



Worksheet FB & Training Record Formulas and Fundamentals

Hydraulics Fundamentals

Email:

Course:

Provider:

Expected Outcomes: (30-60mins)

To learn the fundamental principles on which all hydraulic systems are based.
To perform simple calculations to size system pumps and actuators.

Previous Knowledge Required:

Students should have completed worksheet IH1 'Introduction to hydraulics' or have a basic understanding of what hydraulics is used for and which components are employed.

Self-driven micro-learning tutor (SDLT)

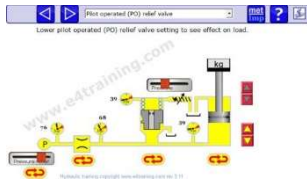
Complete the 'Formulas and Fundamentals' SDLT via the website, phone app or CD/download.
On completion, email the results to yourself or to your course provider.
We recommend you also record the time below and note down all observations and exercise findings.

Date, score & time:

Detailed explanations and instructional videos

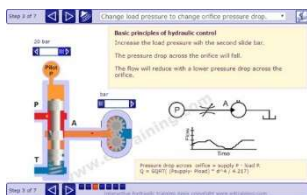
Visit the 'hydraulic pump review' section on the website, phone app or CD/download. Read the additional explanations and watch the instructional videos.
Keep a record of the time you spend studying in each section.

Dates & durations



Experiment with the 'control valve fundamentals' simulation:

- Change supply pressure, cylinder area and mass, to observe effects.
- Select 'constant pressure over an orifice' from drop down menu.
- Change orifice area and observe cylinder speed (flow) changes.
- Change pressure drop across the orifice and observe flow changes.
- Discuss the factors affecting the control of the cylinder.



Experiment with Spool Valve Fundamentals simulation:

- Observe how pressure moves spools against springs.
- Observe how Spool movements change orifice area sizes.
- Change the load on the hydraulic motor and discuss how load pressure changes affect pressure drops and flows.

App date & duration



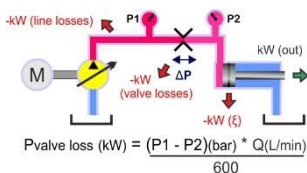
Understand the relationship between force, pressure and area:

- Calculate the pressure generated by a load on a cylinder area.
- Calculate the load a pressure can lift.
- Discuss how cylinder area affects forces and pressures



Understand the relationship between volume, displacement, pump speed and flow:

- Calculate the flow based on pump displacement and speed.
- Calculate the cylinder speed based on area and flow rate.
- Calculate the motor speed and torque based on displacement.
- Discuss how orifice restrictions control the flow.
- Discuss the relationship between flow and pressure drop.



Understand the relationship between pressure, flow, power and system efficiencies:

- Calculate the power based on flow and pressure.
- Discuss the potential energy losses in a hydraulic system.

Sample calculations

Sample calculations to be submitted as part of the design project.



Complete the formulas and fundamental section of the 'Quiz - Intermediate Hydraulics' module of the interactive quiz. Click email button to send results and record below.

Quiz name, date, score

Qualification requirements:

Students need to complete and return all worksheets and course notes to their registered training provider. Methods of testing and qualification may vary between course providers, however, we recommend that students record as much information about their observations, simulation experiment results, and discussions as possible. To achieve a certificate, students will need to provide written evidence of their findings e.g. when we say observe X, we need to know the results you see and when we say discuss X, we need to know the implications of these findings as well.



In most programs, students can send a record of their actions and results by clicking the email button that will appear in the top menu bar of the app, at mid to end point of the training.