

GENERAL

15 A SUPPLY PLUG

Welding Equipment, single phase, fitted with 15A supply plug for Commissioning purposes only.

Issue1

Some single phase Welding equipment is supplied with a 15A plug for commissioning purposes only.

The 15A plug is not suitable for machine operation at maximum output current and duty cycle.

The supply cord is rated for maximum output current and duty cycle.

Welding machines supply current requirements depend on three things.

- 1 The idle condition when no welding is in process, requires very low level of supply current.
- 2 Welding condition when arcing is present, the supply current requirements vary up to I_{max} (A) depending on how much the output current is set to.
- 3 Time spent arcing, and time spent idle. Referred to as duty cycle

Under most welding circumstances (not including automated welding), the Arcing time is intermittent and less than the rated duty cycle, and/ or the output current is not at maximum: The result is that:

1. The I_{eff} will rarely be drawn continuously.
2. The calculated I_{eff} will unlikely be achieved:

This makes welding equipment different to other electrical equipment such as airconditioner or pumps which draw rated current (I_{eff}) continuously.

For a 15A final sub circuit which is correctly installed with the correct cable rating and Main Circuit breaker (not re-wire able fuse), welding equipment with I_{eff} greater than 15A can safely be operated. Provided the output current is not at Maximum or the duty cycle is reduced.

If excessive arcing time or current is used then the circuit breaker will trip and protect the 15A final sub circuit and the 15A plug.

Suitable duty cycle for 15A operation can be calculated by

$$\text{Duty Cycle}\% = 22500 \div I_{max} \div I_{max}$$

Eg for $I_{max} = 30A$ then $\text{Duty Cycle}\% = 22500 \div 30 \div 30 = 25\%$

QUALITY WELDING PRODUCTS, SYSTEMS AND SERVICES

If Maximum rated output and duty cycle is required then correctly rated plug and final sub circuit will be required.

Definitions

The input current of a welder affects supply cables and protection devices in two ways; as the *maximum current* I_{max} and the *effective current* I_{eff} .

The *maximum current* I_{max} is the highest amperage drawn by the machine (which will be during periods of arcing). This value should be stated on the specification plate of the welder, and may be labelled as I_{max} (A)

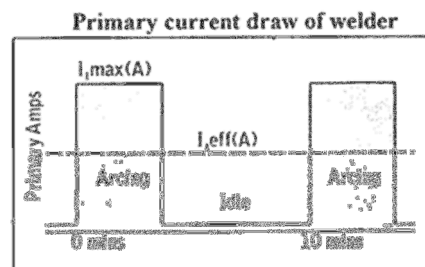
In 'Wiring Rules' terminology, *maximum current* is the "Actual Primary Current"; refer AS/NZS 3000:2007, C2.5.2 1(b)

The *effective current* I_{eff} is a calculated value. It takes into account the duty cycle of the machine, i.e. the percentage of arcing time to "off" time. The *effective current* is the R.M.S. equivalent of the current drawn by the machine when operated at rated output current and duty cycle.

This value should also be stated on the specification plate of the welder, and may be labelled as I_{eff} (A).

In "Wiring rules" terminology, *effective current* is the, "Rated Primary Current", refer AS/NZS 3000:2007 C2.5.2.1 (a), and is considered the "maximum demand" as per AS/NZS 3000:2007 C2.5.

Duty cycle is an indication of the time spent while arcing. It is expressed as a % of one time over a 10minute period. E.g. 30% duty cycle is arcing time of three minutes and idle time of 7 minutes.



Regards,

Willem Corbett B.Eng

Product Engineer
Welding Industries of Australia