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11/01/2016

VERSION

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PRIMARY DEVELOPER: Kevin Ridge, Welding Instructor, Henry Ford College

CIMWD-221 Syllabus

Tool & Die Welding (GTAW)

Recommended Textbook:

Welding: Principles and Applications 8th Edition

Course Description:

Introduces safety protocols, proper preparation procedures, and welding techniques used to weld tool steel used in tools and dies. Focuses on using the gas tungsten arc welding (GTAW) process.

Course Topics

- 1. GTAW pad build-up.
- 2. GTAW line build-up.
- 3. GTAW knife edge.

Learning Objectives

- 1. Demonstrate proper preparation techniques for the repair of a tool or die.
- 2. *Perform a weld using the proper techniques for the repair of a tool or die using the Gas Tungsten Arc Welding process.

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.







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Criteria	Points	Information	Grade
Follow Safety Rules	10		
for Project			
Welding Machine was	10		
Set Correctly			
Followed Instructions	10		
Given			
Correct Assembly and	10		
Fit-up			
Visual Inspection of	10		
Weld			

Grading Scale:

A+ = 100-98

A = 97-93

A = 92-90

B+ = 89-87

B = 86-83

B - = 82 - 80

C+ = 79-77

C = 76-73C = 72-70

D+ = 69-67

D = 66-63

D- = 62-60

Welding Projects:

1. Pad Build Up

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- 2. Line Build Up
- 3. Knife edge build-up
- 4. Shaft Build-up







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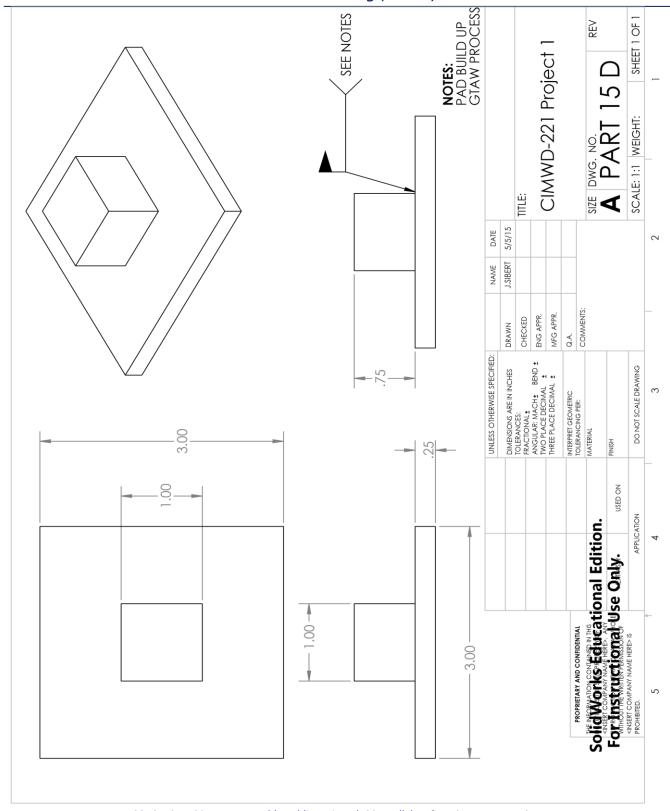
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PRIMARY DEVELOPER: Kevin Ridge, Welding Instructor, Henry Ford College

Tool & Die Welding (GTAW)

Welding Procedure Specification

Weld Type	Pad Build-Up
Welding Process	GTAW
Position	Flat
Material	1/4" Steel
Joint Type	
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	Pass	Process	Filler Metal	Filler	Current	Current	Wire	Volts	Remarks
Layers	No.		Classification	Metal	Amps	Type	Feed		
				Diameter		and	Speed		
				in (mm)		Polarity			
Pad		GTAW	ER70s-6	1/16"	130a	DC+			

Technique:

A pad build up using stringer beads. Looking for bead quality and bead placement. 2"x2"x1" high.





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Heat Treatment:
Preheat Temperature-
Post Heat Temperature-
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Interpass Temperature-
Stress Relieving-
Additional Notes:
Show the instructor progress every 30 minutes minimum.
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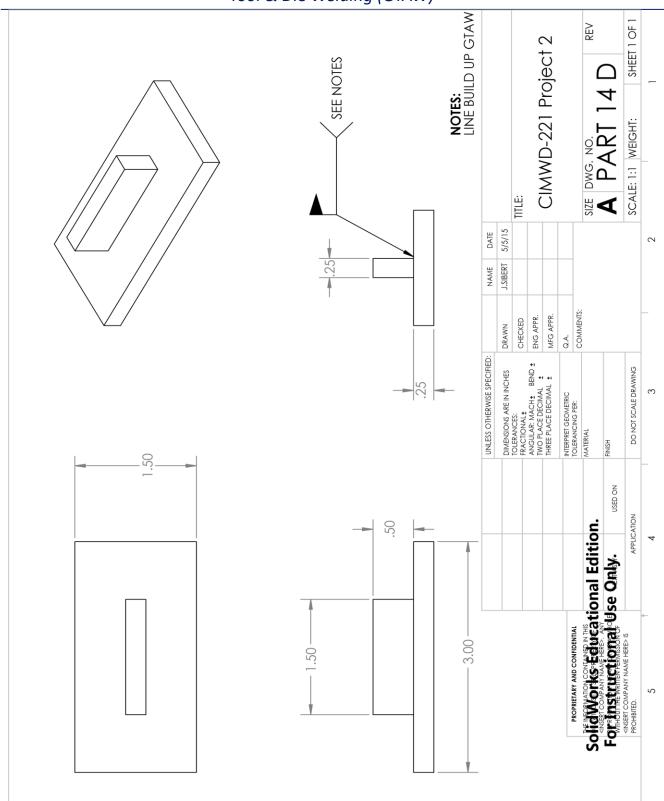
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PRIMARY DEVELOPER: Kevin Ridge, Welding Instructor, Henry Ford College

Tool & Die Welding (GTAW)

Welding Procedure Specification

Weld Type	Line Build-Up
Welding Process	GTAW
Position	Flat
Material	1/4" Steel
Joint Type	
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

			1						
Weld	Pass	Process	Filler Metal	Filler	Current	Current	Wire	Volts	Remarks
Layers	No.		Classification	Metal	Amps	Type	Feed		
				Diameter		and	Speed		
				in (mm)		Polarity			
Line		GTAW	ER70s-6	1/16"	130a	DC+			

Technique:

A Line build up using stringer beads. Looking for bead quality and bead placement. 2 1/2"x1" high.







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Heat Treatment:
Preheat Temperature-
Post Heat Temperature-
1 Ost Heat Temperature
Interpass Temperature-
Channe Dellandar
Stress Relieving-
Additional Notes:
Additional Notes: Show the instructor progress every 20 minutes minimum
Additional Notes: Show the instructor progress every 30 minutes minimum.





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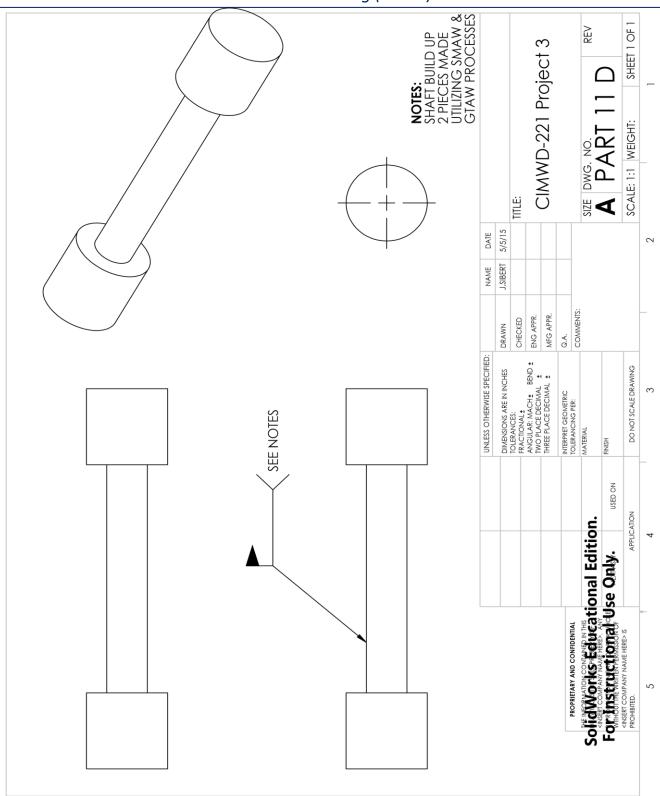
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PRIMARY DEVELOPER: Kevin Ridge, Welding Instructor, Henry Ford College

Tool & Die Welding (GTAW)

Welding Procedure Specification

Weld Type	Worn Shaft Build-Up
Welding Process	GTAW
Position	Flat
Material	1/4" Steel
Joint Type	
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	Pass	Process	Filler Metal	Filler	Current	Current	Wire	Volts	Remarks
Layers	No.		Classification	Metal	Amps	Type	Feed		
				Diameter		and	Speed		
				in (mm)		Polarity			
Stringer		GTAW	ER70s-6	1/16"	130a	DC+			

Technique:

A worn shaft build up using stringer beads. Looking for bead quality and bead placement. Fill to just over thread dimension for machining after.





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PRIMARY DEVELOPER: Kevin Ridge, Welding Instructor, Henry Ford College

Heat Treatment:
Preheat Temperature-
Post Heat Temperature-
Interpass Temperature- Air Cool for controlled temperatures
Stress Relieving-
Additional Nation
Additional Notes:
Show the instructor progress every 30 minutes minimum.





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