

INCH-POUND

MIL-DTL-8971D
 W/AMENDMENT 1
24 July 2009
 SUPERSEDING
 MIL-DTL-8971D
 21 MAY 2002

DETAIL SPECIFICATION

ELECTRODES, GRAPHITE, SPECTROMETRIC GRADE

Inactive for new design after 1 January 1999.

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

1. SCOPE

1.1 Scope. This specification covers high-purity graphite rod and disk electrodes used in rotary electrode optical emission spectrometers for analysis of metallic elements in oils and other fluids.

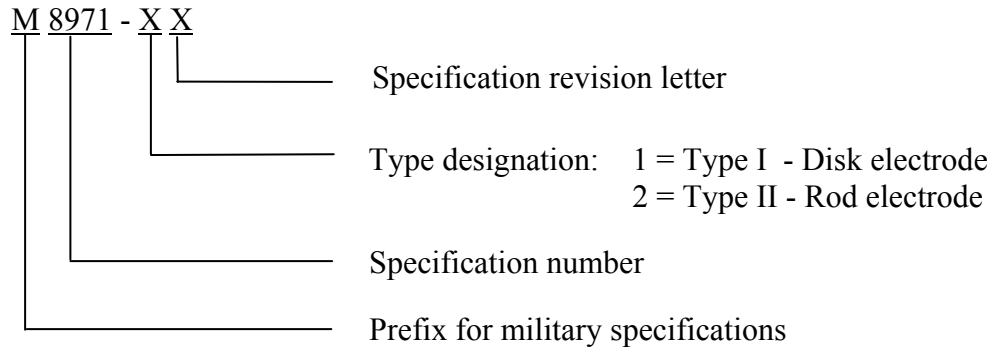
1.2 Classification. Electrodes will be of the following types, as specified (see 6.2), and will be identified by the following part or identification numbers (PIN) (see 1.3):

<u>Electrode Type</u>	<u>PIN</u>
Disk - Type I	M8971-1D
Rod - Type II	M8971-2D

1.3 Part or identifying number (PIN). The PIN used for electrodes acquired to this specification are created as follows. In order to provide better identification control over the electrodes in stock and in the field, beginning with this revision of the specification, the PIN will include the revision letter of the specification under which electrodes were procured.

<p>Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616, or e-mailed to STDZNMGT@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at http://assist.daps.dla.mil/.</p>
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E.g.: M8971-1D indicates a disk (type I) electrode acquired under MIL-DTL-8971D.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.3 Non-government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of these documents are available online at <http://www.asq.org/> or from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

ASTM INTERNATIONAL

ASTM C 559 - Standard Test Method for Bulk Density by Physical Measurements of Manufactured Carbon and Graphite Articles

(Copies of these documents are available online at <http://www.astm.org/> or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 10012 - Measurement Management Systems - Requirements for
Measurement Processes and Measuring Equipment

(Copies of these documents are available online at <http://www.ansi.org/> or from American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036.)

NATIONAL CONFERENCE OF STANDARDS LABS (NCSL)

NCSL Z540.3 - Requirements for Calibration of Measuring and Test
Equipment

(Copies of these documents are available online at <http://www.ncsli.org/> or from National Conference of Standards Labs, 1800 30th Street, Suite 305B, Boulder, CO 80301-1026.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Electrodes furnished under this specification shall be products that are authorized by the Qualifying Activity (see 6.3) for listing on the applicable qualified products list at the time of award of contract (see 4.4 and 6.3).

3.2 Material. Electrodes shall be made from high-purity graphite.

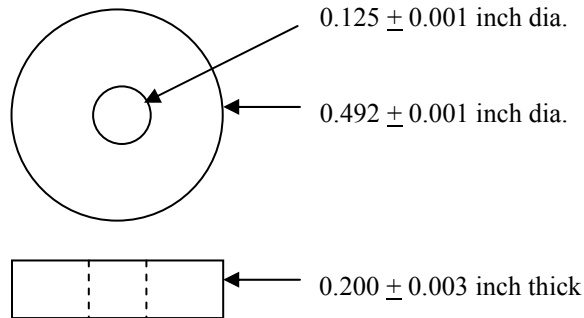
3.3 Electrode dimensions. The dimensions of rod and disk electrodes are illustrated in figure 1.

3.3.1 Rod electrodes. Rod electrodes shall have a circular cross-section with a diameter of 0.242 ± 0.001 inch. They shall be 6.000 ± 0.062 inches long. The bow, from chord to arc, of rod electrodes shall not exceed 0.005 inch. Rods shall be capable of passing freely through a 0.244 inch diameter hole.

3.3.2 Disk electrodes. Disk electrodes shall be right circular cylinders having an outside diameter of 0.492 ± 0.001 inch and a height (thickness) of 0.200 ± 0.003 inch. They shall have a 0.125 ± 0.001 inch hole through the center that is concentric with the outer cylindrical surface. The eccentricity between the center hole and the outer cylindrical surface shall not exceed 0.0005 inch.

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Disk electrode:



Rod electrode:

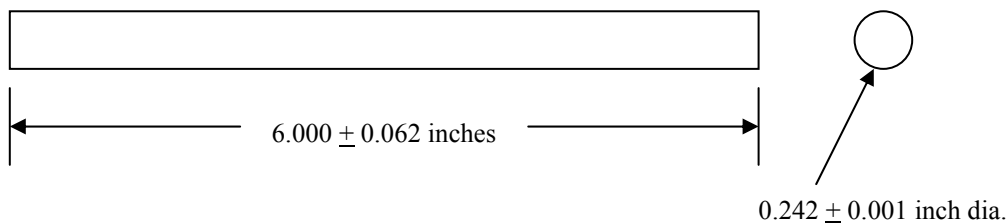


FIGURE 1. Dimensions of rod and disk electrodes (not to scale).

3.3.3 Disk electrode raw stock. Disk electrode raw stock is rods of purified disk electrode material that are used in certain verification inspections. Disk electrode rods shall have a circular cross-section with a diameter of 0.500 ± 0.015 inch. The diameter at any point on the disk electrode rods shall not differ from the average diameter by more than 0.5 percent. Disk electrode rods shall be not less than 6.000 inches long.

3.4 Density. The density of rod electrodes and disk electrode rods shall be determined in accordance with 4.6.2.1. The density shall be not less than 1.56 grams per cubic centimeter (g/cc).

3.5 Resistivity. The resistivity of rod electrodes and disk electrode rods shall be determined in accordance with 4.6.2.2. The resistivity shall be 220 to 450 microhm-inches.

3.6 Breaking strength. The breaking strength of rod electrodes and disk electrode rods shall be determined in accordance with 4.6.2.3. The breaking strength shall be 2,200 to 5,400 pounds per square inch (psi).

3.7 Electrode impurities. The following elements are classified as impurities for electrodes covered by this specification: iron, silver, molybdenum, aluminum, chromium, nickel, silicon, copper, magnesium, sodium, lead, tin, titanium, boron, and zinc. The amount of impurities in electrodes shall be determined in accordance with 4.6.2.4. The amount of each impurity element in electrodes shall be not more than 2 parts per million (ppm). The combined amount of all impurity elements in electrodes shall be not more than 6 ppm.

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3.8 Electrode accuracy and repeatability. The accuracy and repeatability characteristics of electrodes shall be determined in accordance with 4.6.2.5. Electrode accuracy characteristics shall conform to the criteria of table I. Electrode repeatability characteristics shall conform to the criteria of table II. For identification and test purposes, new electrodes being tested for qualification or conformance determination shall be identified as 'candidate' electrodes, and 'reference' electrodes shall refer to electrodes which have previously been tested and approved for Government use and that are being used to facilitate the testing of candidate electrodes.

TABLE I. Electrode accuracy criteria.

<p>This procedure shall be used to determine if electrodes pass accuracy requirements.</p> <p>First, use the following formula to calculate the Accuracy Index (AI) for each element at each applicable concentration level for both the candidate and the reference electrodes (see 3.8, 4.6.2.5):</p> $\text{Accuracy Index (AI)} = \bar{X} - Y , \text{ [Absolute value of } (\bar{X} - Y)\text{]},$ <p>where \bar{X} is the mean of the test results of N analyses (normally 10) in ppm and Y is the elemental concentration in the oil calibration standard solution in ppm. Second, compare the AI value for the candidate electrodes to the corresponding value tabulated below. Third, if needed, statistically compare the AI values of the candidate and reference electrodes.</p> <p>If the candidate electrode's AI value is equal to or less than the tabulated value, or if the statistical comparison between the AI values indicates the candidate electrodes are equal to or better than the reference electrodes, then the candidate electrodes pass accuracy requirement, for an element at a specific concentration.</p> <p>To pass the accuracy requirements for this specification, the candidate electrodes must pass the accuracy requirements for all elements at all applicable concentrations.</p>										
Y	Fe	Ag & Mo	Al, Cr, Ni, & Si	Cu & Mg	Na	Pb	Sn	Ti	B	Zn
5	1.50	1.50	1.20	1.61	2.59	1.98	1.98	1.30	1.30	1.99
30	5.23	5.23	3.33	5.91	11.60	4.47	4.47	3.93	3.93	8.15
100	16.00	16.00	9.65	18.20	37.10	12.20	12.20	11.70	11.70	25.60
300	46.70	46.70	27.80	53.50	110.00	34.30	34.30	33.90	33.90	75.60
500	77.50	N/A	46.00	88.80	183.00	56.60	56.60	56.10	56.10	126.00
900	139.00	N/A	N/A	159.00	328.00	101.00	N/A	N/A	101.00	226.00

N/A = Not Applicable.

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TABLE II. Electrode repeatability criteria.

This procedure shall be used to determine if electrodes pass repeatability requirements.

First, use the following formula to calculate the Repeatability Index (*RI*) for each element at each applicable concentration level for both the candidate and the reference electrodes (see 3.8, 4.6.2.5):

$$\text{Repeatability Index (RI)} = \sqrt{\frac{N(\sum X_i^2) - (\sum X_i)^2}{N(N-1)}}$$

where *N* is the number of analyses (normally 10), $\sum X_i^2$ is the sum of the squares of the test results in ppm of the *N* analyses, and $(\sum X_i)^2$ is the square of the sum of same test results. Second, compare the *RI* value for the candidate electrodes to the corresponding tabulated value. Third, if needed, statistically compare the *RI* values of the candidate and reference electrodes.

If the candidate electrode's *RI* value is equal to or less than the tabulated value, or if the statistical comparison between the *RI* values indicates the candidate electrodes are equal to or better than the reference electrodes, the candidate electrodes pass the repeatability requirements for an element at a specific concentration.

To pass repeatability requirements for this specification, the candidate electrodes must pass the repeatability requirements for all elements at all applicable concentrations.

Y	Fe	Ag & Mo	Al, Cr, Ni, & Si	Cu & Mg	Na	Pb	Sn	Ti	B	Zn
5	0.56	0.64	0.56	0.56	0.64	0.95	1.04	0.58	0.58	0.78
30	1.58	2.45	1.58	1.58	2.45	2.01	2.06	1.87	1.87	3.63
100	5.03	8.02	5.03	5.03	8.02	6.07	6.08	6.02	6.02	12.00
300	24.00	24.00	15.00	27.00	48.00	18.00	18.00	18.00	18.00	36.00
500	40.00	N/A	25.00	45.00	80.00	30.00	30.00	30.00	30.00	60.00
900	72.00	N/A	N/A	81.00	144.00	54.00	N/A	N/A	54.00	108.00

N/A = Not Applicable.

3.9 Workmanship. The electrodes shall be uniform in quality and free from all defects (such as pits, chips, flat spots, cracks, fractures, and spalling) which may affect their machining, serviceability, and appearance.

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4. VERIFICATION

4.1 Classification of inspections. The inspections (examinations and tests) specified herein shall be classified as follows:

- a. Qualification inspection (see 4.4).
- b. Conformance inspection (see 4.5).

4.2 Inspection conditions. Gages and instruments used in qualification and conformance inspections shall be properly calibrated in accordance with NCSL Z540.3 or ISO 10012. Qualification inspections shall be performed in a draft-free room at a temperature of 68 to 86 °F (20 to 30 °C), a relative humidity of 30 to 80 percent, and a barometric pressure of 24 to 31 inches of mercury. Unless otherwise specified in the contract or purchase order, conformance inspections shall be performed under these same conditions.

4.3 Reporting of inspection procedures and results. The procedures for and the results of qualification inspections shall be reported in written form to the Qualifying Activity, to the Preparing Activity (if different), and to the Joint Oil Analysis Program's Technical Support Center (JOAP-TSC) (see 6.4). Unless otherwise specified in the contract or purchase order, the procedures for and the results of conformance inspections shall be reported in written form to the Purchasing Activity and to the JOAP-TSC. The results of all inspections except accuracy and repeatability tests shall be reported to the JOAP-TSC prior to the performance of the accuracy and repeatability tests.

4.4 Qualification inspections. Qualification inspections shall be performed on sample rod electrodes (or sample disk electrodes and disk electrode rods) which were produced with equipment, materials, procedures and processes normally used in production and which were processed as a single qualification lot. A qualification lot is defined as an indefinite quantity of rod electrodes (or disk electrodes and disk electrode rods) which were manufactured at the same location, from the same mix of graphite material, and in accordance with the same manufacturing procedures and processes, and which were subjected to the manufacturer's purification process at the same time. The qualification samples shall be subjected to the inspections shown in table III in accordance with the procedures in 4.6. One or more failures shall be cause for refusal to grant qualification approval. The qualification inspection sample for each examination and test shall consist of the quantities of rod electrodes (or disk electrodes and disk electrode rods) as are indicated in table III. Inspection samples that are not damaged in earlier inspections may be reused as inspection samples in later inspections.

4.4.1 Qualification inspection responsibility. The manufacturer shall be responsible for the performance of all qualification inspections. Electrode accuracy and repeatability tests and calculations shall be performed at a laboratory approved by the Qualifying Activity. The manufacturer may use his own or any other suitable facilities for the performance of the all other qualification inspections, unless disapproved by the Qualifying Activity.

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4.5 Conformance inspections. Conformance inspections are inspections of production products for delivery. Unless otherwise specified in the contract or purchase order, conformance inspection samples from each production lot shall be subjected to the inspections shown in table IV in accordance with the procedures in 4.6. A production lot is defined as an indefinite quantity of electrodes which were manufactured at the same location, from the same mix of graphite material, and in accordance with the same manufacturing processes and procedures, and which were subjected to the manufacturer's purification process at the same time. For Groups I and II inspections, samples of sufficient size to be statistically relevant shall be selected in accordance with ASQ Z1.4 for general inspection Level 1. For Group III inspections, a random sample of 50 rod electrodes or 500 disk electrodes shall be selected for testing.

TABLE III. Qualification inspections.

Inspections	Requirements paragraph	Inspection paragraph	Quantity of rod electrodes	Quantity of disk electrodes	Quantity of disk electrode rods
Material	3.2	4.6.1	20	20	0
Dimensions	3.3	4.6.1	20	20	0
Workmanship	3.9	4.6.1	20	20	0
Density	3.4	4.6.2.1	20	0	20
Resistivity	3.5	4.6.2.2	20	0	20
Breaking strength	3.6	4.6.2.3	40	0	40
Impurities	3.7	4.6.2.4	40	0	40
Accuracy and repeatability	3.8	4.6.2.5	50	500	0

TABLE IV. Conformance inspections.

Inspections	Requirement Paragraph	Inspection paragraph
Group I: Material, dimensions, and workmanship	3.2, 3.3, & 3.9	4.6.1
Group II: Impurities	3.7	4.6.2.4
Group III: Accuracy and repeatability	3.8	4.6.2.5

4.5.1 Rejected lots. If an inspection lot is rejected for a feature that may be corrected or screened, the manufacturer may rework the lot to correct the defects or screen the lot to screen out the defective units and resubmit the lot for reinspection. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots.

4.5.2 Disposition of inspection samples. Product samples which have been subjected to conformance inspection shall not be delivered on contract or order.

4.6 Methods of inspection.

4.6.1 Examinations. Manufacturer's records and sample electrodes shall be carefully examined to determine compliance with the specification requirements for materials, dimensions, and workmanship.

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4.6.2 Tests.

4.6.2.1 Density. The density of rod electrodes and disk electrode rods shall be calculated from dimension and mass measurements in accordance with ASTM C 559.

4.6.2.2 Resistivity. Using the procedures in 4.6.2.2.1, determine the average diameter (D) in inches, effective length (L) in inches, current (I) in amperes, and voltage (E) in millivolts of sample rod electrodes (or sample disk electrode rods). Calculate and record the resistivity of each test sample in microhm-inches using the following formula:

$$\text{Resistivity (microhm-inches)} = \frac{785.4 \times E \times D^2}{I \times L}$$

4.6.2.2.1 Test procedure.

a. Accurately measure the diameter of the test samples. Make sufficient measurements along the length and around the circumference of each test sample to determine the average diameter of the test sample to 0.5 percent. Calculate and record the average diameter (D) of the test sample in inches. Accurately measure the distance between the contact points on the resistivity test block to an accuracy of 0.5 percent and record this distance as the effective length of the test samples (L) in inches.

b. Set up the resistivity test block and electrical components as indicated in figure 2. The battery voltage may vary ± 5 percent. The resistors shall have a resistance tolerance of not more than 5 percent. The full scale value of the ammeter shall be between 4 and 10 amperes, inclusive. The full scale value of the millivolt meter shall be between 100 and 200 millivolts, inclusive. The millivolt meter shall have an impedance of not less than 1000 ohms per volt.

c. Set the variable resistor to its approximate mid point. Place a test sample in V groove of test block and press down firmly to make good contact with electrical contacts on test block. Adjust the variable resistor as needed for the current and voltage indications to be within the middle 80 percent of the respective ammeter and millivolt meter scales. Record current (I) in amperes and voltage (E) in millivolts for each test sample.

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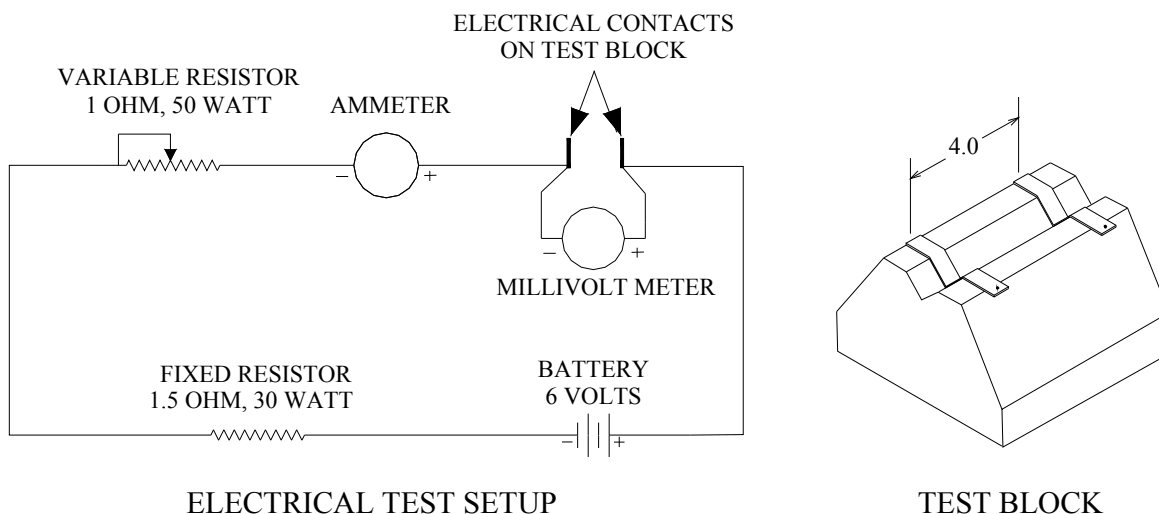


FIGURE 2. Resistivity test setup.

4.6.2.3 Breaking strength. Using the procedures in 4.6.2.3.1, determine the average diameter (D) in inches, effective length (L) in inches, and breaking load (P) in pounds of the test samples. Calculate and record the breaking strength of each test sample in psi using the following formula:

$$\text{Breaking strength (psi)} = \frac{1.697 \times P \times L}{D^3}$$

4.6.2.3.1 Test procedures.

a. Set up a Universal Test Machine with a test fixture equivalent to figure 3. Make sure that the test fixture is centered on the universal test machine. Set up and operate the universal test machine in accordance with standard laboratory procedures. Use a test range on the universal test machine such that the fracture of the test sample occurs at or above 10 percent of the load test range and at or below 95 percent of the load test range.

b. Accurately measure the diameter of each test sample. Make sufficient measurements along the length and around the circumference of the test sample to determine the average diameter of test sample to 0.5 percent. Calculate and record the average diameter (D) of the test sample in inches. Accurately measure the distance between the highest points of the bearing rods on the lower span of the test fixture to an accuracy of 0.5 percent. Record this distance as the effective length of the test samples (L) in inches.

c. Center a test sample on the bearing rods on the bottom span of the test fixture with at least 1/2 inch of test sample extending past the bearing rods on each end of the fixture. Align the upper portion of the test fixture so that the upper bearing rods make contact with the test sample at points that divide the effective length of the test sample into three equal lengths (see figure 3).

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Adjust the Universal Test Machine to apply a slight downward force on the test sample sufficient to hold the test sample in place.

d. Reset the maximum force pointer on the universal test machine. Apply a continuously increasing unidirectional vertical load to the test sample such that the sample fractures between 45 and 60 seconds after the start of the application of the load. The rate of increase in the load should be constant. Record the load (P), in pounds, that was being applied at the time the test sample fractured. NOTE: Disregard the test if the fracture of the test sample did not occur within the middle 43 percent of the effective test sample length.

4.6.2.4 Impurities. Elemental impurity levels in rod and disk electrodes and disk electrode rods shall be determined by a methodology selected by the manufacturer. For each qualification lot, the manufacturer shall provide a written certification to the Qualifying Activity, to the Preparing Activity (if different), and to the JOAP-TSC that the products being qualified conform to the impurity requirements of this specification. For each production lot, the contractor shall provide a written certification to the Procurement Activity and to the JOAP-TSC that the products being proposed for Government acceptance conform to the impurity requirements of this specification. These certifications shall be signed by a responsible official of the manufacturer's/contractor's organization. In their certification documents, manufacturers and contractors shall identify the actual impurity level of each element that was determined to exist in the electrodes and shall provide a copy of their procedure or methodology used to determine the elemental impurity levels. Contractors shall make their certification documents available to Government In-plant Inspectors for their review.

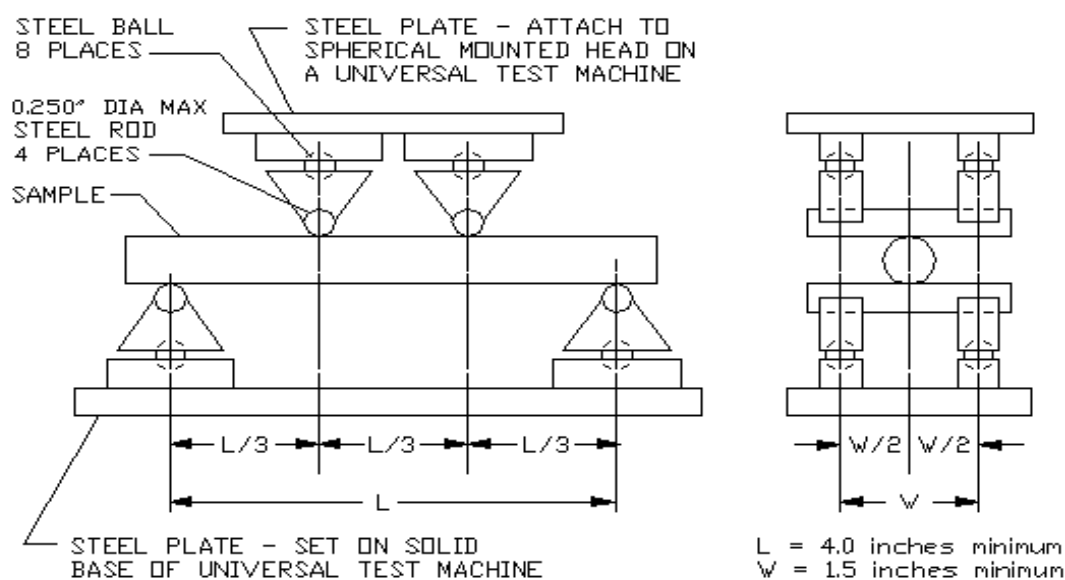


FIGURE 3. Breaking strength test setup.

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4.6.2.5 Accuracy and repeatability. Electrode accuracy and repeatability characteristics shall be determined in accordance with tables I and II, respectively. Tests to obtain data for calculating the Accuracy and Repeatability Indexes of electrodes shall be performed using a rotary electrode optical emission spectrometer, a set of reference calibration oil standards, and a detailed testing procedure, all of which have been approved for this purpose by the JOAP-TSC. Manufacturers submitting candidate electrodes for accuracy and repeatability testing, shall provide at least 50 reference rod electrodes and 500 reference disk electrodes to facilitate the testing of the candidate electrodes. When candidate electrodes fail to pass the accuracy or reliability criteria for one or more element concentrations based on the initial test data, the tests for those elemental concentrations shall be repeated. Candidate electrodes which fail to pass accuracy or repeatability criteria based on data from the second set of tests shall be deemed to have failed the accuracy or repeatability requirement.

4.7 Retention of qualification. To retain qualification, manufacturers shall submit a qualification retention report to the Qualifying Activity annually, with a copy to the Preparing Activity (if different) and to the JOAP-TSC. The Qualifying Activity shall establish the initial reporting date for each manufacturer. The report shall consist of an information and certification document, signed by a responsible company official, and a summary of the results of all conformance inspections performed since the most recent qualification retention report, qualification, or requalification, whichever occurred last. At the option of the Qualifying Activity, the information and certification document may be a DD Form 1718 (Certification of Qualified Products) or it may be a more detailed questionnaire. The summary of results of conformance inspections shall identify the number of lots of products that were manufactured for delivery to the Government by the manufacturer during the period, the number of lots which passed conformance inspection, and the number of lots that failed conformance inspection. For the failed lots, the summary shall include the numbers and types of failures. The results of inspections of all reworked lots shall be identified and accounted for in the report.

4.8 Requalification. Requalification will be required whenever any of the following conditions occurs:

- a. The contractor does not subject products to Government conformance inspection for a period of 36 months.
- b. A change occurs in any of the following:
 - (1) Ownership, management, or location of the manufacturing plant(s),
 - (2) the design of the products,
 - (3) the materials used in the manufacturing or construction of the products,
 - (4) the manufacturer's product designation,
 - (5) the processes used for manufacturing, purification, or quality assurance inspection of the product, or
 - (6) the equipment used for manufacturing, purification, or quality assurance inspection of the product.
- c. A major change, as determined by the Qualifying Activity, is issued to this governing Government specification.
- d. When otherwise required by Government regulations, directives, or guidelines.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Rod and disk electrodes covered by this specification are intended for use in rotary electrode optical emission spectrometers that have been designed and manufactured to analyze metallic impurities in oils and other fluids.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Type and Part or Identifying Number (PIN) (see 1.3).
- c. Packaging requirements (see 5.1). (Note: Contracting officers should be particularly careful to ensure that the PIN, the manufacturer's product identification, lot/batch numbers, and the date of manufacture are included in the product identification markings on both the unit and exterior packages).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in QPL-8971 whether or not such products have actually been listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Richmond, Attn: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616 or STDZNMGT@dla.mil.

6.4 Laboratory approved for accuracy and repeatability testing. The only laboratory that is currently approved for the conduct of electrode accuracy and repeatability tests for products that are covered by this specification is the laboratory at the Joint Oil Analysis Program's Technical Support Center (JOAP-TSC), 85 Millington Avenue, Pensacola, FL 32508-5010. Costs for such testing may be obtained by contacting the JOAP-TSC by letter or by fax to (850) 452-2348.

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6.5 Special oil standards. The D-19 series Primary Reference Calibration Standards are oil samples that are blended with carefully controlled levels of nineteen elements and that are used in the accuracy and repeatability testing of candidate electrodes, for factory calibration of DoD JOAP atomic emission rotrode spectrometers, and for spectrometer standardization prior to electrode testing. The D-19 primary oil standards are available under NSN 9150-01-355-1178 as a set containing each of the following elemental concentration levels: 0, 5, 10, 30, 50, 100, 300, 500, 700, and 900 ppm.

6.6 Subject term (key word) listing.

D-19 Primary Reference Calibration Standards
Disk electrode
Optical emission spectrometer
Rod electrode

6.7 Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Custodians:

Army - AV
Navy - AS
Air Force - 85
DLA - GS

Preparing Activity:
DLA - GS4

(Project 5977-2009-002)

Review Activities:

Army - CR
Air Force - 99

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