



Nebraska Career Pathways Project

SKILLED AND TECHNICAL SCIENCES

***Manufacturing Cluster Technical Knowledge and Skills
High School/College WELDING Student Checklist***

				STUDENT:	DATE:
2	1	N	CODE	N = Not Exposed to Performance Element, 1 = Progressing with Performance Element, 2 = Mastery of Performance Element	
2	1	N	CODE	Understand and practice welding safety (MAN.WS)	
			MAN.WS.1	<i>Demonstrate personal safety</i>	
			MAN.WS.2	<i>Demonstrate general shop safety.</i>	
			MAN.WS.3	<i>Demonstrate gas, electrical and chemical safety.</i>	
			MAN.WS.4	<i>Demonstrate knowledge of proper actions to be taken in an emergency.</i>	
2	1	N	CODE	Demonstrate ability to make accurate welding measurements (MAN.WM)	
			MAN.WM.1	<i>Identify basic metal-working tools used in measuring.</i>	
			MAN.WM.2	<i>Use visual measuring tools to accuracy of 1/32 of an inch.</i>	
			MAN.WM.3	<i>Employ the components of a combination square set.</i>	
			MAN.WM.4	<i>Use layout and marking tools as required.</i>	
			MAN.WM.5	<i>Determine wire feed speed as indicated on drawing.</i>	
2	1	N	CODE	Demonstrate ability to read and use blueprints (MAN.WBR)	
			MAN.WBR.1	<i>Use information found in the information block of the drawing.</i>	
			MAN.WBR.2	<i>Read and understand three-dimensional drawings.</i>	
			MAN.WBR.3	<i>Identify the basic views used in blueprints including assembly, detail and fit-up drawings.</i>	
			MAN.WBR.4	<i>Identify common types of lines, abbreviations and symbols in accordance with national drawing standards—ANSI.</i>	
			MAN.WBR.5	<i>Identify basic welding symbols and components of a symbol (such as arrow, reference line, tail, size or length) in accordance with the national welding symbols standards—AWS.</i>	

2	1	N	CODE	Demonstrate ability in shielded metal arc welding (MAN.SMAW)
			MAN.SMAW.1	<i>Demonstrate safety procedures for SMAW.</i>
			MAN.SMAW.2	<i>Demonstrate ability to correctly set up SMAW power sources, related welding equipment and do basic process and equipment troubleshooting</i>
			MAN.SMAW.3	<i>Correctly identify base metal prior to welding.</i>
			MAN.SMAW.4	<i>Set up and shut down equipment for welding of carbon steel and/or stainless steel.</i>
			MAN.SMAW.5	<i>Select correct type of filler metal size of electrode based on carbon steel and/or stainless steel plate (1/4-inch to 1/2-inch thickness).</i>
			MAN.SMAW.6	<i>Prepare carbon steel and/or stainless steel for welding.</i>
			MAN.SMAW.7	<i>Start, stop and restart stringer beads on carbon steel and/or stainless steel in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.8	<i>Weld a pad with a multiple pass weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.9	<i>Weld a lap joint with a single pass, fillet weld on carbon steel and/or stainless steel sheet/plate in flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.10	<i>Weld a lap joint with a multiple pass, fillet weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.11	<i>Weld a T-joint with a single-pass, fillet weld on carbon steel and/or stainless steel sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.12	<i>Weld a T-joint with a multiple-pass, fillet weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.13	<i>Weld a butt joint with a single-pass, square groove weld on carbon steel and/or stainless steel sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.14	<i>Weld a butt joint with a partial joint penetration, single pass, double V-groove weld on carbon steel and stainless steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.15	<i>Weld a butt joint with a multiple pass, Vgroove weld on carbon steel and stainless steel plate in the flat, horizontal, vertical up and down and overhead positions</i>
			MAN.SMAW.16	<i>Weld a butt joint with complete joint penetration, multiple pass, double groove weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.SMAW.17	<i>Weld 2 to 8 inch diameter, schedules 40 to 80 carbon steel and/or stainless steel pipe, single/multiple pass V-groove weld in the 2G, 5G and 6G positions.</i>
			MAN.SMAW.18	<i>Lay out, weld, cut and prepare coupons for evaluation.</i>
			MAN.SMAW.19	<i>Test prepared coupon.</i>
2	1	N	CODE	Demonstrate ability in gas metal arc welding (MAN.GMAW)
			MAN.GMAW.1	<i>Demonstrate correct safety procedures for GMAW.</i>

			MAN.GMAW.2	<i>Demonstrate ability to correctly set up GMAW power sources, related welding equipment and do basic process and equipment troubleshooting.</i>
			MAN.GMAW.3	<i>Correctly identify base metal prior to welding.</i>
			MAN.GMAW.5	<i>Select correct type of filler metal size of electrode, type of shielding gas, wire feed speed and voltage based on carbon steel, stainless steel and/or aluminum sheet and/ or plate (1/16-inch to 3/8-inch thickness).</i>
			MAN.GMAW.6	<i>Prepare the carbon steel, stainless steel and/or aluminum for welding.</i>
			MAN.GMAW.7	<i>Start, stop and restart stringer beads on carbon steel, stainless steel and/or aluminum steel sheet/plate in the flat, horizontal, vertical up and down, and overhead positions.</i>
			MAN.GMAW.8	<i>Weld a pad with a multiple-pass weld on carbon steel, stainless steel and/or aluminum sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.9	<i>Weld a lap joint with a single-pass, fillet weld on carbon steel, stainless steel and/or aluminum sheet/plate in flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.10	<i>Weld a lap joint with a multiple-pass, fillet weld on carbon steel, stainless steel and/or aluminum plate in the flat, horizontal, vertical up and down and overhead positions. Interrupt root pass at mid point and restart arc.</i>
			MAN.GMAW.11	<i>Weld a T-joint with a single-pass, fillet weld on carbon steel, stainless steel and aluminum sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.12	<i>Weld a T-joint with a multiple-pass, fillet weld on carbon steel, stainless steel and/or aluminum plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.13	<i>Weld a butt joint with a single-pass, square groove weld on carbon steel, stainless steel and/or aluminum sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.14	<i>Weld a butt joint with a partial joint penetration, single-pass, double V-groove weld on carbon steel, stainless steel and/or aluminum plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.15	<i>Weld a butt joint with a multiple-pass, Vgroove weld on carbon steel, stainless steel and aluminum plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GMAW.16	<i>Weld a butt joint with complete joint penetration, multiple-pass, double Vgroove weld on carbon steel, stainless steel and/or aluminum plate in the flat, horizontal, vertical up and down and overhead positions</i>
			MAN.GMAW.17	<i>Weld 2 to 8 inch diameter, schedule 40 to 80 carbon steel, stainless steel and aluminum pipe, single/multiple pass V-groove weld in the 2G, 5G and 6G positions.</i>
			MAN.GMAW.18	<i>Lay out, weld, cut and prepare coupons for evaluation.</i>
			MAN.GMAW.19	<i>Test prepared coupons</i>
2	1	N	CODE	Demonstrate ability in fluxed cored arc welding (MAN.FCAW)
			MAN.FCAW.1	<i>Demonstrate correct safety procedures for FCAW.</i>
			MAN.FCAW.2	<i>Demonstrate ability to correctly set up FCAW power sources, related welding equipment and do basic process and equipment troubleshooting.</i>
			MAN.FCAW.3	<i>Correctly identify base metal prior to welding.</i>
			MAN.FCAW.4	<i>Set up and shut down equipment for welding of carbon steel and/or stainless steel.</i>

			MAN.FCAW.5	Select correct type of filler metal, size of electrode, type of shielding gas (if needed), wire feed speed and voltage based upon carbon steel and/or stainless steel sheet and/or plate (1/16-inch to 3/8-inch thickness).
			MAN.FCAW.6	Prepare carbon steel and/or stainless steel for welding.
			MAN.FCAW.7	Start and stop and restart stringer beads on carbon steel and stainless steel sheet/plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.8	Weld a pad with a multiple-pass weld on carbon steel and/or stainless steel sheet/plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.9	Weld a lap joint with a single-pass, fillet weld on carbon steel and/or stainless steel sheet/plate in flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.10	Weld a lap joint with a multiple-pass, fillet weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and overhead positions. Stop and restart in middle of joint.
			MAN.FCAW.11	Weld a T-joint with a single-pass, fillet weld on carbon steel and/or stainless steel sheet/plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.12	Weld a T-joint with a multiple-pass, fillet weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.13	Weld a butt joint with a single-pass, square groove weld on carbon steel and/or stainless steel sheet/plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.14	Weld a butt joint with a partial joint penetration, single pass, double V-groove weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.15	Weld a butt joint with a multiple-pass, Vgroove weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.16	Weld a butt joint with complete joint penetration, multiple-pass, double Vgroove weld on carbon steel and/or stainless steel plate in the flat, horizontal, vertical up and overhead positions.
			MAN.FCAW.17	Weld 2 to 8 inch diameter, schedules 40 to 80 carbon steel and/or stainless steel pipe, single/multiple pass V-groove weld in the 2G, 5G and 6G positions.
			MAN.FCAW.18	Lay out, cut and prepare coupons for evaluation.
			MAN.FCAW.19	Test prepared coupons.
2	1	N	CODE	Demonstrate ability in gas tungsten arc welding (MAN.GTAW)
			MAN.GTAW.1	Demonstrate safety procedures for GTAW.
			MAN.GTAW.2	Demonstrate ability to correctly set up GTAW power sources, related welding equipment and do basic process and equipment troubleshooting.
			MAN.GTAW.3	Correctly identify base metal prior to welding.
			MAN.GTAW.4	Set up and shut down equipment for regular and pulsed welding of aluminum, stainless steel and/or carbon steel.
			MAN.GTAW.5	Select the correct size and type of tungsten and/or filler metal based on aluminum, stainless steel and/or carbon steel sheet and/or plate (1/16-inch to 1/4-inch thickness).

			MAN.GTAW.6	<i>Prepare aluminum, stainless steel and/or carbon steel for welding.</i>
			MAN.GTAW.7	<i>Start, stop and restart stringer beads on aluminum, stainless steel and/or carbon steel sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.8	<i>Weld a pad with multiple-pass weld on aluminum, stainless steel and/or carbon steel sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.9	<i>Weld a lap joint with a single-pass, fillet weld on aluminum, steel, stainless steel and/or carbon steel sheet/plate in flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.10	<i>Weld a lap joint with a multiple-pass, fillet weld on aluminum, stainless steel and/or carbon steel plate in the flat, horizontal vertical up and down and overhead positions.</i>
			MAN.GTAW.11	<i>Weld a T-joint with a single-pass fillet weld on aluminum, stainless steel and/or carbon steel sheet/ plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.12	<i>Weld a T-joint with a multiple-pass, fillet weld on aluminum, stainless steel and/or carbon steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.13	<i>Weld a butt joint with a single-pass, square groove weld on aluminum stainless steel and/or carbon steel sheet/plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.14	<i>Weld a butt joint with a partial joint penetration, single-pass, double V-groove weld on aluminum, stainless steel and/or carbon steel plate in the flat, horizontal vertical up and down and overhead positions.</i>
			MAN.GTAW.15	<i>Weld a butt joint with a multiple-pass, Vgroove weld on aluminum, stainless steel and/or carbon steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.16	<i>Weld a butt joint with complete joint penetration, multiple-pass, double Vgroove weld on aluminum, stainless steel and/or carbon steel plate in the flat, horizontal, vertical up and down and overhead positions.</i>
			MAN.GTAW.17	<i>Weld 2 to 8 inches diameter, schedules 40 to 80 aluminum, stainless steel and/or carbon steel pipe, single/multiple pass V-groove weld in the 2G, 5G and 6G positions.</i>
			MAN.GTAW.18	<i>Lay out, weld, cut and prepare coupons for evaluation.</i>
			MAN.GTAW.19	<i>Test prepared coupons.</i>
2	1	N	CODE	Demonstrate ability in oxygen fuel cutting (MAN.OFC)
			MAN.OFC.1	<i>Demonstrate safety procedures for OFC.</i>
			MAN.OFC.2	<i>Demonstrate ability to correctly set up the OAC equipment for cutting and do basic process troubleshooting.</i>
			MAN.OFC.3	<i>Correctly identify base metal prior to cutting.</i>
			MAN.OFC.4	<i>Set up and shut down equipment for cutting carbon steel plate.</i>
			MAN.OFC.5	<i>Select correct tip size and gas pressure for serving carbon steel plate (1/4-inch to 1/2- inch thickness).</i>
			MAN.OFC.6	<i>Prepare carbon steel for cutting.</i>
			MAN.OFC.7	<i>Cutting operations will be specified in drawings and procedure sheets provided to the contestants.</i>
			MAN.OFC.8	<i>Properly light, adjust the flame, and shut down the oxygen fuel equipment.</i>
			MAN.OFC.9	<i>Use a straight edge and soap stone laying out the prescribed pattern.</i>
			MAN.OFC.10	<i>Make a square cut on carbon steel in flat, horizontal, vertical and overhead positions.</i>

			MAN.OFC.11	<i>Make a bevel cut (45-degree angle) on carbon steel plate in the flat, horizontal, vertical and overhead positions.</i>
			MAN.OFC.12	<i>Pierce a hole on carbon steel in the flat, horizontal, vertical and overhead position.</i>
			MAN.OFC.13	<i>Make a pipe and tubing cut on carbon steel pipe in flat, horizontal, vertical and overhead positions.</i>
			MAN.OFC.14	<i>Make a gouge and groove cut on carbon steel in flat, horizontal, vertical, overhead positions.</i>
			MAN.OFC.15	<i>Lay out, weld, cut and prepare coupons for evaluation.</i>
			MAN.OFC.16	<i>Test prepared coupon.</i>
2	1	N	CODE	Demonstrate ability in plasma arc cutting (MAN.PAC)
			MAN.PAC.1	<i>Demonstrate safety procedures for PAC.</i>
			MAN.PAC.2	<i>Demonstrate ability to correctly set up the PAC power sources, related cutting equipment and do basic process and equipment troubleshooting.</i>
			MAN.PAC.3	<i>Correctly identify base metal prior to cutting.</i>
			MAN.PAC.4	<i>Set up and shut down equipment for cutting carbon steel, stainless steel and/or aluminum.</i>
			MAN.PAC.5	<i>Select correct cutting head and gas pressure for severing carbon steel, stainless steel and/or aluminum plate and/or sheet (1/16-inch to 1/4-inch thickness).</i>
			MAN.PAC.6	<i>Prepare carbon steel, stainless steel and/or aluminum for cutting.</i>
			MAN.PAC.7	<i>Cutting operations will be specified in drawings and procedure sheets provided to the contestants.</i>
			MAN.PAC.8	<i>Properly adjust and use the plasma arc equipment.</i>
			MAN.PAC.9	<i>Use a straight edge and soap stone laying out the prescribed pattern.</i>
			MAN.PAC.10	<i>Make a square cut on carbon steel, stainless steel and/or aluminum sheet/plate in flat, horizontal, vertical and overhead positions.</i>
			MAN.PAC.11	<i>Make a bevel cut (45-degree angle) on carbon steel, stainless steel and/or aluminum sheet/plate in the flat, horizontal, vertical and overhead positions.</i>
			MAN.PAC.12	<i>Pierce a hole on carbon steel, stainless steel and/or aluminum sheet/plate in the flat, horizontal, vertical and overhead position.</i>
			MAN.PAC.13	<i>Make a pipe and tubing cut on carbon steel, stainless steel and/or aluminum pipe in the horizontal position.</i>
			MAN.PAC.14	<i>Make a gouge and groove cut on carbon steel, stainless steel and/or aluminum sheet/ plate in the flat position.</i>
			MAN.PAC.15	<i>Lay out, cut and prepare coupons for evaluation.</i>
			MAN.PAC.16	<i>Test prepared coupon.</i>

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