

الجمهورية اللبنانية
وزارة التربية والتعليم العالي
المديرية العامة للتعليم المهني والتقني

قرار رقم ٤٣٨ / ٢٠٢٦

اعتماد منهاج التدريب على اختصاص

"مُشغل آلات صناعية"

الذي لا يؤدي لنيل شهادات رسمية في المديرية العامة للتعليم المهني والتقني

إن المديرية العامة للتعليم المهني والتقني بالتكليف،
بناءً على المذكرة الادارية رقم ٢٠١٩/م/٦٥ تاريخ ٢٠١٩/٠٥/٢٤ (قبول طلب المدير العام بالتكليف للتعليم المهني والتقني إعفاء من تكليفه بهذه المديرية العامة وتكليف مدير المعهد الوطني للعناية التمريضية بمهام المدير العام لها)،
بناءً على المرسوم رقم ٨٣٤٩ تاريخ ١٩٩٦/٠٥/٠٢ (تنظيم المديرية العامة للتعليم المهني والتقني)،
بناءً على القانون رقم ١٩٦٤/٦٢ تاريخ ١٩٦٤/٦/٣ (تنظيم التعليم المهني الخاص)،
بناءً على المرسوم رقم ٣٦٦٦ تاريخ ٢٠٠٠/٠٨/١٨ (تنظيم لجان المناهج والتدريب وتحديد التعويضات العائدة لها)،
بناءً على القرار رقم ٢٠٢٦/٢٦٠ تاريخ ٢٠٢٦/٦/١٨ (تأليف لجان فنية متخصصة لدراسة المناهج التدريبية التي لا تؤدي لنيل الشهادات الرسمية)،

بناءً على اقتراح رئيس مصلحة التأهيل المهني بالتكليف،

تقرر ما يأتي:

المادة الأولى: يُعتمد في المديرية العامة للتعليم المهني والتقني، منهاج التدريب المرفق بهذا القرار العائد لإختصاص " مُشغل آلات صناعية " الذي لا يؤدي لنيل شهادة رسمية .

المادة الثانية: يُنشر هذا القرار في الجريدة الرسمية ويُبلغ حيث تدعو الحاجة.

١٤ أيار ٢٠٢٦

المديرة العامة للتعليم المهني والتقني

د. هنادي بري





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Competency-Based Curriculum

Machine Operator in Metal Industry Factories

Sheet Metal and CNC Machine Operation

Section One — Program Description

Program Title	Machine Operator in Metal Industry Factories — Sheet Metal and CNC Machine Operation CNC Machine Operator — Sheet Metal & CNC Fabrication Industry
Context	Within the framework of developing the professional competencies of workers in the metalworking sector, this program aims to qualify machine operators in metal industry factories according to the competency-based training methodology (CBT) adopted by the International Labour Organization, in line with occupational standards. Metal industry factories work in made-to-order sheet metal fabrication (custom parts, cladding panels, structures, precision components) using laser cutting, CNC punching, bending, folding, V-grooving and routing machines. Most operators acquire their skills through field experience without formal systematic training, which makes it necessary to standardize the level of performance and ensure quality and work safety.
Program Objective	Upgrade the skills of machine operators working in metal industry factories and qualify new trainees to work fully independently on laser cutting, CNC punching, bending, folding, V-grooving and routing machines, in accordance with the technical specifications and the quality and safety standards adopted in the factory, at Level 3 (independent performance without supervision).



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Expected Program Outcomes	Upon completion of this program, the trainee will be able to: A. Apply health and safety procedures in the workplace B. Prepare the machine for operation C. Set up the machine for the production job D. Control production quality E. Keep the machines in good working condition F. Complete production documentation
Program Content	A1, A2, A3, A4, A5, A6 B1, B2, B3, B4, B5, B6, B7 C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11 D1, D2, D3, D4 E1, E2, E3, E4, E5 F1, F2, F3, F4, F5, F6
Program Prerequisites / Admission Requirements	Prerequisites: Work and life skills (personal skills, communication skills, basic digital skills) Admission Requirements: 1- Any graduate holding the Vocational Complementary Certificate (BP) or the Technical Baccalaureate in mechanics, electromechanics or an equivalent specialization. 2- Any worker/machine operator working on a metal production line with at least three years of experience operating CNC machines.
Required Mastery Levels (per task)	Level 3: Able to perform the task satisfactorily without assistance and/or supervision (the program target for all tasks)



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	Note: specific tasks (C5, C8, D2) target Level B4 (performance with initiative and problem solving)
Program Format, Structure and Duration	Program Format: This program is delivered in person by an expert in metal machine operation inside the factory. The program includes theoretical training, direct hands-on practice on the machines, and work-based learning (WBL). Program Structure: Machine training is by nature learning through work, since the technical skills specific to each machine can only be acquired through direct field practice according to the standard operating procedures (SOPs) adopted in the factory. The program will be delivered with a maximum of 8 trainees per course. Program Duration: — 64 training hours at the center (sessions S1 to S13) — 270 hours of work-based learning (WBL) — Total: 334 hours Theory / Practice ratio: 20% theory / 80% practice Reference standard: ILO-CBT Occupation (ISCO-08): 7223 / 8211 — Machine Tool Operators National Qualifications Framework: Level 3 Pass rule: Theory $\geq$ 80% (multiple choice) Practical: Competent (C) / Not Yet Competent (NYC)



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Learning Sequence in the Program

Code	Task	Prerequisites (prior)	Code	Task	Prerequisites (prior)
A1	Wear the correct personal protective equipment according to the machine type	—	A2	Inspect the work environment for hazards	A1
A3	Test the machine safety systems before start-up	A1, A2	A4	Apply the lockout/tagout procedure (LOTO)	A1, A2
A5	Respond to emergency situations	A1, A2, A3	A6	Comply with safety zones and warning signs in the workshop	A1, A2
B1	Identify set-up requirements from the work order and technical drawing	A	B2	Complete the daily pre-operation checklist	A, B1
B3	Operate the laser cutting machine	A, B1, B2	B4	Operate CNC sheet metal machines	A, B1, B2
B5	Operate the roll bending machine and the CNC router	A, B1, B2	B6	Operate the nitrogen generator	A, B1, B2



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B7	Handle HMI alerts before starting production	A, B1–B6	C1	Load the CNC program from the network	A, B
C2	Select the laser cutting parameters suitable for the job	A, B	C3	Set up the bending tooling in the bending machine	A, B
C4	Change the punching tool in the turret of the CNC punching machine	A, B	C5	Set up the V-grooving machine for the production job	A, B, C1, C2
C6	Adjust the shearing machine parameters	A, B	C7	Adjust the parts of the folding machine	A, B
C8	Set up the roll bending machine for the job	A, B, C1, C2	C9	Set the work coordinates on the CNC machine	A, B
C10	Perform the trial run before production	A, B	C11	Monitor the production cycle	A, B, C1–C10
D1	Inspect the first piece against the technical drawing	A, B, C	D2	Correct the machine parameters when the first-piece inspection fails	A, B, C, D1
D3	Perform periodic quality checks during production	A, B, C	D4	Handle the produced parts safely	A, B, C



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E1	Shut down the machine at the end of the shift	A, B, C	E2	Clean the machine and the work area	A, B, C
E3	Replace consumables within the operator's authority	A, B, C	E4	Check fluid levels at the end of the shift	A, B, C
E5	Perform nitrogen generator maintenance checks	A, B, C	F1	Record machine log entries	A, B, C, D
F2	Fill in the production report	A, B, C, D	F3	Document the quality control log	A, B, C, D
F4	Fill in the maintenance log	A, B, C, D	F5	Report machine faults to the supervisor	A, B, C, D
F6	Carry out the shift handover to the next operator	A, B, C, D			



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Machines and Tools Used in the Occupation

Machine / Tool	Machine Type	Main Process
Laser Cutting Machine	CO ₂ / Fiber	Cutting mild steel, stainless steel, aluminum and non-metallic materials to the required dimensions
CNC Punching Machine	Turret Punch Press	Punching holes and shapes and cutting profiles
CNC Bending Machine CNC Press Brake	Press Brake	Air bending and performing multiple bend sequences according to the drawing
CNC Folding Machine	CNC Folding / Flat Bender	Box folding and horizontal up and down bending
V-Grooving Machine	CNC / semi-automatic	Cutting V-grooves and calculating and verifying the remaining material thickness (RMT)
CNC Router	Router	Cutting aluminum composite panels (ACP) and sheets
Digital caliper (Fargal (calipers) or Mesmak (thickness gauge). OR Odmè)	150–300 mm	Part dimension inspection — tolerance ± 0.1 to ± 0.3 mm
Angle Gauge / Protractor	Digital or mechanical	Verifying the bend angle — tolerance ± 0.5 degrees
Depth Gauge / Micrometer	Standard workshop grade	Measuring the V-groove depth and the remaining material thickness — tolerance ± 0.1 mm
Daily Work Documents	Job Order · Technical Drawing · CNC Program · Machine Log · Production Report · QC Record	Reading work orders and drawings; filling in 3 logs per job/shift



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Required Performance Standards

Process	Required Performance Standard
Laser cutting dimensions	± 0.1 to ± 0.3 mm according to the drawing; minimum dress; no discoloration; no rework
Bend angle	± 0.5 degrees; flange length ± 0.3 mm; no marks on visible surfaces
Folding consistency	± 0.5 degrees over a batch of 10 parts
V-groove depth	± 0.1 mm at the start, middle and end; verify RMT before production
Pre-operation checklist	Zero missing items; signed before every start-up — without exception
First-piece inspection	Mandatory before every batch. Failure = stop, identify the cause, correct, re-cut



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Safety	Zero PPE omissions; zero system bypasses; E-Stop response according to the standard procedure
Documentation	Machine log + production report + quality log completed for every job/shift — no empty fields
Troubleshooting (operator level)	Handles standard faults independently (dross, burr, alarm reset, consumable change, angle correction); escalates all other faults ¹ in writing

Section Two

DACUM – Attached in a Separate Document

1

- Slag (خبث) = **Dross** It's the molten metal residue / slag that solidifies on the underside or edges of a laser-cut part when cutting parameters are not optimal (wrong speed, pressure, focus, or nozzle condition). It appears as rough, hardened droplets clinging to the cut edge.
- Burr** (شعر) = **Burr** (a thin sharp metal edge/hair left on the cut or punched part)
- Alarm reset** (إعادة ضبط إنذار) = **Alarm reset**
- Consumable change** (تغيير مستهلكات) = **Consumable change** (nozzles, inserts, slugs, etc.)
- Angle correction** (تصحيح زاوية) = **Angle correction**
- Escalates all other faults (يُصعد جميع الأعطال الأخرى) = **Escalates all other faults** (to supervisor/maintenance)



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Section Three: Occupational Standards | Duty



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Duty A — Applying Health and Safety Procedures in the Workplace

(Apply Workplace Health & Safety Procedures — Prerequisite to all duties)

Duties / Competencies		Tasks
A Applying health and safety procedures in the workplace While carrying out his duties and responsibilities		A1 Wear the correct personal protective equipment (PPE) according to the machine type A2 Inspect the work environment for hazards A3 Test the machine safety systems before start-up A4 Apply the lockout/tagout procedure (LOTO — Lock Out-Tag Out) A5 Respond to emergency situations A6 Comply with safety zones and warning signs in the workshop
Tasks	Sub-tasks	Main Tasks / Performance Criteria
A1 Wear the correct personal protective equipment (PPE) according to the machine type	A11 Select the appropriate personal protective equipment (PPE) according to the machine type	- Identify the type of machine to be operated from the work order (Job Order) - Refer to the PPE chart approved in the factory or the board posted on the machine - Verify that the protective equipment is in good condition and undamaged before use - Replace any damaged equipment immediately before approaching the machine
	A12 Wear personal protective equipment correctly	- Wear the safety glasses (Safety Glasses) or face shield (FaceShield) suitable for the machine - Wear safety boots (Steel-Toe Boots) at all times while in the workshop - Wear cut-resistant gloves (Cut-Resistant Gloves) when handling sheets — not while operating the machine (Entanglement hazard) - Wear a respirator (Respirator) when cutting coated, galvanized (Galvanized) or painted materials - Wear ear protection (Ear Protection) when using sheet punching/shearing machines - Make sure there is no jewelry, loose clothing or uncovered hair near the machines



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Tasks	Sub-tasks	Main Tasks / Performance Criteria
A2 Inspecting the work environment for hazards	A21 Perform a general visual inspection of the work environment	• Verify that the floor is clean and free of metal waste (Offcuts/Metal Chips) and oils • Verify that work aisles are free of obstacles (width of at least 1 meter) • Verify that the fire extinguisher (Fire Extinguisher) is in place and unobstructed • Report any hazard immediately to the production supervisor (≤ 10 minutes)
	A22 Check the machine-specific hazards	• Verify that protective guards (Guards) and safety interlock systems (Interlocks) are in place • Verify that the machine operating area is free of unauthorized persons; verify that the lighting in the work area is adequate • Verify that the fume and dust extraction system (Fume Extraction) is running before starting any cutting

Tasks	Sub-tasks	Main Tasks / Performance Criteria
A3 Testing the safety systems in the machine before start-up	A31 Test the emergency stop buttons (E-Stop Emergency Stop)	• Locate all E-Stop buttons on the machine and in the surrounding area • Press the E-Stop button and verify that machine motion stops immediately • Release the E-Stop button with the correct procedure (twist the button to release it) • Verify that the machine does not restart automatically after releasing the E-Stop • Record the test result in the daily checklist
	A32 Check the protective guards and safety interlocks (Guards (Interlocks&	• Verify that all safety doors (Safety Doors) are closed and the safety interlocks are engaged • Test the light curtains (Light Curtains) by passing a hand in front of them and verify that the machine stops immediately • Verify that the HMI screen (digital control interface) shows "Safe" status (Safe Status) before operation • Do not bypass any safety system (Interlock Bypass) under any circumstances

Competency-Based Education Curriculum Developer: Dalia Sh. Ghanem

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Tasks	Sub-tasks	Main Tasks / Performance Criteria
A4 Applying the lockout/tagout procedure LOTO — Lock) (Out-Tag Out	A41 Apply the LOTO procedure when needed	- Identify all energy sources to be isolated: electrical (Electrical), pneumatic (Pneumatic), hydraulic (Hydraulic) - Shut down the machine, disconnect the main energy source at the isolating device (Personal Padlock) and apply the personal lock (Lockout Device) - Hang the warning tag (Warning Tag) bearing the name, date and reason - Verify the zero energy state (Zero Energy State) before starting any work on the machine
	A42 Remove the LOTO procedure after the work is complete	- Make sure all tools and equipment have been removed from the machine area; make sure all persons have left the danger zone; remove the personal lock and the warning tag - Restore the energy sources in the correct sequence according to the machine instructions; test-run the machine before returning to production
Tasks	Sub-tasks	Main Tasks / Performance Criteria
A5 Responding to emergencies and warning signs in the workshop	A51 Act in the event of a machine emergency (fire / injury / serious fault)	- Press the nearest E-Stop button immediately without hesitation; move away from the machine in case of fire or gas leak - Alert the production supervisor and colleagues loudly and clearly - Call emergency services when needed (ambulance, civil defense) - Do not restart the machine until the cause has been identified and addressed by an authorized party - Record the incident in writing in the incident report (Incident Report) on the same day
	A52 Use the fire extinguisher correctly	- Identify the type of extinguisher suitable for the type of fire: - CO₂ for electrical fires and laser machines - ABC for general fires - Apply the PASS technique: - Pull (pull the pin) - Aim (aim at the base of the fire)



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		○ Squeeze (squeeze the handle) ○ Sweep (sweep from side to side) Evacuate the area if the fire cannot be controlled within 30 seconds; report every use of an extinguisher to the production supervisor immediately • Do not enter machine operating zones while they are running • Respect the "Machine Running — No Entry" barriers (Machine Running — No Entry)
Main Tasks / Performance Criteria	Sub-tasks	Tasks
A6 Complying with safety zones and warning signs in the workshop	A61 Recognize and respect the safety zones	• Recognize all warning signs (Warning Signs) and their meanings in the workshop • Move only within the aisles marked by the yellow lines (Yellow Lines) • Do not enter machine operating zones while they are running • Respect the "Machine Running — No Entry" barriers (Machine Running — No Entry)
	A62 Maintain the integrity of the protection zones	• Report any damaged or missing warning sign immediately • Make sure the machine guards are put back in place after maintenance work is finished • Brief visitors and new workers on the boundaries of the safety zones before entering the production floor • Do not store materials or tools inside the designated danger zones
Knowledge		Skills



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• Types of personal protective equipment (PPE) required for each machine and how to use them • Types of hazards in the sheet metal workshop: laser radiation (Laser Radiation), crushing (Crush), entanglement (Entanglement), noise (Noise), fumes (Fumes), flying metal chips (FlyingChips), sharp edges (Sharp Edges) • Principles of the LOTO procedure (Lock Out-Tag Out) and the different energy sources • Types of fire extinguishers and the situations in which each is used • Emergency procedures (Emergency Procedures) specific to each machine; warning signs (Warning Signs) and their meanings • Principles of electrical, pneumatic and hydraulic safety • Incident reporting procedures (Incident Reporting); reading in both Arabic and English in standard operating procedures (SOPs) and safety instructions	• Select the correct PPE according to the machine type and wear it correctly • Perform a safety inspection round (Safety Walkthrough) before starting work • Test the E-Stop buttons and verify that they work • Test the light curtains (Light Curtains) correctly • Apply the LOTO procedure correctly and completely; recognize hazards in the work environment and classify them • Use the appropriate fire extinguisher with the PASS technique • Express the appropriate idea orally in Arabic • Express the appropriate idea orally in English
Occupational Safety and Health	Attitudes
• Commitment to occupational safety and health standards at all times • Attention to environmental standards inside the workshop • Wearing the required work suit (Overall) throughout working time • Complying with warning signs and not overriding them • Refraining from wearing accessories (jewelry, watches, chains) in the workshop • Ensuring clean hands and clothing suitable for work • Taking care to preserve tools, devices and machines	• Readiness for continuous learning and developing safety knowledge • Taking the initiative to report hazards before accidents occur; respecting others and caring for colleagues' safety • Adopting participatory teamwork in applying safety procedures; accepting others' opinions during work • Willingness for field work and practical application



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Duty B — Preparing the Machine for Operation

(Prepare Machine for Work — Prerequisite: A)

Duties / Competencies		Tasks
B Prepare the machine for operation Prerequisites: A		B1 Identify set-up requirements from the work order and technical drawing B2 Complete the daily pre-operation checklist B3 Operate the laser cutting machine B4 Operate CNC sheet metal machines (bending, punching, folding, V-grooving) B5 Operate the roll bending machine and the CNC router B6 Operate the nitrogen generator B7 Handle HMI alerts before starting production
Tasks	Sub-tasks	Main Tasks / Performance Criteria
B1 Identifying set-up requirements from the work order and the technical drawing	B11 Read and interpret the work order (Job Order)	- Verify the part name and number, material type and thickness, and units of measurement in the title block (Title Block) - Identify the type of operations required: cutting (Cutting), punching (Punching), bending (Bending), V-grooving, folding (Folding), routing (Routing); identify the required quantities and the production schedule - Identify the required CNC program number and its storage location on the network
	B12 Read the technical drawing and identify the operational requirements	- Verify the units of measurement (mm or inch) in the drawing — this is always the first step - Identify the critical dimensions (Critical Dimensions) and the permissible tolerances (Tolerances: $\pm$) - Identify the bend sequence (Bend Sequence) if the job has multiple bends - Note any special requirements: grain direction (Grain Direction), protective film (Protective Film), surface treatment - Identify the machine suitable for the job based on reading the drawing

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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B2 Complete the daily pre-operation checklist	B21 Perform the general daily inspection of the machine	• Verify the integrity of all protective guards (Guards) and safety interlocks (Interlocks) • Check the coolant (Coolant) and hydraulic oil levels; verify that the machine work area is free of leftover pieces (Offcuts) and dross (Dross/Slag) • Check the condition of the tooling and consumable parts (Consumables): nozzle (Nozzle), bending tooling (Tooling), punch/die (Punch/Die); test the E-Stop button and verify that it works before any operation
	B22 Document the daily inspection results	• Fill in the daily checklist (Daily Checklist) with all its items — zero missing items • Sign the checklist and record the date and name • Record any observations or problems in the machine log (Machine Log) • Report any failed item to the production supervisor immediately — do not start operation if there is a failed item

Tasks	Sub-tasks	Main Tasks / Performance Criteria
B3 Operating the laser cutting machine	B31 Starting the CO₂ laser machine (requires warm-up time / <i>(Warm-up</i>	• Turn on the main power switch (Main Power Disconnect) • Turn on the CNC control unit and wait for the system to finish loading completely • Read and handle all pending alarms (Pending Alarms) on the HMI screen before proceeding • Verify that the cooling system (Chiller) is running and that the temperature is within the normal range (18–22°C) • Turn on the resonator (CO₂ Resonator) and wait for the warm-up time (~5–10 minutes) until the HMI shows "Laser Ready" • Open the assist gas valves (N₂ or O₂) and verify the pressure according to the job requirements • Turn on the fume extraction system (Fume Extraction) if it does not start automatically



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		• Perform the reference run (Reference/Home Run) for all axes when requested by the system
	B32 Starting the Fiber laser machine (does not require warm-up / <i>No Warm-up</i>)	• Turn on the main power switch • Turn on the CNC control unit and wait for loading to complete; read and handle all pending alarms on the HMI screen • The fiber laser (Fiber Laser) does not need warm-up time — verify that "Laser Source Ready" appears on the HMI • Open the assist gas valves and verify the pressure according to the technology table (Technology Table) • Turn on the fume extraction system (Fume Extraction) • Perform the reference run (Home Run) for all axes



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Tasks	Sub-tasks	Main Tasks / Performance Criteria
B4 Operate CNC sheet metal machines (bending, punching, folding, V-grooving)	B41 Starting the CNC bending machine (Press Brake)	• Turn on the main switch and turn on the CNC control unit • Acknowledge the pending alarms on the HMI screen • Wait for the hydraulic pressure (Hydraulic Pressure) to build up to the normal operating level • Perform the reference run (Reference Run) for the ram axis (Y-axis/Ram) and the back gauge (Back Gauge: X, R, Z) • Test the light curtain (Light Curtain / AKAS) by passing a hand in front of it and verify that the machine stops immediately • Verify that the job load (Tonnage) does not exceed the rated capacity of the machine before bending
	B42 Starting the CNC punching machine, the folding machine and the V-grooving machine	• Turn on the main switch of each machine and turn on the CNC control unit • Acknowledge the alarms and perform the reference run (Home Run) for all axes; test the movement of all axes manually (Jog Test) to verify smooth motion • Verify the integrity of the protective guards and safety interlocks before any operation; verify that the work area is free of leftover material from the previous shift

Tasks	Sub-tasks	Main Tasks / Performance Criteria
B5  Operating the roll bending machine (Metal Roller) and the CNC router (CNC Router)	B51 Starting the roll bending machine (Metal Roller)	- Verify that the bending rolls (Rolls) are free of damage and material left over from the previous job - Turn on the main switch and verify the direction of rotation of the rolls (no unexpected reversal) - Adjust the gap between the rolls (Roll Gap) according to the thickness of the sheet to be bent - Verify the integrity of the emergency stop pedal (Foot Brake) and the protection systems
	B52 Starting the CNC (CNC Router) router	- Turn on the main switch and turn on the CNC control unit - Acknowledge the alarms and perform the reference run for all axes (X, Y, Z) - Turn on the dust collection system (Dust Collection) before starting operation — mandatory - Check the condition of the cutting spindle (Spindle) and that there are no abnormal noises at slow rotation - Verify that the cutting tool (Router Bit) is firmly secured in the holder
Tasks	Sub-tasks	Main Tasks / Performance Criteria
B6 Operate the nitrogen generator (Nitrogen) (Generator)	B61 Inspect the nitrogen generator before start-up	- Verify that the air compressor (Air Compressor) is running and that the air pressure is as required (7–10 bar) - Check the air quality: dryness of the lines (Air Dryer), drain traps (Drain Traps) free of moisture - Verify the integrity of the pre-filters (Pre-filters) and that they are not clogged - Verify that there are no alarms on the control panel and that all indicators are normal - Check the pressure of the storage tank (Buffer Tank) and the pipes — no visible or audible leaks
	B62 Start the nitrogen generator and monitor the gas purity	- Turn on the main switch and turn on the CNC control unit - Acknowledge the alarms and perform the reference run for all axes (X, Y, Z) - Turn on the dust collection system (Dust Collection) before starting operation — mandatory



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		• Check the condition of the cutting spindle (Spindle) and that there are no abnormal noises at slow rotation • Verify that the cutting tool (Router Bit) is firmly secured in the holder
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
B7 Handling HMI alerts before starting production Resolve HMI Alarms before (Production	B71 Identify and classify HMI alerts (digital control interface)	• Read the alarm message on the HMI screen in full — do not ignore any alarm whatever its level • Identify the alarm code (Alarm Code) and its level: warning (Warning), error (Error), critical fault (Critical Fault) • Refer to the machine fault table (Fault Table) or the operator's manual to identify the cause • Distinguish between alarms within the operator's authority and those that require escalation
	B72 Handle alarms within the operator's authority and report the rest	• Handle the standard alarms listed within the operator's authority: re-homing (Re-home), reloading a program, replacing a consumable • Press "Alarm Reset" (Alarm Reset) only after addressing the root cause — no reset without addressing the cause • Verify that the alarm has disappeared and that the machine has returned to "Ready" status (Ready) before starting production • Notify the production supervisor in writing of any alarm outside the operator's authority — do not start production until approval is given • Record all alarms that appeared in the machine log (Machine Log)

Skills	Knowledge
• Read and interpret the work order and technical drawing and extract the critical information • Perform the daily inspection of each machine and document the results without omission • Start the CO₂ and Fiber laser machines in the correct sequence • Start the bending, punching, folding and V-grooving machines in the correct sequence • Adjust the gap between the rolls of the roll bending machine (Metal Roller)	• Contents of the work order (Job Order) and the machine manufacturing manual and how to read them in both Arabic and English • Technical drawing symbols (Drawing Symbols): tolerances ($\pm$), diameter ($\varnothing$), angles, bend reference line • The difference between CO₂ laser and fiber laser (Fiber): operating requirements, warm-up times, types of assist gases • The start-up sequence of each machine according to the user manual • Types of HMI alarms, their levels and their meanings

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• Start the nitrogen generator and monitor the purity level • Read HMI alarms, classify them and handle the standard alarms • Express the appropriate idea orally in Arabic • Express the appropriate idea orally in English • Use information technology (ICT) to access programs and documentation	• The working principle of the nitrogen generator with PSA technology (Pressure Swing Adsorption) • Nitrogen purity standards required for laser operations ($\geq 99.5\%$) • Daily checklist items (Daily Checklist) for each machine • Principles of hydraulic, pneumatic and electrical circuits and the role of each of their components • Functions of the fixed and moving machine parts
Attitudes	Occupational Safety and Health
• Readiness for continuous learning and developing operating competencies • Accuracy and attention when performing daily inspections — no neglected items • Willingness for field work and practical application • Taking the initiative to report any defect before starting operation • Adopting participatory teamwork with the production supervisor and the maintenance team • Accepting others' opinions during work • Working under pressure and managing time at the start of the shift • Respecting others and caring for colleagues' safety	• Commitment to occupational safety and health standards at all times • Attention to environmental standards (no gas leaks, proper disposal of waste) • Wearing the required work suit (Overall) throughout working time • Never bypass any safety system or LOTO procedure under any circumstances • Refraining from wearing accessories (jewelry, watches, chains) in the workshop • Ensuring that hands and clothing are clean and suitable for work • Taking care to preserve tools, devices and machines



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Duty C — Setting Up the Machine for the Production Job

(Set Up Machine for Production Job — Prerequisite: A, B)

Duties / Competencies		Tasks
C Set up the machine for the production job Prerequisites: <i>A, B</i>		C1 Load the CNC program from the network C2 Select the laser cutting parameters suitable for the job C3 Set up the bending tooling in the bending machine (Press Brake) C4 Change the punching tool in the turret of the CNC punching machine (Turret) C5 Set up the V-grooving machine for the production job C6 Adjust the shearing machine parameters (Shearing Machine) C7 Adjust the folding machine segments (Folding Machine Segments) C8 Set up the roll bending machine for the job (Metal Roller) C9 Set the work coordinates on the CNC machine (Work Coordinates) C10 Perform the trial run before production (Dry Run) C11 Monitor the production cycle (Monitor Production Cycle)
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C1 Loading the CNC program from the network	C11 Identify the correct program and access it	- Read the CNC program number from the work order (Job Order) - Access the program manager (Program Manager) on the HMI screen - Identify the correct file path on the network or the local server - Verify that the file name and version number match the work order — do not load an old version



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	C12 Load the program and verify it before operation	• Load the program into the machine memory (Machine Memory) or run it directly from the network • Open the graphics preview (Graphics Preview) or the program simulation (Simulation) and verify: — the part shape matches the technical drawing — the tool paths (Tool Paths) are correct — there is no conflict between the clamp positions (Clamps) and the cutting paths • Verify the programmed sheet dimensions and that they match the actual material
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C2 Selecting the laser cutting parameters suitable for the job	C21 Select the correct technology table (Technology Table)	• Identify the material type (mild steel, stainless steel, aluminum, non-metallic material) and its thickness from the work order • Access the technology table (Technology Table) in the machine system; select the correct row: material type + thickness + assist gas type (N₂ or O₂) • Verify the table parameters: cutting speed (Cutting Speed), gas pressure (Gas Pressure), focus position (Focus Position), laser power (Power)
	C22 Perform nozzle centering (Nozzle-Centering) and set up the cutting head	• Perform the nozzle centering routine (Nozzle Centering Routine) before the first cutting operation or after changing the nozzle • Verify that the beam is precisely centered in the center of the nozzle (Nozzle) — permissible tolerance ≤ 0.1 mm • Set the cutting head height (Standoff Distance) according to the technology table

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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C3 Setting up the bending tooling in the bending machine (Press (Brake	C31 Select the upper tool (Punch) and the lower die (V-Die) and install them	• Select the upper tool (Punch) based on the type of bend required: standard, gooseneck (Gooseneck), acute angle (Acute) • Select the lower die opening (V-Die Opening) according to the rule: V width $\approx 8 \times$ material thickness • Clean the clamping surfaces on the ram (Ram) and the bed (Bed) before installation • Install the upper tool in the ram clamp — make sure it is centered and that the safety clip (Safety Clip) has engaged • Install the lower die and align it with the upper tool — secure the clamping system • (Clamping System) • Verify that the tip of the upper tool is centered exactly over the opening of the lower die
	C32 Load the bending program and set the back gauge (Back Gauge	• Load the bending program from the network or create a new program by entering the parameters: • material type, thickness, angle, flange length (Flange Length), bend sequence • Verify that the calculated load (Tonnage) does not exceed the rated capacity of the machine and the tooling • Move the back gauge (Back Gauge) to the first bend position and measure the distance to make sure it matches the required flange length • Perform a test bend (Test Bend) on scrap material of the same type and thickness and measure the resulting angle before production
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C4 Changing the punching tool in the turret of the punching machine CNC (Turret)	C41 Review the tool list (Tool List) and prepare the required tools	• Read the tool list (Tool List) attached to the CNC program or the set-up sheet • Verify that the tools in the turret (Turret) match what is required — identify the tools that need changing • Prepare the new tools (Punch + Die) suitable for the type of punching required: round, rectangular, special according to their number • Check the sharpness of the punch tips (Punch Tips) — do not use a cracked or worn tool (breakage hazard)



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	C42 Install the tools in the turret (Turret) and verify the alignment	• Remove the tools not required in the correct manner according to the tool change procedure • Install the new tool in the correct station (Station) specified in the CNC program • Verify correct alignment (Punch-to-Die Alignment) and that the clearance (Die Clearance) matches the material thickness • Firmly secure all tool holders (Tool Holders) — no loose components • Enter the new tool data in the tool table on the HMI screen if necessary
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
C5 Setting up the V-grooving machine for the production job	C51 Calculate the groove depth and the RMT requirements (remaining material thickness)	• Read the sheet thickness from the technical drawing and identify the final folding requirements; calculate RMT (Remaining Material Thickness — the remaining material thickness) with the formula: $RMT = \text{sheet thickness} - \text{groove depth}$ • Verify that the RMT falls within the acceptable range for the material type and thickness — an RMT lower than necessary leads to the sheet breaking when folded • Determine the number of passes (Passes) required: for stainless steel or deep grooves, 2–3 passes may be needed

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Tasks	Sub-tasks	Main Tasks / Performance Criteria
		Install the appropriate V-groove insert (V-Groove Insert):
	parameters and perform C61 Cut groove on scrap Set the back gauge distance (Back Gauge) and the blade angle (BladeAngle)	- Read the required dimensions from the technical drawing or the work order - Set the back gauge distance (Back Gauge) to the required value and lock it; verify the clearance between the two blades (Blade Clearance) and that it suits the material thickness - Check the blade sharpness (Blade Sharpness) — a damaged blade produces unclear edges and excessive burr (Burr)
C6		
Adjusting the shearing machine parameters (Shearing Machine)	C62 Verify the pressure parameters and set up the sheet clamping	- Verify the pressure of the hold-down systems (Hold-Down Clamps) and that they grip the sheet firmly before shearing - Verify that the length of the sheet to be sheared does not exceed the machine capacity; verify that the material thickness does not exceed the rated capacity of the blade - Perform a test cut and measure the resulting dimension with the caliper — permissible tolerance ± 0.5 mm
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C7		
Adjusting the segments of the folding machine (Folding Machine Segments)	C71 Assemble the folding beam segments (Folding BeamSegments) according to the drawing	- Read the technical drawing and determine the length of the folding segments required for each bend - Select the appropriate segments from the available set of segments and install them in the folding beam in the correct order - Verify that the total length of the folding segments matches the length of the bend required in the drawing - Firmly secure all segments — no loose components that lead to uneven folding
	C72 Set the folding parameters and load the program or set up manually	- Load the folding program from the network (RAS CNC) or set the parameters manually (Haco Preho) - Set the required angle and the fold sequence (Fold Sequence): up-fold (Up-fold) or down-fold (Down-fold) - Verify the protection of pre-coated sheets or those with a polished surface — - use a protective film (Protective Film) or a soft lining on the folding beam



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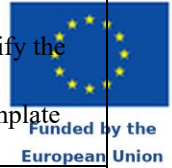


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		• Perform a test fold on scrap and measure the angle — permissible tolerance ± 0.5 degrees
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
C8 B4 Set up the roll bending machine for the job (Metal Roller)	C81 Adjust the rolls (Rolls) according to the required bending radius 	• Read the required bending radius (Bending Radius) or the final cylinder diameter (Cylinder Diameter) from the drawing • Adjust the position of the third roll (Top Roll) to obtain the required bending radius — requires practical experience and trial B4 • Perform a first pass (First Pass) with light pressure to verify the direction and consistency of the bend • Measure the resulting bending radius with a reference template or a suitable gauge
	C82 Handle the gradual bending and correct the cone shape (Cone Shape)	• Increase the roll pressure gradually (Incremental Passes) until the required bend is reached — no full run in a single pass; for grooving (Hairui CNC), verify the groove positions, groove depth and the sequence of operations • For the semi-automatic machine (Anhui): set the depth manually, position the sheet using the back gauge or the rulers • Perform a test groove (Test Groove) on scrap material of the same type and thickness • Measure the groove depth with a depth gauge (Depth Gauge) at three points: start, middle, end — tolerance $\leq \pm 0.1$ mm • Inform the bending operator of the RMT value before starting the folding operations to set the correct load • Pre-bend both edges (Pre-bending Both Edges) first to reduce the flat spot (Flat Spot) at the ends • If a cone shape (Cone Shape) results: adjust the roll asymmetrically (Asymmetric Adjustment) to correct the deviation — requires initiative and problem solving B4 • Verify the roundness (Roundness) by placing the shape on a flat surface and checking for protrusion





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Tasks	Sub-tasks	Main Tasks / Performance Criteria
C9 Setting the work coordinates on the CNC machine (Work Coordinates)	C91 Define the zero point (Work Origin Point /Zero)	• Determine the work reference point (Work Reference Point) according to the technical drawing or the CNC program • Place the sheet or part in the correct position and secure it • Use the auto-sensing system (Auto-sensing) or manual setting to define the zero point on the HMI • Verify that the work coordinates entered match the reference point in the program
	C92 Verify the work coordinates with a slow trial run	• Run the program in slow feed mode (Single Block /Reduced Feed) to verify the coordinates are correct; monitor the tool position on the HMI screen and compare it with the technical drawing • Stop operation immediately if the operator notices any unexpected deviation in the tool position • Correct the coordinates and retest until full correctness is confirmed
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C10 Performing the trial run before production (Dry Run)	C101 Perform the Dry Run and check the tool paths	• Run the program in Dry Run mode (without material or without actual cutting) to verify the tool paths • Monitor the movement of all axes on the HMI screen and ensure there is no potential conflict or collision • Verify that the sequence of operations is correct: tool position, transitions, start and end points The Dry Run is mandatory for all new jobs (New Jobs) and programs that have not been run before — without exception
	C102 Handle any problem discovered during the Dry Run	• Stop the trial run when any problem is discovered: coordinate error, potential conflict, wrong sequence • Identify the cause of the problem: program error, set-up error, parameter entry error • Correct the problem and repeat the Dry Run until the trial run passes completely without problems



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		Notify the production supervisor in writing if the problem lies in the program itself (outside the operator's authority)
Tasks	Sub-tasks	Main Tasks / Performance Criteria
C11 Monitor the production cycle (Monitor) Production (Cycle)	C111 Start the production cycle and monitor the progress of the process	- Close all safety doors and safety systems before pressing CYCLESTART - Monitor the progress of production visually and audibly: cut quality, sounds coming from the machine, HMI alarms - Monitor the HMI screen regularly: tool speed, gas status, status of the subsystems - Do not leave the machine during the production cycle — the operator remains present throughout the process
	C112 Respond to problems during production and report them	- Stop the production cycle (Pause/Stop) when noticing any defect in part quality or abnormal machine behavior - Do not continue production if a defect is discovered in the first piece (First Piece Fail) — stop, identify the cause, correct - Report immediately any alarm (Alarm) that appears during production and document it in the machine log - Record monitoring observations in the production report: any parameter adjustment made during operation

Knowledge	Skills
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• Contents of the CNC program and tool paths (Tool Paths) and how to read them • Laser technology tables (Technology Tables): assist gas type, speed, pressure, power for each material and thickness • Types of bending tools (Punch/Die) and the rule for selecting the V-Die width ($8 \times$ material thickness) • The RMT calculation rule on the V-grooving machine and the consequences of calculation errors • Principles of roll bending (Rolling): adjusting the rolls, correcting the cone shape • Functions of work coordinates (Work Coordinates) in systems • CNC • The importance of the Dry Run and its correct procedures • Types of calibration tools/devices (Calibration Tools) and their characteristics • Causes of common production defects: dross (Dross), burr (Burr), angle deviation, cracking when folding • Reading in both Arabic and English: CNC programs, technology tables, operating manual	• Load the CNC program from the network and verify it before operation; select the correct technology table and perform nozzle centering (Nozzle Centering) • Select and install the bending tooling (Punch + V-Die) correctly • Change the tools in the turret of the CNC punching machine (Turret) in the correct sequence • Calculate the RMT, set the V-grooving machine parameters and perform a test groove • Assemble the folding machine segments and set the folding parameters • Adjust the rolls on the roll bending machine and correct the cone shape • Set the work coordinates and verify them with a slow run; perform a complete Dry Run and handle the problems discovered • Express the appropriate idea orally and in writing in both Arabic and English
Occupational Safety and Health	Attitudes
• Commitment to occupational safety and health standards in all set-up stages • Never exceed the machine or tooling capacity (Tonnage Overload) under any circumstances • Wearing the required work suit and the PPE appropriate for each machine throughout working time • Refraining from wearing accessories (jewelry, watches, chains) in the workshop • Taking care to preserve tools and equipment and return them to their correct places • Attention to environmental standards: proper disposal of metal chips (Chips/Offcuts)	• Accuracy and attention in all set-up steps — a set-up error leads to material waste • Taking the initiative to always perform the Dry Run for new jobs without waiting for instructions • Working under pressure and managing set-up time efficiently to meet the production schedule • Readiness for continuous learning and developing set-up and programming skills; adopting teamwork with the production supervisor and the quality team • Accepting others' opinions during work and prioritizing quality over quantity • Respecting others and coordinating with the operators on neighboring machines



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Duty D — Controlling Production Quality

(Control Production Quality — Prerequisite: A, B, C)

Duties / Competencies		Tasks
D Controlling production quality Prerequisites: A, B, C		D1 Inspect the first piece against the technical drawing D2 Correct the machine parameters when the first-piece inspection fails B4 D3 Perform periodic quality checks during production D4 Handle the produced parts safely
Tasks	Sub-tasks	Main Tasks / Performance Criteria
D1 Inspect the first piece against the technical drawing (First Piece) (Inspection)	D11 Measure the dimensions of the first piece with the appropriate measuring tools	- First-piece inspection is mandatory before running any production batch — without exception under any circumstances - Measure all critical dimensions (Critical Dimensions) specified in the technical drawing: - length and width dimensions: using the digital caliper (Digital Caliper) — tolerance ± 0.1 to ± 0.3 mm - bend angles: using the angle gauge (Angle Gauge/Protractor) — tolerance ± 0.5 degrees at 3 points: left, middle, right - V-groove depth: using the depth gauge (Depth Gauge) — tolerance ± 0.1 mm at the start, middle and end

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		— hole diameters and their positions: digital caliper or special gauge Record all measurements in the first-piece inspection record (First Piece Inspection Record) with comparison to the drawing values
	D12 Visual inspection of surface quality and defects	- Inspect the cut edge quality (Cut Edge Quality) visually and by touch (with a protective glove): - dross (Dross): hardened metal deposits on the bottom edge — not acceptable - burr (Burr): a protruding sharp edge — not acceptable if it exceeds the permissible limit - edge discoloration (Discoloration): yellowing/browning on stainless steel — not acceptable; indicates incorrect gas pressure - Inspect the surface flatness (Flatness): no visible warping (Warping) exceeding the permissible tolerance - Inspect the bend surface: no tool marks (Tool Marks) or scratches on the visible faces - Inspect the punched holes and shapes: edge quality, no tearing (Tearing) or cracking - Compare with the quality standards adopted in the factory and document the inspection result: pass (Pass) or fail (Fail)



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Tasks	Sub-tasks	Main Tasks / Performance Criteria
D2 B4 Correcting the machine parameters when the first-piece inspection fails	D21 Identify the cause of non-conformity and take the appropriate action	- Stop production immediately when the first-piece inspection fails — no continuation of production without approval of the first piece - Analyze the inspection results and identify the type of defect: - dimension error: → correct the back gauge position or the work coordinates - wrong bend angle: → adjust the angle correction factor (Angle Correction) or the ram depth (Ram Depth) - excessive dross (Dross): → change the cutting speed, gas pressure, or inspect the nozzle - excessive burr (Burr) in punching: → check the clearance (Die Clearance) and tool sharpness - Apply the correction within the operator's authority on his own initiative B4 - Produce a second test piece after the correction and repeat the full inspection
	D22 Escalate when the limits of the operator's authority are exceeded	- Distinguish between faults within the operator's authority and those that require the intervention of maintenance or the production engineer - Notify the production supervisor in writing and immediately when unable to address the cause - Document all correction attempts in the quality record (QC Record) and the machine log - Isolate the failed part (Non-conforming Part) and mark it clearly to prevent mixing it with good production - Do not restart the machine for production until approval is obtained from the production supervisor

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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D3 Perform periodic quality checks during production <i>In-Process)</i> <i>(Quality Checks)</i>	D31 Carry out the periodic inspection schedule at the specified frequency	• Apply the approved periodic inspection schedule for the machine being operated: — laser cutting: dimension inspection + edge quality on the first piece and every 20 pieces — Press Brake bending: angle and flange length inspection on the first piece and every 10 pieces — CNC punching: inspection of hole diameters and positions on the first piece and every 10 pieces — V-grooving: measure the groove depth and RMT on the first piece and every 10 pieces — Folding: angle and box dimension inspection on the first piece and every 10 pieces • Record the results of each periodic inspection in the quality control record (QC Record) with the date, time and actual reading
	D32 Act when a deviation is discovered during production	• Stop production immediately when a deviation from specifications is discovered in any periodic inspection • Identify the last part conforming to specifications and isolate all parts produced after it for inspection • Identify the cause of the deviation: tool wear (Tool Wear), change in material, temperature, vibration • Correct the cause within the operator's authority or notify the production supervisor immediately • Re-inspect the isolated parts and decide on them: accept, reject, or rework

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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D4 Handling the produced parts safely <i>Handle Finished)</i> <i>(Parts Safely</i>	D41 Hold and move the parts safely	• Wear cut-resistant gloves (Cut-Resistant Gloves) when handling metal sheets and parts — the edges are extremely sharp • Hold parts by the non-sharp edges or use hand tongs (SheetMetal Tongs) for heavy parts; do not throw or drop parts — each part is placed carefully on a flat surface; no single-person manual lifting of parts weighing more than 25 kg — ask for help or use lifting aids • Separate the produced parts from the metal waste (Skeleton/Offcuts) as soon as they are removed from the machine
	D42 Classify the parts, store them and protect them from damage	• Place the finished parts in their designated area with a clear identification tag (JobTag): work order number, material type, quantity, date • Stack the parts safely: place soft separators (Soft Separators) between the layers to protect polished surfaces • Protect parts with sensitive surfaces (Decorative Finish) with a protective film (Protective Film) before stacking • Place failed parts (Non-conforming) in a designated area marked with a red sign — prevent mixing them with good production • Organize the storage area according to 5S principles: everything in its place, clear aisles ≥ 1 meter
Knowledge		Skills



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• Types of measuring tools, their functions and characteristics: • digital caliper (Digital Caliper), angle gauge (Protractor/Angle Gauge), depth gauge (Depth Gauge), tape measure (Tape Measure) • Tables of permissible tolerances for each machine and each material type; types of production defects, their causes and remedies: • dross (Dross), burr (Burr), edge discoloration (Discoloration), warping (Warping), angle deviation, cracking when bending • Causes of product non-conformity to specifications and methods of troubleshooting them; the parameters adjustable by the operator for each machine (Parameters) and the extent of each one's effect on quality • Non-conforming product isolation procedures (Non-conforming Product Isolation) • Basic principles of statistical quality control (SQC — Statistical Quality Control) • Procedures for the safe handling of metal sheets and parts and PPE requirements • Reading in both Arabic and English: quality record, product specifications	• Use the digital caliper correctly and measure with ± 0.02 mm accuracy • Use the angle gauge at 3 points along the bend line; use the depth gauge to measure the V-groove depth • Compare the measurement results with the technical drawing specifications and make a Pass/Fail decision • Record the results of the first-piece inspection and the periodic inspections accurately • Identify the cause of non-conformity and apply the appropriate correction independently (B4) • Isolate the non-conforming product and mark it correctly • Handle metal sheets and parts safely using the appropriate PPE • Stack the parts and protect sensitive surfaces with a protective film • Express the appropriate idea orally and in writing in both Arabic and English
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Occupational Safety and Health

Attitudes



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| <ul style="list-style-type: none"> • Commitment to occupational safety and health standards at all times during quality inspection • Always wearing cut-resistant gloves when handling sheets and parts • Wearing the required work suit throughout working time; refraining from wearing accessories in the workshop • Taking care to preserve measuring tools and store them in their designated places • Applying 5S principles in the storage and inspection area | <ul style="list-style-type: none"> • Absolute accuracy in measurement and inspection — a measurement error leads to production waste • Taking the initiative to stop production when any defect is discovered — quality before quantity • Making decisions confidently within one's authority and immediately escalating what lies outside it (B4) • Readiness for continuous learning and developing troubleshooting skills; working under production pressure without compromising quality standards; adopting teamwork with the quality team and the production supervisor • Accepting others' opinions and accepting quality remarks in a positive spirit; respecting others and caring about delivering a sound product to the customer |
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Duty E — Keeping the Machines in Good Working Condition

(Maintain Machines in Operational Condition — Prerequisite: A, B, C)

Duties / Competencies		Tasks
E Keep the machines in good working condition Prerequisites: A, B, C		E1 Shut down the machine at the end of the shift E2 Clean the machine and the work area E3 Replace consumables within the operator's authority E4 Check fluid levels at the end of the shift E5 Perform nitrogen generator maintenance checks
Tasks	Sub-tasks	Main Tasks / Performance Criteria
E1 Shut down the machine at the end of the shift (Shutdown) <i>(Procedure)</i>	E11 Shut down the laser cutting machine in the correct sequence	• Make sure the program is complete and the cutting head has returned to the park position (ParkPosition) • Remove all produced parts and skeleton waste (Skeleton Waste) from the cutting table • Turn off the laser source (Laser Source OFF) from the HMI screen • For the CO₂ machine: wait for the cool-down cycle (Cool-down Cycle) to complete before switching off the power — early shutdown causes thermal shock to the optics (Thermal Shock to Optics) • Close the assist gas valves (N₂ / O₂) at the pressure regulator • Turn off the fume extraction system (Fume Extraction) if it is not automatic; shut down the CNC control unit in the correct sequence and wait for the "Shutdown Complete" message before



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		turning off the main switch; turn off the main power switch (Main Power Disconnect)
	E12 Shut down the bending, punching, folding, V-grooving machines and the CNC router	• Make sure the last operation is complete and all axes have returned to the reference or park position • Remove all parts and materials from the machine work area • For bending (Press Brake): make sure the ram beam (Ram) is in the upper position and that the tooling (Tooling) is not under load • For the CNC router: turn off the dust collection system (Dust Collection) after stopping the spindle • Shut down the CNC control unit in the correct sequence, then turn off the main power switch • For V-grooving: retract the back gauge (Back Gauge) to the reference position before shutting down
Tasks	Sub-tasks	Main Tasks / Performance Criteria
E2 Clean the machine and the work area	E21 Clean the inside of the machine according to the requirements of each machine	• Laser: clean the support slats (Slats/Cutting Slats) by removing the slag buildup (Slag Buildup) with a scraper (Scraper) or slag hammer — accumulated slag makes the sheets uneven and causes head collisions • Laser: clean the outside of the cutting head with a lint-free cloth • (Lint-Free Cloth) — never touch the lens with a bare hand • CNC punching: empty the metal waste container (Slug Container) and clean the table grid of metal chips • Bending: clean the surfaces of the lower die (V-Die) and the upper tool (Punch) of metal deposits • V-grooving: remove the long metal chips (Long Chips) with a special comb — do not remove by hand without a glove • CNC router: clean the work table of dust and chips with a vacuum cleaner dedicated to the workshop



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	E22 Clean the work area and apply 5S principles	• Sweep the floor around the machine and remove all metal chips and waste — metal chips are a slipping and cutting hazard • Dispose of metal waste correctly: separate mild steel / stainless steel / aluminum in separate containers • Return tools and equipment to their designated places according to 5S principles; make sure the aisles (≥ 1 meter) are free of any obstacles • Coil the compressed air hose (Air Hose) and hang it in its place; wipe the machine surfaces clean of oil or fluid contamination
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
E3 Replacing consumables within the operator's authority <i>Replace)</i> <i>Operator-Level</i> <i>(Consumables)</i>	E31 Identify the consumables that need replacing and prepare the replacement	• Monitor the condition of consumables during production and periodic inspection — replace when needed, not at complete failure • Consumables within the operator's authority: — laser cutting nozzle (Laser Nozzle): replace when worn or deformed — protective glass (Protective Glass / Lens): clean according to the schedule or replace when damaged — V-groove insert (V-Groove Insert): replace at the end of its productive life — router bit (Router Bit): replace when worn — punching waste (Slugs) from the CNC punching machine container • Verify that the replacement consumable matches the specifications set out in the maintenance manual or the consumables table



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	E32 Replace the consumable correctly and document it	• Apply the LOTO procedure before any replacement that requires access to moving parts or energy sources • Replacing the laser nozzle (Nozzle): — turn off the laser and wait for the cutting head to cool — remove the nozzle with the special wrench and fit the new one firmly — perform nozzle centering (Nozzle Centering) after every replacement • Cleaning the protective glass (Protective Glass): — use only approved cleaning wipes (Lens Cleaning Wipes) — clean in a single circular motion — not back and forth — no contact with fingers — skin oils damage the anti-reflective coating • Record every replacement in the maintenance log (Maintenance Log): date, consumable type, part number, operator signature • Notify the production supervisor of any abnormally repeated replacement (indicates a problem in the machine set-up)
Tasks	Sub-tasks	Main Tasks / Performance Criteria
E4 Checking fluid levels at the end of the shift	E41 Check the machine fluids according to the daily check schedule	• Coolant (Coolant) for the machines: check the coolant level in its tank — add the appropriate fluid if it falls below the specified minimum • Hydraulic oil (Hydraulic Oil) for bending: check the oil level in the hydraulic system tank — report if it is below the minimum; auto-lube oil (Auto-Lube Oil): check the level of the automatic lubrication oil for the axes — add the appropriate oil if necessary; air compressor coolant (Air Compressor Coolant): check the coolant level if the compressor is liquid-cooled • Verify that the coolants are free of abnormal odors or discoloration — indicates bacterial contamination or an oil leak
	E42 Document the inspection results and report deviations	• Record the results of the fluid check in the machine log (Machine Log) at the end of every shift • Report immediately any abnormally low level — indicates a leak that must be addressed • Report any change in the color or odor of the fluids to the production supervisor or the maintenance team



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		Do not fill any fluid that does not conform to specifications or is of unknown origin — refer to the machine manual or the approved consumables list
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
E5 Performing maintenance checks on the nitrogen generator <i>Nitrogen Generator Maintenance (Checks)</i>	E51 Daily and weekly checks of the nitrogen generator	Daily: verify that the auto-drain traps (Auto-DrainTraps) are working and discharging the accumulated moisture — drain manually if the automatic ones fail Daily: record the nitrogen purity reading (Purity Reading) and the storage tank pressure (Buffer Tank Pressure) in the generator log Weekly: check all pipe connections and distribution points for leaks — listen for a hissing/whistling sound or use a leak detection solution (Leak Detection Spray) Weekly: clean the area around the generator and the intake air vents — dust reduces separation efficiency and damages the molecular sieve (CMS — CarbonMolecular Sieve)
	E52 Inspect the filters and determine when they need replacing	- Read the differential pressure gauges (Differential PressureGauges) on the pre-filters (Pre-filters): particulate filter (Particulate Filter) + coalescing filter (Coalescing) (Filter) - Replace the filter element (Filter Element) when the differential pressure exceeds the maximum limit specified in the generator manual - Check the condition of the carbon filter (Carbon Filter) if fitted — report when it is nearing the end of its life Important note: replacing the molecular sieve (CMS), inspecting the internal valves, and maintaining the control system lie outside the operator's authority — notify the specialized maintenance team immediately - Document every inspection and maintenance operation in the nitrogen generator log with the date, readings and action taken
Knowledge		Skills



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• The shutdown sequence of each machine according to the user manual (CO₂ versus Fiber — CO₂ needs a mandatory Cool-down) • Types of consumables within and outside the operator's authority for each machine; how to clean the laser lens and protective glass without damaging them; types of machine fluids (coolant, hydraulic oil, lubricating oil) and the specifications of each • 5S principles and their application at the end of the shift • The working principle of the PSA nitrogen generator and its parts that can be inspected by the operator • How to read the differential pressure on the filters and determine the replacement time • The LOTO procedure when replacing consumables • Distinguishing between operator maintenance work and specialized maintenance work	• Shut down each machine in the correct sequence specified in the SOP; clean the support slats (Slats) of slag and clean the laser head • Empty the metal waste containers and sort the waste; fully apply 5S principles at the end of the shift • Replace the laser nozzle (Nozzle) and perform centering after the replacement • Clean the laser protective glass with the approved wipes • Check fluid levels and top them up with the correct fluid; read the nitrogen generator gauges and inspect the filters • Document maintenance work in the machine log accurately and completely; express the appropriate idea orally and in writing in both languages
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Occupational Safety and Health	Attitudes
• Applying the LOTO procedure before any consumable replacement — without exception • No contact with the laser lens or protective glass with a bare hand • Commitment to environmental safety standards in disposing of used fluids and consumables • Wearing the work suit and the PPE appropriate for each maintenance operation; refraining from wearing accessories in the workshop • Taking care to preserve machines, equipment and tools • Attention to environmental standards: sorting waste, proper disposal of used fluids	• Adhering to the daily and weekly maintenance schedule without waiting for instructions; taking the initiative to replace consumables when needed, not when the failure occurs • Accuracy in documentation — the maintenance log is a legal document and a reference for future maintenance • Readiness for continuous learning and developing first-level maintenance skills • Adopting teamwork with the specialized maintenance team • Humility in acknowledging the limits of one's authority and escalating what lies outside it



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- Willingness for field work and caring for the machines as production assets



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Duty F — Completing Production Documentation

(Complete Production Documentation — Prerequisite: A, B, C)

Duties / Competencies		Tasks
F Complete production documentation Prerequisites: <i>A, B, C, D</i>		F1 Record machine log entries F2 Fill in the production report F3 Document the quality control log F4 Fill in the maintenance log F5 Report machine faults to the supervisor F6 Carry out the shift handover to the next operator
Tasks	Sub-tasks	Main Tasks / Performance Criteria
F1 Recording machine log entries	F11 Identify the mandatory data and record it at the start of the shift	- Open the machine log (Machine Log) at the start of every shift and record: shift date, operator name, machine number, machine condition at takeover (good / remarks) - Record the run hours counter (Run Hours) from the HMI screen at the start and end of the shift — the difference is entered as actual operating hours - Record any alerts (Alarms) that appeared at start-up and how they were handled; record unplanned operational problems (Downtime Events) stating the start time, end time and reason for the stoppage - Do not leave any field of the log empty — if there are no remarks, write "None" or "—"
	F12 Close the machine log at the end of the shift and sign it	- Record the final condition of the machine at the end of the shift: clean, consumables complete, no pending faults — or a description of what requires attention - Record the total actual operating hours and downtime (Downtime) if any - Sign the log and hand it to the supervisor or place it in the designated place according to the factory procedure - Make sure the machine log is completed — it is not replaced by a verbal record or the operator's memory



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Tasks	Sub-tasks	Main Tasks / Performance Criteria
	F31 Record the results of the first-piece inspection and the periodic inspections	- Record the first-piece inspection results (First Piece Inspection) immediately after performing the inspection — do not postpone documentation to the end of the shift - Enter the actual measurements taken with the caliper, angle gauge or depth gauge against the nominal values in the technical drawing - Record the inspection decision clearly: pass (Pass) or fail (Fail) for each dimension inspected
F2 Fill in the production report	F21 Compile the production data from the shift and record it	- Record the periodic inspections (In-Process Checks) during a long batch: state the number of the part inspected and the time of inspection - Record the completed quantities: total number of parts processed during the shift - In case of Fail record the dimension exceeded, the type of defect, and the corrective action taken
F3 Document the quality control log	F32 Document non-conformity cases and isolation measures	- Document every rejected part stating: its number in the batch, the dimension or criterion it failed, the probable cause of the defect - Calculate the rejection rate (Rejection Rate) and compare it with the limit permitted in the factory — usually $\leq 3\%$ - Record the cycle time (Cycle Time) per part or batch (Batch) if required - Record the isolation measures: the rejected parts were placed in the designated area and marked with a "Non-Conforming" sign - Record any stoppages that affected production with the reasons: fault, program change, quality inspection, additional set-up - Record the disposition decision for the rejected parts: rework, scrap, or return to supplier
	F22 Review the report and hand it to the supervisor on time	- Review all fields of the production report before submission: the figures match the actual parts completed and rejected - Sign the report with full name, date and shift - At the end of the shift, hand the production report to the supervisor or enter it in the electronic system before leaving the shift — late submission is a procedural error - Keep a copy in the shift file or in the designated place according to the factory procedure
		In case of a difference between the required and completed quantities: explain the reason in writing in the remarks field — do not leave the field empty

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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F4 Fill in the maintenance log	F41 Record the daily operational maintenance work completed	- Record every operational maintenance task performed by the operator during the shift: cleaning the Slats, emptying the waste containers, cleaning the laser head, greasing the lubrication points; state the machine concerned, the time the task was performed, and the number of minutes of downtime if any - Record the results of the fluid level check: sufficient level or topped up — stating the fluid added and the quantity - Record the results of the nitrogen generator checks (E5): tank pressure, filter condition, readings of the production unit - Every maintenance task is recorded as soon as it is completed — no consolidated recording at the end of the shift
	F42 Recording the replacement of consumables and changes within the operator's authority	- Record every consumable replaced: its type, its code if any, the machine concerned, the reason for replacement (regular cycle / damage / wear) - Examples of consumables that must be recorded: laser nozzle (Nozzle), protective glass (Protective Glass), V-groove insert (V-Insert), hold-down clamps (Hold-Down Clamps) - State the number of operating hours of the consumable before replacement if recorded — helps improve maintenance schedules - Indicate any consumable that has reached the minimum stock level so that the purchasing department is informed - Sign every entry in the maintenance log — no entries without the operator's signature

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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F5 Report machine faults to the supervisor	F51 Identify the fault and document it accurately in writing	• Document the fault as soon as it appears: time of occurrence, alarm code (Alarm Code) from the HMI screen if any, a clear description of the observed phenomenon (noise, vibration, product error, emergency stop) • State the conditions that preceded the fault: the material being processed, the parameters used, the job in progress • Describe the action taken by the operator: did he stop the machine? did he attempt initial handling? what did not work? • Classify the fault according to the operator's authority: within authority (corrected) or outside authority (needs maintenance intervention) • Do not exceed the operator's authority in attempting repairs — immediately escalate what lies outside the authority
	F52 Send the written fault report to the supervisor and follow it up	• Write the fault report on the form approved in the factory or in clear written form including: operator name, machine, date and time, description of the fault, action taken, current status • Hand the report to the supervisor in person or place it in the designated place — verbal reporting alone is not sufficient • In the case of an emergency fault that stops production or poses a danger: notify the supervisor immediately and verbally first, then complete the written report later • Follow up on the status of the request with the supervisor if the problem is not addressed within the same shift • Document the fault in the machine log (F1) and in the production report (F2) simultaneously — the records are interlinked

Tasks	Sub-tasks	Main Tasks / Performance Criteria
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F6 Carry out the shift handover to the next operator	F61 Prepare the shift handover sheet before the end of the shift	• Prepare the shift handover sheet (Shift Handover Sheet) at least 15 minutes before the end of the shift • The sheet must include: machine condition, completed and pending work orders, status of material remaining in the machine, any pending faults or alerts, consumable levels • Review all shift records (F1, F2, F3, F4, F5) and make sure they are complete before handover • Make sure the machine is in a safe condition for takeover: properly shut down or in standby mode according to the approved procedure • Compile the completed work orders and those still in progress and explain what must be accomplished in the next shift
	F62 Hand over the machine and the information to the next operator verbally and in writing	• Receive the next operator in front of the machine — no remote handover or handover by paper alone • Explain the machine condition verbally: what was done, what remains, any special remarks relating to this machine during this shift • Hand over the shift handover sheet (Shift Handover Sheet) and accompany the next operator in reading it if necessary • Answer the next operator's questions honestly — do not hide problems or withhold information that affects performance or safety • The next operator signs for receipt of the handover sheet — the receipt signature closes the responsibility of the ending shift • In the absence of the next operator: hand the sheet directly to the supervisor and inform him verbally — do not leave the shift without a formal handover

Knowledge

Skills



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• Types of mandatory records in metal industry factories and the purpose of each: • machine log (Machine Log), production report (Production Report), quality record (QC Record), maintenance log (Maintenance Log), fault report (Fault Report), shift handover sheet (Handover) (Sheet) • The mandatory information in each record according to the approved NTN procedures • The relationship of documentation to the production quality system: a completed record is a necessity for accepting a production batch • The concept of standard operating procedures (SOPs) and how accurate documentation supports them • The difference between faults within the operator's authority and those outside it, and how to escalate • Principles of traceability (Traceability) in production: every batch has complete, reviewable records • Principles of professional written communication in the production environment: clarity, accuracy, objectivity • Reading and writing basic technical terms in both Arabic and English in the context of documentation	• Fill in the documentation forms in clear, legible handwriting without errors or omissions in the fields • Read the run hours counter from the HMI screen and record it accurately; record the actual measurements from the measuring tools in the quality log against the nominal values • Distinguish between the types of decisions in the quality log: Pass / Fail /Rework / Scrap • Write an accurate description of the fault in clear language that enables the maintenance team to understand the problem • Organize the shift handover sheet and arrange it in a way that is easy for the next operator to grasp • Balance the requirements of fast completion with completing documentation at the required quality • Clear verbal expression when handing over the shift: sequence of information, distinguishing priorities
Occupational Safety and Health	Attitudes



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| <ul style="list-style-type: none"> • Commitment to documenting every incident or safety alert in the machine log — an incomplete record can hide hazards from the next operator; immediate reporting of any hazard or fault affecting safety — delay in reporting is a serious professional error • Not handing over the shift without informing the next operator of any hazard or unusual condition in the machine • Wearing the appropriate PPE during the shift handover procedure at the machine (production area) • Refraining from wearing accessories in the workshop even during the handover process | <ul style="list-style-type: none"> • Accuracy and honesty in documentation — a falsified or incomplete record is a professional betrayal that affects production, quality and safety • Discipline in immediate documentation: every operation is documented at the time, not at the end of the shift • A sense of full responsibility for the shift records until the moment of signing the handover • Readiness for full transparency in the shift handover — no hiding of problems to protect one's personal image • Considering documentation an essential part of the work, not an additional burden — records protect the operator and prove his performance • Readiness for continuous learning and developing professional writing and communication skills • Respecting the next operator by providing a complete and accurate shift handover that enables him to work confidently and safely • Adopting teamwork and coordination with the supervisor and the quality and maintenance teams |
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Duty G — Communication

(*Communicate*) applied in all duties A–F

Duties / Competencies	Tasks
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G Communication Applied in all duties <i>A–F</i>	G1 Read technical drawings and SOP procedures in English G2 Read work instructions and internal notices in Arabic and English G3 Communicate verbally in Arabic with the team and supervisors G4 Write production records and reports in Arabic and English	
Tasks	Sub-tasks	Main Tasks / Performance Criteria
G1 Reading technical drawings and SOP procedures in English	G11 Read and understand the technical drawing (TechnicalDrawing) before starting the set-up	• Identify the drawing number, work order number, material type, thickness, and main dimensions from the title block (Title Block) • Read the dimension and permissible tolerance table (Tolerance Table) and identify the critical values • Identify the welding symbols, finishing symbols, and any professional notes • (Engineering Notes) written in English • Ask the supervisor when there is any symbol or term that is not understood — do not start production with a drawing that is not understood
	G12 Read the standard operating procedures (SOP) and apply them step by step	• Identify the SOP number associated with the machine and the job in progress • Read the SOP steps in the correct sequence before starting; do not rely on memory alone for new or rare jobs • Identify the warning points (WARNING / CAUTION) in the SOP and comply with them without exception • Refer to the SOP when an error occurs to verify that the procedure followed matches the standard
Tasks	Sub-tasks	Main Tasks / Performance Criteria
G2 Reading work instructions and internal notices in Arabic and English	G21 Reading work orders (JobOrders) and daily production instructions	• Read the work order (Job Order) in full at the start of every job: order number, quantity, material, required machine, priority, delivery date • Identify any special requirements mentioned in the work order: special finish, specific packaging, customer instructions • Read the internal notices posted on the notice board (NoticeBoard) at the start of every shift



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		• Ask immediately about any instruction that is unclear or contradicts the drawing or SOP — do not bypass the contradiction without resolving it
	G22 Understanding production schedules, priorities and job change notices	• Read the daily production schedule (Production Schedule) and determine the priority order of the jobs required on his machine • Understand the job priority change notices issued by the production supervisor and apply them immediately • Make sure of understanding the difference between an "urgent" job, a "normal" job and a "pending" job in the production schedule • Confirm understanding verbally with the supervisor when receiving verbal instructions concerning a change of priority or a job modification

Tasks	Sub-tasks	Main Tasks / Performance Criteria
G3 Communicating verbally in Arabic with the team and supervisors	G31 Clear verbal reporting of problems and emergency events	• Report immediately any fault, incident or hazardous situation to the supervisor in clear language: what happened, when, on which machine, what the current situation is • Report any deviation in production quality (failed parts, a noticeable change in part quality) before continuing production • Communicate verbally with the next shift's operator at the shift handover in clear and organized language • Do not rely on gestures or signs alone to convey information relating to quality or safety



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	G32 Effective communication within the production team during work	• Confirm receipt of instructions from the supervisor verbally ("understood" or rephrasing the instruction to confirm correct understanding) • Inform neighboring team colleagues before carrying out any operation that may affect them: sudden start-up, smoke, loud noise • Ask clearly for help when needed to lift a heavy part or perform a job that requires two people • Answer team colleagues' queries accurately and honestly without haste or courtesy at the expense of correct information
Tasks	Sub-tasks	Main Tasks / Performance Criteria
G4 Writing production records and reports in Arabic and English	G41 Writing technical data in both languages in the daily records	• Write the English technical terms correctly in the records: AlarmCode, Nozzle, Dross, Pass/Fail, Downtime • Write numerical data (measurements, hours counter, quantities) clearly without ambiguity in the figures • Write the proper names of machines, programs and consumables in the correct form adopted in the factory • Use only the approved abbreviations (SOP, PPE, QC, WO) — do not invent personal abbreviations
	G42 Writing fault reports and technical remarks clearly and accurately	• Write the description of the fault or technical remark in a clear sentence that answers: what happened + when + on which part of the machine • Avoid vague sentences such as "the machine isn't working" — instead: "Alarm Code 3021 appeared when starting the Fiber laser at 9:15" • Distinguish in writing between: a remark for information, a problem needing follow-up, a fault requiring production to stop • Review what he has written before signing to make sure that anyone else can understand it without additional explanation



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Knowledge	Skills
- English technical terms used in sheet metal and CNC machine operation - Standard technical drawing symbols (ISO/DIN) used in the factory - Types of work documents in the factory and the purpose of each: SOP, Job Order, Production Schedule, Alarm List - Principles of professional communication in the production environment: clarity, accuracy, correct timing - Approved abbreviations and symbols in factory documents - Basic writing rules for technical reports in Arabic and English	- Read and interpret technical drawings and extract the critical information from them - Read the SOP in full and apply its steps in the correct sequence; clear and organized verbal reporting of problems and events; write English technical terms correctly in the records; formulate an accurate description of the fault or technical remark in one clear sentence - Communicate with the production team and supervisors in a professional and constructive manner
Occupational Safety and Health	Attitudes
- Immediate reporting of any hazard or fault affecting safety — delay in reporting is a professional error - Reading the safety warnings in the SOP and drawings with full attention – do not skip the WARNING section - Clear communication with the team before any sudden start-up or movement of heavy equipment - Immediate reporting of any incident or near miss regardless of its size	- Honesty and accuracy in writing and reporting — incomplete or false information harms production and safety - Readiness to ask when not understanding — asking is not a weakness but a professional responsibility - Listening carefully to the supervisor's instructions before starting execution - Readiness for continuous learning and developing technical reading and writing skills - Respecting the communication language adopted in the factory and not neglecting official documents - Taking care that information conveyed verbally or in writing is correct before delivering it



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Duty H — Demonstrating Professional Attributes (*Demonstrate Professional Attributes*) applied in all duties

A–F

Duties / Competencies		Tasks
H Demonstrating professional attributes Applied in all duties A–F		H1 Work independently without continuous supervision H2 Cooperate within the production team H3 Manage work under production pressure and deadlines H4 Exercise personal judgment within the limits of the operator's authority H5 Adapt to different machines and production jobs H6 Take the initiative in quality and safety matters
Tasks	Sub-tasks	Main Tasks / Performance Criteria
H1 Working independently without continuous supervision	H11 Carry out the complete work cycle (set-up → production → inspection → documentation) without requesting guidance at every step	- Carry out all set-up, operation, inspection and documentation steps independently according to the approved SOP - Refer to the SOP and the technical drawing as a reference when in doubt — do not wait for the supervisor to resolve every query - Make daily operating decisions (changing a consumable, resetting a parameter, routine cleaning) with full independence - Notify the supervisor only when the limits of the operator's authority are exceeded or when there is genuine ambiguity in the job
	H12 Manage shift time effectively and complete the required jobs on time	- Plan the sequence of jobs in advance at the start of the shift so that priorities are completed first - Complete documentation (logs and reports) in parallel with operation, not only at the end of the shift - Estimate job times with reasonable accuracy and report early when a work order is expected not to be completed on time - Use downtime (laser cooling, tool change) to complete simple documentation or maintenance tasks
Tasks	Sub-tasks	Main Tasks / Performance Criteria



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H2 Cooperating within the production team	H21 Support team colleagues and offer help within one's authority	• Offer help to a colleague who needs to lift a heavy part or perform a job that requires two people without waiting to be asked • Share useful technical information with colleagues (a successful program, a tested parameter) in a positive spirit • Inform the neighboring colleague of any change in operating conditions that may affect his work (smoke, noise, gas interruption) • Refrain from interfering in a colleague's tasks without being asked — each operator is responsible for his machine and his authority
	H22 Active participation in start-of-shift meetings and problem-solving sessions	• Attend the start-of-shift meeting on time and listen to the supervisor's instructions with full attention • Contribute constructive remarks from the previous shift's experience when asked or when needed • Accept constructive criticism and technical remarks from the supervisor or the quality team positively and without defensiveness • Comply with the collective decisions taken in team meetings and apply them on his machine
Tasks	Sub-tasks	Main Tasks / Performance Criteria
H3 Managing work under production pressure and deadlines	H31 Maintaining performance quality and safety standards under pressure	• Comply with all set-up and inspection steps even under production pressure — do not shortcut safety or quality steps on the pretext of time • Complete the first-piece inspection (First Piece Inspection) in full regardless of production pressure • Report immediately any quality defect even if this will lead to a production stoppage — quality before quantity • Stay calm and think logically when facing a fault or quality problem in times of pressure



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	H32 Prioritizing jobs and managing time in critical times	• Determine the highest-priority job based on the production supervisor's instructions and the delivery schedule — no personal ordering of jobs • Report early (at least one hour before the end of the shift) when a work order is expected not to be completed on time • Avoid unnecessary haste that leads to set-up errors or injuries — efficiency, not haste • Request a time extension or schedule adjustment from the supervisor when necessary instead of sacrificing quality or safety
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
H4 Exercising personal judgment within the limits of the operator's authority	H41 Making independent decisions in matters within one's authority	• Make the decision to stop production immediately when a quality or safety defect appears — without waiting for the supervisor's approval of this decision • Make the decision to change a consumable (Nozzle, Insert) when noticing quality deterioration on his own initiative — within his authority • Make the decision to adjust a production parameter (speed, pressure, angle) based on his experience and the inspection results — within his authority • Document every independent decision he has made in the appropriate records — independence does not mean no documentation



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	H42 Correctly distinguishing between what is within the authority and what requires escalation	- Clearly identify the limits of the operator's authority defined in the SOP and his job description — do not exceed these limits - Immediately escalate any technical problem that exceeds the authority: mechanical repair, CNC program modification, replacement of a major component - Do not hesitate to escalate for fear of appearing incompetent — correct escalation is evidence of competence, not weakness - Document the escalation decision and describe the problem accurately in writing to enable the maintenance team to work quickly
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Tasks	Sub-tasks	Main Tasks / Performance Criteria
H5 Adapting to different machines and production jobs	H51 Moving between different machines and applying the appropriate SOP for each	- When moving to a different machine: read its specific SOP before starting — do not transfer the procedures of one machine to another without verification - Identify the fundamental differences in safety and set-up procedures between the different machines and deal with each according to its particularities - Request a briefing session (Briefing) from the supervisor when moving for the first time to a machine he has not operated for a long time - Inform the supervisor of his actual level of experience on any machine assigned to him — do not claim a mastery that does not exist
	H52 Adapting to different types of work orders, materials and special requirements	- Handle different materials (mild steel, stainless steel, aluminum) and apply the correct parameters for each according to the technology tables (TechnologyTables) - Handle work orders carrying special requirements (finishing, packaging, quality certificate) and execute them accurately - Show flexibility in shift times and production schedules when needed to cover production requirements - Learn quickly from new jobs and record notes for future reference
Tasks	Sub-tasks	Main Tasks / Performance Criteria



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H6 Taking the initiative in quality and safety matters	H61 Stopping production immediately when any quality defect or safety hazard is discovered	• Stop the machine immediately without hesitation when noticing any safety hazard: unusual smoke, burning smell, abnormal noise, warning signal • Stop production without waiting for the batch to end when a recurring deviation in part quality is discovered • Take the initiative to isolate parts of doubtful quality before informing the supervisor — do not leave failed parts mixed with good ones • Report safety concerns even if they have not yet turned into an actual incident (Near Miss Reporting)
	H62 Proposing improvements to operating procedures based on field observation	• Record any field observation that may improve efficiency or safety (a faster way to clean the Slats, a better arrangement of the work order sequence) and submit it to the supervisor • Inform the supervisor of any potential hazard in the design or layout of the machines or aisles before an accident occurs • Propose improvements through the correct channels (supervisor, team meeting) — do not modify procedures individually without approval • Initiative does not mean exceeding authority — initiative remains within the limits of reporting and proposing, not unilateral execution

Knowledge	Skills
• Limits of the operator's authority according to the job description and the SOP approved in the factory; basic principles of lean manufacturing (Lean Manufacturing): reducing waste, quality at the source; principles of teamwork in the industrial production environment • The concept of near-miss reporting (Near Miss) and its importance in preventing accidents • Characteristics of the different machines in the factory and the differences between their procedures • The effect of production pressure on decision quality and ways of maintaining sound judgment under pressure	• Carry out the complete work cycle independently without step-by-step guidance; manage shift time and prioritize jobs effectively • Correctly distinguish between what requires an independent decision and what requires escalation • Stop production immediately without hesitation when a quality or safety defect is discovered • Move between different machines and apply the appropriate SOP for each; formulate a professional improvement proposal and submit it to the supervisor in the correct way



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Occupational Safety and Health	Attitudes
• No compromise on safety standards under any production pressure — safety is non-negotiable • Stopping the machine immediately at any safety doubt — resuming after verification, not before • Reporting near misses with the same seriousness as reporting actual incidents • Not exceeding the limits of the operator's authority even under pressure to complete the work quickly	• A sense of full responsibility for the quality of his production and the safety of his machine throughout the shift • Self-discipline in applying procedures even in the absence of supervision • Readiness for continuous learning and developing competence on the different machines; respecting the decisions of the team and the supervisor and working within the system, not outside it • Honesty in assessing his actual level of experience on each machine without exaggeration; considering initiative in quality and safety matters a professional duty, not a personal choice

Duty I — Maintaining Workplace Order and Hygiene

(Maintain Workplace Order & Hygiene) applied in all duties A–F

Duties / Competencies	Tasks
I Maintaining workplace order and hygiene applied in all duties A–F	I1 Apply 5S principles in the work area throughout the shift I2 Store tools, gauges and documents in their designated places I3 Keep personal protective equipment in good condition throughout the shift I4 Maintain personal hygiene appropriate to the manufacturing environment

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Tasks	Sub-tasks	Main Tasks / Performance Criteria
I1 Applying 5S principles in the work area throughout the shift	I11 Apply sorting, setting in order and shining (Sort – Set in Order – Shine) continuously	- Sort (Sort): remove all unneeded materials, tools and parts from the vicinity of the machine as soon as they are no longer needed - Set in order (Set in Order): place every tool, gauge and log in its designated place marked by a label or drawing on the surface (Shadow Board) - Shine (Shine): remove metal chips, waste and fluids from the vicinity of the machine continuously during the shift — no accumulation of waste until the end - Make sure the aisles (≥ 1 meter) are free of any obstacle at all times during operation
	I12 Applying standardization and self-discipline (Standardize–Sustain) continuously	- Standardize (Standardize): follow the same daily routine for applying 5S according to the schedule approved in the factory — no daily exceptions - Sustain (Sustain): maintain the level of order and cleanliness throughout the shift, not only before its end or before inspection visits - Participate in the periodic 5S assessment if conducted by the factory and apply the required improvement points - Constructively alert team colleagues when noticing any violation of 5S principles that affects shared safety

Tasks	Sub-tasks	Main Tasks / Performance Criteria
I2 Storing tools, gauges and documents in their designated places	I21 Return tools and gauges to their places as soon as they have been used	- Return the caliper, angle gauge and depth gauge to the designated tool box as soon as measuring is finished — do not leave them on the machine or on the floor - Return wrenches and tool change tools to the tool board (ToolBoard) immediately after use - Make sure measuring tools are protected from shocks: do not place a caliper on metal sheets or in an environment that exposes it to rust - Report immediately any missing or damaged tool — do not continue working with an unfit tool



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	I22 Organizing and keeping work documents and records in their designated places	• Keep work orders (Job Orders) and technical drawings in the designated place on the machine or in the document holder — do not leave them in the overall pocket or on the machine • Keep the daily records (Machine Log, Production Report, QC Record) in the shift file after completion • Return SOP copies to their designated place after review — no loss of an SOP document • Do not leave work documents in an environment where they may be exposed to oil, chips or moisture
I3 Keeping personal protective equipment in good condition throughout the shift	I31 Inspecting PPE at the start of the shift and wearing it throughout operating time	• Check the condition of all PPE items at the start of the shift: overall (no tears), gloves (intact), glasses (lenses free of scratches), safety boots (buckle intact) • Wear the PPE appropriate to the machine being operated throughout operating time — do not remove glasses or gloves for reasons of personal comfort in the operating area • Wear the dedicated laser glasses (CO₂ or Fiber depending on the machine) when working on the laser machine — do not substitute ordinary glasses • Refrain from wearing accessories (watch, ring, necklace) in the production area — entanglement hazard with the machines
	I32 Replacing damaged PPE immediately and reporting stock shortages	• Isolate and do not use any damaged PPE item (torn glove, cracked glasses, broken helmet) as soon as the damage is discovered • Request replacement of damaged PPE from the supervisor or the safety officer immediately — do not continue working with unfit PPE • Report a shortage in the PPE stock (gloves, glasses, lens cleaning wipes) before it runs out completely • Store PPE in its designated place after the shift: hang the overall, put the glasses in their case, clean the boots
I4 Maintaining personal hygiene appropriate to the manufacturing environment	I41 Maintaining a personal appearance appropriate to the industrial production environment	• Wear a clean and tidy overall at the start of every shift — a torn or excessively dirty overall is a risk to the professional image and to safety • Tie long hair securely before entering the operating area — loose hair is an entanglement hazard with rotating machines • Trim nails to allow gloves to be worn comfortably and safely • Refrain from smoking in the production area — the gases used in the laser are flammable



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**I42
Personal hygiene
after handling
production
materials and
fluids**

- Wash hands thoroughly after handling operating fluids (oil, lubricants) before eating or drinking
- Avoid touching the face or eyes with a hand contaminated with fine metal chips or operating fluids
- Change gloves contaminated with chemical fluids (lens cleaning materials, lubricating oils) before handling clean surfaces or sensitive parts
- Dispose of clothing contaminated with hazardous materials correctly according to the factory procedures — do not take it home without treatment

Knowledge	Skills
• The five 5S principles, their meaning and their objectives in the industrial manufacturing environment • Types of PPE required for each machine, the characteristics of each type and the replacement criteria • Correct storage requirements for precision measuring tools (temperature, humidity, shocks) • Health hazards of direct contact with operating fluids and fine metal chips • The effect of workplace cleanliness on quality: metal chips on the machine cause scratches on the parts • Fire safety requirements: no smoking near gases, correct storage of flammable materials	• Apply 5S principles practically and continuously without reminders • Inspect PPE at the start of the shift and identify the items that need replacing • Organize and store measuring tools and documents correctly; determine the correct time to change gloves or PPE during the shift • Maintain a constant level of order and cleanliness in the work area throughout the entire shift • Handle chemical materials (lubricating fluids, lens cleaning materials) correctly

Occupational Safety and Health

Attitudes



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| <ul style="list-style-type: none"> • Wearing full PPE at all times during operation without waiting for reminders — safety is a personal responsibility • No use of damaged PPE even if the job is short or "simple" • Keeping the aisles clear to ensure easy evacuation in emergencies • No smoking in the production area — fire hazard with industrial gases • Commitment to personal hygiene as part of the safety system and not only as an outward appearance | <ul style="list-style-type: none"> • Considering order and cleanliness a standard of professionalism, not an additional burden • Self-discipline in applying 5S even in times of production pressure • Taking pride in a clean and organized work area and considering it a reflection of the level of competence • Readiness to constructively alert team colleagues when cleanliness and order rules are violated • Considering the upkeep of PPE and measuring equipment a personal responsibility, not a duty imposed from outside • Attention to a proper professional appearance as part of the identity of a competent operator in a manufacturing environment |
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Section Four — Assessment Plan

4.1 Overview of the Assessment Plan

Reference Criterion	ILO-CBT
Pass Rule	Theory: $\geq 80\%$ in each duty test (multiple choice — closed book) Practical: Competent (C) in all performance criteria specified in the observation checklist WBL: completion of $\geq 80\%$ of the required hours with documented evidence signed by the supervisor
Assessment Tools	a) Multiple-choice test — 10 questions per group of duties b) Observation checklist (Annex A) — the assessor c) WBL evidence log (Annex B) — the trainee and the supervisor d) Portfolio: photos + completed records + supervisor's signature
Who Assesses?	An accredited assessor (internal or external) other than the trainer — for the final practical assessment
Re-assessment	In the case of NYC: the weak points are identified, a targeted remedial task is carried out, then the assessment is repeated on the same criterion

4.2 Assessment Plan by Duty

Duty	Duty Title	Theoretical Assessment	Practical Assessment	WBL Evidence
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A	Applying health and safety procedures	10 MCQ questions, pass mark $\geq 80\%$	Observation A1–A6 Decision C / NYC	Drill report + E-Stop PPE photos
B	Prepare the machine for operation	10 MCQ questions, pass mark $\geq 80\%$	Observation B1–B7 Decision C / NYC	Signed daily checklists $\times 5$
C	Set up the machine for the production job	10 MCQ questions, pass mark $\geq 80\%$	Observation C1–C11 Decision C / NYC	Set-up records + photos Dry Run
D	Control production quality	10 MCQ questions, pass mark $\geq 80\%$	Observation D1–D4 Decision C / NYC	First-piece inspection records $\times 8$ jobs
E	Keep the machines in good working condition	10 MCQ questions, pass mark $\geq 80\%$	Observation E1–E5 Decision C / NYC	Maintenance records + Nozzle replacement evidence
F	Complete production documentation	10 MCQ questions, pass mark $\geq 80\%$	Observation F1–F6 Decision C / NYC	Complete shift records file $\times 5$ shifts
G · H · I	Cross-cutting competencies (communication, attributes, order)	10 MCQ questions, pass mark $\geq 80\%$	Observation G1–G4 H1–H6 · I1–I4 Decision C / NYC	Supervisor's field observation report

4.3 Final Decision Rule

Decision	Conditions
Competent (C)	All practical performance criteria achieved (C in every item of the observation checklist) and theory $\geq 80\%$ in all duty tests and WBL completed at $\geq 80\%$ with documented and signed evidence



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Not Yet Competent (NYC)	Any practical performance criterion not achieved (NYC in any item) or theory below 80% in any duty or WBL below 80% or incomplete evidence → provide a targeted remedial task then re-assess on the same items
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Annex A — Observation Checklist (Assessor)

Assessor instructions: observe the trainee while performing the actual tasks in the production environment. Place a mark (✓) in the "Observed" box and record a C or NYC decision for each item. Any NYC item requires the assessment to stop and a remedial task to be defined before re-assessment.

Trainee name:	_____	Date:	____ / ____ / ____
Assessor name / signature:	_____	Machine / Task:	_____

Duty A — Applying Health and Safety Procedures

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
A1	Wearing the correct PPE according to the machine type	Full PPE matching the machine; 0 omissions; no accessories in the operating area	C / NYC ☐ ☐	
A2	Inspect the work environment for hazards	Systematic inspection of the area; identification of ≥ 3 potential hazards; documentation of the inspection result	C / NYC ☐ ☐	
A3	Testing the safety systems before start-up	E-Stop test within ≤ 5 seconds; Light Curtain check; recording the result in the checklist	C / NYC ☐ ☐	
A4	Applying the LOTO procedure before maintenance work	Lockout + warning tag before any replacement; verification of no residual energy	C / NYC ☐ ☐	
A5	Responding to a simulated emergency	Stopping the machine immediately; evacuating the area; informing the supervisor; recording the incident — all steps in sequence	C / NYC ☐ ☐	
A6	Complying with safety zones and warning signs	Not crossing the barriers; aisles ≥ 1 meter clear; not entering a danger zone without permission	C / NYC ☐ ☐	

Duty B — Preparing the Machine for Operation

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
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B1	Identifying set-up requirements from the work order and drawing	Extraction of: material, thickness, critical dimensions, tolerances; 0 missing information before starting	C / NYC ☐ ☐	
B2	Complete the daily pre-operation checklist	0 missing items; list signed before every start-up — without exception	C / NYC ☐ ☐	
B3	Starting the laser cutting machine (CO ₂ or Fiber)	Correct start-up sequence according to SOP-01; waiting for the CO ₂ warm-up period; handling alerts before production	C / NYC ☐ ☐	
B4	Starting CNC machines (bending / punching)	Running the reference axes (Reference Run); no pending faults; HMI in the correct operating mode	C / NYC ☐ ☐	
B5	Operate the roll bending machine and the CNC router	Start-up sequence according to SOP; inspection of the bending rolls; testing axis movement before production	C / NYC ☐ ☐	
B6	Operate the nitrogen generator	Verifying tank pressure $\geq$ the nominal value; filter check; recording the pressure readings	C / NYC ☐ ☐	
B7	Handling HMI alerts before starting production	Identifying the alarm code (Alarm Code); applying the correct procedure; no starting production with an active alarm	C / NYC ☐ ☐	

Duty C — Setting Up the Machine for the Production Job

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
C1	Loading the CNC program from the network and verifying it	Program number matches the work order; verification of the correct version; 0 wrong programs	C / NYC ☐ ☐	
C2	Selecting the laser cutting parameters for the job	Selection from the technology table (TechnologyTable) appropriate to the material and thickness; verification of the assist gas type	C / NYC ☐ ☐	
C3	Set up the bending tooling in the bending machine (Press Brake)	Selecting the correct Punch and V-Die according to the material and thickness; tool alignment; secure clamping	C / NYC ☐ ☐	



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C4	Changing the punching tool in the Turret	Correct Punch-to-Die Alignment; Die Clearance matching the thickness; 0 loose components	C / NYC ☐ ☐	
C5	Setting up the V-grooving machine for the job	Correct RMT calculation; test groove depth ± 0.1 mm at 3 points; informing the bending operator of the RMT	C / NYC ☐ ☐	
C6	Adjusting the shearing machine parameters (Shearing)	Back Gauge set to the required value; test cut ± 0.5 mm; suitable Blade Clearance	C / NYC ☐ ☐	
C7	Adjusting the folding machine segments (FoldingSegments)	Segment length matches the required bend; test fold ± 0.5 degrees; no loose components	C / NYC ☐ ☐	
C8	Setting up the roll bending machine (MetalRoller)	Adjusting the roll gradually; measuring the radius with a reference template; correcting Cone Shape if it appears	C / NYC ☐ ☐	
C9	Setting the work coordinates (Work Coordinates) on the CNC	Work coordinates match the reference point in the program; verified with a slow run (Single Block)	C / NYC ☐ ☐	
C10	Performing a Dry Run before production	Dry Run mandatory for all new jobs; 0 path conflicts; correction of any problem before production	C / NYC ☐ ☐	
C11	Monitoring the production cycle after launch	Continuous monitoring of the HMI, sounds and visual quality; immediate stop at any abnormality	C / NYC ☐ ☐	

Duty D — Controlling Production Quality

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
D1	Inspect the first piece against the technical drawing	Laser: dimensions ± 0.1 – 0.3 mm; no dross; no discoloration; Bending: angle $\pm 0.5^\circ$; flange length ± 0.3 mm; V-groove: depth ± 0.1 mm at 3 points; Folding: $\pm 0.5^\circ$ over 10 pieces	C / NYC ☐ ☐	
D2	Correct the machine parameters when the first-piece inspection fails	Stopping production immediately; identifying the cause of the defect; applying a correct correction; re-inspecting the second piece	C / NYC ☐ ☐	



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D3	Performing periodic quality checks during production	Periodic inspection for every long batch; recording measurements in the QC log immediately after inspection; isolating any failed part	C / NYC ☐ ☐	
D4	Handle the produced parts safely	Cut-resistant gloves; no single-person lifting >25 kg; soft separators for polished surfaces; identification tag on every batch	C / NYC ☐ ☐	

Duty E — Keeping the Machines in Good Working Condition

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
E1	Shut down the machine at the end of the shift	Shutdown sequence according to SOP (laser: LaserOFF → cooling → gas → power); 0 shortcut steps	C / NYC ☐ ☐	
E2	Clean the machine and the work area	Slats free of slag; Slug Container empty; aisles ≥1 meter; 5S fully applied	C / NYC ☐ ☐	
E3	Replace consumables within the operator's authority	LOTO applied before replacement; Nozzle replaced and centering completed; replacement recorded in the maintenance log	C / NYC ☐ ☐	
E4	Check fluid levels at the end of the shift	Checking all lubrication points and hydraulic oil; recording the results; informing the supervisor when low	C / NYC ☐ ☐	
E5	Perform nitrogen generator maintenance checks	Reading the tank pressure; checking the filter condition; recording the readings; informing the supervisor of any deviation	C / NYC ☐ ☐	

Duty F — Completing Production Documentation

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
F1	Record machine log entries	0 empty fields; operating hours recorded from the HMI; signature at the start and end	C / NYC ☐ ☐	



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F2	Fill in the production report	Good + rejected quantities recorded; rejection rate calculated; submitted to the supervisor before leaving the shift	C / NYC ☐ ☐	
F3	Document the quality control log	Actual measurements recorded against nominal; Pass/Fail decision for each dimension; non-conforming parts — Non-Conforming Parts isolated and documented	C / NYC ☐ ☐	
F4	Fill in the maintenance log	Every maintenance task documented as soon as completed; replaced consumables recorded by type and reason for replacement	C / NYC ☐ ☐	
F5	Report machine faults to the supervisor	Complete written report: Alarm Code + description + time + action taken; submitted to the supervisor without delay	C / NYC ☐ ☐	
F6	Carry out the shift handover to the next operator	Handover sheet complete 15 minutes before the end; in-person handover in front of the machine; receipt signature	C / NYC ☐ ☐	

Cross-cutting Competencies — G: Communication · H: Professional Attributes · I: Workplace Order

Reference	Observation Point	Success Criterion / Technical Requirements	Observed ✓	Remarks
G1	Reading the technical drawing and SOP in English	Extracting critical dimensions, tolerances and warnings without errors; referring to the SOP before new jobs	C / NYC ☐ ☐	
G2	Reading work orders and internal notices	Reading the work order in full before starting; identifying special requirements; 0 bypassing of clear instructions	C / NYC ☐ ☐	
G3	Verbal communication with the team and supervisors	Clear and organized reporting of problems; confirming receipt of instructions; no reliance on signs in critical matters	C / NYC ☐ ☐	
G4	Writing records and reports in Arabic and English	Correct English terms; clear figures; fault description understandable without additional explanation	C / NYC ☐ ☐	



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H1	Working independently without continuous supervision	Carrying out a complete work cycle without requesting guidance at every step; referring to the SOP when in doubt	C / NYC ☐ ☐	
H2	Cooperating within the production team	Offering help to colleagues when needed; accepting constructive criticism positively; attending the meeting on time	C / NYC ☐ ☐	
H3	Maintaining quality and safety under production pressure	No shortcutting of inspections under pressure; stopping production when a defect is discovered regardless of the time	C / NYC ☐ ☐	
H4	Exercising personal judgment within the authority	Correct distinction between decisions within the authority and those requiring escalation; documenting every independent decision	C / NYC ☐ ☐	

H5	Adapting to different machines and jobs	Reading the machine's specific SOP when moving to it; informing the supervisor honestly of his actual level of experience	C / NYC ☐ ☐	
H6	Taking the initiative in quality and safety matters	Stopping the machine immediately at any hazard or quality defect; isolating suspect parts; reporting Near Miss	C / NYC ☐ ☐	
I1	Applying 5S principles in the work area	Sort / Set / Shine applied continuously; aisles ≥ 1 meter; 0 accumulation of waste during operation	C / NYC ☐ ☐	
I2	Storing tools, gauges and documents in their places	Returning the caliper and gauges to the box immediately after use; SOP in its place; 0 missing tools	C / NYC ☐ ☐	
I3	Keeping PPE in good condition throughout the shift	PPE inspected at the start of the shift; immediate replacement when damaged; no removal of glasses or gloves during operation	C / NYC ☐ ☐	
I4	Maintaining appropriate personal hygiene	Clean and tidy overall; hair tied; no accessories; washing hands after handling fluids	C / NYC ☐ ☐	
Trainee Name and Signature		Assessor Name and Signature	Assessment Date	Final Decision
				☐ Competent / Not Yet Competent ☐



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Annex B — Work-Based Learning (WBL) Evidence Plan

Instructions: the trainee collects WBL evidence in a documented file. Each activity requires the supervisor's signature. The assessor reviews the file during the final assessment. Total WBL hours required: **270 hours**.

Duty	WBL Activity	Hours	Required Evidence	Supervisor Signature
A	Applying safety procedures — safety walkthrough + E-Stop test + fire extinguishing drill	20	PPE photos × 3 machines + E-Stop map + fire drill certificate	
B	Completing daily checklists for 5 different machines × 5 days	30	25 signed checklists + machine operation log	
C	Setting up ≥3 jobs on ≥3 different machines independently	60	Set-up records + Dry Run photos + supervisor's approval before production	
D	First-piece inspection for ≥8 different jobs + handling ≥2 cases of non-conforming parts — Non-Conforming Parts	50	8 completed First Piece Inspection records + report on 2 correction cases	
E	Machine cleaning + replacing ≥3 Nozzle + fluid checks × 5 days	40	Daily maintenance records + photos Nozzle before/after + fluid readings	
F	Completing 3 complete shift records daily × 5 shifts + 2 shift handovers	40	15 complete shift records (Machine Log + Production Report + QC) + 2 signed handover sheets	
G·H·I	Supervisor's field observation report on the cross-cutting competencies	30	Supervisor's field observation form completed × 3 different shifts	
Total		270		

Supervisor verification: signature/date on each evidence item; remarks on any rework; informing the assessor when the WBL file is complete.

Annex C — Theory Test Question Bank (10 questions per group of duties)

Theory tests are in multiple-choice format (4 options — closed book). Pass mark: ≥8/10 (80%) for each group of duties.

Sample Questions — Duties A and B (Safety and Preparation)

Competency-Based Education Curriculum Developer: Dalia Sh. Ghanem
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#	Question	Options	Answer
1	What is the correct type of fire extinguisher to use when a fire breaks out in the laser machine?	a) Water · b) CO ₂ · c) Foam · d) Sand	b
2	When an alert appears on the HMI screen before start-up, what should the operator do?	a) Ignore it if the program is running · b) Handle it according to the SOP before production · c) Restart the machine immediately · d) Inform maintenance only	b
3	What is the purpose of the LOTO procedure before replacing the laser nozzle (Nozzle)?	a) Save electricity · b) Prevent the machine from operating while it is being worked on · c) Reset the program · d) Check the oil level	b
4	What is the minimum aisle width in the production area according to safety standards?	a) 0.5 meter · b) 0.8 meter · c) 1.0 meter · d) 1.5 meter	c
5	What is the first step that must be carried out before starting production on any machine in the factory?	a) Loading the program · b) Completing and signing the daily checklist · c) Changing consumables · d) Production test	b

Sample Questions — Duties C and D (Set-up and Quality)

#	Question	Options	Answer
1	What is the permissible tolerance for the bend angle on the bending machine (Press Brake) according to NTN standards?	a) $\pm 1^\circ$ · b) $\pm 0.5^\circ$ · c) $\pm 2^\circ$ · d) $\pm 0.1^\circ$	b
2	What should the operator do when the first-piece inspection fails?	a) Continue production and monitor the next parts · b) Stop production, identify the cause and correct before continuing · c) Inform the customer · d) Replace the machine	b
3	What is the permissible tolerance for laser cutting dimensions?	a) ± 1.0 mm · b) ± 0.5 mm · c) $\pm 0.1-0.3$ mm · d) ± 0.05 mm	c



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4	What is the main purpose of performing a Dry Run before production?	a) Testing the program speed · b) Verifying the tool paths and the absence of conflicts without actual cutting · c) Warming up the machine · d) Testing the material quality	b
5	What is the permissible tolerance for the V-groove depth at three measurement points?	a) ± 0.5 mm · b) ± 0.3 mm · c) ± 0.1 mm · d) ± 1.0 mm	c

Sample Questions — Duties E and F (Maintenance and Documentation)

#	Question	Options	Answer
1	How many mandatory records must be completed for each job/shift at NTN?	a) 1 · b) 2 · c) 3 · d) 4	c
2	What is the correct sequence for shutting down the CO ₂ laser machine at the end of the shift?	a) Gas → Cooling → Laser → Power · b) Laser OFF → Cooling → Gas → Power · c) Power → Gas → Laser d) Cooling → Power only	b
3	What is the purpose of carrying out the shift handover (Shift Handover) face to face in front of the machine?	a) Saving time · b) Proving attendance · c) Ensuring the complete transfer of information and verification of the machine condition · d) Pleasing the supervisor	c
4	What is the best way to report a machine fault according to NTN standards?	a) Verbal reporting only · b) Written reporting with a completed fault report · c) Waiting until the end of the shift · d) Informing a team colleague only	b
5	What does an NYC decision mean in the quality control log?	a) The part is excellent · b) The part needs repainting · c) The part did not meet the quality standards and needs handling · d) The part is optional	c

Sample Questions — Cross-cutting Competencies G · H · I



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#	Question	Options	Answer
1	What are the five 5S principles?	a) Sort, Set, Shine, Standardize, Sustain · b) Safe, Secure, Sort, Store, Sign · c) Sort, Store, Shine, Signal, Sustain · d) Sort, Set, Safe, Signal, Store	a
2	What should the operator do when faced with a job on a machine he has not operated for a long time?	a) Starting directly from memory · b) Asking a colleague · c) Requesting a Briefing from the supervisor and reading the appropriate SOP · d) Trying by intuition	c
3	What is the minimum aisle width in the machine area according to 5S and safety principles?	a) 0.5 m · b) 0.8 m · c) 1.0 m · d) 1.5 m	c
4	What is the correct attitude when the operator's idea is rejected in the team meeting?	a) Stop participating in meetings · b) Accept the team's decision positively and work accordingly · c) Apply his idea individually · d) File an immediate complaint	b
5	Why is reporting near misses (Near Miss) important?	a) Because it is only legally mandatory · b) Because it prevents future accidents by addressing hazards before they turn into accidents · c) Because it increases the operator's income · d) It is not important if no damage occurred	b