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Technical Interview Guide

Authorised Training Body (ATB) identification:

DATE AND PLACE:

After the Portfolio analysis, a technical interview is conducted with focus on the key actions/themes addressed in each Unit. To be approved in the interview the candidate has to score at least 50% in each Competence Unit.

ACTIONS	QUESTION	TYPE OF ANSWER	SCORING	WEIGHTING	NEXT STEPS
Competence unit 2 - Welding and Cutting Processes					
2.3 - Apply basic knowledge of TIG Welding with solid filler material (wire/rod) (141) Fundamentals, equipment, applications, main variables, safety and specific problems	<p>List 5 common applications for TIG welding. What are the arc starting methods suitable for this process? What are the welding parameters a welder can modify in a TIG Welding with solid filler material (wire/rod) (141) equipment?</p> <p>Give 3 examples of welding consumables used in TIG Welding with solid filler material (wire/rod) (141).</p> <p>What are the potential hazards when welding with TIG Welding with solid filler material (wire/rod) (141) ? What methods exist for safe handling and working?</p> <p>What are the common applications for each type of welding current and polarity? Give examples of the adequate electrode composition for each of the discussed materials and applications.</p> <p>Which aspects should be considered when preparing a joint for welding with the TIG Welding with solid filler material (wire/rod) (141) process? What problems can occur when welding with TIG, and how can they be addressed?</p>			1	
2.4.1 - Apply basic knowledge of the MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) fundamentals, including equipment, applications, main variables, safety and common problems.	<p>What are the principles of MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135), including the various metal transfer modes? Give examples of different applications for the MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) process. What are the welding parameters a welder can modify in a MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) equipment?</p> <p>Consider two applications for MIG welding with solid wire electrode (131) and MAG welding with solid wire electrode (135): two low-alloy steel plates, having 6 mm, butt welded, and two aluminium sheets, having 2 mm, also butt welded. What are the suitable shielding gases and filler materials for the two MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) applications?</p> <p>Which aspects should be considered when preparing a joint for welding with the MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) process? What problems can occur when welding with MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) and how can they be addressed? Is there a difference between MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) in the shop and outside? What precautions should be taken?</p> <p>What are the potential hazards when welding with MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135)? What methods exist for safe handling and working?</p> <p>What are the equipment and accessories for MIG welding with solid wire electrode (131)/MAG welding with solid wire electrode (135) ? What are their functions?</p>	Correct		4	
2.4.2 Apply basic knowledge of the MAG Welding with flux cored electrode (136) fundamentals, including equipment, applications, main variables, safety and common problems.	<p>Which are the main elements of a typical MAG welding with flux cored electrode (136) equipment? Describe briefly the function of each one.</p> <p>What are the consumables used in MAG welding with flux cored electrode (136)? Give examples.</p> <p>What are the MAG welding with flux cored electrode (136) process operating principles? Identify common applications for the MAG welding with flux cored electrode (136) process.</p> <p>Which are the most common imperfections when welding with MAG welding with flux cored electrode (136)?</p> <p>Consider two scenarios where MAG welding with flux cored electrode (136) will be used: welding in the PA position and welding in the PF position. Can the filler material be the same for both applications? Discuss.</p>			3	
	<p>What are the main elements of a typical Manual Metal Arc Welding (111) equipment? Describe briefly the function of each one.</p>				

2.5 Apply basic knowledge of the Manual Metal Arc Welding (111) fundamentals, including equipment, applications, safety and common problems.	<p>2 What are the main precautions a welder should have when handling a basic electrodes?</p> <p>3 What are the principles behind Manual Metal Arc Welding (111)? What are the variables that a welder can control when welding with Manual Metal Arc Welding (111)?</p> <p>4 What are the electrode coatings used in Manual Metal Arc Welding (111)? Identify applications for each electrode type, and the influence of the coating in the weld metal properties.</p> <p>5 Which are the most common imperfections when welding with Manual Metal Arc Welding (111)?</p>	4
2.6 Apply basic knowledge of the Submerged Arc Welding (12) fundamentals, including equipment, applications, main variables, safety and common problems.	<p>1 Which are the most common electrodes and fluxes used in Submerged Arc Welding (12)?</p> <p>2 Is Submerged Arc Welding (12) a manual welding process? Discuss.</p> <p>3 What are the principles behind Submerged Arc Welding (12) welding? Give examples of applications for the Submerged Arc Welding (12) welding process. What are the welding parameters a welder can modify in a Submerged Arc Welding (12) welding equipment?</p> <p>4 Give examples of methods used for seam tracking when welding with Submerged Arc Welding (12).</p> <p>5 What is the influence of increasing the welding current in the weld bead when joining two steel plates using Submerged Arc Welding (12)?</p>	3
2.7.1 Apply basic knowledge of Plasma; Electron Beam; Laser, their application, main variables and most common problems.	<p>1 What are the advantages of Electron Beam Welding when compared to Laser Beam Welding?</p> <p>2 What are the main elements of an Laser Beam Welding equipment?</p> <p>3 What are the main elements of an Electron Beam Welding equipment?</p> <p>4 What are the main differences between Plasma and TIG welding?</p> <p>5 Give examples of Plasma, Electron Beam and Laser Welding applications.</p>	1
2.7.2 Apply basic knowledge of the fundamentals and the field of application of electroslag welding (72), friction welding (42); explosion welding (441); diffusion welding (45); aluminothermic welding (71); high-frequency resistance welding; cold pressure welding (48). Including equipment, main variables and most common problems.	<p>1 Give examples of applications of aluminothermic welding (71)?</p> <p>2 Is friction welding (42) a fusion welding process? Discuss the main working principles behind friction welding process.</p> <p>3 Explain the working principles of the electroslag welding (72) process.</p> <p>4 What is the difference between linear friction welding and friction stir welding (43)?</p> <p>5 Give an example of an application for ultrasonic welding (41).</p>	3
2.8 Apply basic knowledge of the basic principles and the fields of application of the most common cutting and edge preparation processes used in weld construction, including equipment, main variables, safety and common problems.	<p>1 What are the working principles of water jet cutting?</p> <p>2 What are the main parameters to control in Laser cutting? What are the consumables used?</p> <p>3 What are the advantages of water jet cutting compared to mechanical cutting? Discuss the economic differences between cutting a 12 mm steel plate with oxy-fuel or mechanical cutting methods.</p> <p>4</p> <p>5 What are the main parameters to control in oxy-fuel cutting?</p>	3
Unit 2 Σ candidate score		22
Competence unit 4- Materials, Their Weldability and Application of Structural and High Strength Steels		
4.1 Apply basic knowledge about the metallurgical processes occurring in welding of iron carbon alloys.	<p>1 What are the metallurgical phases that can be found in a Fe-C alloy?</p> <p>2 How does the carbon content influences the alloy hardness?</p> <p>3 What are the most common heat treatments applied to this type of alloys?</p> <p>4 What are the most common carbide forming elements found in these alloys?</p> <p>5 What is the metallurgical phase occurring when austenite is rapidly cooled?</p>	1,5
4.4 Apply basic knowledge of structural unalloyed steels and the effects of welding processes on the weld joint.	<p>1 What are the most commonly used welding processes when joining structural steels?</p> <p>2 What are the most important structural properties of unalloyed steels?</p> <p>3 What are the most commonly used filler materials to weld structural steels?</p> <p>4 What are the standards addressing filler materials to weld structural steels?</p> <p>5 What are the grades for classification of structural steels?</p>	1,5
4.5 Apply basic knowledge about the effects of micro-alloying elements on structure, mechanical properties and weldability with reference to fine-grained and high strength steels	<p>1 What is the relation between grain size and the yield strength of a material?</p> <p>2 What is the influence of the carbon content in the weldability of a high strength steels?</p> <p>3 What are the most commonly used welding processes when joining high strength steels? What are the advantages of performing a post weld heat treatment to a high strength steels?</p> <p>4</p> <p>5 What are the most common defects found when welding high strength steels?</p>	1,5
	1 What are the main differences between high strength steels and structural steels?	

4.6 Apply basic knowledge about welding problems dealing with the fundamental aspects of the application of structural and high strength steels, with particular reference to physical, chemical and mechanical characteristics	<ol style="list-style-type: none"> What are the most common applications of high strength steels? What are the most common applications of structural steels? What are the main variables to consider when choosing between a high strength steels and a structural steel? Consider a given application where safety is a critical issue. Is the high strength steels the best option? Explain. 	1,5
4.8 Apply basic knowledge on fundamentals of the various types of stainless and heat resistance steels and their weldability including the filler material choice.	<ol style="list-style-type: none"> Which types of stainless steels do you know? What are the main differences between different classes of stainless steels? Please describe the heat treatments performed to stainless steels, if any. What are the most commonly used post weld heat treatments used in a stainless steel? What should be considered when choosing a filler material to weld stainless steels? 	5
4.9 Apply basic knowledge of the metallurgy, the range of application and the weldability of aluminium and aluminium alloys.	<ol style="list-style-type: none"> What is the difference between aluminium and an aluminium alloy? Which one has better weldability: pure aluminium or aluminium alloy? What are the most commonly used welding processes to join aluminium? What are the most common applications for aluminium alloys? What considerations should be made when choosing an electrode to weld aluminium plates? 	2

Validation

Unit 4 Σ candidate score 13

Competence unit 5- Construction and design

5.1 Apply basic knowledge of the design of weld details related to a given material, wall thickness, accessibility, loading, welding process, welding position, welding symbols, available equipment, tolerances.	<ol style="list-style-type: none"> Give examples of different joint types according to ISO 9692? Discuss the position of the throat dimension and bead length dimensions in welding symbology. Draw a representation for a single-V butt welding joint, to be welded with the Submerged Arc Welding (12) process, having a removable backing plate. The bead is 500 mm long. Draw a representation for a single bevel butt welding joint, to be welded with the Manual Metal Arc Welding (111) process in the PC position and having a backing weld. The weld cap should be flat-finished. The bead is 80 mm long. Consider a fillet weld joint, and the welding symbols and details. Draw the welding joint representation according to the System A of EN ISO 2553. 	5
5.2 Apply basic knowledge of identification of joints and relevant details of welded metallic structures.	<ol style="list-style-type: none"> Between a butt joint and an overlap joint, which one resist better to a tensile load? What are the advantages of having a double V butt weld compared to a single V butt weld in a component where low deformations are one of the acceptability criteria? Discuss the major load types associated with a cable, a bar and a beam. Consider the lamellar tearing problem: explain how it can occur, and give one example of a bad and good joint design. Compare a bolted joint to a welded joint, by giving examples of advantages and disadvantages of each one. 	4
5.3 Apply basic knowledge of fatigue and the influence of notches and their avoidance.	<ol style="list-style-type: none"> Give examples of a welded structure that can suffer from fatigue problems due to its design, and give suggestions to improve its design. How is the life of a component influenced by the presence of a notch? Give examples of dynamically loaded components. Identify mechanical methods to improve the fatigue life of a welded component. Identify other methods to improve the fatigue life of a welded component. 	2

Unit 5 Σ candidate score 11

Competence unit 6- General Features for Quality Management

6.1 Apply basic knowledge of the main factors affecting welding stress and distortion in welded fabrications and how these effects can be estimated and minimised.	<ol style="list-style-type: none"> What are the main factors that influence distortion in a welded construction? Explain how the residual stresses can be critical to the component performance. How does the thickness of a welded material influence its residual stress field? Describe ways to minimize distortion in a welded construction. Increasing the heat input of the weld will increase or decrease the residual stresses associated to the weld? 	4
6.2 Apply basic knowledge of the need for, and function of, auxiliary equipment, jigs and fixtures from the viewpoint of quality, economics and the environment.	<ol style="list-style-type: none"> Enumerate 3 reasons for using jigs or fixtures when welding? What are the most common advantages of using fixtures and positioners? What is the advantage of using jigs and fixtures from an economical point of view? What should be considered when tack welding? 	2

	What is the most common type of fixture used when welding tube to tube? And why is it used for?	5	
6.3 Apply basic knowledge of the health and safety hazards associated with welding and fabrication processes, including techniques to minimise them.	<ol style="list-style-type: none"> 1 What are the main health hazards associated with electricity? 2 What are the main health hazards associated with radiation? 3 What are the main protective equipment that should be used by every arc welder? 4 Why an oxygen enriched environment hazardous when welding? 5 What are the main health and safety hazards associated with noise? 	2	
6.5 Apply basic knowledge of the economics of welding operations applied to welded fabrications.	<ol style="list-style-type: none"> 1 What are the main elements that influence the cost of a welded fabrication? 2 How does the automation of a welding process might influence its productivity? 3 What would be the different, cost wise, from a manual to an automatic welding process? 4 Enumerate three factors that influence cost in a welding process. 5 How does the automation of a welding process might influence its cost? 	1	
6.6 Apply basic knowledge of the problems of repair welding both for in manufacture and in-service situations.	<ol style="list-style-type: none"> 1 What are the most common problems related to repair welding? 2 What are the main hazards when welding in-service parts? 3 What are the main procedures to apply when repair welding? 4 What are the qualifications that an operator has to have in order to perform repair welds? 5 What are the most common NDTs used for repair welding? 	2	
Unit 6 Σ candidate score			11
Competence unit 7- Quality Assurance/Quality Control on Welded Joints			
7.1 Apply basic knowledge of principles of quality assurance and quality Control, and recognise the related standards and their application to welded fabrication as a special process.	<ol style="list-style-type: none"> 1 What are the main differences between quality assurance and quality control? 2 Which factors related to the welding equipment might influence the quality of a welded construction? 3 Which factors related to welding personnel might influence the quality of a welded construction. 4 What are the main responsibilities of a welding practitioner in the fabrication industry? 5 What is the main subject addressed in ISO 9000 standards? 	3	
requirements and function of Quality Control during manufacture, the standards related to brazing and welding operators and brazing and welding procedure qualification including joint traceability methods, the need for calibration, and monitoring of process parameters.	<ol style="list-style-type: none"> 1 What is a WPS? Explain its purpose. 2 What are the advantages of a WPS in the quality of a welded fabrication? What are the main advantages of a welding operator qualification in the quality of a welded construction? 3 What are the most common standards used for the approval of welding procedures? 4 What are the most common standards used for the approval of welding procedures? 5 What are the main advantages of a WPQR in the quality of a welded construction? 	3	
Unit 7 Σ candidate score			6
Competence unit 8 Quality Assurance/Quality Control on Welded Joints			
8.3 Apply basic knowledge of the use of Non Destructive Testing as applied to welding fabrications.	<ol style="list-style-type: none"> 1 List three of the most common welding imperfections? What are their causes? 2 What are the main advantages of performing NDT, when compared with destructive testing, to welded fabrications? 3 Which are the standards addressing weld imperfections? 4 List three examples of NDT processes? 5 What are the main safety requirements when applying X-Ray NDT? 	3	
Unit 8 Σ candidate score			3
Total		0	Maximum 66