



INACTIVE DESIGN AFTER 31 JULY 2012 NATIONAL AEROSPACE STANDARD

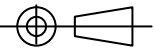
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FED. SUPPLY CLASS

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FORM 09-01	THIRD ANGLE PROJECTION 	CUSTODIAN ENGINEERING MANAGEMENT COMMITTEE	REVISION 5
	PROCUREMENT SPECIFICATION NONE	TITLE MACHINE GAS TUNGSTEN ARC FUSION WELDING EQUIPMENT	CLASSIFICATION SPECIFICATION NAS962 SHEET 1 OF 17

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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 machine for gas tungsten arc welding systems, exclusive of weld positioners, weld manipulators, and other mechanical tooling devices. This standard lists minimum requirements and is not to limit design advances.

1.2 Classification

The welding systems shall be of the following types, sizes and class:

1.2.1 Type

- I Constant Current - DC
- II Combination Constant Potential/Constant Current DC
- III Alternating Current
- IV Combination Alternating current/Direct current

1.2.2 Size

- A 200 Amp
- B 300 Amp
- C 400 Amp
- D 500 Amp
- E 600 Amp

1.2.3 Class

Mechanized Gas Tungsten Arc (N/C Optional)

LIST OF CURRENT SHEETS

NO.	REV.	NO.	REV.	NO.	REV.	NO.	REV.
1	4	5	3	9	3	13	3
2	3	6	3	10	3	14	3
3	3	7	3	11	3	15	3
4	3	8	3	12	3	16	3

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CUSTODIAN: MANUFACTURING COMMITTEE

PROCUREMENT SPECIFICATION	TITLE	CLASSIFICATION
		SPECIFICATION
NONE	MACHINE GAS TUNGSTEN ARC FUSION WELDING EQUIPMENT	NAS 962

SHEET 1 OF 16

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1.3 Intended Use

The welding systems described by this specification are intended for use in the aerospace manufacturing industry and provide performance criteria for a machine for gas tungsten arc 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 of this specification shall preclude any contradictory portions of the following specifications, codes and standards.

- 2.1 Weld Certification MIL-T-5021 (ASG).
- 2.2 Electronic Industries Association (EIA) Construction Standards, Numerical Machine Tool Control, RS-281 and SP-621 Tape Format.
- 2.3 State and Local Safety and Electrical Codes.
- 2.4 FCC Regulations pertaining to Radio Interference.
- 2.5 National Aerospace Standards 955 - Interchangeable Perforated Tape Standards - Variable Block Format, Numerically Controlled Equipment. (3.3.2.4.1)
- 2.6 National Aerospace Standards 938, Machine Axis and Motion Nomenclature.
- 2.7 National Aerospace Standards 953, Numerical Control Systems. (3.3.2.4.1)
- 2.8 American Welding Society's Standard A3.0-69.
- 2.9 Joint Industrial Council (JIC) Electrical Standards for General Purpose Machine Tools, EGP.1.1967, when requirements are not defined in specifications noted in 2.3 and 2.4 above. (3.5) (5.7)
- 2.10 National Electrical Manufacturer's Association (NEMA) EWL-1970. (3.5)
- 2.11 Occupational Safety & Health Standard Part 1910 of Chapter XVII of Title 29 of the Code of Federal Regulations (Occupational Safety & Health Action (OSHA) - 1970). (3.8)

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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

APPROVAL DATE June 1963 REVISION ① 15 April 1965 ② 15 Sept. 1971 ③ 30 Nov. 1974

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3.0 REQUIREMENTS

3.1 Design

The capacities for the respective types and sizes shall be as shown in Section 3.2. The manufacturer has the choice of configuration and the functional operation of the machine, except where specifically stated in this specification.

3.2 Types, Sizes, Class (GTA)

TABLE I

<u>SIZE</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Maximum Rated Current Output at 100% duty cycle	200	300	400	500	600
Maximum rated load voltage in volts					
Type I	25	25	25	25	25
Type II	25	25	25	25	25
Type III	40	40	40	40	40
Type IV	25	25	25	25	25
Output Current Range in Amperes					
Type I	10-200	10-300	10-400	25-500	25-600
Type II	10-200	10-300	10-400	25-500	25-600
Type III	10-200	10-300	10-400	25-500	25-600
Type IV	10-200	10-300	10-400	25-500	25-600
Output Voltage Range in Volts					
Type I	6-25	6-25	6-25	6-25	6-25
Type II	6-25	6-25	6-25	6-25	6-25
Type III	5-40	5-40	5-40	5-40	5-40
Type IV	6-25	6-25	6-25	6-25	6-25
Minimum Open Circuit Voltage in Volts					
Type I	68	68	68	68	70
Type II	68	68	68	68	70
Type III	75	75	75	75	75
Type IV	68	68	68	68	70
Response to Load Variation, Seconds					
Type I	.00005	.00005	.00005	.00005	.00005
Type II	.00005	.00005	.00005	.00005	.00005
Type III	.00005	.00005	.00005	.00005	.00005
Type IV	.00005	.00005	.00005	.00005	.00005

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TABLE I (Continued) INACTIVE DESIGN AFTER 31 JULY 2012

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Polarity Switch					
Type I	x	x	x	x	x
Type II	x	x	x	x	x
Type III	N/A	N/A	N/A	N/A	N/A
Type IV	x	x	x	x	x
Output Voltage Regulation	Plus or minus 1% for plus or minus 10% line variation.				
Input Voltage Requirements	240/480 volts - 3 phase - 60 Hertz				
Input Current Requirements	Maximum noted by manufacturer				
Power Factor	Not less than 75% of maximum rated output				
Auxiliary Power	115 Volt AC receptacle active with main power switch (10 amps)				
Thermal Overload Protection	Provide				
Slope Control (for varying static volt/ampere characteristic).	Variable				

3.3 Machine Sub-Assemblies

3.3.1 Welding Head

The welding head shall consist of a welding torch and head oscillator and filler wire feeder. Head mounting design shall provide for manual adjustment of the electrode tip within a conical angle of 15° measuring from the electrode center line. The entire head assembly shall be adjustable to plus or minus 3" in a transverse direction to the weld joint.

3.3.1.2 Welding Torch

3.3.1.2.1 Capacity - 500 amperes continuous duty.

3.3.1.2.2 Capacity - .040 to .250 diameter tungsten.

3.3.1.2.3 Vertical Adjustment - Combined manual and mechanized adjustment shall include at least 8" mechanized adjustment.

3.3.1.2.4 The welding torch shall have provisions for liquid cooling.

3.3.1.2.5 Inert gas lines shall be flexible and of a type to prevent contamination by osmotic aspiration.

3.3.1.2.6 Permanent leak-proof partitions shall be used between water and gas passages in the torch. 'O' rings shall not be used

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3.3.1.3 Filler Wire Feeder

- 3.3.1.3.1 Filler wire feed rate - infinitely variable over a range of 3 to 300 ipm.
- 3.3.1.3.2 Filler wire feed rate accuracy - plus or minus 1% of pre-set rate, regardless of plus or minus 10% line voltage variation.
- 3.3.1.3.3 Filler wire size range - .020 to .093 (hardwire)
- .030 to .093 (software)
- 3.3.1.3.4 A filler wire feed rate control dial shall read directly in ipm and shall provide wire at plus or minus 1% of the preset rate regardless of a plus or minus 10% line voltage variation.
- 3.3.1.3.5 Filler wire feed design shall incorporate straightening, non-knurling, and non-galling features.
- 3.3.1.3.6 Filler wire reel (spool containers) shall have provisions for internal purge with inert gas.
- 3.3.1.3.7 Filler wire feeder rolls shall be located so as to minimize friction and to insure constant wire feed.
- 3.3.1.3.8 Filler wire feed drive mechanisms shall provide for maximum acceleration or deceleration through any 50% of feed speed range within 8 cycles.
- 3.3.1.3.9 Filler wire feeder design shall provide for pressure adjustment on feed rolls.
- 3.3.1.3.10 Provisions shall be made to prevent excessive unspooling of filler wire.

3.3.1.4 Weld Oscillator

At the customer's option, an oscillator shall be supplied with provisions for direct mounting to the weld head. The device shall have the necessary electrical connections to plug directly into the welding control system.

3.3.1.4.1 Mechanical Head Oscillator

If a mechanical head oscillator is furnished, it shall provide transverse movements on stroke from plus or minus 1/16 inch to 1/2 inch, adjustable dwell from 15° to 30° on cam operated devices and an oscillation frequency of 0.01 to 10 cps.

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