



Worksheet FB3 & Training Record Basic Hydraulic Principles

Hydraulics Principles

Email:

Course:

Provider:

Expected Outcomes: (60-120mins)

To understand the basic principles on which all hydraulic systems are based.
To be able to interpret a valve's function by reviewing the component parts.

Previous Knowledge Required:

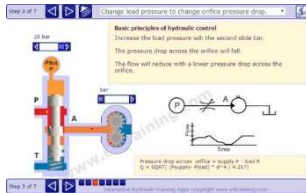
Students should have completed worksheet IH1 'Introduction to hydraulics' or have a basic understanding of what hydraulics is used for and which components are employed.

Certificate of Achievement:



Click the email button (shown left, that will appear within each app) to post your results, once the training module has been completed. Enter your email or the email for your external training provider. e4training.com will also receive a copy of the results to include in the certificate assessment process.

Virtual test rig experiments



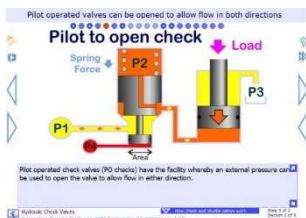
Experiment with Spool Valve Fundamentals simulation at www.e4training.com/hyd_princip/princip3.php

- Observe how pressure moves the spools against the spring.
- Observe how spool movements change the orifice area size.
- Change the load on the hydraulic motor and discuss how load pressure changes affect pressure drops and flows.
- Note how leakage, seal, and a damping orifice affect performance.

App date & duration

Complete

Interactive tutorial



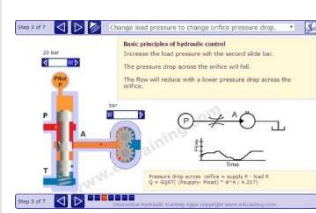
Complete the 'check valve training' tutorial at

www.e4training.com/hydraulic_courses/microtutor1.php?wtvalvescheck
(or via the phone app or CD/download)

- Note how the different poppet designs will have different characteristics, performance, and durability.
- Note how pilot pressure areas are used to provide additional functions.

Date, score & time:

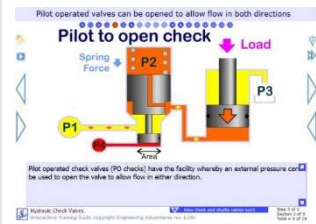
Tick when posted



Study the valve design principles at and video at www.e4training.com/hyd_princip/princip1.php and [princip2.php](http://www.e4training.com/hyd_princip/princip2.php) (or via the phone app, CD, or download)

- Make sure you are able to recognise a spool, piston area, spring force, orifice, leakage area with high pressure drops across small clearances, damped volumes.

Complete

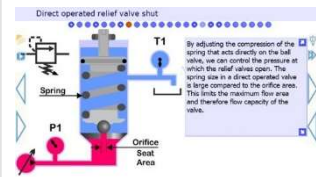


Study the design features and operating characteristics at www.e4training.com/hydraulic_valves/checkpro1.php:

- Make sure you are able to recognise a ball, poppet, hard or soft seat, bore and seat alignment mechanisms, and the quality for how a poppet or spool is guided.
- Make sure you are able to recognise direct acting valves and two stage valves with pilot operation.

Complete

Coursework assignments



Draw a design for a pilot operated relief valve noting the following design features:

- Include a leak free pilot and tank drain line.
- Identify pilot flow and main flow paths.
- Identify all potential leakage paths and highlight where contaminants in the fluid are most likely to collect.
- Identify factors that may affect the speed of operation.
- Identify any concentricity, manufacturing quality or areas of physical contact that may be life restricted.

Coursework submission

Submit marked up design drawing

And Finally:

Complete this worksheet and keep for your records. Submit the written coursework to [e4training.com](http://www.e4training.com) or your training course provider. Application result postings will be collated automatically by the course provider; [e4training.com](http://www.e4training.com) will also receive a copy of the results to include in the certificate assessment process.

Related Worksheets:

Visit www.e4training.com/hydraulic_courses/ to find the next worksheets related to your course.