

Manufacturing

Tuesday, July 29, 2025 3:47 PM

Training

Wednesday, October 15, 2025 2:32 PM

Paul has said that at some point we need to get actual HAAS cert

What to Do
Wait
Send Cut Send
In Shop?
W
In Shop?
In Shop?
Wait
Send Cut Send
Send Cut Send
Send Cut Send?
Wait – Maybe changed
Wait – Maybe changed
In Shop?

Manufacturing Summer Training

Thursday, August 7, 2025 7:20 PM

--Training Plan--
The goal is to have like 8ish people who have the knowledge to make any intermediate part (anything less complex than like Hubs and Uprights) on any machine in a safe, accurate, and efficient way.

Personnel List:
- Ben
- Maddie
- Garrett
- Adi
- Micah
- David T.
- Alexander

4 Things to teach:
Safety, Manual Machines, CAM, CNC Machines

1 Large Safety Class (truthfully not much to go over, but need it nonetheless)
-Shop Rules
-Dos and Don'ts
-Must for Newbies

Parts we can possibly make for training:
- Brake Rotor Pins
- Aero Inserts
- Spherical Cups
- Spherical Spacers
- Suspension Bushings
- Etc.

Manual Machines
-Micah, Garrett already know, David, Ben kinda know as well, just not confident
-Other people & Newbies, 1 on 1, or 1 on 2?

CNC Class
-Have large classes for everyone?
-Have 1 large class about tools and how MasterCAM works?
-Then like 1 on 2 about specifics later?
-Big problem is we don't know the application yet, sucks will truthfully have to wait a bit for this

CNC Machines
-Can do as soon as possible, pre CAMed parts, possibly just manual jogging, just getting people familiar with the machines
-1 on 1, Sam on Lathe, Cam and Abri on Mills, can just teach better 1 on 1, move faster and have a deeper understanding

Actual plan:
Need to prepare for HAAS Certifications, have 4-6 newbies that truly understand CNC machining.
Need to figure out who:
Drew, Darren, Anastasia and 1-3 others
Aubri teaches Monday, Cam and Sam teach Wednesday and Thursday, work with newbies and our schedules to create a time slot for each person for 1 on 1 training.
Don't know if we want 1 or 2 trainings per week per person (if 2 per w/p then only 3 people can be picked (might be overkill though))

Parts to run:
Lathe
Spherical Spacers
Spherical Cups

Manual Lathe
Shockpot Mounts
Aero Inserts

Mill
Acc Mounts??
Part Holders

Training Meeting Ideas with Abri:
- Safety class with possible Kahoot?
- CAM class (either HSM or Mastercam)

- o Get them CAM
- o Show them how to CAM a simple part
- o Possibly give them homework?

- Machining bits

- o Get them to make a part on all four machines
- o Afterwards, get them to make a part for "homework after classes"

- Need to figure out what parts I want to make
- Need to look at stock
- Need to see if I can distribute HSMworks
- Need to fix PowerPoint
- Distribute tool library
- Think about how I want to do training them

- o Whether CAM to be machine or not
- o Be like CNC II class, practice CAM and then do real CAM?

11 Aug 2025 Meeting Notes:
- We can use Fusion360 since it's very similar to HSMworks (Thanks Grarertt)

- o Might need to find a GCode editor (Visual Studio or something else)

- Need to figure out what parts we want to have made for each machine

- o At first, they need to be simple 2D contours for CNC Mill and like one profile for CNC Lathe
- o Manual mill can use a slot and a block or just made a non-square cube square
- o Manual lathe can use whatever bushing

- Also need people to put in their schedules
- First class will be intro, safety, and CAM install, if time permits
- Second will be group CAM and then individual CAM
- Third will be 1-on-1 or 2-on-1

Plastic stock is 2"x2"x0.5"

Link to Word Doc w/ Training Videos (

Thursday, August 7, 2025 7:24 PM

[YouTube Training Video Links.docx](#)

Brake Rotor Manufacturing

Friday, August 8, 2025 9:30 PM

From John/Bray:

- Use short tool and "send it"
- Water jet was used in past for blanks

For actual process:

- Machining blanks shouldn't be too bad, just need to figure out how to cut stock
- Make blanks 5-10 thou larger before surface grinding
- Use Q machine shop surface grinder for actual braking surface, but have to ask for permission to use it
- Need to characterize the friction coefficient so need to make a minimum of 6 parts, 4 for car and two to test different surface finishes
- Possibly use really long parting tool on lathe?
- Could use same tool for wheel inserts because the stock shape is the same, just different material
- If we use the lathe to part it, we also need to use lathe to turn down OD to make sure it is concentric
- Use lathe to face one side, profile it, and then part it with the theoretical 12ft parting tool leaving more than 5-10 thou to account for parting tool deflecting
- Use mill to do locating feature and finish other side

Big Order 1 Tools

Thursday, August 14, 2025 3:28 AM

Helical 4.5" OAL 1/4" Ball x2

<https://www.mscdirect.com/product/details/17733684>

Haas 1.5" OAL 1/8" Ball x4

https://www.haascnc.com/haas-tooling/milling/ball_end_mills/03-0588.html#gsc.tab=0

Haas 1/4" Ball x4

https://www.haascnc.com/haas-tooling/milling/ball_end_mills/03-0590.html#gsc.tab=0

Haas Lathe Inserts

https://www.haascnc.com/haas-tooling/lathe_tooling/turning_inserts/02-0342.html#gsc.tab=0

https://www.haascnc.com/haas-tooling/lathe_tooling/turning_inserts/02-0350.html#gsc.tab=0

https://www.haascnc.com/haas-tooling/lathe_tooling/turning_inserts/02-0458.html#gsc.tab=0

https://www.haascnc.com/haas-tooling/lathe_tooling/turning_inserts/02-0382.html#gsc.tab=0

Long Probe, Dove Tail Jaws, Better Manual Probe, Windex, Paper Towels, Drill Letter setkl,/

Ask Cam and Abri what radius tools did we use for hubs and uprights

- Was there any need for a really long 1/8" Ball?
- Were there any we did not have?

Look and see what tools we have for these jobs, see if we only have one, and see if we can get better stuff in the future (Not this order, but with Haas money)

19 Aug 2025 Ordering Meeting

Tuesday, August 19, 2025 9:16 PM

Put off for later:

- 3/8 Ball Long
- More 1/2 stuff
- Possibly more 0.75 stuff
- Probe styli

Need:

- **Probe batteries**
- Calipers
- **1/8" Balls**
- **Architecture tool (0.75") - 8in OVL - (5in LOC)**
- Stock for everything EXCEPT: Hubs, EV Front Sprocket, Wheel Inserts
- **Stock for jaws** - Depends on how many we want, found 18 6" x 1 1/2" x 3" that we would have to cut and drill ourselves, but newbie project for \$193 where 18 6" x 1 1/2" x 2" would be \$270 from Haas with summer sale 40% w/out
- Speed handles for vices – Newbie Project????

10 PCS 1300mAh LS14250 Batteries 1/2 AA 3.6 Volt Lithium Battery for Dogwatch R9 Leash Dog Collar, Memory Back-up, Real-Time Clocks, Utility Metering er14250 Battery (Non Rechargeable)

From <https://www.amazon.com/BOANY-Batteries-Dogwatch-Real-Time-Rechargeable/dp/B0F2FQX51N/ref=sr_1_5_sspa?crid=2JD5921BJOU6H&keywords=renshaw%2Bprobe%2Bbatteries&qid=1755652685&sprefix=renshaw%2Bprobe%2Bbatteries%2Caps%2C63&sr=8-5-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9idGVY&th=1>

3/8" 1/2" SRACR1010/1212 H06 Lathe Turning Holders Lathe Turning & Profiling Tool Holder with RCMT0602 Round Carbide Milling Inserts For steel stainless steel (2pcs 1/2 holders+ 10pcs inserts)

From <https://www.amazon.com/ZouZmin-SRACR1010-Profiling-RCMT0602-stainless/dp/B0CN4HFWW3/ref=sr_1_8?crid=2J5921BJOU6H&keywords=renshaw%2Bprobe%2Bbatteries&qid=1755652685&sprefix=renshaw%2Bprobe%2Bbatteries%2Caps%2C63&sr=8-5-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9idGVY&th=1>

Meetings

Friday, September 5, 2025 1:47 PM

Attendees: Abri, Cam, Sam
Date: 9/5/2025

Meeting Notes

- Getting a shop manager, remove shop access to anyone who doesn't have shop training
 - o No timeline yet
- During downtime of all machines in O moving to new building, we can submit drawings to Q, and if they don't have the bandwidth, we can get it done
- Paul's Office & new shop managers office will be in new building
- Ppl are trying to start up a combustion team
- We keep dyno and lose composites & machine shop
- WJ will go in the new building
- Hornet hub done march
- Welding tables must be reserved

Training

- 20+ ppl who want to join manufacturing, wanna train 5-6 ppl
- Training days to Wed & Thur & Mon
- Rules test (safety + basics)

Ideas

- 5 weeks until SES projects release
- Monday 1:30pm meeting to pick people to train
- Train 1 person + 1 person doing something on their own following a guide

To-Do

- ☐ Look up if HAAS has free certs or fusion that we can do
- ☒ Push to get orders done, talk to Katie about funding
- ☐ CAM videos
- ☐ Have meetings Fridays at 1:35pm

To-Do Today!

- ★ ☒ Push to be in admin meeting Need probes now, need training stock now, need lathe tools
- ★ ☒ Talk to Earl today about getting HAAS tech back out, we have his contact so ask for permission
- ★ ☒ Send out pool for who can be available mon, thur, wed for training for 5 weeks, training will be 3hrs

Attendees: Abri, Sam, Cam
Date: 9/8/2025

Meeting Notes

- Machine shop is slowly being moved to new building

Training

- 4 weeks training
- Person assigned to one person
- This week make videos & send out forms
- Friday 1:35pm planning

To-Do

- ☐ Look up if HAAS has free certs
- ☐ CAM videos
- ☐ Double check spindle probe
- ☐ Make a maintenance schedule

To-Do Today!

- ★ ☐ Keep trying to find Earl in-person yap
- ★ ☐ Send out poll
- ★ ☐ Need stock onlinemetals

Manufacturing Calendar

Friday, October 24, 2025 12:20 AM

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

30 September 2025 Meeting

Tuesday, September 30, 2025 7:11 PM

- This training set is winding down, so more people can get trained
- Should do debrief with current trainees
- Try to create less of a knowledge discrepancy
- If you'd like to get trained, show up to meetings pls
- Soon™

- Projects:
 - Tool Library - Create accurate list of the tools we own to reduce the amount of time it takes to CAM a part
 - Mill
 - ☐ Daren
 - ☐ ~~Corey~~
 - ☐ Tucker
 - Lathe
 - ☐ Gavin
 - ☐ Erika
 - Spindle Lobe Diagram - Create diagram that helps determine feeds and speeds for our machine
 - Daren
 - Wheel Inserts (Old Design)
 - Jacob
 - Rotor Pins (Old Design)
 - Training Part
 - Water Jet Parts List - Find all the part numbers from OMAX for the parts needed the water jet
 - Trevor
 - Finish Excel Spreadsheet pls - Collets, new lathe inserts, new end mills, drills, center drills, router bits, reams, etc.
 - Ben W
 - David Olmo Inserts
 - Training Part

7 October 2025 Meeting

Tuesday, October 07, 2025 7:06 PM

Stock for wheel inserts was NOT cut

- At Machine Shop
 - Broke first blade
 - Almost broke second blade
 - Got stuck
 - Gave up
- Will NOT be cut, try to wait until we make all of them with new design
 - Out of **rectangular** plate stock
- Alternative: Recip Saw ("It's like...doable" - Cameron Potter)
- Magically find wheel inserts™
-

Mill Library Update

- They know what to do™

Waterjet Update

- "Waterjet" - Trevor™
- Almost done finding part numbers
- Emailed OMAX about part numbers, response TBD
 - Pls CC us on it

Lathe Library Update

- Will do stuff Friday
- Where's Gavin and why is he not dancing

O-Building Lathe Update

- 0.03" OD offset was because probe was replaced and calibration was not done
- ID tools also got fixed
- Bolt-on Toolholders **MUST** be held against the turret during installation
- Flat surfaces do not hold round parts well
- We have like 35,000 jaws that we just never used, but we will be using them from now on
- Basically, it was **mostly** a skill issue

14 October 2025 Meeting

Tuesday, October 14, 2025 7:10 PM

Lathe Fusion Library peoples (Gavin Rogalski, Erika)

- Message sent in Machining general about when to meet

Mill Fusion Library

- Should be done this week

Waterjet-

- Meeting with Paul and Mark Wednesday (10/15/25), order sheet has been sent

Ben's O-Building Library

- Has done nothing...

- Is useless**

Further Training

1. Alden Perreca
2. Ben Weinberger
3. Jack Gambino
4. Anthony Flores
5. Trevor Boydston
6. Gavin Reece
7. Maddie Jesionowski
8. Gavin Rogalski
9. Mustafa Altinay
10. Alex Lochamy
11. Tucker Rivera
12. Rishit Jain

Machining 101 Friday at 5 (this is for Fusion essentials, and basic machining knowledge)

Weeks after will be down in O training on machines

Projects!!!

Rotor Pins

- Cam, Ben, Jack

Thursday

Output shaft Redesign

- Alden

Spherical's

- Tristen

Stock Order

-Mufasa

Brake pivot shaft

Brake pivot shaft flange

-Jacob

Acc mounts

-Someone

15 October 2025 Meeting

Wednesday, October 15, 2025 2:49 PM

Attendees: Cam, Sam, Abri

WATERJET

Meeting Notes:

- No funding for WJ parts or technician to come
- EHS won't approve machine to run until they deem it "safe"
- Can bypass needing an OMAX tech if we replace all "safety" parts\
- Funding may come in Spring, no guarantee

Questions:

- ☐ Ask for EHS list of complaints from Paul
- ☐ Email OMAX about sponsorship
- ☐ Connect with OMAX on LinkedIn & ask about sponsorship
- ☒ Read OSHA req for water separation and reach out to Mathew Rosberg (EHS Guy)
- ☐ Poke Mark about moving the waterjet pump

TRAINING

Meeting Notes:

- Learn by repetition
- Current Parts that need to be assigned:
- Training on 4 machine & weld, 3 -4hr blocks across 3 weeks, 5 groups (1 old & trained, 1 new)

21 October 2025 Meeting Notes

Tuesday, October 21, 2025 6:57 PM

Project Updates

-Excel Library

Ben is slow

-Talked about Haas certifications

Emails:

Omax-waterjet sponsor

MNDT-waterjet

Novelis-stock

SCS-sponsor

HAAS-Certification payed for?

Projects

Acc Mounts-Darren

Spherical Spacers-

24 October 2025 Meeting

Friday, October 24, 2025 2:29 PM

Need something for newbies to do

- Writing meeting notes
- Pull popsicle sticks
 - Create said popsicle sticks
- Game-ify the meeting
- Update manufacturing tracker with their own task as they get assigned
- Create calendar
 - Have date once a year for stock library to be updated
 - Have date for order sheet of everything generic needed
 - Have KSU and Team dates in calendar
 - Have someone fill calendar
- Sitting in front two rows
 - Projector be loud, can't hear
 - We're a team, we don't bite
- People must present their project every week, regardless of any progress
- Create meeting norms
- Start with meeting norms, good news, news news, project updates, then shop rules, then CAM review
- Follow SCARE so scary stuff doesn't happen
- Get there earlier and use personal computers

Jobs:

Stick Puller

Meeting Minutes

Everyone updates the Manufacturing Tracker with their own project

28 October 2025 Meeting

Thursday, October 23, 2025 11:57 PM

Put your project update here (keep it vertical please):

Ex:

Module Plastics Test

Cameron

CAM'ed and machined the stud bond tester. Used a scrap ingot as a sacrificial and toe clamps to secure the stock. Broke the 2 0.03" endmills we have, finished it with a .039. It worked much better machining wise, the studs seem to fit great, the bus bars, not so much. Measured the bus bars and they were about 20-25 thou under, and the plastics were <7 thou over (could have been a measuring error). Figured out machining PEI is not like HDPE.

Waterjet:

Have confirmation and the ok to tear the pump apart tomorrow (wed.) in order to determine the list of parts needed. Hoping the pump isn't in too bad of condition due to the parts being extremely overpriced.

Acc Mounts:

Daren

Was planning on CAMing Monday, has been pushed back to Wednesday, If there is a specific deadline let me know otherwise will be done either Wed or Fri

Front Sprocket Redesign:

Alden

Have solid works model fully finished just need to define the gear to let it change when back gear is Changed. Plan on working on CAM once design is finalized.

Spherical holder cam:

Jack. G

I haven't done an damn thing other than download the file to my pc.

4 November 2025 Meeting

Tuesday, November 04, 2025

5:34 PM

Put your project update here (keep it vertical please):

Ex:

Module Plastics Test

Cameron

CAM'ed and machined the stud bond tester. Used a scrap ingot as a sacrificial and toe clamps to secure the stock. Broke the 2 0.03" endmills we have, finished it with a .039. It worked much better machining wise, the studs seem to fit great, the bus bars, not so much. Measured the bus bars and they were about 20-25 thou under, and the plastics were <7 thou over (could have been a measuring error). Figured out machining PEI is not like HDPE.

Output Shaft Redesign

Alden Perreca

SolidWorks model is fully complete did some coming which need to be reviewed. No cam since lathe tools are

Non existent.

Waterjet Update:

Trevor + Cameron

Took apart water pump to access what is actually wrong with it

Realized only seals and a few filters are actually needed to be replaced as well as a potential for new plunger rods (rods aren't horrible just used)

Took price of waterjet parts from 15k to around 8k

Jack

Started to cam the spherical cups. Missing tooling :{.

11 November 2025 Meeting

Tuesday, November 11, 2025 1:42 AM

Things to discuss:

People Cam is bringing to HAAS for certifications

- Cam
- Sam
- Jacob
- Darren?
- Maddie??

Currently each of you will need to pay \$300 and complete your Video trainings ASAP so we can schedule the trainings.

Project Updates

Output Shaft Redesign

Alden Perreca

Everything should be done PP1 is complete and ready and so is the model in fusion. Need to have CAM be double checked at end.

Module cap machining

Cameron Potter

Still waiting on Dom to finish the CAD (he is waiting on what adhesives to use). Got the new .03 endmills, yippee, don't necessarily need them thou, but will use them.

Tool library (Excel)

Ben weinberger

All of the reams have been logged and some of the end mills gonna try and maybe knock those out this weekend idk ill see how it goes overall like 60% done ish

Emails for Haas and NDT have been drafted, waiting to talk to Cam and Varun before sending. I may also talk to Richard too just to make sure.

Jack.

Cups cammed. I think

18 November 2025 Meeting

Tuesday, November 18, 2025 3:05 PM

Project Updates

Alden Perreca: Front Sprocket

CAM should be good and just need sprocket to be machined.

Need some help finishing up PP1 and PP2 however PP1 practically done.

Jack: Spherical Spacers

Completed the operations, just need feeds and speeds

Anthoney: Spherical spacers

Need to add feeds and speeds to 1 tool then it will be done

Daren: Acc mounts

Was sick for 2 weeks, has NOTHING DONE

Alex: Emails

HAAS is ready, Cam dropped the ball, need to figure out who to send it too

NDT still needs work

Maddie: Lathe Tool Library

Thanos snapped tools because they were wrong, still missing important tools

Hopefully get the important ones done tonight

Sam Forrester: Module test plastics

Almost done, should finish tonight

Jacob: Wheel inserts

Waiting on Jordan for finalized CAM and going to try 3D printing a work holding piece with embedded nuts

Ben: O building library

A few more endmills to do

Assignments:

Trevor: Cam's sleeves

Monday, September 8, 2025 2:26 PM

Welding

Thursday, July 13, 2023 4:19 PM

All stuff welding related :D

Welding Assessment

Friday, July 14, 2023 12:19 AM

[Microsoft Forms](#)

In the microsoft forms group the welding form has been added

Weld Vids

Friday, July 14, 2023 12:19 AM

<https://www.youtube.com/@PacificArcTigWelding/playlists>

Goated channel for learning basics and fundamentals many great series

<https://www.youtube.com/@TheFabricatorSeries/playlists>

Another great resources must watch TIG Theory and Lecture

Welding Info

Wednesday, July 12, 2023 9:16 PM

Intro To Weld ----> Weld 1102----> Partial Weldment--> Weldment Theory----> Advanced Weldmenting Techniques----> 375 Amp BBY

Intro to weld:

Material prep

1. First identify the material you are welding as each material has different procedures
2. Let's start with steel,
 - a. We weld mostly 4130 chromoly tube; chromoly has mill scale from the facturing process that needs to be removed from the top layer of welding, failure to do so will result in contamination in the weld and will make for a weaker weld
 - b. To remove the mill scale you must use an abrasive such as the wire wheel, or scotch-brite pads.
 - c. The metal should no longer be gray and have a nice shiny finish to it
 - d. Your metal is now ready to weld
3. Now let's move on to aluminum
 - a. Aluminum requires a more intensive cleaning process than steel since it is more prone to contamination within the weld.
 - i. Most of are aluminum part are cut on the water jet and will contain garnet in the edge of the weld. Garnet will contaminate your aluminum welds and make for a more difficult weld and a weaker joint.
 - b. To remove the garnet you must file down the edge of the part until shiny
 - c. Now that the garnet is removed you must now clean the part with a scotch-brite pad to remove any surface contamination of the metal
 - d. Once done you should wipe down the surface with acetone to remove any remaining contaminant's
 - e. Not only will you need to wipe down the part but also the filler rod you will be using.
 - f. Your aluminum is now ready for welding
4. In general these are the practices you should follow for the majority of the parts we weld here. While on occasion we weld different grades of steel the general procedure remains the same. While we weld more metals than just aluminum and steel the other metals will be discussed further on in the guide

Torch Setup:

Torches come in a wide range of sizes, shapes, and use different "Consumables"

Consumable- Items that wear over time and you will constantly be changing/ adjusting and changing out

Ex...

Tungsten, Welding Cup, Gas Lens, Back Cap, Collet Body

The torch is the part of the welder where all the consumables go onto. Please note there are 3 main types of torches you will see in our shop.

Ex...

Series 9 (Limited to 125 Amps)

Series 17 (Limited to 150 Amps)

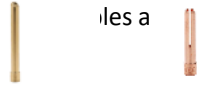
Series 18 (Limited to 350 Amps)

Next up is the back cap



The back cap as the name implies, screws into the back of the torch. Its main purpose is to seal the torch and stores your tungsten based on length. The shorter the back cap the shorter the tungsten must be but also the smaller overall size the torch will be. This allows for greater maneuver

The back cap as the name implies, screws into the back of the torch. Its main purpose is to seal the torch and store your tungsten based on length. The shorter the back cap the shorter the tungsten must be but also the smaller overall size the torch will be. This allows for greater maneuverability to get you into some tight places. Keep in mind that the back cap threads are dependent on torch size. 17/18/26 all can use 9/20



Now to move on to collets

These hold your tungsten and allow the current to flow through the torch handle and into the tungsten. The important thing to remember here is that depending on the thickness of your tungsten that will determine the size of collet that you will need. There are 2 types of collets including wedge and split collets, some argue that wedge collets hold a tighter arc but they are a bit more expensive than split collets

We can't forget about Gas Lenses



Above can be seen 2 different types of gas lenses

The Bronze looking one is known as a standard body and has holes on the side allowing argon to flow out and onto your material. The other one is known as a stubby gas lens. As a personal preference we have switched over to gas lenses due to a more compact size, This is a personal preference and some argue that Standard bodies work better. Find the one you prefer, with welding it is important to remember that there are many ways to weld so find the way in which you are comfortable. For us that means Stubby Gas Lenses.

Last but definitely not least Welding Cups



Welding Cups come in various shapes and sizes as well as material, above you can see a few cups that we most likely have around the shop. The pink is a standard alumina cup, these are great for ac and dc welding and are usually the cheapest available cups, the white is a furick cup, furick cups are expensive but offer a much slimmer package they also use smaller gas lenses. Edge cups are the crème de le crop they are either made of glass, pyrex, or quartz. The Quartz cups can handle AC-DC welding and also use gas lenses.

This is just step 1 of cups step 2 goes into which sizes are used for what materials,

A size 4-8 is recommended for aluminum to decrease white oxidation line on material

A size 8-12 is recommended for Steel and this is what is mainly used on chassis welding and tabs

A size 16-18 is used for Titanium and sometimes stainless steel Keep these cups to exotic materials as they use more argon.

As a rule of thumb your gas flow should be 2.5x the size of your cup size so a size 8 cup uses 20 CFM

Stick-out is also based off the size of your cup, the rule of thumb here your stick-out is cup size/ 16 in inches for a size 8 cup you should have 8/16ths or 1/2 in of stick-out. This is a rule of thumb but generally stick-out can allow you to have better visibility in most areas. In dire situations a size 18 cup will give you the most stick-out and might be necessary

And now you know how to set up your torch

Machine Setting

There are a couple of settings that you will be changing regularly when welding such as amperage, polarity, postflow/preflow. While our machines allow to change more settings there is no real need to change them.

Amperage:

Amperage is the amount of "heat" you are putting into a part the higher the amperage the more heat you will put into a part. The general rule of thumb is to use 1 amp per thousand of an inch of material thickness. For example if you are welding a part with a thickness of .045 you should use around 45 amps. Now this rule does not have to be followed but it will give you a good starting point of where to set amperage. As we move into more advanced joints the material thickness will vary so you will need to be able to

control the foot pedal well. Speaking of foot pedals, the foot pedal connected to the machine allows us to vary our amperage and will have a maximum amperage to what you set on the machine. As you get better at controlling the foot pedal the need to change amperage on the machine will decrease as you will be able to weld most materials with the same amperage setting on the machine.

Polarity:

Our machines have two settings for polarity, AC and DC. DC is used to weld steel, stainless steel, titanium and various other metals. AC on the other hand is used to weld aluminum and various other metals we don't weld here. In general DC does not have many settings you can change, on the other hand AC does; With AC you can change the frequency, balance and waveshape, we'll get more in depth with what each of those do later on.

Postflow/preflow:

Post flow is the amount argon you will have after you finish welding. This is critical as having argon flow when done welding will prevent oxidation of the weld and will therefore make a stronger weld. Not only does this prevent oxidation of the metal but oxidation of the tungsten. Preflow is the same thing as post flow but come before an arc is struck. Pre flow will help make sure that there are no contaminants in the air surrounding the material. Some metals don't require as much post flow as other aluminum for example does not need much post flow on the material itself but is needed to cool down the tungsten, metals like titanium require larger amounts of post flow as oxide will form if the metal is not covered properly

Argon/Cups

Filler Material

Welding plan

Friday, July 14, 2023 1:12 AM

Get person welding. Look for consistency in welds and then move down in thicknesses to gain more control.

A consistent weld should be:

Good pattern

not too big of a heat affected zone.

Weld should mostly be penetrated, as the thickness goes down penetration should become easier and more evident in the weld.

When first training a welder one thing that the Trainer should look for is a good torch angle and be sure that it's not too steep and this could lead to problems welding. Torch height is also important to keep consistent.

Good technique with filler rod should include keeping the filler rod at a proper distance from the weld puddle and not adding an excessive amount of filler to the weld as this will lead to too tall of a weld. The weld should remain mostly flat throughout.

The key step when training someone is to make sure they know why they are doing what they are doing and what changes that they are making are having an effect on their welds. If they are being inconsistent it's good to ask what changes they made, were making the welds look better or worse.

Sheet of a thickness that not too thick but not too thin should be used when first training a welder. .070 works well for starting someone off

As the trainee becomes more comfortable with welding consider moving to tube welding.

To start off have them weld tube ends together as this is more difficult to do and will help move around tube.