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Australian Standard 3195—1982

APPROVAL AND TEST SPECIFICATION FOR

PORTABLE ELECTRIC ARC WELDING MACHINES—TRANSFORMER TYPE

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.
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Australian Consumers Association

Australian Electrical and Electronic Manufacturers Association

Confederation of Australian Industry

Electrical Apparatus Approvals Authorities

Electrical Testing Laboratories

Electricity Supply Association of Australia

Electronics Importers Association

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AMENDMENT No 1
to
AS 3195—1982
Approval and Test Specification
for
PORTABLE ELECTRIC ARC WELDING MACHINES—TRANSFORMER TYPE

REVISED TEXT

SUMMARY: The following sections of the standard are covered by this amendment: Clauses 1, 2.4, 11A, 13, 15.1, 15.5, 15.6, 15.8 and Table 1.

Published on 6 February 1984.

AMDT No 1 FEB. 1984

Page 5. Clause 1.

Add a new paragraph and note:

It applies to welding machines in which all the elements that are characteristic for the method, are controlled manually.

NOTE: This specification is not intended to apply to partly or fully mechanized welding machines such as MIG (Metal Inert Gas) and similar types. It should be noted that requirements for these types of welding machines are under consideration and may be included at a later stage, particularly when the revision of AS 1966—1976 is published.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 5. Clause 2.4.

Delete existing clause and *substitute*:

2.4 Rated output current—the output current as delivered by the welding machine at 25 percent duty cycle.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 7. Clause 11A.

Add the following new clause:

11A RATED OUTPUT CURRENT. The rated output current marked on the nameplate shall not differ by more than 10 percent from the output current measured during the test of Clause 15.6(a).

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 7. Clause 13.

Delete existing items (f) and (g) and the last paragraph and *substitute*:

(f) '25% Duty cycle' and the appropriate rated output current.

Any other marking on a welding machine, or any information, instructions or literature supplied with the welding machine, which refers to output currents and/or duty cycles that are different from the rated output current and the duty cycle marked on the machine in accordance with this clause, shall clearly indicate the duty cycle and/or output current applicable to these additional ratings. Such additional ratings may be applied in conducting the temperature test in Clauses 15.6 and 15.7.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 8. Clause 15.1.

Add a new 2nd paragraph and note between existing 1st and 2nd paragraphs:

For testing purposes, welding machines shall be supplied with welding leads of a maximum total length (i.e. the sum of the lead and return) of 6 m and which, in accordance with Table 2 of AS 1995, have a cross-section appropriate to the rated output current of the welding machine.

NOTE: Welding machine output terminals are also taken to mean the end of the leads remote from the machine, for test purposes.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 8. Table 1. Test No 13.

Delete '6.6 of AS 1939' and *substitute* '6.4 of AS 1939'.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 9. Clause 15.5.

Delete the existing 1st paragraph and *substitute*:

15.5 Maximum Short-circuit Input Current Test. The output of the welder shall be short circuited through welding leads as specified in Clause 15.1 or the leads supplied with the welder if they are permanently attached. Rated input voltage and frequency shall be applied to the input terminals and the current regulator shall be adjusted to draw maximum input current.

This amendment forms part of the specification on publication.

AMDT No 1 FEB. 1984

Page 9. Clause 15.6.

Delete the existing clause and *substitute*:

15.6 Temperatures During Normal Operation. The test shall be carried out as follows:

The welding machine shall be placed on a flat wooden surface in an otherwise open area and a substantially non-inductive load (power factor 0.99 or higher) shall be connected across the welding machine output terminals and any current regulating device shall be adjusted to the maximum output position.

Where a welding machine has more than one input or output range, this test shall be conducted on that range which presents the most arduous conditions.

Any duty cycle shall be averaged over a period of 5 min, e.g. a duty cycle of 25 percent means 1 min 15 s ON, 3 min 45 s OFF. During the OFF period the welding circuit shall be in the open-circuit condition and the mains supply shall remain connected.

When tested under the most arduous of the three conditions set out in (a), (b), or (c) below for a period of 4 h or until stable temperatures are attained, whichever is the lesser, the temperature of essential insulation and materials shall not exceed the limits specified in AS 3100, any thermal limiters shall not operate, and any sealing or impregnating material shall not exude or flow.

(a) The load shall be adjusted so that the load voltage is that calculated from the following formula:

$E = 20 + 0.04I$

where

I = the rated output current in amperes at 25 percent duty cycle (see also Clause 11A)

E = the load voltage to the nearest volt.

The welding machine shall be operated under the above conditions at a duty cycle of 25 percent.

(b) Where any marking on a welding machine, or accompanying literature supplied with the machine, indicates output currents higher than the rated output current at 25 percent duty cycle marked on the nameplate, this test shall be carried out at the highest output current indicated, but at the appropriate duty cycle. Where no duty cycle is marked as appropriate for this higher output current, the test shall be carried out at 25 percent duty cycle.

(c) Where any marking on a welding machine, or accompanying literature supplied with the machine, indicates duty cycles in excess of 25 percent, this test shall be carried out with the welding machine operating at the highest indicated duty cycle but delivering the output current marked as appropriate for this duty cycle. Where no output current is marked as appropriate for this higher duty cycle, the test shall be carried out with the welding machine delivering the rated output current marked on the nameplate.

This amendment forms part of the specification on publication.

Page 9. Clause 15.8.

AMDT No 1 FEB. 1984

Delete the existing clause and *substitute*:

15.8 Test for Current Rating of Supply Flexible Cable. With the welding machine operating as specified in Clause 15.6, the nominal input current as defined below shall be calculated for each of the test conditions.

The output load shall then be disconnected and the no-load input current shall be measured.

The nominal input current is defined by the following formula:

Nominal input current = $\sqrt{I_m^2 d + I_n^2(1-d)}$

Where for any one test condition:

I_m = maximum input current.

I_n = no-load input current.

d = the duty cycle expressed as a decimal fraction.

The highest nominal input current so calculated shall not exceed by more than 10 percent the rating of the supply flexible cable as marked on the nameplate.

This amendment forms part of the specification on publication.

PREFACE

This edition of this specification was prepared by the Association's Committee EL/2, Electrical Approvals Standards.

It is one of a series of approval and test specifications issued by the Association. These specifications are accompanied by a general specification AS 3100, containing definitions and general requirements for electrical materials and equipment. The purpose of these specifications is to outline conditions which must be met to secure approval for the sale and use of electrical equipment in Australia. Only safety matters and related conditions are covered.

This edition is technically identical with the 1975 edition except that it incorporates Amendments Nos 1 and 2 to that edition which were issued in August 1977 and August 1978 respectively, and includes changes to the following :

*Clause 6—relates to addition of fire test
Clause 7.1.1—modifies requirements for connection
†Table 1—additional tests
‡Clause 15.9—adds fire test
§Clause 15.10—adds test for d.c. component

This specification supersedes AS 3195—1975 from date of publication.

The Association desires to call attention to the fact that this specification does not purport to include all the necessary provisions of a contract.

This specification requires reference to the following Australian standard approval and test specifications:

AS 3100 Definitions and General Requirements for Electrical Materials and Equipment
AS 3133 Air-break Switches
AS C109 Appliance Plugs and Appliance Inlet-sockets

and to the following Australian standards:

AS 1939 Classification of Degrees of Protection provided by Enclosures for Electrical Equipment
AS 1995 Welding Cables

In addition, reference to other approval and test specifications may be required for approval of particular components incorporated in electric arc welding machines (see Clause 3.3).

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*This change forms part of the specification on 1 January 1983.
†Test No 14 forms part of the specification on 1 January 1983.
Test No 15 forms part of the specification on 1 March 1983.
‡This Clause forms part of the specification on 1 January 1983.
§This Clause forms part of the specification on 1 March 1983.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
APPROVAL AND TEST SPECIFICATION
FOR
PORTABLE ELECTRIC ARC WELDING MACHINES—TRANSFORMER TYPE

This specification shall be read in conjunction with AS 3100. (See also Clause 3, below.)

1 SCOPE. This specification applies to single operator, portable electric arc welding machines of the transformer type, as defined in Clause 2.1, which are designed for operation at low or medium voltage, are intended for connection to the supply by flexible cable and plug, and which, when tested to Clause 15.5, have a short-circuit input not exceeding 15 kV.A.

It applies... SEE AMENDMENTS No 1

2 DEFINITIONS. For the purpose of this specification the following definitions apply:

2.1 Portable electric arc welding machine—Transformer type (hereinafter referred to as a 'welding machine')—a double-wound transformer, including any stabilizing, regulating and indicating means, for transforming alternating current from normal supply voltage to alternating current, rectified direct current, or combination alternating/direct current output suitable for arc welding purposes and having facilities for a single operator only.

Portable welding machines are welding machines which are moved while in operation or welding machines which can be easily moved from one place to another while connected to the supply.

2.2 Duty cycle—the ratio of the total arcing time to 5 min in any 5 min period, expressed as a percentage.

2.3 Rated input voltage—the input voltage or voltages marked on the nameplate by the manufacturer and chosen to suit nominal supply voltages in use.

NOTE: The preferred voltages are 240 V, 415 V and 480 V.

2.4 Rated output current—the output current as delivered by the welding machine at a specified duty cycle. SEE AMENDMENTS No 1

2.5 Maximum short-circuit input current—the input current flowing when the welding machine is operated under the conditions specified in Clause 15.5.

NOTE: Attention is drawn to the limitations specified in the service rules of Electricity Supply Authorities governing the maximum primary demand of equipment connected to supply mains.

2.6 Open-circuit voltage—the voltage between the welding terminals of a welding machine ready to weld but delivering no current.

2.7 Load voltage—the voltage measured between the output terminals of a welding machine when welding current is flowing.

3 COMPLIANCE WITH SPECIFICATIONS.

3.1 General Requirements of AS 3100. This specification shall be read in conjunction with AS 3100, and the appropriate provisions of AS 3100 shall apply to the construction of the welding machine and the insulation and/or safeguarding of parts which normally carry current.

3.2 Specific Requirements of This Specification. A welding machine shall be deemed to comply with this specification only if it complies with all the appropriate requirements of this specification and passes the relevant tests specified herein.

3.3 Requirements of Other Specifications. Equipment and components incorporated in a welding machine which are depended upon for safety shall comply with the appropriate requirements of any relevant approval and test specification unless such requirements are varied herein.

4 WINDINGS.

4.1 General. Every welding transformer shall have separate input and output windings, in accordance with the following requirements:

(a) All windings other than those designed as moving windings shall be fixed rigidly in relation to one another and the core.

The method of fixing shall be such that it cannot be rendered ineffective by vibration or mechanical shocks. Tapered wedges alone are not considered to provide reliable means of fixing. Where used, tapered wedges shall be supplemented by additional means of fixing to ensure that clearances and creepage distances will not be affected by vibration or mechanical shocks. Where moving windings and/or flexible conductors are employed, the mechanical operation shall be such as to avoid damage to the insulation.

(b) Positive means shall be incorporated in the construction of both input and output windings to eliminate the possibility of end turns of any layer moving in such a manner as will reduce clearance and creepage distances to the core, other windings or other conductive parts.

(c) The transformer may be constructed with or without a metal screen between the windings and shall comply with the specific requirements of Clause 4.2 for transformers with screen, and of Clause 4.3 for transformers without screen.

(d) Hygroscopic materials, used for insulating purposes, shall be suitably impregnated and shall satisfy Clause 2.31 of AS 3100.

Enamel or other wire surface coatings are not deemed to constitute any portion of the total thicknesses of insulation specified in Clause 4.2 or 4.3 below, as applicable.