



Performance Based Objectives – Welding

Sub-Topic	PBO No.	Performance Based Objective
Weld Joint Design and Prep	WD-1	Demonstrate proper welding safety in the lab environment.
	WD-2	Interpret an industrial drawing with welding symbols.
	WD-3	Identify welding joints and welding positions.
	WD-4	Interpret welding terms.
	WD-5	Identify the correct welding code for a given weldment.
	WD-6	Demonstrate satisfactory knowledge of measuring tools used on weld and weldments.
	WD-7	Demonstrate satisfactory knowledge of hand tool safety.
	WD-8	Use hand tools properly.
	WD-9	Identify welding flaws.
	WD-10	Demonstrate proper set-up and use of an Oxy/Fuel cutting outfit.
	WD-11	Demonstrate proper set-up and use of an Oxy/Fuel line cutter.
	WD-12	Demonstrate proper set-up and use of a Plasma Arc Cutter.
	WD-13	Demonstrate proper safety and use of power tools.
	WD-14	Demonstrate fillet and groove joint assembly.
Shielded Metal Arc Welding	WD-15	Demonstrate proper safety practices for Shielded Metal Arc Welding.
	WD-16	Apply the proper welding machine settings for a given competency using the Shielded Metal Arc Welding process.
	WD-17	Identify and explain various welding electrodes used in the Shielded Metal Arc Welding process.
	WD-18	Demonstrate proper welding technique in flat position using the Shielded Metal Arc Welding process.
	WD-19	Demonstrate proper welding technique in horizontal position using the Shielded Metal Arc Welding process.
	WD-20	Perform multiple welds using proper welding technique for a given weldment.
	WD-21	Demonstrate proper safety practices for Shielded Metal Arc Welding.
	WD-22	Apply the proper welding machine settings for a given competency using the Shielded Metal Arc Welding process.
	WD-23	Demonstrate proper welding technique in vertical position using the Shielded Metal Arc Welding process.
WD-27	Demonstrate proper welding technique in overhead position using the Shielded Metal Arc Welding process.	
Gas Tungsten Arc Welding	WD-29	Demonstrate proper safety practices for the Gas Tungsten Arc Welding process.
	WD-30	Prepare the Gas Tungsten Arc Welding machine for a given metal type and thickness.
	WD-31	Select the proper filler metal for a given weldment using the Gas Tungsten Arc Welding process.
	WD-32	Demonstrate the proper welding technique in flat position with steel.





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Sub-Topic	PBO No.	Performance Based Objective
	WD-33	Demonstrate the proper welding technique in horizontal position with steel.
	WD-34	Demonstrate the proper welding technique in flat position with stainless steel.
	WD-35	Demonstrate the proper welding technique in horizontal position with stainless steel.
	WD-36	Perform welds using proper preparation and welding technique for a given weldment.
	WD-37	Demonstrate the proper welding technique in vertical position with steel.
	WD-38	Demonstrate the proper welding technique in vertical position with stainless steel.
	WD-39	Perform welds using proper preparation and welding technique for a given weldment.
	WD-40	Demonstrate the proper welding technique in flat position with aluminum.
	WD-41	Demonstrate the proper welding technique in horizontal position with aluminum.
	WD-42	Demonstrate the proper welding technique in vertical position with aluminum.
	WD-43	Perform welds using proper preparation and welding technique for a given weldment.
Gas Metal Arc Welding	WD-44	Demonstrate proper safety practices for the Gas Metal Arc Welding process.
	WD-45	Prepare the Gas Metal Arc Welding machine for a given metal type and thickness.
	WD-46	Select the proper filler metal for a given weldment using the Gas Metal Arc Welding process.
	WD-47	Demonstrate the proper welding technique in flat position.
	WD-48	Demonstrate the proper welding technique in horizontal position.
	WD-49	Perform welds using proper preparation and welding technique for a given weldment.
	WD-50	Demonstrate the proper welding technique in vertical position.
	WD-51	Demonstrate the proper welding technique in overhead position.
WD-52	Perform welds using proper preparation and welding technique for a given weldment.	
Weld Metallurgy	WD-53	Describe different types of ferrous metal.
	WD-54	Describe the crystal structure of carbon steels.
	WD-55	Describe the effects of heat treating on carbon steel.
	WD-56	Explain the effects of heating and cooling of steel using the Iron/Carbon phase diagram.
	WD-57	Describe different types of non-ferrous metals.





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	WD-58	Identify and explain phase diagrams.
	WD-59	Explain the effects of alloying on non-ferrous metals.
	WD-60	Explain the effects of heat treating of non-ferrous metals.
	WD-61	Identify and explain bend and break tests as destructive weld tests.
	WD-62	Identify and explain various nondestructive weld tests.
	WD-63	Demonstrate destructive weld test procedures.
	WD-64	Demonstrate nondestructive weld test procedures.
	WD-65	Evaluate destructive and nondestructive weld test results.
	WD-66	Explain the heat affected zone in a welded joint.
Pipe Welding	WD-67	Demonstrate proper safety practices for pipe welding.
	WD-68	Identify and explain the 2G and 5G pipe welding positions.
	WD-69	Demonstrate the proper alignment techniques for welded pipe joints.
	WD-70	Demonstrate proper welding technique for an open root pass on plate.
	WD-71	Perform a weld using the proper techniques for the 2G and 5G positions using the Shielded Metal Arc Welding process.
	WD-72	Perform a weld using the proper techniques for the 2G and 5G positions using the Gas Tungsten Arc Welding process.
	WD-73	Demonstrate proper safety practices for pipe welding.
	WD-74	Identify and explain the 6G pipe welding positions.
	WD-75	Demonstrate the proper alignment techniques for welded pipe joints.
	WD-76	Perform a weld using the proper techniques for the 6G positions using the Shielded Metal Arc Welding process.
	WD-77	Perform a weld using the proper techniques for the 6G positions using the Gas Tungsten Arc Welding process.
	WD-79	Identify and explain a socket pipe joint.
	WD-80	Identify and explain a flanged pipe joint.
	WD-81	Demonstrate the proper alignment techniques for the socket and flanged pipe joints.
WD-82	Perform a weld using the proper techniques for the socket and flanged pipe joint using the Shielded Metal Arc Welding process.	
Tool and Die Welding	WD-83	Demonstrate proper safety practices for tool and die welding.
	WD-84	Identify and explain tool steels.
	WD-85	Identify the proper filler metals used in the repair of tools and dies.
	WD-86	Explain the proper preparation techniques for the repair of a tool or a die.
	WD-87	Explain the proper welding procedures for the repair of a tool or die.
	WD-89	Perform a weld using the proper techniques for the repair of a tool or die using the Gas Tungsten Arc Welding process.
	WD-90	Demonstrate the proper preparation techniques for the repair of a tool or die.





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Sub-Topic	PBO No.	Performance Based Objective
	WD-91	Perform a weld using the proper techniques for the repair of a tool or die using the Shielded Metal Arc Welding process.
	WD-92	Demonstrate the proper technique for removing a broken bolt.
Shielded Metal Arc Welding - AWS Cert	WD-93	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-94	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
	WD-95	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.
	WD-96	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-97	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
	WD-98	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.
Gas Tungsten Arc Welding AWS Cert	WD-99	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-100	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
	WD-101	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.
	WD-102	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-103	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
Gas Metal Arc Welding AWS Cert	WD-104	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.
	WD-105	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-106	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
	WD-107	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.
	WD-108	Demonstrate assembly of a test weld following the American Welding Society D1.1 code.
	WD-109	Perform a weld using the proper technique to successfully complete a weld following the American Welding Society D1.1 code.
	WD-110	Perform the proper testing method to successfully complete a weld following the American Welding Society D1.1 code.





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Welding Fabrication Project	WD-111	Devise a product to be produced in the welding lab.
	WD-112	Design the product to be made.
	WD-113	Formulate a plan to be used to move this product to the fabrication stage.
	WD-114	Determine materials used and material costs for the project.
	WD-115	Prepare materials for the project.
	WD-116	Perform the needed joining methods for the project.
	WD-117	Prepare components to be used on the final project.
	WD-118	Examine and assess any flaws that need to be addressed before final assembly.
	WD-119	Construct the fabricated parts and components to produce a final product.

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