Cerritos College Welding Technology

OXY-FUEL SAFETY DATA SHEET page 1

OXYGEN CYLINDERS:

1. Oxygen cylinders are a one piece seamless design and have no welded seams.
2. A full oxygen cylinder holds 2,200 P.S.I.
   The cylinders used at CCC are size large and hold approximately 270 cubic feet.
3. Oxygen cylinders have back seating valves and therefore must be opened all the way.
4. Always identify what type of gas is in a cylinder by its label. Not by the color of the cylinder.
5. Gas distributors each have their own color code systems. This makes it easy for identification and distribution.
6. Oxygen cylinders have an explosion prevention device, which is called a bursting disc.
   The bursting disk is pressure activated and pops off at 3775 P.S.I.
7. Safety caps must be used when moving cylinders, regardless if they are full or empty, and when being stored.
   CCC uses specially designed safety caps that can be in place while the cylinders are in use for added protection.
8. When gas cylinders are empty their valves should always be completely closed.
   This will prevent air from entering and contaminating the cylinder. This applies to all types of gas cylinders.
9. Oxygen cylinders, regulators, fittings, and connectors all have right-handed threads.
   Note: All gas cylinders have right handed threads. (Except for fuel gasses – these all have left handed threads).
10. Never use oil, grease, lubricants or teflon tape on oxy-fuel regulators, fittings, and or connectors.
11. Never use oxygen to blow off dust or dirt from your clothing or person.

ACETYLENE CYLINDERS:

12. Acetylene cylinders are low pressure and have welded seams.
13. A full large size #5 acetylene cylinder holds about 225 cubic ft. of gas at about 250 P.S.I.
14. Acetylene cylinders have a valve that is known as a single seated valve and are to be opened ½ to 1 ½ turns only.
15. Acetylene is a gas that has a very distinct odor which smells like rotten eggs.
16. The maximum working line or hose pressure for acetylene is 15 P.S.I. (It becomes unstable above 15 P.S.I.)
17. Acetylene cylinders have an internal filler, which is saturated with acetone to help stabilize the gas.
    To prevent the acetone from being sucked through the system, never use acetylene cylinders below 20 P.S.I.
18. If acetylene cylinders have been laid down, they should not be used for at least 12 hours, because the acetone will be sucked through the system causing the regulators to be gummed up and damaged.
19. Acetylene cylinders have explosion prevention devices at the top & bottom of the cylinder known as fuse plugs.
    These are activated by heat and melt off at 212° F.
20. Acetylene cylinders, regulators, hoses, fittings, and connectors all have left-handed threads.
    Fact: All fuel gases such as propylene, MAPP, propane, hydrogen, and natural gas have left-handed threads.
21. Acetylene is man-made and is also the hottest industrial gas. It has a flame temperature of 5,600° F.
22. The mechanized torch beveller's and pipe beveller's used at CCC use propylene gas.
23. Propylene has a flame temperature of 5342°F.
24. Steel melts at approximately 2,800 degrees.
25. The only type of metal that can be cut with acetylene and or propylene is Steel.
26. All other metals must be cut with the plasma cutting system.
27. Aluminum, brass, copper, and stainless steel can be melted with OA or OP – But They Cannot Be Cut.

Cerritos College Welding Technology

OXY-FUEL SAFETY DATA SHEET page 2

Lighting the Torch:

a) You must wear your safety glasses under your number 5 cutting goggles or welding hood with a #5 lens.
b) Check and make sure torch valves are both closed.
c) Check and if needed loosen regulator adjusting screws. They should be loose before proceeding to next step.
d) Open Oxygen cylinder valve very slowly at first – then open the valve all the way.
e) Open Acetylene cylinder valve very slowly at first – then open 1½ turns only.
f) If anything ever goes wrong while you're using the torch – **Shut The Acetylene Valve Off First.**
g) The high-pressure gage shows the cylinder pressure.
h) The low-pressure gage shows the working pressure, or the pressure of the gas being delivered to the torch.
i) Screw in each regulator adjusting knob one at a time to set the working pressure.
j) Set the Acetylene to 5 PSI and set the Oxygen to 35 PSI.
k) Purge the torch lines one at a time:
l) Open the Acetylene torch valve for 2 seconds – then close it.
m) Open the Oxygen torch valve for 2 seconds – then close it.
n) Light the torch – crack open the Acetylene torch valve and use a friction lighter to light the torch.
o) Open the Oxygen valve and adjust to a neutral flame.
p) Press Oxygen cutting lever and re-adjust oxygen to sharpen up the blue cones.
q) You are now ready to cut.
r) Three types of Oxyacetylene flames are: carburizing, oxidizing, and neutral.
s) A neutral flame is required for cutting steel.
t) The #1 mistake students make when flame cutting is using too much Oxygen – which is an oxidizing flame.
u) When oxy-fuel cutting – the blue inner cones should be 1/4" from the surface being cut.
v) Never use matches, butane lighters, cigarettes, or other student's lit torches to light your torch.
w) Only use friction lighters to light torches.
x) Never leave a torch lit and unattended or lay a lit torch on the cutting table and walk away.
y) For maximum protection, all CCC torches have one way check valves.
z) One way check valves are, AKA back flash arrestors or blowback arrestors.

Shut Down Procedures:

1. Turn off the Oxyacetylene cutting system at the end of the class session (not on & off during a class session).
2. Turn off both cylinders valves. Snug is good enough – Do Not over torque them.
3. Purge the Oxygen line to zero pressure and make sure the valve is closed.
4. Purge the Acetylene line to zero pressure and make sure the valve is closed.
5. All four gages should read zero pressure.
6. Back out regulator adjusting knobs by rotating them counterclockwise.
7. Unscrew them until they have minimal spring tension – Do Not back them out too far or they will fall off.
8. Roll up torch line. Put the portable OAW cart back in the designated Oxyacetylene Cart Parking Zone.
9. Clean Up – Sweep Up the entire cutting area.

Drop Test

A drop test may be performed to test for leaks on an Oxyacetylene system in lieu of soapy water:

1. Pressurize the system just like you would set it up for a cutting operation.
2. Turn both Oxygen and Acetylene cylinder valves off and wait a few minutes.
3. If there is a leak in the system, the needles on the gauges will slowly drop.
   Recheck all connections, tighten if needed, and then perform another drop test.
4. If a leak is still suspected, then perform a soapy water solution check on all connections.
5. If the system still has a problem – have instructor or classified personnel repair the system.

Other Safety Notes:

1. Leather Jacket or cape sleeves with leather gloves must be worn during all cutting operations.
2. Always fire proof the cutting area – in other words – make sure there are no flammables in the surrounding area.
3. Never cut on or directly over concrete.
4. Never cut into a closed container or a container that has held a flammable substance.
5. The number one safety violation students make when flame cutting – they use clear safety glasses – not a #5 lens.
6. All students must use a #5 lens when performing flame cutting operations.

Cerritos College Welding Technology

SMAW FIRST DAY SAFETY DATA SHEET page 1

1. The following directions are extremely important.
   These directions must be followed for your safety and to prevent equipment damage.

2. At no time should you ever see the bright light from the electric arc.
   Your hood must have a number 10 filter lens and a front mounted protective clear polycarbonate lens.

3. Welding hoods must have a flip up chipper lens or an auto darkening lens.
   Never, Never, Ever chip welding slag with your hood up.

4. If you wear reading glasses and you are having trouble seeing the arc,
   consider using a magnification cheater lens or you may need to get prescription safety glasses.

5. If using a cheater, place the cheater lens in the hood not in the flipper/chipper.
   Remember the order of polycarbonate lens, filter lens, and then gaskets.

6. You must always wear safety glasses under your welding hood.
   Prescription safety glasses must have side shields or use safety glasses over prescription eyewear.

7. Make sure to wear all required safety gear:
   100% cotton clothes, long pants, leather jacket or cape sleeves, hat, high top work boots etc.

8. Make sure to properly set your hood's four adjustments before starting welding operations:
   (Top head height, tilt angle, head circumference adjustment, and hood lock / flip tension controls).

9. Set welding machine amperage and polarity according to your instructor's recommendations.

10. If using the inside Miller Mark 8 Pak Welders, always set the Rheostat on the Machine at 200 Amps.
    Then make final adjustments inside your welding booth (This dial should be set between 60 – 80 for most projects).

11. If using the outside Miller Mark 8 Pak Welders – Set Amperage at Machine between (100 to 140 Amps).
    The outside Miller Mark 8 Paks do not have remote control Rheostats.

12. Always set welding amperage on scrap metal and in the position you are going to weld in.

13. Never change the settings or move dials or knobs or switches on any welding machine while it is under load.
    Under load means the machine is not only turned on but someone is actually welding with it.
    This can destroy the rheostat and cause severe damage to the machine.

14. Stand with feet approximately shoulder width apart using an angled, balanced stance.
    Do Not stand squared up or directly in front of the part you are going to weld on.

15. Use both hands to hold the electrode holder (stinger) and lean your body on the wall for support.

16. Adjust table and or fixture arms to your height and get in the most comfortable position possible.

17. Do Not "Arc Strike" on the table or fixture poles.

18. Do Not lay cable over the table or welding project, these maybe hot and could melt the cable.

19. To start the arc – "Scratch It" – Don't stab the rod into the plate, this will cause it to stick.

20. If rod gets stuck – Do Not Unclamp from Stinger – this will "Arc Out" the jaws and destroy the stinger.

21. Your Instructor will demonstrate the proper procedure for restarting rods – "We Do Not Waste Rod."
    If you get caught wasting rod – you will be warned one time.
    Waste rod again and you will be required to purchase your own welding rod for the rest of the semester.
    F.Y.I. – Five pounds of E7018 welding rod costs about $20.00.

Cerritos College Welding Technology

SMAW FIRST DAY SAFETY DATA SHEET page 2

22. Use proper electrode direction of travel, right handed students will weld from left to right.

23. The most common problem students have on the first day – "Is having too fast of a travel speed".

24. Instructor, explain: Arc Blow - What is it? And how to prevent and or control it.

25. Instructor, explain: Proper rod height and rod angles.

26. Chip off slag and wire brush every weld before making the next weld.

27. Always remove electrode from stinger when you are not actually welding.

28. Be cautious when carrying, handling, and storing stick electrodes.
    Improper care of electrodes may break the brittle flux coating, (don't drop or bend them).

29. Burn electrodes down to a length of 2 inches. Anything longer than 2" is a welding rod.
    "Rod Wasters" will be identified and eliminated from the Program.

30. If class is over and you end up with a rod that is not full length:
    Please put it in your welding bucket or store it with your gear and use it first at the next class session.

31. Always return full length rods to their proper location (oven or rod rack).

32. Never put less than full length rods back in the oven or rod rack.

33. If you get caught wasting rod, you will get one warning and the next time you will be asked to purchase your own welding rods for the remainder of the semester. The next step is elimination from the Program.

34. Do Not put welding rods in the vents.

35. Do not leave metal or welding projects in the water cooling dunk tanks.

36. Please roll up or coil up stinger lead neatly at the end of your class.

37. Please clean your booth (sweep table top, sweep floor, and clean your extra designated shop area).
    Rod stubs, floor sweepings, and scrap metal are to be placed in the big blue metal dumpsters outside.
    Your Instructor is just that, an Instructor – He does not clean up after you like a maid or your mommy.

38. This is your laboratory, so have some pride and keep it looking clean and presentable.

39. Always inform your instructor if anything malfunctions or breaks.

40. Do Not leave damaged or broken equipment for the next class.

41. Shop Etiquette: If welding gear and or tools are in a booth that means that booth is taken.
    It is first come, first serve. You should not remove someone else's equipment.

42. Some instructors assign specific booths to students, this rule supersedes line #41.

43. When welding out of position, make sure to use earplugs to protect your eardrums from sparks.

44. Always be respectful of equipment – The Program has a very limited budget.

45. Remember – If you don't know – Ask for help – There are no stupid questions in welding shop classes.

Cerritos College Welding Technology

GMAW & FCAW WELDING SAFETY DATA SHEET page 1

1. Students may use GMAW or FCAW welders only after they have been given written safety information, verbal instructions, and a live action demonstration by instructor.
2. Students must wear safety glasses that comply with Z87.1 and an arc welding hood with appropriate filter lens.
3. If other students are present, always warn them before initiating the arc.
4. GMAW welding has no slag – but it does produce brown glass – which often pops off unexpectedly.
5. This brown glass will pop off up to one minute after the weld has been completed.
   This happens as the metal cools and shrinks in size.
   This is dangerous because this is the time that the welder looks at or inspects the weld.
6. SMAW and FCAW both produce slags, GMAW does not, so welders do not expect slag (Brown glass particles)
   to fly off and hit them in the eye. This is why accidents are more likely to occur with this process.
   Be careful and keep your safety glasses on at all times.
7. Use the same personal safety gear and equipment for GMAW as you do for SMAW and or FCAW.
8. **Instructor: Please explain the various GMAW system components, their functions and safety features:**
   a) Power Supply: CV or Constant Voltage.
   b) Wire Feeder: Miller S-22A, S-52E or built in.
   c) Drive Rolls: Must match wire size. Some are reversible: .035"/.045"
   d) Tension Control: This spring loaded knob is inside the wire feeder.
   e) Purge Switch: This allows you to set the gas without wasting or feeding wire. (Located on wire feeder).
   f) Jog Switch: This allows you to feed the wire without wasting gas. (Located on wire feeder).
   g) Gun Info: Bernard Centerfire. (Unique because of threadless contact tip design).
   h) Gun Info: Tweeco standard MIG gun, disassembly and parts identification.
   i) Contact Tip: Do not allow the contact tip to ever touch the workpiece – if you do, it's game over!
   j) Gas Diffuser: Brass part that holds the contact tip and diffuses the gas of course.
   k) Nozzle: Copper Cup that requires periodic cleaning. (Directs the shielding gas & protects the contact tip).
   l) Wire Type & Size: ER70S-6. Size: .035". Wire brand name: Lincoln L-56.
   m) Gas Cylinder: These are high pressure cylinders and have back seating valves. (Open all the way).
   n) Full cylinders hold approximately 2,400 psi. Large cylinders hold 280 CF and small cylinders hold 125 CF of gas.
   o) Gas Type and Setting: 75% Argon & 25% CO_2. Set to 25 CFH for indoors and 35 CFH for outdoors.
   p) Flow Meter and Setting: The flow meter measures cubic feet per hour. Read and set at the top of the ball.
9. Use wire cutters or side cutters to cut wire – Do Not "Arc Off" wire on tables or fixtures.
   These are called "Whiskers" and they can snag pants and cut people. (Any cheap side cutters will work).
10. Cut Wire – Every time before making the next weld. (When this is necessary and when it is not necessary).
11. Never Touch The Contact Tip – Always use a 3/8" Stick Out. What happens if you touch the Contact Tip?
12. If the Wire Stops Feeding – Do Not Continue to Press on the Trigger.
    (This causes Birdnesting and it will also destroy the expensive electronic components in the wire feeder).
13. If shielding gas is used, the nozzle should be removed about every hour and cleaned of any Spatter Build Up.
    (This will prevent the restricting of the shielding gas.)
14. Do Not Lay Gun or Cable on or over hot parts on the table. (The rubber and plastic components will melt).
15. Never weld on table tops or welding fixture poles. (Please tack parts only onto tacking arms).
16. Make sure gun cable does not have sharp bends, coils, or kinks in it. (This will prevent Wire Feeding Problems).
17. Unlike Arc Welding, which has a flux coating – MIG welding must be performed on relatively clean metal.
    Paint, grease, grime, and or heavy rust will be difficult to weld on and is likely to cause porosity problems.
18. If your weld has porosity and or brown hazy smoke around it – you have a shielding gas problem.
    The most common cause of porosity relates to an issue or problem with the shielding gas.
    Fix this by turning the gas on or turn the CFH up – and or clean the nozzle.
19. Never weld on or in close proximity to compressed gas cylinders.
20. Never disconnect power or unplug a GMAW welding machine while it is turned on.

GMAW & FCAW WELDING SAFETY DATA SHEET page 2

21. The GMAW system has three main settings:

- Shielding Gas – Open the cylinder valve all the way. These cylinders have back seating valves.
  Set gas flow to 25 CFH (Cubic Feet per Hour) for inside the shop and 35 CFH for outside shop welding.
  The type of shielding gas used at Cerritos College is 75% Argon and 25% CO_2.
- Wire Feed Speed (WFS) and or amperage – different machines have only an amperage dial while others have only a WFS dial. These dials do the same thing – they adjust WFS and the amperage.
  If you increase the WFS you also simultaneously turn up the amperage. Amperage controls the heat.
- Voltage – This controls electrical pressure and controls how the wire burns off.
- Instructor: Explain how Amperage and Voltage should be set for:
  Metal thickness, joint design, welding position, and how to adjust settings based on "frying bacon" sound.

22. Always inform your instructor if anything breaks down, jams, or you "Nuke" the contact tip.
23. Always let your instructor know if you run out of welding wire or shielding gas.
    (Please Do Not leave a GMAW machine out of Wire or Shielding Gas for the next class).
24. At the end of your class:
    - Make sure to shut off your machine.
    - If you were using a portable MIG, shut off the gas cylinder.
    - If you were using the inside XMT 350's shut off the gas valve.
    - Do Not touch or shut off the flow meter dial/valve on any of the MIG welders.
    - This just makes it harder for the next student to set their gas CFH flow rate.
25. After correctly turning off GMAW portable equipment and wrapping cables and leads up neatly.
    Return the welder to its proper parking location.
26. **FCAW SYSTEM SAFETY:**
27. Use the same safety equipment that you would use for SMAW to FCAW weld.
28. Use a shade number 11 filter lens or higher when FCAW with higher amperages.
29. Use of a long sleeve shirt under leather jacket or leather cape sleeves is required.
30. Use of leather cape sleeves and or leather jacket is mandatory. Do Not use cotton jackets or cape sleeves.
31. In open areas, natural ventilation is adequate for some types of FCAW wires if you keep your head out of the fumes.
32. For extra breathing protection when FCAW, the use of a metal fumes respirator is recommended.
33. When using FCAW E71T-8 and or NR-232 FCAW wires, students should use a respirator.
34. Recommended metal fumes respirators include the disposable 3M Particulate Respirators N95 or
    the reusable 3M 7500 Series respirators with the disposable 2093 or
    2097 Particulate Filter, P100, with Nuisance Level Organic Vapor Relief and Ozone Protection.
35. Be cautious when chipping and wire brushing slag, it is very irritating to the respiratory system.
36. Because FCAW wire is hollow, wire cutters are not necessary, use gloved hand to break off wire carefully.
37. To avoid serious injury, make sure to install FCAW wire spool correctly and only with your instructor's presence.
38. Remember: "It's a good feeling when you know you are part of the solution and not part of the problem."

Cerritos College Welding Technology

GTAW FIRST DAY SAFETY DATA SHEET page 1

1. New students to the GTAW process, please follow all of the following written safety instructions as well as your instructor's verbal directions very closely on this first day of TIG welding. This will prevent personal injury and also prevent damaging this sophisticated and expensive equipment.
2. The Miller Dynasty 350 Welders cost $10,000 each. So, please follow all safety directions to prevent damaging them.
3. Set equipment in accordance to the provided Miller Dynasty Setup Procedures Sheet. Your instructor may have you start on Steel or Aluminum. The welding machine has different settings for different types of metals.
4. Some Auto Darkening hoods will be dysfunctional when TIG welding because of the location of their light sensors.
5. Safety glasses must be worn 100% of the time under your welding hood.
6. TIG welding requires a number ten filter lens.
7. Leathers are not required for this process, but all skin below the chin must be covered up with 100% cotton clothing.
8. The shielding gas used for GTAW is 100% Argon. This gas is odorless and is inert. Argon gas is harmless to you and it makes up approximately 1% of the air you are breathing right now. You must hold the torch in your hand when setting CFH gas flow rate, to prevent accidental arcing. You can also press and hold the gas switch to check the gas flow rate.
9. The following are common safety hazards associated with the GTAW process:
   - Skin burn which looks like sun burn from the ultraviolet light rays.
   - Piercing your skin and or body with a sharp tungsten or hot welding rod.
   - Burning your fingers by touching hot metal.
   - Electric shocks by having bare skin complete the electrical circuit.
   - Accidents as well as equipment damage with this process are typically the result of: Negligence, ignorance, and or a failure to follow directions.
10. Any type of non-synthetic gloves can be used for the TIG process, including gauntlet style arc welding gloves. Thinner gloves are preferred and are made from leather, elk skin, pig skin or cotton. Never weld with wet or damp gloves, this could cause electrical shock.
11. Welding without gloves will cause you to be shocked, electrifried, and or burned – So don't try it.
12. CAUTION – Aluminum can be as hot as 1000 degrees and it never changes color. Always use pliers to handle parts that have been recently welded.
13. The tungsten should not extend out past the shielding cup more than ¼ inch.
14. Your instructor will demonstrate the proper procedure for sharpening tungsten electrodes.
15. Belt sanders are for sanding tungstens only. DO NOT sand anything other than tungstens on the belt sanders.
16. Torch Assembly - Follow assembly directions as indicated on the TIG torch assembly diagram sheet. The TIG torch threads are made out of soft copper or brass and are easily stripped out. Please assemble torch components with minimal finger tightness. Over tightening parts will strip out the $120.00 torch. Keep foot off of the foot pedal when assembling torch components, to prevent accidental shock.
17. The torch and supply lines are made from plastic. DO NOT let the torch come in contact with hot metal. NEVER, NEVER, NEVER, EVER LAY THE TORCH OVER THE TABLE. All TIG tables have hooks for hanging the torch off of the side of the table and some booths also have wall hooks.
18. We DO NOT waste or produce TIG welding rod stubs. All short rods are welded together and used as welding rods. Your instructor will demonstrate how to recycle and fuse short rods together. PLEASE DO NOT put short rods back in the full length rod rack. If you end up with a short rod at the end of class - store it with your gear and use it at your next class.

GTAW FIRST DAY SAFETY DATA SHEET page 2

19. DO NOT MIX METALS. Aluminum and Stainless Steel have a similar look. But their welds are very distinctive and so are their weights, if you don't know which is which - Ask. TIG welded Steel parts should be placed in the outside Big Blue Metal Dumpster.

20. Never start off welding on your project at the start of the day. You should always set your machine on and run a few beads on scrap metal every day before starting on projects and or on good material. Please be part of the solution, and not the problem. If you see a short rod in the rod rack, in your booth, on top of a machine, or on the floor – pick it up and just use it. Be a good student, a good citizen, and generate some good karma for yourself.

The Instructor Full Alphabet of Safety and Informational Reminder Bullet Points:

A. What causes the V-shape sun burn on my neck?

B. What causes a person to get shocked if they are wearing gloves?

C. What causes an auto darkening hood to flash on and off?

D. Tungsten Stick out =

E. Tungsten height while welding =

F. Torch direction of travel =

G. Torch angle =

H. Torch hand – positions, support, movement, progression =

I. Filler rod – position, how to properly feed and add to the puddle =

J. What happens if you hold the tungsten too high off of the plate?

K. What happens if you touch the tungsten to the molten puddle or plate?

L. What causes a weld to have contamination?

M. What causes the rod to prematurely melt off and drip in front of the puddle?

N. What causes the weld to melt thru the last inch of the plate?

O. What causes the fingers on my rod feeding glove to shrivel up and or get burnt?

P. What causes the weld to be flat and have a dull grey color?

Q. What causes the weld to be convex and have a shiny chrome color?

R. What causes the weld bead ripples to be so far apart?

S. What causes the weld bead ripples to be so close together?

T. How do I remove the tungsten from the torch when it needs to be sharpened?

U. Why does the tungsten turn grey and or black even when it didn't touch the plate?

V. Why does the arc spin and gyrate around the tungsten?

W. Why would the weld pool have contamination floating around on its surface?

X. Why is it important to wire brush and remove the oxide film off of aluminum?

Y. How short should filler rods get before welding them back together?

Z. How does my instructor make such awesome looking welds?

Cerritos College Welding Technology

HYDRAULIC SHEARS AND IRONWORKERS SAFETY DATA SHEET

1. Students can only use the shears and ironworkers after they have received safety training from their instructor.
2. Students may only operate the shears and ironworkers if instructor and or classified staff member is present.
3. Students are only allowed to use the shears and ironworkers under the direct supervision of their instructor and or classified staff member.
4. Students must wear safety glasses with side shields that comply with ANSI Z87.1 specifications.
5. Gloves must be worn at all times when shearing and handling sheared metals.
6. Never Double Up or Stack metal being sheared.
7. Never cut metal thicker than the shear is rated for.
8. Use diagonal measurements to make sure plate or sheet is squared.
9. Do Not use any of the shears to cut metal that has been welded.
10. Do Not cut or shear through weldments.
11. Always make sure the metal being cut is under a Hold Down before initiating a cut.
12. Hands must be clear of the bed and the metal being sheared before activating the shear.
13. Never use your Fingers to feed metal under the guard, use another piece of metal.
14. Never remove the shear's factory safety guards.
15. Never slam the metal being cut against the Backstop or Fence.
    (This will cause the fence to become misaligned and out of calibration).
16. Remove all metals from the shear before making calibrations or adjusting backstop measurements.
17. Never attempt to shear metal narrower than one inch.
18. Make sure to program appropriate Cut Length: (1'-3'-6'-10') on the "All Steel" shear before operating.
19. Before shearing metal, always make sure that no one is behind the shear picking up metal.
20. Always use extreme caution when operating all shears and Never Rush to finish the job.
    "Rushing the Job" is the most common cause for accidents to happen when shearing.
21. When making multiple cuts, Do Not feed metal into the shear until it has completed its cycle and the blade has come to a complete stop in the up position.
22. Never feed material into the shear from the backside of the machine.

23. **<u>Hydraulic Ironworkers: Unihydro and Piranha</u>**

24. Never Double Up or Stack metal being sheared or coped/notched.
25. Never cut metal thicker than the ironworker or coper/notcher is rated for.
26. Do Not use any of the ironworkers to cut through metal that has been welded.
27. Do Not cut, shear, cope, punch, or notch on welds. This will chip the blade and or tooling.
28. Never attempt to shear metal narrower than one inch or metal that doesn't reach the hold down.
29. Make sure that the die is in the correct position when punching holes.
30. Before punching metal, make sure the punch and die align perfectly. (Always perform a no metal "Dry Run.")
31. Never punch metal thicker than what the die is intended for.
32. Make sure the punch and die are well oiled. This will extend the life of the expensive punch and die set.
33. Do Not cut High Tensile Strength Metals like:
    Rebar, drill bits, saw blades, tools, tungstens or any other type of heat treated high strength metal.

Cerritos College Welding Technology

ANGLE GRINDER SAFETY DATA SHEET

1. When operating the angle grinders, serious injury may occur if safety precautions are not understood and followed by the student operator. Before students may operate the angle grinders, they must be given safety precautions, operational instructions, and a demonstration by the instructor.
2. Safety Glasses and a clear full face shield that comply with ANSI Z87.1 specifications must both be worn when grinding. Reading glasses or sun glasses cannot be used.
3. Protective clothing that covers arms and hands must be worn during grinding operations.
4. Place the grinder on its back and look to see that the switch is in the off position before plugging in the power cord.
5. Never use a grinding disc that is chipped, cracked, or broken.
6. Regular steel grinding wheels are not made to be used to grind on aluminum or non-ferrous metals as they will load up the grinding wheel, heat up and expand, and then cause the wheel to explode.
7. Do Not grind material for which the wheel is not designated.
8. All grinders must be used with original factory safety guards and side handles.
9. Using excessive force and slowing down the motor speed will cause the brushes and armature to overheat, thus smoking the grinder. A strong person using excessive force can smoke a Harbor Freight 4½" angle grinder in less than ten minutes. "Poof!" another Harbor Freight grinder bites the dust.
10. Always direct grinding sparks away from other people that are in the area.
11. Never use a grinder tilted at 90 degrees to attempt to cut thru a part like an abrasive chop saw. This is one of the most common ways that people get injured (cut in the face) using an angle grinder.
12. Always unplug the grinder before attempting to change the grinding disc.
13. Only use grinding discs that are of the proper rated speed of rotation for that grinder.
14. Always check maximum operating speed established for grinding wheel against grinder motor speed.
15. Four inch and 4½" grinders typically operate at 10,000 rpm and 9" grinders typically operate at 8,000 rpm.
16. Keep the power cord away from the grinding disc, so it does not become entangled and or cut.
17. If the use of an extension cord is needed, always inspect the condition of the plug ends and the cord covering to be sure they are not broken or worn (Do Not use 16-18 gage white household extension cords).
18. Do Not use any power tool while standing on wet or damp floors.
19. Wire wheels, knotted wire wheels, cup brushes, or any type of wire wheel is strictly prohibited at CCC. These types of wire wheels commonly shoot off wires making them extremely dangerous.
20. Grinding must only be performed in the outside laboratory designated grinding stations.
21. Never use a grinder that vibrates excessively.
    This is an obvious indication that something is wrong and or unsafe, for example: The disk might have the wrong arbor size.
22. Grinding must be performed in a well-ventilated area.
23. The use of a dust mask or respirator is recommended for all grinding operations. (Recommended: 3M N95)
24. Make sure grinding wheel reaches full speed before engaging with work piece.
25. Before starting grinding operations, make sure grinding area is free of flammable materials.
26. Students using their own personal grinders must follow all of the previously listed safety rules. Example: Use of the proper grinding disk, type, size, speed, condition, etc. are the sole responsibility of the student. Maintenance, safety guards, etc. are also solely the responsibility of the student.
27. Maintenance and adjustments on all Welding Department angle grinders used in the laboratory must be performed by instructors and or classified maintenance staff only.

Cerritos College Welding Technology

BELT SANDER SAFETY DATA SHEET

1. Before students are permitted to operate the Belt Sander, they must be given safety precautions, operational instructions, and a demonstration by the instructor.
2. Students must always wear protective safety glasses with side shields and a clear full face shield that both comply with ANSI Z87.1 specifications. Reading glasses or sun glasses cannot be used.
3. When operating the Belt Sander, do not wear loose clothing or jewelry that could get caught in rotating parts. This could cause you to become entangled and or pulled into the equipment causing an injury.
4. Never modify or tamper with equipment guards or other safety features.
5. Do Not use the Belt Sander if the abrasive belt is torn or frayed.
6. Students should immediately notify instructor if they see any problem with the equipment.
7. The Belt Sander on the outside of the shop may be used to sand Steel Only.
8. The Belt Sanders inside of the shop are to be used to sand Tungstens Only (nothing else).
9. Soft metals and or non-ferrous metals like aluminum will smear and load up the belt.
10. Do Not sand materials like plastic or wood.
11. Never leave the Belt Sander unattended while it is running.
12. Always turn power switch off when you are finished using the Belt Sander.
13. Do Not apply excessive force against the sanding belt, this could cause the belt to fray.
14. The gap between the tool rest and the moving abrasive belt should not exceed 1/8 inch.
15. Always use an upward stroke to present the work piece or tungsten to the abrasive belt. This method increases safety by drawing hands away from the tool rest (AKA Pinch Point).
16. Never touch or slap the back or shoulder of a person using the Belt Sander.
17. Never crowd or startle a person using the Belt Sander.
18. Keep fingers and hands a safe distance from the belt while engaging in sanding operations.
19. Do Not wear gloves while using the Belt Sander.
20. Use caution when using the Belt Sander because parts become very hot rapidly.
21. The proper sanding of a tungsten should ensure that the fine sanding marks corkscrew off the end of the tungsten and or are parallel to the tungsten's length.
22. Do Not sand tungstens or sharp longitudinal objects vertically with the point facing up as they may get caught by the belt and be impaled into your hands.
23. When sanding small parts, make sure to use pliers or vice grips to hold on to the small parts.
24. Maintenance and adjustments on all equipment in the laboratory must be performed by the instructors and or maintenance staff only. This includes changing the sanding belt.
25. <u>Remember, the Belt Sanders inside the shop are to be used only to sand tungstens.</u>

Cerritos College Welding Technology

ABRASIVE CUT-OFF & METAL SAW SAFETY DATA SHEET

1. When operating the Abrasive Cut-Off and Metal Saws serious injury may occur if safety precautions are not understood and followed by the student operator.
2. Before students are permitted to operate the Abrasive Cut-Off and or Metal Saws, they must be given safety precautions, operational instructions, and a demonstration by the instructor.
3. Students must always wear safety glasses with side shields and a clear full face shield that comply with ANSI Z87.1 specifications. Reading glasses or sun glasses cannot be used.
4. Students must never modify or tamper with equipment guards or other safety features.
5. Do Not operate equipment if the guards have been removed or damaged.
6. Never leave the Saw unattended while it is running. When you have finished using the equipment, make sure to turn the power switch off and stay at the machine until it comes to a complete stop. This will prevent another student from approaching an unattended machine in operation.
7. **Abrasive Cut-Off Saw (AKA: Chop Saw or Hot Saw.)**
8. This Saw has high production efficiency because of its ability to make fast, accurate cuts on pipe and structural square and or round tubing as well as angle iron, channel, and solid stock.
9. All parts must be securely clamped to the material feeding bed to prevent movement before initiating cut.
10. Always check the condition of the disc prior to use. A damaged disc must be discarded and replaced.
11. Periodically inspect the inside of the guard for excessive grinding dust buildup – clean as necessary.
12. Never operate the Saw without the disc guard in the "down ready for cutting operations" position.
13. Never raise the guard while the Saw is running.
14. Do Not use the sides of the disk to deburr parts. (A genius invented the Belt Sander to address this deburring issue.)
15. Never force the disc through the part being cut. Let the disk do the cutting by applying a gradual steady pressure.
16. Never remove cut off pieces or try to remove a jammed piece of metal unless the power is turned off and the Saw has come to a full and complete stop.
17. This Saw leaves a razor sharp burr on the cut part.
    The burr is like a razor blade. Be careful not to let it cut you and always wear gloves.
18. Instructors will demonstrate the recommended cutting positions for various structural shapes like angle iron.
19. **Metal Blade Slow Speed Saw (AKA: Wet Saw or Cold Saw.)**
20. If the Saw has any safety issues like: A loose blade, a loose guard or the coolant water is not flowing,
    Stop immediately and notify instructor.
21. This Saw is used for making straight and or miter cuts on various structural shapes with up to 1/4 inch wall thickness.
22. The RPM of this Saw is slow and therefore the cut leaves no burr, but the cut edge is still razor sharp.
23. There are special blades for different thicknesses and types of materials.
24. This Saw has a built in clamping vise, make sure the material to be cut is securely clamped.
25. Make sure guards are locked in place before initiating cutting operations.
26. To prevent overheating and damaging the blade, make sure there is sufficient water soluble oil flowing over the blade and part during the cutting operation.
27. Use the proper cutting speeds for the material you are cutting:
    (Steel is to be cut fast on speed level #2, and Aluminum is to be cut slow on speed level #1).
28. Do Not force the cut by putting excessive down force on the blade.
    Too much down force pressure will cause the blade to break. Let the saw do the work.
29. Remember this important fact: Metal blades cost $262.00 each, so please treat them with respect.
30. Maintenance and adjustments on all Saw equipment in the laboratory is to be performed by instructors and or maintenance staff only.

Cerritos College Welding Technology

PLASMA ARC CUTTING SAFETY DATA SHEET

1. Students must wear safety glasses that meet ANSI Z87.1 safety standards.
   - Students must also wear a welding hood with the appropriate shade number filter lens.
   - The higher the cutting amperage used, the higher the filter lens requirement.
   - Students may use a number 5 filter lens for demonstrations and cutting durations less than 20 minutes.
2. Protective clothing, gloves and safety boots must be worn to protect students from flying sparks and hot metal.
   - Wear flame resistant clothing that covers all skin below the chin.
   - Plasma Arc Cutting is very loud and the use of hearing protection is highly recommended.
   - If cutting out of position, earplugs are recommended to keep sparks from penetrating the inner ear.
   - Avoid breathing fumes produced by the Plasma Arc Cutting process.
3. Do Not have matches or butane lighters in clothing pockets when using the PAC system.
4. Heat and sparks generated by the PAC system can ignite flammable materials.
   Make sure all flammable materials are at least 35 feet away from the cutting area.
5. Never cut on closed or pressurized containers, tanks or drums.
   Do Not cut on containers that have held toxic or flammable materials.
6. Never Plasma Arc Cut near flammable gases, vapors, liquids, dust or in locations where explosions are possible.
7. Always verify proper grounding of the PAC equipment to the work piece.
   Do Not use chains or wire rope to make the ground connection to the work piece.
8. When cutting on galvanized steel or cadmium plated steel, remove the coating from the cutting area if possible.
   These coatings can give off toxic fumes when cut with the PAC system.
   These coatings can be removed by grinding, sanding, filing, and a respirator should be used.
9. Make sure to direct sparks away from others in the surrounding area.
10. Verbally notify other students in the area when you are about to begin cutting operations.
11. Pay attention to the location of the torch cable, ground cable, and shop airline.
    Route these lines to the work piece in the safest and best way possible to avoid sparks and dripping hot metal.
    Route and or mark these lines so they will not be a tripping hazard to other students.
12. After completing cutting operations, use caution when handling the hot parts that were cut.
    Handle hot parts with pliers and not your gloves.
    A $20 pair of gloves can be destroyed by picking up just one hot piece of metal.
    Do Not leave hot metal parts where others may be subject to burns. Assume all metals are hot!

Operational Directions

a) Set the PAC Machine polarity to DCEN – Ground the part with the grounding cable/clamp.
b) Set the air pressure to 80 P.S.I. – Purge water from airline before connecting PAC airline.
c) Set the amperage in accordance with the metal thickness being cut.
d) Do Not ever allow the torch tip to make contact with the part being cut. This will destroy the tip!
e) Students are not allowed to use the PAC system to cut holes in parts!

Cerritos College Welding Technology

AIR CARBON ARC SAFETY DATA SHEET

1. Students must wear safety glasses that meet ANSI Z87.1 safety standards.
   - Students must also wear a welding hood with the appropriate shade number filter lens.
   - The higher the cutting amperage used, the higher the filter lens requirement.
   - Students may use a number 10 filter lens for demonstrations and cutting durations less than 20 minutes.
2. Students must wear the following personal safety equipment to protect themselves from sparks and hot metal: Leather jacket or cape sleeves with bib, work pants, welding cap, ear plugs, and gauntlet style welding gloves.
3. This cutting process produces very high sound levels.
   Earplugs are required to protect hearing as well as keep sparks from entering your inner ear.
4. Position your head away from any cutting fumes to avoid breathing the fumes being produced.
5. Do Not have matches or butane lighters in clothing pockets when using the ACA process.
6. Make sure that all flammable materials are at least 35 feet away from the cutting area.
7. Never cut on closed or pressurized containers, tanks or drums.
   Do not cut on containers that may have held toxic or flammable materials.
8. Air Carbon Arc cutting requires very high amperage levels.
   Touching live electrical parts can cause shocks and or burns.
   Poor connections and bare spots on cables increase the possibility of electrical shock.
   Inspect leads and or cables daily and notify your Instructor of any problems before using the equipment.
9. Always verify proper grounding of the equipment to the work piece through clean bare metal.
   Do Not use chains or wire rope to ground the work piece.
10. Make sure that the insulating cover is positioned over the air / stinger connection.
    This connection must not be allowed to touch anything that is grounded.
11. Make sure the air ports on the stinger jaws are pointed toward the work piece before turning on the air flow.
12. Discard hot carbon rod stubs into the cutting spark collection / scrap bin.
13. Direct sparks away from others in the area and notify them before starting cutting operations.
14. Pay special attention to the location and placement of ground/power leads and air hose lines.
    Route the leads in the safest and best way possible to avoid sparks and falling metal debris that may cause damage.
15. After completing cutting operations, use caution when handling the hot parts that were cut.
    Handle hot parts with pliers and not your gloves.
    A $20 pair of gloves can be destroyed by picking up just one hot piece of metal.
    Do Not leave hot metal parts where others may be subject to burns. Assume all metals are hot!

Operational Directions:

a) Set the ACA machine polarity to DCEP.
b) Set the amperage in accordance with the electrode diameter being used and the metal thickness being cut.
c) Set the Air Pressure at 100 to 120 P.S.I.
d) Use a maximum electrode extension of 8 inches
e) Stop cutting operation when the electrode is 2 inches from the torch jaw. Reposition, then resume cutting.
f) Turn air valve on before initiating cut.

Instructor's Last Name:	STUDENT SAFETY POLICY	Class Number:

DIRECTIONS: PLEASE PRINT ALL INFORMATION VERY CLEARLY

NAME: _____ STUDENT # _____

ADDRESS: _____ CITY: _____ ZIP: _____

HOME PHONE (____) _____ CELL PHONE (____) _____

E-MAIL: _____

IN CASE OF ACCIDENT NOTIFY:

NAME _____ PHONE (____) _____

NAME _____ PHONE (____) _____

OPTIONAL INFORMATION:

EMPLOYER–COMPANY NAME _____ YEARS EMPLOYED _____

TITLE _____ JOB DESCRIPTION _____

HAVE YOU EVER HAD A WELDING CLASS AT CERRITOS COLLEGE? YES NO

If yes, circle class numbers completed: 49, 59, 60, 100, 120, 130, 170, 200, 210, 220, 240, 250.

STUDENT SAFETY CONTRACT

- I have read and understand the Welding Department's Safety Policies.
- I have read and understand the Continuing Student's Safety Policies or the New Student's Safety Policies & Safety Test.
- I promise to observe all Welding Program Safety Policies and Rules.
- I understand that I am also responsible for knowing and following all rules and policies in the Schedule of Classes.
- I have read, understand, and can physically comply with the Welding Program's "Personal Physical Requirements."
- I have read, understand, and agree to comply with the Welding Program's "Technical Standards Requirements."
- I understand that I will receive specific welding process and equipment Safety Data Sheets, verbal safety instructions from my instructor and a physical demonstration by my instructor before I am permitted to work on new equipment. If I am ever in doubt regarding safety, I will ask my instructor for assistance before proceeding.
- I realize if I am not in attendance at the instructor safety demonstration and I do not sign the Safety Record Sheet testifying that I have received training on that specific equipment, I will not be permitted to use that specific equipment. This will result in the student's inability to complete laboratory assignments. Students that cannot complete laboratory assignments will be asked to withdraw from the class or they will likely fail the class.
- I understand that failure to wear all required personal safety clothing, equipment, and safety glasses as required by Welding Department Safety Policies will be grounds for dismissal from the Program. There should be no skin below the chin exposed. Prescription reading glasses are not permitted unless they have side shields and meet ANSI Z87.1, students that require prescription glasses will need to order prescription safety glasses.
- Students that do not have 100% of their personal safety gear such as:
  Boots, safety glasses, proper clothing etc. will be sent home and marked absent for the day.
- Students that do not have all of their personal safety gear by the first class meeting of the second week will be dropped from the class. The non-compliant student will be dropped and replaced with the next student on the waiting list.
- Any student under the influence, will be subject to disciplinary action, suspension, and or removal from the College.
- I understand that the removal of tools, equipment, metals, welding electrodes, or welding rods from the Welding Department constitutes theft and will result in expulsion from the Welding Program, Cerritos College, and could result in my arrest followed by legal prosecution to the fullest extent of the law.

STUDENT SIGNATURE _____ DATE _____