CIMWD-121 Syllabus

Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Recommended Textbook:

Welding: Principles and Applications 8th Edition

Course Description:

Discusses theory and operation of gas tungsten arc welding. Emphasizes safety protocols, and flat and horizontal welding positions while using mild and stainless steel.

Course Topics

1. Flat weld position on steel
2. Flat weld position on stainless steel
3. Horizontal weld position on steel
4. Horizontal weld position on stainless steel

Learning Objectives

1. Demonstrate the proper welding technique in flat position with steel.
2. Demonstrate the proper welding technique in horizontal position with steel.
3. Demonstrate the proper welding technique in flat position with stainless steel.
4. Demonstrate the proper welding technique in horizontal position with stainless steel.
5. *Perform welds using proper preparation and welding technique for a given weldment.

Competency-Based Education

The Welding Program at Henry Ford College uses a system of learning called Competency-Based Education (CBE). This competency-based welding program is centered on teaching specific job skills required in industry and mastery of these skills.

CBE is a very personalized teaching system that has the following characteristics:

- Ongoing Program
- Open entry - flexible schedule
- Credit granted for work completed
- Evaluation (grades) based on performance
- Fixed content in each course
- Variety of student levels served in each class
- Work at your own pace
- Live or taped lectures and demonstrations

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This competency-based program has several very important benefits for you:

- You will be given a list of the skills and knowledge needed to complete the program successfully.
- Your performance will not be compared to that of other students, but to a fixed standard, which has been set for the program.
- If you have already acquired certain skills required for this program, you may simply demonstrate this and begin focusing your attention on new skills.
- You will be able to review learning materials several times in order to attain the skill or knowledge.
- If you are able to attain the skills easily, you may progress through the program faster than the average person. If you progress through the program faster than average, you can graduate in a shorter time frame.

What's Required of You:

For this system to work, you will be expected to:

1. Assume the responsibility for your own learning. Your instructor will give you assistance, but the actual responsibility for learning rests with you, the student.
2. Utilize the materials provided for you. The program's resources have been carefully chosen and developed to help you learn.
3. Devote your energy to attaining the skills and knowledge required for your program.

The Instructor's Role:

The instructors in HFC's Welding Program work with students individually and guide them through the learning process with the help of many different learning resources. In CBE, instructors are often referred to as learning managers because they manage the activities in the program and facilitate the learning process. If you are having difficulty, you should go to your instructor with your problem. The instructor's goal is to find the most effective way to help you learn the tasks in the program.

How your grade is computed in this program:

If your class is a designated lecture module, your grade will be based off of an exit quiz. When a passing grade is complete, you will be able to move on to the next module.

If this class is a designated lab module, your grade will be based off of a grading matrix. You will evaluate your competencies along with the instructor. You will need a 3-ring binder to keep the finished and signed grading sheets. Those will be turned in when all projects are finished for the module your taking. The final grade will be entered when these are reviewed.

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Welding Technology Grading Checklist

Check	Criteria	Points
	Safety (10 points)	
	PPE	
	Equipment in working order	
	Lab rules followed	
	Work areas cleaned and tools returned	
	Welding, Cutting, & Fabrication Set-Up (10 points)	
	Welding machine set correctly	
	Cutting machines set correctly	
	Fabrication machines set correctly	
	Followed Instructions (10 points)	
	Parts cut to correct size	
	Joints assembled correctly	
	Position of weld was correct	
	Correct filler metal was used	
	Visual Inspection of weld (20 points)	
	Bead width	
	Welding angle	
	Arc gap if applicable	
	Porosity	
	Fillet weld size if applicable	
	Groove weld under fill	
	Joint penetration	
	Incomplete fusion	
	Cracks	
	Cold lap	
	Undercut	
	Arc strikes	
	Fillet weld contour if applicable	
	Inclusions	
	Groove weld height (overfill)	

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Corrective Action Taken:

_____
_____
_____
_____
_____
_____
_____

Student: _____ Instructor: _____

Grading Scale:

A+ = 100-98
A = 97-93
A- = 92-90
B+ = 89-87
B = 86-83
B- = 82-80
C+ = 79-77
C = 76-73
C- = 72-70
D+ = 69-67
D = 66-63
D- = 62-60
E = 59-below

Lectures/Demonstrations:

1. Steel
2. Stainless Steel

Chapters:

16, 17, 22, 23, 25

Estimated Time for Projects:

Project 1: 4 hrs
Project 2: 4 hrs
Project 3: 4 hrs
Project 4: 4 hrs
Project 5: 4 hrs
Project 6: 4 hrs
Project 7: 4 hrs

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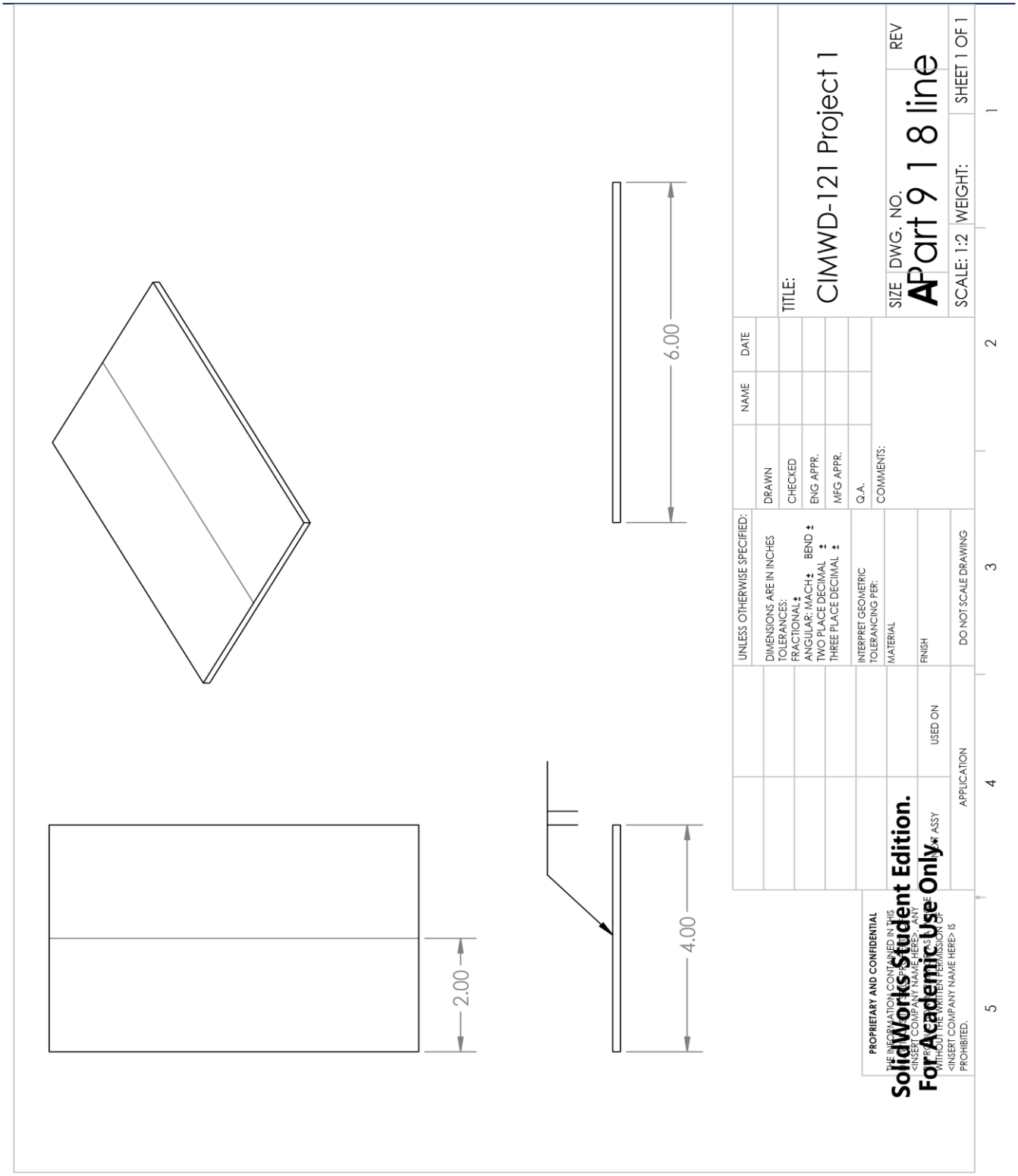

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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 1

Weld Type	Square Groove
Welding Process	GTAW
Position	Flat
Material	1/8" Steel
Joint Type	Butt
Backing Option	PJP
Backing Material	

Polarity	DC+
Electrode	ER70s-6
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Butt	GTAW	ER-70s-6	1/16"	120a	DC+			

Technique:
Butt Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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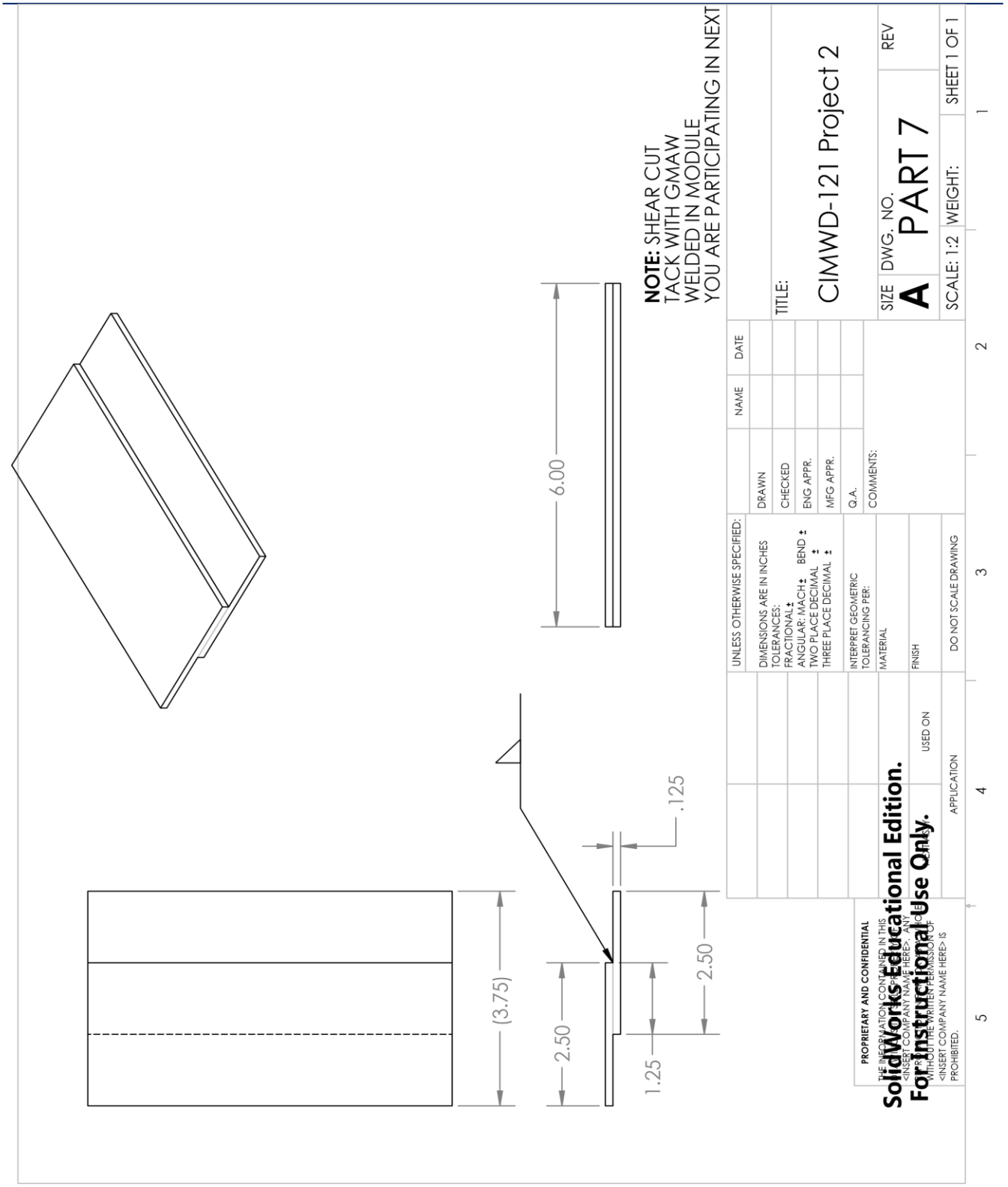

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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 2

Weld Type	Fillet
Welding Process	GTAW
Position	Horizontal
Material	1/8" Steel
Joint Type	Lap
Backing Option	
Backing Material	

Polarity	DC+
Electrode	ER70s-6
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Lap	GTAW	ER-70s-6	1/16"	120a	DC+			

Technique:
Lap Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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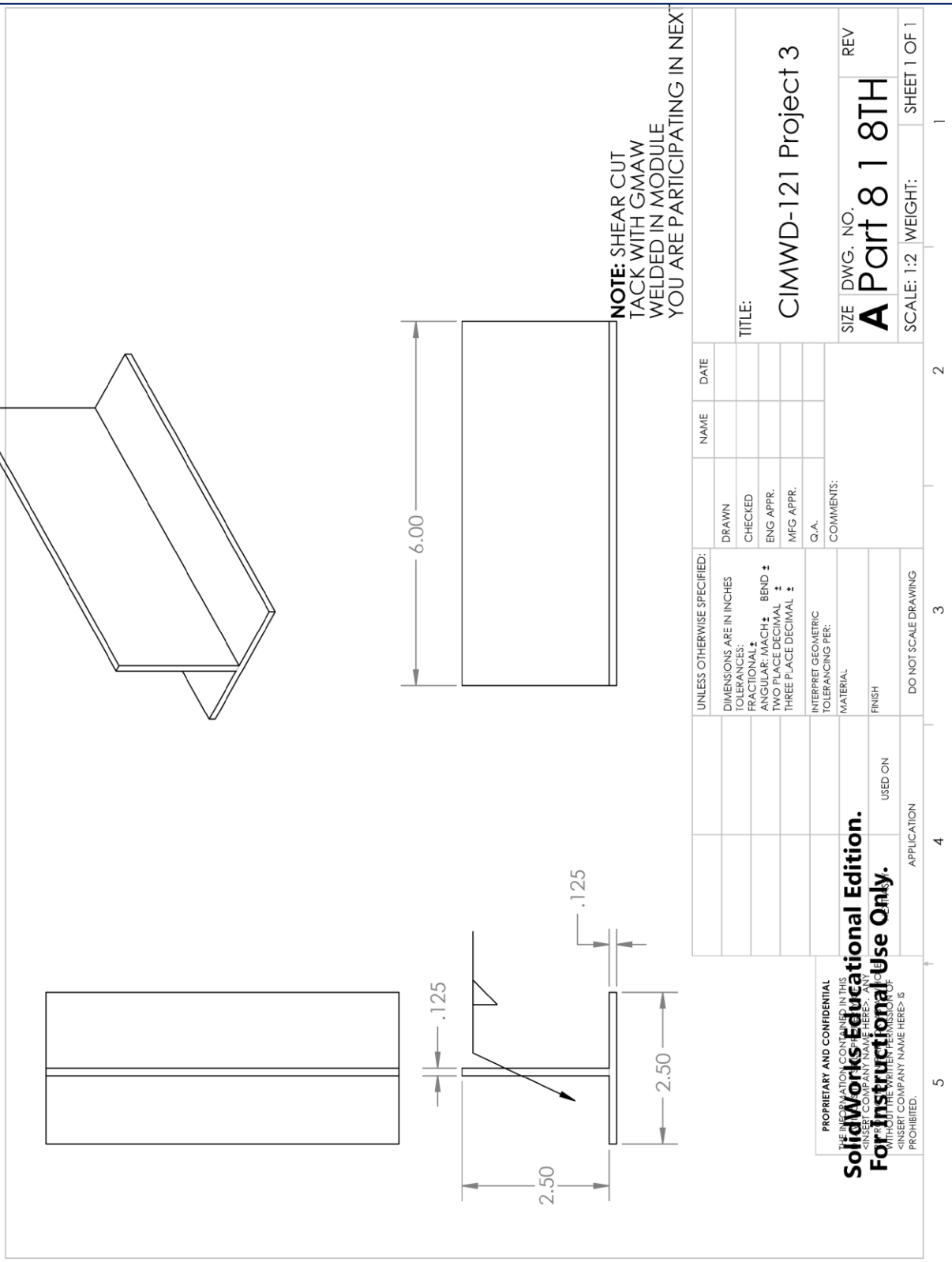

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Welding Procedure Specification

WPS Name	CIMWD-121 Project 3

Weld Type	Fillet
Welding Process	GTAW
Position	Horizontal
Material	1/8" Steel
Joint Type	Tee
Backing Option	
Backing Material	

Polarity	DC+
Electrode	ER70s-6
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Tee	GTAW	ER-70s-6	1/16"	120a	DC+			

Technique:
Tee Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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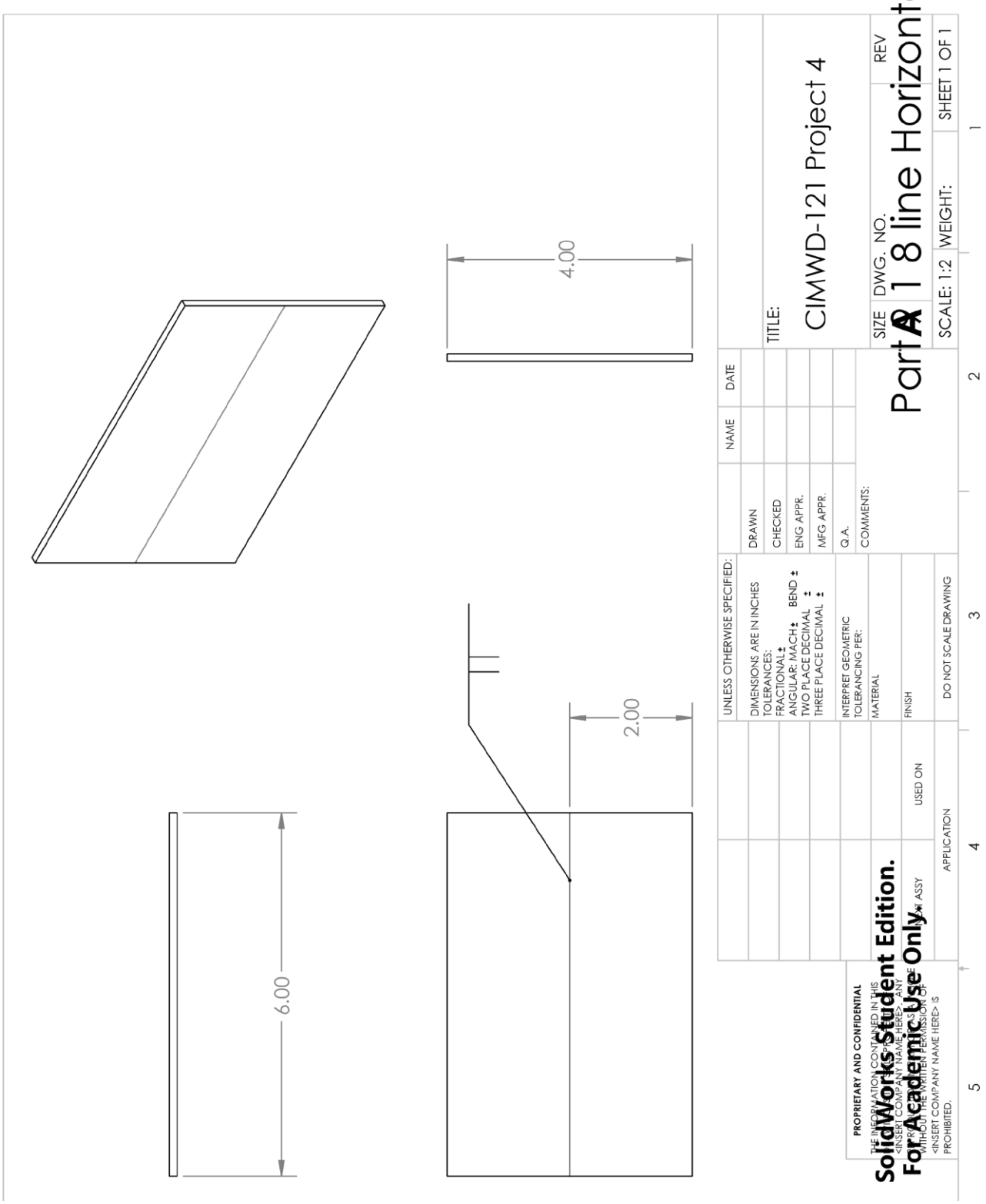

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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 4

Weld Type	Square Groove
Welding Process	GTAW
Position	Horizontal
Material	1/8" Steel
Joint Type	Butt
Backing Option	
Backing Material	

Polarity	DC+
Electrode	ER70s-6
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Butt	GTAW	ER-70s-6	1/16"	120a	DC+			

Technique:
Butt Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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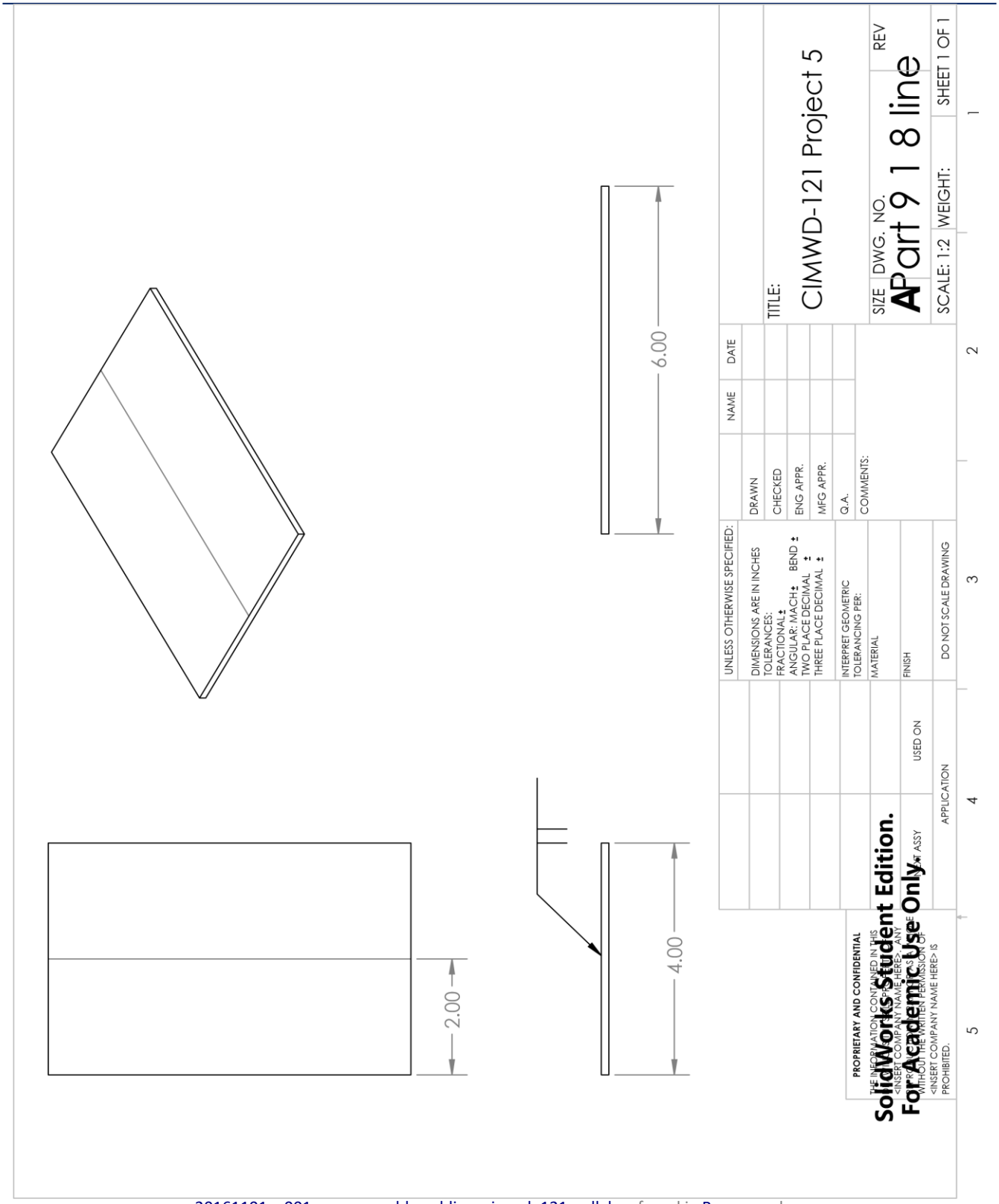
Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal



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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 5

Weld Type	Square Groove
Welding Process	GTAW
Position	Flat
Material	1/8" Stainless Steel
Joint Type	Butt
Backing Option	
Backing Material	

Polarity	DC+
Electrode	308
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Butt	GTAW	308	1/16"	75a	DC+			

Technique:
Butt Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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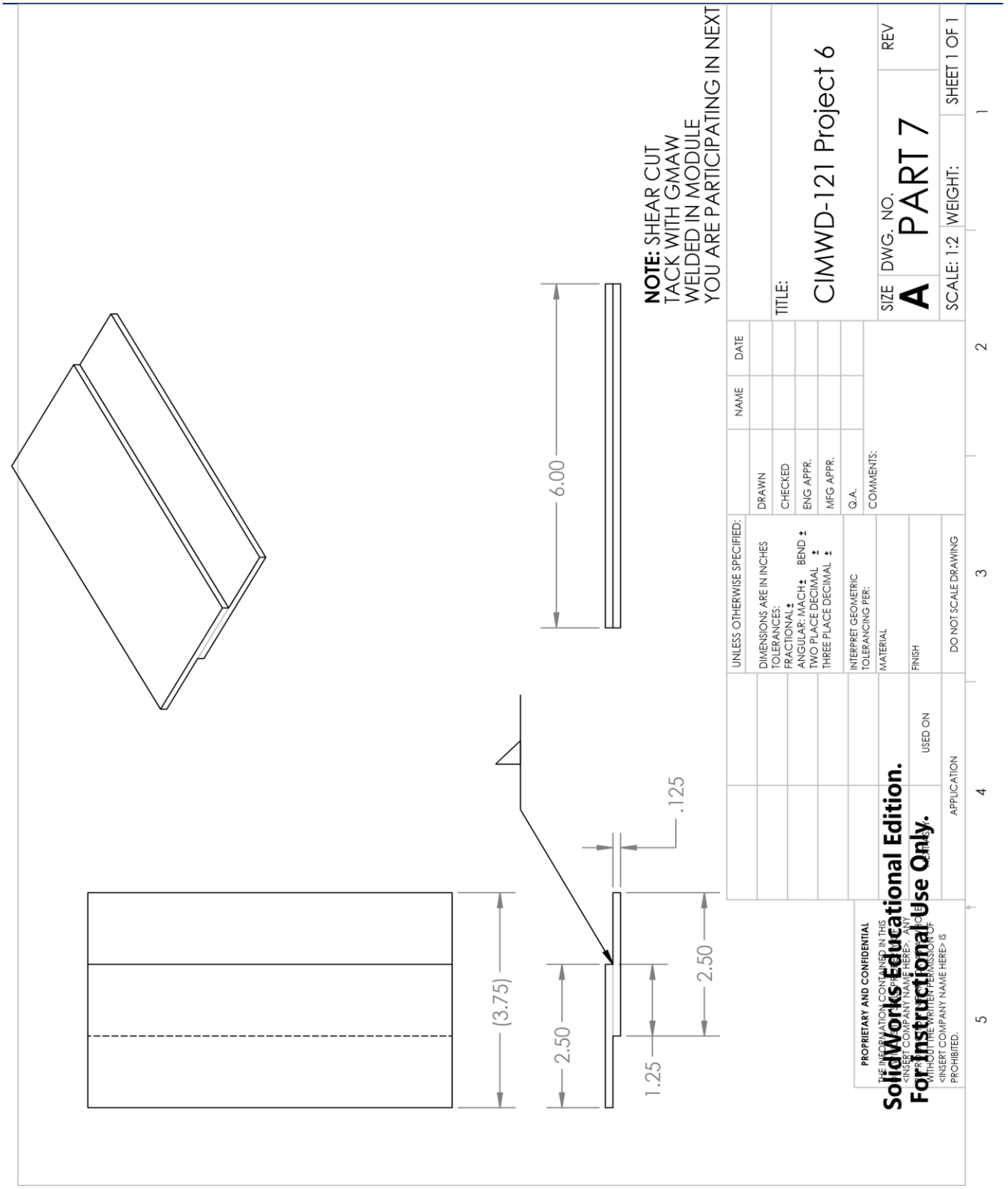

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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 6

Weld Type	Fillet
Welding Process	GTAW
Position	Horizontal
Material	1/8" Stainless Steel
Joint Type	Lap
Backing Option	
Backing Material	

Polarity	DC+
Electrode	308
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Lap	GTAW	308	1/16"	75a	DC+			

Technique:
Butt Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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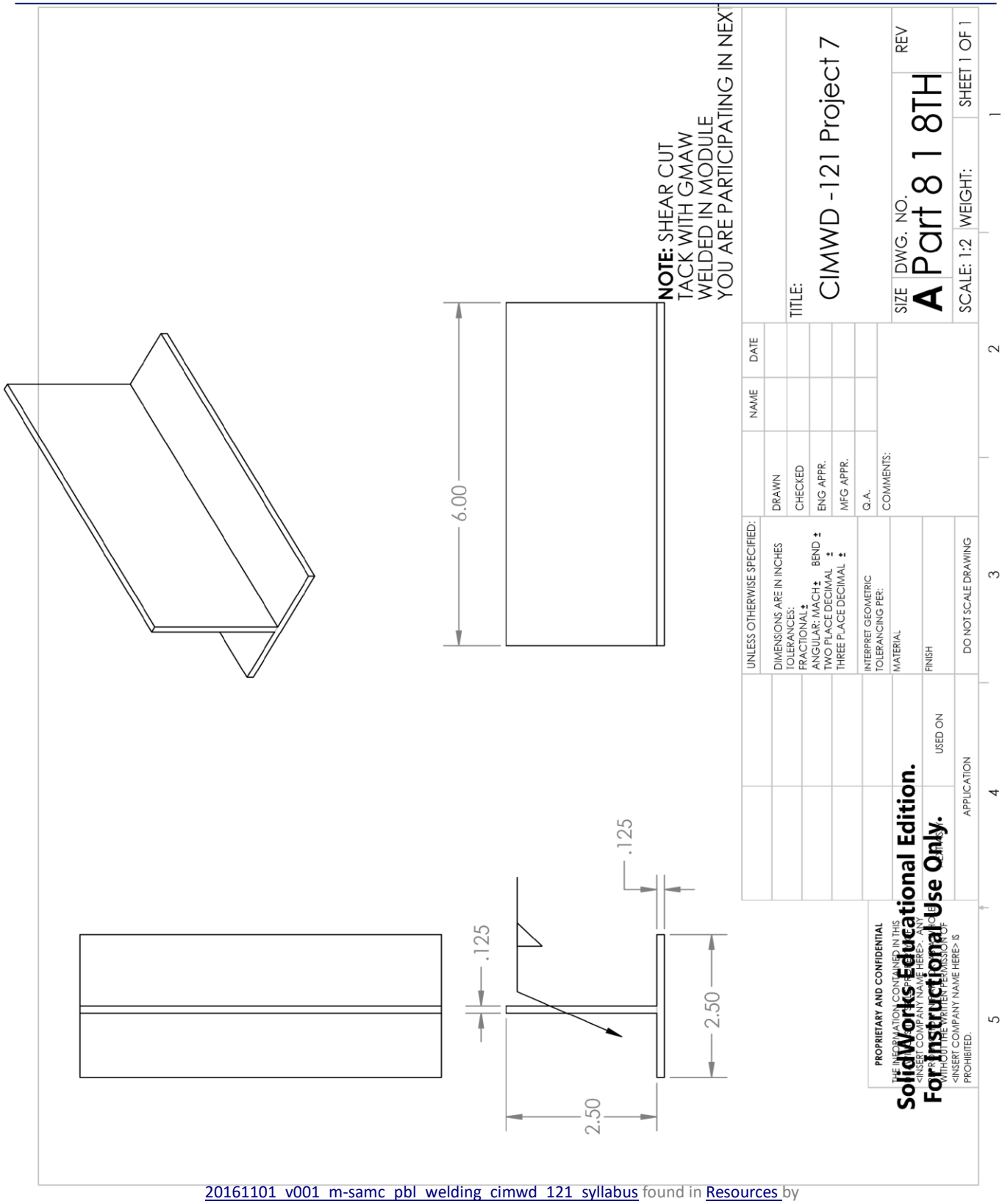

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Gas Tungsten Arc Welding – Steel & Stainless Steel, Flat and Horizontal

Welding Procedure Specification

WPS Name	CIMWD-121 Project 7

Weld Type	Fillet
Welding Process	GTAW
Position	Horizontal
Material	1/8" Stainless Steel
Joint Type	Tee
Backing Option	
Backing Material	

Polarity	DC+
Electrode	308
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

Welding Procedure

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Stringer	Tee	GTAW	308	1/16"	75a	DC+			

Technique:
Butt Joint single pass weld

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Heat Treatment:
Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.

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