SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Occupation: Senior Machinist/Senior Technician

Occupation Description:

The Senior Machinist/Senior Technician operates a variety of equipment/machines to fabricate components and parts. He/She also adapts procedures to troubleshoot and diagnose routine problems, and handles the maintenance of machines.

He/She actively contributes to innovation by suggesting areas of improvement to enhance productivity and efficiency of work processes.

He/She works in a team to achieve production and quality targets, while complying with and reporting deviances in Workplace Safety and Health requirements..

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The skills expected of the Senior Machinist/Senior Technician are summarised as below:

Skill Category	Skill Sub-Category	Skills	
Technical and Engineering Fundamentals		**PRE-TEF-2008-1**	Apply Computer and Information Technology
		PRE-TEF-2009-1	Apply Computer-aided Drafting and Design
		PRE-TEF-2010-1	Apply Computer-aided Manufacturing (CAM) Processes
		PRE-TEF-2011-1	Handle Machine Tools and Apply Lubrication
		PRE-TEF-2012-1	Set Up and Operate Coordinate Measuring Machine
		PRE-TEF-2013-1	Write Software Programmes
Technical and Engineering Design		**PRE-TED-2001-1**	Apply Machine Elements
		PRE-TED-2002-1	Design Electric Drives and Electro-Mechanical Systems
		PRE-TED-2003-1	Design Handling Systems in Industrial Automation
Precision Manufacturing Processes		**PRE-PMP-2018-1**	Assemble Simple Drive Mechanism
		PRE-PMP-2019-1	Implement Programming of Programmable Logic Controllers
		PRE-PMP-2020-1	Perform Advanced Gas Tungsten Arc Welding
		PRE-PMP-2021-1	Perform Diffusion Bonding of Material
		PRE-PMP-2022-1	Perform Geometric Tolerance and Inspection
		PRE-PMP-2023-1	Perform Machining

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Skill Category	Skill Sub-Category	Skills	
		PRE-PMP-2012-1	Perform Material Hot Processing
		PRE-PMP-2013-1	Perform Non-conventional Cutting Process
		PRE-PMP-2014-1	Perform Non-destructive Testing
		PRE-PMP-2015-1	Perform Optical Digitising
		PRE-PMP-2016-1	Perform Surface Coating
		PRE-PMP-2017-1	Perform Surface Preparation and Finishing
Maintenance		**PRE-MAI-2001-1**	Diagnose and Rectify Faults in Equipment and Circuits
		PRE-MAI-2002-1	Maintain and Repair Hydraulic Systems
		PRE-MAI-2003-1	Maintain and Repair Pneumatic Systems
		PRE-MAI-2004-1	Maintain Common Tools and Workshop Equipment
Quality		**PRE-QUA-1001-1**	Apply Quality Systems
		PRE-QUA-2002-1	Perform Dye/Liquid Penetrant Testing
		PRE-QUA-2003-1	Perform Eddy Current Testing
		PRE-QUA-2004-1	Perform Magnetic Particle Testing
Workplace Safety and Health		**PRE-WSH-2003-1**	Apply Workplace Safety and Health Policies
		PRE-WSH-1001-1	Apply Workplace Safety and Health in Metal Work
		PRE-WSH-1002-1	Identify Hazards and Maintain Risk Control Measures

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Skill Category	Skill Sub-Category	Skills	
Manufacturing Productivity and Innovation		**PRE-MPI-2004-1**	Apply Basic Lean Techniques in the Workplace
		PRE-MPI-2005-1	Apply Lean Thinking in the Workplace
Service Excellence		**SVCF-CS-101C-1**	Provide Go-the-Extra-Mile Service
		SVCF-CS-103C-1	Respond to Service Challenges
Personal Management and Development		**ES-PMD-104G-1**	Adapt to Change
		ES-PMD-103G-1	Apply Emotional Competence to Manage Self at the Workplace
		ES-PMD-101G-1	Develop Personal Effectiveness at Operations Level
		ES-PMD-102G-1	Maintain Personal Presentation and Employability at Operations Level
Analytical, Conceptual and Evaluative		**ES-ACE-101G-1**	Demonstrate Initiative and Enterprising Behaviour
		ES-ACE-302G-1	Solve Problems and Make Decisions at Supervisory Level
Interpersonal		**ES-IP-101G-1**	Communicate and Relate Effectively at the Workplace
		ES-IP-102G-1	Work in a Team

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-TEF-2008-1</td><td>Skill Category</td><td>Technical and Engineering Fundamentals</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill Title</td><td colspan="3">Apply Computer and Information Technology</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to apply computing techniques to solve problems. It also includes the ability to use both hardware and software components to process and communicate information and solve problems.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Types and application of computer – desktop, laptop, tablet, etc
• Types and application of software – word processing, spreadsheet, information retrieval/file management systems, data-logging, etc
• Types and application of peripheral devices
• Data protection, privacy and data integrity
• Files management and storage
• Computer security and usage
• Intellectual property rights
• Information/data presentation
• Good documentation practices</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Set up computer and peripheral devices according to manufacturer instructions
• Select and use appropriate software to process information/data according to job requirements
• Check and verify the status of external devices(s) and files to be secured and virus-free
• Operate computer to process information/data using appropriate technique(s) and in accordance with organisational procedures
• Interpret and organise information to facilitate problem-solving and communication of data
• Print hardcopy of completed work in the approved format according to organisational procedures and in sufficient quantity
• Manage and save completed work in the approved file format using appropriate file name in accordance with organisational procedures
• Update document(s) according to approved format and is legible, accurate and complete</td></tr>
</table>

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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Clarify details of work to be carried out based on given work instructions • Provide constructive and positive feedback to enhance team-working
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge
Range of Application (where applicable) *It refers to the critical circumstances that the skill may be demonstrated.*	Tools and equipment must include: • Computer and peripheral devices Rules and regulations must include: • Personal Data Protection Act • Copyright Act

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-TEF-2009-1</td><td>Skill Category</td><td>Technical and Engineering Fundamentals</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Apply Computer-aided Drafting and Design</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to produce assembly, detail and layout drawings using a computer-aided drafting and design (CAD) software. It also includes the ability to identify design needs, generate CAD drawings, validate and store CAD drawings.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Safety and health procedures
• Organisational procedures
• International/industry drawing and design practices and standards
• Use of relevant engineering tables and catalogues including electronic searches and databases
• Design concepts and practices
• Application of library catalogues
• Types of drawings including detail, assembly and layout
• Line types, line thickness and their uses
• Geometrical constructions of 2D and 3D objects
• Orthogonal projections including first and third angle projections and views
• Sectioning methods
• Development and use of object libraries
• Dimensioning and projection lines
• Fits and tolerances
• Drawing/drafting symbols
• Use of relevant CAD analysis
• Drawing documentation</td></tr>
</table>

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Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Obtain and clarify design objectives • Define and verify design constraints, functions and specifications in accordance with design requirements • Identify and verify materials, machining/manufacturing processes and relevant technical information in accordance with design specifications • Plan and review design scope, budget and schedule in accordance with design requirements • Carry out measurements required for preparation of drawings in accordance with organisational procedures • Generate and review preliminary design/drawings in accordance with design specifications • Conduct final review of all drawings in accordance with organisational procedures • Control the release of authorised document in accordance with organisational procedures • Document drawings and associated data in accordance with organisational procedures • Store and safeguard drawings and associated data using appropriate storage media • Clear and purge all unwanted or unauthorised drawings and information generated during the drafting activities in accordance with organisational procedures • Return printed copy of all authorised drawings or CAD files after use • Manage version control of the completed and authorised drawings in accordance with organisational and quality system procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Create/expand library of common components drawings to enhance drawing efficiency

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Clarify details of work activities to be carried out based on given work instructions • Communicate/consult all dimensional amendments with designers for drawings to be kept updated
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own drafting/design skills and knowledge • Keep up-to-date on changes in drawing/design standards • Find ways to improve/simplify drawing/drafting methods to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Measuring devices • Calculator • Computer • Appropriate CAD/CAM software Procedures and supporting documents must include: • Organisational procedures • Parts specifications • Work instructions • CAD/CAM software manufacturers' specifications Rules and regulations must include: • Workplace Safety and Health Act • Industry codes and guidelines • Organisational code of practice • International and/or relevant organisational and/or industry drafting and design standard

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-TEF-2010-1</td><td>Skill Category</td><td>Technical and Engineering Fundamentals</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Apply Computer-aided Manufacturing (CAM) Processes</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to use Computer-Aided Manufacturing (CAM) system to generate CNC part programs for CNC machining. It also includes the ability to identify task requirements, generate 2D or 3D models, navigate CAD/CAM software applications and generate CNC part programs.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Knowledge on engineering tables and catalogues
• Knowledge on electronic data input and storage
• Knowledge on machining process and sequences
• Comprehending technical drawing specifications of the work piece
• Knowledge on machine tool limitations
• Workplace Safety and Health procedures for general machining
• Knowledge on set-up and CNC machining
• Computer specifications, graphic and processing requirements</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Gather part specifications, quality standards, manufacturing processes, costs, resources and equipment, time frame and milestone for delivery of CAM programs
• Access and interpret international drawing conventions and standards
• Create the CAD model using the CAM system
• Configure appropriate system variables and defaults for processing the tool paths
• Select appropriate cutting tools and machining parameters for the tool paths
• Generate the tool paths
• Verify the tool paths for possible cutting or galling errors
• Convert the tool paths into CNC part programs using the post-processor
• Store CNC part programs and associated technical data according to established organisational procedures</td></tr>
</table>

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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Consider the need of using proper fixtures to reduce set-up time and maintain positioning accuracy • Test out machining parameters with different cutting tool materials to optimise outcome and improve cutting tool life • Compare and contrast production outcomes against standard time to seek means of possible improvement in output time • Organise work approach and review methods to reduce operational time
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Clarify details of work activities to be carried out based on given work instructions • Communicate/consult all dimensional amendments with designers for drawings to be kept updated
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Reflect on machining approach and possible ways to improve productivity • Compare and contrast machining data of different types of cutting tool materials for productivity and cost evaluation • Communicate with fellow machinist to exchange data and approach for issues encountered
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Computer system and compatible software • Goggles • Safety shoes Appropriate CAM software must include: • Unigraphics • Master CAM • Delcam • Catia • Pro-E

	• Hypermill Procedures and supporting documents must include: • Organisational procedures • Parts specifications • Work instructions • CAD/CAM software manufacturers' specifications Rules and regulations must include: • Workplace Safety and Health Act

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Skill Code	PRE-TEF-2011-1	**Skill Category**	Technical and Engineering Fundamentals
		Skill Sub-Category *(where applicable)*	N/A
Skill	Handle Machine Tools and Apply Lubrication		
Skill Description	This skill describes the ability to handle machine tools and apply lubricants. It also includes the ability to identify the type of machine tools, evaluate the tools and tool holders, review EDM and wire cut operations, review the types of lubricants and the methods of lubrication.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Definition of machine tools • Types of machine tools • Principles of machine tool operation • Function of various parts of a machine tool • Purpose of tools and tool holders • Materials for EDM electrodes • Sizes of wires for wire cut machines • Definition of lubricant • Consequences of lubricant contamination		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Identify the type of machine tool by their operation principles • Review the parts of a machine tool • Evaluate the tools and tool holders • Review EDM and wire cut operations • Review the type of lubricant and methods of lubrication • Test out machining parameters for conformance		
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned*	The ability to: • Anticipate possible failure of equipment and measures to take • Generate ideas to prolong the life span of hand tools • Organise work approach and review methods to reduce operational time		

to organisational goals.	
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report dysfunctional equipment to the attention of superiors to repair or replace where appropriate • Share best practices with co-workers in Workplace Safety and Health requirements
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Create SOP and highlight possible pitfalls • Learn and share on approaches to use hand tools that may enhance/ease the job and minimise errors • Keep up-to-date on latest knowledge and innovations in hand tools • Compare and contrast machine accuracy repeatability • Record challenges encountered and effective solutions discovered • Use relevant engineering tables and catalogues including electronic searches and databases
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Personal protective equipment • Production machine tools • Assembly tools • Test equipment and tools to measure • Lubricants Procedures and supporting documents must include: • Maintenance plan/guide • Job sheets

	• Technical drawings • Machine operation manual • Reference charts • Maintenance plan • Lubrication recommendations and guidelines • Mineral oil and synthetic liquid • Classification and grades Rules and regulations must include: • Workplace Safety and Health Act

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Skill Code	PRE-TEF-2012-1	**Skill Category**	Technical and Engineering Fundamentals
		Skill Sub-Category *(where applicable)*	N/A
Skill	Set Up and Operate Coordinate Measuring Machine		
Skill Description	This skill describes the ability to set up and operate coordinate measuring machines (CMM). It also includes the ability to observe safety precautions, identify task requirements, set up components, configure program and probes, measure components and refurbish machines, equipment and tools.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Use of equipment, machines, protective clothing and eyewear in accordance with safety and health procedures • Potential hazards and appropriate minimisation and control methods • Workplace practices, task planning and interpretation of task, job and production sheets • Quality procedures in the workplace • Principles and application of CMM • Types of tools and fixtures • Types and application of probes • Procedures for setting CMM • Methods and techniques of measurement • Measurement records		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Inspect equipment for serviceability in accordance with safety, health and organisational procedures • Select and use personal protective equipment in accordance with safety, health and organisational procedures • Identify relevant drawings, job sheets, job specifications and any additional documentation for the task in accordance with job requirements and organisational procedures • Conduct pre-operation checks to verify the condition of CMM in accordance with organisational procedures • Set up CMM in accordance with safety, health and organisational procedures • Set up component securely and correctly oriented for maximum measurement access • Select and verify appropriate part program in accordance with organisational procedures • Select appropriate probes and determine appropriate probe		

	configuration in accordance with specifications • Set up probe in accordance with specifications and organisational procedures • Edit CMM program to incorporate component specification changes and to compensate for errors • Run and validate part program in accordance with organisational procedures • Measure components in accordance with organisational procedures • Record and interpret results of measurements for conformance to specification within tolerances according to organisational procedures • Shut down part program and remove components in accordance with organisational procedures • Upkeep production logs and records correctly in accordance with organisational procedures • Shut down CMM and perform housekeeping in accordance with safety, health and organisational procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Create/expand library of common components to enhance measurement efficiency
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Communicate all dimensional/part programs amendments with engineers for drawings to be kept updated • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Keep up-to-date on changes in measurement standards • Find ways to improve/simplify measuring methods to enhance part

work.	programs/productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and Equipments must include: • Personal protective equipment • Tools and fixtures • Test equipment and tools to measure Procedures and supporting documents must include: • For carrying out dimensional and geometric measurement • Standard workplace/organisational operating procedures • Relevant workplace safety procedures Rules and regulations must include: • Workplace Safety and Health Act • Current WSH policies • Code of practices on weights and measures

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Skill Code	PRE-TEF-2013-1	**Skill Category**	Technical and Engineering Fundamentals
		Skill Sub-Category *(where applicable)*	N/A
Skill	Write Software Programmes		
Skill Description	This skill describes the ability to compile/edit software programs and apply them to a variety of software applications and requirements within the precision engineering workplace. It also includes the ability to prepare for work-based software writing activities, analyse control requirements or software program flow chart, determine code requirement and compile software program, test software program, prepare document for the program and use of the software and use equipment to ensure that the output conforms to specifications.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Interpretation of control requirements and software program flowchart • Types, characteristics and operating principles of input and output devices • Types and characteristics of PLC, programming input devices and programming software • Operating programming devices and software syntax • Writing, testing and saving software program • Downloading program to PLC, setting up PLC and running PLC • Use of program conformance checklist • Types of storage devices		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Analyse control requirements and software program flow chart • Code and compile software program • Test software program • Prepare documents • Connect programming device to PLC		

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Create/expand library of common components drawings to enhance drawing efficiency • Recommend possible troubleshooting solution for faulty programming devices and software
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty programming devices and software to designated personnel • Report any incomplete work to designated personnel
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work*	The ability to: • Participate in information sharing with colleagues to improve own software programming skills • Recommend modification to programming devices and software • Keep up-to-date on software programme trends
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Input devices • Output devices • Features of programmable logic controllers • Programming devices • Environment Procedures and supporting documents must include: • IEC Standards • Electrical safety standards • Electronic emission safety standards • Software editing quality standards

	• ISO 14000 series • ISO 9000 series • Applicable standards for the industry operating the software Rules and regulations must include: • Workplace Safety and Health Act • Environmental Policy • Organisational Policy

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-TED-2001-1</td><td>Skill Category</td><td>Technical and Engineering Design</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Apply Machine Elements</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to apply knowledge of machine elements in equipment building, manufacturing, production, design, fabrication and assembly work. It also includes determining maintenance needs of machine elements.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Applications of the following machine elements:
  ○ Screw threads
  ○ Bolts and screws
  ○ Countersinks
  ○ Nut
  ○ Washers
  ○ Pins and clevis pins
  ○ Shaft hub connections
  ○ Springs, components of jigs, fixtures and tool
  ○ Drive elements
  ○ Bearings
• Technical drawing and specifications
• Interpreting assembly and schematic drawings
• Identifying measuring and assembly tools required for the job
• Geometric tolerances and requirements
• Selecting appropriate machine elements and corresponding working tools
• Assembly, alignment and securing machine functional units with appropriate machine elements
• Identifying maintenance needs of machine elements</td></tr>
</table>

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Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Gather details of control requirements for designing the handling system • Identify the control sequence based on the control requirements • Select required handling components and required electrical devices based on given control requirements • Design pneumatic and electro-pneumatic circuit and handling circuit in accordance with control requirements • Check completed circuit to ensure that it meets control requirements • Prepare parts list of all components used in the handling system • Connect pneumatic components, electrical devices, test equipment and handling components in accordance to circuit diagram • Test handling system in accordance with established organisational procedures and record testing results in an appropriate document • Shut down handling system in accordance with established organisational procedures • Disconnect all pneumatic components, electrical devices, handling components and test equipment
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Organise work approach and review methods to reduce operational time • Modify to improve performance and operational stability
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty handling systems in accordance with established organisational procedures • Maintain good housekeeping practices in workplace • Report challenges encountered and effective solutions discovered for exchanges and sharing
Learning to Learn *It refers to the ability to develop and improve*	The ability to: • Reflect on work approach and possible ways to improve assembly and maintenance time

one's self within and outside of one's area of work.	• Compare and contrast machine accuracy repeatability • Record challenges encountered and effective solutions discovered for exchanges and sharing • Create SOP and highlight possible pitfalls • Use relevant engineering tables and catalogues including electronic searches and databases
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Personal protective equipment • Goggles • Safety shoes • Machine elements • Test and control equipment • Assembly tools • Lubricants Procedures and supporting documents must include: • Maintenance plan/guide • Work information • Machine elements information chart Rules and regulations must include: • Workplace Safety and Health Act • Environmental legislation and regulations

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Skill Code	PRE-TED-2002-1	**Skill Category**	Technical and Engineering Design
		Skill Sub-Category *(where applicable)*	N/A
Skill	Design Electric Drives and Electro-Mechanical Systems		
Skill Description	This skill describes the ability to operate electric drives and electromechanical systems in a range of industrial applications at the workplace. It also includes the ability to prepare for work activities, carry out design and test of electric drives and electromechanical systems and reinstate work area.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types and usage of electric drives, electromechanical system devices and electrical circuit diagram • Types of hardware and software for design drawing • Interpretation of control requirements and ISO circuit diagram symbols • Industry standards used in operating electric drives and electromechanical systems • Design principles of electrical circuit operation of electric drives and electromechanical system components • Procedure of checking, verifying and amending completed electrical control circuit • Industrial health and safety risks and dangers involved in designing electric drives and electromechanical systems • Recording of observations, defects and other findings • Organisational procedures for submission of completed circuit diagrams, part list and control requirements, for reporting faulty electric drives and electromechanical system device, recording and compiling of work documentation • Proper disposal of waste materials • Housekeeping procedures		

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Gather details of given control requirements for designing electric drives and electromechanical systems • Identify control sequence based on control requirements and electrical diagram • Identify and select required electric drive components and electromechanical system devices based on given control requirements • Draft electric drives and electromechanical system design to fulfil control requirements • Design electric drives and electromechanical systems in accordance with control requirements • Check completed circuit diagram to ensure that it meets control requirements • Make amendments, if any, to completed circuit to meet control requirements • Connect electrical drives, electromechanical system and test equipment in accordance to specification of completed circuit diagram and approved written work instructions • Activate and test electric drives and electromechanical system in accordance with established organisational procedures • Carry out modifications to electric drives and electromechanical system when necessary • Record testing results in an appropriate document • Shut down electric drives and electromechanical system in accordance with established organisational procedures • Disconnect electric drives, electromechanical system devices and test equipment • Label, isolate and report clearly any faulty component or device identified during work activity
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Recommend possible troubleshooting solutions for faulty electric drives and electromechanical systems • Recommend modifications to electric drives and electromechanical systems

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty electric drives and electromechanical systems • Report any incomplete work to designated personnel • Maintain good housekeeping practices in workplace
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own drafting/design skills and knowledge • Keep up-to-date on changes in drawing/design standards • Find ways to improve/simplify carrying out of design and testing of electric drives and electromechanical systems
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Desktop computer or notebook connected to printer • Inventory management system software • Design and modification construction and simulation tools • Workplace Safety and Health signage Procedures and supporting documents must include: • Approved written work instructions • Test procedures • Manufacturer's specifications and instructions • Technical manuals • Design, construction and modification • Simulation tools • Company organisational procedures • Control requirements • ISO circuit diagram symbols • Circuit diagram • Process line up blueprint drawings • Complete parts list • Appropriate work documents • Relevant process control system standards • Quality procedures and applicable procedures

	Rules and Regulations includes: • Workplace Safety and Health Act • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-TED-2003-1	**Skill Category**	Technical and Engineering Design
		Skill Sub-Category *(where applicable)*	N/A
Skill	Design Handling Systems in Industrial Automation		
Skill Description	This skill describes the ability to select and assemble commission and test handling systems in a range of industrial applications within the precision engineering industry. It also includes the ability to prepare for work activities, carry out design of handling systems, assemble and test handling systems and reinstate the work area.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types and usage of pneumatic components, electrical devices, handling systems, displacement-step diagram and electrical diagrams • Interpretation of control requirements and ISO circuit diagram symbols • Design principles of pneumatic circuit operation of pneumatic components, electro-pneumatic circuit and operation of electrical devices, vacuum and gripper components and their operations and handling components and their operations • Procedure for checking, verifying and amending completed pneumatic control circuit • Types of industry standards and industrial health and safety risks in designing handling systems in industrial automation • Types of Personal Protective Equipment (PPE)		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Gather details of control requirements for designing the handling system • Identify the control sequence based on the control requirements • Select required handling components and required electrical devices based on given control requirements • Design pneumatic and electro-pneumatic circuit and handling circuit in accordance with control requirements • Check completed circuit to ensure that it meets control requirements • Prepare parts list of all components used in the handling system • Connect pneumatic components, electrical devices, test equipment and handling components in accordance to circuit diagram • Test handling system in accordance with established organisational procedures and record testing results in an appropriate document • Shut down handling system in accordance with established organisational procedures • Disconnect all pneumatic components, electrical devices, handling components and test equipment
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Recommend possible troubleshooting solution for faulty pneumatic and electro-pneumatic circuit
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty pneumatic and electro-pneumatic circuit in accordance with established organisational procedures • Report any faulty handling systems in accordance with established organisational procedures • Report any incomplete work to designated personnel • Maintain good housekeeping practices in workplace

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Recommend modification to pneumatic and electro-pneumatic circuit in accordance with established organisational procedures • Recommend modification to handling systems in accordance with established organisational procedures
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Desktop computer or notebook connected to printer • Inventory management system software • Design and modification construction and simulation tools • Workplace Safety and Health signage Procedures and supporting documents must include: • Approved written work instructions • Test procedures • Manufacturer's specifications and instructions • Technical manuals • Design, construction and modification • Simulation tools • Company organisational procedures • Control requirements • ISO circuit diagram symbols • Circuit diagram • Process line up blueprint drawings • Complete parts list • Appropriate work documents • Relevant process control system standards • Quality procedures and applicable procedures Rules and Regulations includes: • Workplace Safety and Health Act • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-PMP-2018-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Assemble Simple Drive Mechanism		
Skill Description	This skill describes the ability to handle commonly used simple drive mechanism of machine tools. It also includes the ability to assemble linear motion guides, ball screws, different types of bearings and spacers.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Advantages of using linear motion guide • Method of assembling linear motion guide • Method of checking surface smoothness of linear motion guide • Procedure to lubricate linear motion guide • Method of assembling different types of bearings to the machine tool • Method of assembling ball screw assembly • Method of pre-loading of spacer in wire cut machine • Method of pre-tensioning using spacers		

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Prepare linear motion guide components in accordance with organisational procedures • Assemble linear motion guide components according to safe working practices and organisational procedures • Check surface smoothness of linear motion guide in accordance with specification requirements • Select the right lubricant for linear motion guide in accordance with specification requirements • Lubricate linear motion guide in accordance with organisational procedures • Assemble different types of bearings to the machine tool according to safe working practices and organisational procedures • Assemble ball screw assembly according to safe working practices and organisational procedures • Perform ball screw alignment – vertical and horizontal • Pre-load spacer in machine tool in accordance with specification requirements • Perform pre-tensioning using spacers in accordance with specification requirements • Apply safety rules and regulations in accordance with Workplace Safety and Health Act • Take corrective action against any errors in accordance with organisational procedures • Carry out action plan(s) on the proposed corrective actions in accordance with organisational procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Organise work approach and review methods to reduce operational time • Modify processes to improve performance and operational stability • Contribute ideas and suggestions for continuous process improvement

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty handling systems in accordance with established organisational procedures • Maintain good housekeeping practices in the workplace • Report challenges encountered and effective solutions discovered for exchanges and sharing • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Reflect on assembly or any process errors to prevent reoccurrence • Record challenges encountered and effective solutions discovered for exchanges and sharing • Create SOP and highlight possible pitfalls
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment Procedures and supporting documents must include: • Operation manual • Technical manual and instructions Rules and regulations must include: • Workplace Safety and Health Act • Industry codes and guidelines

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-PMP-2019-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Implement Programming of Programmable Logic Controllers		
Skill Description	This skill describes the ability to program a programmable logic controller (PLC). It also includes assessing control requirements for the system, writing PLC program, testing and debugging PLC program and preparing documents.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Control requirements for automation system • Types, characteristics and operating principles of binary and analogue input devices as well as binary and analogue output devices • Types and characteristics of PLC, programming devices and programming software • Types of inputs and outputs, memory, programming language and PLC communication • Operation and use of programming devices • Programming software syntax including writing, testing and saving software program • Connection of programming device to PLC • Manufacturer's procedures relating to downloading program to PLC, running of PLC, setting-up of PLC, testing the program and debugging the program • Operational procedures relating to switching on power supply to equipment • Use of program performance checklist • Operation of a printer and types of storage device		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Interpret and clarify details of control requirements for systems with appropriate person • Identify number and types of inputs and outputs based on control requirements • Identify model of PLC based on compatibility between features of PLC and control requirements • Identify programming device and software required to be used with PLC • Switch on programming device and select appropriate programming software • Write software program for different systems in accordance with control		

	requirements of system • Carry out syntax test during program writing process to identify any errors in syntax • Compile software programs after writing process is completed for different systems • Save software program into appropriate storage device during writing process to prevent any accidental loss of data • Obtain relevant information from built-in software documentation • Connect programming device to PLC for testing of software program • Switch on power to PLC in proper sequence in accordance with operational procedures for switching on power supply to equipment • Establish communication if two or more PLCs are used • Download software program using programming device in accordance with manufacturer's procedures • Activate PLC in accordance with manufacturer's procedures • Verify software program performance in accordance with control sequence and requirements using program performance checklist • Debug and modify software program, if software program does not meet control requirements • Switch off power to PLC and programming device and disconnect programming device from PLC • Switch on power to programming device and print out software program • Save software program in relevant media and back-up in appropriate storage device • Deliver printed copy and storage media to appropriate person • Switch off programming device and printer after use
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to : • Create/expand library of trends in PLC

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty handling systems in accordance with established organisational procedures • Report challenges encountered and effective solutions discovered for exchanges and sharing • Seek clarifications where applicable • Seek guidance or supervision from supervisor when assessing control requirements, designing PLC, testing of PLC program, or documenting cannot be fully completed, in accordance with approved written work instructions
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Record challenges encountered and effective solutions discovered for exchanges and sharing • Keep up-to-date on trends in PLCs
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment must include: • Desktop computer or notebook connected to printer • Inventory management system software • Design and modification construction and simulation tools • Workplace Safety and Health signage • Personal protective equipment • Pneumatic components and test equipment • Electrical devices and test equipment • Hand tools and power tools Procedures and supporting documents must include: • Process line up blueprint drawings • Completed parts list • Appropriate work documents • Work instructions • Manufacturer's specifications and instructions • Organisation work procedures and specifications • Test procedures • Technical manuals • Control requirements • ISO circuit diagram symbols • Operational setup checklist

	• Electrical diagram • Displacement diagram • Pneumatic circuit diagram • Electro-pneumatic circuit diagram Rules and regulations must include: • Workplace Safety and Health Act • Relevant process control system standards • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-PMP-2020-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Advanced Gas Tungsten Arc Welding		
Skill Description	This skill describes the ability to perform advanced gas tungsten arc welding. It also includes the ability to interpret various types of engineering drawings, adopting safe and healthy working practices, prepare welding materials and equipment, select and use tools and equipment to perform welding, assess weld quality and rectify faults of welded product.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workshop safety and health requirements • Mechanical and physical properties of materials • Types and applications of welding standards/codes and statutory requirements • Welding procedure specification and data sheets • Principles and applications of gas tungsten arc welding • Types of equipment for gas tungsten arc welding • Storage, handling and use of welding consumables and gas • Types and applications of filler metals • Types of joint designs • Methods of joint and surface preparation • Types and applications of jigs and fixtures • Types of welding techniques (vertical and overhead) • Methods of distortion control and distortion rectification • Types of weld defects and implications • Methods of weld defect rectification • Types and applications of destructive and non-destructive tests • Welding related document control		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Interpret engineering drawings to extract relevant information to prepare and set up welding materials and equipment • Conduct pre-operational checks and inspections to verify working conditions of welding tools and equipment according to job requirements • Perform joints and surfaces preparation according to job requirements and ensure equipment is completely clean and free from contaminants • Set up welding equipment according to safe working practices		

	• Set up component using appropriate jigs and fixtures according to job requirements • Perform welding operation and adjust appropriately to achieve required quality • Assess weld quality for compliance with appropriate standard and free from defects • Rectify welding defect (when necessary) using appropriate processes to meet specifications • Update document(s) according to approved format and is legible, accurate and complete
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify welding operation to enhance finishing/productivity
Range of Application *(where applicable)*	Tool and equipment must include: • Suitable work area with good lighting • Hand tools

It refers to the critical circumstances and contexts that the skill may be demonstrated.	Procedures and supporting documents must include: • Company organisational procedures • Welding related documents Rules and regulations must include: • Quality procedures and applicable procedures • Workplace Safety and Health Act • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Skill Code	PRE-PMP-2021-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Diffusion Bonding of Material		
Skill Description	This skill describes the ability to perform diffusion bonding process for the manufacture. It also includes the ability to adopt safe and healthy working practices, perform pre-inspection of the components, perform equipment checks and setup, perform pre-loading set-up of components, operate, monitor and control the operation and perform conformance inspection of the finished components.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace safety and health requirements • Cleanroom practices as per organisational standard operating procedures • Types of furnace • Operating principles of furnace • Use of thermocouples to monitor temperature in a furnace • Principles of diffusion bonding • Principles of Hot Isostatic Pressing (HIP) • Types of surface defects arising from diffusion bonding		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Conduct pre-operational checks and inspections to verify working conditions of equipment according to job requirements • Set up equipment for diffusion bonding operation according to safe working practices • Set up components for diffusion bonding operation according to job requirements • Perform and monitor diffusion bonding operations and adjust appropriately to achieve required quality • Check finished components for compliance with required specifications and free from defects • Update document(s) according to approved format and is legible, accurate and complete		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify bonding operation to enhance finishing/productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Medium and heavy duty equipment • Mobile and portable units • Visual inspection tools • Hand tools • Cleaning materials • Suitable work area with good lighting Procedures and supporting documents must include: • Company organisational procedures • Testing reference codes and standards used in industry Rules and regulations must include:

	• Workplace Safety and Health Act • International standards and procedures for magnetic particle testing • ISO 14644 cleanroom standards • CP 55 : 1991 Code of Practice for use in Fire Extinguisher

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-PMP-2022-1</td><td>Skill Category</td><td>Precision Manufacturing Processes</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Perform Geometric Tolerance and Inspection</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to perform dimensional and geometrical measurements and inspection of manufactured components. It also includes the ability to interpret various types of engineering drawings, adopt safe and healthy working practices, select and use inspection instruments/fixtures/gauges to determine the geometrical tolerances and carry out visual inspection.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Health, safety and environmental requirements
• Identification of organisational procedures on carrying out dimensional and geometrical measurements
• Specifications and acceptance criteria
• Adjusting deviation in tolerance
• Tolerance stack up in assemblies
• Reading and recording of results of measurements
• Use of inspection fixtures and dial indicators
• Types of dimensional measuring gauges and applications
• Importance of calibration for dimensional measuring gauges and fixtures
• Use of binocular
• Types of visual defects
• Record of inspection results in accordance to organisational procedures</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Interpret engineering drawings to determine accurately the acceptable dimensional and geometrical tolerances • Conduct pre-operational checks and inspections to verify working conditions of tools and fixtures according to job requirements • Perform calibration check of measuring gauges to enhance its accuracy and validity • Set up component to inspection fixtures securely to achieve accurate measurements • Perform measurements and inspection to obtain sufficient indications for evaluation • Update document(s) according to approved format and is legible, accurate and complete
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarification on doubts and challenges where applicable

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Reflect on set-up and work approach for possible improvement or ease of work
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Medium and heavy duty equipment • Mobile and portable units • Visual inspection tools • Hand tools • Cleaning materials • Suitable work area with good lighting Procedures and supporting documents must include: • Company organisational non-destructive test procedures • Testing reference codes and standards used in industry Rules and regulations must include: • Workplace Safety and Health Act • International standards and procedures for magnetic particle testing • ISO 14644 cleanroom standards • CP 55 : 1991 Code of Practice for use in Fire Extinguisher

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-PMP-2023-1</td><td>Skill Category</td><td>Precision Manufacturing Processes</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Perform Machining</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to perform CNC machining to manufacture aerospace components. It also includes the ability to prepare CNC part programs, set up and operate a multi-axis CNC machining centre to manufacture components in a single set-up, check finished components for conformity and carry out preventive maintenance.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Workplace Safety and Health requirements
• Application of proper Personal Protective Equipment (PPE)
• Types of aerospace materials commonly used
• Types of processes commonly used in manufacturing aerospace components
• Types of cutting methodology and approaches
• Types of machining defects and its causes
• Operating principles and features of a multi-axis CNC machining centre
• Operating procedures of the machine control panel
• Application of ISO codes, addresses, work coordinates and subroutines
• Types of preventive maintenance
• Methods of inspection</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Select and use suitable personal protective equipment appropriate to the job requirements
• Interpret engineering drawings to extract relevant information to set up part program and machine configuration
• Select appropriate tools and equipment, and check for safe and useable condition prior to carry out machining work to minimise safety risks
• Conduct pre-operational checks and inspections to verify working conditions of tools and machine according to job requirements
• Perform CNC program verification to eliminate errors and minimise safety risks
• Perform multi-axis CNC machining simulation to eliminate machine collisions, near-misses and improve cycle time
• Set up multi-axis CNC machining operations according to safe working</td></tr>
</table>

	practices • Set up component for CNC machining operations according to job requirements • Produce CNC machined aerospace components according to the given specifications • Perform quality checks of finished components for compliance with required specifications and free from defects • Perform preventive maintenance to maintain machine in its operational working condition • Update document(s) according to approved format and is legible, accurate and complete • Prepare clear and accurate report of equipment abnormalities and submit to designated person
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge

one's self within and outside of one's area of work.	• Find ways to improve/simplify processes to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment Procedures and supporting documents Rules and regulations must include: • Workplace Safety and Health Act • CP 55 : 1991 Code of Practice for use in Fire Extinguisher • Applicable Singapore National Standards • Applicable International Standards

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Skill Code	PRE-PMP-2012-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Material Hot Processing		
Skill Description	This skill describes the ability to perform hot processing operations for the manufacturing of components. It also includes the ability to interpret various types of engineering drawings, adopt safe and healthy working practices, select and use tools and equipment to perform hot forming and super-plastic forming operations and conduct final conformance checks.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace Safety and Health requirements • Types of furnace • Operating principles of furnace • Application of die set • Principles of hot forming • Principles of super plastic forming • Types of surface defects arising from hot forming processes		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Interpret engineering drawings to extract relevant information to set up equipment configuration • Conduct pre-operational checks and inspections to verify working conditions of tools and equipment according to job requirements • Set up furnace with correct parameters according to job requirements • Set up die for hot forming operation according to safe working practices • Set up component for hot forming operation according to job requirements • Perform and monitor hot processing operation, and adjust appropriately to achieve required quality • Check finished components for compliance with required specifications and free from defects • Perform rework (if necessary) to achieve the desired product outcome • Update document(s) according to approved format and is legible, accurate and complete		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Interpret and report abnormalities and effect on the material in accordance with organisational procedures • Seek clarifications on doubts and challenges where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify material hot processing operation to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment Procedures and supporting documents Rules and regulations must include: • CP 55 : 1991 Code of Practice for use in Fire Extinguisher • Workplace Safety and Health Act • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-PMP-2013-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Non-conventional Cutting Process		
Skill Description	This skill describes the ability to produce sheet metal components using non-conventional cutting process. It also includes the ability to interpret various types of engineering drawings, adopt safe and healthy working practices, use CAD/CAM software to design sheet metal layout, set up and operate CNC profile cutting machine, monitor and control the cutting process and perform conformance checks.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace Safety and Health requirements • Types and application of proper Personal Protective Equipment (PPE) • Types of materials and processes commonly used in manufacturing components • Types of non-conventional cutting methodology and approaches (CNC Wire Cutting, Water-jet Cutting and Laser Cutting) • Operating procedures and techniques used to produce CAD models • Application of CAM in laser cutting • Application of ISO codes, addresses, work coordinates and subroutines • Types of cutting defects, its causes and remedies • Operating principles and features of a laser cutting machine • Selection criteria of cutting parameters • Types of preventive maintenance • Methods of inspection		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Interpret engineering drawings to extract relevant information to set up machine configuration of cutting parameters • Conduct pre-operational checks and inspections to verify working conditions of tools and equipment according to job requirements • Perform CAD/CAM programming according to job requirements • Perform profile cutting simulation to eliminate cutting errors and improve process efficiency • Set up machine for profile cutting operation according to safe working practices		

	• Set up component for profile cutting operation according to job requirements • Produce profile cut of components according to the given specifications • Perform quality checks of finished components for compliance with required specifications and free from defects • Perform preventive maintenance to maintain machine in its operational working condition • Update document(s) according to approved format and is legible, accurate and complete
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify processes to enhance productivity
Range of Application *(where applicable)* *It refers to the critical*	Tool and equipment must include: • Suitable work area with good lighting

circumstances and contexts that the skill may be demonstrated.	Procedures and supporting documents must include: • Company organisational procedures • Welding related documents Rules and regulations must include: • Workplace Safety and Health Act • CP 55 : 1991 Code of Practice for use in Fire Extinguisher • Applicable Singapore National Standards • Applicable International Standards

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-PMP-2014-1</td><td>Skill Category</td><td>Precision Manufacturing Processes</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Perform Non-destructive Testing</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to perform non-destructive testing of manufactured components. It also includes the ability to prepare and set up the components, conduct non-destructive test using ultrasonic, dye penetrant and x-ray methods, interpret and record the results obtained.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Health, safety and environmental requirements
• Importance of equipment calibration
• Principles of ultrasonic testing and applications
• Principles of dye penetrant testing and applications
• Principles of x-ray testing and applications
• Operation of ultrasonic testing equipment
• Interpretation of non-destructive testing results
• Types of flaws and defects
• Record of non-destructive testing results</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Select and use suitable personal protective equipment appropriate to the job requirements
• Perform pre-operational checks of non-destructive testing equipment for safe and useable conditions to minimise safety risks
• Verify non-destructive testing equipment’s expiry date on calibration label/certificate for compliance with test validity
• Prepare component(s) according to the requirements of the non-destructive test to be conducted
• Set up component to fixtures securely to enhance test accuracy
• Set up non-destructive testing equipment according to job requirements
• Perform non-destructive test according to safe working practices and obtain sufficient indications for evaluation
• Interpret test results obtained to evaluate the indication(s) found accurately
• Update document(s) according to approved format and is legible, accurate and complete</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Recommend possible troubleshooting solution for process of non-destructive testing
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify non-destructive testing to enhance part programs/productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment Procedures and supporting documents Rules and Regulations must include: • Workplace Safety and Health Act • CP 55 : 1991 Code of Practice for use in Fire Extinguisher

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Skill Code	PRE-PMP-2015-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Optical Digitising		
Skill Description	This skill describes the ability to perform optical digitising operation for the manufacturing of components. It also includes the ability to conduct pre-checks, calibrate and scan using an optical digitiser to obtain digital data for analysis and evaluation.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Health, safety and environmental requirements • Application of non-contact optical digitising • Effects of lighting condition in optical digitising • Analysis of scanned data		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Conduct pre-operational checks and inspections to verify working conditions of optical digitiser according to job requirements • Perform calibration checks of optical digitiser to enhance its accuracy and validity • Set up equipment for digitising operation according to safe working practices and job requirements • Set up component for digitising operation according to job requirements • Perform digitising operation to obtain sufficient data for analysis and evaluation • Analyse scanned data to obtain and evaluate relevant info for its intended use • Update document(s) according to approved format and is legible, accurate and complete		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Improve work performance by improving work holding devices/fixtures for digitising • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify processes to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Optical digitiser • Suitable work area with appropriate lighting Procedures and supporting documents must include: • Company organisational procedures • Apply work procedures which may be required by the digitiser manufacturer • Scanned reports and data Rules and regulations must include:

	• Workplace Safety and Health Act

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Skill Code	PRE-PMP-2016-1	**Skill Category**	Precision Manufacturing Processes
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Surface Coating		
Skill Description	This skill describes the ability to perform surface coating process for the manufacturing of aerospace components. It also includes the ability to interpret various types of engineering drawings, adopt safe and healthy working practices, select and use tools and equipment for hand and thermal spray coating operations, operate and monitor the operations and conduct final conformance checks.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace Safety and Health requirements • Types and applications of fixtures • Types and applications of masking • Types and operation of hand spray coating process • Types and operation of thermal spray coating process • Application and limitations of surface coating process • Application of proper Personal Protective Equipment (PPE)		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Interpret engineering drawings to extract relevant information to set up equipment • Conduct pre-operational checks and inspections to verify working conditions of tools and equipment according to job requirements • Set up component for spray coating operation according to job requirements • Set up equipment for spray coating operation according to safe working practices • Perform and monitor spray coating operation and adjust appropriately to achieve desired quality • Carry out visual inspection of coatings for compliance with specifications and free from defects		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Interpret and report abnormalities and effect on the material in accordance with organisational procedures • Seek clarifications on doubts and challenges where applicable
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify surface coating process to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment Procedures and supporting documents Rules and regulations must include: • CP 55 : 1991 Code of Practice for use in Fire Extinguisher • Workplace Safety and Health Act • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-PMP-2017-1</td><td>Skill Category</td><td>Precision Manufacturing Processes</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Perform Surface Preparation and Finishing</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to prepare component surface and finishing process of components. It also includes the ability to adopt safe and healthy working practices, select and use tools and equipment according to the various types of surface preparation and finishing processes, operate, monitor and control the processes, and check finished components for conformity.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Health, safety and environmental requirements
• Machine pre-operational checks requirement
• Types of machines and applications
• Principles and applications of finishing process, shot peening process, super polishing process, acid etching process, hand polishing process and grit blasting process
• Handling of hazardous materials
• Methods of waste material disposal (hazardous and non-hazardous)
• Operation of equipment
• Types of machine tools and accessories
• Types of processing media
• Types of finishing requirements</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Conduct pre-operational checks and inspections to verify working conditions of tools and equipment according to job requirements • Set up machine for surface preparation and finishing operations according to safe working practices • Set up component for surface preparation and finishing operations according to job requirements • Perform and monitor surface preparation and finishing operations, and adjust appropriately to achieve desired quality • Check finished components for compliance with required specifications and free from defects • Update document(s) according to approved format and is legible, accurate and complete • Dispose of wastes in accordance with safe working practices and approved procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Anticipate possible failure of equipment and measures to take • Analyse work procedures to enhance productivity and quality
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report incidences of equipment abnormalities to be rectified • Seek clarifications on doubts and challenges where applicable

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Find ways to improve/simplify surface preparation process to enhance productivity
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tools and equipment Procedures and supporting documents Rules and regulations must include: • CP 55 : 1991 Code of Practice for use in Fire Extinguisher • Workplace Safety and Health Act • Environmental legislation and regulations

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-MAI-2001-1</td><td>Skill Category</td><td>Maintenance</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Diagnose and Rectify Faults in Equipment and Circuits</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to diagnose and rectify electrical faults in equipment. It also includes the ability to interpret electrical circuit diagram, select and use tools, equipment and techniques to locate and rectify faults, and test the equipment to ascertain its operational condition.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Workplace health, safety and environmental requirements
• Lock-out tag-out (LOTO) procedures
• Types of safety signs and applications
• Electrical principles
• Types of electrical controls and warning devices
• Equipment functions and operating principles
• Electrical circuits and symbols
• Types and purposes of test tools and equipment
• Fault diagnostic procedures
• Testing procedures
• Documentation and reports</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use suitable personal protective equipment appropriate to the job requirements • Conduct pre-operational checks and inspections to verify working conditions of test tools and equipment according to job requirements • Set up test tools and equipment according to safe working practices • Establish safety parameters to be applied prior to and during the fault diagnosis • Perform LOTO procedures to secure and isolate all energy sources before conducting fault diagnosis • Apply appropriate technique(s) to determine the faults in accordance with safe working practices • Determine fault codes from test equipment to isolate the faults systematically • Compare and verify test results against design parameters to ascertain fault(s) has been corrected • Rectify fault(s) using correct techniques, procedures, tools and equipment according to safe working practices • Conduct trial runs for the repaired and corrected equipment to verify its operational condition • Update document(s) according to approved format and is legible, accurate and complete • Conduct briefing on any changes to the applicable procedure for the operation of the equipment to prevent future recurrence
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Create ideas to improve/simplify carrying out of electrical testing tools • Establish orderly storage and differentiation of “similar” tools that result in ease of retrieving and operating them

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Check and report damaged or dysfunctional tools and equipment to rectify, repair or replace • Report any faulty electric faults according to organisational procedures • Share best practices with co-workers in Workplace Safety and Health requirements
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Learn and share on approaches to use hand tools that may enhance/ease the job and minimise errors • Keep up-to-date on electrical controls and warning devices
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment Procedures and supporting documents Rules and regulations must include: • Workplace Safety and Health Act • CP 55 : 1991 Code of Practise for use in Fire Extinguisher

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-MAI-2002-1</td><td>Skill Category</td><td>Maintenance</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Maintain and Repair Hydraulic Systems</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to repair hydraulic systems at the workplace. It also includes the ability to assess task requirements, plan task execution, prepare system and perform inspection, maintenance and repair, restore system and test to confirm correct operation, and prepare inspection, maintenance and repair reports.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Knowledge on task scope, including task boundaries and equipment isolation requirements
• Knowledge on Workplace Safety & Health (WSH), production facility and environmental factors
• Knowledge on test and support equipment requirements and support documentation
• Scheduling of tasks in enterprise Maintenance Management System
• Steps in conducting pre-maintenance tests
• Enterprise instructions for system shut-down, service isolation with the use of isolation tags, system services restoration, and isolation tags removal
• Hydraulic hygiene principles for the opening up inspection/maintenance/repair and closing up of system inspection/maintenance/repair
• Specified instructions for depressurising or isolating system pressure vessels, recharging and de-isolating system pressure vessels
• Approved parts, and support and test equipment for repairs and maintenance
• Approved procedures for operating and testing system and shut-down, including relevant reports when handing over to operators</td></tr>
</table>

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and identify task scope including task boundaries and equipment isolation requirements • Identify WSH, production facility and environmental safety factors associated with the task in accordance with organisational procedures • Identify test and support equipment and support documentation required for the task • Determine equipment maintenance shut-down period(s) and promulgate schedules with users in accordance with enterprise procedures • Determine and schedule available human resource in accordance with enterprise procedures • Assess test and support equipment, and support documentation to ensure availability in accordance with enterprise procedures • Conduct pre-maintenance tests as specified in system documentation to determine the state of the system • Record results in accordance with enterprise procedures • Conduct and record pre-maintenance tests as specified in system documentation • Isolate system and shut-down for safety of the system, including isolation of the system from supply services • Conduct and lock in place isolation/maintenance in accordance with enterprise instructions • Depressurise or isolate system pressure vessels in accordance with applicable instructions • Apply hydraulic hygiene principles during the opening up inspection/ maintenance/repair and closing up of systems • Select and employ approved support and test equipment to effect inspection maintenance and repair • Inspect system components in accordance with approved procedures • Conduct maintenance of system components in accordance with approved procedures • Conduct repair of system components in accordance with approved procedures • Recharge and reconnect system pressure vessels in accordance with instructions • Restore system services and remove isolation tags in accordance with enterprise instructions, including the removal of WSH warning signs and barriers placed as required by enterprise procedures • Operate and test system performance after post maintenance or repair in accordance with approved procedures, and in conjunction with users and operators • Identify and investigate defects and anomalous operations, and record causes to rectify all anomalies and defects

	• Compile relevant reports in accordance with approved procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Recommend possible troubleshooting solution for faulty hydraulic circuit • Generate ideas to prolong the life span of hand tools • Organise work approach and review methods to reduce operational time
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty hydraulic circuit in accordance with established organisational procedures • Share best practices with co-workers in Workplace Safety and Health requirements
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Able to reflect on likely causes of hydraulic circuit failure and the remedies • Learn and share on approaches to use hand tools that may enhance/ease the job and minimise errors
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Personal protective equipment • Hydraulic systems, machines and accessories • Measuring tools • Setting tools and devices • Hand tools • Lifting equipment • Material movement equipment Procedures and supporting documents must include:

	• Organisational procedures • Workflow procedures • Engineering drawings • Job specifications • Job planning sheets Rules and regulations must include: • Workplace Safety and Health Act

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Skill Code	PRE-MAI-2003-1	**Skill Category**	Maintenance
		Skill Sub-Category *(where applicable)*	N/A
Skill	Maintain and Repair Pneumatic Systems		
Skill Description	This skill describes the ability to maintain and repair pneumatic systems at the workplace. It also includes the ability to assess task requirements, plan task execution, prepare system and perform inspection, maintenance and repair, restore system and test to confirm correct operation, and prepare inspection, maintenance and repair reports.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Knowledge on task scope, including task boundaries and equipment isolation requirements • Knowledge on Workplace Safety & Health (WSH), production facility and environmental factors • Knowledge on test and support equipment requirements and support documentation • Scheduling of tasks in enterprise Maintenance Management System • Steps in conducting pre-maintenance tests • Enterprise instructions for system shut-down, service isolation with the use of isolation tags, system services restoration, and isolation tags removal • Pneumatic hygiene principles for the opening up inspection /maintenance/repair and closing up of system inspection/maintenance/repair • Specified instructions for depressurising or isolating system pressure vessels, recharging and de-isolating system pressure vessels • Approved parts, and support and test equipment for repairs and maintenance • Approved procedures for operating and testing system and shut-down, including relevant reports when handing over to operators		

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and identify task scope including task boundaries and equipment isolation requirements • Identify WSH, production facility and environmental safety factors associated with the task in accordance with organisational procedures • Identify test and support equipment and support documentation required for the task • Determine equipment maintenance shut-down period(s) and promulgate schedules with users in accordance with enterprise procedures • Determine and schedule available human resource in accordance with enterprise procedures • Assess test and support equipment, and support documentation to ensure availability in accordance with enterprise procedures • Conduct pre-maintenance tests as specified in system documentation to determine the state of the system • Record results in accordance with enterprise procedures • Conduct and record pre-maintenance tests as specified in system documentation • Isolate system and shut-down for safety of the system, including isolation of the system from supply services • Conduct and lock in place isolation/maintenance in accordance with enterprise instructions • Depressurise or isolate system pressure vessels in accordance with applicable instructions • Apply pneumatic hygiene principles during the opening up inspection/maintenance/repair and closing up of systems • Select and employ approved support and test equipment to effect inspection maintenance and repair • Inspect system components in accordance with approved procedures • Conduct maintenance of system components in accordance with approved procedures • Conduct repair of system components in accordance with approved procedures • Recharge and reconnect system pressure vessels in accordance with instructions • Restore system services and remove isolation tags in accordance with enterprise instructions, including the removal of WSH warning signs and barriers placed as required by enterprise procedures • Operate and test system performance after post maintenance or repair in accordance with approved procedures, and in conjunction with users and operators • Identify and investigate defects and anomalous operations, and record causes to rectify all anomalies and defects

	• Compile relevant reports in accordance with approved procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Recommend possible troubleshooting solution for faulty hydraulic circuit • Generate ideas to prolong the life span of hand tools • Organise work approach and review methods to reduce operational time
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any faulty pneumatic circuit in accordance with established organisational procedures • Report any incomplete work to designated personnel • Share best practices with co-workers in Workplace Safety and Health requirements
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Able to reflect on likely causes of pneumatic circuit failure and the remedies • Learn and share on approaches to use hand tools that may enhance/ease the job and minimise errors
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Personal protective equipment • Hydraulic systems, machines and accessories • Measuring tools • Setting tools and devices • Hand tools • Lifting equipment • Material movement equipment Procedures and supporting documents must include:

	• Organisational procedures • Workflow procedures • Engineering drawings • Job specifications • Job planning sheets Rules and regulations must include: • Workplace Safety and Health Act

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<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-MAI-2004-1</td><td>Skill Category</td><td>Maintenance</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Maintain Common Tools and Workshop Equipment</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to maintain and upkeep common tools and workshop equipment. It also includes the operation of common tools/various tools and workshop equipment.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Awareness of work safety and possible danger
• Types and function of common tools and workshop equipment
• Proper method of handling the common tools and workshop equipment
• Tools and equipment for the correct job
• Correct posture and handling of the tools and equipment
• Possible causes of tools, components and equipment damage
• Proper maintenance of tools and equipment</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Plan the maintenance of common tools and workshop equipment
• Operate the various tools and equipment to check for functionality
• Check common tools and workshop equipment for non-conformance
• Repair or replace faulty tools and equipment
• Refill/replenish oil/lubricants</td></tr>
<tr><td>Innovation and Value Creation

It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</td><td colspan="3">The ability to:

• Create ideas to fool-proof possible selection of wrong tools
• Establish orderly storage and differentiation of “similar” tools that result in ease of retrieving and operating them</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Check and report damaged or dysfunctional tools and equipment to rectify, repair or replace • Observe safe practices and communicate/discuss possible danger immediately • Share best practices with co-workers in Workplace Safety and Health requirements
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Keep updated on advancement in prolonging the life span of common tools and workshop equipment • Learn and share on approaches to use hand tools that may enhance/ease the job and minimise errors
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Measuring/checking instruments • Common tools e.g. Allen key set; screwdrivers set; pumps; lifters; hand drill; hammers and mallets • Lubricants Procedures and supporting documents must include: • For carrying out dimensional and geometric measurement • Standard workplace/organisational operating procedures • Relevant workplace safety procedures Rules and regulations must include: • Workplace Safety and Health Act

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-QUA-1001-1	**Skill Category**	Quality
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Quality Systems		
Skill Description	This skill describes the ability to apply skills and knowledge related to quality improvement in the workplace. It also includes planning and carrying out daily work to meet organisational quality system requirements as well as maintaining and improving work quality.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Organisational quality systems, procedures and policies • Interpretation of work instructions • Applicable product, process and quality specifications • Types and usage of quality system tools and equipment • Types and interpretation of quality records • Legislative and industrial framework for quality • Organisational procedures for detecting and reporting non-conformities • Organisational procedures for detecting, reporting and resolving non-compliances • Organisational procedures for providing feedback for quality improvement		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Plan work activities to meet quality systems requirements • Carry out work activities according to work instructions and organisational quality procedures • Monitor quality outcomes against established job and quality objectives to achieve consistency and quality • Take appropriate corrective action(s) to rectify non-conformities promptly • Monitor resolution of non-compliances via quality records • Assess effectiveness of the corrective action(s) to rectify non-conformities • Report any abnormalities and problems encountered in encountered in planning, carrying out, maintaining and improving work quality		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Improvise techniques to simplify processes/operations leading to shorter duration to complete the work • Provide constructive suggestions to improve on quality system and work processes according to organisational procedures
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Establish networks and working relationships with others to enhance team effectiveness • Seek appropriate advice for own work improvement from relevant personnel • Carry out improvement of own work and quality performance according to feedback received
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Undertake appropriate opportunities to learn and develop required work competencies and quality skills for continuous improvement

Range of Application
 	
(where applicable)
 	
It refers to the critical circumstances and contexts that the skill may be demonstrated.
	Organisational quality systems, procedures and policies must include:
	
	• Quality Management System (QMS)
	• Quality objectives
	• Quality policies
	• Quality procedures
	
	Tools and equipment must include:
	
	• Measuring equipment
	• Comparative equipment
	• Statistical analysis equipment and processes
	• Quality control tools
	  ○ Charts
	  ○ Tables

	○ Spreadsheets ○ QC 7 Tools ○ Acceptance Sampling Plan Quality records must include: • Quality control records • Non-conformity records • Non-compliance records • Customer satisfaction records Legislative and industrial framework for quality must include: • Relevant industry codes of practice • International/National Quality Standards/Framework ○ ISO 9001 ○ Singapore Quality Class (SQC)

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-QUA-2002-1	**Skill Category**	Quality
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Dye/Liquid Penetrant Testing		
Skill Description	This skill describes the ability to perform dye/liquid penetrant testing in a range of industrial applications. It also includes the ability to interpret job requirements, prepare parts for penetrant testing, select penetrant testing techniques and interpret the results obtained.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace Safety and Health practices • Overview of non-destructive testing processes • Principles and applications of liquid penetrant process • Principles and applications of dye penetrant test • Types of equipment and materials used • Types and characteristics of penetrant, developer and method of application • Types of liquid penetrant test units and methods of measurement • Types and purpose of lighting for liquid penetrant testing • Importance of penetrant removal process • Critical factors that affect indications • Types of relevant and non-relevant indications • Types of personal protective equipment • Methods of used materials disposal		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use personal protective equipment according to job requirements • Interpret and extract relevant information to determine work scope accurately • Select appropriate penetrant technique to suit the material of the part to be tested • Prepare and clean thoroughly the part to be tested • Perform penetrant test in accordance with manufacturer instructions • Set up appropriate UV lighting to locate indications accurately for visual inspection and evaluation • Identify and evaluate the results for compliance with specifications • Dispose of used materials in accordance with Workplace Safety and Health requirements • Update document(s) according to approved format and is legible, accurate and complete
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Compare and contrast liquid penetrant inspection method against other form of NDT for its economic viability
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Interpret and report abnormalities and effect on the material in accordance with organisational procedures • Seek clarification on doubts and challenges with team members
Learning to Learn *It refers to the ability to develop and improve one's self within and*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge

outside of one's area of work.	• Keep up-to-date on trends in development of dye and liquid penetrants
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Suitable work area with good lighting • Visual inspection tools • Hand tools • Cleaning materials Procedures and supporting documents must include: • Work instructions • Manufacturers specifications and instructions • Organisation work procedures and specifications Rules and regulations must include: • Workplace Safety and Health Act • Quality procedures and applicable procedures • Environmental legislation and regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-QUA-2003-1	**Skill Category**	Quality
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Eddy Current Testing		
Skill Description	This skill describes the ability to perform electromagnetic testing of welds using eddy current techniques. It also includes the ability to prepare and carry out eddy current inspection of welds, interpret and report inspection results and carry out post-inspection activities.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Overview of non-destructive testing processes • Working principle of the eddy current test process and its application • Principles of Lenz's Law and magnetic field created by a current • Basic principles of electricity, magnetism and electromagnetism • Types of materials and its conductivity • Purposes of cleaning and preparation processes • Procedures and safety requirements in relation to the preparation process • Assessment procedures and techniques • Types of discontinuities and their consequences • Procedures for carrying out eddy current testing • Purposes of tools, equipment, techniques and system verification checks • Factors to be considered which affect eddy current testing		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use appropriate personal protective equipment according to job requirement • Conduct pre-operational check of test instruments and equipment to verify safe and useable condition • Check calibration label/certificate to verify the currency and validity of the test instruments and equipment • Set up test instruments and equipment in accordance with manufacturer instructions • Prepare and clean test piece thoroughly • Set up test piece securely to achieve optimum and accurate test results • Perform eddy current testing in accordance with safe working practices and organisational procedures • Identify and evaluate the results for compliance with specifications • Use calculations relating to eddy current testing for optimum probe frequency • Maintain test/inspection equipment in accordance with organisational procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Reorganise essential tools and equipment to reduce searching time
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Interpret and report abnormalities and effect on the material in accordance with organisational procedures • Seek clarification on doubts and challenges with team members
Learning to Learn	The ability to:

It refers to the ability to develop and improve one's self within and outside of one's area of work.	• Participate in information sharing with colleagues to improve own skills and knowledge • Keep up-to-date on trends in development of eddy current testing
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Suitable work area with good lighting • Visual inspection tools • Hand tools • Cleaning materials Procedures and supporting documents must include: • Company organisational non-destructive test procedures • Eddy current testing reference codes and standards used in industry • Technical manuals of eddy current testing equipment environment • Maintaining environment, including 5S practices Rules and regulations must include: • Workplace Safety and Health Act • Quality procedures and applicable procedures • Environmental Legislation and Regulations

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-QUA-2004-1	**Skill Category**	Quality
		Skill Sub-Category *(where applicable)*	N/A
Skill	Perform Magnetic Particle Testing		
Skill Description	This skill describes the ability to perform magnetic particle testing at the workplace safely based on workplace requirements. It also includes the ability to adopt safe working practices, set up and operate test equipment, set up test component, perform magnetic particle testing, apply appropriate evaluation techniques to identify and interpret magnetic particle test indications in accordance with standard operating procedures.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Principles of magnetism and electromagnetism • Characteristics of magnetic field • Types of electric current • Effects of current on flux fields • Detection and effect of discontinuities on materials • Techniques of magnetisation by means of electric current • Selection of proper method for magnetisation • Principles and methods of de-magnetisation • Types of inspection materials • Types of magnetic particle testing equipment • Types of discontinuity detected by magnetic particle testing • Magnetic particle test indications and interpretations • Evaluation techniques • Quality control of equipment and processes • Types of equipment and accessories • Advantages and limitation of magnetic particle testing • Safe practices in performing magnetic particle testing • Standard operating procedures for performing magnetic particle testing		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Select and use personal protective equipment according to job requirements • Plan work activities and requirements in accordance with organisational procedures • Conduct pre-operational checks of test equipment for safe and usable condition prior to performing the test • Check calibration label/certificate to verify the currency and validity of the test equipment • Set up test equipment in accordance with manufacturer instructions • Prepare and set up test component securely to achieve optimum and accurate test result • Perform magnetic particle testing in accordance with safe working practices • Identify and evaluate the discontinuity for compliance with specifications • Maintain records and documentation of the work in accordance with organisational procedures • Maintain good housekeeping in accordance with Workplace Safety and Health practices
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Reorganise essential tools and equipment to reduce searching time
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Interpret and report abnormalities and effect on the material in accordance with organisational procedures • Seek clarification on doubts and challenges with team members • Share best practices with co-workers in Workplace Safety and Health requirements

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Participate in information sharing with colleagues to improve own skills and knowledge • Reflect on set-up and work approach for possible improvement or ease of work
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Tool and equipment must include: • Mechanised inspection equipment • Stationary unit • Medium and heavy duty equipment • Mobile and portable units • Visual inspection tools • Hand tools • Cleaning materials • Suitable work area with good lighting Procedures and supporting documents must include: • Company organisational non-destructive test procedures • Testing reference codes and standards used in industry • Technical manuals of eddy current testing equipment environment • Maintaining environment, including 5S practices Rules and regulations must include: • Workplace Safety and Health Act • International standards and procedures for magnetic particle testing

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-WSH-2003-1	**Skill Category**	Workplace Safety and Health
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Workplace Safety and Health Policies		
Skill Description	This skill describes the ability to apply Workplace Safety and Health (WSH) policies to maintain health and safety in the workplace. It also includes the ability to apply basic knowledge and application skills of WSH policies, schedule daily work, identify hazards in accordance to WSH requirements and implement risk controls.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types and interpretation of relevant WSH legislations and relevant industry codes of practice (CP) • Types and usage of Personal Protective Equipment (PPE), safety devices and equipment • Types and interpretation of safety signage • Organisational WSH procedures and Risk Assessment (RA) • Common manufacturing hazards and risk controls • Types of hazards on work area, safety signage, safety devices and equipment • Types of risk control measures • Organisational WSH procedures and WSH legislative requirements		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Establish job and WSH objectives according to work instructions, organisational WSH procedures and policies • Plan work activities to meet WSH requirements • Schedule daily work activities in accordance to organisational WSH procedures • Identify and monitor hazards by conducting WSH checks on work area, safety signage, safety devices and equipment • Carry out risk controls • Follow organisational emergency and evacuation procedures in the event of emergencies or drills • Report any abnormalities and problems encountered in complying with WSH requirements		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Contribute ideas to enhance WSH programs • Provide constructive suggestions to apply WSH practices
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Check with designated personnel on risk control measures • Seek appropriate advice for monitoring hazard checks • Cooperate with peers to implement WSH policies
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Undertake appropriate opportunities to learn and develop required work competencies and skills for implementing WSH in workplace • Keep up-to-date on changes to WSH policies
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Legislative and industrial framework for WSH WSH checks must include: • Workplace • Safety tools and equipment • Safety signage • Personal Protective Equipment (PPE) Type of hazards must include: • Physical hazards • Chemical hazards

	• Ergonomics hazards Risk control must include: • Elimination • Substitution • Engineering controls • Administrative controls • Use of PPE

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-WSH-1001-1	**Skill Category**	Workplace Safety and Health
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Workplace Safety and Health in Metal Work		
Skill Description	The ability to apply Workplace Safety and Health practices to ensure the safety of oneself and others at work in metal work. It also includes identifying own roles and responsibilities in a metal work job by following safe work procedures and adopting relevant risk control measures when conducting metal works and responding to fire emergencies.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Workplace Safety and Health legal obligations and other organisational requirements • Rights and responsibilities of a worker stipulated by the Workplace Safety and Health (WSH) Act • Rights and responsibilities of a worker stipulated by the Employment Act and Work Injury Compensation Act • Common safety signs in a factory • Common workplace hazards in a factory • Types of risk control measures • Components of “Permit-to-Work” (PTW) • Types of Personal Protective Equipment (PPE) • Proper usage and maintenance of PPE		

Application and Adaptation
 	
It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.
	The ability to:
	
	• Identify own roles and responsibilities in metal working considering legal obligations in Workplace Safety and Health (WSH) and its legal requirements, the Employment Act and Work Injury Compensation Act
	• Follow safe work procedures in metal working noting:
	  o Safety signs in a factory
	  o Common workplace hazards in a factory
	• Identify relevant risk control measures to be implemented according to safe work procedures
	• Follow “Permit-to-Work” (PTW) procedures according to safe work procedures
	• Wear appropriate Personal Protective Equipment (PPE) according to safe work procedures
	• Respond to fire emergencies following:
	  o Fire evacuation procedures based on incident at site in accordance with organisational firefighting procedures		

	○ Using correct types of fire extinguishers in the event of a fire ○ Applying the correct techniques to extinguish a fire according to established organisational firefighting procedures
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Contribute ideas to enhance WSH programs • Provide constructive suggestions to apply WSH practices
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report unsafe working conditions, work practices and any irregularities in firefighting or related activities to relevant stakeholders in accordance with organisational procedures • Cooperate with peers to implement WSH policies
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Practise and take part in drills to be ready for emergencies. • Stay abreast of developments in equipment and personal protective gears • Stay updated on latest legislative requirements • Familiarising with safety practices at workplace relating to health and safety at workplace
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Rules and regulations must include: • Workplace Safety and Health (WSH) Act and subsidiary legislations ○ WSH (General Provisions) Regulations • Employment Act • Work Injury Compensation Act • Penalties for non-compliance • WAH Regulation • WSH (Risk Management) Regulations

	• Code of Practice on WSH Risk Management • Statutory Medical Examinations as required under the WSH (Medical Examinations) Regulations Organisational and other requirements must include: • Company in-house rules and regulations • Equipment manufacturer's guidelines (instructions, specifications, operators manual or checklists) • Safety signs on site • Workplace hazards • Risk control measures Tools and equipment must include: • Personal Protective Equipment (PPE) • Fire extinguishers

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">PRE-WSH-1002-1</td><td>Skill Category</td><td>Workplace Safety and Health</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Identify Hazards and Maintain Risk Control Measures</td></tr>
<tr><td>Skill Description</td><td colspan="3">The skill describes the ability to identify hazards and maintain risk control measures at workplace.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Types of hazards associated with the use of tools and operation of equipment and machine at workplace
• Types of hazards associated with materials and chemicals used at workplace
• Principles and methodology of risk assessment
• Importance and types of risk control measures at workplace
• Organisational WSH procedures and WSH legislative requirements</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Identify hazards by conducting WSH checks on work area, safety signage, safety devices, equipment, machine, materials and chemicals used at workplace
• Carry out risk controls in accordance to WSH organisational procedures and legislative requirements</td></tr>
<tr><td>Innovation and Value Creation

It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</td><td colspan="3">The ability to:

• Contribute ideas to improve control of WSH risks in accordance to the hierarchy of control
• Identify inadequacies in the existing control measures in accordance with organisational procedures
• Provide constructive suggestions to carry out risk controls measures</td></tr>
<tr><td>Social Intelligence</td><td colspan="3">The ability to:</td></tr>
</table>

and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	• Report any abnormalities and problems encountered in identifying and monitoring hazards • Check with designated personnel on risk control
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Provide input to risk assessment team at workplace in accordance to WSH organisational procedures and legislative requirements
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Legislative and industrial framework for WSH Hazards associated with tools, equipment and machines must include: • Electrical • Mechanical • Fire and explosion • Radiation • Noise Hazards associated with materials and chemicals must include: • Fire and explosion • Burn and scald • Sudden release of pressure • Corrosion • Irritation • Asphyxiation • Toxicity • Carcinogens • Acute effects • Chronic effects • Chemical products

Hazards associated with environment must include:

- Poor housekeeping
- Unstable stacking of materials
- Storage of incompatible materials
- Incompatible works
- Unguarded machines
- Hazardous atmosphere
- Conditions that expose a person to hazards:
    - Struck by or struck against objects
    - Trip and fall on same level
    - Falling from height
    - Drowning
    - Scalds and burns
    - Lightning strikes

At-risk behaviours must include:

- Violating procedures
- Taking short-cuts
- By-passing safety procedures
- Disabling machine safety features
- Not using or misuse of Personal Protective Equipment (PPE)
- Unauthorised use of equipment
- Misuse of equipment
- Reckless acts
- Horseplay

Health hazards must include:

- Noise
- Chemical
- Haze
- Ergonomic
- Poor posture
- Duration
- Frequency
- Area layout
- Manual handling

Hierarchy of risk control must include:

	• Elimination • Substitution • Engineering controls • Administrative controls • Personal Protective Equipment (PPE) Common risk assessment approaches must include: • Activity-Based • Trade-Based Simple risk assessment methods must include: • Review Material Safety Data Sheets • Job Safety Analysis (Task Analysis) • Workplace Audits and Inspections • Risk Analysis Form • Matrix method Risk quantification must include: • Severity of hazard • Likelihood of the occurrence • Risk Level = Severity x Likelihood

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-MPI-2004-1	**Skill Category**	Manufacturing Productivity and Innovation
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Basic Lean Techniques in the Workplace		
Skill Description	This skill describes the ability to apply the methods and tools used for identifying and assessing the actual and potential failures in product and process designs in the workplace.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Cycle-time in the workplace • Importance and types of layout design in the workplace • Concept of Poka-Yoke in the workplace • Steps of creating value stream mapping in the workplace • Benefits of Process Mapping in the workplace • Strategy to implement the Business Improvement Project		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Apply cycle time measurement techniques according to simulation guide • Simulate types of Layout Design for activities improvement • Apply Poka-Yoke technique in the workplace according to simulation guide • Apply Value Stream Mapping in the workplace according to simulation guide • Apply Process Mapping for understanding activities flow • Identify and implement Business Improvement Project		
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Contribute ideas for business improvement project		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
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Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Report any abnormalities encountered in cycle time measurement • Report any problems encountered during simulation of layout design • Report any difficulties encountered in process mapping • Check with designated personnel on business improvement project
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Able to recommend continuous improvement in the workplace • Reflect on problems encountered during simulation of layout design and seek ways to improve • Reflect on difficulties encountered in process mapping and seek ways to improve
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Cycle time measurement must include: • Cycle time • Capacity calculation Layout design must include: • Types of layout • Batch versus continuous flow Business improvement project must include: • Project charter • Project tracking • Performance measurement • Project presentation Tool and equipment must include: • Lego • Jigsaw • Video • Flip chart • Digital camera

	Procedures and supporting documents must include: • Organisational procedures • Specifications • Work instructions • Technical manual • Simulation guide for cycle time • Simulation guide for Poka-Yoke • Simulation guide for Value Stream Mapping Rules and regulations must include: • Workplace Safety and Health Act

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	PRE-MPI-2005-1	**Skill Category**	Manufacturing Productivity and Innovation
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Lean Thinking in the Workplace		
Skill Description	This skill describes the ability to apply LEAN thinking in the workplace. It also includes the ability to interpret LEAN thinking, apply the principles of LEAN, identify types of wastes in the workplace, carry out Standardised Work in the workplace and apply thinking and problem-solving skills.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • LEAN history from Toyota Production System (TPS) • Importance of practicing 3M's in the workplace • Link between LEAN Thinking with Productivity • LEAN Metric to measure performance • Culture of continuous improvement in the organisation • Role and responsibility of member in a LEAN project		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Interpret LEAN thinking to eliminate wastes and increase value-added activities according to simulation guide • Apply the 5 principles of LEAN as a framework for improvement activities • Identify 8 Types of Wastes in the workplace according to simulation guide • Carry out Standardised Work in the workplace according to simulation guide • Carry out waste elimination activities in the workplace • Apply A3 Thinking for problem-solving skills		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Carry out improvement activities based on the 5 Principles of LEAN • Apply LEAN quality tools in the workplace
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Contribute ideas for work improvement activities • Check with designated personnel on work improvement activities • Report any problems encountered during waste elimination activities • Report any difficulties encountered applying the 5 principles of LEAN in the workplace
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Reflect on problems encountered during waste elimination activities • Reflect on difficulties encountered applying the 5 principles of LEAN in the workplace
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	LEAN thinking overview must include: • LEAN definition • Benefits & results of LEAN • LEAN history – from Toyota Production System (TPS) • Developing a LEAN House/System • LEAN metric • Introduction to LEAN tools and techniques • LEAN 5 key principles & tools • LEAN versus productivity versus innovation • Importance of 3M's

	LEAN culture in the organisation must include: • The need for a cultural of continuous improvement in the organisation • Business improvement is a journey • Mindset change • Build LEAN culture • The role and responsibility of member in a LEAN project 8 Types of Waste must include: • Work cycle with Type 1 and 2 wastes • Zero waste • Definition of each waste & examples • "Learning to see waste" group exercise • Understand Standardisation in the workplace A3 thinking must include: • Definition of A3 • Definition of problem • Step-by-step of using A3 • 7 quality tools • 5 why method • A3 worksheet • Standard work Tool and equipment must include: • Lego • Jigsaw • Video • Flip chart • Digital camera Procedures and supporting documents must include: • Organisational procedures • Specifications • Work instructions • Technical manual • Simulation guide for 8-Wastes • Simulation guide for standard work • A3 worksheet

	Rules and regulations must include: • Workplace Safety and Health Act

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	SVCF-CS-101C-1	**Skill Category**	Customer Experience
		Skill Sub-Category *(where applicable)*	N/A
Skill	Provide Go-the-Extra-Mile Service		
Skill Description	This skill describes the ability to provide go-the-extra-mile service to exceed customer expectations and create a positive customer experience. It also includes demonstrating the qualities and characteristics of a service professional and escalating feedback on areas of improvement to enhance the customer experience.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types of customers • Customer needs and expectations • Qualities and characteristics of a service professional • Importance of go-the-extra-mile for service to oneself and the • organisation • Methods to exceed customer expectations • Principles of effective communication • Methods to escalate areas of improvement to enhance customer experience		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Recognise the diverse range of customers and their needs and expectations • Demonstrate the qualities and characteristics of a service professional when delivering go-the-extra-mile service to exceed customer expectations • Create a positive customer experience by offering customized and personalized service in accordance with organisation guidelines		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Escalate feedback through appropriate channels on areas of improvement to enhance the customer experience
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Empathise with customers' needs to exceed customers' expectations to create a positive customer experience • Demonstrate customer-friendly communication principles in go-the-extra-mile interactions with customers
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Seek customer's feedback on service delivery to improve own performance in providing go-the-extra-mile service
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Customer expectations may be defined as the perceived value customers seek from the purchase of a good or service and must include: • Reliability • Quality of product/service • Safety of product/service • Performance of product/service • Aesthetic appearance of product/service • Comfort of product/service • Durability of product/service Qualities and characteristics of a service professional must include:

	• Ability to work with diverse team members • Good communication skills • Integrity Positive attitude • Flexible and ability to adapt to provide service to a diverse range of customers • Proactive in seeking out unmet needs of customer • Consistent service • Initiative • Customer-first mindset Go-the-extra-mile service is defined as service that exceeds both internal and external customer expectations and must include: • Being aware of the different customer's needs before approaching customers • Offering alternate solutions to customers • Providing value-add services to customers (e.g. calling another store inm the area to see if that product is available) • Suggesting alternate choices to customers when preferred choices are not available • Establishing rapport with customers to build relationships with customers who frequent the establishment • Following up with customers on unanswered questions Customer experience is the sum of all experiences a customer has with an organisation and its product or service. A positive customer experience makes the customer feel happy, satisfied, justified, valued, served and cared for throughout their relationship with the organisation. The ability to deliver a positive customer experience enhances customer loyalty and retention. Methods to offer customised and personalised service must include: • Balancing time spent with one customer against the needs of other customers • Treating customers as individuals • Varying personal approaches in response to customer attributes such as being patient with older customers and being sensitive when handling customers from different cultural backgrounds • Acceding to customer's special requests according to organisational guidelines such as extending warranty period

	• Up-selling products or services by offering the customer the opportunity to purchase additional item • Cross-selling products or services by offering the customer additional options to complement their purchase

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	SVCF-CS-103C-1	**Skill Category**	Customer Experience
		Skill Sub-Category *(where applicable)*	N/A
Skill	Respond to Service Challenges		
Skill Description	This skill describes the ability to respond to challenging service situations through the use of appropriate verbal and non-verbal communication techniques. It also includes recognising triggers which may lead to service challenges, use of service recovery procedures to respond to the challenges and escalating unresolved service challenges.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types of triggers in the service environment • Types of service challenges • Importance of responding to service challenges • Principles of effective communication • Method to escalate service challenges • Service escalation channels • Resilience and methods to demonstrate resilience		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Use service recovery procedures to respond to service challenges in accordance with organisation guidelines • Escalate unresolved service challenges using appropriate channels in accordance with the organisation's guidelines • Demonstrate resilience in the handling of service challenges		
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or*	The ability to: • Strive for win-win outcomes when handling service challenges • Identify and suggest areas of improvement that may arise out of service challenges		

enhance business values that are aligned to organisational goals.	
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Empathise with customers while facing service challenges to prevent situation from escalating
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Undertake • Keep abreast of latest products and services and service delivery procedures to avoid creating service challenges • Reflect on own handling of service challenges to improve performance in future situations • Monitor own service delivery to avoid creating situations that may give rise to service challenges
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Triggers may be defined as causes of an event or situation that may lead to service challenges. The service environment may be defined as the workplace where products or services are sold or delivered. It includes the shop-front, back-room operations or store. Triggers in the service environment must include: • Un-trained service staff • Poor attitude of staff • Lack of urgency to resolve complaints and feedback • Long waiting times and queues • Unresolved issues or problems • Poor response to information requested • Un-informed staff

	• Lack of communication • Lack of availability of product • Poor product or service quality Service challenges must include: • Customer complaints on products or services • Negative feedback from customers on service delivery Service recovery is a procedure for dealing with customers' service challenges. It must include: • Listening to the customer to identify the cause of the service challenge • Using verbal and non-verbal communication to address service challenge • Apologising to the customer immediately • Taking immediate action to resolve the situation • Showing empathy • Conducting follow-up with customer • Resilience may be defined as the process and experience of being disrupted by change, opportunities, stressors and adversity, and, after introspection, accessing strengths to grow stronger through disruption Methods to demonstrate resilience must include: • Developing coping skills to deal with stress of change, opportunity, stress or adversity • Building on actions and focusing on outcomes • Practicing realistic optimism and remaining hopeful under pressure • Developing strong support systems in or outside the workplace

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	ES-PMD-104G-1	**Skill Category**	Personal Management and Development
		Skill Sub-Category *(where applicable)*	N/A
Skill	Adapt to Change		
Skill Description	This skill describes the ability to identify local and/or global trends and changes impacting the workplace with a view to enhancing productivity and effectiveness in a diverse workplace. It also includes adapting to changes for sustained employability in the new knowledge economy and sharing knowledge and skills.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Ways in which various types of local and global trends impact one's employability and job role • Ways to cope with adjustments and expectations required in current and new job situation in a local and global context • Causes of gaps in own competencies • Types of learning opportunities and their characteristics • Types of other resources and opportunities for development • Ways to overcome barriers to the transfer of learning • Process and strategies of coaching to motivate and help others • Factors that hinder and encourage learning • Types of diversity at the workplace • Sources and stages of change and resistance to change • Components of self-esteem and positive attitude		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Access available sources of information to identify local and global trends and interpret information that impact one's employability and job role • Identify the types of expectations and adjustments required in current and new job situation to stay employable and competitive in the local and global context • Identify the types of competencies required in current and new job requirements • Identify the implications of diversity at the workplace and participate in		

	relevant approaches to work within a diverse workforce
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Transfer skills and knowledge acquired from training and development to the workplace and measure performance improvement as a result of training and development
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Demonstrate the ability to learn from and coach others a given set of skills from one job situation to another
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Identify gaps in own competencies, determine training and development needs and select suitable learning opportunities that match personal learning styles • Identify the impact of change on oneself and own job and adopt appropriate techniques to respond to change
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated*	N/A

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	ES-PMD-103G-1	**Skill Category**	Personal Management and Development
		Skill Sub-Category *(where applicable)*	N/A
Skill	Apply Emotional Competence to Manage Self at the Workplace		
Skill Description	This skill describes the ability to understand and apply self-awareness techniques. It also includes applying emotional intelligence principles to manage oneself at the workplace.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Definitions of emotional intelligence • Aspects of emotional intelligence • Domains of emotional intelligence and their application • Importance of emotional intelligence at work • Importance of considering cultural differences in the application of emotional intelligence • Factors in recognising the emotional needs of others at the workplace • Traits of low personal confidence • Characteristics of individuals with high emotional intelligence • Importance of demonstrating initiative and optimism at the workplace • Methods to develop emotional intelligence and their features		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Demonstrate conscientiousness and trustworthiness to complete given tasks according to organisational standards		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
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Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Present self with confidence and show flexibility in responding to changes at the workplace
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Manage own emotions and impulses to work effectively with others, taking into consideration the different cultures and background of individuals at the workplace • Recognise the emotional needs of others, empathise and respond appropriately to their needs
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Recognise own emotional states, the causes of those emotional states and its effects on performance and interpersonal relationships at the workplace • Identify personal strengths and weaknesses and make improvements needed to develop emotional intelligence • Demonstrate initiative and optimism in pursuing goals beyond what is required and expected of self
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated*	Definitions of emotional intelligence must include: • The innate potential to feel, use, communicate, recognise, remember, describe, identify, learn from, manage, understand and explain emotions • The ability, capacity, skill or, in the case of the trait EI model, a self-perceived ability to identify, assess, and control the emotions of oneself, of others, and of groups • The capacity to reason about emotions, and of emotions to enhance thinking. It includes the abilities to accurately perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth

	Aspects of emotional intelligence must include: • Understanding oneself, personal goals, intentions, responses, behaviour and all • Understanding others and their feelings Domains of emotional intelligence must include: • Knowing one's emotions • Managing one's emotions • Motivating oneself • Recognising and understanding others' emotions • Managing relationship through use of emotional intelligence

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	ES-PMD-101G-1	**Skill Category**	Personal Management and Development
		Skill Sub-Category *(where applicable)*	N/A
Skill	Develop Personal Effectiveness at Operations Level		
Skill Description	This skill describes the ability to apply knowledge and life skills and relate them to personal and team goals. It also includes managing time effectively, maintaining work-life balance, managing stress as well as personal finances.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types of motivational factors affecting personal goal setting and achievement • Strategies to link one's roles and responsibilities to individual and team success • Factors that may affect the achievement of team goals • Strategies to achieving goals • Benefits of prioritising tasks according to team goals • Various types of paraphernalia, technology and methods to manage time and work priorities and their features • Various barriers to effective time management and their characteristics • Various ways to access resources to overcome barriers to effective time management and their characteristics • Practices that promote personal well-being and aspects of personal management • Issues related to personal and family responsibilities and their impact on work • Common sources of assistance available to support personal management		

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Set up personal goals and align them to team goals based on objectives set • Plan and complete personal tasks to meet team goals according to timelines set • Identify work-life balance programmes to maintain personal work-life balance for the achievement of team goals
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Recognise symptoms of and deal with stress to maintain work effectiveness
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Seek guidance when setting and achieving personal goals

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Identify own roles and responsibilities and their contribution towards the achievement of team goals • Identify personal strengths and weaknesses, list the strategies to overcome weaknesses and describe how personal strengths can contribute towards the achievement of team goals • Identify own existing financial position using appropriate tools and describe how to manage such a position
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	N/A

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SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	ES-PMD-102G-1	**Skill Category**	Personal Management and Development
		Skill Sub-Category *(where applicable)*	N/A
Skill	Maintain Personal Presentation and Employability at Operations Level		
Skill Description	This skill describes the ability to identify personal career goals and take steps to realise career goals. It also includes determining one's competences and preparing for interviews.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Meaning of competencies • Necessity of setting personal career goals • Guidelines for setting personal career goals • Ways to develop career plan to achieve personal career goals • Components of resume and/or application form • Purpose of a resume and/or application form for job application • Factors to consider in preparing a resume or filling in an application form • Different types of job interview and their features • Necessity to prepare for job interview • Importance of basic social etiquette skills • Ways to develop basic social etiquette skills		
Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Determine personal career goals taking into account personal competences based on guidelines set • List personal competencies acquired through learning and experience to meet qualifications and expectations for the job • State sources of and interpret information on potential employment opportunities • Select jobs that best match personal competencies and career goals and apply for jobs • Prepare for and attend job interview by applying basic social etiquette skills		
Innovation and Value Creation	The ability to: • Elaborate on personal strength, abilities and aptitudes that may add		

It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational	value to the organisation
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Demonstrate basis social etiquette skills and personal hygiene during job interview
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Reflect on performance and feedback during job interview to address areas of improvement for future interviews
Range of Application (where applicable) *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	N/A

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">ES-ACE-101G-1</td><td>Skill Category</td><td>Analytical, Conceptual and Evaluative</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Demonstrate Initiative and Enterprising Behaviours</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to demonstrate innovation and initiative to initiate and sustain continuous improvement at the workplace. It also includes identifying, evaluating and managing risks associated with innovating and taking initiative.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Initiative attributes that one should possess and display and their characteristics
• Thinking skills and process for generating innovative outcomes and identifying related risks and their features
• Potential obstacles to creativity and innovation and how they can be managed
• Ethics relating to innovation
• Types of risks associated with new initiatives and periodic initiatives
• Ways to identify possible risks for innovation
• Ways to assign and determine probability of risks identified
• Corrective actions to deal with risks
• Factors to consider for selection of the most appropriate mode of communication
• Skills required for an effective self-directed individual and team</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Develop an action plan to implement the selected risk strategy in consultation with stakeholders using the most suitable mode of communication
• Monitor the risks identified at individual level to implement action plan and update risk response plan using appropriate measurements</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Show initiative in identifying opportunities and goals for continuous improvement in workplace performance • Review new initiatives for possible risks and recommend corrective actions and an appropriate strategy to deal with identified risks
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Identify stakeholders' interests and concerns and discuss with stakeholders to garner concurrence on potential areas and/or practices for innovation at the workplace • Demonstrate innovative and enterprising behaviours to improve business performance in accordance with regulatory requirements and ethics
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Translate ideas into action with self-direction and sustain efforts for goal attainment in accordance with context requirements, best practices and future needs
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	N/A

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Skill Code	ES-ACE-302G-1	**Skill Category**	Analytical, Conceptual and Evaluative
		Skill Sub-Category *(where applicable)*	N/A
Skill	Solve Problems and Make Decisions at Supervisory Level		
Skill Description	This skill describes the ability to acquire the skills to work with a team of subordinates in practising problem-solving and decision-making. It also includes anticipating and identifying potential problems, facilitating team's effort to resolve the problems, making appropriate decisions and seeing implementation plans through.		
Knowledge and Analysis *It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.*	The ability to understand: • Types of information to be gathered and analysed to identify and confirm a problem • Characteristics of appropriate problem-solving tools and techniques • Idea generation techniques and their characteristics • Types of value and impact to be evaluated for selection of ideas • Techniques to manage team conflict in decision-making process • Factors affecting the effectiveness of an implementation plan • Advantages and disadvantages of the various methods for gathering feedback from relevant sources • Methods used to identify deficiency in the implemented solution and implementation plan and their characteristics		

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Identify symptoms that could lead to potential problems at the workplace using appropriate tools and techniques • Apply logical deduction to anticipate and detect problems at the workplace based on symptoms and relevant information gathered • Analyse relevant information surrounding the perceived problems and identify the exact problem using elimination process, objective reasoning or process questioning • Analyse the root causes of the problems at the workplace using appropriate problem-solving tools and techniques • Develop an implementation plan that addresses the root causes of the problems and consider the impact to self and team at the workplace • Evaluate the effectiveness of the implemented solution and implementation plan by analysing feedback gathered from relevant sources
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Select a solution among the shortlisted ones collectively with team members using appropriate evaluative techniques and criteria • Formulate and execute modifications to restore and/or enhance effectiveness of implemented solution and implementation plan
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Facilitate generation of solutions to solve problems by encouraging creativity among team members

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Review the effectiveness of modifications made and analyse learning points and best practices that can be used for future reference
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	N/A

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">ES-IP-101G-1</td><td>Skill Category</td><td>People and Relationship Management</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Communicate and Relate Effectively at the Workplace</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to use effective communication techniques at the workplace, while taking into consideration social and cultural differences. It also includes interpreting, clarifying, analysing and responding to information received, as well as using effective negotiation skills to resolve conflicts for a win-win outcome.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Sources of information within and outside the organisation
• Types of information to be received, clarified and responded to and their features
• Different modes of communication and communication tools and their characteristics
• Principles of effective communication and interpersonal techniques
• Internal and external barriers to effective communication
• Strategies for communicating in a courteous and respectful manner that considers social and cultural differences
• Ways to distinguish between objective facts and subjective interpretation in a conflict
• Definition of conflict and common types of conflict at the workplace
• Definition of negotiation and types of negotiation styles and their characteristics
• Types of reference documents to use during negotiations
• Types of conflict resolution strategies to achieve outcomes in negotiation</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Application and Adaptation *It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.*	The ability to: • Interpret and analyse information received according to workplace procedures • Plan response to information received taking into account the social and cultural background of the recipient of the information • Identify signs, stages and causes of conflict with individuals or groups of people based on objective facts and interpretation • Define the conflict and highlight points of differences and contention objectively, taking into consideration social and cultural differences of parties involved
Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Work towards achieving a win-win outcome in assessing mutually acceptable solutions
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Use appropriate communication techniques that consider social and cultural differences to clarify and respond to information received • Negotiate for mutually acceptable solutions by all parties using effective communication and negotiation skill • Communicate outcome of negotiation and propose relevant recommendations with justifications to supervisor to seek concurrence and endorsement

Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Reflect on communication techniques to learn from weaknesses
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	Principles of effective communication and interpersonal techniques must include: • Feedback – to ensure that the receiver was listening, understood the information or message and agrees to the required action. Suggestions and criticisms to be provided when necessary at this stage • Clarity – message or information must be clear and concise and should not be ambiguous • Objectivity – the purpose of the message or information to be communicated must be clear, so as to decide the best mode of communication and medium for the message and to trigger the emotional and cognitive responses to ensure receivers are engaged e.g.: To gain information, to provide information, initiate action, praise, criticize, inspire, change a person's attitude, etc. • Listen and understand – use active listening skills to probe into a situation, repeat what was said to ensure that the information received is accurate. It is important to interpret the information correctly. Understanding include being aware of the receiver's state of mind and being upon receiving the information, emotions, social climate and customs • Connectivity – to connect with the receiver(s) and address their needs • Consistency – message or information must be consistent to the current plans, policies and procedures, programmes and goals of the organisation • Completeness – message or information must be completed and adequate to avoid any misunderstanding and any delay of action if required • Time – information should be communicated at the right time • Respect – to respect various cultural backgrounds, histories, and experiences, accepting their rights and paying attention to their needs

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

<table>
<tr><td rowspan="2">Skill Code</td><td rowspan="2">ES-IP-102G-1</td><td>Skill Category</td><td>People and Relationship Management</td></tr>
<tr><td>Skill Sub-Category
(where applicable)</td><td>N/A</td></tr>
<tr><td>Skill</td><td colspan="3">Work in a Team</td></tr>
<tr><td>Skill Description</td><td colspan="3">This skill describes the ability to apply effective communication techniques to achieve individual and team goals. It also includes providing support to team members while taking into consideration diversity issues.</td></tr>
<tr><td>Knowledge and Analysis

It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</td><td colspan="3">The ability to understand:

• Definition of organisational vision, mission and goals
• Different roles played by team members
• Interdependence of roles within a team
• Importance of maintaining open communication within a team
• Effects of trust, respect and support within a team
• Diversity issues and their impact on communication
• Relevant parties from whom one can seek feedback, advice and assistance
• Effects of organisational, industry and legislative requirements and work performance standards and/or targets on attainment of individual, team and organisational goals
• Organisational policies, limits of autonomy and span of control</td></tr>
<tr><td>Application and Adaptation

It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</td><td colspan="3">The ability to:

• Define and align team goals with departmental and organisational goals
• Demonstrate responsibility and commitment for work done and to the achievement of individual and team goals
• Identify potential areas of conflict with team members and methods to overcome them, taking into consideration diversity issues</td></tr>
</table>

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
SENIOR MACHINIST/SENIOR TECHNICIAN

Innovation and Value Creation *It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.*	The ability to: • Listen to and contribute ideas and skills using appropriate communication techniques to achieve team goals • Recommend improvements to established policies and procedures in a proactive manner
Social Intelligence and Ethics *It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.*	The ability to: • Maintain open communication with team members by sharing information and discussing work-related issues to achieve individual and team goals to meet organisational requirements • Demonstrate trust, respect and support towards team members in daily activities to achieve team goals • Identify and resolve issues and concerns through collaborative activities with supervisor
Learning to Learn *It refers to the ability to develop and improve one's self within and outside of one's area of work.*	The ability to: • Define own and individual roles within the team and work within the team and organisation dynamics • Accept and provide feedback, advice and assistance in a considerate and constructive manner to accomplish task assigned
Range of Application *(where applicable)* *It refers to the critical circumstances and contexts that the skill may be demonstrated.*	N/A

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Version Control

Version	Date	Changes Made	Edited by
1.0	12 October 2016	Initial Version	SSG and EDB

SKILLS FRAMEWORK FOR PRECISION ENGINEERING
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Definitions of the Five (5) Domains

Domain	Definition
Knowledge and Analysis	Knowledge includes the gathering of facts and information through traditional and digital forms. Analysis involves the cognitive processing, integration and inspection of single or multiple sources of facts and information required to perform work tasks and activities and takes into consideration, the work contexts in which the tasks and activities are carried out. The result of knowledge and analysis produce judgements on work tasks/activities/issues/areas, and the conceptualisation of solutions to solve problems at work.
Application and Adaptation	Application involves the ability to perform work tasks and activities defined by the requirements of the occupation. Adaptation involves the ability to react to and manage the changes in the work contexts. The result of application and adaptation leads to the production of psycho-motor actions and behavioural reactions to the work tasks/activities/issues/areas, and the execution of the planned solutions to solve problems at work.
Innovation and Value Creation	Innovation includes the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to the organisational goals. As a result of innovation, the organisation is able to reap the values from individual or team contributors to achieve organisational growth.
Social Intelligence and Ethics	Social intelligence includes the ability to appreciate and use affective factors in leadership, relationship and diversity management guided by professional codes of ethics as effective individuals or team contributors.
Learning to Learn	Learning-to-learn includes the ability to improve on self-development within and outside of one's area of work. It involves the continual inspection of one's knowledge, analytical, application, adaptive, innovative and social skills that are needed to perform the work optimally and/or solve problems effectively.