

Appendix A

WORK PROCESS SCHEDULES AND RELATED INSTRUCTION OUTLINE

Air Conditioning Trade Association UAC

Sheet Metal Worker

O*NET-SOC CODE: 47-2211-00 RAPIDS CODE: 0510

**APPROVED BY
THE NEVADA LABOR COMMISSIONER AND THE NEVADA STATE APPRENTICESHIP COUNCIL**

Toni Giddens, Nevada State Apprenticeship Director

REGISTRATION DATE: _____

RAPIDS PROGRAM ID NUMBER: _____

**DEVELOPED IN COOPERATION WITH THE NEVADA LABOR COMMISSIONER, THE NEVADA
STATE APPRENTICESHIP COUNCIL AND THE U.S. DEPARTMENT OF LABOR**

Appendix A

WORK PROCESS SCHEDULE

This schedule is attached to and a part of these Standards for the above identified occupation.

1. TYPE OF OCCUPATION

☒ Time-based ☐ Competency-based ☐ Hybrid

2. TERM OF APPRENTICESHIP

The term of the apprenticeship is 4 years with an OJL attainment of 6500 hours, supplemented by 1052 hours of related instruction. With the first 1625 hours extending over not more than 12 months, probationary period for the trade.

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The ratio of apprentices to journeypersons shall be established by the ACTA program standards, which allow no more than one apprentice for the first journeyperson at the job site and not more than one apprentice for every two additional journeypersons. Any changes to the apprentice to journeyperson ratio shall be made in accordance with the ACTA program requirements and subject to approval by the Nevada State Apprenticeship Council.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages including fringe benefits based on a percentage of the current journeyman wage rate.

4-Year Term = 6500 hours

<u>Level</u>	<u>% of Journeyman Wage</u>	<u>Related Instruction</u>
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1 st	1 Semester =45%	
2 nd	1 Semester + minimum 812.5 hours = 50%	
3 rd	1 Semester + minimum 812.5 hours = 60%	
4 th	1 Semester + minimum 812.5 hours = 65%	
5 th	1 Semester + minimum 812.5 hours = 70%	
6 th	1 Semester + minimum 812.5 hours = 75%	
7 th	1 Semester + minimum 812.5 hours = 80%	
8 th	1 Semester + minimum 812.5 hours = 85%	

5. WORK PROCESS SCHEDULE (See attached Work Process Schedule)

6. RELATED INSTRUCTION OUTLINE (See attached Related Instruction Outline)

Every apprentice is required to participate in related instruction in technical subjects related to the occupation. Apprentices will not be paid for hours spent attending related instruction classes.

Apprentice applicants requesting up to 12 months of credit for prior experience gained outside the sponsor's supervision must submit their request during the application process and pass the Challenge Exam with a score of 70% or higher.

Apprentice applicants seeking credit for previous experience gained outside the supervision of the apprenticeship committee, ranging from more than 12 months up to 42 months, must follow these procedures: 1. Work for an ACTA-approved contractor who is willing to sponsor their training. 2. Have at least 10 years of experience in the HVAC Sheet Metal Trade. 3. Complete a Challenge Exam, which must be passed with a minimum score of 70% to gain credit. 4. The summary letter and Challenge Exam results will be submitted to the UAC Committee for final approval of credit.

An apprentice granted credit shall be advanced to the wage rate designated for the period to which such credit accrues.

Appendix A

WORK PROCESS SCHEDULE

The term of the occupation shall be defined by the attainment of all required competencies, both technical and behavioral, and the completion of the minimum required on the job learning and related instruction hours. Completion is expected to occur within approximately 1,625 hours of on-the-job learning per year, for a total of approximately 6,500 hours over a four-year program, supplemented by approximately 1052 hours of related technical instruction delivered throughout the program.

Fabrication & Shop Production — 1,400 Hours

Fabrication of sheet metal components including material fabrication, design, detailing and layout, welding, brazing and soldering, industrial fabrication, quality assurance and material conservation, and fabrication of architectural sheet metal, kitchen equipment, and metal roofing components.

HVAC & Air Distribution Systems — 2,000 Hours

Installation and servicing of HVAC systems including air distribution systems, heating and ventilation components, duct installation and sealing, exhaust and blow piping systems, fire damper installation, and testing and balancing of air systems.

Mechanical Equipment & System Installation — 1,300 Hours

Installation and servicing of mechanical equipment including equipment setting, service and repair of installed systems, kitchen equipment installation, solar installations, and related mechanical system components.

Architectural Sheet Metal & Exterior Systems — 900 Hours

Installation of architectural and exterior sheet metal including flashings, gutters, downspouts, and roofing and siding systems, architectural sheet metal systems, metal roofing, and related building envelope components.

Plans, Layout, and Job Planning — 400 Hours

Interpreting plans, specifications, and construction documents; job planning and layout; tool and equipment usage; and coordination of installation activities required to complete sheet metal projects.

Jobsite Safety, Materials Handling & Environmental Practices — 500 Hours

Jobsite support activities including safety practices, rigging, insulation installation, sign construction, delivery and cleanup, indoor air quality considerations, seismic restraints, and incorporating green construction practices.

Total On-the-Job Learning Hours: 6500

The above on-the-job-learning (OJL) work process competencies are intended as a guide. It need not be followed in a specific sequence, and it is understood that some adjustments may be necessary in the hours allotted for different work experience. In all cases, the apprentice is to receive sufficient experience to make them fully competent and use good workmanship in all work processes, which are a part of the industry. In addition, the apprentice shall be fully instructed in safety and OSHA requirements.

Apprenticeship Competencies – Behavioral

Apprentices are expected to demonstrate professional conduct consistent with industry standards and workplace expectations. This includes punctuality, reliability, effective communication, cooperation with supervisors and coworkers, adherence to safety practices, and compliance with program rules. Apprentice conduct and performance will be monitored through employer supervision, progress reports, and program review to ensure satisfactory advancement in the apprenticeship program. Behavioral competencies are considered as part of the apprentice's overall progress and may affect advancement, discipline, or continuation in the program.

- punctuality and reliability
- safe work practices
- teamwork and cooperation
- effective communication with supervisors and coworkers
- respect for workplace policies and procedures
- proper care of tools and equipment

RELATED INSTRUCTION OUTLINE

A. Related Instruction Outline

Related Technical Instruction shall include a structured sequence of classroom and laboratory instruction delivered by qualified instructors and integrated with on-the-job learning. RTI hours shall be completed annually in accordance with the work process schedule and course outlines set forth below. The related technical instruction component of the program consists of 1052 hours of classroom and laboratory instruction over the four-year apprenticeship term.

COURSE TOPICS	HOURS
A. Field Installation (See attached Year 1 Curriculum Schedule)	264
B. Fabrication/Layout (See attached Year 2 Curriculum Schedule)	282
C. Advanced Techniques (See attached Year 3 Curriculum Schedule)	254
D. Forman/Supervisor Options (See attached Year 4 Curriculum Schedule)	252

COURSE TOPIC DESCRIPTIONS

- A. Safety, Anti-Harassment training, OSHA 10, CPR First Aid, trade orientation, field tools; basic math; mechanical equipment; duct installation; metal types; basic codes; flue pipe/combustion air; free dampers; and basic thermostat/low voltage.
- B. Shop safety; Anti-Harassment training, OSHA 30 sheet metal processes; principles of layout; triangulation; soldering; gutters and downspouts; roof flashings; specialty fabrications.

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- C. Anti-Harassment training, CPR First Aid, SMACNA manuals; sheet metal duct fabrication standards; seismic bracing; field measuring; rigging; advanced blueprint techniques; troubleshooting; principles of refrigeration; and codes.
- D. Anti-Harassment training, Project scope and specifications; the submittal process; problem solving; daily reports; RFIs and Change Orders; record drawings/as-builts; HVAC take-off, architectural research; professional development; test and air balance; Leed; and tie-ins.

B. Instructor Qualifications

Instruction for the related technical instruction portion of the apprenticeship program shall be provided by qualified instructors whose knowledge, experience, and ability to teach the required subject matter have been evaluated and approved by the program sponsor.

Instructors may include experienced journeypersons, industry subject matter experts, or individuals meeting applicable vocational-technical instructional requirements. All instructors must possess demonstrated competency in the subject area being taught and relevant industry experience in the sheet metal trade.

The program sponsor will review instructor qualifications prior to assignment and periodically monitor instructional performance to ensure the quality and effectiveness of the training program. Instructors may be required to participate in instructor development or training related to instructional methods and adult learning principles.

C. Instruction Materials and Reference Resources

Instruction for the related technical instruction portion of the apprenticeship program may utilize industry-recognized training materials, reference manuals, and technical publications relevant to the sheet metal trade. Reference materials may include publications from recognized industry organizations, manufacturers, safety authorities, and educational institutions.

Examples of reference materials that may be used include:

- SMACNA manuals and technical standards
- Industry safety and OSHA training materials
- Sheet metal trade textbooks and instructional manuals
- HVAC and refrigeration reference materials
- Manufacturer installation guides and product manuals
- Blueprint reading and construction document resources

The program sponsor may update or supplement reference materials as needed to ensure the curriculum reflects current industry practices and technology.

D. **Methods of Evaluation**

Apprentices enrolled in related technical instruction will be evaluated through a combination of written examinations, practical exercises, classroom participation, homework assignments, and instructor observation.

Apprentices must demonstrate satisfactory progress in related instruction to advance in the apprenticeship program. Unsatisfactory performance, excessive absences, or failure to complete required coursework may result in corrective action, suspension from related instruction, or delay in advancement until deficiencies are corrected. Records of attendance, grades, and progress in related instruction will be maintained by the program sponsor.

E. **Attendance Requirements**

Apprentices are required to attend and actively participate in all scheduled related instruction classes. Attendance will be recorded for each training session.

Apprentices who miss related instruction classes without an approved excuse may be required to complete make-up assignments or additional instruction as determined by the program sponsor. Continued failure to attend required related instruction may result in disciplinary action or delay in advancement within the apprenticeship program.

SECTION 27 - OFFICIAL ADOPTION OF APPRENTICESHIP STANDARDS

Air Conditioning Trade Association UAC hereby adopts these standards of apprenticeship.

Tony Creighton
Signature of Sponsor (*designee*)

Date: 01/20/2026

Tony Creighton, Sr. Operations Director
Type Name & Title

Curriculum Schedule				
Yr. 1, Sem. 1				
	Lesson Description	Hours		
	Orientation	2.5		
	Anti-Harassment Training	2		
	CPR/First Aid Training	2		
	Safety (field/shop)	2.5		
	OSHA 10 Training	10		
	Equipment & Tools of the Trade	2.5		
	Shop Equipment & Safety	2.5		
	Basic Geometry Drawing/Drafting Techniques	2.5		
	Duct Fabrication	2.5		
	Sheet Metal Processes	2.5		
	Basic Math	2.5		
	Trade Orientation	2.5		
	Work Ethics/Professional Development	2.5		
	Ductwork Types	2.5		
	Ductwork Install	2.5		
	Field Math	2.5		
	Air Distribution	2.5		
	Dampers (control/fire/fire smoke)	2.5		
	Commercial HVAC Equipment	2.5		
	Math Review	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	139		

Curriculum Schedule				
Yr. 1, Sem. 2				
	Lesson Description	Hours		
	Architectural Sheet Metal	2.5		
	Introduction to Residential Heating System	2.5		
	Use of Ductulator	2.5		
	Residential Duct & System Sizing	2.5		
	Residential Duct Install	2.5		
	Flue Piping and Condensate Drain	2.5		
	Working with Other Trades	2.5		
	Louvers, Dampers, Access Doors	2.5		
	Insulation and Sealing	2.5		
	Layout and Fab Plenum, Return Air Cans, Register Boots	2.5		
	Soldering/Brazing	2.5		
	Residential Flashings	2.5		
	Residential Exhaust/Kitchen Hood/Bath Fans/Dryer Vents	2.5		
	Residential Equipment	2.5		
	Basic Electricity	2.5		
	Thermostatic Controls	2.5		
	Setting a Residential Furnace and Start-up	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	125		

Curriculum Schedule				
Yr. 2, Sem. 1				
	Lesson Description	Hours		
	Orientation/Codes	2.5		
	Anti-Harassment Training	2		
	Safety	2.5		
	OSHA 30	30		
	HERS Duct Pressure Testing	2.5		
	Trade Math – Geometric Basics	2.5		
	Trade Math – Geometric Measurements	2.5		
	Geometric Formulas	2.5		
	Sheet Metal Processes	2.5		
	Principles of Layout	2.5		
	China Cap and Straight Cone Layout (Radial Line)	2.5		
	Elbow Fabrication -90°	2.5		
	Layout and Pattern Development for a Change Cheek Elbow	2.5		
	Fabrication - Ogee Offset	2.5		
	Fabrication – Transition Rect. to Rect.	2.5		
	Fabrication – Transition 2	2.5		
	Fabrication/T-Joints	2.5		
	Fabrication/T-Joint on Angle	2.5		
	Fabrication/7-Gore Elbow	2.5		
	Semester Review	2.5		
	Lab (Hand-On)	80		
	Total	157		

Curriculum Schedule

Yr. 2, Sem. 2

	Lesson Description	Hours		
	Fabrication – Gutter Miter/Downspout	2.5		
	Scalene or Oblique Cones	2.5		
	Y-Branch	2.5		
	Symmetrical Sq. to Rd.	2.5		
	Asymmetrical Sq. to Rd. – CL One Way	2.5		
	Asymmetrical Sq. to Rd. – No Way	2.5		
	Asymmetrical Sq. to Rd. – No Way	2.5		
	Tricks of the Trade	2.5		
	Sq, to Sq,/Rect to Rect. - Twist Transition	2.5		
	Roof Flashings	2.5		
	Fasteners, Hangers, & Supports	2.5		
	Fabrication – Tool Box	2.5		
	Plans & Specs	2.5		
	Gas Heating & Troubleshooting – Part I	2.5		
	Gas Heating & Troubleshooting – Part II	2.5		
	Principles of Refrigeration – Part I	2.5		
	Principles of Refrigeration – Part II	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	125		

Curriculum Schedule				
Yr. 3, Sem. 1				
	Lesson Description	Hours		
	Orientation	2.5		
	Anti-Harassment Training	2		
	CPR/First Aid Training	2		
	SMACNA Manuals	2.5		
	Sheet Metal Duct Fab. Standards	2.5		
	Seismic Bracing	2.5		
	Intro. To Field Measuring/Field Measurement	2.5		
	Reference Points & Centerlines	2.5		
	Detailing Field Measurements	2.5		
	Tie-In Drawings	2.5		
	Equipment Layout and Placement	2.5		
	Rigging	2.5		
	Exhaust Systems-Fume	2.5		
	Exhaust Systems-Product Conveying	2.5		
	Hoods/Ventilators	2.5		
	Kitchen Exhaust Fan System	2.5		
	Field Measuring Kitchen Systems	2.5		
	VRF	2.5		
	Metal Roof Systems	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	129		

Curriculum Schedule				
Yr. 3, Sem. 2				
	Lesson Description	Hours		
	Roof Curbs (Cricket)/Roof Flashings	2.5		
	Rectangular Roof Flange	2.5		
	Fabricate a Chimney Cap	2.5		
	Project Specifications	2.5		
	Project Submittals	2.5		
	Advanced Blueprint Techniques	2.5		
	Advanced Blueprint Techniques	2.5		
	Intro. to Service	2.5		
	Cone Triangulation	2.5		
	Triangulate a Pair of Pants (Y Branch)	2.5		
	Fabricate a Round Finial (Ball)	2.5		
	Duct Design	2.5		
	Equipment/Subcontractor Preparation	2.5		
	Fabricate a Drop Check Elbow	2.5		
	Air Balance	2.5		
	Fabricate a Pitcher	2.5		
	Trade Math Review	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	125		

Curriculum Schedule				
Yr. 4, Sem. 1				
	Lesson Description	Hours		
	Orientation/Review of Handbook/Blueprint Review	2.5		
	Anti-Harassment Training	2		
	Communication	2.5		
	Working with Other Trades	2.5		
	Problem Solving/LEAN Process	2.5		
	Project Scope, Specifications, & Submittals	2.5		
	Daily Reports/Memo's and their uses	2.5		
	RFI's/Change Orders	2.5		
	HVAC Take-off and Detail	2.5		
	Air Distribution Take-Off and Ordering	2.5		
	Accounts and Ordering	2.5		
	Develop Change Order Packet	2.5		
	Record Drawings/As-Builts	2.5		
	SMACNA Duct/ASM	2.5		
	Codes	2.5		
	Test and Balance	2.5		
	Leed	2.5		
	Acceptance Testing	2.5		
	Semester Review	2.5		
	Lab (Hands-On)	80		
	Total	127		

Curriculum Schedule				
Yr. 4, Sem. 2				
	Lesson Description	Hours		
	Project Orientation	2.5		
	Safety Forms/Accident Prevention	2.5		
	Submittals & RFI's	2.5		
	Equipment & Register Take-Off	2.5		
	HVAC Take-Off and Detail	2.5		
	ASM Take-Off and Detail	2.5		
	Schedule/Mobilization/Manpower/Install	2.5		
	Change Order Packet	2.5		
	Troubleshoot HVAC Common Problems	2.5		
	Project Close Out/Punchlist/Demobilize	2.5		
	Record As-Built Drawings	2.5		
	Start-up/Checklist/Commissioning	2.5		
	Welding	2.5		
	Principles of CAD	2.5		
	Review Principles of Layout	2.5		
	Principles of Layout 2	2.5		
	Journeyman Review – Part I	2.5		
	Journeyman Review – Part II	2.5		
	Lab (Hands-On)	80		
	Total	125		

Apprentice Daily Record																																			
Apprentice Level: _____		Apprentice Name: _____										Month/Year: _____ Company: _____										Trade: <u>Sheet Metal</u>													
On-Job-Training		Line Out Calendar Dates Not Included in the Training Period																																	
List Of Work Processes			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
Fabrication																																			
1500 Hours may include but not limited to:	Material Fabrication	A																																	
	Design, Detail, Layout																																		
	Welding, brazing & Soldering																																		
	Industrial																																		
	Quality Assurance & Material Conservation																																		
	Kitchen Equipment																																		
	Architectural																																		
Metal Roofing																																			
Installation																																			
4000 Hours may include but not limited to:	Material Installation	B																																	
	Service and Repair																																		
	A/C Heating, Ventilation and Duct sealing																																		
	Welding, Brazing & Soldering																																		
	Exhaust & Blow piping																																		
	Solar Installations																																		
	Tool & Equipment usage																																		
	Kitchen Equipment																																		
	Flashing, Roofing & Siding																																		
	Equipment Setting																																		
	Plans Specifications & Construction Documents																																		
	Air Distribution																																		
	Testing and Balancing																																		
	Architectural Sheet Metal																																		
	Metal Roofing																																		
Seismic Restraints																																			
Fire Damper Installation																																			
Miscellaneous																																			
1000 Hours may include but not limited to:	Job Planning	C																																	
	Insulation																																		
	Safety																																		
	Sign Construction																																		
	Rigging																																		
	Delivery & Cleanup																																		
	Indoor Air Quality																																		
Incorporating Green Construction Practices																																			
HOURS																																			
6500	Apprentice Monthly Total																																		
On-Job Supervisor of Apprentice to verify Monthly record																																			
	Print Name of On-Job Supervisor										Signature of On-Job Supervisor										Signature of Apprentice														