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SURGICAL INSTRUMENTS MANUFACTURING TECHNICIAN

ASSESSMENT PACKAGE

National Vocational Certificate Level 3

Version 1 - October, 2019

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SURGICAL INSTRUMENTS MANUFACTURING TECHNICIAN

ASSESSMENT PACKAGE

National Vocational Certificate Level 2

Version 1 - October, 2019

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code: 072200883	Level: 3	Version: 01
Competency Standard Title: Perform Forging	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Candidate Details	Name: ..... Registration/Roll Number: .....
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):** 1. **Assessment Task 1:** Perform sheet cutting for surgical instrument's forging as per job requirements 2. **Assessment Task 2:** Perform hammer stroke as per job requirements 3. **Assessment Task 3:** Perform trimming as per assessor's instructions **And complete:** 4. **Knowledge assessment test (written or oral)** 5. **Portfolios at the time of assessment (if any)**
Minimum Evidence Required	**During a practical assessment, under observation by an assessor, you will complete:** **Assessment Task 1** **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange suitable material and measure thickness of sheet as per product specification / drawing **Performance Criteria** 3: Set shearing parameters as per required strip sizes and adjust the Jig size for sheet cutting on shearing press table **Performance Criteria** 4: Cut down the large size sheet into strips according to job specification using shearing press **Performance Criteria** 5: Measure strips to verify required specifications **Performance Criteria** 6: Mount cutting die on power press and cut strips for pre-forge shape (raw shape) and manage PTC
	Assessment Task 2 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Mount both parts of forging dies on drop forged hammer and align forging dies **Performance Criteria** 3: Heat up the pre-forged work pieces in furnace to achieve required temperature **Performance Criteria** 4: Place preheated pieces in forging die and apply hammer stroke as per requirements **Performance Criteria** 5: Remove the forged pieces out of die safely and place in storage container/trolley/bin **Performance Criteria** 6: Inspect the size and shape of forged pieces after cooling down to verify required specifications and manage PTC

	Assessment Task 3 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Mount trimming die on power press and set press parameters (Daylight, stroke etc.) as per job requirements **Performance Criteria** 3: Trim the extra material from forged pieces on power press **Performance Criteria** 4: Check quality of trimmed forged work pieces **Performance Criteria** 5: Perform cold stamping if required and store in designated place **Performance Criteria** 6: Prepare report of completed work on prescribed format and manage PTC
	Portfolios required at the time of assessment (if any) for

Continued on following page

Assessors Judgment Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:..... .....
Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor: ....

Assessment Summary (to be filled by the assessor)							
Activity	**Method**					**Result**	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration							
Knowledge Assessment							
Other Requirement							

Each Assessment Task (with Learning Unit)	
Assessment Task 1	**Description of assessment task 1** Perform sheet cutting for surgical instrument's forging as per job requirements

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange suitable material and measure thickness of sheet as per product specification / drawing	☐	☐	
3	**Performance Criteria** 3: Set shearing parameters as per required strip sizes and adjust the Jig size for sheet cutting on shearing press table	☐	☐	
4	**Performance Criteria** 4: Cut down the large size sheet into strips according to job specification using shearing press	☐	☐	
5	**Performance Criteria** 5: Measure strips to verify required specifications	☐	☐	
6	**Performance Criteria** 6: Mount cutting die on power press and cut strips for pre-forge shape (Raw shape) and manage PTC	☐	☐	
Competent ☐		Not Yet Competent ☐		

Assessment Task 2	**Description of assessment task 2** Perform hammer stroke as per job requirements

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Mount both parts of forging dies on drop forged hammer and align forging dies	☐	☐	
3	**Performance Criteria** 3: Heat up the pre-forged work pieces in furnace to achieve required temperature	☐	☐	
4	**Performance Criteria** 4: Place preheated pieces in forging die and apply hammer stroke as per requirements	☐	☐	
5	**Performance Criteria** 5: Remove the forged pieces out of die safely and place in storage container/trolley/bin	☐	☐	
6	**Performance Criteria** 6: Inspect the size and shape of forged pieces after cooling down to verify required specifications and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 3	**Description of assessment task 3** Perform trimming as per assessor instructions

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Mount trimming die on power press and set press parameters (Daylight, stroke etc.) as per job requirements	☐	☐	
3	**Performance Criteria** 3: Trim the extra material from forged pieces on power press	☐	☐	
4	**Performance Criteria** 4: Check quality of trimmed forged work pieces	☐	☐	
5	**Performance Criteria** 5: Perform cold stamping if required and store in designated place	☐	☐	
6	**Performance Criteria** 6: Prepare report of completed work on prescribed format and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Perform Forging	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Guidance for Candidate	**To complete your assessment for this Competency Standard, you need to answer the questions on the following pages correctly.**

Assessors Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name:..... Registration/Roll Number: Candidate Signature: ....
Written Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor:..... Assessor's code: Signature of the Assessor:..... .....

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Perform Forging	**Assessment Date (DD/MM/YY):** **Time Duration :**		

WRITTEN ASSESSMENT

Question	**Candidate's answer**
1. Write any 3 safety precautions for forging process.	• Wear PPE's during forging operation. • Always avoid the use of damaged hammers. • Never try to strike a hardened surface with a hardened tool. • No person should stand in line with the flying objects. • Always use the proper tongs tool to grip and lift objects according to the type of work
2. Name any 6 PPEs of the forging process.	• Face mask • Gloves • Safety shoe • Apron • Ear plugs • Goggles • Helmet
3. How can we cut large size strips into small pieces?	With the help of power press, we can cut large sizes strips into small pieces.
4. What is the temperature of forging furnace?	Temperatures of forging furnace for different material are 700° to 2,250°F.

Question	Candidate's answer
5. What is forging?	Manufacturing process in which a piece of (usually hot) metal is formed into the desired shape by hammering, pressing, rolling, squeezing, and other such operations in one or more forging equipment.
6. Name any 5 precise measuring instruments.	• Vernier caliper • Micrometer • Dial indicator • Height gauge • Electronic balance • Depth gauge • Angle protector • Dial Vernier caliper
7. What is the function of jigs and fixtures?	• A jig is a device which supports and holds the work piece intact at the proper location with the help of locators. It guides the cutting tool in most of its usages to ensure that the operation is done at the exact place and it is primarily used in drilling and reaming operation. • A fixture is a device which is used to locate the work piece accurately and to hold it securely. Depending upon the machining operation and the place of the part where material is to be removed, one or more work pieces may be placed within one fixture setup. Fixtures are widely used for all types of machining operation and for very huge work pieces.
8. What is the need of trimming operation for forged work pieces?	Trimming is a finishing operation in which shearing off of burrs from the cut edges is carried out in order to make the edges smooth and also impart dimensional accuracy.
9. What is the importance of proper die setting and alignments?	Proper alignment and setting of die is very important for the life of die. Not properly set and align die cause damage of job, die and accident.
10. What are the defects of sheet cutting, forged and trimmed work pieces?	• Exterior/ Interior Cracking • Laps/ Folds • Cold shuts • Improper Grain Flow • Warping

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code: 072200884	Level: 3	Version: 01
Competency Standard Title: Perform Manual Machining	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Candidate Details	Name: ..... Registration/Roll Number: .....
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):** 1. **Assessment Task 1:** Perform turning operation on surgical instrument, assigned task given by assessor 2. **Assessment Task 2:** Perform milling operation on surgical instrument, assigned task given by assessor **And complete:** 3. **Knowledge assessment test (Written or Oral)** 4. **Portfolios at the time of assessment (if any)**
Minimum Evidence Required	**During a practical assessment, under observation by an assessor, you will complete:** **Assessment Task 1** **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange tools and work piece (surgical Instrument) for turning operations according to job requirement and prepare work piece by required machining (sawing and filing etc.) and get it ready for clamping **Performance Criteria** 3: Arrange measuring instruments and holding devices as per work instructions **Performance Criteria** 4: Clamp and align the work piece and tools on lathe machine **Performance Criteria** 5: Set lathe machine parameters (Spindle speed (rpm), feed etc.) according to the machining requirements **Performance Criteria** 6: Perform machining to achieve required dimensions and surface finish **Performance Criteria** 7: Use appropriate measuring tools & instruments to ensure the quality and measurements of work piece according to standards and manage PTC

	Assessment Task 2 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange tools and work piece (surgical Instrument) for milling operations according to job requirement and prepare work piece for required machining (sawing and filing etc.) and get it ready to clamp **Performance Criteria** 3: Arrange the cutters, measuring instruments and holding devices as per work instructions **Performance Criteria** 4: Clamp and align the work piece and tool on milling machine **Performance Criteria** 5: Set milling machine parameters (spindle speed(rpm), feed, depth of cut, etc.) according to the machining requirements **Performance Criteria** 6: Perform milling to achieve required dimensions and surface finish **Performance Criteria** 7: Use appropriate measuring tools & instruments to ensure the quality and measurements of work piece according to standards and manage PTC
	Portfolios required at the time of assessment (if any) for

Continued on following page

Assessors Judgment Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:..... .....
Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor: ....

Assessment Summary (to be filled by the assessor)							
Activity	**Method**					**Result**	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration							
Knowledge Assessment							
Other Requirement							

Each Assessment Task (with Learning Unit)	
Assessment Task 1	**Description of assessment task 1** Perform turning operation on surgical instrument, assigned task given by assessor

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange tools and work piece (surgical Instrument) for turning operations according to job requirement and prepare work piece by required machining (sawing and filing etc.) and get it ready for clamping	☐	☐	
3	**Performance Criteria** 3: Arrange measuring instruments and holding devices as per work instructions	☐	☐	
4	**Performance Criteria** 4: Clamp and align the work piece and tools on lathe machine	☐	☐	
5	**Performance Criteria** 5: Set lathe machine parameters (spindle speed (rpm), feed etc.) according to the machining requirements	☐	☐	
6	**Performance Criteria** 6: Perform machining to achieve required dimensions and surface finish	☐	☐	
7	**Performance Criteria** 7: Use appropriate measuring tools & instruments to ensure the quality and measurements of work piece according to standards and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 2	**Description of assessment task 2** Perform milling operation on surgical instrument, assigned task given by assessor

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange tools and work piece (surgical Instrument) for milling operations according to job requirement and prepare work piece for required machining (sawing and filing etc.) and get it ready to clamp	☐	☐	
3	**Performance Criteria** 3: Arrange the cutters, measuring instruments and holding devices as per work instructions	☐	☐	
4	**Performance Criteria** 4: Clamp and align the work piece and tool on milling machine	☐	☐	
5	**Performance Criteria** 5: Set milling machine parameters (spindle speed(rpm), feed, depth of cut, etc.) according to the machining requirements	☐	☐	
6	**Performance Criteria** 6: Perform milling to achieve required dimensions and surface finish	☐	☐	
7	**Performance Criteria** 7: Use appropriate measuring tools & instruments to ensure the quality and measurements of work piece according to standards and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Perform Manual Machining	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Guidance for Candidate	**To complete your assessment for this Competency Standard, you need to answer the questions on the following pages correctly.**

Assessors Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name:..... Registration/Roll Number: Candidate Signature: ....
Written Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor:..... Assessor's code: Signature of the Assessor:..... .....

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Perform Manual Machining	**Assessment Date (DD/MM/YY):** **Time Duration :**		

WRITTEN ASSESSMENT

Question	Candidate's answer
11. Write any 2 safety precautions for manual machining.	• Wear PPE's during machining operation. • Don't touch the moving parts of machine. • No oil o liquid should be available at floor. • Proper ventilation and lightening system must be installed.
12. Name any 4 PPEs of manual machining.	• Face mask • Gloves • Safety shoe • Apron • Ear plugs • Goggles • Helmet
13. What is RPM and what is the formula of spindle speed?	• RPM stands for revolution per minute. • $SpindleSpeed(S) = \frac{V \cdot 1000}{\pi \cdot D}$
14. Name the materials commonly used for making surgical instruments.	• Mild steel • High speed steel • Teflon • Brass • Aluminum
15. Name 3 lathe operations and 3 milling operations.	Lathe operations • Turning • Facing • Knurling • Threading Milling operation • Slot milling • Threading • Facing • Drilling • Gear cutting • Planning

Question	Candidate's answer
16. Name the 2 lathe cutting tools angles.	• Side rake angle • Side relief angel • End relief angel • End cutting edge angle
17. Name any 3 bench work tools.	• File • Hammer • Hacksaw • Vice
18. What is the least count of vernier caliper, micrometer and dial indicator?	• Least count for vernier caliper is 0.1mm. • Least count for micrometer is 0.01mm. • Least count for dial indicator is 0.01mm
19. Name any 2 attachments of lathe and milling machine.	Attachments for lathe: • Tapper turning attachments • Milling attachments • Gear cutting attachments for lathe Attachments for milling: • Slotting attachment • Rotary table attachment • Indexing head attachment
20. Name the 5 parts of lathe machine	• Head stock • Tail stock • Chuck • Tool post • Carriage • Slides • Pan

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code: 072200885	Level: 3	Version: 01
Competency Standard Title: Develop Sheet Metal Surgical Instruments	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Candidate Details	Name: ..... Registration/Roll Number: .....
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):** 1. **Assessment Task 1:** Perform blanking and punching operation as per specifications 2. **Assessment Task 2:** Perform bending operation as per technical drawing/ sample 3. **Assessment Task 3:** Perform deep drawing operation as per specifications 4. **Assessment Task 4:** Perform spinning operation as per task given by assessor **And complete:** 5. **Knowledge assessment test (written or oral)** 6. **Portfolios at the time of assessment (if any)**
Minimum Evidence Required	**During a practical assessment, under observation by an assessor, you will complete:** **Assessment Task 1** **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange material and tools required for blanking and punching operation as per work instructions **Performance Criteria** 3: Set parameters to perform shearing on shearing press as per required strip sizes **Performance Criteria** 4: Mount and set blanking die on press as per work specifications and procedures **Performance Criteria** 5: Adjust press daylight and stroke according to sheet thickness and perform blanking on sheets **Performance Criteria** 6: Offload & store separately sheet scrap and blanks safely at designated places **Performance Criteria** 7: Mount and set punching die on press as per work specifications and procedures **Performance Criteria** 8: Adjust press daylight and stroke according to sheet thickness **Performance Criteria** 9: Perform punching on blanks **Performance Criteria** 10: Offload & store separately scrap and blanks safely at designated places and manage PTC

	Assessment Task 2 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange material and tools required for bending operation as per work instructions and set bending die on press as per work specifications and procedures. **Performance Criteria** 3: Adjust power / hydraulic press daylight and stroke according to sheet thickness **Performance Criteria** 4: Start the required operations as per drawing and job specifications **Performance Criteria** 5: Offload and store work pieces safely at designated place and manage PTC
	Assessment Task 3 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange material and tools required for deep draw operation as per work instructions and set deep draw dies on hydraulic press as per work specifications and procedures. **Performance Criteria** 3: Punch marks using manual punches on the product wherever applicable **Performance Criteria** 4: Perform deep draw process on hydraulic press **Performance Criteria** 5: Offload and store work pieces safely at designated place and manage PTC
	Assessment Task 4 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange material and tools required for spinning operation as per work instructions and clamp the work piece and tool on spinning lathe machine as per process requirement **Performance Criteria** 3: Apply force gradually to the spinning object to achieve required shape and size **Performance Criteria** 4: Use appropriate tools and gauges to ensure the quality of the product **Performance Criteria** 5: Offload and store work pieces safely at designated place **Performance Criteria** 6: Prepare report of completed work and manage PTC
	Portfolios required at the time of assessment (if any) for

Continued on following page

Assessors Judgment Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:..... .....
Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor: ....

Assessment Summary (to be filled by the assessor)							
Activity	**Method**					**Result**	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration							
Knowledge Assessment							
Other Requirement							
Each Assessment Task (with Learning Unit)							

Assessment Task 1	**Description of assessment task 1** Perform blanking and punching operation as per specifications

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange material and tools required for blanking and punching operation as per work instructions	☐	☐	
3	**Performance Criteria** 3: Set parameters to perform shearing on shearing press as per required strip sizes	☐	☐	
4	**Performance Criteria** 4: Mount and set blanking die on press as per work specifications and procedures	☐	☐	
5	**Performance Criteria** 5: Adjust press daylight and stroke according to sheet thickness and perform blanking on sheets	☐	☐	
6	**Performance Criteria** 6: Offload & store sheet scrap and blanks safely at designated places	☐	☐	
7	**Performance Criteria** 7: Mount and set punching die on press as per work specifications and procedures	☐	☐	
8	**Performance Criteria** 8: Adjust press daylight and stroke according to sheet thickness	☐	☐	
9	**Performance Criteria** 9: Perform punching on blanks	☐	☐	
10	**Performance Criteria** 10: Offload & store scrap, blanks safely at designated places and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 2	**Description of assessment task 2** Perform bending operation as per technical drawing/ sample

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange material and tools required for bending operation as per work instructions and set bending die on press as per work specifications and procedures.	☐	☐	
3	**Performance Criteria** 3: Adjust power / hydraulic press daylight and stroke according to sheet thickness	☐	☐	
4	**Performance Criteria** 4: Start the required operations as per drawing and job specifications	☐	☐	
5	**Performance Criteria** 5: Offload and store work pieces safely at designated place and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 3	**Description of assessment task 3** Perform deep drawing operation as per specifications

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange material and tools required for deep draw operation as per work instructions and set deep draw dies on hydraulic press as per work specifications and procedures.	☐	☐	
3	**Performance Criteria** 3: Punch marks using manual punches on the product wherever applicable	☐	☐	
4	**Performance Criteria** 4: Perform deep draw process on hydraulic press	☐	☐	
5	**Performance Criteria** 5: Offload and store work pieces safely at designated place and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 4	**Description of assessment task 4** Perform spinning operation as per task given by assessor

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange material and tools required for spinning operation as per work instructions and clamp the work piece and tool on spinning lathe machine as per process requirement	☐	☐	
3	**Performance Criteria** 3: Apply force gradually to the spinning object to achieve required shape and size	☐	☐	
4	**Performance Criteria** 4: Use appropriate tools and gauges to ensure the quality of the product	☐	☐	
5	**Performance Criteria** 5: Offload and store work pieces safely at designated place	☐	☐	
6	**Performance Criteria** 6: Prepare report of completed work and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop Sheet Metal Surgical Instruments	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Guidance for Candidate	**To complete your assessment for this Competency Standard, you need to answer the questions on the following pages correctly.**

Assessors Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name:..... Registration/Roll Number: Candidate Signature: ....
Written Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor:..... Assessor's code: Signature of the Assessor:..... .....

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop Sheet Metal Surgical Instruments	**Assessment Date (DD/MM/YY):** **Time Duration:**		

WRITTEN ASSESSMENT

Question	**Candidate's answer**
21. Write any 3 safety precautions for press works.	• Wear PPE's during press and spinning operation. • Inspect the press before operating it. • Keep our body safe and away from moving parts of machines. • Proper ventilation and lightening system must be installed.
22. Name any 4 PPEs of press works and spinning operation.	• Face mask • Gloves • Safety shoe • Apron • Ear plugs • Goggles • Helmet
23. Which press is used in deep drawing operation?	Hydraulic press is used in deep drawing operation.
24. Which press is used for blanking operation?	Power press is used for blanking operation.

Question	Candidate's answer
25. What is the difference the between gauges and measuring instruments?	Measuring instruments are used for measure a range of measurements from single measuring instruments. But the gauges are design to measure a single size/ measurement from it.
26. What you know about hollow wear instruments?	The family of surgical instruments, which are prepared by the sheet metal press operations are called hollow wear instruments.
27. Name the 3 parts of the power press.	• Clutch • Flywheel • Crankshaft • Ram/ slides
28. Name the 3 parts of hydraulic press.	• Hydraulic cylinder • Pressure gauge • Oil tank • Relief valve • Pressing plate
29. What is a spinning operation?	Spinning is a metal working process by which a disc or tube of metal is rotated at high speed and formed into an axially symmetric part. Spinning can be performed by hand or by a CNC lathe. Metal spinning does not involve removal of material
30. What is the importance of PTC?	Process travel card plays a key role in production. Process travel card shows the processes done on the job and also other details like quantity etc.

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code: 0472200886	Level: 3	Version: 01
Competency Standard Title: Apply Heat Treatment	**Assessment Date (DD/MM/YY):** **Time Duration :**		

Candidate Details	Name: ..... Registration/Roll Number: .....
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):** **1. Assessment Task 1:** Perform heat treatment and annealing on surgical instruments by conventional method **2. Assessment Task 2:** Perform heat treatment by vacuum furnace on surgical instruments as per assessor's instructions **3. Assessment Task 3:** Perform heat treatment by conveyor belt furnace on surgical instruments as per assessor's instructions **And complete:** **4. Knowledge assessment test (written or oral)** **5. Portfolios at the time of assessment (if any)**
Minimum Evidence Required	**During a practical assessment, under observation by an assessor, you will complete:** **Assessment Task 1** **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange work piece and equipment for the heat treatment and annealing by conventional method and check quality of work pieces before heat treatment **Performance Criteria** 3: Set furnace parameters (temperature, time) as per material requirements and place work pieces inside the furnace **Performance Criteria** 4: Maintain flame quality by adjusting air : fuel ratio to avoid carbon deposits on instruments **Performance Criteria** 5: For annealing, switch off the furnace and let work pieces cool down to room temperature inside the furnace (12 to 18 hours) **Performance Criteria** 6: For hardening, remove work pieces safely from furnace and quench in quenching medium (air, water & oil) for specified time and remove oil from quenched work pieces using appropriate method (draining by hanging and cleaning with cotton etc.) **Performance Criteria** 7: Check hardness of work pieces using Rockwell Hardness Tester as per hardness requirements **Performance Criteria** 8: Perform acid pickling to remove the scales from surface of work pieces, if required. Prepare test report and manage PTC

	Assessment Task 2 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange work piece and equipment for the heat treatment by vacuum furnace and check quality of work pieces before heat treatment **Performance Criteria** 3: Prepare vacuum furnace (temperature, time) as per material requirements **Performance Criteria** 4: Perform vacuum heat treatment (vacuum, heating & cooling) on work pieces as per requirement **Performance Criteria** 5: Remove work pieces safely from the furnace after completing the processes **Performance Criteria** 6: Test hardness of work pieces using Rockwell Hardness Tester (scale C) as per hardness requirements. Prepare test report and manage PTC
	Assessment Task 3 **Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions **Performance Criteria** 2: Arrange work piece and equipment for the heat treatment by conveyor belt furnace and check quality of work pieces before heat treatment **Performance Criteria** 3: Prepare furnace (temperature, time, speed, gas setting) as per material requirements **Performance Criteria** 4: Place the work pieces on conveyor belt of the furnace and start the process **Performance Criteria** 5: Remove work pieces from furnace, test hardness of work pieces using Rockwell Hardness Tester as per hardness requirements. Prepare test report and manage PTC
	Portfolios required at the time of assessment (if any) for

Continued on following page

Assessors Judgment Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:..... .....
Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor: ....

Assessment Summary (to be filled by the assessor)							
Activity	**Method**					**Result**	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration							
Knowledge Assessment							
Other Requirement							
Each Assessment Task (with Learning Unit)							

Assessment Task 1	**Description of assessment task 1** Perform heat treatment and annealing on surgical instruments by conventional method

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange work piece and equipment for the heat treatment and annealing by conventional method and check quality of work pieces before heat treatment	☐	☐	
3	**Performance Criteria** 3: Set furnace parameters (temperature, time) as per material requirements and place work pieces inside the furnace	☐	☐	
4	**Performance Criteria** 4: Maintain flame quality by adjusting air: fuel ratio to avoid carbon deposits on instruments	☐	☐	
5	**Performance Criteria** 5: For annealing, switch off the furnace and let work pieces cool down to room temperature inside the furnace (12 to 18 hours)	☐	☐	
6	**Performance Criteria** 6: For hardening, remove work pieces safely from furnace and quench in quenching medium (air, water & oil) for specified time and remove oil from quenched work pieces using appropriate method (draining by hanging and cleaning with cotton etc.)	☐	☐	
7	**Performance Criteria** 7: Check hardness of work pieces using Rockwell Hardness Tester as per hardness requirements	☐	☐	
8	**Performance Criteria** 8: Perform acid pickling to remove the scales from surface of work pieces, if required. Prepare test report and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 2	**Description of assessment task 2** Perform heat treatment by vacuum furnace on surgical instruments as per assessors instructions

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange work piece and equipment for the heat treatment by vacuum furnace and check quality of work pieces before heat treatment	☐	☐	
3	**Performance Criteria** 3: Prepare vacuum furnace (temperature, time) as per material requirements	☐	☐	
4	**Performance Criteria** 4: Perform vacuum heat treatment (vacuum, heating & cooling) on work pieces as per requirement	☐	☐	
5	**Performance Criteria** 5: Remove work pieces safely from the furnace after completing the processes	☐	☐	
6	**Performance Criteria** 6: Test hardness of work pieces using Rockwell Hardness Tester (scale C) as per hardness requirements. Prepare test report and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Assessment Task 3	**Description of assessment task 3** Perform heat treatment by conveyor belt furnace on surgical instruments as per assessors instructions

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1	**Performance Criteria** 1: Wear PPE and follow workplace environment safety instructions	☐	☐	
2	**Performance Criteria** 2: Arrange work piece and equipment for the heat treatment by conveyor belt furnace and check quality of work pieces before heat treatment	☐	☐	
3	**Performance Criteria** 3: Prepare furnace (temperature, time, speed, gas setting) as per material requirements	☐	☐	
4	**Performance Criteria** 4: Place the work pieces on conveyor belt of the furnace and start the process	☐	☐	
5	**Performance Criteria** 5: Remove work pieces from furnace, test hardness of work pieces using Rockwell Hardness Tester as per hardness requirements. Prepare test report and manage PTC	☐	☐	

Competent ☐	Not Yet Competent ☐

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Apply Heat Treatment	**Assessment Date (DD/MM/YY):** **Time Duration:**		

Guidance for Candidate	**To complete your assessment for this Competency Standard, you need to answer the questions on the following pages correctly.**

Assessors Guide (to be completed by the assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name:..... Registration/Roll Number: Candidate Signature: ....
Written Assessment Outcome	COMPETENT☐ NOT YET COMPETENT☐ Name of the Assessor:..... Assessor's code: Signature of the Assessor:..... .....

Title of Qualification: NVQF Level II to IV Surgical Instrument Manufacturing Technician	CS Code:	Level: 3	Version: 01
Competency Standard Title: Apply Heat Treatment	**Assessment Date (DD/MM/YY):** **Time Duration:**		

WRITTEN ASSESSMENT

Question	Candidate's answer
31. Write any 3 safety precautions of the heat treatment process.	• Wear PPE's during heat treatment process. • Check that all safety devices, such as automatic shut-off valves, air switches, and exhaust fans are working properly before lighting the furnace. • Follow the manufacturer's instructions when lighting the furnace. • Cover quenches tanks when not in use. • Proper ventilation and lightening system must be installed.
32. Name any 5 PPEs used during the heat treatment process.	• Face mask • Gloves • Safety shoe • Apron • Ear plugs • Goggles • Helmet
33. What is the purpose of heat treatment?	Heat treatment is controlled heating and cooling operations used to bring about a desired change in the physical properties of a metal. Its purpose is to improve the structural and physical properties for some particular use or for future work of the metal.
34. Name the methods of heat treatment and define annealing?	Methods of heat treatment: • Annealing • Conventional heat treatment method • Conveyor belt heat treatment • Vacuum heat treatment Annealing: Annealing is the process of heat treatment in which we heat the metal and allow it to cool slowly, in order to remove internal stresses and toughen it.

Question	Candidate's answer
35. What is an ammonia cracker?	Ammonia cracker is a chamber of conveyor belt heat treatment. In which heated job cooled down with the help of ammonia gas.
36. Name the defects of the heat treatment process.	• Decarburization • Oxidization • Quenching cracks • Warping • Overheating • Soft spots • Excessive or insufficient hardens after tempering
37. Which gas is used in vacuum furnace?	Argon and nitrogen (inert gas) used in vacuum furnace.
38. Name the quenching media's uses in heat treatment process.	• Water • Quenching oil • Ammonia Gas • Nitrogen gas
39. What is a Rockwell hardness tester?	The Rockwell hardness tester is a hardness testing machine based on indentation hardness of a material. The Rockwell test measuring the depth of penetration of an indenter under a large load (major load) compared to the penetration made by a preload (minor load).
40. Differentiate between hardness and brittleness.	• Hardness is the ability to resist deformation. • Brittleness is the tendency to undergo sudden structural failure instead of plastic deformation.

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