THE SHED
KU-RING-GAI COMMUNITY WORKSHOP

Member Accreditation

TIG Welding	M11

PowerCraft TIG201

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The Shed provides items such as welding masks and gloves.

Members are required to provide their own footwear, eyewear, hearing protection and masks.

Safety

This is a very high priority for our Shed members. There are some aspects that are mandatory under our insurance policies and some which the The Shed requires members to adhere to for everyone's benefit.

The Shed Safety Induction

It is a requirement of attendance at The Shed that members have reviewed the Safety Induction Presentation

Personal Protective Equipment

This is required in various forms depending upon the equipment being used or the activity being undertaken.

Protective eyewear is always mandatory when using machinery.

The Shed schedules a Coordinator and a First Aid Safety Officer for each day of attendance and their safety directions are final and must be adhered to.

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TIG Welding

https://www.weldingtipsandtricks.com/tig-welding-tips.html

https://www.youtube.com/watch?v=tNYmo2_DI6c

TIG Welding

Gas tungsten arc welding, also known as TIG - Tungsten Inert Gas welding, is an arc welding process that uses a non-consumable tungsten electrode to produce the weld. The weld area and electrode are protected from oxidation or other atmospheric contamination by an inert shielding gas

TIG welders can be used to weld steel, stainless steel, chromoly, aluminum, nickel alloys, magnesium, copper, brass, bronze, and even gold. TIG is a useful welding process for welding wagons, bike frames, lawn mowers, door handles, fenders, and more.

TIG welding uses electricity to create an arc between a tungsten electrode and the metal to be welded. The arc melts a filler rod of metal alloys. In order to make the weld as strong as possible, the arc where the tungsten electrode is closest to the metal and the filler rod is surrounded by an inert gas, typically argon or an argon-CO2 blend. This “shielding gas” as it is known prevents atmospheric gases like oxygen from entering the pool of molten metal filler rod.

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Eye protection is mandatory

Eye protection during TIG Welding

The arc created during TIG welding gives off UV (ultra-violet) and IR (infra-red) radiation that are absorbed by the cornea and can even reach the retina of the eye. The UV given off by any electric arc welding is considerably more intense than sunlight.

To protect the eyes, a welding helmet is used during TIG welding. The helmet has a darkly tinted window in front of the eyes called a lens shade. The shade protects the cornea of the eyes from Photokeratitis or “arc eye” which is damage caused by too much UV light. Only a few seconds of exposure will result in "arc eye" although symptoms may not be felt for several hours.

In addition to protecting the eyes, the welding helmet protects the welder’s face and neck from the UV light which can cause damaging skin burns.

Fortunately, except in the most extreme cases arc eye can be treated with eye drops, pain medication and limiting further exposure to light (dark rooms, sunglasses, etc.) until the symptoms improve. Repeated exposure has been linked with cataracts.

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Radiation burns

Skin protection during TIG Welding

Skin reacts to exposure of high levels of UV radiation from TIG welding. Over time it will cause the equivalent of sun burn from staying out too long in the sun.

Like sun burn, TIG welding skin burn is caused by overexposure to UV radiation. However, unlike sun burn, the effects from TIG welding can happen in as little as 15 minutes.

The effects of UV radiation poisoning to the skin are well known. Ultraviolet radiation increases the risk of three types of skin cancer: melanoma, basal-cell carcinoma and squamous-cell carcinoma.

Fortunately, the solution is simple. In addition to eye, head, and neck protection from the welding helmet, gloves and long-sleeve shirts should be used during TIG welding.

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Safety First

Turn on and use the fume extraction system whenever you are welding

It has been installed to protect your health

TIG Welding Fumes

A small but toxic by-product of TIG welding is the generation of ozone, nano-particles (less than 100 nm) and off-gassing of the molten metal. Nano-particles are especially harmful to human health because of their ability to penetrate inside the respiratory system and enter the blood stream.

One chemical that was always present was ozone (O3). Even relatively low amounts of ozone can cause chest pain, coughing, shortness of breath and throat irritation. It may also worsen chronic respiratory diseases such as asthma and compromise the ability of the body to fight respiratory infections.

While the long-term health effects of welding exposure to many of the chemicals and particles are not agreed upon, the safest solution would be to only weld in a well-ventilated area and to follow proper welding technique.

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Pic of fume extraction when installed

TIG Welding Shield Gas Exposure

TIG uses argon, carbon dioxide and other inert welding shield gases which can be dangerous if they displace the oxygen in a confined space. For example, welding may be required inside a stainless-steel container or in long sections of industrial pipe. Even in small TIG welding projects, the welder is only inches away from the plume of shield gas surrounding the work piece. Unless an effort is made the welder and support personnel in the vicinity can be exposed to an accumulated cloud of argon or carbon dioxide.

If safety is not central to the welding personnel, people in the area are subject to the effects of both high levels of shield gas and oxygen depletion.

The effects of elevated levels of argon and carbon dioxide are similar. Both are odorless and tasteless gases. High levels of exposure can lead to dizziness and nausea ultimately followed loss of consciousness, and death.

In cases where TIG welding takes place in a factory, a local exhaust ventilation system including a hood and ducted fan are recommended.

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TIG Welder

The Shed has installed new welding technology together with enhanced fume extraction

- Powercraft TIG 201 Welder
- Statiflex® Wall Mounted Welding Fume Extractors with Ultraflexiable Fume Arm 3M

The Statiflex 400-MS stationary, wall-mounted low vacuum system is intended for light to medium duty extraction and filtration of welding fume. The Statiflex is designed for facilities with fixed work stations and little available floor space. A self-cleaning filter is standard on the Statiflex 400-MS.

Generous Airflow - 735 CFM with LFA 3.1 or 4.1 extraction arms and SF2400 fan

Cleaner Work Environment - Reduce dust and dirt in operator and surrounding work area

Filter Size - Generously sized filters help to lower operational costs

Flexible Configuration - Ability to choose a single or dual arm unit to meet application requirements

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Powercraft TIG 201

One machine, 7 types of welding processes:

- MMA
- DC TIG
- DC TIG/PULSE □ AC TIG
- AC TIG/PULSE □ AC TIG/MIX
- TIG/SPOT

PWM - Pulse-Width Modulation;

MMA - Manual Metal Arc welding;

TIG - Tungsten Inert Gas welding.

POWERCRAFT® TIG 201 AC/DC

The POWERCRAFT® TIG 201 AC/DC is a new generation of multi-functional high quality welding machine. The power source adopts a microcomputer system control, dual current loop PWM control, full-bridge high frequency inverter system. It has convenient operation, stable performance, small size and high duty cycle. The power source is mainly applied to the welding of aluminium, aluminium alloy, copper, titanium, and other non-ferrous metals and stainless steel, carbon steel and other metals.

CHARACTERISTICS

To ensure a high success rate of arc starting the power source incorporates a high voltage and pulse (high frequency) arc start circuit but without a discharge circuit so that it makes arc start easier and safer. Lift arc start is another option for those wishing to avoid electromagnetic interference.

Stable arc without breaking the arc. Adopted synchronous pulse arc maintenance circuit and dynamic voltage clamping circuit so as to avoid arc breaking issues during the AC TIG welding process.

In MMA mode, the machine will turn off the main loop output power within 2 seconds after ending welding, the advantage is safer operation, and saving power.

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Features

- 2T/4T Gun Trigger Settings For selecting preferred trigger operation.
- Gas Solenoid Provides control for shielding gas.
- Spot Timer Adjust spot time duration.
- Full Control Over Output Anti-sticking, adjustable AC Balance, Pre-flow and Post-flow, control of Initial, Slope and Crater Currents, Pulse Frequency and Ratio controls.
- For Stick Welding Adjustable Arc Force, Hot Start, IGBT technology, easy to set controls, ready to weld with accessories.
- Remote Control Ready operates optional foot remote control.

Features

The **POWERCRAFT® TIG 201 AC/DC** inverter machine is intended to be used for light to medium duty welding application. It is an ideal choice for maintenance, small repairs & general fabrication. The POWERCRAFT® machines are designed to be used on aluminium, aluminium alloy, copper, titanium and other non ferrous metals as well as stainless steel, carbon steel and other metals.

- Small and light weight yet versatile with 6 machines in one.
- Built in VRD Increased operator safety in environments with increased hazard of electric shock.
- Generator Compatible - Ideal for site work.
- Intelligent protection - Over voltage, low voltage and over current.
- High Frequency and Lift TIG functions - For arc starting without tungsten contamination your choice of arc initiation is provided.
- Save your settings Up to 20 set modes can be saved and recalled.

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POTENTIAL HAZARDS

- Electric shock.
- Fumes.
- Radiation burns to eyes or body.
- Body burns due to hot or molten materials.
- Flying sparks.
- Fire.

PRE-OPERATIONAL SAFETY CHECKS

1. Locate and ensure you are familiar with all machine operations and controls.
2. Check workspaces and walkways to ensure no slip/trip hazards are present.
3. Ensure the equipment and work area is dry to avoid electric shocks
4. Ensure the work area is clean and clear of grease, oil and any flammable materials.
5. Keep the welding equipment, work area and your gloves dry to avoid electric shocks.
6. Ensure your gloves, welding torch and work leads are in good condition.
7. Ensure other people are protected from flashes by closing the curtain to the welding bay or erecting screens.
8. Start the fume extraction unit is on before beginning to weld.
9. Ensure work leads do not create a tripping hazard.

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Control Panel

Controls

The front panel includes 6 button switches (welding model switch, welding function switch, arc start switch, 2T/4T switch, data loading, recall switch and remote switch), 1 encoder switch, 33 LED indicators and 1digital display meter.

WELDING MODES SWITCH:

□ MMA □ DC TIG □ AC TIG □ SPOT

WELDING FUNCTIONS SWITCH:

- Pulse (output current will be variable periodically based on the preset pulse frequency and base current)
- MIX (AC square wave current will be inserted by a DC current to stabilize arc)

ARC START SWITCH:

- LIFT: TIG operation with touch start method.
- HF: TIG operation with High frequency start method so operator doesn't need electrode to touch work.

2T/4T SWITCH:

- 2T: For 2-step operation of short welding. □ 4T: For 4-step operation of long welding.

DATA LOADING AND RECALL SWITCH:

- Loading (20 of set modes can be saved)
  Recall (operator can use saved procedures).

ENCODER SWITCH (SETTING)

- The switch can be turned and pushed. Turning for choosing program and adjust data. Pushing for confirming and exit of program and data.

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After Use

- Switch off the machine and fume extraction unit when work has been completed.
- Close the gas cylinder valve.
- Hang up the welding gun and welding cables.
- Leave the work area in a safe, clean and tidy state.

OPERATIONAL SAFETY CHECKS

1. Ensure the machine is correctly set up for current, voltage, and gas flow.
2. Ensure work return earth cables make firm contact to provide a good electrical connection.
3. Strike the arc before placing the tip of the filler wire in the weld zone.
4. Ensure power is off when changing tungsten electrodes.
5. Never leave the welder running unattended.
6. Avoid welding flashes.
7. Erect UV safety curtains as required
8. Ensure no person is endangered when operating equipment.
9. Maintain a straight wrist position. Avoid using your wrist in a bent, extended or twisted position.
10. Maintain a proper balance and secure footing. Do not stand on slippery, uneven or unstable surfaces. Do not work in odd positions or on ladders.
11. Do not apply excessive force to consumables.
12. Do not allow waste to accumulate in or around work area.
13. If the welder starts to vibrate unusually, switch off and check immediately