



THE REPUBLIC OF UGANDA Ministry of Education and Sports

**Directorate of Industrial Training** 



# **Qualification Level: 1**

# **Occupational Cluster: Technology and Design**

# September2020

<u>Developed by:</u> Qualifications Standards Department Directorate of Industrial Training <u>Funded by:</u> Government of Uganda



# Assessment and Training Package

For a

# SHEET METAL FABRICATOR

**Qualification Level: 1** 

**Occupational Cluster: Technology and Design** 

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All rights reserved. No reproduction or copy transmission of this publication may be made without written permission or in accordance with the provisions of the Copyright, Designs and Patents Act or under the terms of licence permitting limited copying issued by the licencing agency in Uganda. Any person who does any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages. Under BTVET Act, 2008, the functions of the Directorate of Industrial Training are:

- (a) To identify the needs of the labour market for occupational competencies that fall under the UVQF.
- (b) To regulate apprenticeship schemes.
- (c) To foster and promote entrepreneurial values and skills, as an integral part of the UVQF.
- (d) To secure adequate and sustainable financing for the efficient operations of the Directorate.
- (e) To accredit training institutions or companies as assessment centres.
- (f) To determine fees payable under the Act.
- (g) To develop, apply, expand and improve the purposeful application of Uganda vocational qualifications defined in the UVQF.
- (h) To assess and award Uganda Vocational Qualifications.
- (i) To promote on-the-job training in industry for apprenticeship, traineeship and indenture training and for other training such as further skills training and upgrading.
- (j) To prescribe the procedure for the making of training schemes.

Further to the above provisions, there is an established Uganda Vocational Qualifications Framework (UVQF), under part V of the BTVET Act, 2008. It is stated that:

The purpose of the UVQF is to;

- (a) Define occupational standards in the world of work.
- (b) Define assessment standards.
- (c) Award vocational qualifications of learners who meet the set standards of different studies.
- (d) Provide guidelines for modular training.

The UVQF shall follow principles of Competence Based Education and Training (CBET) which include:

- (a) Flexible training or learning modules.
- (b) Positive assessment and certification.
- (c) Assessment of prior learning.
- (d) Recognition of formal and non-formal training.
- (e) Self-paced or individual learning.
- (f) Work place learning.

For award and recognition of certificates, the BTVET Act, 2008 provides that:

- (1) The Directorate and other examination boards established under the Act shall award certificates and diplomas for Business, Technical or Vocational Education and Training under the UVQF.
- (2) The Certificates and Diplomas to be awarded shall be in the form prescribed by the Minister on the recommendation of the Industrial Training Council.
- (3) The Certificates and Diplomas awarded under the Act shall be recognised in the Uganda education system and by the labour market.

Under the TVET Implementation Standards 2020, the proposed new mandate of the Directorate of Industrial Training shall be restricted to promoting the highest standards in the quality and efficiency of industrial training in the country and ensuring an adequate supply of properly trained manpower at all levels in the industry and the world of work.

The functions shall include:

- (a) Regulating Industrial Training and Trainers.
- (b) Developing Industrial Training Curricula.
- (c) Harmonising Curricula and Certificates of competence.
- (d) Assessing Industrial Training.
- (e) Development of Occupational Standards and Assessment and Training Packages (ATPs) for Trade Testing for the industry and world of work.
- (f) Awarding certificates in that respect.

At operational level in the Directorate, the Qualification Standards Department performs development tasks related to concepts, procedures and instruments for establishment of the UVQF in close collaboration with both public and private stakeholders in vocational training.

In particular, the Department organises and coordinates the development of Assessment and Training Packages for use in competence-based vocational training as well as standards-based assessment and certification.

The Directorate has therefore produced this Assessment and Training Package for use in implementing Competence-Based Education and Training mechanisms.

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## Word from Permanent Secretary

The Kajubi Report (1989) and the Uganda Government White Paper on Education Review (1992) emphasised that the Uganda Secondary School Education should be vocationalised.

The World Bank Report on education in Uganda 2007 observed that although Uganda was experiencing steady economic growth on one hand, the secondary education curriculum was inadequately addressing the social and economic needs of the country on the other. The Report further noted that it is not the very top academic cadres that contribute most to the growth of the GDP but rather the competent middle level technicians that are flexible and technologically literate that the economy needs in the labour market at all levels.

Correspondingly, the NDP III 2020/21- 2024/5 highlights (i) low labour productivity (ii) high youth unemployment (38%) (iii) low transition rates from training to employment (35%) as some of the key challenges to Human Capital Development in Uganda.

In order to overcome these challenges, NDP III 2020/21- 2024/5, under objective 2 peaks the need to train the learners for the urgently needed skills and mainstream a dual education and training system. This paved way for the development of the lower secondary school vocational curriculum which supports both academic and vocational training.

The afore is in line with the Uganda Vision 2040. Under section 261, it emphasises that learners will be accorded opportunities to excel in the skills areas they are placed into. These will range from sports and cut to technical and vocational training. Hitherto, section 262 clearly states that the entire education system will be changed to emphasise practical skills, attitude and moral values.

Government of Uganda through the Ministry of Education and Sports rolled out the New Lower Secondary Curriculum in secondary schools countrywide during the first term of the academic year 2020. The overall goal of this curriculum is to produce graduates with employable skills and who are competitive in the labour market. It should be emphasised that vocational training will produce graduates who are employable. In the New curriculum, emphasis will be on equipping learners with employable skills and competencies. This will enable learners perform the requisite duties of the specified occupations. This is the reason why the lower secondary school vocational curriculum was tailored to the assessment requirements of the world of work.

Reading from the Curriculum Framework page 12, it is stated that the learners will be assessed by DIT. Upon assessment and certification, the graduates will be employable and competitive in the labour market. It's against this background that DIT, within its mandate vested in the BTVET Act, 2008 comes on board to take the lead in the development of the requisite Assessment and Training Packages (ATPs) for the various occupations that will be assessed under the Lower Secondary Curriculum.

The ATPs can be used by any training provider and/or those who wish to present themselves for Occupational Assessment and Certification.

Herewith, the Directorate of Industrial Training presents the Assessment and Training Package for training, assessment and certification of a **SHEET METAL FABRICATOR QUALIFICATION LEVEL 1.** 

Finally, I thank all individuals, organisations and review partners who have contributed and/or participated in the review of this noble document.

Alex Kakooza Permanent Secretary

## **Executive Summary**

This Assessment and Training Package is a Competence-Based Education and Training (CBET) tool and consists of three major parts:

- 0.1 **PART I: The Occupational Profile (OP) of a SHEET METAL FABRICATOR.** This Occupational Profile which was reviewed by Sheet Metal Fabricators practicing in the world of work mirrors the duties and tasks that Sheet Metal Fabricators are expected to perform.
- 0.2 **PART II: Training Modules** in the form of guidelines to train Sheet Metal Fabricators both on the job as well as in training centres (or combinations of both venues of learning). The Training Modules herein have been reviewed basing on the Occupational Profile and hence are directly relevant for employment.
- 0.3 **PART III: Assessment Instruments** in the form of performance (Practical) and written (theory) test items that can and should be used to assess whether a person complies with the requirements of employment as a SHEET METAL FABRICATOR. These assessment instruments were reviewed jointly by job practitioners (Sheet Metal Fabricators) and instructors based on the occupational profile and training modules.
- 0.4 While the Occupational Profile (OP) contained in PART I of this document provides the information on <u>WHAT a person is expected to do</u> competently in the world of work, the test items, - including performance criteria- of PART III qualify the <u>HOW</u> <u>and/or HOW WELL a person must do the job</u>.
- 0.5 The modular format of the curriculum (PART II) allows learners to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing flexibility for learners to move directly into an entry level job, go for further modules or advance to higher levels of training. Modular courses allow more learners to access the training system because training centres as well as companies can accommodate more learners in a given period of time.
- 0.6 In addition to improved access, equity and relevance of BTVET, the UVQF will also enable people who are convinced to have acquired competencies laid down in this ATP through prior training and on-the-job experience to access assessment and certification directly; be it on the basis of a single module, a group of modules or all modules pertaining to the occupation at once. This achievement will facilitate Recognition of Prior Learning (RPL).

- 0.7 The parts of this Assessment and Training Package were sequentially reviewed as follows:
  - i Part 1: Occupational Profile: August 2020
  - ii Part 2: Training Modules: *August 2020*
  - iii Part 3: Assessment Instruments (initial bank): August 2020

This ATP (or parts of it) may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

DIT takes responsibility of any shortcomings that might be identified in this publication and welcomes suggestions for effectively addressing the inadequacies. The suggestion can be communicated to DIT through P.O. Box 20050, Kampala or through email uvaf.dit@gmail.com.

Patrick Byakatonda Ag Director

# Acknowledgement

The Qualifications Standards Department of DIT wishes to sincerely acknowledge the valuable contributions to the review of this Assessment and Training Package by the following persons, Institutions and organisations:

- Members of the DIT Industrial Training Council,
- The Director and staff of DIT,
- Ministry of Education and Sports,
- The practitioners from the world of work,
- Teachers of Metal Works from various Secondary Schools,
- Sheet Metal Works Curriculum Specialists from NCDC,
- Examination Specialists from UNEB,
- The facilitators involved in guiding the review panel in their activities,
- The Government of Uganda for financing the review of this ATP.

# Abbreviations and Acronyms

A&C	Assessment and Certification
ATP	Assessment and Training Packages
CBET	Competency Based Education and Training
DIT	Directorate of Industrial Training
ITC	Industrial Training Council
GoU	Government of Uganda
LWA	Learning-Working Assignment
MC	Modular Curriculum
MoES	Ministry of Education and Sports
OP	Occupational Profile
PEX	Practical Exercise
PTI	Performance (Practical) Test Item
QS	Qualification Standards
RPL	Recognition of Prior Learning
TIB	Test Item Bank
TVET	Technical, Vocational Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item

## Key Definitions

- Assessment Assessment is the means by which evidence is gathered and judged to decide if an individual has met the stipulated assessment standards or not. Testing is a form of formal assessment.
- **Certification** Certification is a formal procedure to issue a certificate (qualification) to an individual that has demonstrated during formal assessment that he/she is competent to perform the tasks specified in the occupational profile.
- **Competence** Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.
- **Competency** (Occupational) competency is understood as the ability to perform tasks common to an occupation to a set standard.
- **CBET** Competence-based education and training means that programs:
  - 1. have content directly related to work
  - 2. focus is on 'doing something well'
  - 3. assessment is based upon industry work standards, and
  - 4. curricula are developed in modular form
- **Duty** A Duty describes a large area of work in performance terms. A duty serves as a title for a cluster of related Tasks (see also: TASK).

Learning-<br/>WorkingLWA are simulated or real job situations / assignments that are<br/>suitable for learning in a training environment (e.g. "small projects").Assignment<br/>(LWA)In a working environment LWAs are real work situations<br/>/assignments.

- **Modules** Modules are part(s) of a curriculum. Modules can be considered as "self-contained" partial qualifications which are described by learning outcomes or competencies and which can be assessed and certified individually.
- Occupational<br/>Profile (OP)An Occupational Profile is an overview of the duties and tasks a job<br/>incumbent is expected to perform competently in employment.<br/>Occupational Profiles developed by practitioners from the world of<br/>work enhance the relevance of training and learning to the<br/>requirements of the world of work.

Occupational Profiles define what a person is supposed to do in performance terms. It also contains generic information regarding related knowledge and skills, attitudes/behavior, tools, materials and equipment required to perform as well as trends/ concerns in the occupation.

Occupational profiles are the reference points for developing modular curricular and assessment standards.

- **Qualification** A qualification is a formal recognition for demonstrating competence, based on formal assessment against set standards. A qualification is provided to the individual in form of a certificate specifying the nature of the competence.
- **Task** Job tasks represent the smallest unit of job activities with a meaningful outcome. Tasks result in a product, service, or decision. They represent an assignable unit of work and have a definite beginning and ending point. Tasks can be observed and measured. (*Also see: Duty*)

# 1.0 ATP-PART I

# **Occupational Profile for a SHEET METAL FABRICATOR**

- 1.1 The OCCUPATIONAL PROFILE (OP) for "Sheet Metal Fabricator" below defines the **Duties** and **Tasks** a competent Sheet Metal Fabricator is expected to perform in the world of work (on the job) in Uganda and the East African region today.
- 1.2 Since it reflects the skill requirements of work life, the Occupational Profile is the reference document for the subsequent development of training modules and assessment instruments (test items) which are directly relevant to employment in Ugandan and the East African businesses and industries.
- 1.3 To ensure that the Occupational Profile is relevant for employment in Uganda and East Africa, the DIT used the method of "occupational/job profiling.

This approach involves the brainstorming of a panel of 8 to 12 competent job practitioners guided by trained and experienced facilitators. During a two-day workshop the panelists defined the duties and tasks performed in employment, as well as the prerequisite skills, knowledge, attitudes, tools and equipment, and the future trends and concerns in the occupation/job.

1.4 The panelists, facilitators and coordinators who participated in developing this Occupational Profile are listed on the following page.

<sup>1</sup> The DACUM-method was used. DACUM is an acronym for 'Develop A Curriculum'

#### Job Expert Panel

Kintu Robert Jinja black Smith Saving and Credit Co-operative

Waiswa Nelson Lugogo V.T.I

Alio Peter Mengo S.S

Sebunya Steven B.M.A Metal Fabricators

Bwambale Wesley Nakawa V.T.I

**Nyesiga Wallace Rukatu** Mbarara High School

**Tubugwasi Yonna James** Ntinda V.T.I

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Baliraba Elizabeth Directorate of Industrial Training

**Funded by** The Government of Uganda



THE REPUBLIC OF UGANDA Ministry of Education and Sports

**Directorate of Industrial Training** 

# **Occupational Profile**

For a

## "SHEET METAL FABRICATOR"

Reviewed by: Qualifications Standards Department of the Directorate of Industrial Training

Date of workshop:14<sup>th</sup> –18<sup>st</sup> September, 2020

### NOMENCLATURE FOR THE OCCUPATION OF A SHEET METAL FABRICATOR

### **Definition of a Sheet Metal Fabricator**

This is a person who re-shapes sheet metal into desired products for commercial purposes.

## JOB ORGANISATION CHART FOR SHEET METAL FABRICATOR



### Descriptions for the levels in the occupation of 'Sheet metal fabricator'

- **UVQ Level I:** A sheet metal fabricator is a person who re-shapes sheet metal into simple desired products using basic tools and equipment under maximum supervision.
- **UVQ Level II:** A sheet metal fabricator is a person who is capable of using semiautomated tools and equipment to re-shapes sheet metal into complex products under maximum super vision.
- **UVQ Level III:** A sheet metal fabricator is a person who is capable of using automated tools and equipment to design and plan sheet metal into more complex products with or without supervisions.

# **Duties and Tasks**

A. PLAN WORK A1	A1 Carryout site investigation	A2 Prepare work schedule	A3 Determine financial resources
	A4 Identify design	A5 Identify materials, tools and equipment	A6 Prepare budgets
	A7 Select materials, tools and equipment	<b>A8</b> Determine layout	A9 Adhere to regulations

B. ESTABLISH WORKSHOP	B1 Select site	B2 Secure site	<b>B3</b> Prepare site
	<b>B4</b> Set up structures	<b>B5</b> Procure materials, tools and equipment	<b>B6</b> Install equipment
	<b>B7</b> Store tools and equipment		

C. MANAGE WORKSHOP	C1 Organise work shop	C2 Assign work	C3 Supervise performance
	C4 Control materials, tools and equipment	C5 Check product quality	C6 Conduct meetings
	C7 Monitor security	C8 Label tools, materials and equipment	

D. MAINTAIN WORKSHOP	D1 Develop maintenance schedule	D2 Service tools, materials and equipment	D3 Repair tools, materials and equipment
	D4 Replace tools, materials and equipment	D5 Store materials, tools and equipment	D6 Clean workshop
	D7 Inspect work shop	D8 Sort off cut	

E. FABRICATE PRODUCTS	E1 Select materials	E2 Prepare material	E3 Confirm measurements
	E4 Grip metal	E5 Cut materials	E6 Notch materials
	E7 Bend material	E8 Check measurements	<b>E9</b> De-burr materials
	E10 Join materials		

F. PERFORM FINISHING	F1 Grind surface	F2 Sand surface	F3 Fill surface
	F4 Clean surface	<b>F5</b> Prime surface	F6 Apply spray

G. MARKET PRODUCT	G1 Label products	G2 Brand products	G3 Package products
	G4 Price products	G5 Advertise product	<b>G6</b> Display products
	G7 Sell products	<b>G8</b> Deliver products	<b>G9</b> Would involve a simple report as a feed back

H. PERFORM ADMINISTRATIVE TASKS	H1 Recruit workers	H2 Orient workers	H3 Train workers
	H4 Acquire license operational	H5 Assign duties	H6 Keep business records
	H7 Appraise workers	H8 Supervise works	H9 Manage finance
	H10 Set policies	H11 Prepare reports	H12 Motivate workers
	H13 Pursue continuous professional development		-

I. PERFORM OCCUPATIONAL HEALTH,	11	Administer first aid	12	Wear protective gear	13	Practice fire fighting
SAFETY AND ENVIRONMENTA L PROTECTION PRACTICES	14	Waste management	15	Display safety signs	16	Demarcate path ways
	17	Install safety guards	18	Sensitise workers on occupational hazards	19	Enforce SOPs

## **Additional Information**

#### Related knowledge & skills

- 1. Skills of selecting proper tools
- 2. Resource mobilisation
- 3. Work holding
- 4. Grinding skill
- 5. chiseling skills
- 6. Guidance and counseling
- 7. Interpreting technical information
- 8. Paint and paint mix
- 9. Bolting and bolting equipment
- 10. Riveting and riveting materials

- 11. Creative and innovative
- 12. Ability to weld
- 13. Communication skills
- 14. Soldering skills
- 15. Skills of public relations
- 16. Skills of bending
- 17. Skills of chiseling
- 18. Resource mobilisation
- 19. Human resource management

#### Attitudes / Traits / Behaviour

- 1. Friendly
- 2. Committed
- 3. Team spirit
- 4. Calm
- 5. Decent
- 6. Customer friendly
- 7. Self-motivated
- 8. Faithful and trustworthy
- 9. Teachable
- 10. Analytical
- 11. Cooperative
- 12. A good listener
- 13. Honest
- 14. Social
- 15. Strategic
- 16. Meets deadlines
- 17. Resourceful
- 18. Team player
- 19. Flexibility
- 20. Tolerant
- 21. Result oriented
- 22. Team work
- 23. Committed
- 24. Positive attitude
- 25. Practical
- 26. Integrity

### **Future Trends and Concerns**

- 1. Provide relent training
- 2. Integrate computer aided related fabrication skills/drawings
- 3. UBOS should collaborate in
- 4. Government should reduce on the prices of materials
- 5. Price fluctuation
- 6. Quality production
- 7. Updated in the changes
- 8. Continuous professional development
- 9. High industrial demands
- 10. Need for value addition
- 11. Lack of equipment
- 12. Lack of infrastructure
- 13. Lack of awareness
- 14. Public private partnership
- 15. Memorandum of understanding (collaboration
- 16. Lack of formal curriculum for sheets metals(NCDC)
- 17. Worker insurance
- 18. Need for value addition
- 19. Involve industrial sectors
- 20. Lack of enough trained personnel for sheet metal

#### **Tools, Equipment and Material**

- 1. Soldering kit
- 2. Avil
- 3. Pliers
- 4. Spray gun
- 5. Screw driver
- 6. Cutter
- 7. Drilling machines
- 8. Allen keys
- 9. Vice
- 10. Blowers
- 11. Hack saws
- 12. Magnets
- 13. Helmet
- 14. Hammer
- 15. Spanners
- 16. Clamps
- 17. Files of various sizes / types
- 18. Brushes
- 19. Rivet gun
- 20. Spot machine
- 21. Mallet
- 22. Trammel
- 23. Dividers
- 24. Chisel
- 25. Rollers
- 26. Flat bars
- 27. Searing machine
- 28. Bender
- 29. Groves
- 30. Compressor

- 31. Die
- 32. Gas cylinder
- 33. Welding machine
- 34. Grinder
- 35. Center punch
- 36. Square campus
- 37. Tape measure
- 38. Vanier caliper
- 39. Lenz cutters/ tools
- 40. Slide rule
- 41. Micrometer screw gauge
- 42. Round pipes
- 43. Channel bars
- 44. Sand paper
- 45. Scribers
- 46. Pens.
- 47. Chalk
- 48. Markers
- 49. Pencil
- 50. Steel rule
- 50. Steel Tule
- 51. Square pipe
- 52. Speed cutter
- 53. Vibral shear
- 54. Screw press
- 55. Corner shear,
- 56. Geometrical set
- 57. Manila paper.

# 2.0 ATP – PART II

# **Training Modules for a SHEET METAL FABRICATOR**

- 2.1 A curriculum is a "guide /plan for teaching and learning" which provides a guide to teachers, instructors and learners. In the envisaged system of competencebased or outcome-oriented education and training (CBET), Curricula are no longer the benchmark against which assessment is conducted. It is rather the Occupational Profile that provides the benchmark for Curriculum development as well as assessment.
- 2.2 This modular format of the curriculum allows learners of Sheet metal fabricator to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing learners to move directly into an entry level job, do further modules and advance to higher levels of training. Modular courses allow more learners to access the training system because training centres, as well as companies can accommodate more learners in a given period of time.
- 2.3 The modules were reviewed jointly by both instructors and job practitioners. They were developed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes.
- 2.4 The modules contain "Learning-Working Assignments" (LWAs) and related "Practical Exercises" (PEXs) as key elements.

LWAs are simulated or real job situations/assignments that are suitable for learning in a training environment (e.g. "small projects"). In a working environment, LWAs are real work situations.

PEXs are therefore sub-sets of a LWA.

2.5 In principle, and following the philosophy of Competence-Based Education and Training (CBET), the modules can be used as a guide for learning in a training Centre, at the workplace; or a combination of both.

## Who is a Sheet Metal Fabricator Qualification Level 1?

A Sheet Metal Fabricator Level 1 is a person who shapes sheet metal in to simple desired products using basic tools and equipment under maximum supervision.

Code	Module Title	Average duration		
		Contact hour BFs	Weeks	
UE/SMF/M1.1	Establish Workshop	40	1	
UE/SMF/M1.2	Manage Workshop	80	2	
UE/SMF/M1.3	Make shapes from sheet metal	320	8	
UE/SMF/M1.4	Perform Joining	320	8	
UE/SMF/M1.5	Perform Panel Beating	320	8	
UE/SMF/M1.6	Perform Finishing	160	4	
UE/SMF/M1.7	Perform Basic Entrepreneurship Skills	40 1		
Summary	7 Training modules	1280 hours 32 weeks		

## TRAINING MODULES FOR A SHEET METAL FABRICATOR UVQ LEVEL 1

### Note: Average duration is contact time but NOT calendar duration

It is assumed that:

- 1 day is equivalent to 8 hours of nominal learning and
- 1 month is equivalent to 160hours of nominal learning

Information given on the average duration of training should be understood as a guideline. Quick learners may need less time than indicated or vice versa.

At completion of a module, the learner should be able to satisfactorily perform the included Learning Working Assignments, their Practical exercises and attached theoretical instructions, as the minimum exposure.

Prior to summative assessment by recognised agencies, the users of these Modules Guides are encouraged to carefully consider continuous assessment using samples of (or similar) performance (practical) and written test items available in part 3 of this ATP.

Code	UE/SMF/M1.1
Module title	M 1.1: Establish Workshop
Related Qualification	Part of Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1)
Qualification Level	1
Module purpose	After completion of this module, the trainee shall be able to start up sheet metal work shop
Learning-Working Assignments (LWAs)	LWA 1/1: Set up Structure LWA 1/2: Install Equipment LWA 1/3: Prepare Fabricating Material LWA 1/4: Perform Occupational Health, Safety and Environmental Protection Practices Note:
	<ol> <li>The learning exercises may be repeated until the trainee acquires targeted competence;</li> <li>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> <li>Order of execution may vary.</li> </ol>
Related Practical Exercises (PEXs)	LWA 1/1: Set up StructuresPEX 1.1: Select sitePEX 1:2: Draft work shop plan and layoutPEX1.3: Select tools and equipmentPEX1.4: Prepare sitePEX1.5: Construct structuresLWA 1/2: Install EquipmentPEX 2.1: Source tool and equipment
	PEX 2.2: Transport equipment PEX 2.3: Position equipment PEX 2.4: Test equipment <b>LWA 1/3: Prepare Fabricating Materials</b> PEX 3.1: Source materials PEX 2.2: Transport materials
	PEX 3.3: Store materials

	LWA 1/4: Perform Occupational Health, Safety and Environmental Protection Practices
	PEX 4.1: Perform firefighting
	PEX 4.2: Wear protective gear
	PEX 4.3: Manage waste
	PEX 4.4: Obtain first aid
	PEX 4.5: Maintain general hygiene
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge	For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:
	Creative and innovative
	Interpreting technical information
	Personnel protective gears
	Tools and equipment usage
	First aid kit and its components
	Human resource management
	Operating basic equipment
	Time management
Average duration of learning	40 hours (5 days) of nominal learning suggested to include:
	2 days of occupational theory and
	3 days of occupational practice
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank.
Minimum required tools/ equipment/ implements or equivalent	pick axe, slashers, timber, panga, bow saw, handsaw, spades, hoes, nails, iron sheets, bricks, sand, cement, DPC, wheel barrow, square, steel rule, spanners (open, ring, ring fix), vehicle, fork lift, crane, rolling bars, wedges, blocks, fire extinguisher, first aid kit, padlock, painting brush, computer, calculator, telephone

Minimum required materials and consumables or equivalent	basic scholastic materials (books, pens, book shelves, desk, chair, files)
Special notes	Conduct oral interviews with practitioners

Code	UE/SMF/M1.2
Module title	M1.2: Manage Workshop
Related Qualification	Part of Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1)
Qualification Level	1
Module purpose	After completion of this module, the trainee shall be able to manage a sheet metal workshop effectively
Learning-Working Assignments (LWAs)	<ul> <li>LWA 2/1: Organise Workshop</li> <li>LWA 2/2: Maintain Structure, Tools and Equipment</li> <li>LWA 2/3: Perform Occupational Health, Safety and Environmental Protection Practices</li> <li><u>Note:</u></li> <li>1. The learning exercises may be repeated until the trainee acquires targeted competence;</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each</li> </ul>
Related Practical Exercises (PEXs)	Image: Second and Second
	PEX 1.3: Arrange tools and equipment         LWA 2/2: Maintain Structure, Tools and Equipment         PEX 2.1: Inspect work place         PEX 2.3: Repair tools and equipment         PEX 2.4: Repair structures         PEX 2.5: Re-label tools and equipment         PEX 2.6: Lubricate tools and equipment
	LWA 2/3: Perform Occupational Health, Safety and Environment Protection Practices PEX 3.1: Perform firefighting PEX 3.2: Wear protective gear PEX 3.3: Manage waste PEX 3.4: Observe health and safety regulations PEX 3.5: Administer first aid PEX 3.6: Display safety rules and regulation
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.

Pre-requisite modules	None
Related knowledge/ theory	<ul> <li>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</li> <li>Record all safety hazards during the day</li> <li>Time management</li> <li>First aid kit and its components</li> <li>Handling tools and equipment</li> <li>Report accidents</li> <li>Assign duties</li> </ul>
Average duration of learning	<ul> <li>80 hours (10 days) of nominal learning suggested to include:</li> <li>3days of occupational theory and</li> <li>7 days of occupational practice</li> </ul>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	brushes, brooms, slashers, dustpans, dustbin, waste bins, oil can, wire brush, pair of pliers, spanners (open, ring and fix ring), adjustable spanners, circlip, wire cutter, gloves, apron, helmet, goggles, hammers, bowsaw, handsaw, hacksaw, ladder, nails, pair of snips, computer, calculator, telephone
Minimum required materials and consumables or equivalent	lubricants, oil, paint, glue, basic scholastic materials (books, pens, book shelves, desk, chair, files)
Special notes	Conduct oral interviews with practitioners

Module title       M1.3: Make Shapes from Sheet Metal         Related Qualification       Part of Uganda Vocational Qualification (Sheet metal fabricator UVQ 1)
Related       Part of         Qualification       Uganda Vocational Qualification         (Sheet metal fabricator UVQ 1)
Qualification Level 1
Module purposeAfter completion of this module, a trainee shall be able to make basic/simple shapes out of sheet metal effectively
Learning-Working Assignments (LWA 3/2: From Cubical ShapesLWA 3/2: From Cubical ShapesLWA 3/3: Form Conical Shapes
LWA 3/4: Form Pyramidal Shapes
LWA 3/5: Perform Occupational Health, Safety and Environmental Protection Practices
Note:
1. The learning exercises may be repeated until the trainee acquires targeted competence;
2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.
Related Practical LWA 3/1: Form Cylindrical Shapes
Exercises (PEXs) PEX 1.1: Sketch design
PEX 1.2: Draw to dimensions
PEX 1.3: Measure and mark
PEX 1.4: Confirm measurements
PEX 1.5: De-burr work pieces
PEX 1.6: Roll work piece
PEX 1.7: Check dimension
LWA 3/2: Form Cubical Shapes
PEX 2.1: Sketch shapes
PEX 2.2: Draw to dimension
PEX 2.3: Confirm measurements
PEX 2.4: Cut out work pieces
PEX 2.5: Notch work pieces
PEX 2.6: De-burr work pieces
PEX 2.7. Bend work pieces

	LWA 3/3: Form Conical Shapes
	PEX 3.1: Sketch shapes
	PEX 3.2: Draw to dimension
	PEX 3.3: Measure and mark
	PEX 3.4: Confirm measurements
	PEX 3.5: Trim work pieces
	PEX 3.6: Roll work piece
	PEX 3.7: Check dimensions
	LWA 3/4: Form Pyramidal Shapes
	PEX 4.1: Sketch shapes
	PEX 4.2: Draw to dimensions
	PEX 4.3: Measure and mark
	PEX 4.4: Confirm measurements
	PEX 4.5: Notch work pieces
	PEX 4.6: De-burr work pieces
	PEX4.7: Check dimensions
	LWA 3/5: Perform Occupational Health, Safety and Environmental Protection Practices
	PEX 5.1: Use protective gears
	PEX 5.2: Wear protective gear
	PEX 5.3: Administer first aid
	PEX 5.4: Manage waste
	PEX 5.5: Clean tools and equipment
	PEX 5.6: Perform firefighting
	PEX 5.7: Store tools and equipment
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:
	Basic mathematical concepts
	Basic geometrical drawings
	Behaviour of materials
	Sheet metal sizes
	Types of sheet metal sizes
	Tools and equipment for soldering
	Measuring and marking

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Average duration of learning	<ul> <li>320 hours (40 days) of nominal learning suggested to include:</li> <li>10 days of occupational theory</li> <li>30 days of occupational practice</li> </ul>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	steel rule, square pipe, speed cutter, vibral shear, screw press, corner shear, geometrical sett, hammer, chisel, pair of snip, punch, wire brush, pliers, tape measure, square, scriber, file, compass screw driver, bending channel.
Minimum required materials and consumables or equivalent	drawing paper, galvanised sheets, stainless steel, aluminum sheets, copper sheets, zinc sheets, brass sheets, mild steel sheets, masks, filler paste, silicon, bolts, nuts, flux, solder, magnesium rods, gas rods, gas, sand paper
Special notes	Demonstrations can be done using manila paper before embarking on real sheet mental (for accuracy and quality)

Code	UE/SMF/M1.4
Module title	M1.4: Perform Joining
Related Qualification	Part of Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1)
Qualification Level	1
Module purpose	After completion of this module, a trainee shall be able to perform joining on sheet metal using the basic methods effectively.
Learning-Working Assignments (LWAs)	<ul> <li>LWA 4/1: Apply Solder</li> <li>LWA 4/2: Fix Rivets</li> <li>LWA 4/3: Fix Bolts and Nuts</li> <li>LWA 4/3: Fix Bolts and Nuts</li> <li>LWA 4/4: Apply Brazing</li> <li>LWA 4/5: Make Seams</li> <li>LWA 4/6: Perform Occupational Health, Safety and Environmental Protection Practices</li> <li>Note:</li> <li>1. The learning exercises may be repeated until the trainee acquires targeted competence;</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ul>
Related Practical Exercises (PEXs)	LWA 4/1: Apply SolderPEX 1.1: Select materials and toolsPEX 1.2: Clamp work piecePEX 1.3: Clean work piecePEX 1.4: Apply fluxPEX 1.5: Place solder wirePEX 1.6: Tack work piecesPEX 1.7: Check dimensionsPEX 1.8: Heat work piecePEX 1.9: Clean work piecePEX 1.10: Polish work placeLWA 4/2: Fix RivetsPEX 2.1: Select tools and materialsPEX 2.2: Prepare tools and materialsPEX 2.3: Measure and mark pointsPEX 2.4: Centre punchPEX 2.5: Drill work piecePEX 2.6: De-burr work piecePEX 2.7: Insert rivetsPEX 2.8: Apply pressurePEX 2.9: Check quality of joint

LWA 4/	3: Fix Bolts and Nuts
PEX 3.	1: Select tools and Materials
PEX 3.2	2: Prepare tools and materials
PEX 3.3	3: Measure and mark
PEX 3.4	4: Centre punch
PEX 3.5	5: Drill holes
PEX 3.6	6: De-burr work piece
PEX 3.7	7: Insert bolt
PEX 3.8	3: Screw nut
LWA 4/	4: Apply Brazing
PEX 4.	1: Select tools and materials
PEX 4.2	2: Prepare tools and equipment
PEX 4.3	3: Measure and mark
PEX 4.4	4: Clamp work piece
PEX 4.5	5: Clean surfaces
PEX 4.6	5: Dip filler wire in the heat
PEX 4.	7: Apply heat on the work piece
PEX 4.8	3: Tack work pieces
PEX 4.9	9: Leave to cool
PEX 4.	10: Clean surface
PEX 4.	11: Test quality
LWA 4/	5: Make Seams
PEX 5.	1: Select tools and materials
PEX 5.2	2: Prepare tools and materials
PEX 5.3	3: Confirm measurements
PEX 5.4	4: Grip work piece
PEX 5.	5: De-burr work piece
PEX 5.0	5: Fold work piece
PEX 5.	7: Fit work piece
PEX 5.8	3: Straighten work pieces
PEX 5.9	9: Apply pressure
PEX 5.	10: Check dimensions
LWA 4/	6: Perform Occupational Health, Safety and Environmental Protection Practices
PEX 6.1	1: Display safety notice
PEX 6.2	2: Wear protective gear
PEX 6.3	3: Administer first aid
PEX 6.4	4: Manage waste
PEX 6.9	5: Maintain tools and equipment
PEX 6.0	6: Clean tools and equipment
PEX 6.	7: Store tools and equipment

Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<ul> <li>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</li> <li>Operating basic equipment</li> <li>Thickness of material</li> <li>Hand tools used on different materials</li> <li>Types of seams</li> <li>Knowledge of fluxes</li> <li>Knowledge of electrodes</li> <li>Basic arithmetic and trigonometry</li> <li>Nature and types of sheet metal materials</li> <li>Behavior of material towards atmospheric condition</li> <li>Basic knowledge of measuring tools</li> <li>Conversion of basic units (metric and imperial system)</li> <li>Types of lock seams/grooves</li> <li>Basic knowledge of hand tools used on different gauges of materials</li> <li>Behavior of different rivets</li> <li>Knowledge of different thickness of materials</li> <li>Knowledge of hand tools used on different gauges of materials</li> <li>Knowledge of measuring tools</li> <li>Conversion of basic units (metric and imperial system)</li> <li>Types of lock seams/grooves</li> <li>Basic knowledge of hand tools used on different gauges of materials</li> <li>Behavior of material not tools used on different gauges of materials</li> <li>Knowledge on health and safety precautions</li> <li>knowledge on mixing paint and its drying behavior</li> <li>Knowledge about personal protective gears</li> </ul>
Average duration of learning	<ul> <li>320 hours (40 days) of nominal learning suggested to include:</li> <li>10 days of occupational theory</li> <li>30 days of occupational practice</li> </ul>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	chisel, nails, pair of scissors, pliers, hammer, chisel, pair of snip, punch, wire brush, tape measure, square, scriber, file, compass screw driver, bending channel, stakes, anvil

Minimum required materials and consumables or equivalent	drawing paper, galvanised sheets, stainless steel, copper sheets, zinc sheets, brass sheets, mild steel sheets, masks, filler paste, silicon, bolts, nuts, flux, solder, magnesium rods, gas rods, gas, sand paper, soldering bit (copper), first aid kit, brooms, water.
Special notes	

Code	UE/SMF/M1.5				
Module title	M1.5: Perform Panel Beating				
Related Qualification Qualification Level	Part of Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1) 1				
Module purpose	After completion of this module, a trainee shall be able to perform panel beating on sheet metal material				
Learning-Working Assignments (LWAs)	<ul> <li>LWA 5/1: Remove the Damaged Part</li> <li>LWA 5/2: Straighten the Damaged Part</li> <li>LWA 5/3: Scrap the Straightened Part</li> <li>LWA 5/4: Perform Occupational Health, Safety and Environmental Protection Practices</li> <li><u>Note:</u></li> <li>1. The learning exercises may be repeated until the trainee acquires targeted competence;</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform</li> </ul>				
Related Practical Exercises (PEXs)	<ul> <li>LWA 5/1: Remove the Damaged Part</li> <li>PEX 1.1: Identify the damaged part</li> <li>PEX 1.2: Select tools and equipment</li> <li>PEX 1.3: Dis-assemble the damaged parts</li> <li>LWA 5/2: Straighten Damaged Part</li> <li>PEX 2.1: Identify tools for straightening</li> <li>PEX 2.2: Re-shape parts</li> <li>PEX 2.3: Cut off excess materials</li> <li>LWA 5/3: Scrap the Straightened Part</li> <li>PEX 3.1: Remove old filler for paint</li> <li>PEX 3.2: Heat again to remove paint</li> <li>PEX 3.3: Clean surface</li> </ul>				

	LWA 5/4: Perform Occupational Health, Safety and Environmental Protection Practices				
	PEX 4.1: Manage waste				
	PEX 4.2: Clean tools and equipment				
	PEX 4.3: Use personnel protective equipment				
	PEX 4.4: Store chemical, equipment and tools				
	PEX 4.5: Perform firefighting				
	PEX 4.6: Administer first aid				
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.				
Pre-requisite modules	None				
Related knowledge/ theory	<ul> <li>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</li> <li>Behavior of metals</li> <li>Identification of materials</li> <li>Heat treatment of metals</li> </ul>				
	Application of tools				
Average duration of learning	320 hours (40 days) of nominal learning suggested to include:				
_	30 days of occupational practice				
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.				
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank				
Minimum required tools/ equipment/ implements or equivalent	steel rule, square pipe, speed cutter, vibral shear, screw press, corner shear, geometrical set and manila paper.				
Minimum required materials and consumables or equivalent	sheet metal, water, sand paper				
Special notes					

Code	UE/MP/M1.6				
Module title	M1.6: Perform Finishing				
Related Qualification	Part of: Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1)				
Qualification Level	1				
Module purpose	After completion of this module, a trainee shall be able to perform finishing on sheet metal products				
Learning-Working Assignments (LWAs)	LWA 6/1: Select Tools and Equipment LWA 6/2: Apply Filler LWA 6/3 Smoothen Surface LWA 6/4: Apply Primer LWA 6/5: Paint Surface				
	<ul> <li>Environmental Protection Practices</li> <li><u>Note:</u> <ol> <li>The learning exercises may be repeated until the trainee acquires targeted competence;</li> <li>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ol></li></ul>				
Related Practical Exercises (PEXs)	LWA 6/1: Select Tools and EquipmentPEX 1.1: Identify tools and equipmentPEX 1.2: Sort tools and materialsPEX 1.3: Prepare materialsLWA 6/2: Apply FillerPEX 2.1: Identify fillerPEX 2.2: Clean surfacePEX 2.3: File fillerPEX 2.4: Sand surfacePEX 2.4: Blow dust surface				
	LWA 6/3: Smoothen SurfacePEX 3.1: Clean surfacePEX 3.2: Apply puttyingPEX 3.3: Sand surfaceLWA 6/4: Apply PrimerPEX 4.1: Mix primerPEX 4.2: Spray primerPEX 4.3: Allow to dryPEX 4.4: Wash surface				

	LWA 6/5: Paint Surface					
	PEX 5.1: Prepare tools and materials					
	PEX 5.2: Identify paint					
	PEX 5.3: Mix the paint					
	PEX 5.4: Wipe surface					
	PEX 5.5: Apply paint					
	LWA 6/6: Perform Occupational Health, Safety and Environmental Protection Practices					
	PEX 6.1: Manage waste					
	PEX 6.2: Clean tools and equipment					
	PEX 6.3: Use personnel protective equipment					
	PEX 6.4: Keep hygiene					
	PEX 6.5: Perform firefighting					
	PEX 6.6: Administer first aid					
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.					
Pre-requisite modules	None					
Related knowledge/ theory	For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:					
	Interpreting technical information					
	Time management					
	Knowledge on health and safety precautions					
	Knowledge on mixing paint and its drying Behavior					
	<ul> <li>Response of different materials towards atmospheric pressure</li> </ul>					
	Resistance of tensile stress of different materials					
	<ul> <li>Knowledge of designing and decoration.</li> </ul>					
	<ul> <li>Types of paints and oils</li> </ul>					
	<ul> <li>Types of sanding material</li> </ul>					
	Procedure of applying paints and oils					
	Procedure of sanding surfaces					
	<ul> <li>Methods of cleaning surfaces</li> </ul>					
	Procedure of filing surfaces					
	Methods for cleaning workshop equipment					
Average duration of	160 hours (30 days) of nominal learning suggested to include:					
learning	5 days of occupational theory					
	25 days of occupational practice					

Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.			
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank			
Minimum required tools/ equipment/ implements or equivalent	file, hammer, chisel, mallet, snips, paint brush, brush wire			
Special notes				

Code	UE/SMF/M1.7				
Module title	M 1.7: Perform Basic Entrepreneurship Skills				
Related Qualification	Part of Uganda Vocational Qualification (Sheet Metal Fabricator UVQ 1)				
Qualification Level	1				
Module purpose	After completion of this module, the trainee shall be able to start up a sheet metal work shop				
Learning-Working Assignments (LWAs)	LWA 7/1: Set up Enterprise LWA 7/2: Market Product LWA 7/3: Keep Records LWA7/4: Perform Occupational Health, Safety and Environmental Protection Practices				
	<ul> <li><u>Note:</u></li> <li>1. The learning exercises may be repeated until the Trainee acquires targeted competence;</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ul>				
Related Practical Exercises (PEXs)	LWA 7/1: Set up Enterprise PEX 1.1: Carryout feasibility study PEX 1.2: Source for resources PEX 1.3: Make a budget PEX 1.4: Secure work place PEX 1.5: Procure tools and materials PEX 1.6: Register enterprise				
	<ul> <li>LWA 7/2: Market Product</li> <li>PEX 2.1: Brand product</li> <li>PEX 2.2: Package product</li> <li>PEX 2.3: Price product</li> <li>PEX 2.4: Exhibit product</li> <li>PEX 2.5: Advertise product</li> <li>PEX 2.6: Transport product</li> <li>LWA 7/3: Keep Records</li> <li>PEX 3.1: Keep financial records</li> <li>PEX 3.2: Keep human resource records</li> <li>PEX 3.3: Keep health records</li> <li>PEX 3.4: Keep visitors' book</li> </ul>				

	LWA 7/4: Perform Occupational Health, Safety and					
	Environmental Protection Practices					
	PEX 4.1: Use personnel protective equipment					
	PEX 4.2: Administer first aid					
	PEX 4.3: Manage waste					
	PEX 4.4: Perform water source contamination prevention					
	PEX 4.5: Display safety signs					
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs					
Pre-requisite modules	None					
Related knowledge	For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:					
	Customer care habits					
	Communication skills					
	<ul> <li>Basic planning and management skills</li> </ul>					
	<ul> <li>Basic principles of procurement</li> </ul>					
	<ul> <li>Basic principles of stores management</li> </ul>					
	Basic principles of record keeping					
	<ul> <li>Types of records used by sheet metal fabrication</li> </ul>					
	Definition of the different types of documents used by sheet metal fabrication					
	<ul> <li>Components of different types of documents used by sheet metal fabrication</li> </ul>					
	<ul> <li>Methods of marketing electrical services</li> </ul>					
	Explain marketing					
Average duration	40 hours (5 days) of nominal learning suggested to include:					
of learning	2 days of occupational theory and					
	3 days of occupational practice					
Suggestions on	The acquisition of competencies (skills, knowledge, attitudes)					
organisation of learning	described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.					
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank.					
Minimum required tools/ equipment/ implements or equivalent	computer, calculator, telephone					

Minimum required materials and consumables or equivalent	basic scholastic materials (books, pens, book shelves, desk, chair, files)
Special notes	conduct oral interviews with practitioners

# 3.0 ATP- PART III

# **Assessment Instruments for a SHEET METAL FABRICATOR**

- 3.1 **Assessment** of occupational competence is the procedure by which evidence is gathered and judged to decide if an individual (candidate) has met the stipulated assessment standards.
- 3.2 Assessment of occupational competence should comprise of both practical (performance) testing and written (theory/knowledge) testing.
- 3.3 Based on the Occupational Profile and Training Modules, a combined panel of job practitioners and Instructors developed a substantial number of test items for assessing (practical) performance as well as items for assessing occupational knowledge (theory) all stored in an electronic Test Item Bank (TIB) at the Directorate of Industrial Training.
- 3.4 Performance (Practical) Test Items (PTI) are closely related to typical work situations in Ugandan business enterprises. They comprise of a test assignment for candidates and assessment criteria and/or scoring guides for assessors' use.
- 3.5 Written Test items (WTI) for written testing of occupational theory, (knowledge) are presented in different forms which include:
  - Short answer test items.
  - Multiple choice test items
  - Matching test items,

These WTIs herein focus on functional understanding as well as trouble-shooting typically synonymous with the world of work.

- 3.6 Composition of assessment/test papers will always require good choices of different types of WTI in order to ensure the assessment of relevant occupational knowledge required of candidates to exhibit competence.
- 3.7 The test items contained in the Test Item Bank may be used for continuous/formative assessment during the process of training as well as for summative assessment of candidates who have acquired their competences non-formally or informally.
- 3.8 In this document, samples of test items for assessing both performance (practical) and occupational knowledge (theory) of a SHEET METAL FABRICATOR are included.

## 3.9 Overview of Test Item Samples Included

No	Type of test Items	Numbers included
1.	Written (Theory)- short answer	3
2.	Written (Theory)- multiple choice	3
3.	Written (Theory)- matching with generic	2
4.	Written (Theory)- matching with work-sequence	2
5.	Performance (Practical) test items	2
Total	·	12

# WRITTEN TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 1				
Occupational Title:	Sheet Metal Fabricator				
Competence level:	Level 1				
Code no.					
Test Item type:	Short answer	$\checkmark$			
	Multiple choice				
	Matching item	Generic	Cause- Effect	Work- sequence	
Complexity level:	C1				
Date of OP:	September 2020				
Related module:	M1.4				
Time allocation:	4 minutes				

Test Item	List four methods used in joining sheet materials				
Answer spaces	(i) (ii) (iii) (iv)				
Expected key (answers)	<ul> <li>(i) Seaming</li> <li>(ii) Brazing</li> <li>(iii) Bolting</li> <li>(iv) Screwing</li> <li>(v) Soldering</li> <li>(vi) Arc welding</li> <li>(vii) Gas welding</li> <li>(viii) Spot welding</li> <li>(ix) Gluing</li> <li>(x) Riveting</li> </ul>				

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 2				
Occupational Title:	Sheet Metal Fabricator				
Competence level:	Level 1				
Code no.					
	Short answer	$\checkmark$			
	Multiple choice				
Test Item type:	Matching item	Generic	Cause- Effect	Work- sequence	
Complexity level:	C2				
Date of OP:	September 2020				
Related module:	M1.4				
Time allocation:	4 minutes				

Test Item	State two functions of flux during brazing
Answer spaces	(i) (ii)
Expected key (answers)	<ul> <li>(i) Cleans oxides</li> <li>(ii) Prevent atmospheric air</li> <li>(iii) Aid in capillary attraction</li> <li>(iv) Prevents oxidation</li> </ul>

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 3			
Occupational Title:	Sheet Metal Fabri	icator		
Competence level:	Level 1			
Code no.				
	Short answer	$\checkmark$		
Tast Itom type:	Multiple choice			
rest item type.	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.1, M1.2, M1.3, M1.4, M1.5, M1.6			
Time allocation:	3 minutes			

Test Item	Outline three safety precautions observed when handling sheet metal
Answer spaces	(i) (ii) (iii)
Expected key (answers)	<ul> <li>(i) Wear safety gears</li> <li>(ii) Use correct tools</li> <li>(iii) Observe personal hygiene</li> <li>(iv) Follow standard operating procedures</li> </ul>

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 4			
Occupational Title:	Sheet Metal Fabri	cator		
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice	$\checkmark$		
Test Item type:	Matching item	Generic Cause- Work- Effect sequence		Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	2 minutes			

Test Item	is the best tool used for marking out on a sheet metal
Distractors and correct answer	<ul><li>A. Scriber</li><li>B. Hacksaw blade</li><li>C. Hammer</li><li>D. Snip</li></ul>

Key (answer)	A
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 5			
Occupational Title:	Sheet Metal Fabr	icator		
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice	$\checkmark$		
Test Item type:	Matching item Generic Cause- Effect	Cause- Effect	Work- sequence	
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1:3			
Time allocation:	2 minutes			

Test Item	Which of the following tools is used for cutting a thin sheet metal?
Distractors and correct answer	A. Hacksaw B. Chisel C. Hand saw
	D. LINSNIP

Key (answer)	D
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 6			
Occupational Title:	Sheet Metal Fabri	cator		
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice	$\checkmark$		
Test Item type:	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1:6			
Time allocation:	2 minutes			

Test Item	is a process used to prevent rusting on sheet metal surfaces
	A. Painting
Distractors and	B. Cutting
correct answer	C. Grinding
	D. Filling

Key (answer)
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 7			
Occupational Title:	Sheet Metal Fabricator			
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice			
Test Item type:	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C3			
Date of OP:	September 2020			
Related module:	M1.4: M1.6			
Time allocation:	7 minutes			

Test Item

Match the following materials and theirimportance

	Column A (Materials)		
1	Solder		
2	Flux		
3	Spelter		
4	Paint		
5	Sand paper		
6	Thinner		

	Column B (Importance)
А	Dilute paint
В	Lubrication
С	Brazing
D	Bonding surfaces
Е	Prevents rusting
F	Remove oxides
G	Smoothening
н	Oxidising

Key (answer)	1-D, 2-F, 3-C, 4-E, 5-G, 6-A
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 8			
Occupational Title:	Sheet Metal Fabricator			
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice			
Test Item type:	Matching item	Generic	Cause- Effect	Work- sequence
		$\checkmark$		
Complexity level:	СЗ			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	3 minutes			

Test Item

Match the following tools and their functions

	Column A (Tools)
1	Tin snips
2	Folding bars
3	Clamps
4	Tape measure
5	Punch
6	Dividers
7	Bevel
8	Calipers

	Column B (Functions)
А	Chiseling
В	Transfer measurements
С	Taking measurements
D	Make drill point
Е	Cutting sheet metal
F	Drawing arc and circles
G	Check angles
н	Bonding
Ι	Holding material
J	Mark boundaries

Key (answer)	1-E, 2-H, 3-J, 4-C, 5-D, 6-F, 7-G, 8-C
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 9			
Occupational Title:	Sheet Metal Fabricator			
Competence level:	Level 1			
Code no.				
	Short answer			
Test Item type:	Multiple choice			
	Matching item	Generic	Cause- Effect	Work- sequence
				$\checkmark$
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.6			
Time allocation:	3 minutes			

Test Item	Arrange the following steps of performing finishing in
	chronological order

Column A (chronology)	Column B (work steps) in wrong chronological order	
1 <sup>st</sup>	А	Select materials and equipment
2 <sup>nd</sup>	В	Apply patty on metal surface
3 <sup>rd</sup>	С	Sand surface
4 <sup>th</sup>	D	Blow surface
5 <sup>th</sup>	Е	File filler from surface
6 <sup>th</sup>	F	Dry clean
7 <sup>th</sup>	G	Apply filler to surface
8 <sup>th</sup>	Н	Smoothen surface
9 <sup>th</sup>	I	Spray products
10 <sup>th</sup>	J	Wash surface

Key (answer)	1-A, 2-G, 3-E, 4-C, 5-D,6-B,7-H,8-J,9-F,10-I
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 10			
Occupational Title:	Sheet Metal Fabricator			
Competence level:	Level 1			
Code no.				
	Short answer			
	Multiple choice			
Test Item type:	Matching item	Generic	Cause- Effect	Work- sequence
				$\checkmark$
Complexity level:	C2			_
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	7 minutes			

Test Item         Arrange the following steps in order when making gutter	) a square
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Column A (chronology)	Column B (work steps) in wrong chronological order	
1 <sup>st</sup>	А	Grip the material
2 <sup>nd</sup>	В	Confirm measurements
3 <sup>rd</sup>	С	Square the material
4 <sup>th</sup>	D	Select the tools and equipment
5 <sup>th</sup>	Е	Measure and mark material
6 <sup>th</sup>	F	Cut the material
7 <sup>th</sup>	G	Bend the material
8 <sup>th</sup>	Н	De-burr the material

Key (answer)	1-D, 2-C, 3-E, 4-B, 5-A,6-F,7-H,8-G
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# PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 11		
Occupational Title:	Sheet Metal Fabricator		
Competence level:			
Code no.			
Test Item:	Make a dust pan by riveting. Handle dimensions (80X40) main body dimensions (250X200X50)		
Complexity level:	P2		
Date of OP:	September 2020		
Related module:	M1.3 M1.4, M1.6		
Related skills and knowledge:	<ul> <li>Selection of materials, tools and equipment</li> <li>Measuring and marking</li> <li>Cutting</li> <li>De-burring</li> <li>Notching</li> <li>Properties of materials</li> <li>Joints used in sheet metal work</li> <li>Geometric drawing concepts</li> <li>Applied mathematics</li> </ul>		
Required tools, Materials and Equipment:	mallet, tape measure, steel rule, scribers, straight edge, Riveting gun, drill bit, galvanized iron sheet, cutting snip, divider/compass, try square, soldering bit, wire brush, steel rule, machine vice, flat file, folding edge, centre punch, rivets		
Time allocation:	6 hours		
Preferred venue:	Workshop		
Remarks for candidates	<ul> <li>Observe health and safety practices</li> <li>Avoid material wastage</li> <li>No communication to candidates</li> </ul>		
Remarks for assessors	<ul> <li>Prepare work drawing</li> <li>Provide tools and materials</li> <li>Wear personnel protective equipment</li> </ul>		

#	Assessment	Scoring guide	Max S	Score
	criteria		Process	Result
1	Prepare work place	Wore protective gears Gloves		1
		Overall		1
		Helmet		1
				1
		Selected tools observed		2
		Selected material observed		2
	Measure and mark	Measured handle dimensions	1	
2		Marked accurate handle dimensions	2	
		Accurate handle dimensions observed (80X40)mm + (± 2mm) allowance		1
		Measured main body dimensions	2	
		Marked accurate main body dimensions	4	
		Accurate main body dimensions observed (250X200X50)mm		2
		Marked location of holes	2	
3	Cut out marked	Cut out the handle material	2	
	pieces	Accurate cut handle material observed	1	
		Cut out main body material	3	
		Accurate cut main body material observed		4
		Notched the work piece	2	
		Notched work piece observed		2
		Drilled required holes on the work piece	2	
		Accurate drilled holes observed		4
		De-burred work piece surface	2	
		De-burred work piece surfaces observed		2
4	Folding	Folded faces	3	
		Folded faces observed		2
		Folded straight flanges	2	
		Folded straight flanges observed		2
		Folded safe edges on both handle and main body work piece	3	
		Folded safe edges observed		2

5	Perform joining	Inserted rivets in the holes	2	
		Applied correct pressure	4	
		Firmly fixed rivets observed		2
6	Perform finishing	Polished rivets' surfaces	2	
		Polished rivet surfaces observed		2
	TOTAL		39	33
	Maximum score(Y)	X/Y		

DIT/ QS	Test Item Database	
	Written (Theory) Test Item- no. 12	
Occupational Title:	Sheet Metal Fabricator	
Competence level:	Level 1	
Code no.		
Test Item:	Make sauce pan dimensions (300x0.8)mm by soldering	
Complexity level:	P2	
Date of OP:	September 2020	
Related module:	M1.2 and M.4	
Related skills and knowledge:	<ul> <li>Interpretation of working drawing</li> <li>Measuring and marking</li> <li>Cutting</li> <li>De-burring</li> <li>Folding</li> <li>Bending</li> <li>Soldering</li> <li>Tinning</li> <li>Applied mathematics</li> <li>Application of tools</li> </ul>	
Required tools, Materials and Equipment:	Snip, tape measures, steel ruler, scriber, soldering bit Flux, solders, galvanised iron sheets (0.8)mm	
Time allocation:	4 hours	
Preferred venue:	work shop	
Remarks for candidates	<ul> <li>Observe health and safety practices</li> <li>Avoid material wastage</li> <li>No communication to candidates</li> </ul>	
Remarks for assessors	<ul> <li>Prepare working drawing</li> <li>Provide tools and materials</li> <li>Wear personal protective equipment</li> </ul>	

#	Assessment	Scoring guide	Max Score	
	criteria		Process	Result
1 Prepare work place		Wore protective gears		1
		Gloves		1
		Safety boots		1
		Helmet		1
		Ear Pads		1
		Selected materials observed		2
		Selected tools observed		2
2	Measure and mark	Measured handle dimension(180x50x0.8)mm	1	
		Marked handle dimension observed		2
		Measured surface cover diameter (312x0.8)mm	2	
		Measured surface cover observed		2
3	Cut out marked	Cut marked pieces	2	
	pieces	Cut marked pieces observed		4
		De-burred work pieces	2	
		Smoothened edges of work pieces Observed		3
4	Fold and bend	Folded safe edges on work piece	3	
	work pieces	Folded safe edges on work piece observed		3
		Bent handle to 90 angles as per working drawing]	2	
		Bent handle to 90 angles observed		3
5	Perform joining	Cleaned sheet metal surface	2	
		Cleaned surfaces observed		2
		Applied flux on surface	4	
	Soldering bit heated to correct temperature	4		
		Cleaned heated soldering bit	2	
		Cleaned heated soldering bit observed		2
		Correctly applied solder wire	4	

		Quality soldered jointed observed		3
6	Perform finishing	Polished work pieces surface	2	
		Polished work pieces surfaces observed		2
	TOTAL			
	Maximum score (Y)	X/Y	32	35

# 4.0 ATP- PART IV

# INFORMATION ON DEVELOPMENT PROCESS

## 4.1 Occupational Profile Development (September 2020)

The Assessment and Training Package was exclusively reviewed by job practitioners of the Sheet Metal Fabricator occupation, Secondary school Teachers who double as examiners of Agriculture with the Uganda National Examinations Board (UNEB) and Curriculum Development Specialists working with the National Curriculum Development Centre (NCDC).

The job expert panel, guided by UVQF Facilitators reviewed duties and tasks performed and provided additional generic information regarding the occupation.

### 4.2 Training Module Development (September 2020)

Based on the reviewed <u>Occupational Profile</u> for Sheet Metal Fabricator of September 2020, Training Modules were reviewed by job practitioners, guided by UVQF Facilitators.

### 4.3 Test Item Development (September 2020)

Based on the reviewed <u>Occupational Profile</u> for Sheet Metal Fabricator of September 2020, and Training Modules of September 2020, Test Items were reviewed by combined panels of Teachers and job practitioners, guided by UVQF Facilitators.

### 4.4 Methodology

The rationale for the Assessment and Training Package development was to link Vocational Education and Training to the real world of work by bridging Occupational Standards to Training Standards through industry-led Standards-Based Assessment.

Active participation of both teachers and job practitioners' panels consolidated the development philosophy.

The panelists worked as teams in workshop settings complemented by offworkshop field research and literature review activities including international benchmarking.

ATP Part IV [Review process]

### 4.5 Development Panels

The participating panels of Job Practitioners required at for the review exercise were constituted by members from the following organisations:

Review Panel				
No.	Name	Institution/Organisation		
1.	Mr. Kintu Robert	Jinja Black Smith Savings and Credit Co-operative		
2.	Mr. Waiswa Nelson	Lugogo V.T.I		
3.	Mr. Alio Peter	Mengo Senior secondary school		
4.	Mr. Sebunya Steven	B.M.A Metal fabricators		
5.	Mr. Tubugwisa Yonnah James	Ntinda V.T.I		
6.	Mr. Nyasiga Wallace Rukatu	Mbarara High School		
7.	Mr. Mafabi peter	NCDC		
8.	Mr. Kasinga Godfrey	Ntinda V.T.I		
9.	Mr. BwambaleWesley	Nakawa V.T.I		
10.	Mr. Settabi. Joshua	Mengo Senior Secondary School		

### 4.6 Facilitator team

This Assessment and Training Package was developed by a Facilitator team listed below:

- 1. Team Leader: Ms. Mukyala Ruth, Ag Deputy Director, DIT
- 2. **Facilitators**: Ms. Tuhirirwe Doreen DE , Ms. Baliraba Elizabeth DE and Natumanya Sharon DE DIT
- 3. Data Entrants: Mr. Mawata. Grace, Nalwanga Rebecca
- 4. **Compiled by**: Baliraba Elizabeth and edited by Ms. Mukyala Ruth Ag. DD Qualification Standards Dept. DIT
- 5. **Coordinated by**: Mr Byakatonda Patrick, Ag. Director, DIT; and Ms. Mukyala Ruth Ag. DD Qualification Standards Dept. DIT

### 4.7 Reference time:

The Assessment and Training Package was compiled September 2020 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

## **References:**

- 1. A. Robinson(1979). The repair of vehicles bodies
- 2. Dickson .A (1987). The Geometry of sheet metal works. Longman
- 3. Ed Barr (2013). Professional Sheet Metal Fabrication. Motor books; illustrated edition
- 4. Ed Barr (2019). Sheet Metal shaping: Tools, skills and projects. Motor book; illustrated edition
- 5. George Love (2000). The theory and practices of metal work. Seventh edition
- 6. Paul Lawrence (2016). Sheet metal Mathematics and Geometry. First edition; Create space independent publishing platform
- 7. Shailendra Kumar. Applications in sheet metal forming: Topics in mining, metallurgy and materials engineering
- 8. Tayla Altan and Erman Tekkaya (2012). Sheet Metal Forming fundamentals
- 9. Tubal Cain (1998). Soldering and Brazing. Special interest model books
- 10. W.A.J Chapman (1978). Work shop technology Part 1



