

O.7
WORK PROCESS SCHEDULE
HEATING AND AIR-CONDITIONING INSTALLER-SERVICER
(REFRIGERATION MECHANIC)
O*NET-SOC CODE: 7-2152 RAPIDS CODE: 0637
ALTERNATE TITLES: AIR-CONDITIONING MECHANIC,
ENVIRONMENTAL-CONTROL SYSTEM INSTALLER-SERVICER, HEATING
AND AIR-CONDITIONING MECHANIC, HEATING MECHANIC

This trade schedule is attached to and a part of the Apprenticeship Standards for the above identified occupation. This sequence of Related Classroom Instruction is competency-based and will be offered as traditional classroom training or independent study, which may include electronic media.

1. TERM OF APPRENTICESHIP

The term of the occupation shall be four (4) years with an OJL attainment of 8000 hours supplemented by the required hours of related technical instruction.

2. RATIO OF APPRENTICES TO JOURNEYPERSONS

1:1,1:2,2:4,3:6,4:8,5:10,6:12,7:14,8:17,9:20,10:23 Max. A fraction-there-of will be adhered to.

3. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on a percentage of the current journeyperson wage rate of **\$21.00**.

Term: 8,000 Hours

1st 2000 hours = 40 % of journeyperson's rate
2nd 2000 hours = 50 % of journeyperson's rate
3rd 2000 hours = 60 % of journeyperson's rate
4th 2000 hours = 70 % of journeyperson's rate
(All steps are 2000 hours)

4. SCHEDULE OF WORK EXPERIENCE (See attached Work Process Schedule)

Apprenticeship Oversight Committee may add to the work processes prior to submitting these Standards to the Division of Apprentice Training for approval.

5. SCHEDULE OF RELATED TECHNICAL INSTRUCTION (See attached Related Classroom Instruction Outline)

Instruction can incorporate elements of both electronic media and traditional classroom including online training, distance learning, or independent study of established curriculum.

Curricula modules are based on industry standardized applications of current construction practices. Modules are knowledge and skill based including a system for assessment. The

assessment will include task objectives, procedures, review materials, and competency-based performance tests.

O.7 - WORK PROCESS SCHEDULE

HOURS

This instruction and experience shall include the following operations, but not necessarily in the listed sequence. Time spent on specific operations need not be continuous.

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| 1. General Trade Orientation | 350 |
| a. Care and use of tools | |
| b. Test and measurement devices | |
| c. Types and sizes of fittings, piping, and tubing | |
| d. Safety procedures | |
| e. Equipment records and reports | |
| f. Environmental safety, CFC handling | |
| 2. Fabrication of Systems Components | 550 |
| a. Cut, thread, flare, bend, shape piping and tubing | |
| b. Install fittings | |
| c. Solder and braze tin fittings and components | |
| d. Care and use of torches | |
| e. Silver and soft soldering | |
| 3. System Installation and connection | 1600 |
| a. Electrical supply lines and cables | |
| b. Electrical connections | |
| c. Water service lines | |
| d. Air supply lines | |
| e. Steam lines and steam return lines | |
| f. Steam traps and strainers | |
| g. Pressure reduction, expansion, evaporators, stop valves | |
| h. Suction and discharge lines | |
| i. Gauges | |
| j. Dehydrators | |
| k. Filters and strainers | |
| l. Controls | |
| 4. Equipment Installation | 950 |
| a. Install condensers | |
| b. Prepare compressor and motor bases | |
| c. Install and align compressors and motors | |
| d. Install evaporators and other cooling coils | |
| e. Install and align centrifugal pumps and bases | |
| f. Use slings, lines, blocks and falls, chain hoists, rollers, dollies and skids | |
| 5. System Maintenance | 1050 |
| a. Troubleshoot field systems | |
| b. Test pressure and flow | |
| c. Check liquid levels | |
| d. Check and repair leaks | |

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|---|-------------|
| e. Purge, dehydrate, and recharge systems | |
| f. Repair, align, and adjust fans and blowers | |
| g. Align pulleys, bearing blocks, and belt tension | |
| 6. Equipment Repair | 2900 |
| a. Disassemble and clean, repair, renew, and test compressors | |
| b. Repair, pressure test, dehydrate evaporators | |
| c. Repair condensers, roll condenser tubes | |
| d. Remove, replace, disassemble, test, clean, calibrate, and renew parts on controls of all types | |
| 1. Pneumatic | |
| 2. Electrical | |
| 3. Electro-pneumatic | |
| 4. Thermostatic | |
| 5. Humidity | |
| 5. Pressure | |
| 6. Vacuum | |
| 7. Machine Shop Practice | 300 |
| a. Use of grinders, drill presses, lathes | |
| b. Tool and drill sharpening | |
| 8. Miscellaneous | 300 |
| a. Housekeeping | |
| b. Safety | |
| TOTAL HOURS | 8000 |

O.7 - HEATING AND AIR-CONDITIONING INSTALLER-SERVICER RELATED CLASSROOM INSTRUCTION

Note: Due to regional and local code differences and climate conditions, duration of instructional competencies/modules is suggested estimates only.

| Modules | Hours |
|---|--------------|
| Basic Safety | 15 |
| Introduction to Construction Math | 15 |
| Introduction to Hand Tools | 10 |
| Introduction to Power Tools | 5 |
| Introduction to Blueprints | |
| 10.5 | |
| Basic Rigging | 20 |
| Introduction to HVAC | 20.5 |
| Copper and Plastic Piping Practices | 5 |
| Soldering and Brazing | 7.5 |
| Basic Electricity | 12.5 |
| Introduction to Cooling | 30 |
| Introduction to Heating | 15 |
| Air Distribution Systems | 10 |
| Chimneys, Vents, and Flues | 5 |
| Maintenance Skills for the Service Technician | 17.5 |

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| Alternating Current | 7.5 |
| Basic Electronics | 5 |
| Electric Heating | 5 |
| Introduction to Control Circuit Troubleshooting | 30 |
| Accessories and Optional Equipment | 7.5 |
| Metering Devices | 7.5 |
| Compressors | 15 |
| Heat Pumps | 15 |
| Leak Detection, Evacuation, Recovery, and Charging | 20 |
| Planned Maintenance | 20 |
| Troubleshooting Gas Heating | 12.5 |
| Troubleshooting Electric Heating | 5 |
| Troubleshooting Oil Heating | 10 |
| Troubleshooting Cooling | 20 |
| Troubleshooting Heat Pumps | 12.5 |
| Troubleshooting Accessories | 10 |
| Troubleshooting Electronic Controls | 7.5 |
| Hydronic Heating and Cooling Systems | 30 |
| Airside Systems | 15 |
| Air Properties and Balancing | 20 |
| Advanced Blueprint Reading | 25 |
| Indoor Air Quality | 15 |
| Energy Conservation Equipment | 10 |
| Building Management Systems | 17.5 |
| Water Treatment | 10 |
| System Start-Up and Shut-Down | 22.5 |
| Heating and Cooling System Design | 25 |
| Commercial and Industrial Refrigeration | 22.5 |
| TOTAL HOURS | 621 |

DAT apprenticeship program standards recommend 150 hours of related technical instruction per year.