

Safe Use of Manual Metal Arc (MMA / “Stick”) Welding Equipment

Standard Operating Procedure (SOP)

1. Purpose

To prevent electric shock, burns, arc eye, inhalation of toxic fumes, and fire when stick welding mild steel, stainless steel, or hard-facing.

2. Scope

Applies to all MMA (stick) welders in the workplace – inverter, transformer, or engine-driven.

3. Responsibilities

Operator: Must be trained and follow this SOP at all times.

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

4. Major Hazards

- Electric shock (open-circuit voltage up to 90 V AC/DC)
- UV/IR radiation (arc eye, sunburn)
- Welding fumes (manganese, Cr(VI) from 316/312 rods, fluorides from 7018 low-hydrogen)
- Spatter burns
- Fire from hot slag

5. Mandatory Personal Protective Equipment (PPE)

- Auto-darkening or fixed shade 10–14 welding helmet (AS/NZS 1338.1)
- Flame-resistant welding clothing - cotton or leather
- Dry leather welding gloves (gauntlet type)
- Class 5 hearing protection when using high-amperage or engine-driven welders
- P2 or PAPR respirator when welding stainless, high-nickel, or in confined spaces
- Steel-cap boots, no synthetic clothing

6. Pre-Operation Checks

- Welding leads and electrode holder undamaged – no exposed copper or cracked insulation
- Earth clamp clean, tight, and within 2 m of weld
- Correct electrode type and diameter for job (e.g., 6013, 7018, 309, 312)

- Electrode stored in dry rod oven or sealed container (low-hydrogen rods)
- Machine set to correct polarity (DCEN or DCEP as required) and amperage
- Local exhaust ventilation (LEV) or fume extractor in position
- Fire extinguisher (9 kg ABE dry chemical) within 5 m and in test
- Area clear of flammables for 8 m radius

7. Safe Operating Procedure

Set-Up

- Set amperage according to electrode diameter and position (refer rod packet or machine chart).
- Clean base metal – remove rust, paint, oil, galvanising within 50 mm of weld.
- For low-hydrogen rods (7018, 7016): bake if required and use within 4 hours of removal from oven.

Welding

- Put on full PPE – helmet down before striking arc.
- Strike arc using tap or scratch method – never drag electrode along work like a match.
- Maintain correct arc length (approx. electrode core-wire diameter).
- Chip slag and wire-brush between passes.
- Never weld galvanised or painted metal without LEV and P2/PAPR respirator.

Shut-Down

- Release electrode holder, place on insulated hook or bench.
- Turn welder off, then isolate at wall.
- Remove electrode stub from holder and dispose safely.

8. Absolutely Prohibited Actions (Zero Tolerance)

- Welding with damaged leads or holder
- Welding in wet clothing or on wet ground
- Leaving a live electrode holder on the bench or floor
- Welding on containers that held flammables without hot-work permit
- Using 2 m or longer electrode extensions (“suicide leads”)
- Dry sweeping welding slag/fumes
- Leaving welder running unattended

9. Emergency Procedures

- Electric shock: isolate power first – do not touch victim until safe
- Arc eye: rinse with sterile saline, seek medical attention same day
- Fire: use extinguisher on small fires; evacuate and call 111 for large fires

- Fume inhalation: fresh air, oxygen if trained, medical review

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