

O.14
WORK PROCESS SCHEDULE
PIPEFITTER
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0414
ALTERNATE TITLES: REFRIGERATION, HEATING, AND AIR-CONDITIONING

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

Pipe Fitter **East** Ratios: 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. Pipe Fitter (**4 year**) Ratio: 1:5

3. APPRENTICE WAGE SCHEDULE

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

Term: 8,000 Hours

East

Other 4 year

1st 2000 hours = 40 % of journeyperson's rate 1st 2000 hours = 40 % of journeyperson's rate
2nd 2000 hours = 45 % of journeyperson's rate 2nd 2000 hours = 50 % of journeyperson's rate
3rd 2000 hours = 60 % of journeyperson's rate 3rd 2000 hours = 60 % of journeyperson's rate
4th 2000 hours = 70 % of journeyperson's rate 4th 2000 hours = 70 % of journeyperson's rate
(Steps are one (1) year/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.14- 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.

1. Use and care of tools and equipment and safety	700
Welding, soldering, and brazing	
2. Installation and service (compression systems)	700
a. Compressors-all types	
b. Condensers-water, air, combinations, cascade, and evaporative	
c. Receivers – tube type and shell	
d. Evaporators-tube, fin, plate, brine, wet, and dry	
e. Piping-all materials	
3. Refrigerant controls	500
a. Expansion valves-hand, thermostatic, and automatic	
b. Power elements, mechanism	
c. Float controls-high side, low side, bucket and ball types	
d. Capillary tubes-sizing and orifices	
e. Check valves-solenoids, unloaders, pressures, and relief	
f. Safety-hazards and controls	
4. Motor controls (installation and service)	500
a. Thermostats	
b. Pressure devices	
c. Combinations, adjustment mechanism	
d. Switches-relays, fuse elements, and protections and delays	
5. Electric motors (service) up to 5 horsepower	200
a. Installation-alignment and load test	
b. Lubrication	
c. Field test	
d. Servicing	
6. Installation and service (absorption systems)	200
a. Solid absorbent	
b. Liquid absorbent	
c. Controls	
7. Installation and service (hermetic, semi hermetic)	200
a. Dismantle and rebuild	
b. Field test	
c. Shop and field repair	
d. Controls	
8. Commercial refrigeration (various applications)	1500
a. Condensing units – all types	

b. Coils and evaporators – wet and dry	
c. Heat exchanger – dryers and chemical reactivators	
d. Surge tanks, separators, refrigerant piping and insulating	
e. Vacuum and pressure test – evacuating and charging	
f. Multiple installations – multitemp and freezers	
g. Truck and transport refrigeration	
h. Marine installation service	
i. Cold storage and processing – maintenance and service	
j. Assemblies – cooling towers and process water recovery	
k. Icemakers, brine chillers	
9. Installation and service (air conditioning systems)	900
a. Humidifiers and dehumidifiers	
b. Filtering and air cleaning equipment	
c. Circulating equipment – fans, natural and controls	
d. Cooling equipment	
e. Packaged units – combinations, single, and multiple	
f. Cooling towers – water recovery and evaporator and air-cooled condensers	
10. Installation and service (heating equipment)	900
a. Furnaces – boilers (round, square, and sectional)	
b. Fuel burners – stokers, oil burners, gas burners, and electric	
c. Unit heaters (blowers), all types	
d. Packaged units – multiple, combination, and single	
e. Safety – hazards and controls	
11. Installation and service (fuel-burning equipment)	400
a. Oil burners – piping, tank and controls	
b. Gas burners – adjustments and controls	
c. Stokers – hopper, bin feed, and controls	
d. Electric heaters – controls	
e. Safety – hazards and controls	
12. Boiler room piping (service and installation)	400
a. Heaters	
b. Circulators – flow control and regulating valves	
c. Pumps – condensers, P.R. valves, tank, and blow downs	
d. Expansion loops – joints, anchors, and boiler trim	
e. Safety – hazards and controls	
13. Installation (heating systems)	900
a. Hot water – one-pipe forced circulation	
b. Hot water – two-pipe forced circulation	
c. Steam – one-pipe, two-pipe vapor and vacuum systems	
d. Installation panels – coils, blowers, rods, convectors, etc.	
TOTAL HOURS	8000

O.14 - PIPEFITTER 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	7.5
Basic Rigging	20
Pipefitting Hand Tools	20
Pipefitting Power Tools	15
Threaded Pipe Fabrication	15
Ladders and Scaffolds	10
Motorized Equipment	10
Excavations	10
Underground Pipe	12.5
Intermediate Excavations	10
Underground Pipe Installation	20
Drawings and Detail Sheets	12.5
Piping Systems	5
Pipefitting Trade Math	15
Socket Weld Pipe Fabrication	12.5
Butt Weld Pipe Fabrication	45
Rigging	17.5
Pipe Hangers and Supports	15
Advanced Blueprint Reading	15
Standards and Specifications	7.5
Advanced Trade Math	20
Motorized Equipment	15
Introduction to Aboveground Pipe Installation	20
Identifying and Installing Valves	20
Field Routing and Vessel Trim	15
Spring Can Supports	10
Testing Piping Systems and Equipment	20
Basic Plumbing	12.5
Planning Work Activities	7.5
Advanced Pipe Fabrication	50
Performing NDE Testing	15
Stress Relieving and Aligning	10
Steam Traps	10
In-Line Specialties	10
Special Piping	25
Hot Taps	10
Maintaining Valves	10
TOTAL HOURS	620

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