

The Leader in On-Line Industrial Skills Training

ITC Learning

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Air Conditioning and Refrigeration Library (8 Videotapes/DVD's)

This training program consists of eight Videotapes/DVD's that train students to understand, maintain, test and troubleshoot air conditioning and refrigeration systems.

Audience: This program is excellent for the training of maintenance mechanics and electricians as well as multi-craft training needs.

Introduction to Air Conditioning & Refrigeration (1001)

Refrigeration • Heat Transfer • Phase Changes • Compression • Condensation and Expansion • Refrigerant Tables • Review

Vapor Compression Cycle Designs & Refrigerants (1002)

Evaporator Operation • Reciprocating Compressor Operation • Centrifugal Compressor Operation • Condenser Operation • Metering Devices

Test and Maintenance Equipment (1003)

Temperature Sensors • Pressure Gauges • Gauge Manifold • Leak Detecting Procedures • Using Leak Detectors • Vacuum Pumps and Vacuum Gauges

System Operation Checks (1004)

General System Checks • Checking the Refrigerant Charge • Removing Oil • Testing Oil and Adding Oil • Checking the Compressor Motor • System Start-Up

Pump Down, Evacuation and Charging (1005)

System Pump Down • System Evacuation • High-Side Charging • Low-Side Charging • Determining Proper Charge

Mechanical Troubleshooting (1006)

Mechanical Troubleshooting • General Troubleshooting Approach • Short-Cycling • Restrictions in the Liquid Line • Insufficient Cooling • Condenser Operation • Heat Transfer • Filter Drier

Electrical Controls and Circuits (1007)

Cycle Controls • Pump Down Cycle • Safety Controls • Safety Control Circuits • Interlocks • Interlocks in a Chiller System • Relays, Contactors and Overload Protectors

Electrical Troubleshooting (1008)

Introduction to Troubleshooting • Dividing and Checking Circuits • Troubleshooting a Motor Contactor Coil • Troubleshooting a Control Circuit • Troubleshooting a Low Pressure Switch • Troubleshooting a Tripped Circuit Breaker

Electric Motor and Control Maintenance Library (11 Videotapes/DVD's)

44 hours of training

This training program consists of eleven Videotapes/DVD's that train students to disassemble, inspect, maintain, and troubleshoot a variety of motors. Also presented are procedures for maintaining and troubleshooting control equipment.

Audience: This program is excellent both for the training of maintenance mechanics as well as for the multi-craft training needs of process and manufacturing facilities.

Motors # 1 (20071)*

Basic Parts and Operation • Bearings and Lubrication • Failing Bearings • Disconnecting Power Supply and Motor Leads • Predisassembly Readings • Motor Disassembly • Removing the Rotor

Motors # 2 (20072)*

Installing a Split Bearing Puller • Removing Bearings and Inspecting Bearing Surfaces • Measuring Bearing Seating Surfaces • Inspecting the Rotor and Stator • Preparing Bearings for Installation and Cleaning the Rotor and Stator • Replacing Bearings • Motor Reassembly • Reconnecting the Motor

Motors # 3 (20073)*

Wound Rotor Induction Motors • Brush Assemblies • Brush Assembly Maintenance • Slip Ring Maintenance • Rotor Winding Maintenance and Variable Resistor Inspection • Contact Assembly • Verifying Change in Rotor Resistance • Split Phase Motors • Centrifugal Switches • Capacitor Start-Induction Run Motors

Motors # 4 (20074)*

DC Motor Operation • Commutators • Commutator Inspection • Removing Brush Rigging • Undercutting Mica • Reinstalling Brush Rigging • Installing Brushes • Seating Brushes • Completing Maintenance

Motors # 5 (20075)*

Introduction to Troubleshooting • Questioning the Operator • Evaluation and Power Supply Check • Control Circuit Checks • Mechanical Checks • Electrical Checks • Operational Checks • Program Review

Control Equipment # 1 (20061)*

Introduction to Troubleshooting • Ruling out Problems • Troubleshooting Control Circuits • Introduction to Removing and Replacing Parts • Checking a Circuit Dead • Checking for Continuity • Removing and Installing Parts • Poles and Throws

Control Equipment # 2 (20062)*

Introduction to Limit Switches • Finding the Cause of the Problem • Replacing the Contact Block and Testing the Switch • Introduction to Torque Switches • Adjustment and Testing of a Torque Switch • Setting the Open Rotor on the Geared Limit Switch • Setting the Close Rotor

Control Equipment # 3 (20063)*

Overload Relays • De-Energizing a Controller • Performing a Continuity Check • Overload Relay Removal • Installing and Checking a New Overload Relay • Introduction to Coils • Replacing a Coil • Ruling Out Components Based on Operation • Performing a Continuity Check to Find the Problem

Control Equipment # 4 (20064)*

Fuses • Installing New Fuses • Small Molded Case Circuit Breakers • Replacing a Circuit Breaker • Ground Fault Circuit Breakers • Large Molded Case Circuit Breakers • Testing Large Molded Case Circuit Breakers

Control Equipment #5 (20065)*

Motor Starters • Troubleshooting Coil-Operated Contactors • Auxiliary Contacts and Removing Coil-Operated Contactors • Disassembling Coil-Operated Contactors • Reversing Magnetic Starters • Control Transformers • Operationally Testing a Control Transformer

Control Equipment #6 (20066)*

Performing an Operational Test • Ruling Out Portions of the Circuit • Ruling Out Components • Locating the Problem • Testing a Valve Mechanically and Electrically • Locating the Problem • Checking for a Short Circuit • Finding a Grounded • Soldering Connections • Finishing Connections • Solderless Connectors

Electrical Maintenance Fundamentals Library (14 Videotapes/DVD's)

72 hours of training

This training program consists of fourteen Videotapes/DVD's that train students in basic electrical theory and print reading for AC/DC and solid state devices. It also shows how to make electrical connections.

Audience: This program is excellent both for the training of electricians as well as multi-craft training needs of process and manufacturing facilities.

AC/DC Theory # 1 (20011)*

Introduction to Electricity • Voltage • Units of Measurements Used for Electricity • Voltage, Current and Resistance • Ohm's Law Relationship of Work and Power • Kilowatt Hours

AC/DC Theory # 2 (20012)*

Introduction to Alternating Current and Direct Current • Types of Circuits • Finding Total Resistance and Current in a Series Circuit • Characteristics of Current and Voltage in a Series Current • Characteristics of Current and Voltage in a Parallel Circuit • Finding Total Resistance of Parallel and Series-Parallel Circuits • Common Causes of Circuit Failure

AC/DC Theory # 3 (20013)*

Magnetism • Magnetic Fields • Magnetism and Electricity • Induced Voltage • Sine Waves • Resistance and Inductance • Capacitance

AC/DC Theory # 4 (20014)*

Three-Phase Voltage Systems • Wye Connections • Delta Connections • Transformers • Transformer Operation • Motors • AC Induction Motors

Electrical Print Reading # 1 (20031)*

Introduction to Schematic Diagrams • Using Device Designations and Numbers for Symbols • Additional Uses of Schematics • Reading Schematic Diagrams • Additional Information Found on Schematics • Using Schematics When Modifying Circuits

Electrical Print Reading # 2 (20032)*

Introduction to Wiring Diagrams • Using Wiring Diagrams When Modifying Circuits • Additional Information on Wiring Diagrams • Single Line Drawings • Building Electrical Diagrams • Use of Electrical Diagrams When Troubleshooting

Electrical Connections # 1 (20051)*

Conductors • Sizes of Conductors • Insulation • Ampacity • Making a Splice Connection • Soldering Connections • Finishing Connections • Solderless Connectors

Electrical Connections # 2 (20052)*

Conduit Selection • Flexible Conduit and Connectors • Hand Benders • Power Benders • Using a Power Bender • Installing Conduit • Offset Bends • Installing Flexible Conduit and Wires

Electrical Connections # 3 (20053)*

Cable Construction • Shielding and Grounding High Voltage Cables • Removing a Cable Jacket • Terminating Insulating Shields • Final Preparations for Cable Termination • Building a Stress Cone • Class 3 Terminations • Class 2 Terminations • Class 1 Terminations

Electrical Connections # 4 (20054)*

Terminations and Splices • Ribbon-Shielded Cable • Cutting a Ribbon Metallic Shield • Braided Ground Straps • Preformed Stress Cones • Installing Prestretched Tubing and Stress Cone Ground Connections • Heat-Shrinkable Tubing • Molded Insulation

Solid-State Devices # 1 (20121)*

The Crystal • Forward and Reverse Bias • Diode Codes & Symbols • Operating Characteristic Curves • Rectification • Zener Diodes

Solid-State Devices # 2 (20122)*

Electronic Circuit Power Supply • Half Wave Rectifiers • Full Wave Rectifiers • Bridge Rectifiers • Filters

Solid-State Devices # 3 (20123)*

Transistors • Bipolar Junction Transistors • Current Flow through a Transistor • Transistors in Circuits • Checking Transistor Operation • SCR's and Triacs

Solid-State Devices # 4 (20124)*

Introduction to the Oscilloscope • Setting up an Oscilloscope • The Coupling Switch • Vertical Amplifier Controls • Horizontal Amplifier Controls • Triggering Controls • Oscilloscope Probes • Troubleshooting a Circuit • Printed Circuit Assemblies • Repairing Printed Circuit Assemblies

Electrical Safety Library (1 Videotape/DVD)

3 hours of training

This videotape/DVD-based training program consists of one videotape/DVD that trains students to understand the principles of basic electrical safety and the proper ways to work with electrical equipment.

Audience: This program is excellent for training both electricians and operators as well as for the multi-craft needs of process and manufacturing facilities. Every employee could benefit from various portions of this program.

Electrical Safety (2400)

Types of Hazards • Electrical Shock • Flash/Arc Blast • Safety Principles & Dangers • Effects of Current on the Body • Contaminated Environment • Recognizing Hazardous Areas/Equipment • Dangers of Working Under the Influence of Drugs and/or Alcohol • Common Safety Tips • Using Extension Cords • 110 & 120 Voltage • Hazards from Personal Items • Test Equipment • Lockout/Tagout • Testing Locked Out Circuits Procedure • De-Energizing Equipment • Removing & Installing Fuses and Resetting

Electrical Switchgear Maintenance Library (4 Videotapes/DVD's)

20 hours of training

This training Program consists of four Videotapes/DVD's that train students to test, troubleshoot and repair/replace switchgear, protective relays, and transformers.

Audience: This program is excellent both for the training of electricians and maintenance mechanics as well as for the multi-craft training needs of process and manufacturing facilities.

Switchgear # 1 (20091)*

Circuit Breakers • Circuit Breaker Contacts • Control Circuits • Circuit Breaker Connections • Racking a Breaker • Circuit Breaker Disassembly and Inspection • Testing Breaker Contacts

Switchgear # 2 (20092)*

Checking Main Contact Pressure • Checking Main Contact Resistance • Additional Breaker Tests • Checking the Control Circuits • Lubricating the Disconnects • Circuit Breaker Reinstallation • Final Tests • Inspecting Bus Work

Protective Relays (2008)*

Introduction to Protective Relays • Relay Circuits • Types of Protective Relays • Electromagnetic Relays • Relay Maintenance • Relay Removal and Inspection • Relay Calibration • Relay Reinstallation

Transformers (2011)*

Introduction to Transformers • De-Energizing and Grounding • Testing for Combustible Gases • Testing Winding Resistance • Drawing an Oil Sample • Performing a Dielectric Test • Drawing an Air-Free Oil Sample

Equipment Operation Library (13 Videotapes/DVD's)

52 hours of training

This training program consists of thirteen Videotapes/DVD's that train students in the principles of normal operation, and in basic operational procedures for common equipment.

Audience: An excellent program for the training of equipment operators, maintenance personnel and the multi-craft training needs of process and manufacturing facilities.

Techniques and Practices for Equipment Operators (2501)

Safety • Knowing the Equipment • Normal Operations • Changing the Operating Status of Equipment • Responding to Problems • Following Up Problems • Starting Repaired Equipment

Centrifugal Pumps (2502)

Centrifugal Pumps • Preoperational Checks • Valve Lineup and Venting • Start-up and Loading • Graphing Pump Characteristics • Cavitation • Air Binding and Pump Shutdown Procedure

Steam Turbines (2503)

Introduction to Turbine Operation • Principles of Turbine Operation • Auxiliary Systems and Control Devices • Valve Lineup and Other Preoperational Checks • Checking Auxiliary Systems • Turbine Warmup • Initial Roll and Start-up • Loading and Shutdown

Valves (2504)

Valve Designs • Preoperational Checks • Normal Operations • Bypass Operations • Valve Inspections • Abnormal Valve Conditions • Automatic Valve Operation

Reciprocating Air Compressors (2505)

Introduction to Compressor Operations • Principles of Compressor Operation • Capacity Control Modes • Preoperational Checks • Start-up • Periodic Checks • Manual Unloading and Shutdown

Heat Exchangers (2506)

Heat Transfer • Tube and Shell Heat Exchangers • Preoperational Checks • Filling and Venting • Completing Start-Up • Increasing Heat Load • Recognizing Problems • Shutdown

Positive Displacement Pumps (2507)

Positive Displacement Pumps • Principles of Operation • Preoperational Checks • Start-up • Periodic Checks • Shutdown • Reciprocating Pumps

Boilers (2508)

Boiler Operation • Burner Operation • Preoperational Checks • Start-Up • Operational Checks and Shutdown

Water Chemistry and Chemical Handling Practices (2509)

Corrosion • Deposits • Boiler System Treatment Methods • Cooling Water System Treatment Methods • Safety Practices • Adding Chemicals with a Batch Feed System • Adding Chemicals with a Continuous Feed System • Monitoring the System

Electrical Equipment (2510)

Circuit Breaker Operation • Racking Breakers • Ground Trucks and Relays • Control Fuses and Racking Low Voltage Breakers • Disconnects and Key Interlocks • Pole Use

Demineralizers (2511)

Ion Exchange • Putting a Demineralizer into Service • Monitoring Demineralizer Operation • Backwashing a Demineralizer • Adding Regenerant Chemicals • Rinsing and Remixing Resins • Filling and Rinsing

Vacuum Pumps, Air Ejectors, Strainers and Traps (2512)

Vacuum Pumps • Operating a Vacuum Pump • Starting an Air Ejector • Periodic Checks and Shutdown • Strainers • Putting a Standby Basket into Operation • Cleaning a Strainer Basket • Steam Traps

Lubrication for Equipment Operators (2513)

Friction and Lubrication • Natural-Feed Lubrication Systems • Monitoring a Natural-Feed System • Adequate Lubrication • Force-Feed Lubrication Systems • Monitoring a Force-Feed System • Filters and Centrifuges • Centrifuge Operation

Hydraulic Systems Library (9 Videotapes/DVD's)

36 hours of training

This comprehensive training program consists of nine videotapes/DVD's that train students to understand the principles of hydraulic system operation, as well as how to operate, maintain, troubleshoot, and repair a variety of hydraulic equipment.

Audience: This program is excellent both for the training of maintenance personnel as well as for the multi-craft training needs of process and manufacturing facilities.

Introduction to Hydraulic Systems (3501)

Properties of Liquids • Hydraulic System Components • Hydraulic Schematic Symbols • Pressure and Flow • System Flow and Pressure • Hydraulic Power Transmission • Hydraulic System Efficiency • Hydraulic System Safety

Pressure Controls (3502)

Introduction to Pressure Control Valves • Unloading and Counterbalance Valves • Sequence and Pressure Reducing Valves • Direct-Acting and Pilot-Operated Pressure Control Valves • External Control of Pilot-Operated Valves • Spool-Type Pressure Control Valves • Pressure Reducing Valve Operation

Directional Flow Controls (3503)

Direction Control Valves • Centering Conditions • Actuating Directional Control Valves • Piloting and Draining • Packed Spool Valves • Flow Control Valve Designs • Flow Control Applications

Fluids, Filters, and Reservoirs (3504)

Functions of Hydraulic Fluids • Characteristics of Hydraulic Fluid • Fluid Conditioning in the Reservoir • Draining and Replacing Fluid • Reducing External Contamination • Filters • Filter Maintenance

Hydraulic Pumps, Pumping Principles, and Accumulators (3505)

Hydraulic Power • Hydraulic Pumps • Vane Pumps • Piston Pumps • Monitoring Pump Operation • Hydraulic Accumulators • Accumulator Maintenance • Precharging the Accumulator

Variable Volume Hydraulic Pumps (3506)

Fixed Volume and Variable Volume Pumps • Horsepower Reduction • Variable Volume Vane Pumps • Variable Volume Piston Pumps • Volumetric Efficiency • Case Drain Flow • Electrical Checks • Reversible Pumps

Actuators (3507)

Hydraulic Cylinders • Cylinder Regulation • Cylinder Repair • Hydraulic Motors • Motor Regulation • Motor Repair

Hydraulic System Troubleshooting (3508)

Introduction to Troubleshooting • Using Schematic Diagrams • Flow-Related Problems • Cylinder Malfunction • Edgeguide Circuit Malfunction • Downender Malfunction • Traversing Circuit Malfunction

Electrohydraulic Servo Systems (3509)

Signal Transmission • Servo System Schematic Symbols • Spool Servo Valves • Jet Pipe Servo Valves • Flapper Servo Valves • Frequency Response Tests

Maintenance Management Library (10 Videotapes/DVD's)

30 hours of training

This comprehensive training program consists of ten videotapes/DVD's that train students to properly staff, schedule, supervise, and manage a maintenance organization. Principles of preventive and predictive maintenance are also included.

Audience: This program is excellent for training both maintenance managers and supervisors.

The Maintenance Organization (4001)

The Role of Maintenance • Organizational Structure • Time Management & the Leadership Role • Maintenance Training

Maintenance Systems & Documentation (4002)

Documentation • Types of Maintenance • Contract Maintenance

Maintenance Safety & Efficiency (4003)

Plant Safety • Shop Safety • Field Safety • Shop & Field Efficiency

Planning (4004)

Levels of Planning • Short-Range Planning • Day-to-Day Planning

Scheduling (4005)

Scheduling • Factors Affecting Scheduling • Techniques • Emergency Work

Preventive & Predictive Maintenance (4006)

The Purpose of Preventive Maintenance • Placing Equipment on Preventive Maintenance • Scheduling Preventive Maintenance • Predictive Maintenance

Parts & Material (4007)

Inventory Control Stages • Procurement • Receiving and Distributing • Restocking

Work Execution (4008)

Planning & Organizing • Staffing & Communicating • Supervising the Job • Controlling the Job

Evaluating the Maintenance Program (4009)

Evaluating the Program • Materials Use • Labor Use • Control Factors

Computerized Maintenance Systems (4010)

Computerized Work Request Systems • Computerized Inventory Control • Computerized Management Reports

Mechanical Drive Maintenance Library (6 Videotapes/DVD's)

24 hours of training

This comprehensive videotape-based training program consists of six videotapes/DVD's that train students to properly maintain gearboxes, mechanical drives, and couplings. It also shows techniques for coupling alignment and vibration analysis.

Audience: This program is excellent both for the training of maintenance personnel as well as for the multi-craft training needs of process and manufacturing facilities.

Gear Boxes #1 (45221)

Gear Boxes • Component Inspection • Performing Precision Measurements • Installing Bearings & Oil Seals • Reinstalling the Bearing Covers & Checking Shaft Runout • Checking Backlash & Tooth Contact • Gear Designs

Gear Boxes #2 (45222)

Periodic Checks • Lubrication • Removing & Installing the Oil Seals • Wormgearing Design • Worm Shaft Endplay • Wormgear Endplay & Positioning • Gear Box Maintenance Guidelines

Mechanical Drives, Couplings, & Alignment #1 (45061)*

Couplings & Alignment • Disassembling Couplings & Detecting Angular Misalignment • Detecting Parallel (Offset) Misalignment • Interpreting Alignment Measurements • Correcting Misalignment • Assembling the Coupling • Removing Belts

Mechanical Drives, Couplings, & Alignment #2 (45062)*

Installing Belts • Chain Drive Systems • Routine Servicing of Speed & Increases • Major Overhaul of Speed Reducers & Increases • Checking Gear Engagement • Vibration

Advanced Alignment (4519)*

Introduction to Alignment • Misalignment in the Vertical & Horizontal Planes • Detecting Misalignment • A Typical Alignment Kit • Measuring Bracket Sag • Mounting Dial Indicators • Taking Alignment Readings • Calculating Misalignment Corrections

Vibration Analysis (4517)*

Introduction to the Hand-Held Vibration Meter • Using the Hand-Held Vibration Meter • Storing the Hand-Held Vibration Meter • Introduction to the Vibration Analyzer • Taking Unfiltered Readings • Taking Filtered Readings • Taking a Signature Balancing

Mechanical Maintenance Fundamentals Library (15 Videotapes/DVD's)

60 hours of training

This comprehensive training program consists of fifteen videotapes/DVD's that train students in mechanical maintenance fundamentals such as shop practices, measuring instruments, and print reading as well as maintenance procedures for bearings.

Audience: This program is excellent both for the training of maintenance personnel as well as for the multi-craft training needs of process and manufacturing facilities.

General Shop Practices #1 (45031)*

Blank Flange Layout • Drilling Pilot Holes • Drilling Finished Holes • Countersinking • Counterboring
Rectangular Plate Layout

General Shop Practices #2 (45032)*

Grinding Wheels • Grinding Wheel Inspection and Mounting • Testing and Truing a Grinding Wheel • Rough
Grinding a Steel Flange • Grinding Soft Metals • Tool Sharpening • Installing a Wire Brush Wheel

General Shop Practices #3 (45033)*

Inspecting Horizontal Band Saw • Setting Up and Cutting Flat Iron • Mounting Work for a 45° Angle Cut •
Cutting Aluminum • Removing a Blade • Installing a Blade • Cutting Stainless Steel Using the Work Stop

Hand Tools #1 (45011)*

Vises and Clamps • Screwdrivers • Hammers, Mallets and Sledges • Punches • Non-Adjustable Wrenches •
Socket Wrenches • Adjustable Wrenches • Torque Wrenches • Pliers

Hand Tools #2 (45012)*

Snips and Hacksaws • Chisels • Power Hand Tools • Taps • Dies and Reamers • Files

Measuring Instruments (4502)*

The Steel Rule • The Vernier Caliper • The Outside Micrometer • The Outside Vernier Micrometer • Inside
and Depth Micrometers • Telescoping and Thickness Gauges • The Dial Indicator

Mechanical Print Reading (4504)

Visible and Hidden Lines • Sectional Views • Break Lines and Phantom Lines • Dimensions • Isometric
Drawings and Orthographic Projections • Screw Threads and Surface Finish • Written Information

Bolting and Fastening (4526)

Fastener Performance • Proper Preloading • Fastener Designs • Fastener Installation • Bolting Patterns •
Lubricating Fasteners • Locking Devices • Frozen Fasteners

Rigging and Lifting #1 (45051)*

Hand-Operated Hoists • Planning and Equipment Selection • Hoist Inspection • Sling Inspection • Shackle
and Trolley Inspection • Lifting Equipment Installation • Inverting a Load • Rigging Disassembly and Review

Rigging and Lifting #2 (45052)*

Introduction to Overhead Traveling Cranes • Performing an Operational Inspection on an Overhead Traveling
Crane • Performing a Single-Point Lift Using an Overhead Traveling Crane • Using a Spreader Bar • Lifting
Irregularly Shaped Loads • Lifting a Long, Balanced Load

Rigging and Lifting #3 (45053)*

Inspecting a Mobile Crane • Test Driving a Mobile Crane and Communicating with Audible Signals and Hand
Signals • Performing a Four-Point Lift Using a Mobile Crane • Rigging, Lifting, and Transporting Various
Loads Using a Mobile Crane • Static and Operational Inspection of a Forklift • Maneuvering Around a Tight
Corner and Backing with a Large Load Using a Forklift • Removing a Pallet from a Truck Using a Forklift •
Unstacking and Stacking Pallets Using a Forklift

Rigging and Lifting #4 (45054)*

Components of Ladders and Ladder Selection • Inspecting and Using a Single Ladder • Inspecting and Using
an Extension Ladder • Climbing and Lowering an Extension Ladder • Inspecting and Using a Stepladder •
Selecting and Inspecting Tubular or Welded Frame Scaffolding • Erecting a Fixed Scaffold • Completing
Assembly and Using the Scaffold • Inspecting and Using a Suspended Scaffold

Bearings and Lubrication #1 (45081)*

Introduction to Bearings • Disassembling and Inspecting a Plain Journal Bearing • Checking the Oil Clearance
of a Plain Journal Bearing Using a Micrometer and Telescoping Gauge • Performing a Bearing Contact Check
• Checking the Oil Clearance of a Plain Journal Bearing Using Lead Wire • Assembling a Plain Journal
Bearing

Bearings and Lubrication #2 (45082)*

Introduction to Anti-Friction Journal Bearings • Maintenance of Tapered Roller Bearings in a Gear-Type Speed
Reducer • Removing the Top Housing from a Speed Reducer • Removing a Shaft and Bearing from a Gear
Reducer • Removing the Bearing Inner Ring from the Shaft • Cleaning and Inspecting an Anti-Friction
Bearing • Replacing and Assembling an Anti-Friction Bearing • Using a Bearing Puller

Bearings and Lubrication #3 (45083)*

Introduction to Thrust Bearings • Tilting Pad, Oil Film Thrust Bearings • Disassembling a Tilting Pad, Oil Film Thrust Bearing • Disassembling and Inspecting the Thrust Bearing Assembly • Reassembling a Tilting Pad, Oil Film Thrust Bearing • Final Assembly of a Tilting Pad, Oil Film Thrust Bearing • Bearing Lubrication

Other Mechanical Maintenance Subjects (12 Videotapes/DVD's)

48 hours of training

This comprehensive training program consists of twelve videotapes/DVD's that train students to maintain a variety of special equipment, including boilers, turbines, and diesel engines.

Audience: This program is excellent both for the training of maintenance mechanics as well as for the multi-craft training needs of process and manufacturing facilities.

Boilers and Boiler Equipment #1 (45141)*

Identifying Boiler Tube Damage • Repairing a Waterwall Tube by Pad Welding • Removing a Section of Boiler Tube • Preparing to Install a New Section of Tube • Cutting Windows in the New Tube • Installing a Replacement Tube

Boilers and Boiler Equipment #2 (45142)*

Gauge Glass Operation and Disassembly • Cover Disassembly and Reassembly • Gauge Glass Assembly Completion • Soot Blower Disassembly • Final Soot Blower Disassembly • Poppet Valve Disassembly, Cleaning, and Inspection • Thrust Bearing Inspection

Auxiliary Steam Turbines #1 (45241)

Turbine Operation • Removing the Casing • Measuring Thrust • Measuring the Rotor-to-Nozzle Clearance • Removing and Measuring Carbon Rings • Checking Shaft and Wheel Runout and Backlash • Removing the Rotor and Checking Bearing Balance

Auxiliary Steam Turbines #2 (45242)

Cleaning Turbine Parts • Inspecting Turbine Parts • Adjusting Nozzle Clearance • Theoretical Clearance Measurements • Actual Clearance Measurements • Installing the Packing and Wheel Cover • Turbine Overhaul Guidelines

Auxiliary Steam Turbines #3 (45243)

Mechanical & Hydraulic Governors • Maintaining Hydraulic Governors • Mechanical-Hydraulic Governors • Overspeed Trip Mechanisms • Overspeed Sensor Maintenance

Coal and Ash Handling Equipment #1 (45151)*

Preparing a Conveyor Belt for Maintenance • Cutting a Conveyor Belt • Punching Holes in the Belt for a Bolted Fastener • Assembling and Installing Metal Fasteners • Completing the Bolted Metal Splice • Preparing a Belt for Splicing with Riveted Solid Metal Fasteners • Completing the Riveted Solid Metal Splice • Installing a Riveted Hinged Splice and Aligning the Belt

Coal and Ash Handling Equipment #2 (45152)*

Re-Blading and Balancing a Pulverizer Exhauster • Disassembling a Control Valve • Removing the Seat and Disc • Reassembling the Control Valve • Disassembling and Inspecting an Air Piston Operator • Reassembling an Air Piston Operator • Water Jet Exhauster Operation and Inspection • Assembling a Water Jet Exhauster

Diesel Engines #1 (45161)*

Engine Operation • Two-Stroke and Four-Stroke Engine Cycles • The Air Intake System • The Fuel System • The Exhaust System • The Lubricating Oil System • The Cooling System

Diesel Engines #2 (45162)*

Checking the Oil Level • Changing a Cartridge Type Oil Filter • Changing the Oil • Maintaining an Oil Filter Housing • Replacing an Oil Filter and Adding Oil • Replacing a Dry Element Air Cleaner • Maintaining an Oil Bath Air Cleaner

Diesel Engines #3 (45163)*

Draining a Fuel Tank • Removing a Fuel Filter • Reinstalling a Fuel Filter • Checking the Coolant • Locating a Leak in the Cooling System • Engine Timing • Checking Exhaust Valve Timing • Checking Injector Timing

Hydraulic Equipment #1 (45201)*

Basic Hydraulic Systems • Hydraulic Cylinder Disassembly • Shaft Runout • Cylinder Reassembly • Control Valve Disassembly • Control Valve Inspection and Reassembly

Hydraulic Equipment #2 (45202)*

- Gear Pump Disassembly • Parts Inspection • Gear Pump Reassembly • Vane Pump Disassembly • Inspection
- Vane Pump Reassembly

Mechanical Troubleshooting Library (4 Videotapes/DVD's)

16 hours of training

This comprehensive training program consists of four videotapes/DVD's that train students in the basic troubleshooting procedure. It also shows how to troubleshoot a variety of equipment.

Audience: This program is excellent both for the training of maintenance mechanics and equipment operators as well as for the multi-craft training needs of process and manufacturing facilities.

Principles of Mechanical Troubleshooting (6501)

- A General Troubleshooting Procedure • Investigating the Problem • Understanding Normal Operations • Background Information • Analyzing Information • Repairing the Problem • Preventing Future Problems • Troubleshooting Under Pressure

Troubleshooting Centrifugal Pumps (6502)

- Troubleshooting Steps and Diagrams • Bearings • Gland Leakage • Pump Head and Capacity

Troubleshooting Positive Displacement Pumps (6503)

- Seal Failure • Knocking • Loss of Capacity

Troubleshooting Reciprocating Air Compressors (6504)

- Failure to Unload • Knocking • Increased Discharged Temperature

Piping and Valve Maintenance Library (16 Videotapes/DVD's)

64 hours of training

This comprehensive training program consists of sixteen videotapes/DVD's that train students to install tubing and piping systems. In addition, it shows how to disassemble, clean, inspect, align, and reassemble a variety of piping and valves.

Audience: This program is excellent both for the training of maintenance personnel as well as for the multi-craft training needs of process and manufacturing facilities.

Piping #1 (45111)*

- Preparing for Tubing System Repair • Flaring Tubing • Bending and Cutting Tubing • Tubing Connections • Pipe Cutting • Threading Pipe • Pipe Assembly • Union Replacement

Piping #2 (45112)*

- General Maintenance and Insulation Removal • Elbow Removal • Elbow Installation • Selecting and Installing Insulation on an Elbow • Insulating a Flange and Applying Cloth • Plastic-Lined Piping

Piping #3 (45113)*

- Inverted Bucket Trap Disassembly and Reassembly • Float-and-Bellows Trap Disassembly and Reassembly • Impulse Steam Trap (Piston-Type) • Impulse Steam Trap (Disc Type) • The Duplex Strainer • The Edge-Type Strainer

Piping #4 (45114)*

- Cleaning Steam Condenser Tubes • Inspecting and Plugging Steam Condenser Tubes • Cutting a Tube for Removal • Collapsing a Tube for Removal • Replacing a Tube • Gauge Glass Replacement

Advanced Pipefitting #1 (45211)*

- Introduction to Pipefitting • Blueprints • Piping Materials • Materials List and Field Checks • Determining Pipe Length • Fitting Measurements • Marking a Pipe • Cutting Methods

Advanced Pipefitting #2 (45212)*

- Torch Cutting • Using an Automatic Cutting Torch • End Preparation Tool • Alignment • Checking Alignment and Tack-Welding • Installation and Support

Advanced Pipefitting #3 (45213)*

- Fabricated Joints • Mitre Joints • Riser Joints • Centering Heads • Contour Markers • Field Marking • Hole Projection Markers

Advanced Pipefitting #4 (45214)*

Introduction to Plastic Pipe and Cutting • End Preparation • End Cleaning • Joining • Plastic Welding • Fiberglass Reinforced Plastic • Pipe-Cutting and End Preparation • Making a Butt and Wrap Joint • Program Review

Valves #1 (45121)*

Gate Valve Construction • Disassembling the Gate Valve • Disassembling the Gate Valve Bonnet Assembly • Inspection • Lapping the Gate Valve Disc • Checking Contact Between the Gate Valve Disc and Seats • Reassembly

Valves #2 (45122)*

Globe Valve Construction • Removing and Disassembling the Globe Valve Bonnet Assembly • Inspection • Reassembly • Lapping the Globe Valve Disc

Valves #3 (45123)*

Control Valve Construction • Disassembling the Control Valve • Inspecting Control Valve Components • Reassembly • Installing the Control Valve

Valves #4 (45124)*

Diaphragm Valve Construction and Disassembly • Disassembling the Diaphragm Valve Bonnet Assembly • Reassembly • Butterfly Valve Construction • Disassembly • Inspecting and Reassembly

Motorized Valve Actuators #1 (45231)

Valve Actuators • Mechanical Components • Electrical Components • Removing a Valve Actuator • Disassembly • Reassembly

Motorized Valve Actuators #2 (45232)

Limit Switch Adjustment • Torque Switch Adjustment • Operational Tests • Mechanical Troubleshooting • Electrical Troubleshooting

Relief Valves #1 (45181)*

Safety Valve Operation • Disassembly • Removing the Disc Assembly • Blue Checking the Seat and Disc • Performing Spindle Runout • Reassembly • Installing and Setting

Relief Valves #2 (45182)*

Relief Valve Operation • Disassembly • Removing the Pilot Valve • Blue Checking the Pilot Valve • Making Valve Seat Repairs • Reassembly and Installation

Programmable Controllers Library (22 Videotapes/DVD's)

60 hours of training

This comprehensive training program consists of twenty-two videotapes/DVD's that train students to understand the functions performed by a programmable controller system. In addition, it trains students how to configure, program, install, and troubleshoot programmable controllers.

Audience: This program is excellent for the training of programmable controller technicians.

Controllers (5001)

Control Technologies • Input Modules • The Central Processing Unit and Output Modules • The User Program

Central Processing Unit (5002)

CPU Operation and Components • CPU Scanning and Memory • CPU Memory Map • CPU Memory Types and Diagnostics

Discrete I/O Modules (5003)

I/O Devices and Modules • Discrete Input Modules • Discrete Output Modules • Connections and Addresses

Analog and Special I/O Modules (5004)

Analog I/O Modules • Special I/O Modules • Motion Control I/O Modules

Programming Devices and Peripheral Equipment (5005)

Peripherals • Programming Devices • Programming Devices and Printers • Tape Loaders and Simulators

Principles of Ladder Diagrams (5006)

Elements of Control • Information Devices • Decision and Action Devices • Ladder Diagrams

Interpreting Ladder Diagrams (5007)

Parts of the Diagram • Techniques for Interpreting Ladder Diagrams • Common Circuit Arrangements • Reading Ladder Diagrams

Numbering Systems, Numbering Codes, and Logic Concepts (5008)

Number Systems Principles • Binary Number System • Octal, Hex, and BCD • Logic Functions

Principles of Ladder Logic Programming (5009)

Programming Principles • Latching Relays and Master Control Relays • Programming Limitations

Programming: Timers and Counters (5010)

Ladder Logic Timing Functions • Functional Blocks and Cascading • Counting Functions

Comparison and Arithmetic Functions (5011)

Data Comparison • Addition and Subtraction • Multiplication and Division

Programming: Logical Operations and Data Manipulation (5012)

Data Transfer • Data Manipulation Logic Operations

Programming: Analog and PID (5013)

Analog Control • Multiplexing Analog Inputs • Programming Analog Systems • PID Control

Communication Fundamentals (5014)

Applications and Overview • Communications Module • The Serial Interface and Communications Line • Data Transmission

Networking (5015)

Networks • Access Control Methods

Developing a Program (5016)

Describing the System • Flowcharting • Ladder Diagrams • Addressing and Coding

Program Documentation (5017)

Importance of Documentation • Types of Documentation • Computerized Documentation

Sizing and Selection (5018)

Considerations for Selecting a PC • Determining I/O and Memory Requirements • Programming and Peripheral Requirements • Final Selection

Installation Considerations (5019)

Selecting an Installation Site • PC Component Layout • Grounding and Electrical Safety • Start-Up

Troubleshooting Techniques (5020)

The Analytical Framework • Preliminary Troubleshooting Steps • Troubleshooting with the PC

Troubleshooting PC Malfunctions (5021)

Memory Fault Scenario • I/O Module Malfunction • Division Method

Troubleshooting Field Device Malfunctions (5022)

Internal vs. External Causes • The Troubleshooting Sequence

Pump and Compressor Maintenance Library (13 Videotapes/DVD's)

52 hours of training

This comprehensive training program consists of thirteen videotapes/DVD's that train students to remove, disassemble, inspect, and maintain all types of pumps and compressors. Packing and seal maintenance is also included.

Audience: This program is excellent both for the training of maintenance personnel as well as for the multi-craft training needs of process and manufacturing facilities.

Centrifugal Pumps #1 (45091)*

Pump Description • Pump Maintenance: General • Disassembling the Casing • Removing the Rotating Element • Inspecting the Casing • Disassembling the Rotor

Centrifugal Pumps #2 (45092)*

Measuring Packing Sleeves • Measuring Impellers and Wearing Rings • Measuring the Shaft • Inspecting Seal and Bearing Parts • Measuring Bearing Oil Clearance

Centrifugal Pumps #3 (45093)*

Assembling the Rotor • Installing the Rotor • Measuring Sleeve Bearing Oil Clearance • Assembling the Bearings

Centrifugal Pumps #4 (45094)*

Assembling the Casing • Tightening Casing Studs and/or Bolts • Installing Packing • Test Operating the Pump

Specialized Centrifugal Pumps (4510)*

Pump Disassembly • Shaft and Bearing Removal • Shaft and Impeller Inspection • Pump Reassembly • Setting Pump Impeller Clearance • Mechanical Seal Installation • Setting Vertical Pump Impeller Clearance

Air Compressors and Blowers #1 (45131)*

Reciprocating Air Compressor Discharge Valve Removal and Disassembly • Seat Cleaning, Inspection, and Lapping • Guard Cleaning, Inspection, and Maintenance • Reinstallation • Suction Valve Unloader Removal and Disassembly • Unloader Testing • Installation

Air Compressors and Blowers #2 (45132)*

Reciprocating Air Compressor Disassembly • Piston and Piston Rod Removal • Measurements • Ring Installation • Piston-to-Cylinder Head Clearance Adjustment

Air Compressors and Blowers #3 (45133)*

Rotary Blower Disassembly • Removing the Timing Gears • Removing Head Plate and Shafts • Removing the Bearings • Installing the Bearings and the Seal • Installing the Timing Gears • Adjusting the Timing and Reassembly

Centrifugal Air Compressors #1 (45251)

Air Compression • Centrifugal Air Compressors • Air Intake Filters • Filter Maintenance • Lubrication System Maintenance and Troubleshooting

Centrifugal Air Compressors #2 (45252)

Gear Box Design • Inlet Disassembly • Horizontally-Split Compressor Disassembly • Vertically-Split Compressor Disassembly • Checking Bearing Clearance, Gears and Impeller Clearance

Centrifugal Air Compressors #3 (45253)

Intercoolers and Aftercoolers • Separators, Receivers, and Dryers • Coupling Alignment • Vibration Analysis • Troubleshooting High Air Temperature • Common Compressor Problems

Packing and Seals #1 (45071)*

Removing Conventional Valve Packing • Installing Valve Packing • Removing Chevron Packing • Installing Preformed Chevron Packing • Using Preformed Graphite Ring Packing

Packing and Seals #2 (45072)*

Fabricating Graphite Ring Packing • Removing Pump Packing • Installing Pump Packing • Removing, Disassembling, and Inspecting a Mechanical Seal • Assembling and Installing a Mechanical Seal • Types of Mechanical Seals

Rotating Equip. Predictive Maint. and Align. Library (7 Videotapes/DVD's)

21 hours of training

This comprehensive training program consists of seven videotapes/DVD's that train students in the principles and practices of predictive maintenance. Advanced alignment techniques are also covered.

Audience: This program is excellent both for the training of maintenance personnel and equipment operators as well as for the multi-craft training needs of process and manufacturing facilities.

Principles and Practices of Predictive Maintenance (5401)

Testing Methods • Trend Analysis • Purpose of Effective Predictive Maintenance Program • Vibration, Lubricant, and Trend Analysis

Vibration Analysis (5402)

Monitoring Vibration • Performing a Vibration Analysis • Determination of Velocity and Displacement

Lubricant and Trend Analysis (5403)

Principles of Lubrication Analysis • Trend Analysis • Taking Oil Samples • Reading Oil Analysis Report

Techniques for Extending Bearing Life (5404)

Handling and Storage • Proper Bearing Installation • Maintenance

Principles of Reverse Double Dial Alignment (5405)

Introduction to Reverse Double Dial Alignment • Determining Misalignment • Correcting Misalignment

Reverse Double Dial Alignment Procedure (5406)

Prealignment Measurements • Determining Misalignment • Correcting Vertical Misalignment • Correcting Horizontal Misalignment

Computerized and Laser Alignment (5407)

Computerized Alignment • Laser Alignment • Bracket Sag • Correcting Vertical and Horizontal Alignment

Statistical Process Control (7 Videotapes/DVD's)

21 hours of training

This comprehensive training program consists of seven videotapes/DVD's that train students to use statistical process control as a means of improving a process. The use of several types of control charts is included.

Audience: This program is excellent for every employee in all disciplines.

Introduction to Statistical Process Control (5501)

What is SPC? • Controlling a Process • Using Histograms and Frequency Charts to Monitor Variability • Curves and Distributions

Introduction to Control Charts (5502)

Basic Elements of a Control Chart • Organization of Control Charts • Measures of Location • Measures of Dispersion • Plotting Values

Control Charts for Variables (5503)

Variable Control • Variable Sampling • Principles in Interpreting Variable Charts • Random and Non-Random Patterns

Control Charts for Attributes (5504)

Attribute Control • p and np Charts • u, c, and Multiple Characteristic Charts • Interpreting Attribute Control Charts

Advanced Control Charts (5505)

Control Limits for Variables Charts • Control Limits for Attribute Charts • Cusum Charts

Machine and Process Capability Studies (5506)

Capability Studies • Performing a Machine Capability Study • Calculating Machine Capability Indexes • Process Capability

Problem Solving Techniques (5507)

Constructing Pareto Diagrams • Using Pareto Diagrams • Brainstorming • Cause and Effect Diagrams • Scatter Diagrams • Interpreting Diagrams • Problem Solving Techniques Used in Statistical Process Control

Training the Trainer (14 Videotapes/DVD's)

42 hours of training

This comprehensive training program consists of fourteen videotapes/DVD's that train students become trainers, including how to develop, deliver, and evaluate a training program.

Audience: This program is excellent for the training of managers and supervisors who teach employees in some capacity.

The Elements of Effective Training (6001)

Starting the Course • Assessing Student Skills and Attitudes • Training Philosophy • The Training Process

Planning for Effective Training (6002)

Identifying Training Need Symptoms • Performing a Needs Analysis • Job and Task Analyses

Developing and Writing Training Objectives (6003)

Training Objectives • Writing Objectives • Using Objectives

Learning: How it Occurs (6004)

Principles of Adult Education • The Learning Process • Learner Profiles

Instructing to Facilitate Learning (6005)

Facilitating Learning • The Presentation Stage • The Feedback Stage • The Adaptation Stage

Methods for Teaching Skills (6006)

Guidelines for Teaching Skills • Demonstrations • Hands-On Practice • Role Playing

Methods for Teaching Information (6007)

Preparing a Lecture • Delivering a Lecture • Question-and-Answer Sessions • Group Discussions

Principles of Visual Training (6008)

Visual Communication • Selecting Visual Aids • Visual Design

Using Visual Aids Effectively (6009)

Using Visual Aids • Computers as Training Media • Interactive Videodisc

Measuring Instructional Effectiveness (6010)

Evaluation Purposes • Written Tests • Performance Tests • Reaction Sheets

Developing and Using Lesson Plans (6011)

Elements of a Lesson Plan • The Body of the Plan • The Content Outline • Completing the Plan

On-the-Job Training (6012)

Classroom versus On-the-Job Training • Approaches to On-the-Job Training • Job Aids

Teaching Your First Class (6013)

Preparation • Instruction • Following Up

Administering the Training Program (6014)

The Cost of Training • Scheduling and the Training Environment • Staff and Resources • Program Evaluation and Revision

Welding (12 Videotapes/DVD's)

48 hours of training

This comprehensive training program consists of twelve videotapes/DVD's that train in the theory and practice of various welding and cutting techniques.

Audience: This program is excellent both for the training of welders and for the multi-craft training needs of process and manufacturing facilities.

Principles and Metallurgy (7001)

Welding Processes • Properties of Metals • Determining the Properties of Metals • Identification of Metals • Effects of Welding • Preheating and Post-Heating

Joint Design and Symbols (7002)

Joint Design • Types of Joints • Fillet Welds • Groove Welds • Welding Symbols • Fillet Weld Dimensions • Groove Weld Dimensions

General Techniques and Safety Practices (7003)

Personal Safety Gear • Environment and Equipment Safety • Joint Preparation • Positions and Angles • Arc Length and Travel Speed • Depositing Beads • Positions and Techniques

Oxygen-Fuel Gas Cutting (7004)

Equipment Set-Up • Setting Operating Pressures • Torch Operation • Performing a Straight Cut • Performing a Bevel Cut • Special Cutting Applications

Brazing and Braze Welding (7005)

Capillary Action • Brazing Filler Metals and Fluxes • Equipment Set-Up • Brazing Aluminum • Braze Welding Cast Iron • Soldering Copper Pipe • Brazing Copper and Carbon Steel

Shielded Metal-Arc Welding Principles (7006)

Welding Safety • Electrodes • Welding Equipment • Striking an Arc • Performing a Practice Weld • Finishing a Weld

Shielded Metal-Arc Structural and Pipe Welding (7007)

Performing a Weld using the Inverted V Technique • Preparing a Pipe Joint for Welding • Pipe Welding Positions • Pipe Welding • Performing a Weld Using the Whip and Pause Technique • Performing a Weld Using the Inverted T Technique

Principles of TIG (7008)

The TIG Electrical System • Electrical Settings • The TIG Shielding System • Adjusting the Flow Rate • TIG Electrodes • The TIG Torch • The TIG Weld

TIG Structural and Pipe Welding (7009)

Welding Aluminum • Welding Stainless Steel • Welding Carbon Steel Pipe • Preparing Stainless Steel Pipe • Welding Stainless Steel Pipe • Welding Carbon Steel Pipe in the 6g Position

Principles and Techniques of MIG (7010)

MIG Welding Equipment • Equipment Set-Up • Transfer Methods • MIG Welding in the Vertical Uphill Position • MIG Welding in the Vertical Downhill Position • Welding Thick Aluminum

Weld Defects: Causes and Corrections (7011)

Removing a Defective Weld • Overlapping, Undercutting, Distortion, and Warpage • Cracks, Craters, Porosity, and Inclusions • Burnthrough, Inadequate Penetration, and Incomplete Fusions • Brittle Welds, Arc Strike, and Excessive Splatter • Visual and Dye Penetrant Examinations • Nondestructive Examinations

Cutting: Plasma-Arc and Air Carbon-Arc (7012)

Arc Cutting Processes • Air Carbon-Arc Cutting Equipment • Air Carbon-Arc Cutting Preparations • Air Carbon-Arc Gouging • Plasma-Arc Cutting Equipment • Plasma-Arc Equipment Setup • Plasma-Arc Cutting