



Level 1 Mobile Hydraulics

Course Number 60

Course Description

This course covers the fundamentals and principles of mobile hydraulics with an emphasis on hands-on exercises. Basic fluid power principles set the foundation. The construction, operation, and specific use of individual hydraulic components such as actuators, pressure controls, flow controls and directional controls, cartridge valves, pumps, reservoirs, accumulators and filtration units become the focus. In addition, safety, fluid conductors including tube bending, seals, leak prevention and basic hydraulic symbols are covered.

Prerequisites: None

Course Length: 3 to 5 days

Textbooks: Parker/Vickers with handouts and fluid power data book

Course Outline

Hydraulic Fundamentals, Fluids & Reservoirs

- **Pascal's law**, force (PSI) and motion (GPM)
- Conductor flows and sizing
- Sizing, construction of conductors, seals & reservoirs
- Proper Filtration & Locations

Actuators (Cylinders & Motors)

- Construction, operation and applications
- Area ratios for speed and force output

Pressure Controls

- Construction, operation and applications
- Proper use of relief, reducing, counter balance sequence, and brake valves

Pumps and Pumping Principles

- Construction, theory and operation of pressure controls
- Start-up and troubleshooting techniques

Flow Controls and Flow Dividers

- Construction theory and operation

Directional Controls

- Construction, operation and applications
- Parallel, series and power beyond circuits

Accumulators & Accessories

- Construction, theory and operation of accumulator

Electrical Basics

Learning Objectives

- Explain the construction, operation and application of actuators, pressure controls, flow controls, directional controls, pumps, cartridge valves, reservoirs, accumulators, heat exchangers, filtration units, flow meters and gauges used on mobile equipment
- Disassemble, inspect, and reassemble pressure controls, directional valves, motors in both fixed and variable pumps
- Identify/classify relief, reducing, sequence, counterbalance, and unloading valves
- Distinguish meter-in vs. meter-out operations, and pressure compensated flow
- Identify/classify the different types of hydraulic pumps and power steering units
- Explain how hydrostatic systems work
- Identify schematic symbols of hydraulic components covered in class
- State the relationship between hydraulic pressure and flow
- Compare area ratios for speed & force output.
- Identify and work with connecting lines, tube bonding, and fittings
- Explain how to prevent leaks using proper seals and materials



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