
British Standard

Arc welding power sources, equipment and accessories

Part 8. Specification for electrode holders and hand held torches and guns for MIG, MAG and TIG welding

Sources d'alimentation, équipement et accessoires pour le soudage électrique à l'arc
Partie 8. Porte-électrodes, chalumeaux à main et pistolets de soudage à l'arc en atmosphère
inerte ou sous protection de CO₂ avec électrode fusible et en atmosphère inerte avec
électrode de tungstène — Spécifications

Stromquellen, Schweißeinrichtungen und Zubehör für das Lichtbogenschweißen
Teil 8. Elektrodenhalter, Handbrenner und Schweißpistolen für das MIG-, MAG- und
WIG-Schweißen

Foreword

This Part of BS 638 has been prepared under the direction of the Welding Standards Committee. It is a revision and metrication of the 1966 edition of BS 638 and takes into consideration the international standards which have been published in the interim, particularly ISO 700-1982. It was considered that any future alignment with internationally agreed standards would be facilitated if BS 638 were published in several Parts, which in any case should also make for easier use and comprehension of the standard. Consequently, BS 638 has been divided into the following Parts:

- Part 1 Specification for oil cooled power sources for manual, semi-automatic and automatic metal-arc welding and for TIG welding
- Part 2 Specification for air cooled power sources for manual metal-arc welding with covered electrodes and for TIG welding
- Part 3 Specification for air cooled power sources for semi-automatic and automatic metal-arc welding
- Part 4 Specification for welding cables
- *Part 5 Specification for accessories
- Part 6 Specification for safety requirements for construction
- Part 7 Specification for safety requirements for installation and use
- Part 8 Specification for electrode holders and handheld torches and guns for MIG, MAG, and TIG welding

This Part of BS 638 was originally intended to be included in Part 5. However, the need to take account of work being done in the international (International Electrotechnical Commission (IEC)) and European (CENELEC) standardization sectors expanded the original requirements for electrode holders, guns and torches to the point where Part 5 was likely to become too unwieldy for practical use and the decision was made to group these separately.

Attention is drawn to the relevant safety requirements in BS 638 : Parts 6 and 7.

In addition, appendix D of this Part gives guidance on inspection and maintenance to ensure continuing safety in use.

The assistance of the Welding Manufacturers' Association (Arc Welding Plant Section) and the Health and Safety Executive in the drafting of this Part is acknowledged.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

* In preparation. In the meantime refer to the relevant requirements in BS 638 : 1966.



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TIG welding

Correction

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Table 10. Characteristics of capacitor discharge sources
For 1 damped oscillation per half-wave of the system voltage, in the column headed
'Maximum pulse width in the first half-wave of the damped oscillation', delete the
value '50' and substitute the value '10'.

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Section one. General

1 Scope

1.1 Electrode holders

This Part of BS 638 specifies requirements for general purpose electrode holders for manual arc welding with covered electrodes:

- (a) having a mass less than 1000 g;
- (b) suitable for the reception of welding cable complying with BS 638 : Part 4;
- (c) used with electrodes complying with BS 639, BS 2493 and BS 2926, the maximum diameter of utilizable electrodes being 8 mm and the maximum length being 500 mm.

It does not apply to electrode holders intended for special applications such as underwater welding.

1.2 Torches and guns

This Part of BS 638 specifies requirements for handheld guns and torches used for MIG, MAG and TIG welding for maximum operating voltages of 450 V d.c., 380 V a.c. (r.m.s.) and, in the case of TIG torches, up to a maximum of 8000 V peak.

1.3 Operating conditions

This Part of BS 638 applies to electrode holders, torches and guns designed for use:

- (a) in altitudes less than 2000 m;
- (b) in conditions where the temperature of the ambient air does not exceed 40 °C.

NOTE to clause 1. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 638, the following definitions apply. For other relevant terms, the definitions in BS 499, Part 1 apply.

NOTE. For additional terminology, see appendix A.

2.1 Definitions for electrode holders

2.1.1 electrode holder. A tool intended for clamping and guiding the electrode and ensuring electrical connection with the welding circuit.

2.1.2 head (of electrode holder). The part of the electrode holder that has cavities, jaws, etc., for insertion and clamping of the electrode.

2.1.3 handle (of electrode holder). The part of the electrode holder designed to be held by hand.

2.1.4 lever (of electrode holder). A part that may be fitted to control the clamping device of the electrode.

2.1.5 clamping device (of electrode holder). A device in which the electrode is inserted and held.

2.1.6 duty cycle. The ratio of the duration of operation under load to the duration of the complete cycle. This ratio, lying between 0 and 1, may be expressed as a percentage.

NOTE. In this specification the word 'load' is to be understood as referring to a constant resistive load having a power factor not less than 0.99. The duration of the cycle has been fixed at 5 min.

2.1.7 rated welding current. The highest value of welding current for the stipulated rated duty cycle enabling the temperature rises specified in 7.5.3 to be achieved, when the tests are made in accordance with 7.5.1 and 7.5.2.

2.2 Definitions for torches and guns

2.2.1 torch. A unit in which the handle is coaxial with the body and through which all services, current, gas, coolant and electrode wire, as applicable, pass to a neck, which may be straight or curved, at the end of which is located a gas nozzle.

2.2.2 gun. A unit in which the handle is substantially perpendicular to the body.

2.2.3 handle (of torch or gun). A tubular, or substantially tubular part, that enables the torch or gun to be held in the hand.

2.2.4 torch body (gun body). The main internal part of the torch or gun on which the auxiliary components are mounted and to which the elements of the cable/hose assembly are connected.

2.2.5 nozzle. A cylindrical component, of metal or mineral insulant, fixed at the front end of the torch or gun for directing the shielding gas around the arc.

2.2.6 cable-hose assembly. A flexible assembly of cables and hoses that delivers all requisite supplies for the normal functioning of the torch or gun.

2.2.7 electrode (TIG welding). A substantially non-consumable cylindrical rod, generally of tungsten with or without stabilizing elements, normally clamped into the electrode collet.

2.2.8 electrode wire (MIG, MAG and flux-cored wire welding). Consumable metal wire that passes through the contact tube and constitutes one of the electric arc poles. The arc is formed between the end of the electrode wire and the workpiece.

Section two. Electrode holders

3 Classification according to the degree of protection

With regard to the accessibility of the live parts, electrode holders shall be classified as follows.

- (a) Type A, or with complete insulation, in which no live part is accessible to a probe in the form of the test finger shown in figure 1.
- (b) Type B, in which no live part in the head is accessible to a probe in the form of a 12 mm metal ball and no live part of the remaining parts of the holder is accessible to a probe in the form of the test finger shown in figure 1.

NOTE. For type B electrode holders designed for electrodes having a diameter greater than 6.3 mm, the diameter for the metal ball is equal to twice the diameter of the electrode.

4 Designation

The following characteristics shall be given to designate an electrode holder.

- (a) Rated welding current for duty cycle 60 % or duty cycle 35 %. These currents shall be expressed in r.m.s. values rounded to the nearest 10 A.
- (b) Maximum and minimum diameter of electrodes for which it is designed.
- (c) Maximum and minimum cross-sectional area of cable for which it is designed.
- (d) Letter A or B, according to type.
- (e) Mass of electrode holder, expressed in g.
- (f) Reference to this Part of this standard, i.e. BS 638/8*.

5 Rated current

The rated current for duty cycle of 60 % and 35 % and the corresponding cross-sectional areas of cables with copper core shall not exceed the values given in table 1.

6 Construction

6.1 Electrode holders shall be designed to comply with the degree of protection corresponding to their type.

(a) Type A electrode holders shall be designed so that when an electrode is in place, the electrode end inserted into the electrode holder is not accessible (see 7.2).

(b) Type B electrode holders shall enable welding to be carried out in all positions by a simple orientation of the electrode in its clamping device.

6.2 No component of the electrode holder shall, under any normal operating conditions, give rise to burning, i.e. self-extinguishing material shall be used.

6.3 The external surfaces of the electrode gripping jaws and all metal parts subject to high temperature through proximity to the welding arc shall be encased in a suitable electrical insulating material for use at high temperature.

6.4 Screws shall be of a type resistant to corrosion by ambient air and shall not be damaged by temperatures reached during welding.

6.5 Electrode holders shall be designed to connect with the conductors of standard cables, the dimensions of which are specified in BS 638 : Part 4.

Table 1. Rated current and cross-sectional area of cable conductors				
Cross-sectional area of cable construction	Rated current at 60 % duty cycle		Rated current at 35 % duty cycle	
	Maximum temperature conductor 60 °C	Maximum temperature conductor 85 °C	Maximum temperature conductor 60 °C	Maximum temperature conductor 85 °C
mm ²	A	A	A	A
16	135	175	190	245
25	175	230	245	330
35	220	290	310	410
50	285	370	400	520
70	350	460	495	650
95	425	560	600	790

* Marking BS 638/8 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, Quality Assurance Division, BSI, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ for certification marks administered by BSI or to the appropriate authority for other certification marks.



Figure 1. Standard test finger