eLearning (download printable certificate upon sucessful completion)

Course title: eHYi-101-1 (Overview of Industrial Hydraulics Pt.1)
Principles of Hydraulics

Description: This is part one of a 1st level hydraulics training course for anyone involved with industrial hydraulic equipment. The course was developed with the idea that hydraulic systems are best understood and that hydraulic system problems are more efficiently resolved by those who understand the physical principles that apply to hydraulics. The course is meant for anyone interedsed learning about general hydraulic principles and the knowlede is a prerequisite for hydraulic energy control learning. The information covered is part 1 of 2 of the prerequisite for custom on-site hydraulic training

Target audience: Users of Industrial hydraulic equipment gain a strong understanding of the principles of hydraulics.

Prerequisite: Access to a computer with internet access and an email address
Proficiency in reading and math

chapters in sequence	Approximate duration (hrs)	Description	# of pages
0 - eLearning Navigation	0.02	Understanding how to navigate Bosch Rexroth Canada's eLearning	
1 - eHYi-101-1 Hydraulic Basics 2 - eHYi-101-1T Hydraulic Basics-Test	0.75	Hydraulic Basics What is hydraulics? Important basic terms Basic Properties Distinction from other technical systems Applications	34
3 - eHYi-101-2 Basic Physical Principles 4 - eHYi-101-2T Basic Physical Principles-Test	1	Basic Physical Principles Mass and force Pressure Pascal's law Units for pressure “psi” Absolute and gauge pressure Flow rate and the flow law Types of flow Creating and throttling flow	68
5 - eHYi-101-3 Design of a Hydraulic System 6 - eHYi-101-3T Design of a Hydraulic System-Test	0.75	Design of a Hydraulic System Functional groups Functionality Important components Valves, pumps and cylinders Open/closed hydraulic circuit Losses Efficiency	41
7 - eHYi-101-4 Graphic Symbols 8 - eHYi-101-4T Graphic Symbols-Test	0.75	Graphic Symbols Functions of Graphical Symbols Symbol Design Basic Elements, symbol elements Commonly used symbols Circuit diagrams	47
9 - eHYi-101-5 Fluids 10 - eHYi-101-5T Fluids-Test	1	Fluids Main functions of hydraulic fluids Functions, capacity and construction of reservoirs Hydraulic fluid reqirements Types of hydraulic fluids Viscosity of hydraulic fluids Compressibility Fluid analysis	55
11 - eHYi-101-6 Filtration 12 - eHYi-101-6T Filtration-Test	0.75	Filtration The need for filtration Understand what contamination is Understand clearances in hydraulic components Understand the term micron Sources of Contamination Locations of hydraulic filters Understand ISO cleanliness codes Depth vs. surface style filtration Understand filter efficiency ratings Nominal vs. Absolute rated filters	29
13 - eHYi-101-7 Hydraulic Pumps 14 - eHYi-101-7T Hydraulic Pumps-Test	1	Hydraulic Pumps Functions and operating principles Distinguishing characteristics Standard pump types Gear pumps (internal and external design) Vane pumps (balanced and unbalanced deign) Variable displacement operation - pressure controller Radial piston pumps Axial piston pumps (swashplate and bent-axis design)	68
15 - eHYi-101-8 Hydraulic Cylinders 16 - eHYi-101-8T Hydraulic Cylinders-Test	0.5	Hydraulic Cylinders Physical correlations / operating principles Functions Design and operation Types of cylinders Cylinder design types Technical specifications End position cushioning Air bleeding	47
17 - eHYi-101-9 A Practical Overview 18 - eHYi-101-9T A Practical Overview-Test	0.75	A Practical Overview Ground Rules of Hydraulics Hydraulic Pumps -Positive vs. non-positive displacement -Calculating output flow -Pressure Limitation -Calculating Power Differential Cylinders -Calculating areas -Cylinder force calculations -Cylinder speed calculations	36

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Total time: 7.27

eLearning (download printable certificate upon sucessful completion)

Course title: eHYi-101-2 (Overview of Industrial Hydraulics Pt.2)
Hydraulic Control Technology

Description: This is part two of a 1st level hydraulics training course for anyone involved with industrial hydraulic equipment. The course was developed with the idea that hydraulic systems are best understood and that hydraulic system problems are more efficiently resolved by those who understand the physical principles that apply to hydraulics. The course is meant as a precursor for second level instructor led Bosch Rexroth hydraulic courses. The information covered is a prerequisite for custom on-site hydraulic training

Target audience: Users of Industrial hydraulic equipment gain a strong understanding of the control of hydraulic energy .

Prerequisite: Completion of eHYi-101 - Part 1
Access to a computer with internet access and an email address
Proficiency in reading and math

chapters in sequence	Approximate duration (hrs)	Description	# of pages
0 - eLearning Navigation	0.02	Understanding how to navigate Bosch Rexroth Canada's eLearning	
1 - eHYi-101-10 Control Valve Principles 2 - eHYi-101-10T Control Valve Principles-Test	0.5	Control Valve Principles Valve families Seat and spool valve principles Mounting types Valve application and sizes Alternative valve mounting techniques	32
3 - eHYi-101-11 Pressure Control Valves 4 - eHYi-101-11T Pressure Control Valves-Test	0.75	Pressure Control Valves Overview Schematic symbols Direct operated pressure relief valves Pilot operated press relief valves Effects of back pressure Valve control options Comparison of direct and pilot operatedpressure relief valves 2-way and 3-way pressure reducing valves	51
5 - eHYi-101-12 Variable Displacement Pumps 6 - eHYi-101-12T Variable Displacement Pumps-Test	0.75	Variable Displacement Pumps Power distribution - fixed vs. variable pumps Pressure compensated vane pump Variable displacement piston pump type A10V Pressure controller operation	35
7 - eHYi-101-13 Multi-function Valves 8 - eHYi-101-13T Multi-function Valves-Test	0.75	Multi-function Valves Overview Schematic symbols Internal and external piloting Internal and external draining Unloading valve operation Typical hi-low circuit using and unloading valve Sequence valve operation Typical sequence (clamp/drill) circuit Counterbalance valve Operation Internal vs. external pilot Load deceleration Internal and external piloted valves	45
9 - eHYi-101-14 Flow Control Valves 10 - eHYi-101-14T Flow Control Valves-Test	0.75	Flow Control Valves Graphic symbols Principles of operation Flow, area, pressure drop relationship Temperature compensation Throttle valves vs. flow control valves Upstream pressure compensator Flow control placement	43
11 - eHYi-101-15 Check Valves 12 - eHYi-101-15T Check Valves-Test	0.75	Check Valves Simple check valve - functiona nd operation Pilot operated check valve - function and operation Sandwich mounted pilot operated check valves	22
13 - eHYi-101-16 Directional Control Valves 14 - eHYi-101-16T Directional Control Valves-Test	0.75	Directional Control Valves Graphic symbols 2-way, 3-way and 4-way valves Actuators Valve construction Common spool types Fluidically operated valves Pilot operated vales Effects of spool leakage	35
14 - eHYi-101-17 Hydraulic Accumulators 15 - eHYi-101-17T Hydraulic Accumulators-Test	0.75	Hydraulic Accumulators Design and operation of hydropneumatic accumulators Energy storage via a gas Accumulator cycle Definition of pressure levels Importance of safety isolation manifold Checking precharge Working safely with hydraulic accumulators	20
15 - eHYi-101-18 Continuous Control Valves 16 - eHYi-101-18T Continuous Control Valves-Test	0.5	Continuous Control Valves Control possibilities with ON/OFF valves Definition of proportional Controlling speed Controlling (de)acceleration Controlling foce and position Design and operation of a proportional valve Proportional directional, pressure and flow control valves Electronic amplifiers Continuous control valve designs	40
			272

Total time: 6.27