheets:

Potential follow-on worksheets include:

HI04 – Basic hydraulic components

For specialist course worksheets visit www.e4training.com/hydraulic_courses/worksheets1.php