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Connected-Tech Training

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HELP YOUR TECHNICIANS TAKE THEIR HYDRAULIC SKILLS TO THE NEXT LEVEL!

Hydraulics is a branch of technology and applied science that leverages engineering, chemistry, and physics to study the mechanical properties and behavior of liquids. At its core, hydraulics serves as the liquid-based counterpart to pneumatics and is a key component of fluid power systems.

This single-day course introduces the foundational principles of hydraulics, beginning with basic theory and progressing through practical applications.

In this class, students will explore:

- Pascal's Law and its role in hydraulic pressure transmission
- Hydraulic system architecture, including pumps, valves, cylinders, and fluid reservoirs
- Hydraulic symbols and schematics, with guidance on how to interpret system diagrams
- Testing and troubleshooting techniques, enabling learners to diagnose and resolve common hydraulic issues

Through a combination of theoretical instruction and hands-on practice, participants will gain the skills needed to understand, operate, and maintain hydraulic systems with confidence and precision.

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Hydraulics Fundamentals I Course Summary

Course Objectives

After completing this course, the student will be able to:

- Explain Pascal's Law/Principle
- Demonstrate the flow of hydraulic fluid in a basic hydraulic circuit
- Interpret and explain a hydraulic hose layline
- Describe the importance of clean hydraulic oil
- Understand the benefits of using a good hydraulic oil filter and how to know the filtration ability
- Name all hydraulic components in basic hydraulic system
- Describe each hydraulic component function in a basic system
- Identify hydraulic schematic symbols in a basic system
- Point out schematic symbol functions
- Troubleshoot basic hydraulic system failures
- Name each type of hydraulic pump used in a hydraulic system
- Identify each type of hydraulic valve used in a hydraulic system
- Explain the difference between each type of hydraulic actuator
- Summarize how to perform a hydraulic cylinder bypass test on a hydraulic system

Hydraulics I Outline

1. **Hydraulic Theory & Principles**
   - What is hydraulics?
   - Pascal's Law and its application
   - Incompressibility, energy conservation, flow continuity
2. **Basic Hydraulic System Operation**
   - How a hydraulic system works
   - System components and their functions
3. **Hydraulic Oil & Contamination**
   - Oil selection, viscosity, contamination sources, and control
   - Cost reduction and maintenance best practices
4. **Filter Quality & Beta Ratio**
   - Importance of filter quality
   - Beta ratio explanation and ISO code for oil cleanliness
5. **Oil Change & Tank Design**
   - When to change oil
   - Oil tank features and maintenance
6. **Hydraulic Pumps**
   - Types: Gear, Vane, Piston
   - Operation, efficiency, failure modes, and schematic symbols
7. **Hydraulic Control Valves**
   - Manual, pneumatic, electrical, and proportional valves
   - Valve operation, troubleshooting, and schematic symbols
8. **Pressure Relief Valves**
   - Function, adjustment, and troubleshooting
9. **Cylinders & Testing**
   - Cylinder types, failures, bypass testing, and troubleshooting rules
10. **Troubleshooting & Maintenance Rules**
    - Key rules for diagnosing and repairing hydraulic systems
    - Common causes of component failure
11. **Knowledge Check / Test Questions**
    - Multiple slides with review questions on key concepts, troubleshooting, and component identification

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Factory Location - Heil Training Center | 4301 Gault Ave. N. | Fort Payne AL 35967

Have questions? We're here to help! Contact us by email: Nexteligence@Terex.com

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