



INACTIVE FOR DESIGN AFTER 31 JULY 2012
NATIONAL AEROSPACE STANDARD

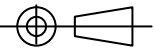
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FED. SUPPLY CLASS

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FORM 09-01	THIRD ANGLE PROJECTION		CUSTODIAN ENGINEERING MANAGEMENT COMMITTEE	REVISION 4
	PROCUREMENT SPECIFICATION NONE		TITLE MANUAL GAS METAL ARC (GMA) WELDING EQUIPMENT	CLASSIFICATION SPECIFICATION NAS959 SHEET 1 OF 15



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1.0 SCOPE

1.1 Purpose

This specification provides a standard for the manufacture, performance, inspection, reliability and procurement of a series of manual gas metal arc welding equipment. This standard lists minimum requirements and is not to limit design advances.

1.2 Classification

The machine shall be of the following types, sizes and classes.

1.2.1 Type

- I DC Constant Potential
- II DC Constant Current
- III DC Short Circuiting Arc
- IV DC Pulsed Power

1.2.2 Size

1.2.2.1 All equipment shall be rated according to maximum current and to current at 100% (continuous) and 60% duty cycles in addition to the following noted dimensions.

1.2.2.1.1 Power Source - current

1.2.2.1.2 Welding gun - Current at continuous duty

1.2.2.1.3 Filler Metal Feeder - in inches per minute and diameter of hard and soft filler wire.

LIST OF CURRENT SHEETS

NO.	REV.	NO.	REV.	NO.	REV.
1	3	6	3	11	3
2	3	7	3	12	3
3	2	8	3	13	NEW
4	3	9	3	14	3
5	3	10	3		

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CUSTODIAN: MANUFACTURING COMMITTEE

PROCUREMENT SPECIFICATION

NONE

TITLE

MANUAL GAS METAL ARC (GMA) WELDING EQUIPMENT

CLASSIFICATION SPECIFICATION

NAS 959
SHEET 1 OF 14

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT OR SERVICE. IT IS THE RESPONSIBILITY OF THE USER TO INVESTIGATE THE APPLICABILITY OF THIS DRAWING TO HIS PROJECT. THE AIA AND ITS COMMITTEES WILL NOT INVESTIGATE THE APPLICABILITY OF THIS DRAWING TO HIS PROJECT. THE AIA AND ITS COMMITTEES DO NOT ASSUME ANY LIABILITY TO PATENT OWNERS OR TO PROSPECTIVE USERS.

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1.2.3 Class

Commercial Hardware - stock item
Modified Commercial Hardware
Custom Hardware

1.2.4 Intended Use

The welding system described in this specification is intended for use in the aerospace manufacturing industry and provides performance criteria for manual gas metal arc welding machines for welding of ferrous and non-ferrous alloys.

2.0 APPLICABLE SPECIFICATIONS, CODES AND STANDARDS

The latest revision of the following specifications, codes and standards are included as a portion of this specification. Detail requirements listed in this specification shall override any contradicting portions of the following specifications, codes and standards.

- 2.1 The Joint Industrial Council (JIC) Electrical Standards for General Purpose Machine Tools, EGP.1.1967. (3.5.8)
- 2.2 National Electrical Code (NEC). (3.5)
- 2.3 Federal, State and Local Regulations pertaining to radio interference.
- 2.4 Electronic Industries Association Standards for Electronic Wiring and Components RS 281.
- 2.5 National Aerospace Standards 972, Glossary of Manufacturing Equipment Terms.
- 2.6 Welder Qualification Tests MIL-T-5021 (ASG).
- 2.7 American Welding Society's Standards A 3.0-69.
- 2.8 State and Local Safety and Electrical Codes.
- 2.9 Occupational Safety & Health Standard Part 1910 of Chapter XVII of Title 29 of the Code of Federal Regulations (Occupational Safety & Health Act (OSHA) - 1970). (3.8)

3.0 REQUIREMENTS

3.1 Design

The manufacturer has the choice of configuration and the functional operation of the machine, except where specifically stated in this specification or customer direction.

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3.2 **INACTIVE FOR DESIGN AFTER 31 JULY 2012**
Types, Sizes, Class

TABLE I

Type	I CP	II CC	III SC	IV Pulse
<u>Rated Output</u>	---			
At 60% duty	Manufacturer shall specify---			
At 100% duty	Manufacturer shall specify---			
<u>Output Current Range</u>				
Minimum: less than	5%	5%	10%	10% of
Maximum: greater than	120%	120%	120%	120% max. rated output
<u>Input Voltage Requirements</u>	---230/460 V, 3 phase, 60 Hertz---			
<u>Input Current Requirements</u>	---Max. noted by manufacturer---			
<u>Output Voltage Range</u>	15-60	15-60 adjustable	15-30	bkgnd 15-50 peak 30-50
<u>Output Voltage Stability</u>	---+0.1 volt for +5% primary line variation---			
<u>Output Regulation</u>	+1 volt with +5 amps ---- + 5 amps +50% var in output current			
<u>Resolution of Control</u>	+0.1 volt + 1 amp ---- + 1 amp			
<u>Inductance Control</u>	---To vary the dynamic VA relationship over a suitable range for the given mode of GMA welding---			
<u>Slope Control</u>	---To vary the static VA relationship over a suitable range for the given mode of GMA welding---			
<u>Response to Load Change</u>				
Min to max or max to min current in less than	8.0	8.0	0.05	--millisecs
<u>Pulse Repetition Rate</u>	--	--	--	60/sec. or greater
<u>Minimum Open Circuit Voltage</u>	----- 75 volts -----			
<u>Compensation for Cable Loss</u>	As a customer option a means may be pro- vided for boosting the output voltage to compensate for potential drop on long cables. This may be accomplished internally by an adjustment such as a tap switch.			

NOTE: Limits other than those above are considered but alternatives and quantities unspecified above are to be specifically identified by the manufacturer in soliciting or bidding documents.

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Documents

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N. W., WASHINGTON, D. C. 20036

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THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST DATE OF APPROVAL SHOWN HEREON

- 3.3 Machine Sub Systems
 - 3.3.1 Welding Guns and Wire Feed Units
 - 3.3.1.1 Welding Guns
 - 3.3.1.1.1 Capacity - 200 amps, 350 amps and 500 amps continuous duty, or otherwise noted.
 - 3.3.1.1.2 Capacity for hard filler metal .020" to .093" diameter.
 - 3.3.1.1.3 Capacity for soft filler metal .030" to .125" diameter.
 - 3.3.1.1.4 Inert gas lines shall be flexible and of a type to prevent contamination by osmotic aspiration.
 - 3.3.1.1.5 The welding gun and components shall be adequately cooled. Leak proof permanent seals between the cooling and insert chambers shall be provided.
 - 3.3.1.1.6 The current transfer to wire arrangement (contact tube) shall be easily accessible for servicing and/or replacement. No special tools should be required.
 - 3.3.1.1.7 Provisions shall be made for an inert gas atmosphere in the filler metal guide feed tube.
 - 3.3.1.2 Filler Metal Feeder
 - 3.3.1.2.1 Feed rate - steplessly variable from 20-1000 ipm or two step 10-200, 200-1000 ipm (customer option).
 - 3.3.1.2.2 Feed accuracy - +2% or +1/4 in from 10-200 ipm and (whichever is greater) +2% or +1/2 in from 100-500 ipm and +2% or +1 in from 200-1000 ipm.
Motors shall be adaptive feedback control type.
 - 3.3.1.2.3 Size range - .020" to .093" diameter hard filler metal.
.030" to .125" diameter soft filler metal.
 - 3.3.1.2.4 A filler metal feed rate direct reading type dial shall be supplied which will correspond to feed rate accuracy as stated above for a wire diameter specified by the customer (customer option).
 - 3.3.1.2.5 Filler metal feeder design shall incorporate adequate straightening, non-knurling and non-galling features. The wire feed liner shall be non-contaminating, low friction and easily replaceable.
 - 3.3.1.2.6 Filler metal feeder rolls shall be located so as to minimize friction and to insure constant filler metal flow.

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