Welder Harmonization

Transition Plan

Table of Contents

Abbreviations

CCDA	Canadian Council of Directors of Apprenticeship
CL	Current level (2013)
FDN	Foundation program
HFDN	Harmonized Foundation program
HL	Harmonized level (Mar 2017)
NOA	Red Seal National Occupational Analysis
RSOS	Red Seal Occupational Standard; replaces NOA
SLE	Standardized Level Exam
TP	Training provider
TT	Technical training
TW	Trade worker
WBT	Work-based training

Introduction: Harmonization

The Canadian Council of Directors of Apprenticeship (CCDA) is responsible for the Red Seal Program, which develops common interprovincial standards and examinations. The CCDA is undertaking the Harmonization Initiative in 30 Red Seal trades by 2020. British Columbia is an active participant in this initiative.

The goal is to substantively align apprenticeship systems across Canada by making apprenticeship training requirements more consistent in the Red Seal trades.

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.

HARMONIZATION: What's changing for **WELDER**

	Changing in BC?	What will it be?
TRADE NAME	NO	**Welder**
NUMBER OF TRAINING LEVELS	NO	**3**
TOTAL HOURS technical + work-based training	**YES**	**5400 hours** Increased by 120 work-based hours & 60 hours technical training (Level 3)
TRAINING SEQUENCE order of subjects taught	**YES**	**Some changes to sequence**

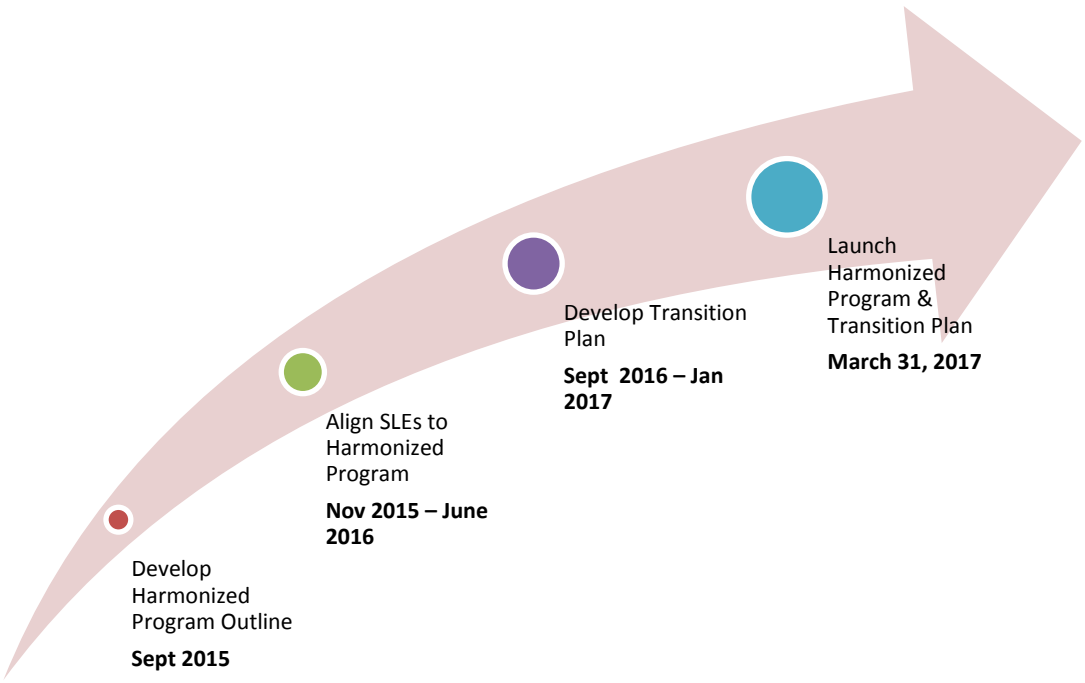
Transition Planning

The re-sequencing of the Welder program through the Harmonization Initiative has resulted in significant changes to the program.

In October 2016 and January 2017, ITA consulted with the 13 public post-secondary institutions that deliver the Welder program, and also considered the input of our internal partners. The transition plan outlined in this document was identified as the best option.

In all of our work on harmonization and program development, we are guided by the following principles:

- Meet the needs of industry
- Minimize disadvantage to TWs, including those currently registered
- Minimize challenges for training providers in implementing the program



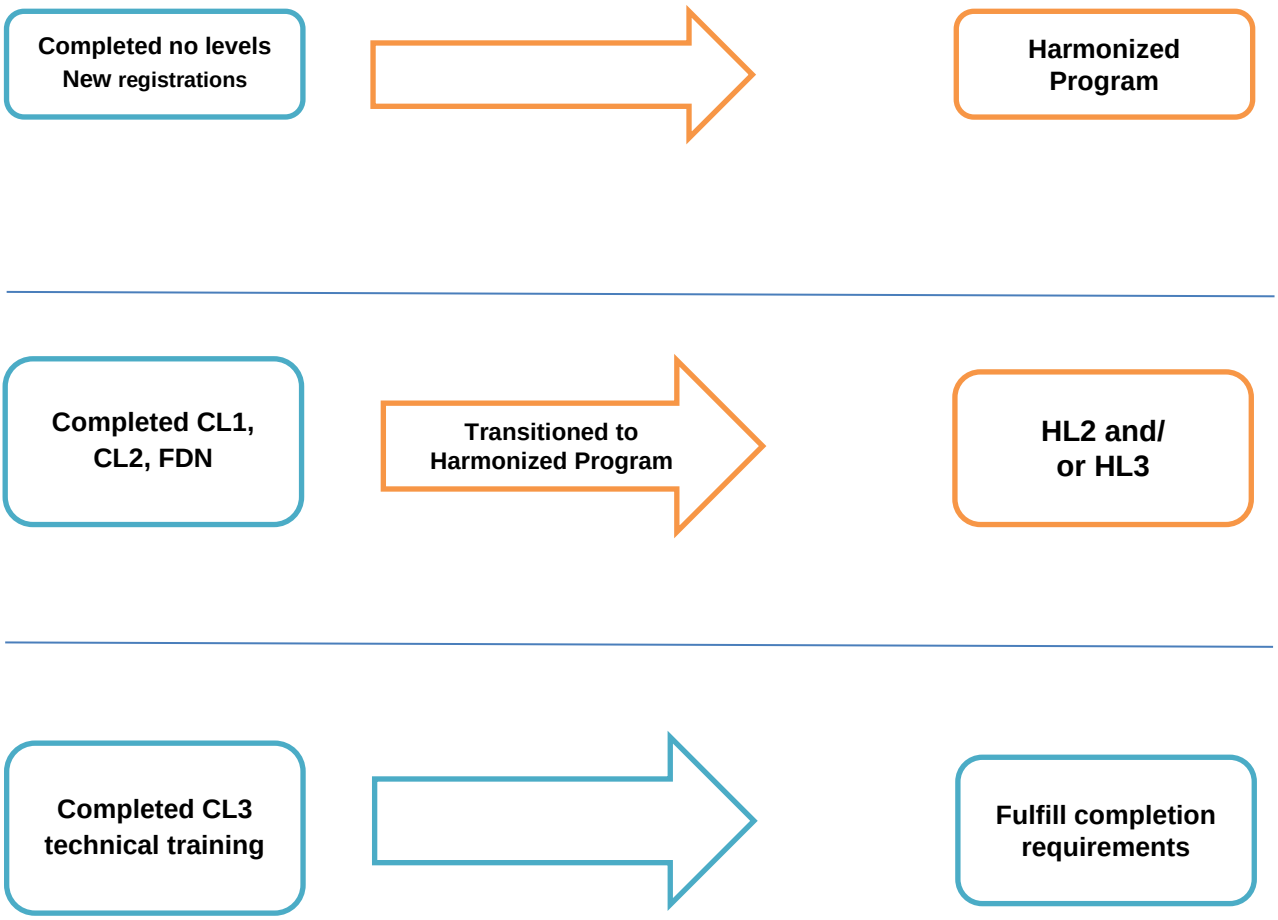
Transition Plan

Timelines	
All Levels	March 31, 2017

Year 0 16/17	CL1	CL2	CL3
Year 1 17/18	HL1	HL2	Gap Training / HL3
Year 2 18/19	HL1	HL2	Gap Training / HL3
Year 3 19/20	HL1	HL2	Gap Training / HL3
Year 4 20/21	HL1	HL2	HL3

HL = Harmonized Level
CL = Current Level

Pathways for Current Apprentices



Work-Based Training Hours (WBT)

In order to align with the harmonized standard of **5,400 hours of total training**, BC's WBT hours will be **reduced** as follows.

Apprenticeship Pathway (WBT increased by 120 hours)

Current Program (Jan 2016)	Hours
Technical Training (240 hours X 3 levels = 720 hours)	720
WBT Hours	4,500
Current Total Training Hours	**5,220**

Harmonized Program (Mar 2017)	Hours
Technical Training (240 hours X 2 levels + 300 hours x 1 level = 780 hours)	780
WBT Hours	4,620
Harmonized Total Training Hours	**5,400**

Challenge Pathway and Sign-off Authority (WBT increased by 180 hours)

Current Program	Hours
WBT Hours	4,500
ITA Formula for Calculating Challenge WBT	X 1.5
Current Challenge WBT Hours	**6,750**

Harmonized Program	Hours
Harmonized WBT Hours	4,620
ITA Formula for Calculating Challenge WBT	X 1.5
Harmonized Challenge WBT Hours	**6,930**

NOTE: If TWs complete the current program, the WBT hours for that program will apply. If they transition, they will complete the increased hours.

Standardized Level Exams (SLEs)

SLEs for the Harmonized Program

Because of the extent of the changes made to the sequencing of technical training, we will need to launch new Standardized Level Exam (SLEs) for HL1, HL2 and HFDN.

However, in order to pilot the SLEs with an appropriate cohort, the new SLEs will not be available with the first cohort through each of Harmonized Levels.

An **OPSN** will be sent to announce the implementation of the SLEs as they are launched.

The SLEs will **NOT** be available for challenge.

Appendix A: Details of Gaps

Gap CL1 → HL2

Current Level 1 to Harmonized Level 2

	Competencies	Missed Topics	Delivery Option
A7	Describe shop materials	• Identify and describe common sheet, plate, pipe and structural shapes.	• On the job & self study (module RK1)
A8	Apply lifting, hoisting and rigging procedures	• Describe safety procedures for rigging and material handling. • Perform safe working load (SWL) calculations involving geometric formulas, volumes and capacities. • Perform safe manual-lifting procedures. • Describe wire rope, slings and rigging hardware. • Use hoisting equipment to perform lift.	• On the job & self study (module RK1)
D7	Use the hardsurfacing process on low carbon steel	• Describe hardsurfacing preparation. • Describe problems encountered while hardsurfacing. • Use hardsurfacing on low carbon steel plate.	• On the job & self study (module P4-7 & P4-14)
D9	Use the SMAW process on stainless steel and/or low carbon steel plate and pipe	• Describe proper handling of stainless steel plate and consumables. • Use the SMAW process to apply stainless steel filler metal to low carbon steel plate.	• On the job & self study (module P4-16)
I1	Identify common welding symbols and bolted connections	• Identify standard welding symbols and supplementary welding symbols. • Describe the dimensioning of fillet and groove weld symbols. • Describe other weld symbols and the dimensioning of threaded fasteners used in structural steel construction.	• On the job & self study (module RK2)
Approximately 15 hours of self-study total, and work-based training. **Note: Level 1 & 2 Learning Resources are currently being updated by Open School BC*			

Gap – CL2/FDN → HL3

Current Level 2 or Foundation to Harmonized Level 3

	Competencies	Missed Topics	Delivery Option
E7	Use the SAW process	• Describe the welding variables for using the SAW process on low carbon steel plate. • Use the SAW process to weld fillet welds on low carbon steel plate.	• Self study (modules P6-1, P6-2, P6-3) • Practical requirement negligible (exposure/demonstration only)
F1	Describe the GTAW process and its application	• Describe the GTAW process. • Describe the function of electrodes and shielding gases. • Describe the basic components of a GTAW work station. • Identify the applications of GTAW and the safety requirements.	• Gap training combined with F2, F3, F4, F5: 30 hours (module P10)
F2	Describe GTAW equipment and its operation	• Identify types of GTAW power sources. • Describe shielding gases and systems. • Describe torches and their components. • Describe tungsten electrodes used for GTAW. • Correctly assemble GTAW equipment.	• Gap training combined with F1, F3, F4, F5: 30 hours (module P10)
F3	Describe the application of GTAW for ferrous metals	• Describe the GTAW process on low carbon steel. • Identify discontinuities. • Identify the main factors of GTAW.	• Gap training combined with F1, F2, F4, F5: 30 hours (module P10)
F4	Use the GTAW process for ferrous metals	• Use the GTAW process to strike an arc using three methods. • Use the GTAW process to weld stringer beads and fillet welds on low carbon steel sheet. • Use the GTAW process to weld groove welds on low carbon steel sheet.	• Gap training combined withF1, F2, F3, F5: 30 hours (module P10)

F5	Use the GTAW process for stainless steel	• Describe the GTAW process and procedures on stainless steel. • Use the GTAW process to weld fillet welds on stainless steel sheet. • Use the GTAW process to weld groove welds on stainless steel sheet.	• Gap training combined with F1, F2, F3, F4: 30 hours (module P10)
I7	Costing and Estimating	• Identify project costs. • Calculate project cost for simple fabrication.	• Gap training not required, covered in more detail in Harmonized Level 3
Nominal time for self-study, 30 hours gap training. **Note: Level 1 & 2 Learning Resources are currently being updated by Open School BC*			

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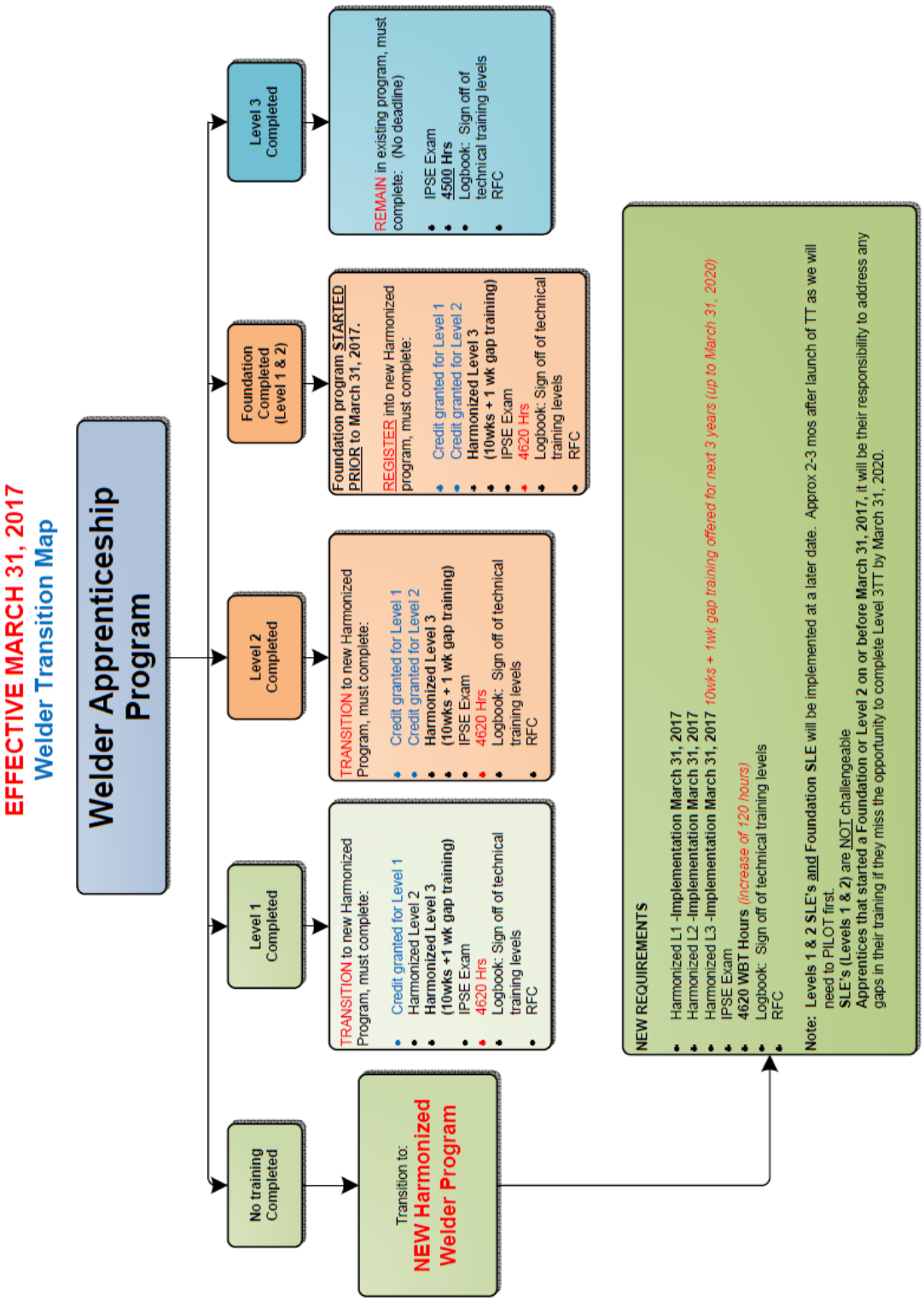
Appendix B: Transition Map



Appendix C: Learning Module Reference Chart

WELDER – Level 1

***LEARNING RESOURCES**

LINE A	**OCCUPATIONAL SKILLS**	
A2	Describe safe working practices	P1-2
A3	Perform basic trade related mathematical calculations	P1-3
A4	Use and maintain measuring and layout tools	P1-4 and P1-6
A5	Use and maintain hand tools	P1-4 and P1-6
A6	Use and maintain power tools (electric and pneumatic)	P1-5 and P1-6
A7	Describe shop materials	RK1
A8	Apply lifting, hoisting and rigging procedures	RK1: 1-1, 1-3, 1-4, 1-5 & 1-6
LINE B	**Oxy- Fuel Cutting and Processes (OFC and OFW)**	
B1	Describe Oxy-Fuel cutting (OFC) processes and their applications	P2-1
B2	Describe Oxy-Fuel cutting (OFC) equipment and its operation	P2-2 & P2-3
B3	Perform freehand and guided cuts on low carbon steel (OFC)	P2-4
B4	Use automatic and semi-automatic cutting machines (OFC)	P2-5
B5	Describe CAC-A and PAC processes, equipment and their applications	P5-1, P5-2 & P5-3
B6	Use CAC-A and PAC cutting and gouging processes and equipment	P5-4 and P5-5
LINE C	**Fusion and Braze Welding (TB) Using the Oxy Fuel (OFW) Process**	
C1	Describe fusion welding, braze welding and brazing processes and their applications	P3-1 and P3-2
C2	Describe fusion welding, braze welding and brazing equipment and its operation	P3-2
C3	Describe filler metals, fluxes and tips used for fusion and braze welding and brazing	P3-4
C4	Describe joint design and weld positions (OFW)	P3-5
OPTIONAL		
C5	*Fusion weld on low carbon steel sheet*	*P3-6*
C6	*Braze weld (TB) using the OFW process*	*P3-7*
C7	*Silver alloy braze on similar and dissimilar metals*	*P3-3 & P3-8*
LINE D	**Shielded Metal Arc Welding (SMAW)**	
D1	Describe the SMAW process	P4-1
D2	Describe SMAW equipment and its operation	P4-2
D3	Select electrodes for SMAW	P4-3
D4	Describe basic joint design and weld positions for SMAW	P4-4
D5	Describe weld faults and distortion in fabrication in SMAW	P4-5
D6	Use the SMAW process on low carbon steel plate and pipe	P4-6, P4-10, P4-11, P4-12 & P4-13
D7	Use the hardsurfacing process on low carbon steel	P4-7 & P4-14
D9	Use the SMAW process on stainless steel and/or low carbon steel plate and pipe	P4-16
LINE E	**Semi-Automatic Welding and Automatic Welding**	

E1	Describe GMAW, GMAW-P, FCAW, MCAW and SAW processes and their applications	P6-1, P6-2, & P6-3
E2	Describe semi-automatic and automatic welding equipment and its operation	P6-1, P6-2, & P6-3
E3	Describe filler metal and shielding gases for semi-automatic and automatic welding processes	P6-1, P6-2, & P6-3
E4	Use the GMAW process and GMAW-P processes	P6-4, P6-5 & P6-10
E6	Use the FCAW process	P6-7 & P6-8
LINE I	**Welding Drawings, Layout and Fabrication**	
I1	Identify common welding symbols and bolted connections	RK2

**Note: Level 1 & 2 Learning Resources are currently being updated by Open School BC*

WELDER – Level 2

		*LEARNING RESOURCES
LINE A	**OCCUPATIONAL SKILLS**	
A8	Apply lifting, hoisting and rigging procedures	RK1: 1-1, 1-3, 1-4, 1-5 & 1-6
LINE D	**Shielded Metal Arc Welding (SMAW)**	
D3	Select electrodes for SMAW	P4-3 & P4-16
D6	Use the SMAW process on low carbon steel plate and pipe	P4-17 & P7
D8	Describe the SMAW process on grey cast iron	P4-8 & P4-15
LINE E	**Semi-Automatic and Automatic Welding**	
E4	Use the GMAW and GMAW-P process	P6-6, P6-9, P6-10, P6-11, P6-12, P6-13 & P6-14
E5	Use the FCAW process	P9-1, P9-2, P9-3 & P9-4
E6	Use the MCAW process	P6-1, P6-2 & P6-3
E7	Use the SAW process	P6-1, P6-2 & P6-3
LINE F	**Gas Tungsten Arc Welding (GTAW)**	
F1	Describe the GTAW process and its application	P10-1
F2	Describe GTAW equipment and its operation	P10-2
F3	Describe the application of GTAW for ferrous and non-ferrous metals	P10-3
F4	Use the GTAW process for ferrous metals	P10-3 & P10-4
F5	Use the GTAW process for stainless steel	P10-5 & P10-6
LINE H	**Basic Metallurgy**	
H1	Describe production processes for manufacturing metals	RK3-2
H2	Describe mechanical and physical properties of ferrous and non-ferrous metals	RK3-1
H3	Describe common ferrous, non-ferrous and reactive metals and their weldability	RK3-3 & RK3-4
LINE I	**Welding Drawings**	
I2	Read and interpret drawings	RK2
I3	Perform basic drafting	RK2 & RK6
I4	Perform mathematical calculations	RK2
I5	Interpret and apply mechanical drawings and layout components	RK2
I6	Fabricate weldments	RK6
I7	Costing estimating	NEW

**Note: Level 1 & 2 Learning Resources are currently being updated by Open School BC*

WELDER – Level 3

		LEARNING RESOURCES
LINE D	**Shielded Metal Arc Welding (SMAW)**	
D3	Select electrodes for SMAW	P4-3 & P4-16
D6	Use the SMAW process on low carbon steel plate and pipe	P4-17 & P7
LINE E	**Semi-Automatic and Automatic Welding**	
E4	Use the GMAW and GMAW-P process	P8-1, P8-2, P8-3, P8-4 & P8-5
E8	Use combined GMAW, MCAW and FCAW processes	P8-4 & P8-5
LINE F	**Gas Tungsten Arc Welding (GTAW)**	
F4	Use the GTAW process for ferrous metals	P10-3 & P10-4
F6	Use the GTAW process for aluminum	P10-7 & P10-8
LINE G	**Basic Metallurgy**	
G2	Describe mechanical and physical properties of ferrous and non-ferrous metals	RK7-2
G4	Describe the grain structure of metals	RK7-1
G6	Describe aluminum, aluminum alloys and their weldability	RK7-3
LINE I	**Welding Drawings, Layout and Fabrication**	
I2	Read and interpret drawings	RK6-1
I5	Interpret and apply mechanical drawings and layout components	RK6-2
I6	Fabricate weldments	RK6-2
I7	Costing and estimating	NEW
LINE J	**Quality Control and Inspection**	
J1	Describe basic welding quality control and inspection requirements	RK5-1
J2	Describe inspections and testing procedures	RK4-1 & RK4-2
J3	Describe the scope of the welding supervisor and inspector responsibilities	RK5
LINE K	**Standards, Codes, Specifications and Welder qualification**	
L1	Identify applicable standards, codes, specifications and jurisdictional bodies	RK5-1
L2	Comply with weld procedure specifications (WPS) and data sheets	RK5-1

WELDER – MPAW (Multi-Process Alloy Welding)

		LEARNING RESOURCES
LINE D	**Shielded Metal Arc Welding (SMAW)**	
D3	Select electrodes for SMAW	P4-17, P7 & P11-2
D6	Use the SMAW process on low carbon steel plate and pipe	P4-17, P7 & P11-2
D9	Use the SMAW process on stainless steel and/or low carbon steel plate and pipe	P4-17, P7 & P11-2
LINE F	**Gas Tungsten Arc Welding (GTAW)**	
H5	Use the GTAW process for stainless steel	P12-3
LINE G	**Specialized Processes**	
G1	Describe specialized welding processes	Welding Skills (ATP), Welding Principles and Applications (7th ed, author: Larry Jeffus)
LINE H	**Basic Metallurgy**	
H3	Describe common ferrous, non-ferrous, reactive metals and their weldability	RK8-1 & RK8-2
H5	Describe die castings and their weldability	RK8-3
LINE I	**Welding Drawings, Layout and Fabrication**	
I5	Interpret and apply mechanical drawings and layout components	RK9-1 & RK9-2
I6	Fabricate weldments	RK9-1 & RK9-2

Appendix D: Log Book Information Sheet

The Log Book information sheet can be found at www.itabc.ca/sites/default/files/docs/welder-logbook-info-sheet-feb-2017.pdf

It contains the following details:

About Your Log Book

Your log book is an important record of your apprenticeship. It is a complete record of your training, competencies, certifications, endorsements and employment history. You need to take great care to keep it up-to-date, and ensure that all the required information is complete and correct. Each section of your log book will be reviewed by ITA to determine if you have met the completion requirements of your program.

Getting Your Log Book

Welder Foundation Trainees	After you have completed your foundation program, your ITA-approved training provider will provide you with the most current edition of the log book.
Welder Apprentices	After you have completed Level 1 technical training, your ITA-approved training provider will provide you with most current edition of the log book. If you want a log book before you complete technical training, you must send the *Request for Document Replacement* form with 2 passport sized photos (digital or printed) to ITA Customer Service, where you will receive most current edition of the log book. This form requires that your ID be verified. There is no fee required. Please see form for further directions.
Welder Challengers	After you have passed your Interprovincial Red Seal Exam & standardized practical assessment, you may request the most current edition of the log book by sending the *Request for Document Replacement* form with 2 passport sized photos (digital or printed) to ITA Customer Service. This form requires that your ID be verified. There is no fee required. Please see form for further directions.
Certified Red Seal Welders from outside BC	If you have an Interprovincial Red Seal Certification from a Canadian jurisdiction other than BC, you may request a blank log book of the most current version for BC Safety Authority pressure ticket(s) purposes. In order to obtain most current edition of the log book, please send the *Request for Document Replacement* form with 2 passport sized photos (digital or printed) to ITA Customer Service. This form requires that your ID be verified. There is no fee required. Please see form for further directions.
Replacement Log Book	If you need a replacement log book, you must complete the *Request for Document Replacement* form available from the ITA website and send it to ITA Customer Service along with 2 passport sized photos (digital or printed). If you hold a BC issued certification there is a $35.00 replacement fee. If you lost your log book, but were never certified, you can request a blank log book. There is no fee required to obtain a blank log book. You will receive the most current edition of the log book. *NOTE:* training and hours tracked in a misplaced log book will not be transferred to your replacement log book, but previously submitted training and hours will be recorded on your Direct Access file. Please make copies of your current log book on a regular basis to ensure all training and credit obtained will be credited towards your apprenticeship. Verification of the information provided on these copies will be performed.

Completing Your Log Book

Old Editions (Blue or Green)

Your log book must document completion of the following:

1. All **Practical Modules** (P Modules) and **Related Knowledge** (RK Modules) for the following programs/levels, signed off by your ITA-approved training provider:
   - Welder Foundation, Welder C Modular or Levels 1 & 2 technical training
   - Welder B Modular or Level 3 technical training
   - Welder A Modular or Multi-Process Alloy Welding (MPAW) Endorsement technical training.
2. All **Training and Course Endorsements**, signed off by your ITA-approved training provider.
3. **Employment Record. All columns must be completed and signed by the employer(s).** Please note that the Green log book does not have a total hour's column.
4. **Welder Code Qualifications and Endorsements** handled by the British Columbia Safety Authority (BCSA) will be housed in the log book. This, however, is not required for ITA certification.

EMPLOYER 1. NAME 2. ADDRESS	DATE: FROM: Y/M/D	 TO: Y/M/D	TOTAL HOURS	*ASME OR GENERAL SECTION 1. PROCESS(ES) 2. PROCEDURES USED	EMPLOYER'S REPRESENTATIVE 1. NAME 2. SIGNATURE
1. 2.				1. 2.	1. 2.

New Edition (Red)

Your log book must document completion of the following:

1. **The following programs/levels**, signed off by your ITA-approved training provider:
   - Welder Foundation or Levels 1 & 2 technical training
   - Welder B Modular or Level 3 technical training
   - Welder A Modular or Multi-Process Alloy Welding (MPAW) Endorsement technical training.
2. All **Training and Course Endorsements**, signed off by your ITA-approved training provider.
3. **Welder Code Qualifications and Endorsements** handled by the British Columbia Safety Authority (BCSA) will be housed in the log book. This, however, is not required for ITA certification.
4. **Employment Record. All columns must be completed and signed by the employer(s).**
5. **Name and ITA Registration number and/or British Columbia Safety Authority Registration number at the top of every page.**

EMPLOYER 1. NAME 2. ADDRESS	DATE: From: MM/DD/YYYY To: MM/DD/YYYY	Total Hours	*ASME OR GENERAL SECTION 1. PROCESS(ES) 2. PROCEDURES USED	EMPLOYER'S REPRESENTATIVE 1. NAME 2. TITLE 3. SIGNATURE
1. Get It Together Welding 2. 1200 Arctime Lane Sparksville BC, V0Z 1Z0	From: 02/02/2014 **To:** 08/05/2014	1040	1. SMAW 2. PWP#7 ASME Sec. IX	1. George Jensen 2. Operations Supervisor 3. George Jensen

Submitting Your Log Book

Registered Apprentices

When you have met all your program requirements, your sponsor should submit your log book, along with a completed *Recommendation for Certification* form to ITA. Once certification is granted, ITA will send your certificate package to your sponsor. Your log book with the completion stamp enclosed can be mailed to your sponsor along with your certificates or mailed separately directly to you. Our ITA staff will contact you after your certification is achieved to verify which option you prefer. Please note your certificates will be sent to your sponsor.

Modular Trainees

When you have completed all your program requirements, send your log book, along with a completed *Completion of Modular Welder C, B, A & IP* form, to ITA Customer Service for assessment. Once approved, ITA will send you a Certificate of Qualification and your log book with the completion stamp attached.

Foundation

Log book submission is not required.

Photo Requirements

Printed

- Passport photos recommended
- 50 mm wide x 70 mm high (2 in. wide x 2 ¾ in. high)
- Taken straight on, with face and shoulders **centered** and squared to the camera, and covering **at least 50%** of the photo area
- You must be the **only person** in the picture
- Taken in front of a plain white or light-coloured background with **no** shadows, glare or flash reflections
- Photos may be in colour or in black and white

Digital

- Smaller than 5MB in size (larger file sizes will be rejected)
- JPEG or PNG format
- Resolution must be between 1024 x 768 pixels and 1280 x 960 pixels
- You must be the **only person** in the picture
- Taken straight on, with face and shoulders **centered** and squared to the camera, and covering **at least 50%** of the photo area
- Taken in front of a plain white or light-coloured background with **no** shadows, glare or flash reflections
- Photos may be in colour or in black and white
- Please submit a copy of your government issued photo ID (e.g. driver's license) along with your digital copies to confirm identity

Your photo will NOT be processed if:

- Your head is tilted up, down, or to the side
- Your face is not clearly visible or is out of focus
- Anything blocks your head or face, including sunglasses, hats, or other objects
- If your image has been altered, filtered or excessively enhanced (i.e. instagrammed)

Appendix E: Practical Skills Checklist

To operationalize this support tool we need to work together to ensure its success.

Uses:

- Provide information to instructors (work experience)
- Provide information to the journeyperson supervisor/employer (technical training progress)

Objectives:

- Ensure apprentices have skills required for success in technical training
- Track progress through apprenticeship
- Identify skills that are missing or not fully refined

ITA's role:

- Provide a link to the document on the ITA website (http://www.itabc.ca/program/welder)
- Engage employer/sponsor support
- Assist apprentices with information about the tool
- Inform apprentices that Training Providers might begin to request this document as part of registration

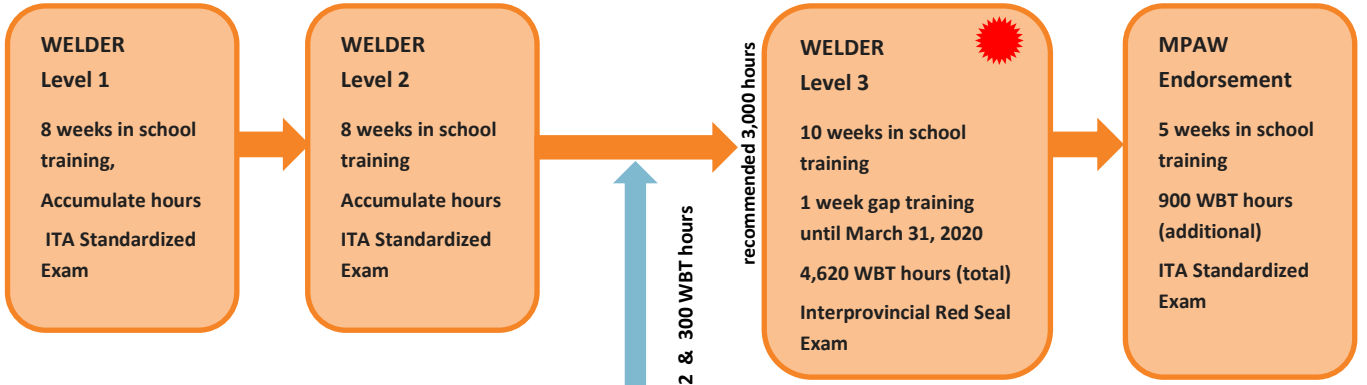
Training Provider role:

- Work with their administration/registrars to request this document from registering apprentices prior to the start of training
- Support apprentices and employer/sponsors by providing information
- Include the document on your website or direct apprentices to the ITA Welder Webpage
    - Training Provider web support to provide contact info to the Program Standards Coordinator at programstandards@itabc.ca so any updates can be distributed

Please inform ITA if you intend to utilize the checklist with apprenticeship registration by March 31, 2017. Email Angela Caughy at acaughy@itabc.ca.

Appendix F: Welder Interim Model

Welder Apprenticeship Pathway - Harmonization (with a sponsor)



Welder Modular Pathway (without a sponsor)