

Course Name:	Reciprocating Compressor Course and Workshop Ariel, Clark, Gemini, Ingersoll-Rand, Superior and Worthington Compressors
Course Length:	12 hours classroom + 20 hours of Hands-On maintenance
Target Audience:	Operators, mechanics, technicians, engineers, and maintenance / equipment specialists responsible for the safe day to day operation and care of high-speed, separable compressors
Goal:	Knowledge & comprehension of the equipment components and their function, basic operation, and common maintenance practices used with the high-speed compressor and accessories.

DAY 1 - CLASSROOM	
High Speed Compressor Course Introduction (0910K) <ul style="list-style-type: none"> • Instructor and Student introductions • Review of course objectives and syllabus • Introduction to important safety and hazards 	1
Reciprocating Compressor: Identify Major Mechanical Components (2100K) <ul style="list-style-type: none"> • Identifies and describes the function of major components of a reciprocating compressor (frame, crankshaft, crosshead guide, compressor cylinder, piston, rider bands and compressor rings, cylinder head, connecting rod, piston rod, crosshead, and distance piece). 	3
Reciprocating Compressor: Identify Compressor Fundamentals & Sequence of Events (2000K) <ul style="list-style-type: none"> • Explains the key terminology (single and multistage compression, single and double acting, suction and discharge pressure, flow, head end, crank end, load/unloading sequence). • Describes typical compressor layout with cylinder and valve numbering. • Describes the sequence of events for reciprocating compressors (re-expansion, suction, compression, and discharge). • Understands rod load and rod pin reversal. 	2
Reciprocating Equipment: Lubrication System for the Frame and Running Gear (1400K) <ul style="list-style-type: none"> • Explains the purpose of lubrication oil. • Identifies the main oil lubrication system flow path and its components. • Explains lubrication oil composition and viscosity • Identifies basic elements of oil sampling and analysis and the effects of equipment operation on oil impurities and life. 	0.5
Reciprocating Compressor: Describe Elements and Operation of Compressor Valves (2130K) <ul style="list-style-type: none"> • Describe the basic construction and operation of compressor valves. • Identifies the types of compressor valves and valve elements. • Describes basic wear and maintenance of compressor valves. 	1.5

DAY 2 - CLASSROOM (4 HRS) + HANDS-ON (4 HRS)

Reciprocating Equipment: Describe Elements and Operation of the Force Feed Lubrication System (1450K)	1
<ul style="list-style-type: none"> Identifies components and describes the operation of force feed lubrication systems (Point to Point and Divider Block). Explains the basics of force feed lubrication monitoring and related alarm and shutdown devices. 	
Reciprocating Compressors: Compressor Rod Packing (2170K)	1
<ul style="list-style-type: none"> Identifies the basic components and operation of compressor rod packing (packing case/cups, pressure packing rings, and oil wiper packing rings). Describes the types of pressure packing and oil wiper packing geometry and materials Explains the normal wear and failure modes including signs of a leak. 	
Reciprocating Compressor: Describe Capacity Control / Unloading Devices (2150K)	1
<ul style="list-style-type: none"> Identifies the purpose of capacity control / unloading devices. Describes the theory of operation of capacity control / unloading devices and explains the effects of these devices on gas flow, horsepower, and the relationship of pressure to volume graph. 	
Reciprocating Compressor: Basic Troubleshooting (2850K)	0.5
<ul style="list-style-type: none"> Understand basic process and knowledge needed to perform reciprocating compressor troubleshooting. Demonstrate how to use the OEM manual to diagnose and identify probable corrections for compressor problems. Understand key compressor operating and performance parameters including normal and abnormal conditions. 	
Written Course Exam (Open Notes)	0.5
HANDS-ON TRAINING ACTIVITIES (6 Student Max)	
Reciprocating Equipment: Perform Maintenance of Force Feed Lubrication System (1452T)	4
<ul style="list-style-type: none"> Prepares for force feed lubrication system maintenance (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). Tests system for air lock and purge. Tests lubrication lines and check valves with hand pump. Replace check valve as necessary. Performs divider block replacement. Purges and tests the operation of the force feed lubrication. Documents work performed and "as left" conditions. 	
DAYS 3 & 4 – HANDS-ON (16 hours)	
Reciprocating Compressor: Remove and Install Compressor Valves (2132T)	4
<ul style="list-style-type: none"> Prepares for compressor valve maintenance (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). Removes compressor valve and documents "as found" conditions. Inspects replacement compressor valve (condition, valve lift, spring tension). Installs compressor valve, verifies proper installation, and documents "as left" conditions. 	

<p>Reciprocating Compressor: Remove, Inspect, and Install Compressor Piston, Compressor Rod, and Packing (2102T)</p> <ul style="list-style-type: none"> • Prepares for compressor piston and rod maintenance (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). • Removes compressor piston and compressor rod and documents "as found" conditions. • Removes pressure and oil wiper packing and documents "as found" conditions. • Inspects compressor cylinder and documents "as found" conditions. • Installs pressure and oil wiper packing. • Installs compressor piston and compressor rod. • Documents work performed. 	2
<p>Reciprocating Compressor: Remove, Inspect, and Install Crosshead and Pin (2104T)</p> <ul style="list-style-type: none"> • Prepares for crosshead maintenance (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). • Removes crosshead and crosshead pin. • Inspects crosshead guide/"doghouse", crosshead, and crosshead pin and bushing and documents "as found" conditions. • Prepares crosshead for installation (changing shoes or pin bushing as needed). • Installs crosshead and crosshead pin. • Documents work performed. 	2
<p>Reciprocating Compressor: Verify Compressor Alignment and Rod Runout by Performing Gas Path Integrity Inspection (2110T)</p> <ul style="list-style-type: none"> • Prepares for Gas Path Integrity Inspection (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). • Performs gas path integrity inspection and records "as left" conditions. 	4
<p>Reciprocating Equipment: Inspect Frame and Crankshaft Alignment - Soft Foot and Web Deflections (1150T)</p> <ul style="list-style-type: none"> • Prepares for Frame and Crankshaft Alignment Inspection (reviews OEM manual and work documentation, gathers proper tools and parts, and performs pre-work safety activities). • Verifies foundation bolts for proper torque and soft foot and records "as left" conditions. • Verifies frame/crankshaft alignment by performing Web Deflection and records "as left" conditions. 	4