MIL-P-80109D
31 August 1987
SUPERSEDING
MIL-P-80109C
25 June 1981

MILITARY SPECIFICATION

PLASMA SPRAY SYSTEMS, MANUALLY OPERATED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers manually operated plasma spray systems which apply coatings in the form of molten spray to metallic or nonmetallic surfaces. The molten spray is developed from material in powder form which is heated by a plasma gas.

1.2 Classification. The plasma spray systems shall be of the following sizes. The size to be furnished shall be as specified (see 6.2.1).

Size 1 - 40 kilowatt system.
Size 2 - 80 kilowatt system.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

MIL-W-45562 - Welding and Soldering Equipment, Supplies and Accessories, Packaging of.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Industrial Plant Equipment Center, ATTN: DIPEC-SSG, Memphis, TN 38114-5051, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 3433

MIL-P-83348 - Powders, Plasma Spray.

STANDARDS

FEDERAL

FED-STD-H28 - Screw Thread Standards for Federal Service.

FED-STD-376 - Preferred Metric Units for General Use by the Federal Government.

MILITARY

MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.

MIL-STD-462 - Electromagnetic Interference Characteristics Measurement of.

2.1.2 Other Government documents. The following other Government document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issue shall be that in effect on the date of the solicitation.

U. S. DEPARTMENT OF LABOR

CFR 29, CHAPTER XVII, PART 1910 - Occupational Safety and Health Standards.

(Copies of specifications, standards, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment document which is current on the date of the solicitation.

AEROSPACE MATERIAL SPECIFICATIONS (AMS)

AMS 4026 - Aluminum Alloy Sheet and Plate.

AMS 5504 - Steel Sheet, Strip, and Plate, Corrosion and Moderate Heat Resistant.

(Application for copies should be addressed to Customer Services Department, Publications Group, Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale PA, 15086-7511.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3951 - Standard Practice for Commercial Packaging.

ASTM C 633 - Adhesion or Cohesive Strength of Flame Sprayed Coating.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103-1187.)

COMPRESSED GAS ASSOCIATION (CGA)

CGA V-1 - Compressed Gas Cylinder Valve Outlet and Inlet.

(Application for copies should be addressed to the Compressed Gas Association Inc., 500 Fifth Ave., New York, NY 10036-0110.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 79 - Electrical Standard for Industrial Machinery.

(Application for copies should be addressed to the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269-9101.)

UNDERWRITERS LABORATORIES (UL) STANDARDS FOR SAFETY

UL 252 - Compressed Gas Regulators.

(Application for copies should be addressed to Underwriters Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062-2002.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order (see 6.2.1), a sample shall be subjected to first article inspection (see 4.4 and 6.3).

3.2 Design. The system shall be new and one of the manufacturer's current models capable of spraying powdered materials in accordance with the requirements herein. The system shall include all components, parts, and features necessary to meet the performance requirements specified herein. All parts subject to wear, breakage, or distortion shall be accessible for adjustment, replacement, and repair.

3.2.1 Dimensional system. Unless otherwise specified, either the U.S. Customary System of Units (US) or the International System of Units (SI) shall be used in the design and construction of the system. When only one dimensional system is acceptable, the particular system required shall be as specified (see 6.2.1). In this specification, all dimensions, measurements, sizes, and capacities are given in US units. These dimensions may be converted to SI units through the use of the conversion factors and methods specified in FED-STD-376.

3.2.1.1 Measuring and indicating device calibrations. Unless otherwise specified, either the U.S. Customary System of Units (US) or the International System of Units (SI) shall be used to graduate measuring and indicating devices such as scales, dial indicators, pressure gauges, and other similar devices. When only one system of graduation is acceptable, the particular graduation required shall be as specified (see 6.2.1). Regardless of the measurement system used, all measuring and indicating devices on the system shall be graduated in the same system.

3.2.2 Reclaimed materials. The system may contain reclaimed materials provided such materials will not jeopardize the intended use and performance of the machine. The reclaimed materials shall have been reprocessed, remanufactured, or recycled in a manner which will restore them to the same chemical composition and physical properties as the materials originally selected for use on the system.

3.2.3 Energy efficiency. The system and its components that directly consume energy in normal operation shall be designed and constructed for the highest degree of energy efficiency as governed by the latest developments available within the industry.

3.2.4 Controls. All operating controls shall be located conveniently to the operator at his normal work station.

3.2.5 Safety and health requirements. The system shall be equipped with safety devices as required to protect personnel from electrical voltages constituting a safety hazard. Power supply terminals shall be enclosed in a manner that will prevent accidental contact by operating personnel. The outer shell of the spray gun assembly shall be electrically neutral or insulated to ensure that the operator will not be exposed to electrically charged components. The system shall be designed to shut down automatically if the gas pressure or cooling water volume falls below a safe level. All system parts, components, mechanisms, and assemblies furnished on the system, whether or not specifically required herein, shall comply with all of the requirements of CFR 29, Chapter XVII, Part 1910 that are applicable to the system itself. Additional safety and health requirements should be specified in detail (see 6.2.1).

3.2.6 Mercury restriction. The system shall not contain mercury or mercury compounds nor be exposed to free mercury during manufacture.

3.2.7 Asbestos restriction. Asbestos and materials containing asbestos shall not be used on or in the system

3.2.8 Environmental protection. The system shall be so designed and constructed that, under the operating, service, transportation, and storage conditions described herein, the system shall not emit materials hazardous to the ecological system as prohibited by Federal, state, or local statutes in effect at the point of installation.

3.2.9 Plasma gases. Unless otherwise specified the system shall be capable of operation using the following plasma gases:

Argon
Argon/Helium
Argon/Nitrogen
Nitrogen

If the system shall be required to operate using other types of plasma gases, they shall be as specified (see 6.2.1).

3.2.10 Lubrication. Means shall be provided to ensure adequate lubrication for all moving parts. Recirculating lubrication systems shall include a cleanable or replaceable filter. Each lubricant reservoir shall have means for determining fluid level. All oil holes, grease fittings, and filler caps shall be accessible.

3.2.11 Interchangeability. All parts shall be manufactured to definite dimensions and tolerances that will permit installation of replacement parts without modification of the part or system.

3.3 Construction. The system shall be constructed of parts which are new, without defects, and free of repairs. The structure shall be capable of withstanding all forces encountered during operation of the system at its maximum rating and capacity without permanent distortion.

3.3.1 Castings and forgings. All castings and forgings shall be free from defects, scale, and mismatching. Processes such as welding, peening, plugging, or filling with solders or pastes shall not be used on castings or forgings to reclaim any defective components for use on the system. Such processes may be used only for enhancing surface finish and appearance.

3.3.2 Welding, brazing, or soldering. Welding, brazing, or soldering shall be employed only where specified in the original design. None of these processes shall be employed as a repair measure for any defective part.

3.3.3 Fastening devices. All screws, pins, bolts, and other fasteners shall be installed in a manner to prevent change of tightness. Fastening devices subject to removal or adjustment shall not be swaged, peened, staked, or otherwise permanently installed.

3.3.4 Surfaces. All surfaces shall be clean and free of sand, dirt, fins, sprues, flash, scale, flux, and other harmful or extraneous materials. All edges shall be either rounded or beveled unless sharpness is required to perform a necessary function. Except as otherwise specified herein, the condition and finish of all surfaces shall be in accordance with the manufacturer's commercial practice.

3.3.5 Painting. Unless otherwise specified (see 6.2.1), the system shall be painted in accordance with the manufacturer's standard commercial practice and color.

3.3.6 Threads. All threaded parts used on the system and its related attachments and accessories shall conform to FED-STD-H28.

3.3.7 Gears. All Gears shall be constructed from a material suitable for the intended purpose. All drive gears shall have the hardness, surface finish, and toughness that will enable the gear train to transmit full rated torque of the drive motor without gear damage, failure, or premature deterioration and wear.

3.3.8 Electromagnetic interference control. When specified (see 6.2.1), equipment furnished under this specification shall comply with MIL-STD-461. The equipment and subsystems class and the emission and susceptibility requirement shall be as specified.

3.4 Components.

3.4.1. Gun. The gun shall be compact and complete with all necessary components required for operation using all plasma gases specified in 3.2.9, including additional plasma gases specified by the purchaser. All necessary connections shall be provided for connection of electric power, water for cooling, and plasma gas. The gun shall allow for a quick change of nozzles and powder parts. The rated continuous duty direct current (DC) power capability of the gun shall be not less than stated in 1.2 for the size specified.

3.4.1.1 Gun cooling system. The gun cooling system shall be designed to provide adequate heat dissipation when the gun is operating at full rated power with the manufacturer's recommended water flow rate. When specified (see 6.2.1), an electric motor driven water circulating pump and heat exchanger shall be furnished. The pumping system shall be assembled as a complete unit and shall be capable of supplying the volume of water required for adequate cooling of the system when operating at continuous duty at rated power.

3.4.2 Power supply. The power supply shall be of the transformer rectifier type designed for plasma spraying purpose. The rated continuous duty power output shall be not less than stated in 1.2 for the size specified. The power supply shall be enclosed in a cabinet of steel frame construction. The thickness of the materials used and the physical strength of the chassis and cabinet shall be adequate to support and protect all components. The sides and top panels of the cabinet shall be removable to provide access for servicing. The power supply shall be capable of operating under full load in an ambient temperature of at least 104 degrees Fahrenheit. Suitably rated protective devices shall be furnished in the primary input power circuit and in the output DC circuit.

3.4.2.1 Power supply cooling. Unless otherwise specified (see 6.2.1), power supply cooling may be accomplished by either a forced air system or by a water cooling system. Forced air cooling when furnished shall be provided by

a fan mounted inside the power supply cabinet. When a water cooling system is furnished it shall be constructed of corrosion resistant components.

3.4.3 Control console. The control console shall contain at least a DC current control, a DC ammeter and voltmeter, a plasma start control, a means to control and monitor the plasma gas or gases, and all switches and indicator lights required for safe operation. Control and monitoring of powder injection may be accomplished either at the control console or at the powder feed unit. Start of spraying may be accomplished by a control on the control console or by a control on the gun. All controls shall be accessible and all meters, gauges, and indicator lights shall be located and positioned in a manner which will permit accurate monitoring of the system by the operator. The components of the control console shall be housed in a sturdy, compact steel cabinet of the strength required for protection and rigid support.

3.4.3.1 DC voltmeters and ammeters. The DC voltmeters and ammeters may be either of the analog or digital type. The meters shall have a full scale accuracy of not less than $\pm$ 3 percent.

3.4.3.2 Plasma gas flow control system. The plasma gas flow control system shall consist of pressure gauges to monitor gas pressure and a means to control the gas flow rate. Unless otherwise specified (see 6.2.1), control of the gas flow may be accomplished by the use of flowmeters or a critical orifice . The system furnished shall be complete and capable of controlling and monitoring all gases specified in 3.2.9 including all additional gases specified by the purchaser.

3.4.3.2.1 Flowmeters. When furnished, the operating range of the flowmeters shall be within 10 percent to 80 percent of the full scale reading. The accuracy of the flowmeters shall be not less than $\pm$ 3 percent of the full scale reading. The flowmeters shall be rated for safe operation up to 250 pounds per square inch (psi). If glass or other brittle material is used in the construction of the flowmeters, a transparent non-breakable safety shield shall be furnished to protect operating personnel.

3.4.3.2.2 Critical orifice. When furnished, the accuracy of the gas flow rate when controlled by a critical orifice shall be not less than $\pm$ 5 percent of the established flow rate when using gas flow rate charts furnished by the manufacturer.

3.4.4 Powder feed system. Unless otherwise specified (see 6.2.1), the powder feed system furnished shall be of the manufacturer's standard design.The system shall deliver a regulated flow of powder to the spray gun. The method of transporting powder from the feed unit hopper to the gun shall be such that interruptions of the powder flow will not occur as long as the hopper contains powder. The powder flow rate shall be controlled with an accuracy that will permit consistent reproduction of sprayed coatings when using any powder for which the system was designed. When using blended powders, the feed unit shall not segregate the powders to an extent that will prevent the desired mixture from being delivered to the gun. Unless otherwise specified (see.6.2.1), the powder feed system shall be designed for either table, wall, or shelf mounting. When specified (see 6.2.1), dual hoppers or two single hoppers shall be furnished to provide uninterrupted powder flow for continuous duty operation.

3.4.4.1 Powder hopper. Unless otherwise specified (see 6.2.1), the powder hopper shall have a capacity of not less than 90 cubic inches.

3.4.5 Power cables and hose assemblies. The cable supplying DC power to the plasma gun shall be capable of carrying adequate water to properly cool the cable and gun. All power cables and hoses between the control console and the gun shall be not less than 12 feet in length. All electric power cables, gas and water supply hoses, connectors, and fittings necessary for the operation of the spray system at full rated power shall be furnished.

3.4.6 Gas regulators and pressure gauges. Unless otherwise specified (see 6.2.1), the system shall be furnished with gas regulators of the two stage type, suitable for the gases utilized. The regulators shall be furnished with pressure gauges. The regulators shall conform to UL 252. The inlet connectors shall conform to CGA V-1. Unless otherwise specified, regulators shall be furnished for argon, helium, and nitrogen gases. When specified (see 6.2.1), regulators for other gases shall be furnished.

3.4.7 Electrical system. Unless otherwise specified (see 6.2.1), the electrical system shall conform to NFPA 79. An identified terminal for grounding the system when it is installed shall be mounted in or near the disconnect switch. The terminal shall be suitable for connecting the size grounding conductor specified in NFPA 79 for the disconnect fuse rating.

3.4.7.1 Primary input voltage. Unless otherwise specified (see 6.2.1), the system shall be wired to draw its electrical power from a single 230/460, 3 phase, 60-Hz circuit and if required by the manufacturer, a 120 volt, single phase 60-Hz circuit. The system or that portion of the system which operates from a 230/460 volt circuit shall initially be wired to operate from a 460 volt source.

3.4.7.2 Motors. Motors shall be rated for continuous duty and shall have ball or roller bearings of the sealed and permanently lubricated type.

3.4.7.3 Control circuit voltage. The control circuits shall be isolated from the input electric power supply by a low-voltage transformer having a secondary voltage no greater than 120 volts.

3.5 Performance. The systems supplied under this specification shall equal or exceed the delivery rate and deposition efficiency specified in table I. The powders listed in table I shall meet the requirements of MIL-P-83348.

TABLE I. System spray rate and deposition efficiency requirements.

Type and class from MIL-P-83348	Composition	Delivery rate lb/hr	Deposition 1/ efficiency
Type II, class 2	D-Aluminum Oxide	3.5	65%
Type I, class 1	P-Molybdenum	6.0	70%
Type I, class 1	AA-Tungsten-Carbide	9.0	70%

1/ Deposition efficiency - The ratio of sprayed material that bonds to the specimen to the total weight of material sprayed.

3.5.1 Additional performance requirements. Performance features required in addition to, or in lieu of, the requirements herein shall be as specified and fully described (see 6.2.1).

3.6 Standard equipment. Unless otherwise specified, all equipment normally furnished with the manufacturer's standard commercial system shall be furnished. When specified (see 6.2.1), required additional equipment shall be furnished and fully described.

3.7 Optional equipment. Optional equipment shall be furnished as specified and shall be fully described (see 6.2.1).

3.8 Repair parts. Repair parts shall be furnished as specified (see 6.2.1).

3.9 Marking on plates and charts. All words on plates and charts shall be in the English language. Characters shall be engraved, etched, embossed, or stamped in boldface on a contrasting background.

3.9.1 Lubrication chart or plate. A lubrication chart or plate shall be securely attached to each system. If a chart is furnished, it shall be placed in a transparent plastic folder, or permanently sealed between clear plastic sheets, with a suitable means of mounting. The chart or plate shall contain the following information:

Points of lubricant application
Servicing interval
Type of lubricant
Viscosity

3.10 Nameplate. A nameplate shall be securely attached to each system. The nameplate shall contain the information listed below. If the system is a special model, the model designation shall include the model of the basic standard system and a suffix identified in the manufacturer's permanent records. The captions listed may be shortened or abbreviated, provided the entry for each caption is clear as to its identity.

Nomenclature
Manufacturer's name
Manufacturer's model designation
Manufacturer's serial number
Power input (volts, total amps, phase, frequency)
Contract Number or Order Number
National Stock Number or Plant Equipment Code
Date of manufacture

3.11 Hour meter. When specified (see 6.2.1), the system shall be equipped with an hour meter. The hour meter shall be installed to display accumulated operating time of the main drive motor. The meter shall be of the nonresetting type and shall have a range of 0 to 99,999 hours in increments of not greater than one hour. The meter shall be sealed to prevent the entrance of dust and moisture and shall be mounted to withstand shock and vibration generated by the system. Upon reaching 99,999 hours, the meter readout shall automatically return to zero and continue to accumulate time.

3.12 Technical data. When technical data is required it shall be furnished in accordance with the requirements of the contract. All technical data furnished shall be written in the English language.

3.13 Workmanship. Workmanship of the system and accessories shall be of a quality equal to that of the manufacturer's commercial equipment of the type specified herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspections. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.4).

b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections, tests, and examinations shall be performed in the manufacturer's designated indoor test area under the ambient temperature, the relative humidity, and the air pressure existing inside the building at the time the inspections, tests, and examinations are performed.

4.4 First article inspection. When first article inspection is required, it shall be applied to the first article submitted in accordance with 3.1. Unless otherwise specified (see 6.2.1), first article inspection shall consist of the examination in 4.6 and all tests in 4.7.1 through 4.7.2.3 and when applicable 4.7.2.4. Failure of the item to pass the first article examination and all tests shall be cause for rejection.

4.5 Quality conformance inspection. A quality conformance inspection shall be applied to each item prior to being offered for acceptance under the contract. Unless otherwise specified (see 6.2.1), the quality conformance inspection shall consist of the examination in 4.6, the test in 4.7.1, and the

inspection in 4.8. Failure of the item to pass the examination, the test, and the inspection shall be cause for rejection.

4.6 Examination. The system shall be visually examined to determine compliance with all requirements of this specification.

4.7 Tests.

4.7.1 Operational test. The complete system shall be connected to the specified sources of electricity, gas, and water . The system shall then be prepared for metallizing in accordance with the manufacturers published operating instructions. The type of gases to be used for the operational test shall be as specified (see 6.2.1). The system shall be tested under operating conditions for not less than 10 minutes. Unless otherwise specified (see 6.2.1), the composition of powder to be sprayed shall be selected from table I as determined by the purchaser. Performance of all components which make up the system shall be checked for proper operation. During this test, the molten material shall be sprayed on one test specimen conforming to AMS 4026 (aluminum) and one specimen conforming to AMS 5504 (steel). The sprayed coatings shall have a uniform appearance. Surface defects of the coatings shall be limited to small nodules not to exceed 0.045 inch in diameter and shall not exceed 0.015 inch above the surrounding sprayed surface. The coatings shall not contain any:

Blisters.
Cracks.
Chips or loosely adhering particles.
Pits exposing the substrata.
Any other evidence of malfunction.

4.7.2 Performance test. Unless otherwise specified (see 6.2.1), the system shall be tested for metallizing capabilities by spraying three test specimens conforming to AMS 4026 and three specimens conforming to AMS 5504. The type of gas used for this test shall be as specified in 4.7.1. Each aluminum and each steel specimen shall be sprayed with a different powder selected from table I. Preparation of the specimens and the spray technique shall be the responsibility of the manufacturer and as described in their operating manuals. The system to be tested shall be prepared as specified in 4.7.1. The sprayed coatings shall conform to 4.7.1. Sufficient spraying shall be accomplished to verify that the spray rate for each material is not less than specified in table I.

4.7.2.1 Bond strength test. When specified (see 6.2.1), a bond strength test shall be accomplished in accordance with ASTM C 633. The substrata sprayed, gases used, composition of powders, and test limits shall be as specified by the purchaser.

4.7.2.2 Flowmeter test. Flowmeters furnished shall be tested to determine conformance with 3.4.3.2.1. Flowmeters shall be checked at 20, 50, and 90 percent of full scale. A certificate of calibration issued by the manufacturer may be submitted in lieu of this test.

4.7.2.3 Critical orifice gas flow regulation system. The critical orifice gas flow regulation system shall be tested for conformance with 3.4.3.2.2.

4.7.2.4 Powder canister volume. The inside height and diameter of the powder canister shall be measured and the volume calculated. The volume shall conform to 3.4.4.1.

4.7.3 Electromagnetic interference control tests. When specified (see 6.2.1), the system shall be tested for conformance with 3.3.8. The tests shall be accomplished in accordance with MIL-STD-462.

4.8 Packaging inspection. Packaging of each item shall be inspected to determine compliance with the requirements of section 5.

5. PACKAGING

5.1 Preservation, packing, and marking. Unless otherwise specified, preservation, packing, and marking shall be in accordance with ASTM D 3951. When specified (see 6.2.1), level A or level B preservation, level A or level B packing, and marking shall be accomplished in accordance with MIL-W-45562.

6. NOTES

6.1 Intended use. The plasma spray systems described herein are intended for use in facilities having a requirement for high speed, high capacity, plasma spraying capability.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Size required (see 1.2).

c. First article, if required (see 3.1).

d. If system design and construction is required in a specific dimensional system (US or SI), state required system (see 3.2.1).

e. If measuring and indicating devices are required to be graduated in a specific measurement system (US or SI), state required system (see 3.2.1.1).

f. Additional safety and health requirements, if required (see 3.2.5).

g. Plasma gases, if different (see 3.2.9).

h. Painting, if different (see 3.3.5).

i. If electromagnetic interference control is required, specify the equipment and subsystem class and the emission and susceptibility required (see 3.3.8).

j. Gun cooling system, if required (see 3.4.1.1).

k. Specific type of power supply cooling, if required see (3.4.2.1).

l. Specific type of plasma gas flow regulation system, if required (see 3.4.3.2).

m. Specific type of powder feed system, if required (see 3.4.4).

n. Specific type of mounting, if required (see 3.4.4).

o. Dual or two single hoppers, if required (see 3.4.4).

p. Specify size of powder hopper, if different (see 3.4.4.1).

q. Regulators and pressure gauges, if different (see 3.4.6).

r. Regulators for other gases, if required (see 3.4.6).

s. Electrical system, if different (see 3.4.7).

t. Primary input voltage, if different (see 3.4.7.1).

u. Additional performance features, if required (3.5.1).

v. Standard equipment, if different (see 3.6).

w. Specify and fully describe optional equipment, if required (see 3.7).

x. Specify applicable repair parts, if required (see 3.8).

y. Hour meter, if required (see 3.11).

z. First article inspection, if different (see 4.4).

aa. Quality conformance inspection, if different (see 4.5).

bb. Specify types of gases to be used for the operational test (see 4.7.1).

cc. Composition of powder to be used for the operational test (see 4.7.1).

dd. Performance test, if different (see 4.7.2).

ee. Bond strength test, and parameters of test, if required (see 4.7.2.1).

ff. Electromagnetic interference control test, if required (see 4.7.3).

gg. If preservation, packing, and marking in accordance with MIL-W-45562 is required, specify level of preservation and packing required (see 5.1).

6.2.2 Contract data requirements. Required technical data such as operator's manuals, parts lists, wiring diagrams, and acceptance test reports should be specified on a DD Form 1423, Contract Data Requirements List, incorporated into the contract.

6.3 First article. When first article inspection is required, the item to be tested should be the first item offered for acceptance under the contract. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Subject term (key word) listing.

Coating
Hard surfacing
Metal protection
Metal spraying
Metallizing
Plasma arc spraying
Spray coating
Surface finishing

6.5 Cross-reference of classification changes. The machine classification changes from the previous issue of this specification are as follows:

MIL-P-80109C	MIL-P-80109D
One type-one size	Size 1 (new size)
	Size 2 (new size)

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Air Force - 99

Preparing activity:
DLA - IP

(Project 3433-0106)

Review activities:
Air Force - 71, 84

User activities:
Navy - AS, SH

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-P-80109D	Plasma Spray Systems, Manually Operated

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.