STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILLS STANDARD)

C331-005-2:2018

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE
PENYELENGGARAAN MESIN SULAMAN INDUSTRI

LEVEL 2

JPK

JABATAN PEMBANGUNAN KEMAHIRAN
KEMENTERIAN SUMBER MANUSIA, MALAYSIA

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NATIONAL OCCUPATIONAL SKILLS STANDARD

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

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Abbreviation

1.	IEM	Industrial Embroidery Machine
2.	PPE	Personal Protective Equipment
3.	HSE	Health, Safety and Environment
4.	OEM	Original Equipment Manufacturer
5.	SOP	Standard Operating Procedure

Glossary

1. Embroidery — Embroidery is the technique of decorating apparel, fabric, or other materials with needle and thread.

2. Bobbin — A small spool of thread inside the rotary hook housing of a sewing machine. The bobbin thread forms the stitches on the underside of the garment. Bobbin thread holds the top embroidery thread to the garment. The bobbin on an embroidery machine works in the same manner and for the same purpose as on a standard sewing machine.

3. Hoop — Device made from plastic, metal, or wood that grips the fabric tightly between an inner and outer ring and attaches to the machine's pantograph. Machine hoops are designed to push the fabric to the bottom of the inner ring and hold it against the machine bed for sewing.

4. Hooping — The process where the item to be embroidered is loaded into a hoop. This hoop will later be loaded or attached to the pantograph for sewing.

5. Bobbin case — Round assembly that applies tension to the bobbin thread and holds the bobbin in the machine. The latch mechanism locks the bobbin case into the hook. It is important that the embroidery machine operator be trained to properly install the bobbin case in the machine to minimize costly repairs of the machine. After the bobbin case in properly positioned to the bobbin case holder in the hook, it should then snap on the spindle when it is fully loaded. Most embroidery machines use an "L" size bobbin and bobbin case; even though sometimes larger hook styles are used.

6. Flat Embroidery — Embroidery that is cut in panels or patches that is framed in hoops on a flat surface above the embroidery machine's hook assembly.

7. Needle Bar — Bar that carries the needle up and down so a stitch can be formed. Each embroidery machine head can have up to 15 needle bars that can be selected to form the embroidery stitch pattern.

8. Origin — The starting point of your design

9. Tension — Refers to the amount of tension applied to the threads by the sewing machine, which can be adjusted. Many embroiderers use the 2/3 Rule meaning that if you look at the underside of the embroidery after it has been stitched, that you should see approximately 2/3 needle thread to 1/3 bobbin thread. Normally this is easy to do because most embroiderers use a white bobbin thread. Loosening or tightening the needle and bobbin tensions can accomplish this. Proper machine thread tension is critical to quality

	embroidery.
10. Tubular Embroidery	Embroidery produced on a cylinder bed embroidery machine that allows tubular fabric or pre-assembled garments (i.e. sleeves). Allows sewing a part or the garment after it has been assembled, as compared to using a flatbed machine to sew fronts or sleeves prior to assembly the garment.

Acknowledgement

The Director General of DSD would like to extend his gratitude to the organisations and individuals who have been involved in developing this standard including:

i. National Skills Development Council (NSDC)
ii. Standard Technical Committee (STC)
iii. Standard Technical Evaluation Committee (STEC)
iv. Standard Development Committee (SDC)
v. Facilitator
vi. Secretariat
vii. Related Organisations

STANDARD PRACTICE

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

1. Introduction

The current embroidery industry utilises high-end technology and computer application in its operation. The various types of industrial embroidery machines, which are computer controlled and pre-programmed digital embroidery patterns are essential equipment for embroidery creation, in order to meet market demands timely and economically. Most industrial and commercial embroidery machines are specifically engineered for embroidery. The machines for industries are available in single head or multiple heads with a hooping or framing system that holds the framed area of fabric. The proper maintenance of industrial embroidery machines by competent worker is of vital importance in ensuring that these machines are safe to use, operating at optimum efficiency and producing quality output that complies with production and diverse style requirements. Maintenance jobs include machine installation, set-up, test run, periodic maintenance and repair for various types of standard and specialised industrial embroidery machines.

The demand for textile and apparel, including embroidery, is expected to further increase in the future. The growth is mainly driven by the increasing demand in the global market for high quality textiles and clothing from Malaysia, as well as the rising purchasing power in major importing countries, namely the United States (US), the European Union (EU) countries, and Canada. The industry also implemented the latest automation and technology in its manufacturing and distribution, which computerised embroidery design are among of the high demand manufactured goods in Textile and Apparel industry.

Hence, the development of competent Industrial Embroidery Machine Maintenance personnel is crucial, not only to meet the shortage of skilled workers in this industry, but also to ensure quality embroidery output that suits the high fashion and increasingly sophisticated market.

1.1. Occupation Overview

Industrial Embroidery Machine Maintenance Level 2 personnel perform maintenance based on job instructions and assist industrial embroidery machine maintenance supervisor in all maintenance work. The routine tasks for this occupation include industrial embroidery machine installation, industrial embroidery machine set-up, industrial embroidery machine test run, industrial embroidery machine periodic maintenance and repair. Industrial embroidery machine maintenance personnel work on various types of industrial embroidery machines such as Flat and Tubular Embroidery Machine that is available with Single-head or Multi-head. They are required to adhere to work order and industrial embroidery machine specifications as in user's/operating manuals, to ensure that the industrial embroidery machines are safe and ready for production. The Industrial Embroidery Machine Maintenance personnel are required to practice workplace safety, security and cleanliness at all times at the workplace.

Performing industrial embroidery machine installation, setup, test run, periodic maintenance and repair is not an easy task as the maintenance personnel are required to

maintain a high degree of concentration and attentiveness on machine operations and mechanical problems as well as to obtain output samples. Apart from these, due to the nature of the occupation, Industrial Embroidery Machine Maintenance personnel are required to possess a safety oriented mind-set and adhere to all workplace safety, security and cleanliness policies to avoid machinery, equipment and other occupational hazards.

1.2. Rationale of NOSS Development

This NOSS development is an initiative to support the high demand for skilled personnel in the embroidery industry which is facing serious shortage particularly for this job area. Currently, industrial embroidery machine maintenance personnel acquire their skills from on-the-job training in an ad-hoc manner. This NOSS provides a basis for formal and systematic training. It can also be used to certify experienced maintenance personnel. Trained and competent personnel will be able to support the activities in the embroidery industry which provides employment opportunities in the private sector and subsequently generate income for the country.

This document covers the competency standard of Industrial Embroidery Machine Maintenance (Level 2) that is presently significant in the embroidery industry. The industry observes that Industrial Embroidery Machine Maintenance is a critical job area to support the embroidery industry's skill shortage in Malaysia. Consequently, the development of this Industrial Embroidery Machine Maintenance NOSS is essential in developing skilled workers in this area.

1.3. Rationale of Occupational Structure and Occupational Area Structure

According to the Occupational Analysis (OA) findings, Industrial Embroidery Machine Maintenance is under Section C-Manufacturing and Group 331-Repair and Maintenance of Industrial Machinery and Equipment as stated in the Malaysian Standard Industrial Classification (MSIC). Figure 1.1 and 1.2 are the Occupational Structure (OS) and Occupational Area Structure (OAS) respectively showing the position of Embroidery Machine Maintenance sub-area is under the Industrial Embroidery Machine within apparel manufacturing machine maintenance job area. The panel of experts concluded that level 1 and level 2 in OAS can be shrunk due to industry employability demands, industry needs and similar functions and competency in performing required activities.

Therefore this job area starts with Level 2 as the job requires competency in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and require individual responsibility and autonomy. Most of the activities in this occupation involve various types of industrial embroidery machines which are automated and computerised. The operation of these sophisticated machines needs to be done by skilled personnel at Level 2. Equipped with the knowledge and skills in machine operations, maintenance, work safety and regulatory/statutory requirements, and with additional support from a Level 3 supervisor, they will be able to carry out their job functions effectively and satisfactorily.

1.4. Regulatory/Statutory Body Requirements Related to Occupation

None

1.5. Occupational Pre-Requisite

Not colour blind

2. Occupational Structure (OS)

Section	(C) Manufacturing		
Group	(331) Repair and Maintenance of Industrial Machinery and Equipment		
Area	Apparel Manufacturing Machine Maintenance		
	Industrial Sewing Machine	Industrial Embroidery Machine	Plant And Facility
Level 5	Apparel Manufacturing Machine Maintenance Manager		
Level 4	Industrial Sewing Machine Maintenance Assistant Manager	Industrial Embroidery Machine Maintenance Assistant Manager	Plant And Facility Maintenance Assistant Manager
Level 3	Industrial Sewing Machine Supervisor	Industrial Embroidery Machine Maintenance Supervisor	Plant & Facility Supervisor
Level 2	Industrial Sewing Machine Senior Technician	Industrial Embroidery Machine Maintenance Senior Technician	Maintenance Senior Technician
Level 1	Industrial Sewing Machine Technician	Industrial Embroidery Machine Maintenance Technician	Maintenance Technician

Figure 1: Occupational Structure

3. Occupational Area Structure (OAS)

Section	(C) Manufacturing		
Group	(331) Repair and Maintenance of Industrial Machinery and Equipment		
Area	Apparel Manufacturing Machine Maintenance		
	Industrial Sewing Machine	Industrial Embroidery Machine	Plant and Facility
Level 5	Maintenance Management		
Level 4	Maintenance Planning & Control		
Level 3	Industrial Sewing Machine Maintenance Supervision	Industrial Embroidery Machine Maintenance Supervision	Plant & Facility Supervision
Level 2	Industrial Sewing Machine Maintenance	Industrial Embroidery Machine Maintenance	Maintenance Operation
Level 1	Embedded to L2	Embedded to L2	Embedded to L2

Figure 2: Occupational Area Structure

4. Definition of Competency Levels

The NOSS is developed for various occupational areas. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Level 1: Competent in performing a range of varied work activities, most of which are routine and predictable.

Level 2: Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and require individual responsibility and autonomy.

Level 3: Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.

Level 4: Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.

Level 5: Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

5. Award of Certificate

The Director General may award, to any person upon conforming to the standards, the following skills qualifications as stipulated under the National Skills Development Act 2006 (Act 652):

- Malaysian Skills Certificate
- Statements of Achievement

6. Occupational Competencies

The Industrial Embroidery Machine Maintenance Level 2 personnel are competent in performing the following core competencies:

a. Industrial Embroidery Machine Installation
b. Industrial Embroidery Machine Set Up
c. Industrial Embroidery Machine Test Run
d. Industrial Embroidery Machine Periodic Maintenance
e. Industrial Embroidery Machine Repair

7. Work Conditions

The Industrial Embroidery Machine Maintenance personnel should be able to work in a variety of situations. For the personnel in production industry, they will be working in shifts and may be required to extend their working hours (overtime) as required by their employers particularly during peak production periods. In other situations, they are required to travel to the client's premises to support maintenance activities.

They are expected to work in a factory environment and as such, are required to be disciplined in meeting deadlines and observe the company's Safe Work Procedures (SWP). Good eyesight (non-colour blind) is needed for visual inspection during set up, maintenance and repair of industrial embroidery machines.

It is mandatory for Industrial Embroidery Machine Maintenance personnel to wear personal protective equipment (PPE) such as mask, safety shoes and earplugs while performing the job. They are not allowed to wear conductive articles of jewellery and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalised aprons, cloth with conductive thread, or metal headgear) to avoid accidents. The Industrial Embroidery Machine Maintenance personnel must be able to maintain a high degree of alertness at all times while handling machines, equipment and threads.

8. Employment Prospects

Textiles and apparels are expected to remain important export products for Malaysia. The contribution of the industry to the national economy will remain significant, in terms of

investments and export earnings. The industry is expected to attract total investment of RM13.7 billion. Investment are projected to increase in the textiles sub-sector, mainly for the manufacture of synthetic textiles and functional fabric. The export are targeted to grow at 5.8 per cent, from RM13.4 billion in 2010 to RM24 billion in 2020. The increase in exports will be contributed by the textiles sub-sector, particular yarns and woven fabric.[1]

According to the Malaysian Investment Development Authority (MIDA) report, the textile and apparel industry currently employs over 68,000 workers across more than 970 registered garment and textile factories in the country, of which over 400 are making ready-made garments, and the rest are operating in major sub-sectors including polymerisation, spinning, weaving, knitting and wet processing, and textile accessories. In 2015, Malaysia's textile and apparel industry was one of the top ten largest export earners in the country, with an export value reaching RM 13.2 billion, representing 1.7% of Malaysia's total exports of manufactured goods. The latest figure shows that Malaysia's textile and apparel exports increased 10% from the same period in the previous year to RM 6.99 billion (US$ 1.7 billion) in the first half of 2016.[2]

The textile and apparel industry, including the embroidery industry, is an important industry to the Malaysian economy. The Malaysian exports of textile and apparel industry for the year 2011 totalled RM10.8 billion while imports amounted to RM6.6 billion. In 2011, the textile and apparel industry was the tenth largest export earner, contributing approximately 1.6% to Malaysia's exports and 2.3% to Malaysia's total exports of manufactured goods. Due to its importance, the availability of trained manpower is a key issue for the textile and apparel industry.

A large portion of the textile and apparel industry has low technical support particularly industrial embroidery machine technicians. The availability of competent technicians is highly important for the growth of this industry and the country.

Upon completion of the Competency Units (Core), other related occupations with respect to employment opportunities are:

- Industrial Embroidery Machine Maintenance Trainer and Coach
- Industrial Embroidery Machine Sales Personnel
- Industrial Embroidery Product Consultant

Other related industries with respect to employment opportunities are:

- Education (Fashion and Design)
- Embroidery house/Boutique
- Industrial Embroidery Machine Merchandising
- Tailoring

[1] http://www.mkma.org/Notice%20Board/Oct2006%20-%20IMP3.htm, 13/6/2017, 11.00am
[2] https://www.bizvibe.com/blog/malaysias-textile-apparel-industry-expects-another-strong-year-growth/, 13/6/17, 11.00am

9. Up Skilling Opportunities

As for career advancement, most competent technicians learn their craft on the job. They usually begin as qualified industrial embroidery machine maintenance technician and gradually learn new skills as they gain experience. Further certification may increase their chances of career advancement. Thus, with additional formal training/education and certification, the experienced and competent industrial embroidery machine maintenance technician can advance to become a senior technician and even up to Maintenance Manager.

10. Organisation Reference for Sources of Additional Information

The following organisations can be referred as sources of additional information which can assist in defining the document's contents.

a. Malaysian Textile and Apparel Centre (MATAC)
C-9-4, Megan Avenue 1
189, Jalan Tun Razak
50400 Kuala Lumpur, Malaysia

Tel. : 603-2162 1454
Email : info@matac.org.my
Website : www.matac.com.my

b. Malaysian Textile Manufacturers Association (MTMA)
Box 42, 9th Floor, Selangor Dredging
142C, Jalan Ampang
55000 Kuala Lumpur, Malaysia

Tel. : 603-2162 1587
Email : info@mtma.org.my
Website : www.fashion-asia.com

c. Malaysian Knitting Manufacturers Association (MKMA)
12-1, Jalan Megat
83000 Batu Pahat
Johor, Malaysia

Tel. : 607- 4343203
Email : mkma@streamyx.com
Website : www.mkma.org

d. Department of Occupational Safety and Health (DOSH)
Ministry of Human Resource
Level 2, 3 & 4, Block D3, Complex D
Federal Government Administrative Centre
62530 W. P. Putrajaya, Malaysia

Tel. : 603-8886 5000
Email : jkkp@mohr.gov.my
Website : www.dosh.gov.my

e. International Textile and Apparel Association (ITAA)
PO Box 70687
Knoxville, TN 37938-0687
United States of America

Tel. : 865-992-1535
Email : info@itaaonline.org
Website : http://itaaonline.org

11. Standard Technical Evaluation Committee

NO	NAME	POSITION & ORGANISATION
1.	Mr. Chow Wei Sin	Technical Specialist Barudan Embroidery (M) Sdn. Bhd.
2.	Mr. Bahauddin Bin Abd Rashid	Technician Selembar Gemilang Enterprise
3.	Mr. KC Poo	Manager Tai Kwong Enterprise Sdn. Bhd.

12. Standard Development Committee

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

NO	NAME	POSITION & ORGANISATION
1.	Mr. Jamizal bin Mohammad Zinul	Senior Manager Malaysian Textile Manufacturer Association
2.	Mr. Boo Wee Siong	Sales Marketing Manager Tarmah Sewing Machine (M) Sdn. Bhd.
3.	Mr. Gan Cheng Say	Chief Technician Tai Wah Garments Sdn. Bhd.
4.	Mrs. Foo May Lee	Supervisor PCCS Sdn. Bhd.
5.	Mr. Yeow Jian Sheng	Specialist Technician Embroidery Tarmah Sewing Machine (M) Sdn. Bhd.
6.	Mr. Mohd Shah Rezza bin Abdul Rahman	Senior Technician Gimmill Industrial (M) Sdn. Bhd.
7.	Mr. Syed Abu Bakar bin Syed Abdul Rahman	Designer and Technician Embroidery Barudan (M) Sdn. Bhd.
8.	Mrs. Mastura binti Samean	Digitizer & Trainer Tarmah Sewing Machine (M) Sdn. Bhd.
FACILITATOR		
1.	Puan Siti Salmah binti Mohd Nor	DJ Automation Sdn. Bhd.

STANDARD CONTENT

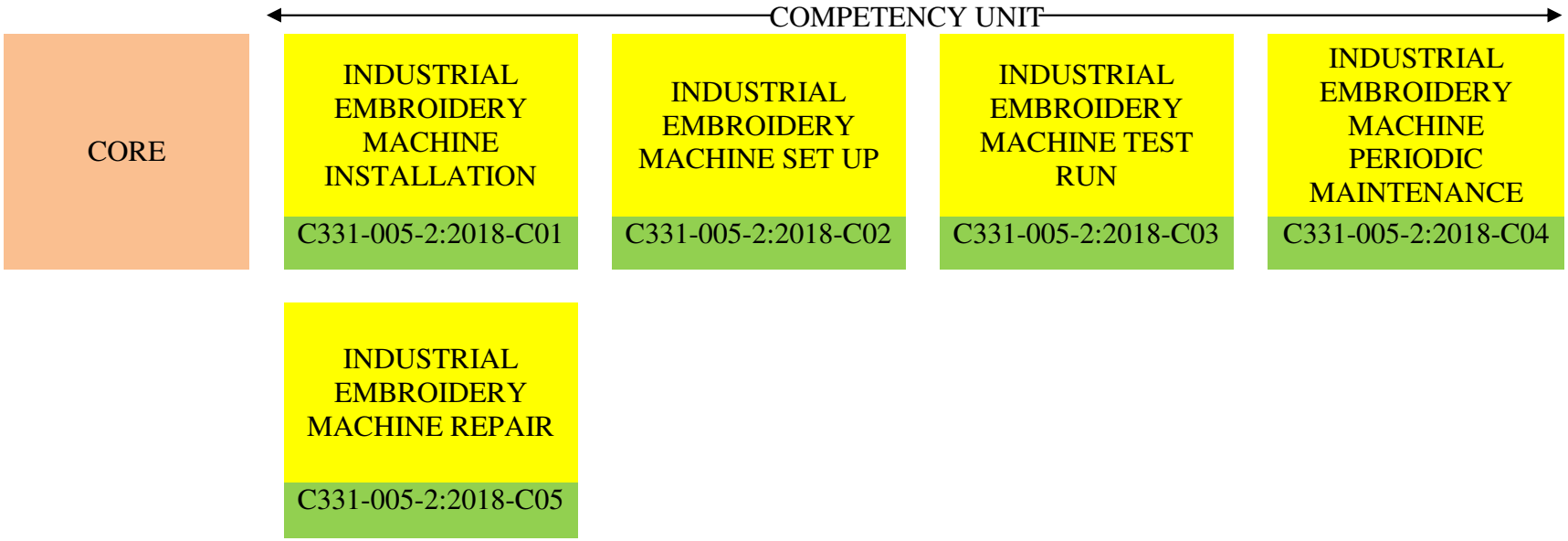
NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

13. Competency Profile Chart (CPC)

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
NOSS LEVEL	2	NOSS CODE	C331-005-2:2018



14. Competency Profile (CP)

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
NOSS LEVEL	2	NOSS CODE	C331-005-2:2018

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
1. Industrial Embroidery Machine Installation C331-005-2:2018-C01	Industrial Embroidery Machine Installation describes the competencies required to assemble parts and components of various types of new industrial embroidery machines according to user's and manufacturer's manual. The industrial embroidery machines are classified as flat or tubular types. They are categorised by the number of heads and needles (single-head and multi-head).	1. Prepare work area, tools, equipment and materials for IEM installation	1.1 Industrial embroidery machine (IEM) installation work requirements identified according to job instructions, user's and manufacturer's manual. 1.2 Tool and equipment condition, functionality and required specifications confirmed according to work requirements. 1.3 Material specifications confirmed according to type of IEM. 1.4 Work area condition, readiness, cleanliness and safety compliance assured according to work organisation method. 1.5 Barricades and signage placed at designated areas according to workplace procedures. 1.6 Proper Personal Protective Equipment (PPE) selected correctly according to functionality and safety requirements.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	The person who is competent in this CU shall be able to prepare work area, tools, equipment and materials for IEM installation, arrange industrial embroidery machine unloading work, check industrial embroidery machine components, place industrial embroidery machine to production area, carry out industrial embroidery machine balancing, install industrial embroidery machine accessories and carry out workplace housekeeping after IEM installation. The personnel must be physically fit and is not affected by colour blindness. The outcome of this competency is that the assembled/installed IEM will be in safe and good operating condition in compliance with user's and manufacturer's manual, workplace Standard Operating Procedure (SOP)	2. Arrange industrial embroidery machine unloading work	2.1 Industrial embroidery machine unloading procedure and method determined according to types of IEM, user's and manufacturer's manual. 2.2 Safety rules/requirements adhered to during unloading work. 2.3 Tools and equipment organised systematically and utilised correctly according to functionality, installation procedure and Health, Safety and Environment (HSE) requirements. 2.4 Proper Personal Protective Equipment (PPE) applied/worn according to functionality and safety requirements. 2.5 Industrial embroidery machine unboxed/unpacked from carton according to installation procedure, method and technique based on type of packing. 2.6 Industrial embroidery machine components organised systematically in safe manner according to component specifications and HSE.
		3. Check industrial embroidery machine components	3.1 Related industrial embroidery machine installation documents acquired according to Standard Operating Procedure (SOP). 3.2 Industrial embroidery machine component conditions and specifications checked based on

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	and Health, Safety and Environment (HSE) requirements.		packing list/OEM manual. 3.3 Issues and IEM component status recorded accurately after confirmation based on recording procedure and format. 3.4 Relevant parties (supplier, superior) informed regarding raised issues for further action according to SOP.
		4. place industrial embroidery machine to production area	4.1 Suitability and type of transportation used to move industrial embroidery machine component to designated area confirmed according to job instructions, user's and manufacturer's manual. 4.2 Movement method for machine placement confirmed based on type of industrial embroidery machine and manufacturer manual. 4.3 Designated location safety, suitability and condition to assemble component confirmed according to job instructions. 4.4 IEM components placed safely according to installation procedure, method and technique.
		5. Carry out industrial embroidery machine balancing	5.1 Suitable levelling tools utilised correctly to check IEM balancing. 5.2 Industrial embroidery machine base bolts and levelling base adjusted to

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			ensure machine height and level (front-back and left-right) are within required specifications/measurement. 5.3 Industrial embroidery machine base bolts locked to ensure stability.
		6. Install industrial embroidery machine accessories	6.1 Industrial embroidery machine table and thread stand assembled correctly according to user's and manufacturer's manual. 6.2 Control panel assembled correctly according to user's and manufacturer's manual. 6.3 Industrial embroidery machine switched on according to user's and manufacturer's manual. 6.4 Panel control application software (digitised embroidery design) installed and tested according to user's and manufacturer's manual. 6.5 Suitable tools used in a safe and effective manner.
		7. Carry out workplace housekeeping after IEM installation	7.1 Industrial embroidery machine installation work recorded accurately according to required format and documentation procedure. 7.2 Incomplete set of industrial embroidery machines or abnormalities recorded and reported for further action. 7.3 Industrial embroidery machine

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			installation records compiled and submitted in a timely manner. 7.4 Work place area rearranged neatly according to work organisation method. 7.5 Used tools and equipment cleaned and returned to designated area. 7.6 Waste (chemical & non chemical) disposal procedure aligned with HSE requirements.
2. Industrial Embroidery Machine Set Up C331-005-2:2018-C02	Industrial Embroidery Machine Set Up describes the competencies required to set up various types of newly assembled industrial embroidery machines according to user's and manufacturer's manual. The person who is competent in this CU shall be able to prepare work area, tools, equipment and materials for IEM set up, carry out industrial embroidery machine accessories setting, check hook timing and carry out workplace housekeeping after IEM set up.	1. Prepare work area, tools, equipment and materials for IEM set up	1.1 Industrial embroidery machine set up requirements determined according to corresponding user's and manufacturer's manual specifications. 1.2 Tools and equipment condition, functionality and required specifications confirmed according to work requirements. 1.3 Material specifications confirmed according to its function. 1.4 Work area condition readiness, cleanliness and safety compliance assured according to work organisation method. 1.5 Barricades and signage placed at designated areas according to workplace procedures. 1.6 Proper Personal Protective Equipment (PPE) selected correctly according to functionality and safety requirements.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	The outcome of this competency is the effective and safe set-up of newly assembled industrial embroidery machines that are ready to be used for production according to user's and manufacturer's manual, workplace SOP and Health, Safety and Environment (HSE) requirements.	2. Carry out industrial embroidery machine accessories setting	2.1 Various upper threads inserted into needle holes correctly and thread tension adjusted according to operation manual and thread setting procedure. 2.2 Under thread and bobbin tension adjusted according to operation manual. 2.3 Various types of thread applications (embroidery design) imported/ inserted into control panel set according to user's manual and sample design. 2.4 Bobbin winder setting and movement confirmed according to operation manual. 2.5 Under thread winded smoothly according to setting parameter. 2.6 Installed bobbin rotation confirmed in the right direction. 2.7 Suitable tools for bobbin case adjustment used in a safe and effective manner. 2.8 Installation of industrial embroidery machine accessories aligned with health, safety and environment requirements.
		3. Check hook timing	3.1 Needles point and main shaft angle degree set to ensure right timing between needle and hook. 3.2 Gap measurement between hook point and needle scarf checked according to

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			hook and timing specification. 3.3 Gap between needle and hook point aligned as per gap distance.
		4. Carry out workplace housekeeping after IEM set up	4.1 Industrial embroidery machine set up work recorded accurately according to required format and documentation procedure. 4.2 Issues and abnormalities in industrial embroidery machine set up recorded, compiled and submitted in a timely manner. 4.3 Work place area rearranged neatly according to work organisation method. 4.4 Used tools and equipment cleaned and returned to designated area
3. Industrial Embroidery Machine Test Run C331-005-2:2018-C03	Industrial Embroidery Machine Test Run describes the competencies required to test run various types of newly assembled industrial embroidery machines according to user's, manufacturer's and operating manual. The person who is competent in this CU shall be able to prepare work area, tools,	1. Prepare work area, tools, equipment and materials for IEM test run	1.1 Industrial embroidery machine test run requirements determined according to corresponding user's and manufacturer's manual specifications. 1.2 Tools and equipment condition, functionality and required specifications confirmed according to work requirements. 1.3 Material specifications confirmed according to its function. 1.4 Work area condition readiness, cleanliness and safety compliance assured according to work organisation

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	equipment and materials for IEM test run, carry out industrial embroidery machine test run, carry out design testing, check embroidery defect and carry out workplace housekeeping after IEM test run. The outcome of this competency is the effective and safe test run of newly assembled industrial embroidery machines that are ready to be used for production according to user's, manufacturer's and operation manual, workplace SOP and Health, Safety and Environment (HSE) requirements.		method. 1.5 Barricades and signage placed at designated areas according to workplace procedures. 1.6 Proper Personal Protective Equipment (PPE) selected correctly according to functionality and safety requirements.
		2. Carry out industrial embroidery machine test run	2.1 Industrial embroidery machine set to test mode according to user's manual. 2.2 All electronic parts are in normal operation according to operation manual. 2.3 Industrial embroidery machine run smoothly without fabrics after lubricated. 2.4 Minor problems/issues after test run rectified/adjusted/replaced immediately or relevant parties informed for further action 2.5 Test run of industrial embroidery machine aligned with health, safety and environment requirements.
		3. Carry out design testing	3.1 Test run design requirements determined according to sample design and embroidery technique. 3.2 Design testing materials (fabric and interlining) positioned in correct direction according to design requirements.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			3.3 Design starting point on frame determined and set according to design stored in machine memory. 3.4 Design outline traced to ensure position accuracy within embroidery area to prevent machine damage. 3.5 Design testing executed on materials according to operation procedure.
		4. Check embroidery defect	4.1 Embroidery appearance (stitches, tie off), quality (meeting standard), assessed according to product specifications. 4.2 Types of defect determined based on output. 4.3 Defect causes identified and recorded according to type of defects and symptoms. 4.4 Defect solutions identified and fixed based on type of defects. 4.5 Design testing executed repeatedly to ensure issues solved according to design quality standard.
		5. Carry out workplace housekeeping after IEM test run	5.1 Industrial embroidery machine test run results recorded accurately according to required format and documentation procedure. 5.2 Issues and abnormalities during industrial embroidery machine test run recorded, compiled and submitted in a

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			timely manner. 5.3 Work place area rearranged neatly according to work organisation method. 5.4 Used tools and equipment cleaned and returned to designated area.
4. Industrial Embroidery Machine Periodic Maintenance C331-005-2:2018-C04	Industrial Embroidery Machine Periodic Maintenance describes the competencies required to perform regular maintenance (according to predetermined schedule) in order to upkeep the optimum condition or operational status of industrial embroidery machine. Maintenance work can be performed while the equipment is still running, so that it does not break down unexpectedly. This maintenance exercise can be carried out on a daily, weekly, monthly or yearly basis depending on workplace maintenance procedures and industrial embroidery machine user's	1. Prepare industrial embroidery machine maintenance requirements	1.1 Maintenance and inspection service requirements interpreted clearly according to maintenance service records/manufacturer's manual. 1.2 Type, quantity and location of industrial embroidery machines for maintenance determined according to maintenance and inspection service requirements. 1.3 Time and duration for maintenance estimated according to maintenance and inspection service requirements and severity of breakdown. 1.4 Availability and functionality of tools, equipment and materials for maintenance and inspection services confirmed according to type of maintenance services. 1.5 Designated maintenance area readiness and safety ensured and confirmed according to workplace procedure and HSE requirements.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	and manufacturer's manual. The person who is competent in this CU shall be able to prepare industrial embroidery machine maintenance requirements, carry out industrial embroidery machine daily maintenance, carry out industrial embroidery machine scheduled maintenance and carry out workplace housekeeping after IEM periodic maintenance. The outcome of this competency is the effective and efficient maintenance of industrial embroidery machines according to user's and manufacturer's manual and SOP. Proper periodic maintenance enhances the quality of output, durability and life span of the industrial embroidery machines.		1.6 Barricades and signage at maintenance areas prepared according to workplace procedures. 1.7 Proper Personal Protective Equipment (PPE) selected correctly according to functionality and safety requirements.
		2. Carry out industrial embroidery machine daily maintenance	2.1 Industrial embroidery machine physical condition checked and restored according to user's and manufacturer's manual. 2.2 Industrial embroidery machine components cleaned (waste/dust) according to maintenance procedure. 2.3 Industrial embroidery machine moving components oiled to ensure smooth movement according to maintenance procedure. 2.4 Stitching on interlining/fabric performed (if necessary) to remove oily thread from needle bar based on type of machine and maintenance procedure. 2.5 Embroidery design origin reset to starting point before actual production confirmed according to maintenance procedure.
		3. Carry out industrial embroidery machine scheduled maintenance	3.1 Schedule information confirmed based on maintenance schedule. 3.2 Availability of required tools, equipment, materials and spare parts

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			confirmed based on type of maintenance. 3.3 Industrial embroidery machine physical condition checked and adjusted (if necessary) according to user's and manufacturer's manual. 3.4 Industrial embroidery machine components cleaned (waste/dust) according to maintenance procedure. 3.5 Industrial embroidery machine moving components oiled and greased sufficiently to ensure smooth movement according to maintenance procedure. 3.6 Stitching on interlining/fabric performed (if necessary) to remove oily thread from needle bar based on type of machine and maintenance procedure. 3.7 Embroidery design origin resetting to starting point before actual production confirmed according to maintenance procedure.
		4. Carry out workplace housekeeping after IEM periodic maintenance	4.1 Industrial embroidery machine maintenance work recorded accurately according to required format documentation procedure.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			4.2 Issues and abnormalities in industrial embroidery machine periodic maintenance recorded, compiled and submitted in a timely manner. 4.3 Work place area rearranged neatly according to work organisation method. 4.4 Used tools and equipment cleaned and returned to designated area.
5. Industrial Embroidery Machine Repair C331-005-2:2018-C05	Industrial Embroidery Machine Repair describes the competencies required to repair defect/breakdown/ failure/malfunction of industrial embroidery machines according to industrial embroidery machine repair procedure and manufacturer's manual. The person who is competent in this CU shall be able to carry out clarification on repair activity requirements, arrange repairing work schedule and preparation, repair industrial embroidery machine defect/problem and carry out workplace	1. Carry out clarification on repair activity requirements	1.1 Job instructions interpreted clearly according to company procedure and repair requirements. 1.2 Industrial embroidery machine breakdown/malfunction confirmed according to customer's or operator's feedback. 1.3 Type, quantity and location of industrial embroidery machines for repair determined according to job instructions. 1.4 Time and duration for repair work estimated according to repair requirements and severity of breakdown. 1.5 Designated maintenance area readiness and safety ensured and confirmed according to workplace procedure and HSE requirements.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	housekeeping after IEM repair activities. The outcome of this competency is the efficient and effective restoration of malfunction/breakdown of industrial embroidery machines to normal operating performance in compliance with user's/manufacturer's manual, workplace procedures and Health, Safety and Environment (HSE) requirements.	2. Arrange repairing work schedule and preparation	2.1 Availability and functionality of tools, equipment and materials for repair work prepared according to type of repair services and HSE requirements. 2.2 Industrial embroidery machine manual repair guidelines and historical data referred to confirmed against repairing requirements. 2.3 Parts logistic arranged according to specification and requirements. 2.4 Travelling arrangements for on-site repair venue confirmed based on job instructions. 2.5 Availability of proper Personal Protective Equipment (PPE) confirmed for repair work according to HSE requirements.
		3. Repair industrial embroidery machine defect/problem	3.1 Barricades and signage at work areas prepared according to workplace procedures and HSE requirements. 3.2 Visual observation and testing performed to identify machine malfunction and faulty components according to repair guidelines. 3.3 Types of industrial embroidery machine defect/failure complexity determined according to industrial embroidery machine manual troubleshooting guidelines.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			3.4 Industrial embroidery machine malfunction/breakdown causes and suitable repair work confirmed according to industrial embroidery machine troubleshooting guidelines. 3.5 Defective industrial embroidery machine parts disassembled, replaced/adjusted and fixed according to repair guidelines. 3.6 Repaired industrial embroidery machine performance operated and tested in comparison with standard performance and HSE requirements. 3.7 Tools, equipment and PPE utilised in a safe and effective manner. 3.8 Breakdown data affecting production downtime captured for record and monitoring purposes. 3.9 Breakdown issues, corrective action and results/outcome in confirmation memo/breakdown service record completed accurately for signing off.
		4. Carry out workplace housekeeping after IEM repair activities	4.1 Industrial embroidery machine repairing recorded accurately according to required format and documentation procedure. 4.2 Issues and abnormalities in industrial embroidery machine repairing recorded, compiled and submitted in a timely manner.

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			4.3 Work place area rearranged neatly according to work organisation method. 4.4 Used tools and equipment cleaned and returned to designated area.

CURRICULUM OF COMPETENCY UNIT

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

NOSS LEVEL 2

15. Curriculum of Competency Unit

15.1. Industrial Embroidery Machine Installation

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
COMPETENCY UNIT TITLE	Industrial Embroidery Machine Installation		
LEARNING OUTCOMES	The outcome of this competency unit is that the assembled/installed IEM will be in safe and good operating condition in compliance with user's and manufacturer's manual, workplace Standard Operating Procedure (SOP) and Health, Safety and Environment (HSE) requirements. Upon completion of this competency unit, trainees shall be able to: 1. Prepare work area, tools, equipment and materials for IEM installation. 2. Arrange industrial embroidery machine unloading work. 3. Check industrial embroidery machine components. 4. Place industrial embroidery machine to production area. 5. Carry out industrial embroidery machine balancing. 6. Install industrial embroidery machine accessories. 7. Carry out workplace housekeeping after IEM installation.		
TRAINING PRE-REQUISITE	N/A		
CU CODE	C331-005-2:2018-C01	NOSS LEVEL	2

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare work area, tools, equipment and materials for IEM installation.	1.1 Types and features of industrial embroidery machines such as: • Tubular • Flat 1.2 Types of industrial embroidery machine head and quantity:	1.1 Identify types and features of industrial embroidery machines. 1.2 Identify types of industrial embroidery machine head and quantity.	<u>ATTITUDE</u> • Comply with work instructions. • Comply with industrial embroidery machine manual instructions.	1.1 Types and features of industrial embroidery machines in installation listed and confirmed according to work instruction. 1.2 Types of industrial embroidery machine head and quantity differentiated and listed.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Single head • Multi head (2, 4, 6, 8, 12, 18, 20,…56) 1.3 Industrial embroidery machine parts, components and accessories: • Accessories (thread stand, table, frame, lamp, bobbin winder and levelling base) • Mechanical components (machine body, head, rotary hook base, X and Y-axis driving system) • Electrical and electronic components (such as Servo Motor/ /Induction Motor/ Stepping Motor, solenoid, main controller box, operation	1.3 Identify industrial embroidery machine parts, components and accessories 1.4 Select machine installation tools, equipment, materials and documentations. 1.5 Interpret machine installation procedure and sequence 1.6 Arrange machine installation tools, equipment and materials.	<u>SAFETY</u> • Use tools in a safe manner. • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping.	1.3 Industrial embroidery machine parts, components and accessories listed based on IEM types. 1.4 Machine installation procedures and sequence retrieved from user's and manufacturer's manual. 1.5 Machine installation tools, equipment, materials (TEM) and documentation selected and organised in a safe manner. 1.6 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	box, X, Y driver box, thread detector) 1.4 Machine installation tools, equipment and materials (TEM) and documentation requirement: • Hand tools (such as adjustable spanner, pliers, Allen key, levelling tools) • Hand drill • Testing equipment (such as Multi meter, test pen, test lamp) • Connectors (such as cable tie, cable clip) • Mounting rubber • User's and manufacturer's manual 1.5 Relevant IEM installation documentations as references:			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• machine instruction manuals • user's manual • manufacturer's manual 1.6 Machine installation procedure and sequence 1.7 Health, Safety and Environment requirements: • PPE (gloves, mask, safety boots, goggles, earplugs) • Workplace and personal safety • Housekeeping			
2. Arrange industrial embroidery machine unloading work.	2.1 Procedure and method for IEM unloading work. 2.2 Safety rules/ requirements such as: • PPE application during unloading work. • Occupational Safety and	2.1 Identify IEM unloading procedure and method. 2.2 Apply safety rules/requirements. 2.3 Utilise/use tools, equipment and materials. 2.4 Apply PPE. 2.5 Organise IEM unpacking activities.	<u>ATTITUDE</u> • Comply with work instructions. • Comply with IEM manual instructions. • Work conscientiously within allocated time. • Ensure components are correctly matched with industrial embroidery machine.	2.1 Procedure and method for IEM unloading work explained. 2.2 Safety rules/requirements and work organisation explained. 2.3 Correct tools, equipment and materials (TEM) handled and utilised in a safe manner. 2.4 IEM unpacking activities arranged according to work procedure and method. 2.5 IEM components arranged

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	Health Act 1994 2.3 Work organisation method for organising TEM and components such as: • Positioning of IEM component • 5S 2.4 Procedure, method and technique for unpacking activities.	2.6 Organise IEM components.	SAFETY • Use tools in a safe manner. • Wear PPE at all times. • Maintain workplace safety. • Handle industrial embroidery machine components safely. ENVIRONMENT • Practise good housekeeping.	accordingly. 2.6 Personal and workplace safety as well as good housekeeping practised at all times.
3. Check industrial embroidery machine components.	3.1 Related IEM installation documents such as: • User's manual. • Manufacturer's manual. • Company's SOP. • IEM component checklist from manufacturer. 3.2 IEM component conditions and specifications such as: • Defect-free	3.1 Obtain IEM installation related documents. 3.2 Check IEM component conditions and specifications. 3.3 Record issues and IEM component status. 3.4 Inform relevant parties on raised issues.	ATTITUDE • Comply with work instructions. • Comply with IEM manual instructions. • Work conscientiously within allocated time. • Check IEM components thoroughly. SAFETY • Use tools in a safe manner. • Wear PPE at all	3.1 IEM component conditions and specifications explained. 3.2 Checking procedures and other relevant information retrieved from user's and manufacturer's manual. 3.3 IEM component conditions and specifications examined. 3.4 Issues and IEM component status registered accurately. 3.5 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	components. • Model plate information. • Machine voltage. • Serial number. • Quantity of component. 3.3 Type of issues and discrepancies to be recorded (e.g. missing components) 3.4 Recording procedure and format. 3.5 Reporting procedure and format.		times. • Maintain workplace safety. • Handle industrial embroidery machine components safely. <u>ENVIRONMENT</u> • Practise good housekeeping.	
4. Place industrial embroidery machine to production area.	4.1 Type of transportation such as: • Forklift. • Trolley. • Roller. 4.2 IEM movement method and technique to designated location. 4.3 IEM component placement requirements such as: • Floor loading capacity	4.1 Check suitability and type of transportation. 4.2 Monitor movement of IEM to location. 4.3 Check safety, suitability and condition of designated location. 4.4 Execute IEM component placement.	<u>ATTITUDE</u> • Comply with work instructions. • Comply with IEM manual instructions. • Work conscientiously within allocated time. • Check IEM condition thoroughly. <u>SAFETY</u> • Wear PPE at all times. • Maintain workplace safety. • Handle industrial	4.1 Types of transportation listed. 4.2 IEM movement method and technique to designated location explained, handled and monitored. 4.3 IEM component placement requirements retrieved from user's and manufacturer's manual. 4.4 Safety, suitability and condition of designated location confirmed based on machine's specification. 4.5 IEM components arranged according to requirements. 4.6 Personal and workplace safety

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	condition based on machine specifications • Noise pollution • Machine vibration 4.4 IEM placement procedure and method.		embroidery machine components safely. ENVIRONMENT • Practise good housekeeping.	as well as good housekeeping practised at all times.
5. Carry out industrial embroidery machine balancing.	5.1 Procedure and technique for using levelling tools. 5.2 Technique for IEM bolts and levelling base adjustment. 5.3 Method for IEM base bolts locking. 5.4 Method for checking IEM stability (visual check to ensure same water level for IEM both ends – left and right).	5.1 Use levelling tools. 5.2 Adjust IEM bolts and levelling base. 5.3 Lock IEM base bolts 5.4 Check IEM stability.	ATTITUDE • Comply with work instructions. • Comply with IEM manual instructions. • Work conscientiously within allocated time. • Check IEM condition thoroughly. SAFETY • Wear PPE at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	5.1 IEM balancing procedures and other relevant information retrieved from user's and manufacturer's manual. 5.2 Correct tools, equipment, materials (TEM) and documentation selected, handled and utilised in a safe manner. 5.3 IEM bolts and levelling base adjusted according to machine specifications. 5.4 IEM base bolts fastened firmly according to machine specifications. 5.5 IEM levelled and stability confirmed. 5.6 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
6. Install industrial embroidery machine accessories.	6.1 Procedure and technique to assemble IEM table and thread stand. 6.2 Procedure and technique to assemble control panel. 6.3 IEM operation procedures. 6.4 Panel control application software installation procedure. 6.5 IEM accessory installation tools application technique.	6.1 Assemble IEM table and thread stand. 6.2 Assemble control panel. 6.3 Operate IEM. 6.4 Install panel control application software. 6.5 Use suitable tools for IEM accessory installation.	ATTITUDE • Comply with work instructions. • Comply with IEM manual instructions. • Work conscientiously within allocated time. • Check IEM accessories thoroughly. SAFETY • Use tools in a safe manner. • Wear PPE at all times. • Maintain workplace safety. • Handle IEM accessories safely. ENVIRONMENT • Practise good housekeeping.	6.1 IEM accessories installation procedures and other relevant information retrieved from user's and manufacturer's manual. 6.2 IEM accessories assembled according to machine specifications. 6.3 Panel control application software installed. 6.4 Correct tools, equipment, materials (TEM) and documentation selected, handled and utilised in a safe manner. 6.5 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
7. Carry out workplace housekeeping after IEM installation	7.1 IEM installation status. 7.2 Recording format. 7.3 Work organisation method for organising workplace area and TEM such as: • Positioning of IEM component. • 5S 7.4 Waste disposal procedure such as 3R (Reduce/Reuse/ Recycle). 7.5 Categories of waste: • Packing materials • Chemical substances	7.1 Record IEM installation results. 7.2 Arrange work place area. 7.3 Upkeep work area and used TEM. 7.4 Return used TEM to designated area. 7.5 Dispose of waste.	<u>ATTITUDE</u> • Comply with work instructions • Work conscientiously within allocated time • Accurate, thorough and timely in maintaining records <u>SAFETY</u> • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping. • Adhere to environmental act.	7.1 IEM installation results recorded according to required format. 7.2 TEM cleaned and placed properly. 7.3 Waste disposal procedure explained and complied with according to regulatory requirements. 7.4 Personal and workplace safety as well as good housekeeping practised at all times.

15.2. Industrial Embroidery Machine Set Up

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
COMPETENCY UNIT TITLE	Industrial Embroidery Machine Set Up		
LEARNING OUTCOMES	The outcome of this competency unit is effective and safe set-up of newly assembled industrial embroidery machines ready to be used for production according to user's and manufacturer's manual, workplace SOP and Health, Safety and Environment (HSE) requirements. Upon completion of this competency unit, trainees shall be able to: 1. Prepare work area, tools, equipment and materials for IEM set up. 2. Carry out industrial embroidery machine accessories setting. 3. Check hook timing. 4. Carry out workplace housekeeping after IEM set up.		
TRAINING PRE-REQUISITE	N/A		
CU CODE	C331-005-2:2018-C02	NOSS LEVEL	2

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare work area, tools, equipment and materials for IEM set up.	1.1 Types and features of industrial embroidery machines such as: • Tubular • Flat 1.2 Types of industrial embroidery machine head and quantity: • Single head • Multi head (2, 4, 6, 8, 12, 18,	1.1 Identify types and features of industrial embroidery machines. 1.2 Identify types of industrial embroidery machine head and quantity. 1.3 Identify industrial embroidery machine parts, components and accessories	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. SAFETY • Use tools in a safe manner.	1.1 Types and features of industrial embroidery machines in machine set up listed and confirmed according to work instruction. 1.2 Types of industrial embroidery machine head and quantity differentiated and listed 1.3 Industrial embroidery machine parts, components and accessories listed based on

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	20,…56) 1.3 Industrial embroidery machine parts, components and accessories: • Accessories (thread stand, table, frame, lamp, bobbin winder and levelling base) • Mechanical components (machine body, head, rotary hook base, X and Y-axis driving system) • Electrical and electronic components (such as Servo Motor/ /Induction Motor/ Stepping Motor, solenoid, main controller box, operation box, X, Y driver box, thread detector) 1.4 Machine set up tools, equipment and materials (TEM) and documentation	1.4 Select machine setup tools, equipment, materials and documentations. 1.5 Interpret machine set up procedure and sequence 1.6 Arrange machine set up tools, equipment and materials.	• Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping.	IEM types 1.4 Machine set up procedures and sequence retrieved from user's and manufacturer's manual. 1.5 Machine set up tools, equipment and materials (TEM) and documentation selected and organised in a safe manner. 1.6 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	requirements: • Hand tools (such as adjustable spanner, pliers, Allen key, levelling tools) • Hand drill • Testing equipment (such as Multi meter, test pen, test lamp) • Connectors (such as cable tie, cable clip) • Mounting rubber • User's and manufacturer's manual 1.5 IEM machine set up document and relevant references: • machine instruction manuals • user's manual • manufacturer's manual 1.6 Machine set up procedure and sequence. 1.7 Health, Safety and			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	Environment requirements: • PPE (gloves, mask, safety boots, goggles, earplugs) • Workplace and personal safety. • Housekeeping			
2. Carry out industrial embroidery machine accessories setting.	2.1 Type of stitches (Tatami, Satin) 2.2 Threads specifications (type and size) 2.3 Needle specifications (model, size, point shape). 2.4 IEM accessories setting document and relevant references: • User's manual • Manufacturer's manual 2.5 Procedure and method for upper threads insertion. 2.6 Method for upper threads tension adjustment. 2.7 Criteria for thread and bobbin adjustment:	2.1 Identify type of stitches. 2.2 Identify threads and needle specifications 2.3 Interpret IEM accessories setting documentations 2.4 Insert various upper threads into needle hole. 2.5 Adjust upper threads tension. 2.6 Adjust under thread and bobbin tension. 2.7 Store embroidery design. 2.8 Check bobbin winder setting and movement. 2.9 Check installed bobbin rotation direction. 2.10 Execute bobbin case	<u>ATTITUDE</u> • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Check IEM accessories thoroughly. <u>SAFETY</u> • Use tools in a safe manner. • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u>	2.1 Type of stitches confirmed according to product design. 2.2 Threads and needle specifications explained. 2.3 IEM accessories setting procedures, method and other relevant information retrieved from user's and manufacturer's manual. 2.4 Various upper threads inserted into needle hole and adjustment demonstrated according to procedure and method. 2.5 Thread, bobbin tension and bobbin case adjusted according to thread, fabrics and design. 2.6 Rotation of installed bobbin checked properly. 2.7 Personal and workplace safety

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Fabrics • Design 2.8 Method for under thread and bobbin tension adjustment. 2.9 Method to store embroidery design into control panel. 2.10 Bobbin winder setting and movement effect on bobbin. 2.11 Direction of installed bobbin rotation. 2.12 Procedure, method and technique for bobbin case adjustment.	adjustment.	• Practise good housekeeping.	as well as good housekeeping practised at all times.
3. Check hook timing.	3.1 Types of needle and size based on design and fabrics. 3.2 Correct position of main shaft angle degree. 3.3 Procedure and method to check setting of needle point. 3.4 Gap measurement between hook point and needle scarf. 3.5 Procedure and method	3.1 Check types of needle and size. 3.2 Check setting of needle point and main shaft angle degree. 3.3 Check gap measurement between hook point and needle scarf. 3.4 Check alignment of needle and hook point gap. 3.5 Execute adjustment of	<u>ATTITUDE</u> • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Check IEM accessories thoroughly. <u>SAFETY</u> • Use tools in a safe	3.1 Types of needle and size based on design and fabrics listed. 3.2 Correct position of main shaft angle degree determined. 3.3 Needle point setting procedures, method and other relevant information retrieved from user's and manufacturer's manual. 3.4 Needle and hook point gap alignment procedures, method and other relevant information retrieved from user's and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	to align needle and hook point gap. 3.6 Document and relevant references such as: • User's manual. • Manufacturer's manual.	misaligned/incorrect measurement of needle and hook point.	manner. • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	manufacturer's manual. 3.5 Misaligned/ incorrect measurement of needle and hook point adjusted according to specifications. 3.6 Personal and workplace safety as well as good housekeeping practised at all times.
4. Carry out workplace housekeeping after IEM set up.	4.1 IEM set up status. 4.2 Recording format. 4.3 Work organisation method for organising workplace area and TEM such as: • Positioning of IEM components. • 5S. 4.4 Waste disposal procedure such as 3R (Reduce/Reuse/ Recycle). 4.5 Categories of waste: • Non chemical materials • Chemical substances	4.1 Record IEM set up results. 4.2 Arrange work place area. 4.3 Upkeep work area and used TEM. 4.4 Return used TEM to designated area. 4.5 Dispose of waste.	ATTITUDE • Comply with work instructions. • Work conscientiously within allocated time. • Accurate, thorough and timely in maintaining records. SAFETY • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping. • Adhere to environmental act.	4.1 IEM set up results recorded according to required format. 4.2 TEM cleaned and placed properly. 4.1 Waste disposal procedure explained and complied with according to regulatory requirements. 4.3 Personal and workplace safety as well as good housekeeping practised at all times.

15.3. Industrial Embroidery Machine Test Run

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
COMPETENCY UNIT TITLE	Industrial Embroidery Machine Test Run		
LEARNING OUTCOMES	The outcome of this competency unit is the effective and safe test run of newly assembled industrial embroidery machines that are ready to be used for production according to user's, manufacturer's and operation manual, workplace SOP and Health, Safety and Environment (HSE) requirements. Upon completion of this competency unit, trainees shall be able to: 1. Prepare work area, tools, equipment and materials for IEM test run. 2. Carry out industrial embroidery machine test run. 3. Carry out design testing. 4. Check embroidery defect. 5. Carry out workplace housekeeping after IEM test run.		
TRAINING PRE-REQUISITE	N/A		
CU CODE	C331-005-2:2018-C03	NOSS LEVEL	2

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare work area, tools, equipment and materials for IEM test run.	1.1 Types and features of industrial embroidery machines such as: • Tubular • Flat 1.2 Types of industrial embroidery machine head and quantity: • Single head • Multi head (2, 4, 6,	1.1 Identify types and features of industrial embroidery machines. 1.2 Identify types of industrial embroidery machine head and quantity. 1.3 Identify industrial embroidery machine parts, components and	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. SAFETY • Use tools in a safe	1.1 Types and features of industrial embroidery machines in machine test run listed and confirmed according to work instruction. 1.2 Types of industrial embroidery machine head and quantity differentiated and listed 1.3 Industrial embroidery machine parts, components and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	8, 12, 18, 20,…56) 1.3 Industrial embroidery machine parts, components and accessories: • Accessories (thread stand, table, frame, lamp, bobbin winder and levelling base) • Mechanical components (machine body, head, rotary hook base, X and Y-axis driving system) • Electrical and electronic component (such as Servo Motor/ /Induction Motor/ Stepping Motor, solenoid, main controller box, operation box, X, Y driver box, thread detector)	accessories 1.4 Select machine test run tools, equipment, materials and documentations. 1.5 Interpret machine test run procedure and sequence 1.6 Arrange machine test run tools, equipment and materials.	manner. • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping.	accessories listed based on IEM types 1.4 Machine test run procedures and sequence retrieved from user's and manufacturer's manual. 1.5 Machine test run tools, equipment, materials (TEM) and documentation selected and organised in a safe manner. 1.6 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	1.4 Machine test run tools, equipment and materials (TEM) and documentation requirement: • Hand tools (such as adjustable spanner, pliers, Allen key, levelling tools) • Hand drill • Testing equipment (such as Multi meter, test pen, test lamp) • Connectors (such as cable tie, cable clip) • Mounting rubber • User's and manufacturer's manual 1.5 IEM machine test run document and relevant references: • machine instruction manuals • user's manual • manufacturer's			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	manual 1.6 Machine test run procedure and sequence. 1.7 Health, Safety and Environment requirements: • PPE (gloves, mask, safety boots, goggles, earplugs) • Workplace and personal safety. • Housekeeping			
2. Carry out industrial embroidery machine test run.	2.1 IEM test mode procedure. 2.2 Procedure and method to check operation of all electronic parts. 2.3 Procedure and method to check IEM operation without fabric. 2.4 IEM testing requirements such as • Speed limit • Vibration • X-Y position 2.5 IEM test run status (such as issues,	2.1 Set IEM test mode. 2.2 Check operation of all electronic parts. 2.3 Check IEM operation without fabric. 2.4 Rectify issues/inform relevant parties of any discrepancies.	<u>ATTITUDE</u> • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Test IEM functions properly. <u>SAFETY</u> • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety.	2.1 IEM operation checking procedures, method and other relevant information retrieved from user's and manufacturer's manual. 2.2 Rectification method and other relevant information retrieved from user's and manufacturer's manual. 2.3 IEM functions and operation confirmed based on testing requirements. 2.4 Issues on discrepancies informed to relevant parties according to reporting procedure.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	condition). 2.6 Method to rectify issues/errors. 2.7 Reporting procedure.		ENVIRONMENT • Practise good housekeeping.	2.5 Personal and workplace safety as well as good housekeeping practised at all times.
3. Carry out design testing.	3.1 Test run design requirements such as: • Sample design. • Embroidery technique (hooping/framing, direct onto interlining/fabric). • Design testing materials. 3.2 Procedure to place design testing materials at IEM. 3.3 Procedure to set design starting point on frame. 3.4 Method to trace design outline within embroidery area. 3.5 Procedure to test and monitor design sample on materials.	3.1 Identify test run design requirements. 3.2 Place design testing materials at IEM. 3.3 Set design starting point on frame. 3.4 Trace design outline within embroidery area. 3.5 Test design sample on materials. 3.6 Monitor design testing in progress.	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Test design requirements properly. SAFETY • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	3.1 Test run design requirements explained. 3.2 Design testing procedures, method and other relevant information retrieved from user's and manufacturer's manual. 3.3 Design starting point set on frame. 3.4 Design outline traced properly within embroidery area. 3.5 Design sample tested on materials 3.6 Personal and workplace safety as well as good housekeeping practised at all times.
4. Check embroidery defect.	4.1 Embroidery design specifications (type, size, placement, appearance). 4.2 Types of defect:	4.1 Check embroidery design. 4.2 Identify type of defect. 4.3 Identify defect causes. 4.4 Record defect causes	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery	4.1 Embroidery design specifications explained. 4.2 Type of defect and its causes explained. 4.3 Embroidery defect checking

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Appearance (stitches, tie off) • Quality (not meeting standard) 4.3 Defect causes: • Machine • Design • Human error • Materials 4.4 Procedure and method to solve embroidery various defects/ problems. 4.5 Method to test embroidery design after solution.	(machine, design, human error, materials). 4.5 Identify type of defect solutions. 4.6 Solve IEM various defects/problems. 4.7 Test embroidery design after solution.	machine manual instructions. • Check IEM defect thoroughly. <u>SAFETY</u> • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping.	procedures, method and other relevant information retrieved from user's and manufacturer's manual. 4.4 IEM various defects/problems solved according to identified solutions. 4.5 Embroidery design tested after solution. 4.6 Personal and workplace safety as well as good housekeeping practised at all times.
5. Carry out workplace housekeeping after IEM test run.	5.1 IEM test run status. 5.2 Recording format. 5.3 Work organisation method for organising workplace area and TEM such as: • Positioning of IEM component. • 5S. 5.4 Waste disposal procedure such as 3R (Reduce/Reuse/ Recycle). 5.5 Categories of waste:	5.1 Record IEM test run results. 5.2 Arrange work place area. 5.3 Upkeep work area and used TEM. 5.4 Return used TEM to designated area. 5.5 Dispose of waste.	<u>ATTITUDE</u> • Comply with work instructions • Work conscientiously within allocated time • Accurate, thorough and timely in maintaining records. <u>SAFETY</u> • Maintain workplace safety.	5.1 IEM test run results recorded according to required format. 5.2 TEM cleaned and placed properly. 4.2 Waste disposal procedure explained and complied with according to regulatory requirements. 5.3 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Non chemical materials • Chemical substances		ENVIRONMENT • Practise good housekeeping. • Adhere to environmental act.	

15.4. Industrial Embroidery Machine Periodic Maintenance

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
COMPETENCY UNIT TITLE	Industrial Embroidery Machine Periodic Maintenance		
LEARNING OUTCOMES	The outcome of this competency unit is the effective and efficient maintenance of industrial embroidery machines according to user's and manufacturer's manual and SOP. Proper periodic maintenance enhances the quality of output, durability and life span of the industrial embroidery machines. Upon completion of this competency unit, trainees shall be able to: 1. Prepare industrial embroidery machine maintenance requirements. 2. Carry out industrial embroidery machine daily maintenance. 3. Carry out industrial embroidery machine scheduled maintenance. 4. Carry out workplace housekeeping after IEM Periodic Maintenance.		
TRAINING PRE-REQUISITE	N/A		
CU CODE	C331-005-2:2018-C04	NOSS LEVEL	2

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare industrial embroidery machine maintenance requirements.	1.1 Types and features of industrial embroidery machines such as: • Tubular • Flat 1.2 Types of industrial embroidery machine head and quantity: • Single head • Multi head (2, 4, 6, 8, 12, 18, 20,…56)	1.1 Identify types and features of industrial embroidery machines. 1.2 Identify types of industrial embroidery machine head and quantity. 1.3 Identify industrial embroidery machine parts, components and accessories 1.4 Select machine	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. SAFETY • Use tools in a safe manner. • Wear Personal	1.1 Types and features of industrial embroidery machines in machine maintenance listed and confirmed according to work instructions. 1.2 Types of industrial embroidery machine head and quantity differentiated and listed 1.3 Industrial embroidery machine parts, components and accessories listed based on

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	1.3 Industrial embroidery machine parts, components and accessories: • Accessories (thread stand, table, frame, lamp, bobbin winder and levelling base) • Mechanical components (machine body, head, needle guide, rotary hook base, X and Y-axis driving system) • Electrical and electronic components (such as Servo Motor/ /Induction Motor/ Stepping Motor, solenoid, main controller box, operation box, X, Y driver box, thread detector) 1.4 Machine maintenance tools, equipment and materials (TEM) and documentation	maintenance tools, equipment, materials and documentations. 1.5 Interpret machine maintenance procedure and sequence 1.6 Arrange machine maintenance tools, equipment and materials.	Protective Equipment (PPE) at all times. • Maintain workplace safety. <u>ENVIRONMENT</u> • Practise good housekeeping.	IEM types. 1.4 Machine maintenance procedures and sequence retrieved from user's and manufacturer's manual. 1.5 Correct machine maintenance tools, equipment, materials (TEM) and documentation selected and organised in a safe manner. 1.6 Personal and workplace safety as well as good housekeeping practised at all times.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	requirements: • Hand tools (such as adjustable spanner, pliers, Allen key, levelling tools) • Hand drill • Testing equipment (such as Multi meter, test pen, test lamp) • Connectors (such as cable tie, cable clip) • Mounting rubber • User's and manufacturer's manual 1.5 IEM machine maintenance document and relevant references: • maintenance schedule • machine instruction manuals • user's manual • manufacturer's manual • SOP			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	1.6 Machine maintenance procedure and sequence. 1.7 Health, Safety and Environment requirements: • PPE (gloves, mask, safety boots, goggles, earplugs) • Workplace and personal safety. • Housekeeping			
2. Carry out industrial embroidery machine daily maintenance.	2.1 Industrial embroidery machine physical condition. 2.2 Procedure and method to apply oil to IEM moving components. 2.3 Procedure and method to remove excess oil from parts and components. 2.4 Procedure and method to reset embroidery design origin. 2.5 Relevant documents and manuals for reference.	2.1 Check IEM physical condition. 2.2 Restore IEM physical condition (if any discrepancies). 2.3 Apply oil to IEM moving components. 2.4 Remove excess oil from parts and components. 2.5 Execute embroidery design origin resetting.	<u>ATTITUDE</u> • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Maintain IEM accordingly. <u>SAFETY</u> • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety.	2.1 IEM physical condition assessed. 2.2 Daily maintenance procedures and other relevant information retrieved from user's and manufacturer's manual. 2.3 Correct maintenance tools, equipment and materials (TEM) and documentation selected, handled and utilised in a safe manner. 2.4 IEM physical condition restored. 2.5 Oil applied to moving IEM components. 2.6 Excess oil removed from parts

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
			ENVIRONMENT • Practise good housekeeping.	and components. 2.7 Embroidery design origin reset. 2.8 Personal and workplace safety as well as good housekeeping practised at all times.
3. Carry out industrial embroidery machine scheduled maintenance.	3.1 Maintenance schedule information (date, machine serial/identification number, maintenance duration). 3.2 Physical condition to be checked: • Needle • Hook • Needle guide 3.3 Procedure and method to check and adjust IEM physical condition. 3.4 Procedure and method to upkeep IEM components. 3.5 Procedure and method to apply oil and grease to moving IEM components.	3.1 Check maintenance schedule information. 3.2 Check required tools, equipment, materials and spare parts. 3.3 Check IEM physical condition. 3.4 Adjust IEM physical condition (if necessary). 3.5 Upkeep IEM components. 3.6 Apply oil and grease to moving IEM components. 3.7 Remove oily threads from needle bar. 3.8 Execute embroidery design origin resetting.	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Maintain IEM accordingly. SAFETY • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	3.1 IEM physical condition assessed. 3.2 Scheduled maintenance procedures and other relevant information retrieved from user's and manufacturer's manual. 3.3 Correct maintenance tools, equipment, materials (TEM) and documentation selected and handled and utilised in a safe manner. 3.4 IEM physical condition adjusted according to machine's specification. 3.5 Moving IEM components oiled and greased as per procedure. 3.6 Oily threads removed from needle bar 3.7 Embroidery design origin reset. 3.8 Personal and workplace safety as well as good housekeeping

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	3.6 Procedure and method to remove oily threads from needle bar. 3.7 Procedure and method to reset embroidery design origin.			practised at all times.
4. Carry out workplace housekeeping after IEM Periodic Maintenance.	4.1 IEM periodic maintenance status. 4.2 Recording format. 4.3 Work organisation method for organising workplace area and TEM such as: • Positioning of IEM component. • 5S. 4.4 Waste disposal procedure such as 3R (Reduce/Reuse/ Recycle). 4.5 Categories of waste: • Non chemical materials • Chemical substances	4.1 Record IEM periodic maintenance results. 4.1 Arrange work place area. 4.2 Upkeep work area and used TEM. 4.3 Return used TEM to designated area. 4.4 Dispose of waste.	ATTITUDE • Comply with work instructions • Work conscientiously within allocated time • Accurate, thorough and timely in maintaining records SAFETY • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping. • Adhere to environmental act.	4.1 IEM periodic maintenance results recorded according to required format. 4.2 TEM cleaned and placed properly. 4.3 Waste disposal procedure explained and complied with according to regulatory requirements. 4.3 Personal and workplace safety as well as good housekeeping practised at all times.

15.5. Industrial Embroidery Machine Repair

SECTION	(C) Manufacturing		
GROUP	(331) Repair and Maintenance of Industrial Machinery and Equipment		
AREA	Apparel Manufacturing Machine Maintenance		
NOSS TITLE	Industrial Embroidery Machine Maintenance		
COMPETENCY UNIT TITLE	Industrial Embroidery Machine Repair		
LEARNING OUTCOMES	The outcome of this competency unit is the efficient and effective restoration of malfunction/breakdown industrial embroidery machines to normal operating performance in compliance with user's/manufacturer's manual, workplace procedures and Health, Safety and Environment (HSE) requirements. Upon completion of this competency unit, trainees shall be able to: 1. Carry out clarification on repair activity requirements. 2. Arrange repairing work schedule and preparation. 3. Repair industrial embroidery machine defect/problem. 4. Carry out workplace housekeeping after IEM repair activities.		
TRAINING PRE-REQUISITE	N/A		
CU CODE	C331-005-2:2018-C05	NOSS LEVEL	2

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Carry out clarification on repair activity requirements.	1.1 Job instruction detailed information. 1.2 Method to clarify information in job instructions. 1.3 Type of IEM breakdown/ malfunction such as: • Mechanical • Electronic 1.4 IEM breakdown/	1.1 Clarify job instructions. 1.2 Identify type of IEM breakdown/ malfunction. 1.3 Identify quantity and location of malfunctioning IEM. 1.4 Assess duration for repairing work. 1.5 Check readiness and	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions.	1.1 Type of IEM breakdown explained according to job instructions. 1.2 Time frame for repairing work determined. 1.3 Repairing procedures and other relevant information retrieved from job instructions. 1.4 Readiness and safety of designated repair area

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	malfunction information (quantity and location of malfunctioned/failed IEM). 1.5 Readiness and safety of designated repair area. 1.6 Work procedure and HSE requirements. 1.7 Suitable tools, equipment and materials (TEM) and Personal Protective Equipment (PPE) required for repairing activities.	safety of designated repair area.	SAFETY • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	determined and checked. 1.5 Personal and workplace safety as well as good housekeeping practised at all times.
2. Arrange repairing work schedule and preparation.	2.1 Repair location and destination for preparation of TEM and PPE. 2.2 IEM repair guidelines and historical data. 2.3 Parts logistic and travelling arrangement. 2.4 Communication technique to ensure arrangement completion.	2.1 Check preparation of TEM and PPE for repair work. 2.2 Study IEM repair guidelines and historical data. 2.3 Check parts logistic arrangement. 2.4 Check travelling arrangements for on-site repair venue.	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Cost conscious when planning for travelling arrangement.	2.1 Correct repairing tools, equipment, materials (TEM) and documentation selected, handled and utilised in a safe manner. 2.2 IEM parts logistic and travelling arrangement explained. 2.3 IEM repair guidelines and historical data explained. 2.4 Travelling arrangements for on-site repair location determined.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
			SAFETY • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	2.5 Personal and workplace safety as well as good housekeeping practised at all times.
3. Repair industrial embroidery machine defect/problem.	3.1 Suitable type of barricades and signage at repair/work area. 3.2 Procedure and method to prepare barricades and signage at work area. 3.3 Procedure and method to test malfunctioning IEM and faulty components. 3.4 Procedure and method to rectify malfunctioning IEM. 3.5 Procedure and method to test repaired IEM operation and performance. 3.6 Correct utilisation of TEM and PPE.	3.1 Prepare suitable barricades and signage at work area. 3.2 Test malfunctioning IEM and faulty components. 3.3 Check IEM defect/failure complexity. 3.4 Determine IEM malfunction causes and solutions. 3.5 Carry out rectification work on malfunctioning IEM. 3.6 Test repaired IEM operation and performance. 3.7 Use TEM and PPE. 3.8 Document breakdown	ATTITUDE • Comply with work instructions. • Comply with industrial embroidery machine manual instructions. • Repair IEM properly. SAFETY • Wear Personal Protective Equipment (PPE) at all times. • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping.	3.1 Suitable barricades and signage placed at work area. 3.2 Malfunctioning IEM and faulty components tested according to repairing procedures and other relevant information retrieved from user's and manufacturer's manual. 3.3 IEM malfunction causes and solutions identified. 3.4 Malfunctioning IEM repaired according to identified solution. 3.5 Repaired IEM operation and performance tested. 3.6 Correct repairing tools, equipment, materials (TEM) and documentation utilised, handled and utilised in a safe

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	3.7 Recording procedure and format.	data findings, solutions and production downtime.		manner. 3.7 Breakdown data findings, solutions and production downtime information recorded according to required format. 3.8 Personal and workplace safety as well as good housekeeping practised at all times.
4. Carry out workplace housekeeping after IEM repair activities.	4.1 IEM repairing status. 4.2 Recording format. 4.3 Work organisation method for organising workplace area and TEM such as: • Positioning of IEM component. • 5S. 4.4 Waste disposal procedure such as 3R (Reduce/Reuse/ Recycle). 4.5 Categories of waste: • Non chemical materials • Chemical substances	4.1 Record IEM repairing results. 4.2 Arrange work place area. 4.3 Upkeep work area and used TEM. 4.4 Return used TEM to designated area. 4.5 Dispose of waste.	ATTITUDE • Comply with work instructions • Work conscientiously within allocated time • Accurate, thorough and timely in maintaining records SAFETY • Maintain workplace safety. ENVIRONMENT • Practise good housekeeping. • Adhere to environmental act.	4.4 IEM repairing results recorded according to required format. 4.5 TEM cleaned and placed properly. 4.6 Waste disposal procedure explained and complied with according to regulatory requirements. 4.7 Personal and workplace safety as well as good housekeeping practised at all times.

Employability Skills

Core Abilities

- Please refer to the NCS- Core Abilities latest edition.

Social Values & Social Skills

- Please refer to the Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 http://www.barudanamerica.com/assets/files/BEXS-SC-MK5.pdf, Part List, 21 July 2017, 14:52
2 http://www.barudanamerica.com/assets/files/BEXT-S1501CB2-MK5.pdf, Part List, 21 July 2017, 14:46
3 http://www.barudanamerica.com/assets/files/client_area/CAII_Maintenance_Manual%20revised5.pdf, Maintenance Guide, 21 July 2017, 14:45
4 http://www.barudanamerica.com/assets/files/client_area/knowledge_base/InstallationandMaintenance/KBHookTiming.pdf, Hook Timing, 21 July 2017, 14:49
5 http://www.barudanamerica.com/assets/files/client_area/knowledge_base/SewingHeadManuals/TL02006zqheadmanual.pdf, Needle Depth Adjustment, 21 July 2017, 14:48
6 http://www.barudanamerica.com/assets/files/client_area/parts/XY-Z12-Z15C_R2.pdf, Part List, 21 July 2017, 14:47
7 http://www.barudanamerica.com/assets/files/EliteXLLubrication.pdf, Lubrication Instructions, 21 July 2017, 14:47
8 http://www.barudanamerica.com/assets/files/FZ0QJ40%20BEXY-SC%20II(1).pdf, Part List, 21 July 2017, 14:46
9 http://www.barudanamerica.com/assets/files/Instruction_manual_for_SH_head_[Ver.20130208-1]r3b.pdf, Instruction Manual, 21 July 2017, 14:49
10 http://www.barudanamerica.com/assets/files/MK-7%20Maintenance%20manual%20Vol.3_r1.pdf, MK-7 Maintenance Manual, 21 July 2017, 14:41

16. Delivery Mode

The following are the **recommended** training delivery modes:-

KNOWLEDGE	SKILL
• Lecture • Group discussion • E-learning, self-paced • E-learning, facilitated • Case study or Problem based learning (PBL) • Self-paced learning, non-electronic • One-on-one tutorial • Shop talk • Seminar	• Demonstration • Simulation • Project • Scenario based training (SBT) • Role play • Coaching • Observation • Mentoring

17. Tools, Equipment and Materials (TEM)

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

CU No.	CU CODE	COMPETENCY UNIT TITLE
CU1	C331-005-2:2018-C01	Industrial Embroidery Machine Installation
CU2	C331-005-2:2018-C02	Industrial Embroidery Machine Set Up
CU3	C331-005-2:2018-C03	Industrial Embroidery Machine Test Run
CU4	C331-005-2:2018-C04	Industrial Embroidery Machine Periodic Maintenance
CU5	C331-005-2:2018-C05	Industrial Embroidery Machine Repair

* Items listed refer to TEM's **minimum requirement** for skills delivery only.

No	ITEM*	RATIO (TEM : Trainees)	CU1	CU2	CU3	CU4	CU5
A. Tools			**Tick (√) where relevant**				
1	Common tools (Screw driver, Allen key, spanner)	1:1	√	√	√	√	√
2	Housekeeping tools (broom, wet cloth)	As per required	√	√	√	√	√
3	Levelling tools	1:5	√				
4	Multimeter	1:1	√	√			
5	Crowbar	1:10	√				
6	Hammer	1:10	√	√	√	√	√
B. Equipment			**Tick (√) where relevant**				
1	Industrial Embroidery Machine (Tubular/Flat)	1:10	√	√	√	√	√
2	Computer with design application	1:10		√	√	√	√

3	Forklift	1:25	√	√			
4	Trolley	1:5	√	√			
5	Roller set	1:10	√	√			
6	Pallet jack	1:10	√	√			
7	Hand jack	1:25	√	√			
8	Barricades and signage	1:5	√	√	√	√	√
9	Personal Protective Equipment (PPE) (Mask, ear plug, safety boots, gloves)	1:1	√	√	√	√	√
C. Materials			**Tick (√) where relevant**				
1	Sample design	1:5	√	√			
2	Fabric/interlining	1:5		√	√	√	
3	IEM accessories (Needle, thread, frame, hoop)	1:5	√	√		√	√
4	Document for references (SOP, manufacturer's manual, user's manual, breakdown record, maintenance schedule)	1:1	√	√	√	√	√
5	IEM lubricants (oil, grease)	As per required	√			√	√

18. Training Hours Summary

The following table shows the nominal training hours based on recommendations made by the Standard Development Committee (SDC). For the purpose of Malaysian Skills Certification through accredited centre training, the programme duration is subject to the Malaysian Skills Certification System.

INDUSTRIAL EMBROIDERY MACHINE MAINTENANCE

LEVEL 2

CU CODE	COMPETENCY UNIT TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (HOURS)	RELATED SKILLS (HOURS)	TRAINING DURATION (HOURS)	SKILLS CREDIT
C331-005-2:2018-C01	Industrial Embroidery Machine Installation	Prepare work area, tools, equipment and materials for IEM installation	8	16	130	13
		Arrange industrial embroidery machine unloading work	8	16		
		Check industrial embroidery machine components	3	5		
		Place industrial embroidery machine to production area	3	5		
		Carry out industrial embroidery machine balancing	16	24		
		Install industrial embroidery machine accessories	6	12		

		Carry out workplace housekeeping after IEM installation	2	6		
C331-005-2:2018-C02	Industrial Embroidery Machine Set Up	Prepare work area, tools, equipment and materials for IEM set up	5	11	80	8
		Carry out industrial embroidery machine accessories setting	14	34		
		Check hook timing	2	6		
		Carry out workplace housekeeping after IEM Set Up	2	6		
C331-005-2:2018-C03	Industrial Embroidery Machine Test Run	Prepare work area, tools, equipment and materials for IEM test run	1	3	40	4
		Carry out industrial embroidery machine test run	4	8		
		Carry out design testing	4	8		
		Check embroidery defect	2	6		
		Carry out workplace housekeeping after IEM test run	1	3		

C331-005-2:2018-C04	Industrial Embroidery Machine Periodic Maintenance	Prepare industrial embroidery machine maintenance requirements	8	16	240	24
		Carry out industrial embroidery machine daily maintenance	22	50		
		Carry out industrial embroidery machine scheduled maintenance	36	84		
		Carry out workplace housekeeping after IEM Periodic Maintenance	8	16		
C331-005-2:2018-C05	Industrial Embroidery Machine Repair	Carry out clarification on repair activity requirements	8	24	320	32
		Arrange repairing work schedule and preparation	24	40		
		Repair industrial embroidery machine defect/problem	64	128		
		Carry out workplace housekeeping after IEM repair activities	10	22		
TOTAL HOURS (CORE COMPETENCY)			261	549	810	81