

Issued: April 30, 2018

Program: Sheet Metal Worker

To: ITA Training Providers
Articulation Chair
System Liaison Person
School Districts

Subject: **Sheet Metal Worker (SMW)**

OPSN No.: **OPSN 2018 011**

Effective Date: **December 1, 2018**

Summary of Change: Please be advised that a new Program Outline has been posted to the Industry Training Authority (ITA) [website](#). For details of changes to the Program Outline, please see ***SMW Program Outline Review Details*** (attached).

Please note the following changes have been made to the SMW program:

- Increase of Technical Training Hours – from 180 hours per level to 240 hours per level
- Increase of Work-based Training Hours – from 5,680 hours to 6,240 hours
- Increase of hours required to challenge the trade – from 8,520 hours to 9,360 hours

See attached document, *SMW Harmonized Training Hours*, for details.

Please note that the increase to technical training applies only to the Harmonized Levels. The Harmonized Levels will be implemented starting in December 2018 per the Transition Plan.

Rationale: The SMW National Occupational Analysis (NOA, 2015) was reviewed and updated as part of the **the Harmonization Initiative** (see *General Information* below for more details). After a series of consultations, workshops and pan-Canadian webinars, a new Red Seal Occupational Standard (RSOS) was developed to replace the NOA, including the following finalized priorities for SMW:

Sheet Metal Worker	Changing in BC?	What will it be?
TRADE NAME	NO	Sheet Metal Worker
NUMBER OF TRAINING LEVELS	NO	4
TOTAL HOURS <small>Technical (TT) + work-based training (WBT)</small>	YES	7200 hours <small>TT increased by 240 WBT increased by 560</small>
TRAINING SEQUENCE <small>order of subjects taught</small>	YES	Changes to sequence

The revised RSOS and the finalized harmonization recommendations triggered a full program review in BC. As part of this program review and because of the change to the content mandated by the RSOS, a training duration analysis was also conducted, followed by industry consultation.

Details: A review of the BC SMW Program to align it to the (draft) RSOS was conducted in November 2017 and January 2018. During the Program Outline review, a need for more technical training time was identified. A training duration analysis was conducted and resulted in a proposal to increase the hours as detailed in the attached document, *SMW Harmonized Training Hours*.

Subsequently, ITA consulted more broadly with industry and this consultation validated the need for more technical training time. **The increase has been approved for Harmonized Levels and will be in effect beginning on December 1, 2018 per the Transition Plan.**

ITA will be working with the training providers to identify strategies for transitioning to the harmonized program. ITA is also working on a communication plan to inform apprentices and employers of the changes to the program.

GENERAL INFORMATION: The Harmonization Initiative

At the request of industry, the Canadian Council of Directors of Apprenticeship (CCDA)'s Harmonization Initiative was launched in Fall 2013, and endorsed by the Forum of Labour Market Ministers (FLMM) in 2014. The goal of Harmonization is to *substantively align* apprenticeship systems across Canada by making apprenticeship training requirements more consistent in Red Seal trades.

In consultation with stakeholders, the CCDA identified four harmonization priorities:

1. Use of Red Seal **trade name**
2. Consistent **total training hours** (in-school and on-the-job)
3. Same number of **training levels**
4. Consistent **sequencing** of training content, including use of most recent National Occupational Analysis.

For more information on the Harmonization Initiative, please visit our website at <http://www.itabc.ca/our-trades-training-system/pan-canadian-harmonization-initiative>.

Attachments: ***SMW Program Outline Review Details*** - This attachment provides details of the revisions made to the Sheet Metal Worker Program Outline during the review process.
SMW Harmonized Training Hours – This attachment provides details of the current and harmonized program training hours.

For more information contact: ITA Program Standards
email: programstandards@itabc.ca

cc: All Staff

Sheet Metal Worker (SMW) Harmonization Training Hours Details

The following changes to training time for SMW will come into effect for the Harmonized Levels as they are implemented beginning on **December 1, 2018 per the Transition Plan**:

- Increased technical training hours in order to accommodate content added to the Red Seal Occupational Standard (RSOS) **(increase of 60 hours at each level)**
- Increased work-based training (WBT) hours in order to align with the harmonized standard of 7,200 hours of total training **(increase of 560 hours)**

Apprenticeship Pathway

Current Program	Hours
Technical Training	720
Current Level 1 = 180 hours	
Current Level 2 = 180 hours	
Current Level 3 = 180 hours	
Current Level 4 = 180 hours	
Work-based Training Hours	5,680
Current Total Training Hours	6,400

Harmonized Program	Hours
Technical Training	960
Harmonized Level 1 = 240 hours	
Harmonized Level 2 = 240 hours	
Harmonized Level 3 = 240 hours	
Harmonized Level 4 = 240 hours	
Work-based Training Hours	6,240
Harmonized Total Training Hours	7,200

Challenge Pathway and Sign-off Authority

Current Program	Hours
Work-based Training Hours	5,680
ITA Formula for Calculating Challenge WBT	X 1.5
Current Challenge WBT Hours	8,520

Harmonized Program	Hours
Harmonized Work-based Training Hours	6,240
ITA Formula for Calculating Challenge WBT	X 1.5
Harmonized Challenge WBT Hours	9,360

Key

Blue Text = Content moved to new level

Green Text = New content added

Summary - Competency Migration

Overall: This chart shows the finalized competency distribution for the Harmonized Sheet Metal Worker program. It summarizes the major changes to the competencies, specifically the level they are taught in and any new competencies that were added.

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
Line A	Perform Safety-Related Functions	Line A	Perform Safety-Related Functions	Line A	Perform Safety-Related Functions	Line A	Perform Safety-Related Functions
	A1: Use personal protective equipment (PPE) and safety equipment						
	A2: Maintain safe work environment						
	A3: Perform lock-out and tag-out procedures						
	A4: Use WHMIS						
Line B	Use and Maintain Tools and Equipment	Line B	Use and Maintain Tools and Equipment	Line B	Use and Maintain Tools and Equipment	Line B	Use and Maintain Tools and Equipment
	B1: Use hand and portable power tools						
	B2: Use shop tools and equipment		B2: Use shop tools and equipment		B2: Use shop tools and equipment		
	B3: Use gas metal arc welding (GMAW) equipment		B3: Use gas metal arc welding (GMAW) equipment		B3: Use gas metal arc welding (GMAW) equipment		B3: Use gas metal arc welding (GMAW) equipment
					B4: Use gas tungsten arc welding (GTAW) equipment		
	B5: Use shielded metal arc welding (SMAW) equipment		B5: Use shielded metal arc welding (SMAW) equipment				
	B6: Use oxy-fuel and plasma arc welding equipment						
	B7: Use soldering and brazing equipment	new	B7: Use soldering and brazing equipment				



Sheet Metal Worker Program Outline Review Details

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
	B8: Use measuring and layout equipment						
	B9: Use stationary and mobile work platforms						
	B10: Use hoisting, rigging and positioning equipment						B10: Use hoisting, rigging and positioning equipment
Line C	Organize Work	Line C	Organize Work	Line C	Organize Work	Line C	Organize Work
	C1: Use trade-related documentation		C1: Use trade-related documentation				
	C2: Interpret drawings		C2: Interpret drawings				
	C3: Organize materials and equipment for projects						
		new	C4: Perform basic design and field modifications				
	C5: Use mathematics						
Line D	Use Communication and Mentoring Techniques	Line D	Use Communication and Mentoring Techniques	Line D	Use Communication and Mentoring Techniques	Line D	Use Communication and Mentoring Techniques
	D1: Use communication techniques						
							D2: Use mentoring techniques
Line E	Perform Pattern Development	Line E	Perform Pattern Development	Line E	Perform Pattern Development	Line E	Perform Pattern Development
	E1: Develop patterns using simple and straight line methods		E1: Develop patterns using simple and straight line methods				
	E2: Develop patterns using parallel line method		E2: Develop patterns using parallel line method		E2: Develop patterns using parallel line method		
	E3: Develop patterns using radial line development		E3: Develop patterns using radial line development		E3: Develop patterns using radial line development		
	E4: Develop patterns using triangulation method		E4: Develop patterns using triangulation method		E4: Develop patterns using triangulation method		E4: Develop patterns using triangulation method
							E5: Use computer technology for pattern development



Sheet Metal Worker Program Outline Review Details

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems
	F1: Select materials for trade related products						
	F2: Fabricate ductwork, fittings and components						
	F3: Insulate ductwork, fittings and components						
			F4: Fabricate material handling system components		F4: Fabricate material handling system components		F4: Fabricate material handling system components
						new	F5: Fasten dampers
HL1←CL4	F6: Fabricate hanger systems, supports and bases						
Line G	Fabricate Architectural Sheet Metal Products	Line G	Fabricate Architectural Sheet Metal Products	Line G	Fabricate Architectural Sheet Metal Products	Line G	Fabricate Architectural Sheet Metal Products
			G1: Select material for flashing, roofing, sheeting and cladding				
			G2: Fabricate flashing, roofing, sheeting and cladding				
Line H	Fabricate Products from Specialty Materials	Line H	Fabricate Products from Specialty Materials	Line H	Fabricate Products from Specialty Materials	Line H	Fabricate Products from Specialty Materials
					H1: Select material for specialty products		
					H2: Fabricate specialty products		
Line I	Prepare Installation Site						
		new	I1: Perform on-site measurements				
		new	I2: Perform demolition for renovations				
Line J	Install and Connect Chimneys, Breeching and Venting to	Line J	Install and Connect Chimneys, Breeching and Venting to	Line J	Install and Connect Chimneys, Breeching and Venting to	Line J	Install and Connect Chimneys, Breeching and Venting to



Sheet Metal Worker Program Outline Review Details

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
	Exhaust Appliances and Mechanical Equipment		Exhaust Appliances and Mechanical Equipment		Exhaust Appliances and Mechanical Equipment		Exhaust Appliances and Mechanical Equipment
		HL2←CL3,CL4	J1: Install chimneys				
		HL2←CL3,CL4	J2: Connect appliances or mechanical equipment to chimney and breeching				
		new	J3: Install high efficiency appliances and mechanical equipment				
Line K	Install Air Handling System Components	Line K	Install Air Handling System Components	Line K	Install Air Handling System Components	Line K	Install Air Handling System Components
	K1: Install air handling equipment		K1: Install air handling equipment	HL3←CL4	K1: Install air handling equipment	new	K1: Install air handling equipment
			K2: Install hangers, cables, braces and brackets				
new	K3: Install sheet metal ducts, fittings and dampers						
		new	K4: Install penetrations and sleeves				
new	K5: Install registers, grilles, diffusers and louvers						
				new	K6: Install terminal boxes and coils		
			K7: Install system component accessories		K7: Install system component accessories		K7: Install system component accessories
HL1 ←CL3	K8: Install residential systems						
				new	K9: Install industrial, commercial and institutional systems		



Sheet Metal Worker Program Outline Review Details

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
Line L	Install Material Handling System Components	Line L	Install Material Handling System Components	Line L	Install Material Handling System Components	Line L	Install Material Handling System Components
							L1: Install pneumatic material handling system components
							L2: Install gravity material handling system components
							L3: Install mechanized material handling system components
Line M	Apply Thermal Insulation, Lagging, Cladding and Flashing	Line M	Apply Thermal Insulation, Lagging, Cladding and Flashing	Line M	Apply Thermal Insulation, Lagging, Cladding and Flashing	Line M	Apply Thermal Insulation, Lagging, Cladding and Flashing
							M1: Apply lagging and cladding to components
						new	M2: Apply flashing to components
Line N	Perform Leak Testing, Air Balancing and Commissioning	Line N	Perform Leak Testing, Air Balancing and Commissioning	Line N	Perform Leak Testing, Air Balancing and Commissioning	Line N	Perform Leak Testing, Air Balancing and Commissioning
					N1: Perform leak tests	CL3→HL4	N1: Perform leak tests
					N2: Perform testing, adjusting and balancing (TAB)	new	N2: Perform testing, adjusting and balancing (TAB)
				new	N3: Participate in the commissioning of air and material handling systems	new	N3: Participate in the commissioning of air and material handling systems
Line O	Install Metal Roofing and Cladding/Siding Systems	Line O	Install Metal Roofing and Cladding/Siding Systems	Line O	Install Metal Roofing and Cladding/Siding Systems	Line O	Install Metal Roofing and Cladding/Siding Systems
			O1: Lay out roof and walls				
			O2: Install insulation, isolation material and building envelope components				



Sheet Metal Worker Program Outline Review Details

SMW HARMONIZED LEVEL 1		SMW HARMONIZED LEVEL 2		SMW HARMONIZED LEVEL 3		SMW HARMONIZED LEVEL 4	
			O3: Install roofing, cladding/siding system components				
		new	O4: Seal exposed joints				
			O5: Install decking				
Line P	Install Exterior Components	Line P	Install Exterior Components	Line P	Install Exterior Components	Line P	Install Exterior Components
			P1: Prepare surface				
			P2: Fasten exterior components				
Line Q	Install Specialty Products	Line Q	Install Specialty Products	Line Q	Install Specialty Products	Line Q	Install Specialty Products
					Q1: Install stainless steel specialty products		
					Q2: Install non-stainless steel specialty products		
					Q3: Install marine products		
Line R	Perform Scheduled Maintenance	Line R	Perform Scheduled Maintenance	Line R	Perform Scheduled Maintenance	Line R	Perform Scheduled Maintenance
				HL3 ←CL4	R1: Diagnose system faults		
				HL3 ←CL4	R2: Repair worn or faulty components		

Details of Changes

SHEET METAL WORKER COMPETENCY MIGRATION CHART

Illustrating what happened to each competency in the current SMW Occupational Analysis Chart through the process of aligning to the Harmonized sequencing of training topics

LEVEL ONE

	Current OAC	
Line A	Use Safe Work Practices	Description of Changes
A1	Control Workplace Hazards	Moved to Harmonized A2: Maintains Safe Work Environment. A Learning Task and Content were added. Any content (small amount) on Lock-out procedures was moved to Harmonized A3: Performs Lock-Out and Tag Out Procedures.
A2	Locate Information in the OHS Regulation and WCB Standard	Moved to Harmonized A2: Maintains Safe Work Environment.
A3	Use WHMIS	Became Harmonized A4: Use WHMIS
A4	Use Personal Protective Equipment	Moved to Harmonized A1: Use Personal Protective Equipment and Safety Equipment.
A5	Select Fire Extinguishers	Moved into Harmonized A1: Use Personal Protective Equipment and Safety Equipment.

Line B	Use Tools and Equipment	Description of Changes

Sheet Metal Worker Program Outline Review Details

B1	Use Hand Tools	Became Harmonized B1: Use Hand and Portable Power Tools.
B2	Use Portable Power tools	Moved into Harmonized B1: Use Hand and Portable Power Tools.
B3	Use Shop equipment	Became Harmonized B2: Use Shop Tools and Equipment
B4	Use Welding Equipment	Separated into Harmonized B3: Use Gas Metal Arc (GMAW) Welding Equipment / Harmonized B2: Use Shop Tools and Equipment / Harmonized B5: Use Shielded Metal Arc (SMAW) Welding Equipment Level 1 & 2 / Harmonized B6: Use Oxy-Fuel and Plasma Arc Welding Equipment / Harmonized B7: Use Soldering and Brazing Equipment.
B5	Select Soldering and Brazing Equipment	Became Harmonized B7: Use Soldering and Brazing Equipment Level 1 & 2
B6	Use Fasteners	
B7	Use Ladders and Platforms	Became Harmonized B9: Use Stationary and Mobile Work Platforms
B8	Use Hoisting, Lifting and Rigging Equipment	Became Harmonized B10: Use Hoisting, Rigging and Positioning Equipment. Some equipment content was added. Some content re: selection of equipment, working load limits, and securing of loads was moved out.

Line C	Organize Work	Description of Changes
C1	Use Mathematics	Became Harmonized C5: Use Mathematics
C2	Read Drawings and Specifications	Moved into Harmonized C2: Interprets Drawings. Re-constructed. Some content included re: describing orthographic projection.
C6	Handle Materials	Became Harmonized C3: Organized Materials and equipment for Projects. Some content added re: calculating material requirements.
C7	Communicate with Others	Moved to Harmonized D1: Use Communication

Sheet Metal Worker Program Outline Review Details

		Techniques. Content has been added.
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Line D	Layout and Develop Patterns	Description of Changes
D1	Use Drafting Equipment to Develop Geometric Constructions	Content was dispersed throughout the Develop Pattern competencies.
D2	Develop Pictorial Drawings and Orthographic Projections	Some content moved to Harmonized C1: Use Trade Related Documentation. Other content was dispersed throughout the Develop Pattern competencies.
D3	Develop Patterns Using Parallel Line Development	Became Harmonized E2: Develop Patterns Using Parallel Line Development (introductory).
D4	Develop Patterns Using Radial Line Development	Became Harmonized E3: Develop Patterns Using Radial Line Development (introductory).
D5	Develop Patterns Using Triangulation	Became Harmonized E4: Develop Patterns Using Triangulation (introductory).
D6	Develop Patterns for Duct Fittings	Moved into Harmonized E1: Develop Patterns Using Simple and Straight Line Methods.

Line E	Fabricate Trade Related Products	Description of Changes
E1	Select Materials for Trade Related Products	Became Harmonized F1: Select Materials for Trade Related Products
E2	Fabricate Components	Moved into Harmonized F2: Fabricates Ductwork, Fittings and Components
E3	Fabricate Ductwork and Assemble Fittings with Components	Moved into Harmonized F2: Fabricates Ductwork, Fittings and Components
E4	Insulate Ductwork, Fittings and Components	Became Harmonized F3: Insulate Ductwork, Fittings and Components. Some insulation content added.
E5	Fabricate Hanger Systems	Moved into Harmonized F6: fabricates Hanger Systems, Supports and Bases

Sheet Metal Worker Program Outline Review Details

Line F	Install Air Handling Systems	Description of Changes
F2	Install Air Handling Ductwork and Components	Some content moved to Harmonized K1: Install Air Handling Equipment. Some content moved to Harmonized K2: Install Hangers, Cables, Braces and Brackets, Level 2. Some content moved to Harmonized K7: Install system Component Accessories, Level 2.

LEVEL TWO

Current OAC		
Line A	Use Safe Work Practices	Description of Changes
A1	Control Workplace Hazards	Current Level 2, A1 is a Review of Current Level 1, A1 content.

Line B	Use Tools and Equipment	Description of Changes
B1	Use Hand Tools	Current Level 2, B1 is a Review of some Current Level 1, B1 content.
B2	Use Portable Power tools	Current Level 2, B2 is primarily a Review of some Current Level 1, B2 content, plus some content moved into Harmonized B1: Use Hand and Portable Power Tools.
B3	Use Shop equipment	Moved into Harmonized B2: Use Shop Tools and Equipment.

Sheet Metal Worker Program Outline Review Details

B4	Use Welding Equipment	Separated into Harmonized B3: Use Gas Metal Arc (GMAW) Welding Equipment / Harmonized B5: Use Shielded Metal Arc (SMAW) Welding Equipment / Harmonized B7: Use Soldering and Brazing Equipment.
B6	Use Fasteners	

Line C	Organize Work	Description of Changes
C1	Use Mathematics	Current C1, L2 was primarily a Review of C1 L1. Some content was incorporated into Harmonized C4: Perform Basic Design and Field Modifications.
C2	Read Drawings and Specifications	Became Harmonized C2: Interpret Drawings. Two objectives/ Learning Tasks were moved elsewhere (Generate a Shop Fabrication Drawing and Interpret Welding Symbols)
C3	Use Codes, Regulations and Standards	Moved into Harmonized C1: Use Trade Related Documentation
C4	Use Manufacturer and Supplier Documentation	Moved into Harmonized C1: Use Trade Related Documentation
C5	Analyse Project Requirements	
C6	Handle Materials	Became Harmonized C3: Organize Materials and Equipment for Projects.

Line D	Layout and Develop Patterns	Description of Changes
D2	Develop Pictorial Drawings and Orthographic Projections	Current Level 2 D2 is primarily a Review of Current Level 1 D2, with an objective moving to Harmonized C1 Level 1: Use Trade Related Documentation.
D3	Develop Patterns Using Parallel Line Development	Became Harmonized E2: Develop Patterns Using Parallel Line Development
D5	Develop Patterns Using	Became Harmonized E4: Develop Patterns Using

Sheet Metal Worker Program Outline Review Details

	Triangulation	Triangulation. Objective/ Learning Task 'Architectural Applications' moved out.
D6	Develop Patterns for Duct Fittings	Moved into Harmonized E1: Develop Patterns Using Simple and Straight Line Method (Level 2 & 1).
D7	Develop Patterns Using Computer Technology	Moved to Harmonized E5 Level 4: Use Computer Technology for Pattern development

Line E	Fabricate Trade Related Products	Description of Changes
E1	Select Materials for Trade Related Products	This competency is now in Level 1 only.
E2	Fabricate Components	Some content moved to Harmonized F2 L1: Fabricates Ductwork, Fittings and Components.
E3	Fabricate Ductwork and Assemble Fittings with Components	Moved into Harmonized F2 L1: Fabricates Ductwork, Fittings and Components.
E5	Fabricate Hanger Systems	Moved into Harmonized F6 Level 1: Fabricate Hanger Systems, Supports and Bases
E8	Fabricate Architectural Components	Moved into Harmonized G2: Fabricate Flashing, Roofing, Sheeting and Cladding
E9	Fabricate Industrial Components	Moved to Harmonized F4: Fabricate Material Handling System Components

Line F	Install Air Handling Systems	Description of Changes
F2	Install Air Handling Ductwork and Components	Some content moved to Harmonized K2: Install Hangers, Cables, Braces and Brackets

Line H	Install Architectural and Specialty Components	Description of Changes
H1	Install Roofing, Decking and	Some content (2 Learning Tasks) moved into

Sheet Metal Worker Program Outline Review Details

	Cladding	Harmonized O1: Lay Out Roof and Walls. Some content moved into Harmonized O2: Install Insulation, Isolation Material, Building Envelope Components. Some content moved into Harmonized O3: Install Roofing and Cladding/Siding System Components
H2	Install Panel Systems	Most content moved into Harmonized O1: Lay Out Roof and Walls. Some content moved into Harmonized O2: Install Insulation, Isolation Material, Building Envelope Components. Some content moved into Harmonized G2: Fabricate Flashing, Fabricate Flashing, Roofing, Sheeting and Cladding
H3	Install Exterior Components	Content moved into Harmonized O1: Lay Out Roof and Walls. Content moved into Harmonized P2: Fasten Exterior Components.

LEVEL THREE

	Current OAC	
Line A	Use Safe Work Practices	Description of Changes
A1	Control Workplace Hazards	Current Level 3, A1 is a Review of Current Level 1, A1 content.

Line B	Use Tools and Equipment	Description of Changes
B2	Use Portable Power tools	Some content moved into Harmonized B1 Level 1: Use Hand and Portable Power Tools.



Sheet Metal Worker Program Outline Review Details

B3	Use Shop equipment	Moved into Harmonized B2: Use Shop Tools and Equipment
B4	Use Welding Equipment	Separated into Harmonized B3: Use Gas Metal Arc (GMAW) Welding Equipment / Harmonized B4: Use Gas Tungsten Arc Welding (GTAW) Equipment

Line C	Organize Work	Description of Changes
C1	Use Mathematics	Current C1, Level 3 was a Review of previous content. Some content (1 Learning Task) moved into Harmonized C5 L1. moved into
C2	Read Drawings and Specifications	Current C2 Level 3 was a Review of previous content.
C3	Use Codes, Regulations and Standards	Current C3 Level 3 was a Review of previous content.
C4	Use Manufacturer and Supplier Documentation	Current C4 Level 3 was a Review of previous content.
C5	Analyse Project Requirements	This content was absorbed in other areas.
C6	Handle Materials	Content moved to Harmonized C3 Level 1: Organize Material and Equipment for Projects.

Line D	Layout and Develop Patterns	Description of Changes
D3	Develop Patterns Using Parallel Line Development	Current D3 Level 3 was a Review of previous content.
D5	Develop Patterns Using Triangulation	Current D5 Level 3 was a Review of previous content.
D6	Develop Patterns for Duct Fittings	Some review. One Learning Task moved to Harmonized E1 Level 1: Develop Patterns Using Simple and Straight Line Method
D7	Develop Patterns Using Computer Technology	Moved into Harmonized E5 Level 4: Use Computer Technology for Pattern Development

Sheet Metal Worker Program Outline Review Details

Line E	Fabricate Trade Related Products	Description of Changes
E1	Select Materials for Trade Related Products	This content was absorbed in other areas.
E3	Fabricate Ductwork and Assemble Fittings with Components	Current E3 Level 3 was a Review of previous content. Some content absorbed elsewhere (Fabricate Duct Fittings)
E5	Fabricate Hanger Systems	Moved into Harmonized F6 Level 1: Fabricate Hanger Systems, Supports and Bases
E7	Fabricate Specialty and Stainless Steel Products	Moved into Harmonized H2: Fabricate Specialty Products
E9	Fabricate Industrial Components	Content moved into Harmonized F4: Fabricate Material Handling System Components

Line F	Install Air Handling Systems	Description of Changes
F2	Install Air Handling Ductwork and Components	Current F2 Level 3 was a Review of previous content.
F3	Install Residential Heating, Ventilating and Air Conditioning	Moved into Harmonized K8: Install Residential Systems

Line G	Install Industrial Systems	Description of Changes
G1	Install Chimneys, Breeching and Venting	Most content moved into Harmonized J1 Level 2: Install Chimneys. Some content (1 Learning Task) moved into Harmonized J2 Level 2: Connect Appliances or Mechanical Equipment to chimney and Breeching.

Line H	Install Architectural and Specialty Components	Description of Changes

Sheet Metal Worker Program Outline Review Details

H4	Install Specialty and Stainless Steel Products	Content moved between Harmonized Q1: Install Stainless Steel Specialty Products, and Harmonized Q2: Install Non-Stainless Steel Specialty Products
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Line I	Service Systems	Description of Changes
I1	Test and Adjust Systems	Most content moved into Harmonized N2: Perform Testing, Adjusting and Balancing (TAB). Some content (one learning task) moved to Harmonized N1 Level 4: Perform Leak Tests

LEVEL FOUR

	Current OAC	
Line A	Use Safe Work Practices	Description of Changes
A1	Control Workplace Hazards	Current Level 4, A1 is a Review of previous content.

Line B	Use Tools and Equipment	Description of Changes
B3	Use Shop Equipment	Moved into Harmonized B2 Level 3: Use Shop Tools and Equipment. Some review of previous content.
B4	Use Welding Equipment	Current Level 4, B4 is a review of previous content.
B6	Use Fasteners	Current Level 4, B6 is a review of previous content.
B8	Use Hoisting, Lifting and Rigging Equipment	Current Level 4, B8 is a review of previous content. Some content moved into Harmonized B10: Use Hoisting, Rigging and Positioning Equipment

Sheet Metal Worker Program Outline Review Details

Line C	Organize Work	Description of Changes
C1	Use Mathematics	Current Level 4, C1 is a review of previous content.
C2	Read Drawings and Specifications	Current Level 4, C2 is a review of previous content.
C3	Use Codes, Regulations and Standards	Current Level 4, C3 is a review of previous content.
C4	Use Manufacturer and Supplier Documentation	Current Level 4, C4 is a review of previous content.
C5	Analyse Project Requirements	This content was absorbed in other areas.
C6	Handle Materials	Some content moved into Harmonized C3 Level 1: Organizes Materials and Equipment for Projects. Some content was a review of previously learned content.
C7	Communicate with Others	Some content moved into Harmonized D2: Use Mentoring Techniques

Line D	Layout and Develop Patterns	Description of Changes
D3	Develop Patterns Using Parallel Line Development	Current Level 4, D3 is a review of previous content.
D4	Develop Patterns Using Radial Line Development	Current Level 4, D4 is a review of previous content.
D5	Develop Patterns Using Triangulation	Current Level 4, D5 is a review of previous content.
D6	Develop Patterns for Duct Fittings	Current Level 4, D6 is a review of previous content.
D7	Develop Patterns Using Computer Technology	Content moved to Harmonized D5: Use Computer Technology for Pattern Development

Line E	Fabricate Trade Related Products	Description of Changes
E1	Select Materials for Trade Related	Current Level 4, E1 is a review of previous content.



Sheet Metal Worker Program Outline Review Details

	Products	
E2	Fabricate Components	Current Level 4, E2 is a review of previous content.
E3	Fabricate Ductwork and Assemble Fittings with Components	Content moved to Harmonized F2: Fabricate Ductwork, Fittings and Components
E5	Fabricate Hanger Systems	Some content (1 Learning Task) moved to Harmonized F6 Level 1: Fabricates Hanger Systems, Supports and Bases
E6	Fabricate Equipment Supports and Bases	Moved to Harmonized F6 Level 1: Fabricates Hanger Systems, Supports and Bases
E9	Fabricate Industrial Components	Moved to Harmonized F4: Fabricate Material Handling System Components

Line F	Install Air Handling Systems	Description of Changes
F1	Install Air Handling System Equipment	Moved to Harmonized K1 Level 3: Install Air Handling Equipment
F2	Install Air Handling Ductwork and Components	Current F2 absorbed through Harmonized K line.

Line G	Install Industrial Systems	Description of Changes
G1	Install Chimneys, Breeching and Venting	Moved to Harmonized J1, Level 2: Install chimneys. Some content moved to Harmonized J2 Level 2: Connect Appliances or Mechanical Equipment to Chimney and Breeching.
G2	Install Gravity/Conveyor Material Handling Systems	Content moved to L1: Install Pneumatic Material Handling Systems
G3	Install Pneumatic Material and Dust Handling Systems	Became Harmonized L1: Install Pneumatic Material Handling Systems
G4	Install Lagging	Became Harmonized M1: Applies Lagging and Claddings to Components



Sheet Metal Worker Program Outline Review Details

Line I	Service Systems	Description of Changes
I1	Test and Adjust Systems	Current Level 4, I1 is a review of previous content.
I2	Perform Maintenance Inspections and Service	Content moved to Harmonized R1 Level 3: Diagnose System Faults and Harmonized R2 Level 3: Repair Worn or Faulty Components.

SHEET METAL WORKER COMPETENCY MIGRATION CHART 2

This is a mirror to the above, illustrating what each Harmonized competency consist of

Yellow = new content

LEVEL ONE

	Harmonized OAC	
Line A	Perform Safety-Related Functions	Description of Changes
A1	Use Personal Protective Equipment and Safety Equipment.	Was Current A4: Use Personal Protective Equipment <i>and</i> A5: Select Fire Extinguishers
A2	Maintain Safe Work Environment.	Was Current A1: Control Workplace Hazards <i>and</i> A2: Locate Information in the OHS Regulation and WCB Standards
A3	Perform Lock-out and tag-out Procedures	New competency & new content. A small amount of content was moved here from Current A1: Control Workplace Hazards.
A4	Use WHMIS	Was Current A3: Use WHMIS <i>and</i> some new content added.

Sheet Metal Worker Program Outline Review Details

Line B	Use and Maintain Tools and Equipment	Description of Changes
B1	Use Hand and Portable Power Tools	Was Current B1: Use Hand Tools <i>and</i> B2: Use Portable Power tools
B2	Use Shop Tools and Equipment	Was Current B2: Use Shop Tools and Equipment <i>and</i> some B4: Use Welding Equipment
B3	Use Gas Metal Arc Welding (GMAW) Equipment	Was included in Current B4: Use Welding Equipment + new content added.
B5	Use Shielded Metal Arc Welding (SMAW) Equipment	Was included in Current B4: Use Welding Equipment + new content added.
B6	Use Oxy-Fuel and Plasma Arc Welding Equipment	Was included in Current B4: Use Welding Equipment + new content added.
B7	Use Soldering and Brazing Equipment	Was Current B5: Select Soldering and Brazing Equipment
B8	Use Measuring and Lay Out Equipment	Came from content in Current B1: Use Hand Tools Level 1 & 2 <i>and</i> Current D1: Use Drafting Equipment to Develop Geometric Constructions.
B9	Use Stationary and Mobile Work Platforms	Was Current B7: Use Ladders and Platforms
B10	Use Hoisting, Rigging and Positioning Equipment	Was Current B8: Use Hoisting, Lifting and Rigging Equipment. Some equipment content was added.

Line C	Organize Work	Description of Changes
C1	Use Trade-Related Documentation	New content <i>and</i> Some content moved from Current D2: Develop Pictorial Drawings and Orthographic Projections.
C2	Interpret Drawings	Content from Current C2: Read Drawings and Specifications. Re-constructed. Some content included re: describing orthographic projection.
C3	Organize Materials and Equipment	Was Current C6: Handle Materials. Some content

Sheet Metal Worker Program Outline Review Details

	for Projects.	added re: calculating material requirements.
C5	Use Mathematics	Was Current C1: Use Mathematics

Line D	Use Communication and Mentoring Techniques	Description of Changes
D1	Use Communication Techniques	Was Current C7: Communicate with Others. New content added.

Line E	Perform Pattern Development	Description of Changes
E1	Develop Patterns Using Simple and Straight Line Method	Content from Current D6: Develop Patterns for Duct Fittings. Some new content
E2	Develop Patterns Using Parallel Line Method (introductory)	Was Current D3: Develop Patterns Using Parallel Line Development
E3	Develop Patterns Using Radial Line Development (introductory).	Was Current D4: Develop Patterns Using Radial Line Development
E4	Develop Patterns Using Triangulation (introductory)	Was Current D5: Develop Patterns Using Triangulation. Some new content

Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Description of Changes
F1	Select Materials for Trade Related Products	Was Current E1: Select Materials for Trade Related Products
F2	Fabricates Ductwork, Fittings and Components	Was Current E2: Fabricate Components
F3	Insulate Ductwork, Fittings and Components	Was Current E4: Insulate Ductwork, Fittings and Components. Some insulation content added.
F6	Fabricate Hanger Systems, Supports and Bases Systems	Was Current E5: Fabricate Hanger Systems

Sheet Metal Worker Program Outline Review Details

Line K	Install Air Handling System Components	Description of Changes
K2	Install Air Handling Equipment	Was Current F2: Install Air Handling Ductwork and Components <i>and</i> Level 4 F1: Install Air Handling System Components
K3	Install Sheet Metal Ducts, Fittings and Dampers	New competency and new content.
K5	Install Registers, Grilles, Diffusers and Louvers	New competency and new content.
K8	Install Residential Systems	Includes content from Current Level 3 F3: Install Residential Heating, Ventilating and Air Conditioning

LEVEL TWO

	Harmonized OAC	
Line B	Use Tools and Equipment	Description of Changes
B2	Use Shop Tools and Equipment	Was Current B3: Use Shop Equipment.
B3	Use Gas Metal Arc Welding (GMAW) Equipment	Was included in Current B4: Use Welding Equipment + new content added
B5	Use Shielded Metal Arc Welding (SMAW) Equipment	Was included in Current B4: Use Welding Equipment + new content added
B7	Use Soldering and Brazing Equipment	Was included in Current B4: Use Welding Equipment, Level 1

Sheet Metal Worker Program Outline Review Details

Line C	Organize Work	Description of Changes
C1	Use Trade Related Documentation	Was in Current C3: Use Codes, Regulations and Standards <i>and</i> C4: Use Manufacturer and Supplier Documentation
C2	Interpret Drawings	Was Current C2: Read Drawings and Specifications.
C4	Perform Basic Design and Field Modifications	New competency & new content

Line E	Perform Pattern Development	Description of Changes
E1	Develop Patterns Using Simple and Straight Line Method	Was Current D6: Develop Patterns for Duct Fittings
E2	Develop Patterns Using Parallel Line Development	Was Current D3: Develop Patterns Using Parallel Line Development + new content
E3	Develop Patterns Using Radial Line Development	Some content from Current Level 4 D4: Develop Patterns Using Radial Line Development
E4	Develop Patterns Using Triangulation	Was Current D5: Develop Patterns Using Triangulation.

Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Description of Changes
F2	Fabricates Ductwork, Fittings and Components.	Content from Current E3: Fabricate Ductwork and Assemble Fittings with Components <i>and</i> E2: Fabricate Components
F4	Fabricate Material Handling System Components	Content from Current E9: Fabricate Industrial Components

Line G	Fabricate Architectural Sheet	Description of Changes
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Sheet Metal Worker Program Outline Review Details

Metal Products		
G1	Select Material for Flashing, Roofing, Sheeting and Cladding	New competency & new content. Some content from Current E1: Select Materials for Trade Related Products
G2	Fabricate Flashing, Roofing, Sheeting and Cladding	Some content from Current H2 Install Panel Systems and E8: Fabricate Architectural Components

Line I	Prepare Installation Site	Description of Changes
I1	Perform On-site Measurements	New competency & new content.
I2	Perform Demolition for Renovations	New competency & new content.

Line J	Install and Connect Chimneys, Breeching and Venting to Exhaust Appliances and Mechanical Equipment	Description of Changes
J1	Install Chimneys	Some content from Current Level 3 & 4 G1: Install Chimneys, Breeching and Venting
J2	Connect Appliances or Mechanical Equipment to Chimney and Breeching	Some content from Current Level 3 & 4 G1: Install Chimneys, Breeching and Venting
J3	Install High Efficiency Appliances and Mechanical Equipment	New competency & new content

Sheet Metal Worker Program Outline Review Details

Line K	Install Air Handling System Components	Description of Changes
K1	Install Air Handling Equipment	Some content from Current Level 4 F1: Install Air Handling System Equipment. Some new content.
K2	Install Hangers, Cables, Braces and Brackets	Content from Level 1 & 2 F2: Install Air Handling Ductwork and Components. Some new content.
K4	Install Penetrations and Sleeves	New competency & new content
K7	Install System Component Accessories	Some content from Current Level 1 F2: : Install Air Handling Ductwork and Components.

Line O	Install Metal Roofing and Cladding/Siding Systems	Description of Changes
O1	Lay Out Roof and Walls.	2 Learning Tasks came from Current H1: Install Roofing, Decking and Cladding <i>and</i> H2: Install Panel Systems <i>and</i> H3 Install Exterior Components
O2	Install Insulation, Isolation Material, Building Envelope Components	Content from Current H1: Install Roofing, Decking <i>and</i> Cladding <i>and</i> H2: Install Panel Systems
O3	Install Roofing, Cladding/Siding System Components	Includes content from H1: Install Roofing, Decking and Cladding
O4	Seal Exposed Joints	New competency & new content
O5	Install Decking	Some content from Current H1: Install Roofing, Decking and Cladding.

Line P	Install Exterior Components	Description of Changes
P1	Prepare Surface	Includes content from Current H3: Install Exterior



Sheet Metal Worker Program Outline Review Details

		Components
P2	Fasten Exterior Components	Includes content from Current H3: Install Exterior Components. Some new content.

LEVEL THREE

	Harmonized OAC	
Line B	Use and Maintain Tools and Equipment	Description of Changes
B2	Use Shop Tools and Equipment Portable Power tools	Some content moved from B3: Use Shop Equipment. Some new content.
B3	Use Gas Metal Arc Welding (GMAW) Equipment	Content from Current B4: Use Welding Equipment. Some new content
B4	Use Gas Tungsten Arc Welding (GTAW) Equipment	Content from Current B4: Use Welding Equipment. Some new content, including GTAW aluminum

Line E	Perform Pattern Development	Description of Changes
E2	Develop Patterns Using Parallel Line Development	Some content from Current Level 2 D3: Develop Patterns Using Parallel Line Development. Some new content.
E3	Develop Patterns Using Radial Line Development	Some content from Current Level 4 D3: Develop Patterns Using Radial Line Development. Some new content (a Learning Task & Objective).
E4	Develop Patterns Using Triangulation	Some new content (a Learning Task & Objective). Content from Current D5: Develop Patterns Using

Sheet Metal Worker Program Outline Review Details

		Triangulation
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Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Description of Changes
F2	Fabricate Ductwork, Fittings and Components	Content from Current E2: Fabricate Components
F4	Fabricate Material Handling System Components	Content from Current E9: Fabricate Industrial Components

Line H	Fabricate Products from Specialty Materials	Description of Changes
H1	Select Material for Specialty Products	Content from Current E1: Select Material for Trade Related Products. Some new content
H2	Fabricate Specialty Products	Content from Current B3: Use Shop Equipment. Some new content.

Line F	Install Air Handling Systems	Description of Changes
K1	Install Air Handling System Components	Some content from Current Level 4 F1: Install Air Handling System Equipment
K6	Install Terminal Boxes and Coils	Some content from Current Level 4 F2: Install Air Handling Ductwork and Components. New content
K7	Install System Component Accessories	Some content from Current Level 4 F2: Install Air Handling Ductwork and Components.
K9	Install Industrial, Commercial and Institutional Systems	New Competency & new content

Line N	Perform Leak Testing, Air Balancing and Commissioning	Description of Changes
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Sheet Metal Worker Program Outline Review Details

N1	Perform Leak Tests	Includes some content from Current I1: Test and Adjust Systems
N2	Perform Testing, Adjusting and Balancing (TAB)	Includes most content from Current I1: Test and Adjust Systems. Some new content.
N3	Participate in the Commissioning of Air and Material Handling Systems	New Competency & new content

Line Q	Install Specialty Products	Description of Changes
Q1	Install Stainless Steel Specialty Products	Includes content from Current H4: Install Specialty and Stainless Steel Products
Q2	Install Non-Stainless Steel Specialty Products	Includes content from Current H4: Install Specialty and Stainless Steel Products
Q3	Install Marine Products	New Content. Some content from Current E7: Fabricate Specialty and Stainless Steel Products

Line R	Perform Scheduled Maintenance	Description of Changes
R1	Diagnose System Faults	Includes content from Current Level 4 I2: Perform Maintenance Inspections and Service (2 Learning Tasks)
R2	Repair Worn or Faulty Components	Includes content from Current Level 4 I2: Perform Maintenance Inspections and Service (1 Learning Task)

Sheet Metal Worker Program Outline Review Details

LEVEL FOUR

	Harmonized OAC	
Line B	Use and Maintain Tools and Equipment	Description of Changes
B3	Use Gas Metal Arc Welding (GMAW) Equipment	New Competency at this level (note: B4 Use Welding Equipment was a review at Level 4). All advanced welding processes added.
B10	Use Hoisting, Rigging and Positioning Equipment	Review + 2 new Learning Tasks

Line D	Use Communication and Mentoring Techniques	Description of Changes
D2	Use Mentoring Techniques	Some content from Current C7: Communicate with Others. Some new content added.

Line E	Perform Pattern Development	Description of Changes
E4	Develop Patterns Using Triangulation	Content moved from Current D5. Some new content.
E5	Use Computer Technology for Pattern Development	Content moved from Current Level 2,3 & 4 D7: Develop Patterns Using Computer Technology. New content

Line F	Fabricate Sheet Metal Components for Air and Material Handling Systems	Description of Changes

Sheet Metal Worker Program Outline Review Details

F2	Fabricate Ductwork, Fittings and Components	Content moved from E2: Fabricate Components <i>and</i> E3 Fabricate Ductwork and Assemble Fittings with Components
F4	Fabricate Material Handling System Components	Content moved from E9: Fabricate Industrial Components
F5	Fabricate Dampers	New Competency & new content.

Line K	Install Air Handling System Components	Description of Changes
K1	Install Air Handling Equipment	Some content from Current Level 4 F1: Install Air Handling System Equipment
K7	Install System Component Accessories	Some content from Current Level 1 F2: Install Air Handling Ductwork and Components. New content

Line L	Install Material Handling System Components	Description of Changes
L1	Install Pneumatic Material Handling Systems	Content from Current G3: Install Pneumatic Material and Dust Handling Systems <i>and</i> G2: Install Gravity/Conveyor Material and Handling Systems.
L2	Install Gravity Material Handling System Components	Some content moved from G2: Install Gravity/Conveyor Material and Handling Systems. Some new content
L3	Install Mechanized Material Handling System Components	Some content moved from G2: Install Gravity/Conveyor Material and Handling Systems. Some new content <i>and</i> G3: Install Pneumatic Material and Dust Handling Systems. Some new content.

Line M	Service Systems	Description of Changes



Sheet Metal Worker Program Outline Review Details

M1	Apply Lagging and Cladding to Components	Some content from Current G4: Install Lagging. Some new content
M2	Apply Flashing to Components	New Competency & new content.

Line N	Perform Leak Testing, Air Balancing and Commissioning	Description of Changes
N1	Perform Leak Tests	Includes some content from Current Level 3 I1: Test and Adjust Systems
N2	Perform Testing, Adjusting and Balancing (TAB)	Includes most content from Current Level 3 I1: Test and Adjust Systems. Some new content.
N3	Participate in the Commissioning of Air and Material Handling Systems	New Competency & new content