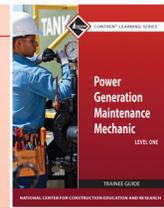


L1 POWER GENERATION MAINTENANCE MECHANIC



LEVEL 1

Curriculum Notes

- 225 Hours
 - Includes 100 hours of *Power Industry Fundamentals*, which is a prerequisite for Level One completion and must be purchased separately.
 - Hardcover: \$57, ISBN 978-0-13-466829-1
- Published: 2010
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$67
Individual Modules: \$20

ISBN

978-0-13-215439-0
see module list

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Tools of the Trade (5 Hours)

ISBN 978-0-13-614584-4

(Module ID 32102-07; from *Industrial Maintenance Mechanic Level One*) Introduces hand and power tools used in industrial maintenance. Covers safety procedures and proper use of these tools.

Fasteners and Anchors (5 Hours)

ISBN 978-0-13-614585-1

(Module ID 32103-07; from *Industrial Maintenance Mechanic Level One*) Covers the hardware and systems used in industrial maintenance. Describes anchors and supports, their applications, and how to install them safely.

Oxyfuel Cutting (17.5 Hours)

ISBN 978-0-13-614586-8

(Module ID 32104-07; from *Industrial Maintenance Mechanic Level One*) Explains the safety requirements for oxyfuel cutting. Identifies oxyfuel cutting equipment and provides instructions for setting up, lighting, and using the equipment. Explains how to perform straight line cutting, piercing, beveling, washing, and gouging.

Gaskets and Packing (10 Hours)

ISBN 978-0-13-614588-2

(Module ID 32105-07; from *Industrial Maintenance Mechanic Level One*) Introduces gaskets and gasket material, packing and packing material, and types of O-ring material. Explains the use of gaskets, packing, and O-rings, and how to fabricate a gasket.

Craft-Related Mathematics (15 Hours)

ISBN 978-0-13-614589-9

(Module ID 32106-07; from *Industrial Maintenance Mechanic Level One*) Explains how to use ratios and proportions, solve basic algebra, area, volume, and circumference problems, and solve for right triangles using the Pythagorean theorem.

Construction Drawings (12.5 Hours)

ISBN 978-0-13-614590-5

(Module ID 32107-07; from *Industrial Maintenance Mechanic Level One*) Introduces plot plans, structural drawings, elevation drawings, as-built drawings, equipment arrangement drawings, P&IDs, isometric drawings, basic circuit diagrams, and detail sheets.

Pumps and Drivers (5 Hours)

ISBN 978-0-13-614591-2

(Module ID 32108-07; from *Industrial Maintenance Mechanic Level One*) Explains centrifugal, rotary, reciprocating, metering, and vacuum pump operation and installation methods, as well as types of drivers. Describes net positive suction head and cavitation.

Valves (5 Hours)

ISBN 978-0-13-614592-9

(Module ID 32109-07; from *Industrial Maintenance Mechanic Level One*) Identifies different types of valves and describes their installation as well as valve storage and handling.

Introduction to Test Instruments (7.5 Hours)

ISBN 978-0-13-614593-6

(Module ID 32110-07; from *Industrial Maintenance Mechanic Level One*) Introduces test equipment for industrial maintenance, including tachometers, pyrometers, strobe meters, voltage testers, and automated diagnostic tools.

Material Handling and Hand Rigging (15 Hours)

ISBN 978-0-13-614594-3

(Module ID 32111-07; from *Industrial Maintenance Mechanic Level One*) Introduces the equipment and techniques of material handling, and describes the procedures for rigging and communicating with riggers.

Mobile and Support Equipment (10 Hours)

ISBN 978-0-13-614560-8

(Module ID 32112-07; from *Industrial Maintenance Mechanic Level One*) Introduces the safety procedures and methods of operation for motorized support equipment, including forklifts, personnel lifts, compressors, and generators.

Lubrication (12.5 Hours)

ISBN 978-0-13-614562-2

(Module ID 32113-07; from *Industrial Maintenance Mechanic Level One*) Explains lubrication safety, storage, and classifications. Also explains selecting lubricants, additives, lubrication equipment, and lubricating charts. Explains lubrication safety, storage, and classifications. Also explains selecting lubricants, additives, lubrication equipment, and lubricating charts.

SMAW Equipment and Setup (5 Hours)

ISBN 978-0-13-610533-6

(Module ID 29107-09; from *Welding Level One, Fourth Edition*) Describes SMAW welding and welding safety. Explains how to connect welding current and set up arc welding equipment. Also explains how to use tools for cleaning welds.

L2 POWER GENERATION MAINTENANCE MECHANIC

LEVEL 2

Curriculum Notes

- 260 Hours
- Published: 2010
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$97
Individual Modules: \$20

ISBN

978-0-13-215441-3
see module list

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Basic Layout (20 Hours)

ISBN 978-0-13-604621-9

(Module ID 32201-07; from *Industrial Maintenance Mechanic Level Two*) Discusses the tools used in layout. Explains how to lay out baselines using the arc method and 3-4-5 method.

Advanced Trade Math (30 Hours)

ISBN 978-0-13-604681-3

(Module ID 32301-08; from *Industrial Maintenance Mechanic Level Three*) Explains right triangle trigonometry and its use in the trade. Also covers interpolation, equilateral and isosceles triangles and the laws of acute triangles.

Precision Measuring Tools (20 Hours)

ISBN 978-0-13-604682-0

(Module ID 32302-08; from *Industrial Maintenance Mechanic Level Three*) Explains how to select, inspect, use and care for levels, feeler gauges, calipers, micrometers, height gauges and surface plates, dial indicators, protractors, parallels and gauge blocks, trammels, and pyrometers.

Introduction to Bearings (15 Hours)

ISBN 978-0-13-604627-1

(Module ID 32207-07; from *Industrial Maintenance Mechanic Level Two*) Introduces plain, ball, roller, thrust, guide, flanged, pillow block, and takeup bearings. Discusses bearing materials and designations.

Installing Bearings (20 Hours)

ISBN 978-0-13-604683-7

(Module ID 32303-08; from *Industrial Maintenance Mechanic Level Three*) Explains how to remove, troubleshoot, and install tapered, thrust, spherical roller, pillow block, and angular contact ball bearings.

Installing Couplings (15 Hours)

ISBN 978-0-13-604684-4

(Module ID 32304-08; from *Industrial Maintenance Mechanic Level Three*) Identifies various types of couplings, and covers installation procedures using the press-fit method and the interference-fit method. Also covers coupling removal procedures.

Continued on following page

Power Generation Maintenance Mechanic Level 2 (continued)

Installing Mechanical Seals (20 Hours)

ISBN 978-0-13-604689-9

(Module ID 32308-08; from *Industrial Maintenance Mechanic Level Three*) Covers the function and advantages of mechanical seals, identifies parts and types of seals, and includes procedures for removing, inspecting and installing mechanical seals.

Conventional Alignment (30 Hours)

ISBN 978-0-13-604686-8

(Module ID 32306-08; from *Industrial Maintenance Mechanic Level Three*) Covers types of misalignment, aligning couplings using a straightedge and feeler gauge, adjusting parallel and angular alignment, using a dial indicator, and eliminating coupling stress.

Reverse Alignment (30 Hours)

ISBN 978-0-13-610448-3

(Module ID 32404-09; from *Industrial Maintenance Mechanic Level Four*) Describes preparation for dial indicator reverse alignment, and explains the procedures for setting up reverse alignment jigs. Explains graphic and mathematical techniques

for aligning equipment based on reverse dial indicator measurements.

Laser Alignment (25 Hours)

ISBN 978-0-13-610449-0

(Module ID 32405-09; from *Industrial Maintenance Mechanic Level Four*) Using one example system, describes the principles of using laser alignment systems to perform alignments.

Installing Belt and Chain Drives (10 Hours)

ISBN 978-0-13-604688-2

(Module ID 32307-08; from *Industrial Maintenance Mechanic Level Three*) Covers the sizes, uses, and installation procedures of six types of drive belts and two types of chain drives.

Introduction to Piping Components (5 Hours)

ISBN 978-0-13-604622-6

(Module ID 32202-07; from *Industrial Maintenance Mechanic Level Two*) Introduces chemical, compressed air, fuel oil, steam, and water systems. Explains how to identify piping systems according to color codes.

Copper and Plastic Piping Practices (5 Hours)

ISBN 978-0-13-604623-3

(Module ID 32203-07; from *Industrial Maintenance Mechanic Level Two*) Covers the selection, preparation, joining, and support of copper and plastic piping and fittings.

Introduction to Ferrous Metal Piping Practices (5 Hours)

ISBN 978-0-13-604624-0

(Module ID 32204-07; from *Industrial Maintenance Mechanic Level Two*) Covers iron and steel pipe and fittings and provides step-by-step instructions for cutting, threading, and joining ferrous piping.

Identify, Install and Maintain Valves (10 Hours)

ISBN 978-0-13-604625-7

(Module ID 32205-07; from *Industrial Maintenance Mechanic Level Two*) Explains how to remove and install threaded and flanged valves, how to replace valve stem O-ring and bonnet gaskets, and how to repack a valve stuffing box. Also discusses the purpose of valve packing.

L3 POWER GENERATION MAINTENANCE MECHANIC

LEVEL 3

Curriculum Notes

- 155 Hours
- Published: 2010
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$97
Individual Modules: \$20

ISBN

978-0-13-215409-3
see module list

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Low-Pressure Steam Systems (10 Hours)

ISBN 978-0-13-604628-8

(Module ID 32208-07; from *Industrial Maintenance Mechanic Level Two*) Introduces the components and functions of basic steam systems, including boilers, steam traps, and blowdown recovery systems.

High-Pressure Steam Systems and Auxiliaries (20 Hours)

ISBN 978-0-13-604664-6

(Module ID 32209-07; from *Industrial Maintenance Mechanic Level Two*) Explains the functioning of high-pressure steam systems used in industry.

Heaters, Furnaces, Heat Exchangers, Cooling Towers and Fin Fans (30 Hours)

ISBN 978-0-13-604666-0

(Module ID 32211-07; from *Industrial Maintenance Mechanic Level Two*) Introduces equipment used to transfer and remove heat from systems in process.

Hydrostatic and Pneumatic Testing (10 Hours)

ISBN 978-0-13-604626-4

(Module ID 32206-07; from *Industrial Maintenance Mechanic Level Two*) Describes non-destructive and pressure testing of systems and equipment.

Installing Fans and Blowers (10 Hours)

ISBN 978-0-13-604771-1

(Module ID 15312-08; from *Millwright Level Three*) Explains how to install axial-flow fans, centrifugal fans, and roots-type and screw-type blowers.

Conveyors (5 Hours)

ISBN 978-0-13-610431-5

(Module ID 15401-08; from *Millwright Level Four*) Describes conveyor systems and their principles of operation.

Troubleshooting and Repairing Conveyors (12.5 Hours)

ISBN 978-0-13-610432-2

(Module ID 15402-08; from *Millwright Level Four*) Describes maintaining and repairing belt, roller, chain, screw, and pneumatic conveyors.

Basic Hydraulic Systems (10 Hours)

ISBN 978-0-13-610475-9

(Module ID 15409-08; from *Millwright Level Four*) Describes principles and types of hydraulic equipment and related safety procedures. Describes applications of hydraulic equipment.

Troubleshooting and Repairing Hydraulic Equipment (7.5 Hours)

ISBN 978-0-13-610476-6

(Module ID 15410-08; from *Millwright Level Four*) Explains inspecting hydraulic systems, diagnosing problems, and repairing these systems. Shows how to read hydraulic schematic symbols.

Motor-Operated Valves (15 Hours)

ISBN 978-0-13-604743-8

(Module ID 40313-09; from *Industrial Maintenance E&I Technician Level Three*) Covers motor-driven valves, ranging from small, servo-mechanical actuators to large valves that could only be operated by several people if they were not motor driven. Includes electrical, pneumatic, and hydraulic operators.

Advanced Blueprint Reading (25 Hours)

ISBN 978-0-13-610446-9

(Module ID 32402-09; from *Industrial Maintenance Mechanic Level Four*) Describes the use of drawing sets to obtain system information. Explains the process of identifying a part of a machine for repair or replacement from a set of drawings.

Continued on following page



L4

**POWER GENERATION
MAINTENANCE MECHANIC**

LEVEL 4

Curriculum Notes

- 187.5 Hours
- Published: 2010
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$97
Individual Modules: \$20

ISBN

978-0-13-215411-6
see module list

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Vibration and Balancing (12.5 Hours)

ISBN 978-0-13-266220-8

(Module ID 52401-10) Reviews machine basics and explains the causes of machine vibrations. Reviews the basics of vibration analysis and covers the devices used to detect and analyze vibration signatures. Explains how and why vibration analysis is used as part of predictive maintenance programs. Describes field machine balancing.

Preventive and Predictive Maintenance

(10 Hours)

ISBN 978-0-13-610445-2

(Module ID 32401-09; from *Industrial Maintenance Mechanic Level Four*) Explains preventive and predictive maintenance and non-destructive testing, and introduces the basic techniques for testing. Also describes lubricant analysis, and acoustic, infrared, and vibration testing.

Fuel Preparation and Delivery Equipment

(25 Hours)

ISBN 978-0-13-266221-5

(Module ID 52402-10) Explains the basic operations of a coal-fired boiler system. Describes the delivery processes from the storage yard into the coal preparation equipment, and from the equipment into the furnace. Addresses the maintenance checks that need to be made on coal delivery and preparation equipment and explains how solid fuel wastes are disposed of in coal-burning furnace systems. Describes how other solid-fuel furnaces, such as biomass furnaces, are used with boilers.

Introduction to Tube Work (10 Hours)

ISBN 978-0-13-604667-7

(Module ID 32212-07; from *Industrial Maintenance Mechanic Level Two*) Covers the basics of working with heat exchanger and furnace tubing and tube sheets.

Compressors and Pneumatic Systems (35 Hours)

ISBN 978-0-13-610447-6

(Module ID 32403-09; from *Industrial Maintenance Mechanic Level Four*) Describes the theory and practice of compressing and transporting gases. Explains the types and principles of compressors and compressed air treatment equipment, as well as compressed air use and safety.

Troubleshooting and Repairing Pumps (10 Hours)

ISBN 978-0-13-610452-0

(Module ID 32407-09; from *Industrial Maintenance Mechanic Level Four*) Explains how to inspect, troubleshoot, disassemble, assemble, and install a pump. Also describes the process of preparing for startup.

Troubleshooting and Repairing Gearboxes

(20 Hours)

ISBN 978-0-13-610453-7

(Module ID 32408-09; from *Industrial Maintenance Mechanic Level Four*) Describes types and operation of gearboxes, and gearbox diagnostics. Explains how to troubleshoot, remove, and disassemble gearboxes, how to identify gear wear patterns, and how to install and maintain gearboxes.

Setting Baseplates and Prealignment (30 Hours)

ISBN 978-0-13-604685-1

(Module ID 32305-08; from *Industrial Maintenance Mechanic Level Three*) Explains how to lay out and install baseplates and soleplates. Describes how to field-verify a plate installation. Covers precision leveling procedures and performing clearance installation. Also describes basic steps for setting motors and pumps.

Turbines (20 Hours)

ISBN 978-0-13-610496-4

(Module ID 15505-09; from *Millwright Level Five*) Describes types of turbines and their components. Describes the operation and common applications of particular types, including gas, steam, and water turbines.

Maintaining and Repairing Turbine Components (15 Hours)

ISBN 978-0-13-610497-1

(Module ID 15506-09; from *Millwright Level Five*) Describes the process of inspecting and repairing key components of turbines. Explains the guidelines for maintaining large steam turbines.

