

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR GEMS & JEWELLERY INDUSTRY

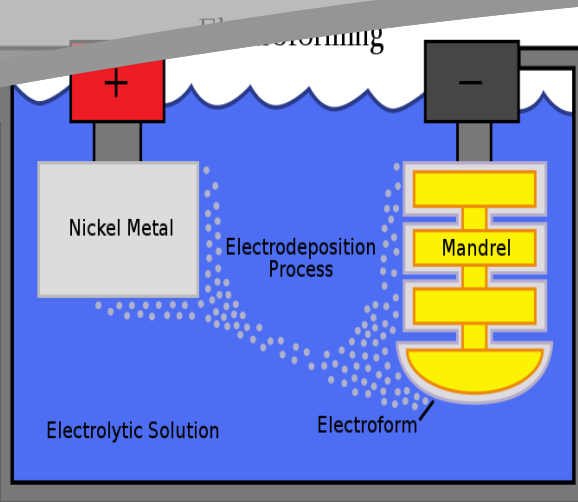
What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

Contact Us:

GJSCI, Mumbai

E-mail: coo@gjsi.org



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Introduction

Qualifications Pack-Electroforming Machine Operator

SECTOR: GEMS & JEWELLERY

SUB-SECTOR: Cast and Diamonds-Set Jewellery

OCCUPATION: Machine-made Jewellery Manufacturing

REFERENCE ID: G&J/Q3302

ALIGNED TO: NCO-2004/NIL

Electroforming Machine Operator: Also known as 'Electroforming Operator', the Electroforming Machine Operator manufactures light weight hollow gold jewellery.

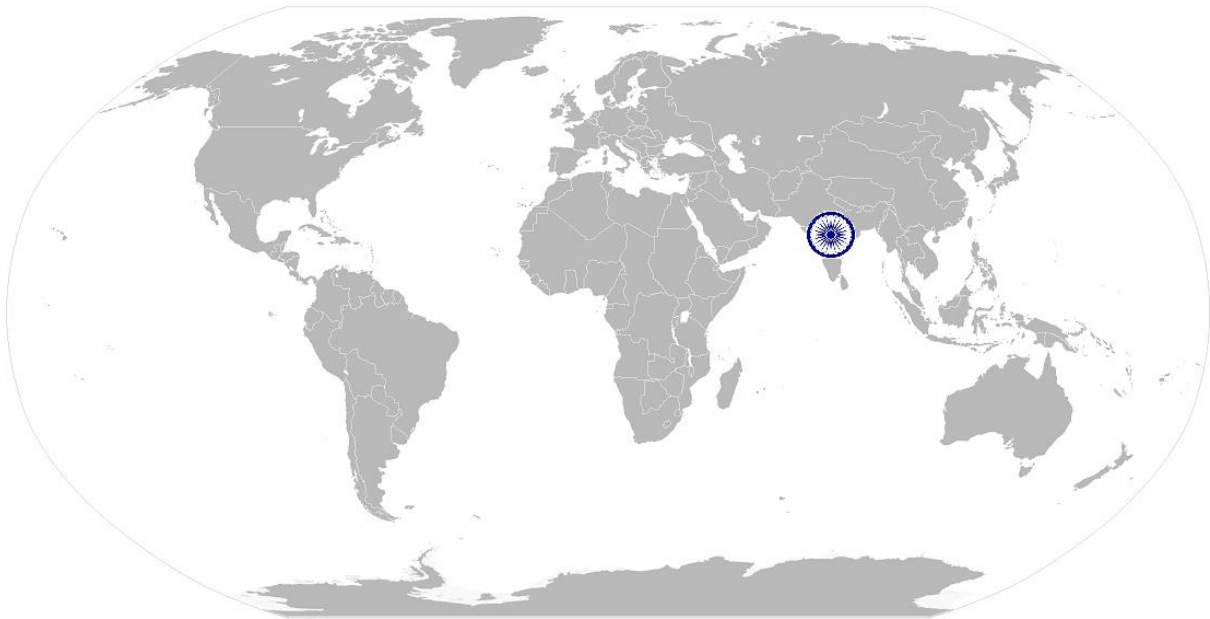
Brief Job Description: The individual at work creates the mandrel out of the mould, applies conductive solution on the surface of the mandrels, prepares the electrolytic solution and operates the electroforming machinery to make the jewellery.

Personal Attributes: The job requires the individual to have: attention to details, patience, ability to comply with standards and hand-eye coordination. Safe handling of hazardous chemicals and integrity as the work involves in dealing with precious metal such as Gold is also required.

Qualifications Pack Code	G&J/Q3302		
Job Role	Electroforming Machine Operator		
Credits(NSQF)	TBD	Version number	1.0
Sector	Gems & Jewellery	Drafted on	29/08/13
Sub-sector	Cast and Diamond-set Jewellery	Last reviewed on	13/08/14
Occupation	Machine-made jewellery Manufacturing	Next review date	15/09/15

Job Role	Electroforming Machine Operator Also called 'Electroforming Operator'
Role Description	Creating the mandrel out of mould, applying electro conductive solution, preparing electrolytic solution and operating the electroforming machine to manufacture light-weight, hollow precious-metal jewellery
NVEQF/NVQF level	4
Minimum Educational Qualifications	B. Sc. (Chemistry)
Maximum Educational Qualifications	
Training	Not applicable
Experience	Preferably 1 year in cast-jewellery production
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> G&J/N3302 Manufacture jewellery using electroforming process G&J/N9901 Respect and maintain IPR G&J/N9902 Coordinate with others G&J/N9905 Maintain occupational health and safety <p>Optional: Not applicable</p>
Performance Criteria	As described in the relevant OS units

National Occupational Standard



Overview

This unit is about making precious-metal jewellery using the electroforming process. This includes preparation of mould, electrolytic solution and operation of electroforming machine. Electroformed jewellery is a combination of light weight and complex designs.

G&J/N3302

Manufacture jewellery using electroforming process

National Occupational Standard

Unit Code	G&J/N3302
Unit Title (Task)	Manufacture light-weight jewellery of complex designs using electroforming process
Description	This OS unit is about manufacturing jewellery using the electroforming process, a technology for producing light-weight jewellery with complex designs, while maintaining its strength, utility and flexibility
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Prepare the mandrel for electroforming process • Prepare the electrolytic solution • Perform electroforming process • Maintain electroforming equipment by scheduling machine maintenance, periodically
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Preparing the mandrel for electroforming process	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. receive precious metal alloy, raw-materials and instructions from supervisor</p> <p>PC2. receive the jewellery mould from mould-making section</p> <p>PC3. check visually the moulds for any damage or aberrations, take out mandrels using the mould.</p> <p>PC4. clamp the mandrel on a Jig.</p> <p>PC5. apply electro conductive solution on the surface of mandrel where the metal deposition needs to take place</p> <p>PC6. accurately apply electro conductive solution where the deposition needs to be done</p> <p>PC7. clamp the mandrel appropriately in the jig to enable electroforming process</p> <p>PC8. analyse the chemical properties in the electrolytic solution procured</p> <p>PC9. add appropriate chemicals if there is a deviation in the composition of chemicals as per the requirement</p> <p>PC10. fill the electroforming machine with the electrolytic solution as per requirement</p>
Electroforming process	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC11. set the parameters on the electroforming machine such as temperature, time</p> <p>PC12. fix the mandrels with the Jig in the machine</p> <p>PC13. operate the machine using controls as instructed</p> <p>PC14. monitor the electroforming process</p> <p>PC15. monitor the ionic movements inside the bath which enables gold deposition over the mandrel</p> <p>PC16. monitor the weight of gold inside the bath</p> <p>PC17. monitor the specifications and controls during the complete electroforming process</p> <p>PC18. remove the jig of mandrels from the solution once the process is completed and check visually for any defects</p> <p>PC19. accurately set various machine parameters such as temperature, gold weight</p>

G&J/N3302

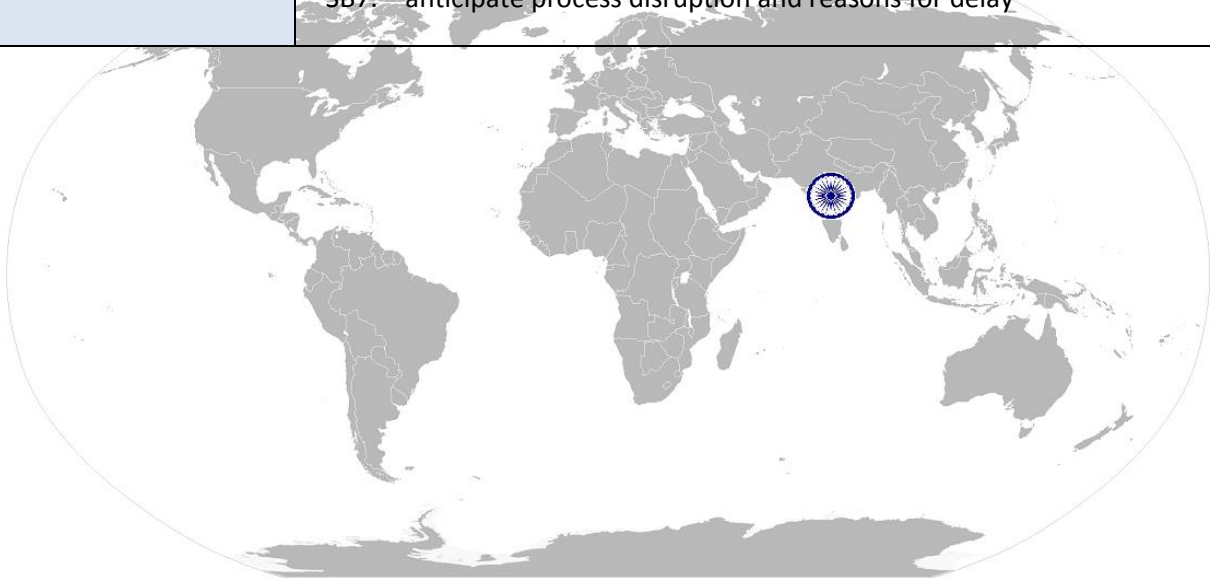
Manufacture jewellery using electroforming process

	<p>in the electrolytic solution</p> <p>PC20. select the cathode (mandrel) and anode (gold) properties correctly to enable electroforming process</p> <p>PC21. ensure that there is no dust or foreign particles in the electrolytic solution during the process</p> <p>PC22. follow steps as per operating procedures for electroforming</p> <p>PC23. handle chemicals with care and ensure zero accidents</p> <p>PC24. avoid any deviation of process from the standard defined</p>
Achieving productivity	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC25. plan the process to ensure optimum use of the electroforming equipment</p> <p>PC26. deliver number of jewellery as per target deliverable</p>
Checking quality of output	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC27. make electroforming metal as per the defined Caratage and design</p> <p>PC28. consistently deliver standardised quality product</p>
Knowledge and Understanding (K)	
A. Organizational Context	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. company's policies on: quality, incentives, delivery standards, safety and hazards, integrity and IPR, and personnel management</p> <p>KA2. importance of the individual's role in the workflow</p> <p>KA3. reporting structure</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. electroforming process</p> <p>KB2. Operations of electroforming machine</p> <p>KB3. the chemical composition, structure, and properties of substances used</p> <p>KB4. chemical processes and transformations that occur during the process</p> <p>KB5. details on ionic movements, properties of anode and cathode, electro deposition, electrolytic solution, etc.</p> <p>KB6. different type of precious metals, alloys and their properties</p> <p>KB7. equipment maintenance</p> <p>KB8. potential work hazards while handling equipment and chemicals</p>
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Basic reading and writing skills
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read notes and operating manual of electroforming machine</p> <p>SA2. read company rules and compliance documents required to complete the work</p>
	Calculation skills
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. ensure that weight of gold in the bath is adequate for deposition</p>
	Teamwork and multitasking
	<p>The user/individual on the job needs to know and understand how:</p> <p>SA4. to share work load as required</p> <p>SA5. deliver metal on time for further processing</p> <p>SA6. to share knowledge with co-workers</p>

G&J/N3302

Manufacture jewellery using electroforming process

B. Professional Skills	Electroforming
	The user/individual on the job needs to know and understand how to: SB1. ensure that electrolytic solution is as per specification SB2. produce jewellery as per design specification and Caratage
	Using tools and machines
	The user/individual on the job needs to know and understand: SB3. how to use the right equipment in the electroforming process SB4. hazards involved and safety measures to be taken SB5. tools and machine operations , maintenance and basic repairs
	Reflective thinking
	The user/individual on the job needs to know and understand how: SB6. improve productivity and increase efficiency based on past working experience
	Critical thinking
The user/individual on the job needs to know and understand how to: SB7. anticipate process disruption and reasons for delay	

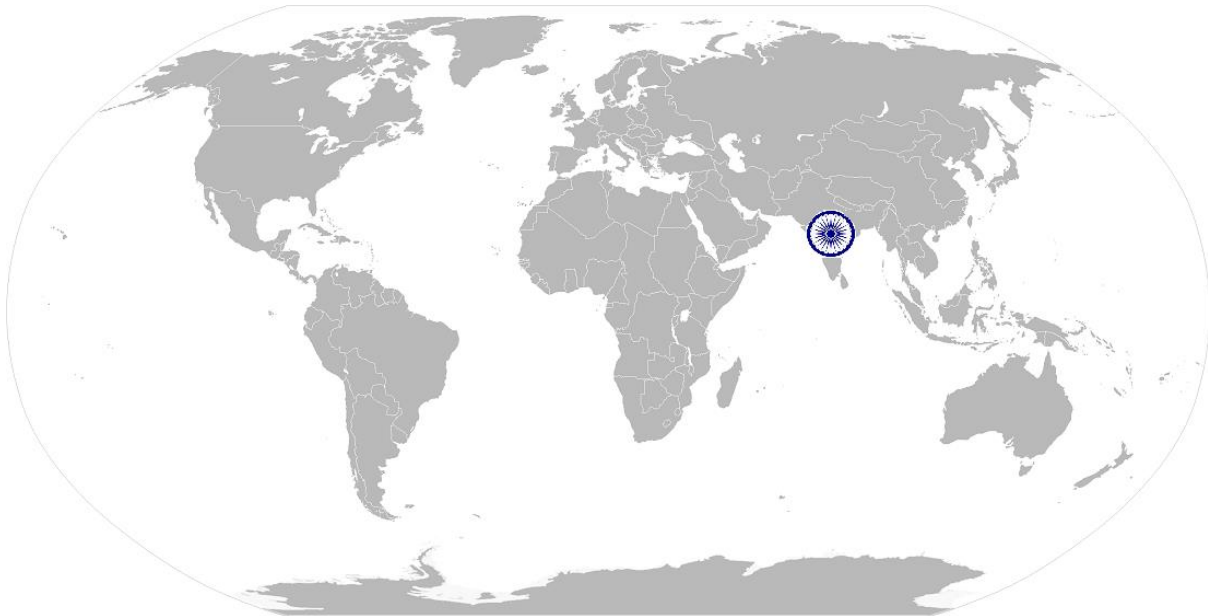


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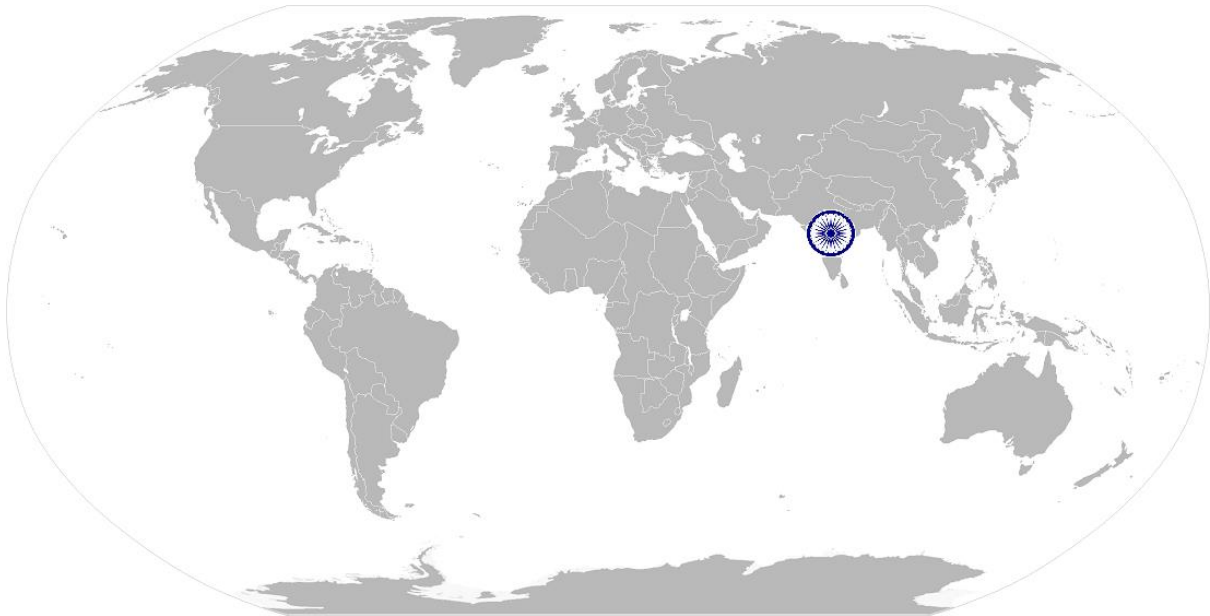
Manufacture jewellery using electroforming process

NOS Version Control

NOS Code	G&J/N3302		
Credits(NSQF)	TBD	Version number	1.0
Industry	Gems & Jewellery	Drafted on	29/08/13
Industry Sub-sector	Cast and Diamond-set Jewellery	Last reviewed on	13/08/14
Occupation	Machine jewellery making	Next review date	15/09/15



National Occupational Standard



Overview

This unit is about respecting intellectual property rights of the company's products and designs as well as avoiding infringement on IPR of other companies.

G&J/N9901

Respect and maintain IPR

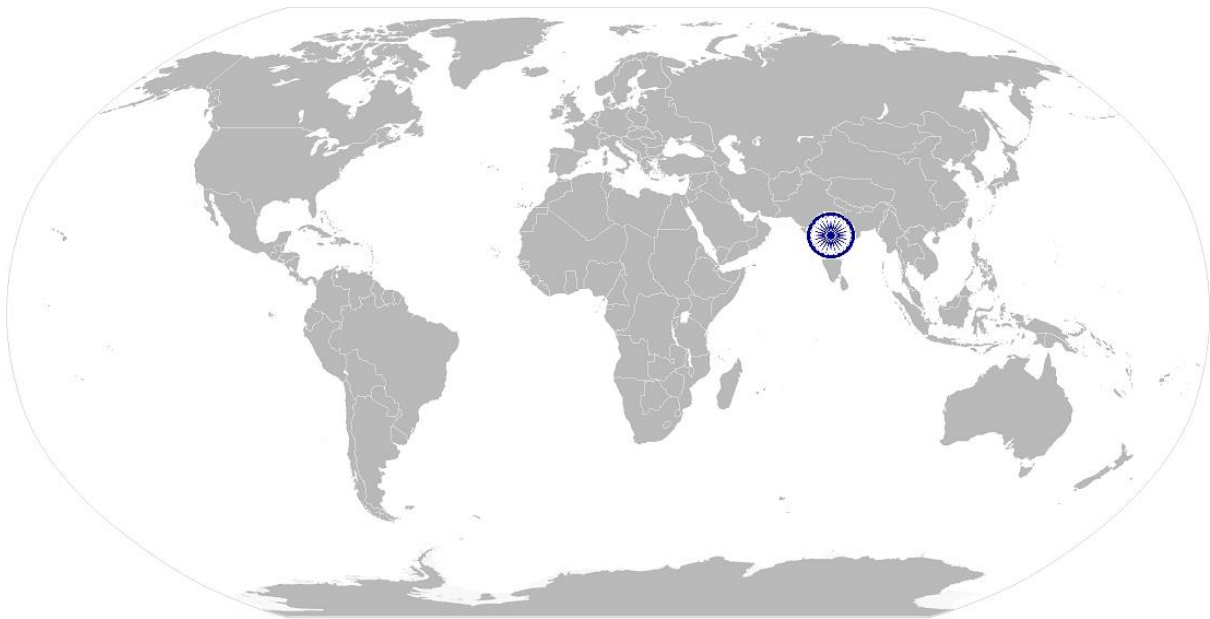
National Occupational Standard

Unit Code	G&J/N9901
Unit Title (Task)	Maintain IPR of company and respect IPR of other companies
Description	This OS unit is about protecting company's IPR and avoiding infringement to IPR of other companies
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> Protect company's Intellectual Property Rights (IPR) Avoid infringement to IPR of other companies
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Respecting and Maintaining IPR	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. prevent leak of new designs to competitors by reporting on time</p> <p>PC2. be aware of any of company's product or design patents</p> <p>PC3. report IPR violations observed in the market, to supervisor or company heads</p> <p>PC4. read copyright clause of the material published on the internet and any other printed material</p> <p>PC5. consult supervisor or senior management when in doubt about using publicly available information</p> <p>PC6. report any infringement observed in the company</p> <p>PC7. spot plagiarism and report</p> <p>PC8. understand significance of patents and IPR</p> <p>PC9. avoid being involved in IPR violations</p>
Knowledge and Understanding (K)	
C. Organizational Context	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. company's policies on IPR and plagiarism</p> <p>KA2. reporting structure</p> <p>KA3. company's unique product range</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. patents and IPR laws</p> <p>KB2. how IPR protection is important for competitiveness of a company</p>
Skills (S) [Optional]	
C. Core Skills/ Generic Skills	Communication skills
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. effectively communicate any observed IPR violations or order leaks</p>
D. Professional Skills	Decision making
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA1. report potential sources of violations</p>

G&J/N9901

Respect and maintain IPR

	Reflective thinking
	The user/individual on the job needs to know and understand to: SA2. learn from past mistakes and report IPR violations on time
	Critical thinking
	The user/individual on the job needs to know and understand how to: SA3. spot signs of violations and alert authorities in time

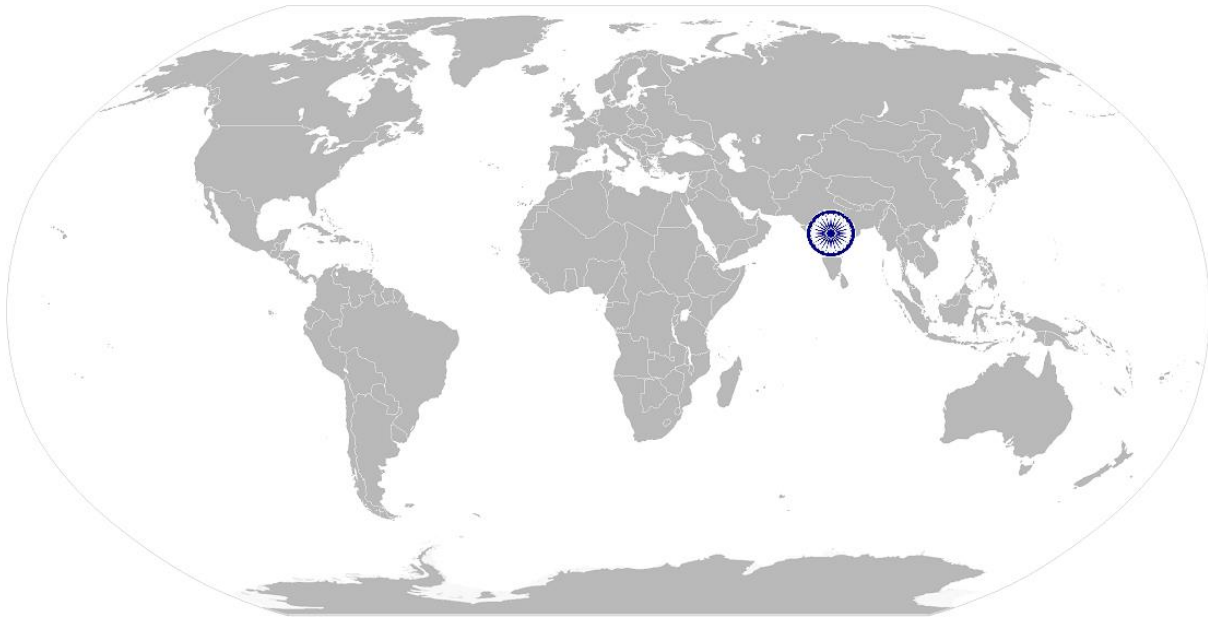


G&J/N9901

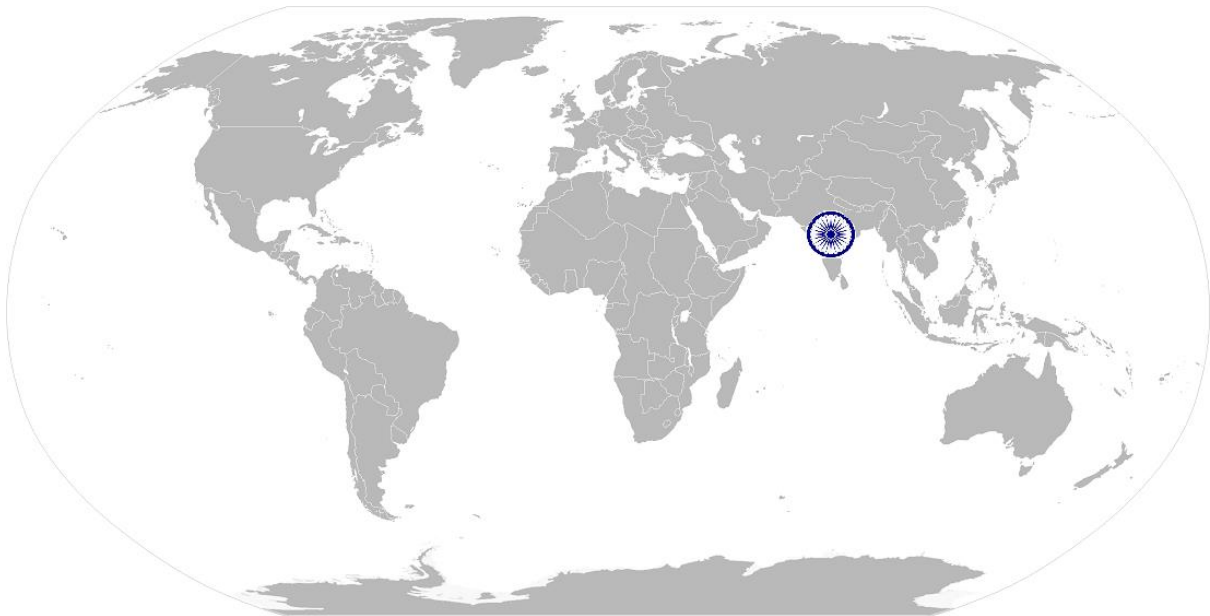
Respect and maintain IPR

NOS Version Control

NOS Code	G&J/N9901		
Credits(NSQF)	TBD	Version number	1.0
Industry	Gems & Jewellery	Drafted on	29/08/13
Industry Sub-sector	Cast and Diamond-set Jewellery	Last reviewed on	13/08/14
		Next review date	15/09/15



National Occupational Standard



Overview

This unit is about team work and level of communication with colleagues or clients. It determines the ability to work as a team member, share work and multi-task in order to achieve the deliverables on schedule.

G&J/N9902

Coordinate with others

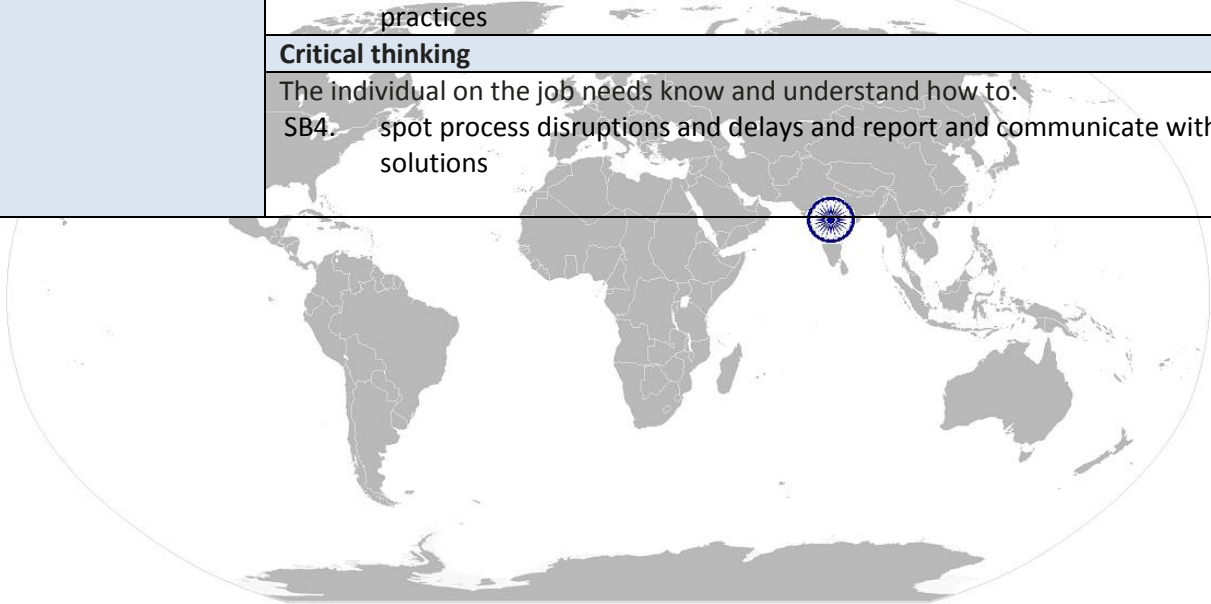
National Occupational Standard

Unit Code	G&J/N9902
Unit Title (Task)	Interact with colleagues and seniors
Description	This OS unit is about communicating with colleagues and seniors in order to achieve smooth and hazard-free work flow
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Interact with supervisor • Interact with colleagues within and outside the department
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Interaction with supervisor	To be competent, the user/individual on the job must be able to: <ul style="list-style-type: none"> PC1. receive work instructions and raw materials from reporting supervisor PC2. communicate to reporting supervisor about process-flow improvements, product defects received from previous process, repairs and maintenance of tools and machinery as required PC3. communicate any potential hazards or expected process disruptions PC4. handover completed work to supervisor PC5. understand the work output requirements PC6. comply with company policy and rule PC7. deliver quality work on time as required by reporting any anticipated reasons for delays
Interactions with colleagues and other departments	To be competent, the user/individual on the job must be able to: <ul style="list-style-type: none"> PC8. work as a team with colleagues and share work as per their or own work load and skills PC9. work with colleagues of other departments PC10. communicate and discuss work flow related difficulties in order to find solutions with mutual agreement PC11. receive feedback from qc and rework in order to complete work on time PC12. put team over individual goals PC13. be able to resolve conflicts PC14. learn how to multi-task relevant activities
Knowledge and Understanding (K)	
A. Organizational Context	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> KA1. company's policies on: preferred language of communication, reporting and escalation policy, quality delivery standards, and personnel management KA2. reporting structure
B. Technical Knowledge	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> KB1. communicate effectively KB2. build team coordination

G&J/N9902

Coordinate with others

Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Communication skills
	The individual on the job needs to know and understand how to: SA1. read and write preferred language of communication as prescribed by the company SA2. read job sheets and interpret technical details mentioned in the jobsheet
B. Professional Skills	Decision making
	The individual on the job needs to know and understand: SB1. how to spot and communicate potential areas of disruptions to work process and report the same SB2. when to report to supervisor and when to deal with a colleague individually, depending on the type of concern
	Reflective thinking
	The individual on the job needs to know and understand how to: SB3. improve work processes by interacting with others and adopting best practices
	Critical thinking
The individual on the job needs know and understand how to: SB4. spot process disruptions and delays and report and communicate with solutions	

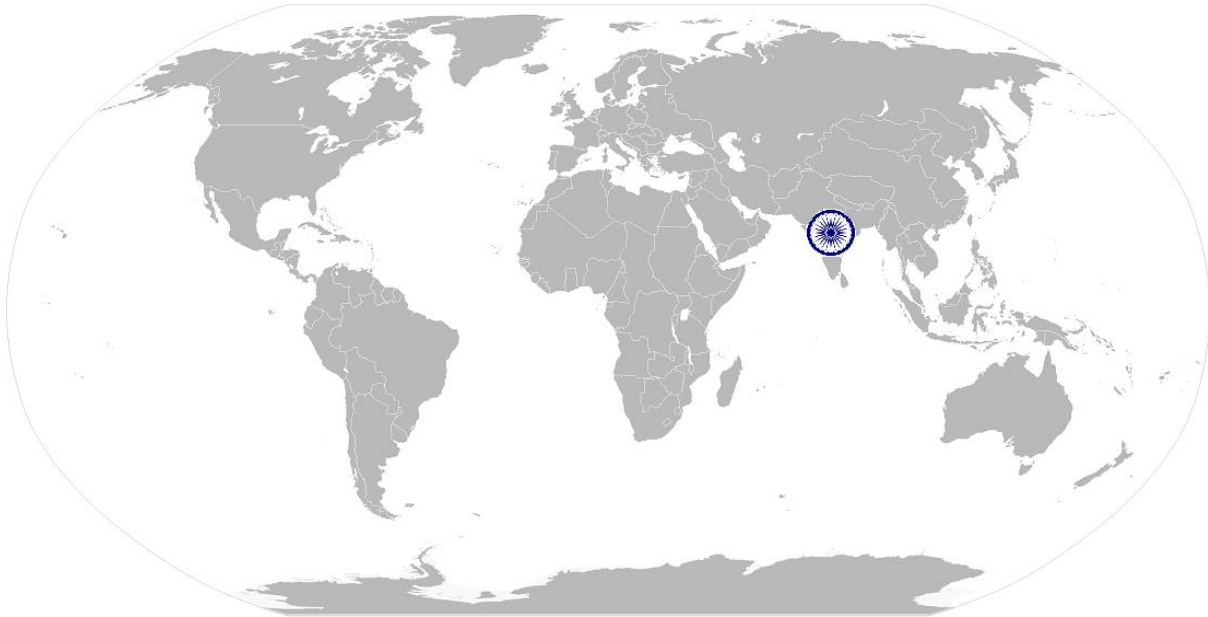


G&J/N9902

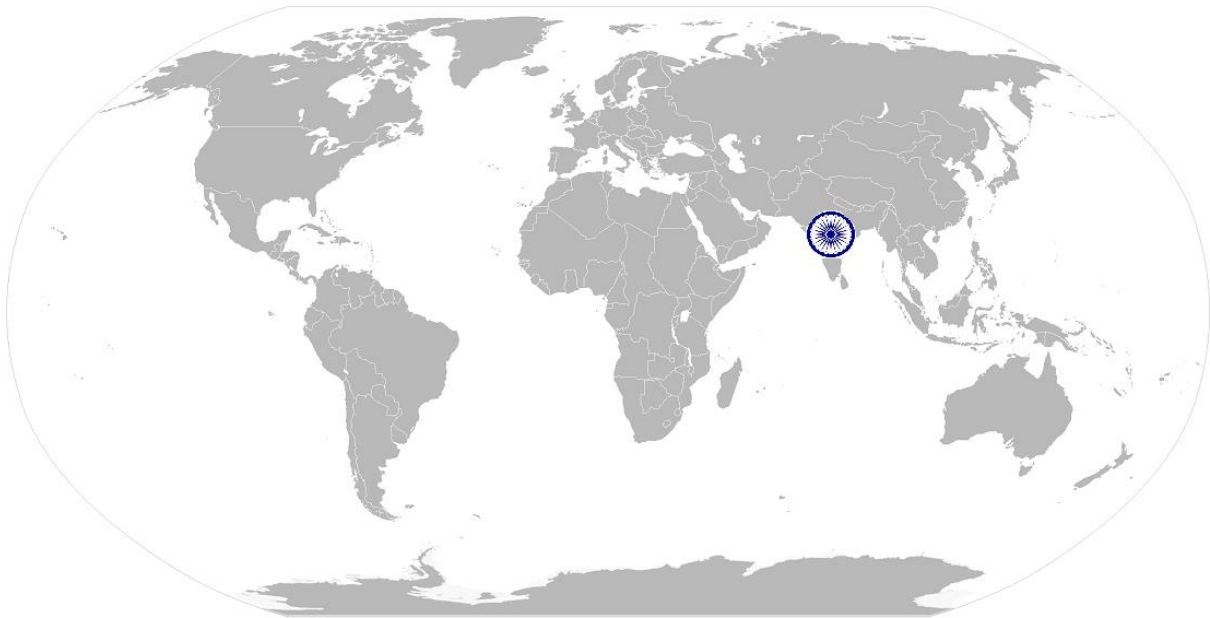
Coordinate with others

NOS Version Control

NOS Code	G&J/N9902		
Credits(NSQF)	TBD	Version number	1.0
Industry	Gems & Jewellery	Drafted on	29/08/13
Industry Sub-sector	Cast and diamond-set jewellery	Last reviewed on	13/08/14
		Next review date	15/09/15



National Occupational Standard



Overview

This unit is about commitment towards reporting potential hazards, taking preventive measures to contain accidents in order to make the work environment safe for self and colleagues and maintaining occupational health and safety.

G&J/N9905

Maintain occupational health and safety

National Occupational Standard

Unit Code	G&J/N9905
Unit Title (Task)	Maintain occupational health and safety
Description	This OS unit is about being aware of, communicating and taking steps towards minimizing potential hazards and dangers of accidents on the job and maintaining occupational health and safety
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Understand potential sources of accidents • Use safety gear to avoid accidents • Actively participate in the health and safety awareness campaigns • Communicate to reporting supervisor about:
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Communicating potential accident points	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. understand potential sources of accidents in order to avoid accidents related to use of potentially dangerous chemicals, sharp tools, hazards from machines and other equipment such as heating lamps</p> <p>PC2. spot and report potential hazards on time</p> <p>PC3. follow company policy and rules regarding use of hazardous materials</p> <p>PC4. attend and actively participate in the health and safety campaigns organised by the company</p> <p>PC5. Process flow improvements that can reduce anticipated or repetitive hazards</p> <p>PC6. Mishandling of tools, machines or hazardous materials</p> <p>PC7. Electrical problems that could result in accident</p>
Using safety gear	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC8. use or wear safety gear as per the rules of the company</p> <p>PC9. attend fire drills organised by the company or industrial zone</p> <p>PC10. learn first aid procedure</p> <p>PC11. be alert about designated assembly area in the event of an emergency</p> <p>PC12. read and understand the evacuation and emergency procedures</p>
Knowledge and Understanding (K)	
A. Organizational Context	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. company's policies on: safety and hazards and personnel management</p> <p>KA2. reporting structure</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. how different chemicals react and what could be the danger from them</p> <p>KB2. how to use machines and tools without suffering bodily harm</p>

G&J/N9905

Maintain occupational health and safety

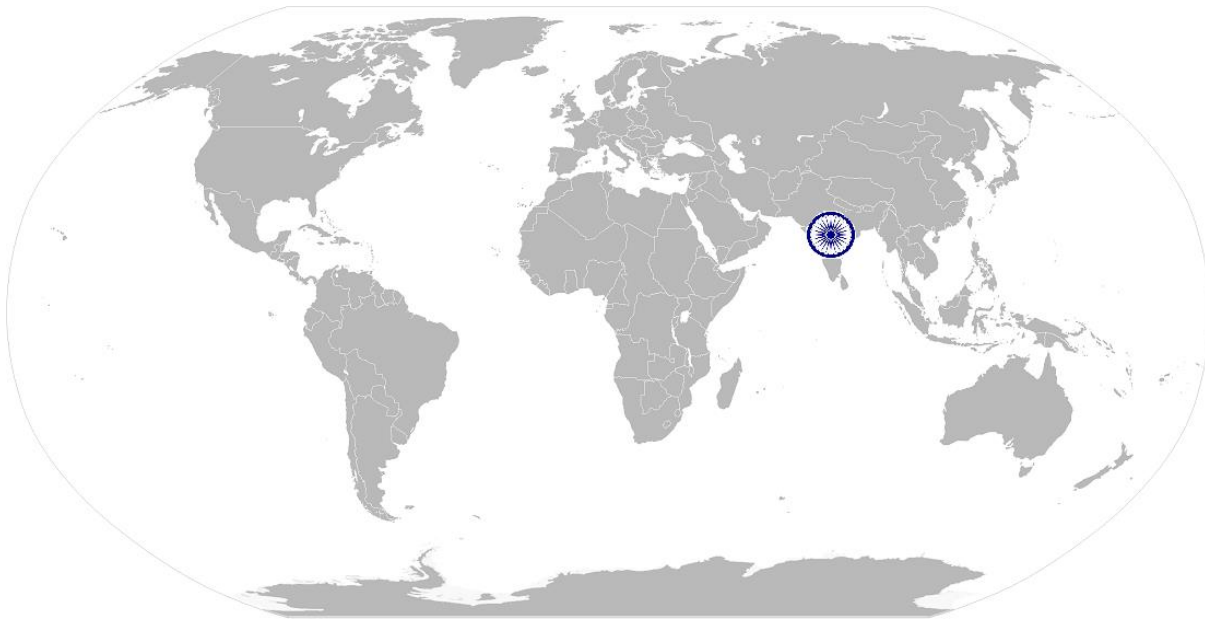
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Communication skills The individual on the job needs to know and understand how to: SA1. effectively communicate the danger
	Organising skills The individual on the job needs to know and understand how to: SA2. keep all the tools in an organised manner so as to avoid accidents SA3. keep the work environment safe and clean
	B. Professional Skills
	Decision making The individual on the job needs to know and understand how to: SB1. report potential sources of danger SB2. follow prescribed procedure in the event of an accident SB3. wear appropriate safety gear to avoid an accident
	Reflective thinking The individual on the job needs to know and understand to: SB4. learn from past mistakes regarding use of hazardous machines or chemicals
	Critical thinking The individual on the job needs to know and understand how to: SB5. spot dangers
	Decision making The individual on the job needs to know and understand how to: SB6. report potential sources of danger SB7. follow prescribed procedure in the event of an accident SB8. wear appropriate safety gear to avoid an accident

G&J/N9905

Maintain occupational health and safety

NOS Version Control

NOS Code	G&J/N9905		
Credits(NSQF)	TBD	Version number	1.0
Industry	Gems & Jewellery	Drafted on	29/08/13
Industry Sub-sector	Cast and diamond-set jewellery	Last reviewed on	13/08/14
		Next review date	15/09/15



Definitions

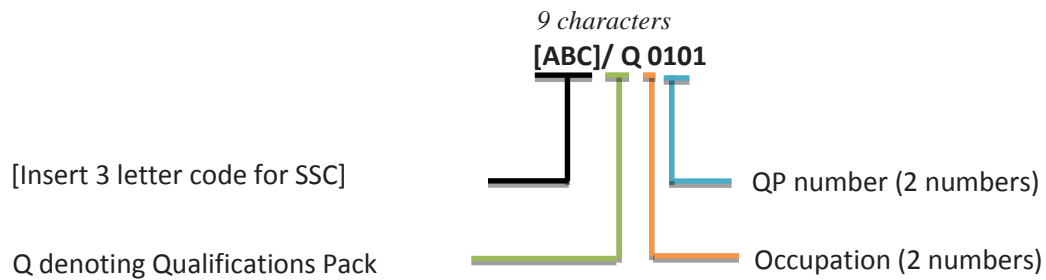
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or an area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Sub-function	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance criteria are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (OS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
Knowledge and Understanding	Knowledge and understanding are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish

	specific designated responsibilities.
Core Skills/ Generic Skills	Core skills or generic skills are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Keywords /Terms	Description
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
IPR	Intellectual Property Rights
NOS	National Occupational Standard(s)
NVQF	National Vocational Qualifications Framework
NSQF	National Qualifications Framework
NVEQF	National Vocational Education Qualifications Framework
QP	Qualifications Pack

Annexure

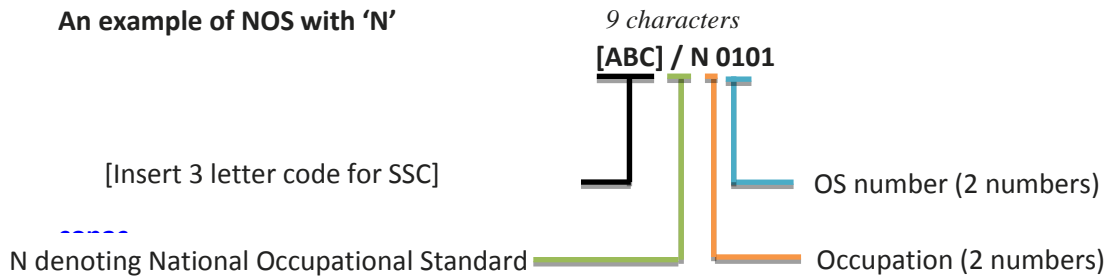
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Handmade gold and gems-set jewellery	01-20
Cast and diamond-set jewellery	21-40
Diamond processing	41-60
Gemstone processing	61-80
Jewellery retailing	81-99

Sequence	Description	Example
Three letters	Industry name	G&J
Slash	/	/
Next letter	Whether QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

<u>CRITERIA FOR ASSESSMENT OF TRAINEES</u>		
Job Role Qualification Pack Sector Skill Council	- - -	Electroforming Machine Operator Electroforming Machine Operator GEMS & JEWELLERY To pass the Assessment, a candidate needs to score 50% in Theory and 70% in Practical
Assessment Strategy		
NOS	Elements	Performance Criteria
G&J/N3302 Manufacture jewellery using electroforming process	Preparing the mandrel for electroforming process	PC1. accurately apply electro conductive solution where the deposition needs to be done
		PC2. clamp the mandrel appropriately in the jig to enable electroforming
	Electroforming process	PC3. accurately set various machine parameters such as temperature, gold weight in the electrolytic solution
		PC4. select the cathode (mandrel) and anode (gold) properties correctly to enable electroforming process
		PC5. ensure that there is no dust or foreign particles in the electrolytic solution during the process
		PC6. follow steps as per operating procedures for electroforming
		PC7. handle chemicals with care and ensure zero accidents
		PC8. avoid any deviation of process from the standard defined
	Productivity	PC9. plan the process to ensure optimum use of the electroforming equipment
		PC10. deliver number of jewellery as per target deliverable
	Quality & Output	PC11. make electroforming metal as per the defined Caratage and design
		PC12. consistently deliver standardised quality product
		Sub Total
2. G&J/N9901 Respect & Maintain IPR	Respecting & Maintaining IPR	PC1. be able to spot plagiarism and report
		PC2. be aware of patents and IPR
		PC3. not be involved in IPR violations
		Sub Total

3. G&J/N9902 Coordinate with team and others	Interaction with superior	PC1. understand the work output requirements
		PC2. comply with company policy and rule
		PC3. deliver quality work on time as required by reporting any anticipated reasons for delays
	Interactions with colleagues, customers and/or vendors	PC4. put team over individual goals
		PC5. be able to resolve conflicts
		PC6. learn how to multi-task relevant activities
		Sub Total
4. G&J/N9905 Maintain occupational health and safety	Communicating potential accident points	PC1. spot and report potential hazards on time
		PC2. follow company policy and rules regarding use of hazardous materials
		PC3. attend and actively participate in the health and safety campaigns organised by the company
	Using safety gear	PC4. use or wear safety gear as per the rules of the company
		Sub Total
		Total

