

Safe Use of TIG (GTAW) Welding Equipment

Standard Operating Procedure (SOP)

1. Purpose

To prevent electric shock, burns, arc eye, UV skin burns, inhalation of toxic fumes (especially from stainless and aluminium), and fire when TIG welding mild steel, stainless steel, aluminium, titanium, or exotic alloys.

2. Scope

Applies to all TIG welders in the workplace.

3. Responsibilities

Operator: Must be trained and strictly follow this SOP.

Supervisor/PCBU: Ensure annual test & tag, correct gas, fume extraction, and only authorised welders use the equipment.

4. Major Hazards

- High-frequency (HF) start shock and burns
- UV radiation (stronger than MIG/Stick)
- Toxic fumes (chromium VI, ozone, aluminium oxide, thoriated tungsten dust)
- Argon asphyxiation in confined spaces
- Fire from sparks

5. Mandatory Personal Protective Equipment (PPE)

- Auto-darkening helmet shade 9–13 (AS/NZS 1338.1)
- Flame-resistant clothing, cotton or leather
- Dry TIG gloves (thin leather or goatskin – no holes)
- Class 5 hearing protection (HF start can be loud)
- P2 or PAPR respirator when welding stainless, aluminium >30 min, or in confined spaces
- Steel-cap boots
- No synthetic clothing

6. Pre-Operation Checks

- Power lead, earth clamp, torch lead, and gas hose undamaged
- Earth clamp clean and tight on work or bench (<2 m from weld)

- Tungsten electrode correctly ground (pointed for DC, balled for AC) – never use thoriated red-tip tungsten unless approved and dust extraction in place
- Collet, collet body, and ceramic cup correct size and undamaged
- Pure argon cylinder secured, regulator set to 8–15 L/min
- Remote foot-pedal or fingertip control clean and working
- Local exhaust ventilation (LEV) or movable fume extractor in position
- Fire extinguisher (9 kg ABE) within 5 m and in test
- Area clear of flammables for 8 m radius

7. Safe Operating Procedure

Set-Up

- Set correct polarity (DCEN for steel/stainless, AC for aluminium)
- Choose correct amperage, balance, and frequency (refer machine chart or WPS)
- Clean base metal and filler rod – acetone wipe stainless/aluminium
- Grind tungsten longitudinally (never across) on dedicated wheel

Standard Operating Procedure (SOP)

- Put on full PPE – helmet down before striking arc
- Strike arc using HF or lift-arc only – never scratch-start
- Maintain 1–3 mm arc length
- Keep argon post-flow on for at least 10 seconds after extinguishing arc (protects tungsten and weld pool)
- Never touch hot tungsten or ceramic cup

Shut-Down

- Release foot pedal/finger control
- Allow post-flow to finish
- Hang torch on insulated hook
- Turn off welder, then close argon bottle valve
- Bleed gas from regulator and hose
- Back off regulator pressure screw

8. Absolutely Prohibited Actions (Zero Tolerance)

- Using red thoriated tungsten without dedicated grinder and LEV
- Welding without post-flow (causes contamination)
- Touching live torch parts or work without gloves
- Welding in wet conditions
- Welding on containers that held flammables without hot-work permit
- Leaving welder running unattended
- Dry sweeping tungsten grinding dust

9. Emergency Procedures

- Electric shock/HF burn: isolate power first – do not touch victim until safe
- Arc eye: rinse with sterile saline, medical attention same day
- Argon asphyxiation: rescue only with breathing apparatus, call 111
- Fire: use extinguisher on small fires; evacuate and call 111 for large fires

Approved by: Joshua Klein Ovink

Position: Director

Date: 01 July 2026

