MIL-STD-1876(AT)
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MILITARY STANDARD

NITRIDING, GASEOUS ATMOSPHERE PROCESSING FOR

No Deliverable Data Document

AREA MFFP

DEPARTMENT OF DEFENSE
Washington, DC 20301

Nitriding, Gaseous Atmosphere Processing For.

MIL-STD-1876(AT)

1. This Military Standard is approved for use by US Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: DRSTA-GSS, Warren, MI 48090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

FOREWORD

The procedure covered in this standard shall be used to provide acceptance criteria for the process of gaseous atmosphere nitriding. The requirements are presented in a self-contained form. This is not an acquisition document.

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1. SCOPE

1.1 Purpose. The purpose of this document is to ensure procedures and parts meet prescribed nitriding, machining, and heat treatment requirements. Nitriding is intended for use where high surface hardness and high wear resistance is required on parts.

1.2 Scope. This standard covers the requirements for gaseous atmosphere nitriding of aircraft quality steel parts and in-process heat treatment and machining operations.

1.2.1 Limitations. This standard does not deal with glow discharge or pressure nitriding nor the nitriding of stainless steels.

2. REFERENCED DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this standard to the extent specified herein.

SPECIFICATIONS
MILITARY

MIL-H-6875	- Heat Treatment of Steels.
MIPD-G-62410	- General Heat Treatment.
MIPD-M-62414	- Metal Texturizing, Process for.
MIPD-M-62433	- Magnetic Particle Inspection.
MIPD-G-62439	- Gears, Material Acceptance Criteria for.

(Copies of specifications, standards, drawings, and publications required by contractor in connection with specific acquisition functions should be obtained from the acquisition activity or as directed by the contracting officer.)

MIPD Specifications and Standards may be obtained from the US Army Tank-Automotive Command, ATTN: DRSTA-GSS, Warren, MI 48090.

2.2 Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)
SAE Standards and recommended practices

SAE J415	- Definition of Heat Treating Terms, Information Report.
SAE J423	- Methods of Measuring Case Depth, Recommended Practice.
AMS 2418	- Copper Plating.
AMS 2480	- Phosphate Treatment, Paint Base.
AMS 2485	- Black Oxide Treatment.
AMS 2750	- Pyrometry.
AMS 6322	- Steel Bars, Forgings, and Rings (SAE 8740).
AMS 6412	- Steel Bars and Forgings (SAE 4337).
AMS 6415	- Steel Bars, Forgings and Tubing (SAE 4340).
AMS 6470	- Steel Bars, Forgings and Tubing, Nitriding (Nitralloy 135 Mod).
AMS 6471	- Steel Bars, Forgings and Tubing, Nitriding (135 Mod).
AMS 6475	- Steel Bars, Forgings and Tubing, Nitriding (Type N).
AMS 6487	- Steel Bars and Forgings (H-11).

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Avenue, Warrendale, PA 15096.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E3	- Metallographic Specimens, Methods of, Preparation of.
ASTM E18	- Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Standard Test Methods for.
ASTM E44	- Heat Treatment of Metals, Standard Definitions of Terms Relating to.
ASTM E384	- Microhardness of Materials, Standard Test Method for.
ASTM E407	- Microetching Metals and Alloys, Standard Methods for.

(Copies of the above publications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

AMERICAN SOCIETY FOR METALS (ASM)

Properties and Selection of Metals, Volume 1, 9th Edition.
Heat Treating, Volume 4, 9th Edition.

(Copies of the above publications may be obtained from the American Society for Metals, Metals Park, Ohio 44073.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. DEFINITIONS

3.1 Dissociation. Dissociation is the process by which a chemical compound decomposes into the simpler components of the chemical compound.

For example:

$$2 \text{ volumes } NH_3 + \text{Heat} \longrightarrow 1 \text{ volume } N_2 + 3 \text{ volumes } H_2$$

(25% by volume) (75% by volume)

3.2 Continuous grain boundary nitride network. Continuous grain boundary nitride network is a continuous film of nitrides enveloping a grain.

3.3 Terms. Definitions of terms relating to heat treatment (gas nitriding) are covered in numerous documents. The most appropriate sources are those shown in SAE-J415, ASTM E44, and ASM Volume 1, 9th edition.

4. GENERAL REQUIREMENTS

4.1 Equipment.

4.1.1 Nitriding furnace. The nitriding furnaces shall consist of suitable furnaces equipped with sealed retorts to contain the gaseous atmosphere and suitable devices to adequately maintain control of the dissociated ammonia. The nitriding furnace shall be capable of heating all parts of the nitriding load uniformly within a tolerance of $\pm$ 15°F ($\pm$ 10°C) and producing a nitrided case of uniform depth and nitrogen content to all parts of the load. The furnace shall provide means for adequate circulation of furnace and retort atmospheres at all times. The furnace shall be capable of meeting the requirements of MIL-H-6875 and shall be equipped with a suitable protective atmosphere to inhibit the oxidation of copper plated parts.

4.1.2 Dissociator. The dissociator shall be capable of producing high ammonia dissociations at reasonable flow rates. Ammonia dissociation measurement shall be controlled to an accuracy of 3 percent (1 % cannot be maintained).

4.1.3 Temperature controls. All nitriding and heat treat furnaces shall be equipped with automatic indicating and recording controllers. Thermocouples shall be covered with suitable protective tubes.

4.1.4 Abrasive blast cleaning equipment. An air pressure source providing an air pressure of 20 to 30 pounds per square inch (psi) shall be required for dry abrasive blasting operations.

4.1.5 Fixtures. Fixtures shall be of suitable design to support parts and minimize distortion. Materials selected for fabrication of fixtures shall be capable of withstanding cyclic conditions of gas nitriding process. Typical alloys selected are type 330 Inconel or 35-15 cast alloy.

4.2 Materials.

4.2.1 Forgings and barstock. Unless otherwise specified, all forgings to be processed shall be in the annealed condition as defined on the applicable material instruction sheet contained in MIPD-G-62410, General Heat Treatment. All barstock delivered for processing shall be in the condition specified in the applicable material specification.

4.2.2 Test coupons or test samples. Test coupons shall be made of the same material and be in the same heat treated condition and shall have received the same surface preparation (ref 4.4.b, c, d) as the nitrided parts which the test coupons represent. Simulated gear test coupons and test coupons for other parts which will have nitrided surfaces adjoining each other to form an edge (eg: apex) shall be in accordance with figure 1. Test coupons for all other part configurations shall be in accordance with figure 2. Sufficient quantity of test samples or test parts shall be distributed within the load to represent nitriding conditions of the parts.

4.2.2.1 Sample material. Unless otherwise specified, samples shall be of same material as the parts being processed.

4.2.2.2 Sample configuration. Unless otherwise specified, samples shall be approximately the same cross sectional area and shape of parts being processed.

4.2.3 White layer etching solution. The white layer etching solution shall be made fresh and used within 24 hours. The solution shall be prepared with 3 percent nital.

4.2.4 Copper stripping solution. The copper stripping solution shall be prepared at room temperature and shall consist of 4 pounds of chromic acid (technical grade) and 5 fluid ounces of sulphuric acid (technical grade) to 1 gallon of water.

4.2.5 Nital etch (2 percent). Nital etch ASTM-E407, #74 shall consist of 98 percent methyl alcohol (reagent grade) and 2 percent by volume of concentrated nitric acid (reagent grade).

4.2.6 Ferricyanide etch. The ferricyanide etch ASTM-E407, #98 shall be made fresh and used within 15 minutes at 125° to 150°F (50° to 65°C). The solution shall consist of 10 grams potassium ferricyanide (reagent grade) and 10 grams of potassium hydroxide (reagent grade) and sufficient water to make 100 (ml) milliliters of solution.

4.2.7 Dry abrasive. Aluminum oxide, Al_2O_3, 220 mesh shall be used for dry abrasive blasting operations.

4.3 Required procedures and operations.

4.3.1 Prenitride surface condition. Carburization, decarburization, or oxidation shall not be acceptable.

4.3.2 Nitride surfaces. Surfaces to be nitrided shall be as specified on the engineering drawing.

4.3.3 Case depth. Case depth shall be as specified on the engineering drawing. The maximum case depth range for gears may be exceeded by 0.003 inch on the top land midway between the two-tooth profiles. The case depth range shall not apply to the radius between the top land and the tooth profile providing the gear tooth has acceptable dimensions. Other areas of the tooth shall meet the engineering drawing case depth requirements. Refer to figure 3 for tooth nomenclature.

4.3.4 Case and core hardness. Case and core hardness shall be as specified on the engineering drawing.

4.3.5 Identification control (serialized parts only). For purposes of traceability, permanent marking shall be performed at all stages of operation from receipt of raw material to completion of the finished part. Method of identification shall be on noncritical surfaces.

4.4 Preparatory machining and heat treatment:

a. Rough machining. Parts shall be rough machined from forgings and barstock (ref 4.2.1).
b. Heat treatment. Rough machined parts shall be heat treated to the requirements of table I as defined on the applicable material instruction sheet contained in MIPD-G-62410.
c. Semifinish machining. Heat treated parts shall be semifinish machined to render parts free from carburization, decarburization, and oxidation.
d. Stress relief (optional). An optional stress relief may be given to parts to eliminate residual machining stresses and subsequent distortion during nitriding. Stress relief shall be to condition L5, MIPD-G-62410.
e. Finish machining. Parts shall be finish machined to engineering drawing dimensions leaving a stock allowance for final grinding operations. Stock allowance shall be in accordance with table II for the applicable range into which the maximum engineering drawing case depth dimension falls.

4.5 Surface preparation (pre-nitride).

4.5.1 Masking (selective nitriding). Part surfaces which are not to be nitrided shall be masked by copper plating in accordance with AMS 2418. The plate thickness shall be 1.0 to 2.0 mils (0.025 to 0.050 mm).

Note: When plating prior to machining is a practicable procedure, all part surfaces may be plated.

4.5.2 Cleaning.

4.5.2.1 Abrasive blast. Vapor degrease and abrasive blast with dry aluminum oxide (see 4.2.7).

4.5.2.2 Alternate phosphate treatment. Phosphate treatment shall be performed in accordance with AMS 2480 to activate the surface on areas requiring nitriding. Areas not responding to treatment indicates the presence of residual copper which must be removed prior to nitriding.

4.5.2.2.1 Liquid honing. The parts shall be prepared for phosphate treatment by liquid honing in accordance with MIPD-M-62414 (skipping the requirement to slush in oil). Care shall be exercised not to erode copper plated surfaces during the liquid honing process.

Caution: Care shall be exercised to ensure all burnished areas (to be nitrided) resulting from polishing, lapping, or fine grinding (eg breakages) are treated in accordance with 4.5.2.2.1.

4.5.2.2.2 Phosphate treatment. Phosphate treatment shall be performed in accordance with AMS 2480 to activate the surface on areas requiring nitriding. Areas not responding to treatment indicates the presence of residual copper which must be removed prior to nitriding.

4.6 Nitriding. Nitriding shall be performed as follows:

a. Parts placement. Parts and samples (ref 4.2.2) to be nitrided shall be placed in the furnace in such a manner that the nitriding medium will have free access to all areas to be nitrided.
b. Air displacement. All air in the nitriding container shall have been displaced by ammonia prior to heating the parts over 300°F (205°C).
c. Nitride cycle. It shall be the responsiblity of the contractor to designate the proper nitriding process (single or double (floe) stage) and desired total case depth for the applicable material. Although table III shows the double stage process recommended for the three aluminum bearing steels specified herein, the nitriding processor could, unless otherwise instructed, proceed to use the single stage process. The three remaining alloy steels AMS 6322, AMS 6412, and AMS 6415 shall be single stage processed to the required case depth unless otherwise specified.

Note: The time required to go from the first stage to the second stage temperature shall not be counted as time for either stage.

4.7 Copper stripping. Copper plate shall be stripped from parts by immersing in copper stripping solution at room temperatures (ref 4.2.5) and rinsing thoroughly in water sufficient to remove all Cu plate.

Note: Stripping shall never be performed by reversing the current in the copper plating bath nor shall a periodic reverse cleaner or acid pickle be used after the nitriding operation.

4.8 Bake. All parts shall be baked at 375° ± 25°F (190° ± 5°C) for 2 hours as soon as possible after stripping.

4.9 White nitride layer removal. White layer shall be evenly removed from the nitrided surfaces by abrasive blasting or other approved means. The process shall have sufficient control to produce a smooth surface with uniform white layer removal. When subsequent machining will remove all of the white nitride layer, the parts need not be abrasive blasted.

4.10 Final (grinding) machining. Parts shall be final ground to engineering drawing dimensions.

Note: Total stock removal from nitrided surfaces, including white nitride layer removal (ref. 4.9), shall not exceed the stock allowance specified in 4.4.e.

4.11 Stress relief. Immediately after final grinding, parts may be stress relieved by heating to 375° ± 25°F (190° ± 5°C), holding for 2 hours and followed by air cooling.

4.12 Black oxide. When specified on the engineering drawing, black oxide treatment shall be done in accordance with the requirements of AMS 2485.

Caution: Unless otherwise approved by the acquisition acitivity, when black oxide is reworked, the black oxide shall only be stripped by mechanical methods.

4.13 Incoming data requirement. Information provided to nitriding heat treat source shall include the following as minimum:

a. Purchase order number.
b. Base material heat treatment and hardness (surface and core) certifications submitted.
c. Part number (latest revision).
d. Quantity of samples submitted.
e. Base material composition.
f. Lot identity required.
g. Cycle required.
h. Total case depth required and means for evaluation.
i. Hardness specified.
j. Case and core microstructure.

5. DETAIL REQUIREMENTS

5.1 Approvals. Sources, materials, equipment facilities, and any changes shall be subject to approval by the acquisition activity. Each facility shall require separate approval for any given part configuration. Specific detailed work instructions (process procedures) shall be submitted to the acquisition activity. Any changes or revisions to the submitted work instructions shall be submitted to the acquisition activity prior to the initial use of revised procedures. The acquisition activity reserves the right to disapprove such work instructions or revisions to the same.

5.1.1 Reports. Unless otherwise specified, the supplier shall furnish with each shipment three copies of a certificate stating the following:

a. Purchase order number.
b. Part number and revision letter.
c. Quantity.
d. Nitride heat number and serial numbers when applicable.
e. Heat treating and nitriding vendor.
f. Case depth.
g. Case and core hardness.
h. Case and core microstructure.
i. Statement of conformance to this standard.
j. All certification requirements expressed in the applicable specifications (eg: raw material specification).

5.1.2 Records. Records shall be maintained to provide correlation of part number and serial number to the original material lot number, material heat number, and nitriding load number.

5.2 Standardization and monitoring of equipment.

5.2.1 Furnace load temperature. Furnace load temperature shall be checked by inserting a calibrated thermocouple within 3 inches of the control thermocouple and comparing temperatures to that of the controlling and recording pyrometers. Care shall be exercised to prevent the leakage of gas from the furnace during the test. Checks shall be made at least once every 3 months at normal working temperatures with normal charges in the furnace.

5.2.2 Pyrometers. Pyrometers shall be checked at regular intervals by measuring the temperature (see AMS 2750) of the working thermocouple with a potentiometer of known accuracy.

5.2.3 Hardness testing facilities. The accuracy of test equipment used to determine the microhardness traverse and the case and core hardness shall be checked as often as necessary in accordance with ASTM E18 and ASTM E384 to ensure the equipment is operating properly and shall be calibrated as required.

5.3 Certification. The following tests shall be conducted on the test coupons submitted for the approval of each furnace load of nitrided parts (see 4.13).

5.3.1. Case depth (as-nitrided). The case depth shall be measured by either of the two following methods. The micro-hardness survey method shall be used in case of any dispute.

5.3.1.1 Micro-hardness survey method. Test coupons or part shall be sectioned in accordance with figure 5 and prepared for evaluation in accordance with ASTM E3. Hardness survey shall be conducted in accordance with ASTM E384 from surface to core using appropriate load and selection of increments to avoid stress deformations between indentations. First impression shall be taken at 0.002 inch from the surface and progressing in increments of 0.004 inch until the case has been traversed. The case depth is the distance from the nitrided surface to the point where the maximum of the core hardness specified on the engineering drawing is obtained. Recommended load is 500 grams.

5.3.1.2 Chemical etch method. The surface of the applicable test coupon (prepared in accordance with 5.3.1.1) shall be etched in 2 percent nital etch (ASTM E407) solution (ref 4.2.5) for a time sufficient to reveal a microstructure. The case depth shall be determined by measuring the distance from the surface to the edge of the dark band (case material) in the location specified in figure 4 using a Brinell glass or equivalent.

5.3.2 General metallurgical structure. With the test slice etched in 2 percent nital etch solution as specified, the test slice shall be subjected to a micro-examination of the general metallurgical structure.

5.3.2.1 White nitride layer. The white nitride layer shall have a maximum depth of 0.0005 inch (0.0127 mm).

5.3.2.2 Case structure. The case structure shall be tempered martensite plus uniformly dispersed nitrides.

5.3.2.2.1 Continuous grain boundary nitride network. The remaining slice of the test coupon prepared in accordance with 5.3.1.1 (see ASTM E3) shall be immersed in ferricyanide solution (ref 4.2.6) for approximately 15 minutes with occasional agitation. The test slice shall be examined to determine the presence of continuous grain boundary nitride network.

a. Continuous grain boundary nitride network is acceptable at the crest of the tooth to the distance D below the crest on simulated gear test coupons and at the corners of flat test coupons (see figure 4).
b. Continuous grain boundary nitride network is not acceptable in areas below the distance D for simulated gear test coupon or in areas more than 1/16-inch from a corner on flat test coupons (see figure 4). Isolated grains displaying this condition may be accepted provided not more than three such grains are visible in a 0.020 inch diameter field when viewed at 200 x magnification and not more than two such grains are adjacent to each other.

5.3.2.3 Core structure. The core structure shall be tempered martensite.

5.4 Test methods. The following tests shall be conducted on finished parts to verify conformance to the requirements of this standard and the applicable engineering drawing.

5.4.1 Hardness (case and core). Case and core hardness shall be determined to verify conformance to the engineering drawing requirements (see 5.4.4).

5.4.1.1 Hardness check. The location for taking hardness checks shall be as specified on the engineering drawing. Checks shall be made in locations not detrimental to part integrity when hardness check locations are not specified.

5.4.1.2 Hardness determination. Unless otherwise specified on the engineering drawing, Rockwell 30N shall be used to determine the case hardness. Rockwell HRA shall be used to determine core hardness. Rockwell HRC shall be used as a reference hardness and shall not be used to determine part conformance.

5.4.2 Imperfections and indications. Gears shall be magnetic particle inspected in accordance with MIPD-M-62433 to verify acceptance limits in MIPD-G-62439. All other part configurations shall be magnetic particle inspected in accordance with MIPD-M-62433 to verify the acceptance limits specified in other specifications related to the engineering drawing.

5.4.3 White nitride layer. Parts shall be prepared and inspected for presence of white nitride layer as follows:

a. White layer etchant (ref 4.2.3) shall be applied to all nitrided areas with a camel hair brush or by immersion for a period of 5 to 15 seconds.
b. The etchant shall be removed by washing with water.
c. All nitrided areas shall be examined for presence of white nitride layer. Surfaces free from white nitride layer shall react with the etchant to produce a smutty black surface.
d. Unless otherwise specified on the engineering drawing, there shall be no evidence of white layer except as follows (ref 4.9).

(1) Class 1 gears. After abrasive blasting, traces of white layer shall be permissible only on the top land area excluding the radius between the top land area and the tooth profile.
(2) Class 2 and 3 gears. After abrasive blasting, traces of white layer shall be permissible only in the following areas:

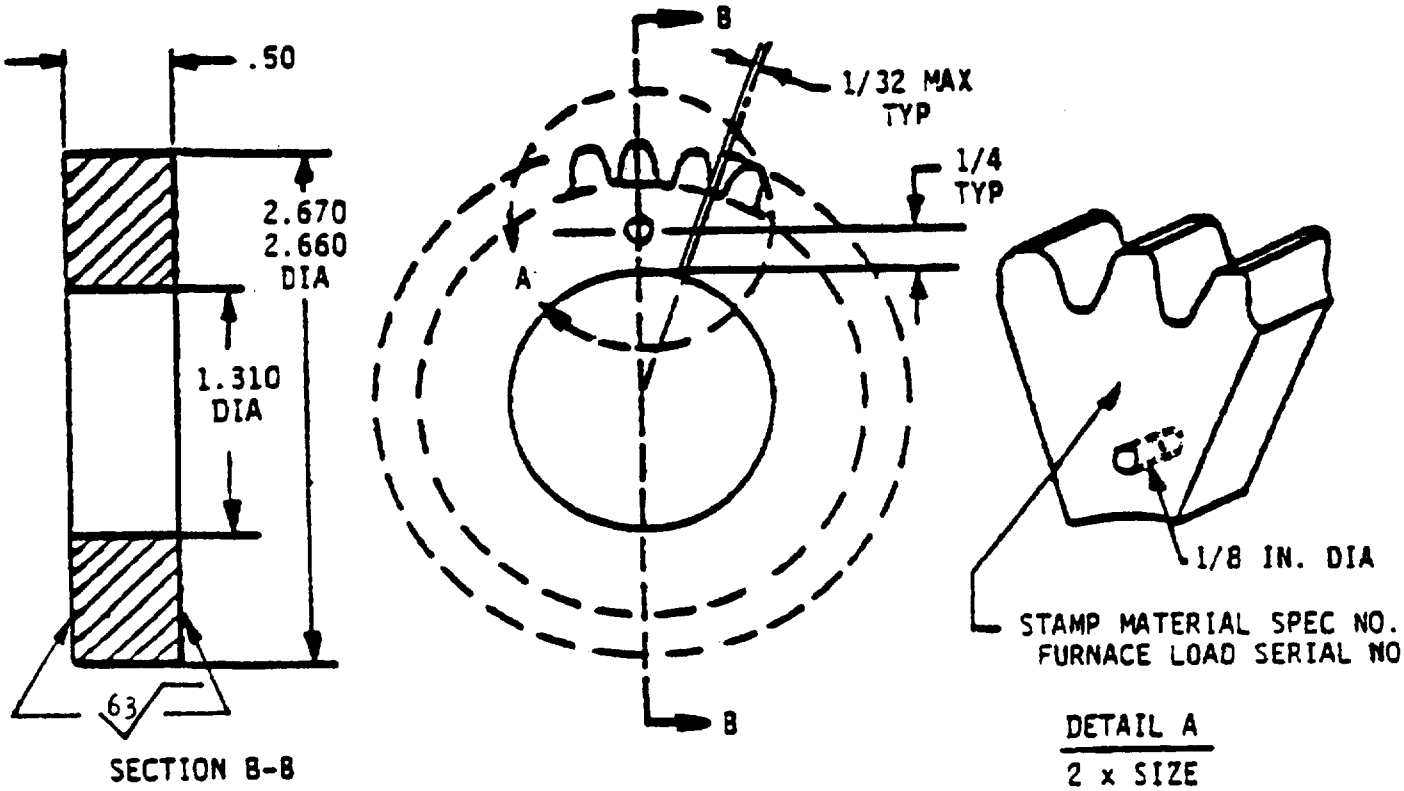
(a) On the top land area excluding the radius between the top land area and the tooth profile.
(b) On the root fillet area provided the areas of the root fillet adjacent to the end faces are free from white layer for a distance equal to 10 percent of the tooth length.

(3) Splines. White layer shall be permissible on the unloaded tooth profile, top land area, and the root fillet areas.

e. Etching stain shall be removed by barrel finishing when specified on the engineering drawing.

5.4.4 Destructive analysis. When destructively evaluated for metallurgical parameters of nitrided case and core, finished parts shall conform to the applicable requirements specified herein.

5.5 Rework. Prior approval shall be obtained before performing any rework.



GEAR TOOTH DATA (FULL GEAR)

DIAMETRAL PITCH	12.0 STD DEPTH
NUMBER OF TEETH	30
PRESSURE ANGLE	20
PITCH DIAMETER	2.500
MEASUREMENT OVER (.144 DIA) WIRES CIR. TOOTH THICKNESS OF 2.500 PD	2.693 - 2.703 .1309 BASIC

NOTE:

1. Full gear to be sectioned into segments consisting of 3 teeth each (ref detail A).
2. Heat treatment per M1PD-G-6241OL234A (AMS6470) HRC 34-40.
3. Finish all over 63 microfinish, as shown section B-B.
4. Gear teeth to be as cut (grinding not required).
5. Break all edges .005 to .015 inch.

FIGURE 1. Simulated Gear Test Coupon.

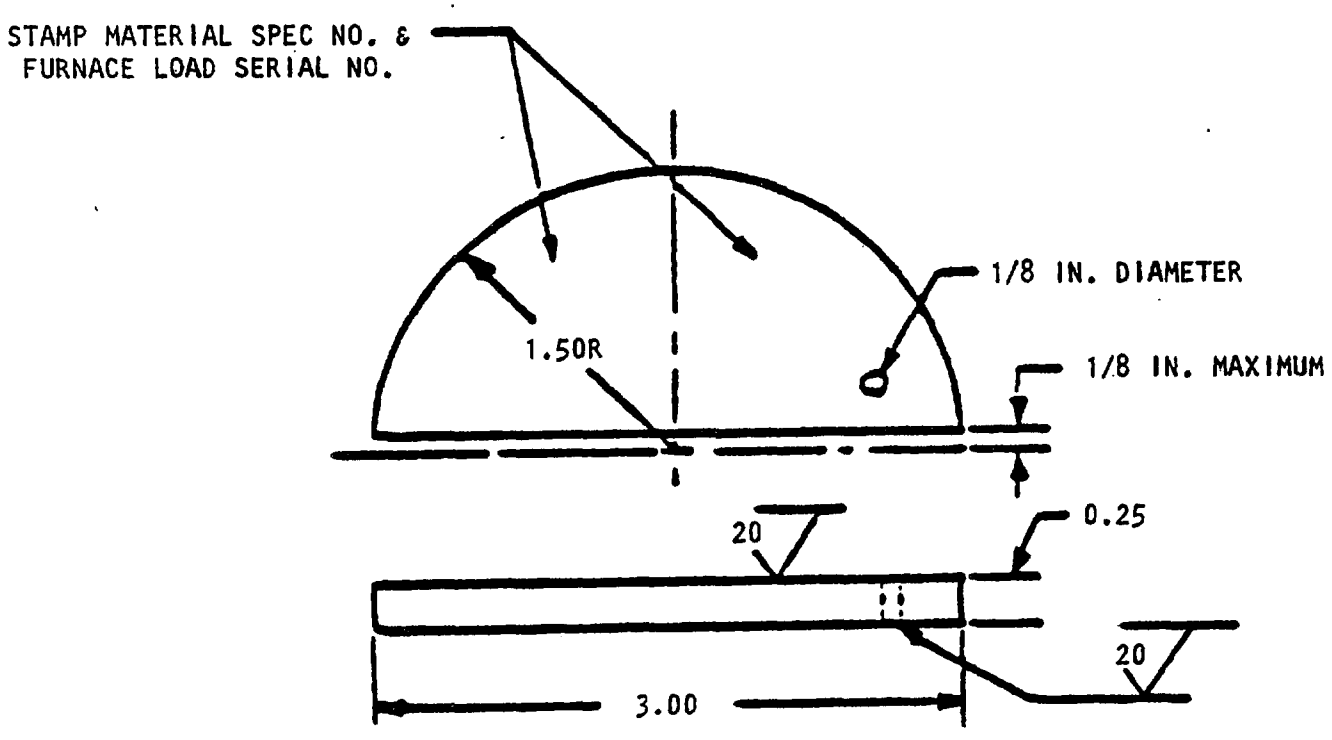


FIGURE 2. Flat test coupon.

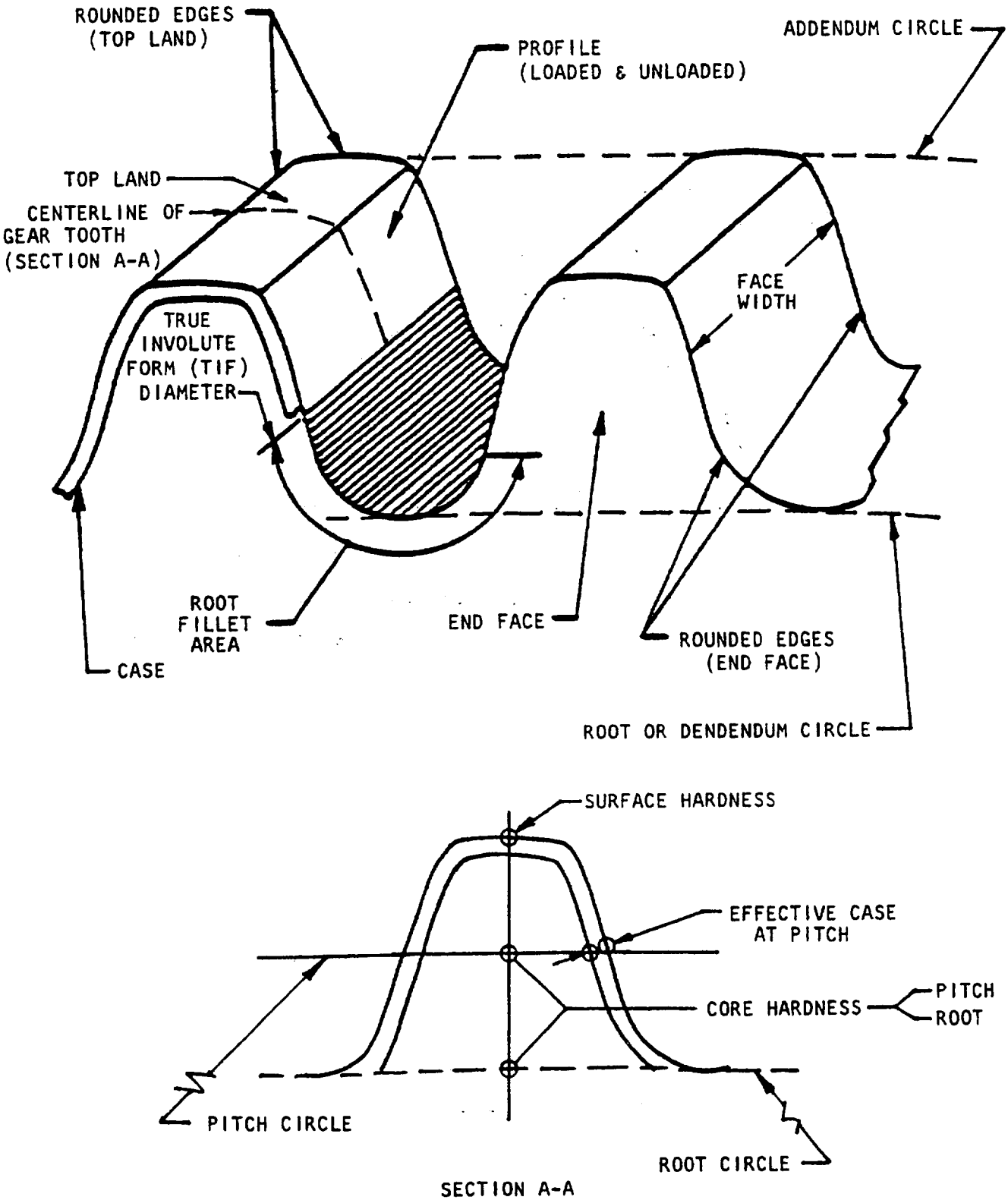
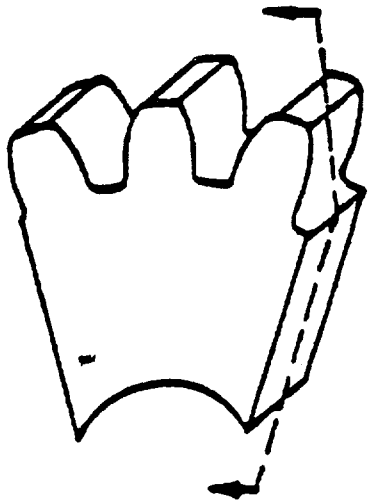
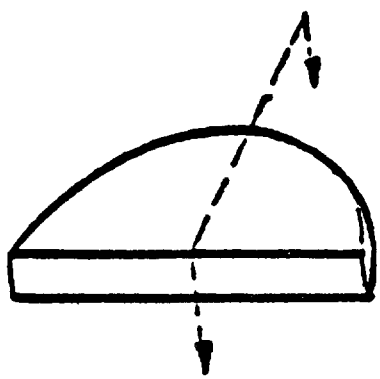


FIGURE 3. Tooth nomenclature.



SIMULATED GEAR COUPON PER FIGURE 2.

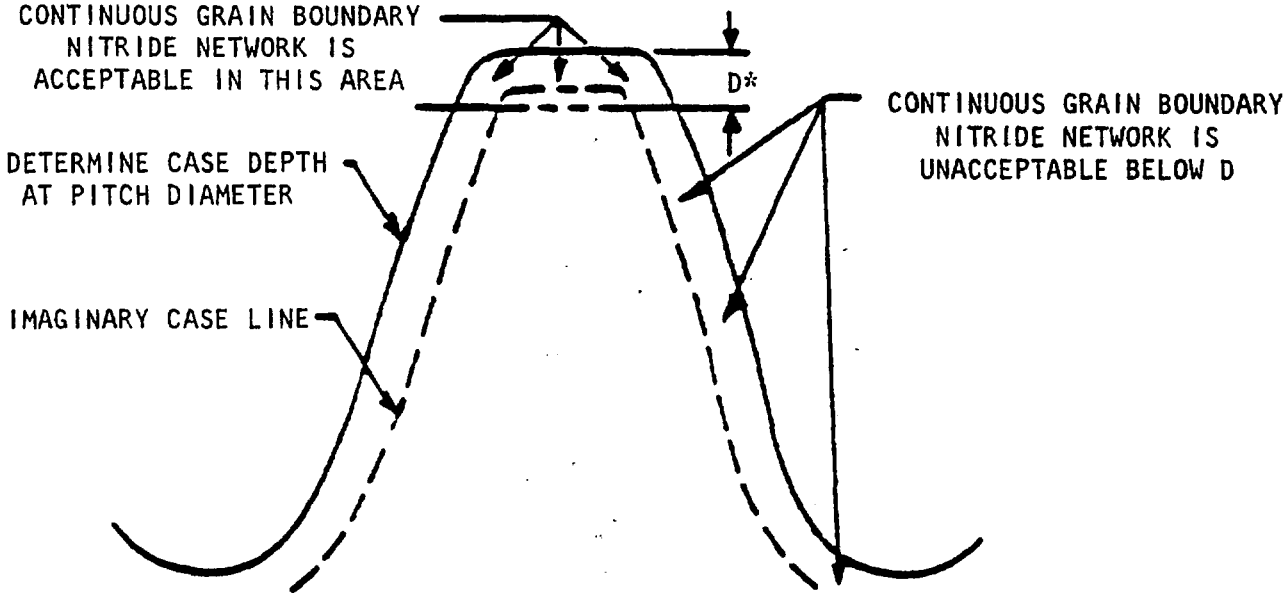
BISECT THE COUPON AT A PLANE PERPENDICULAR TO THE LINEAR TOOTH PROFILE.



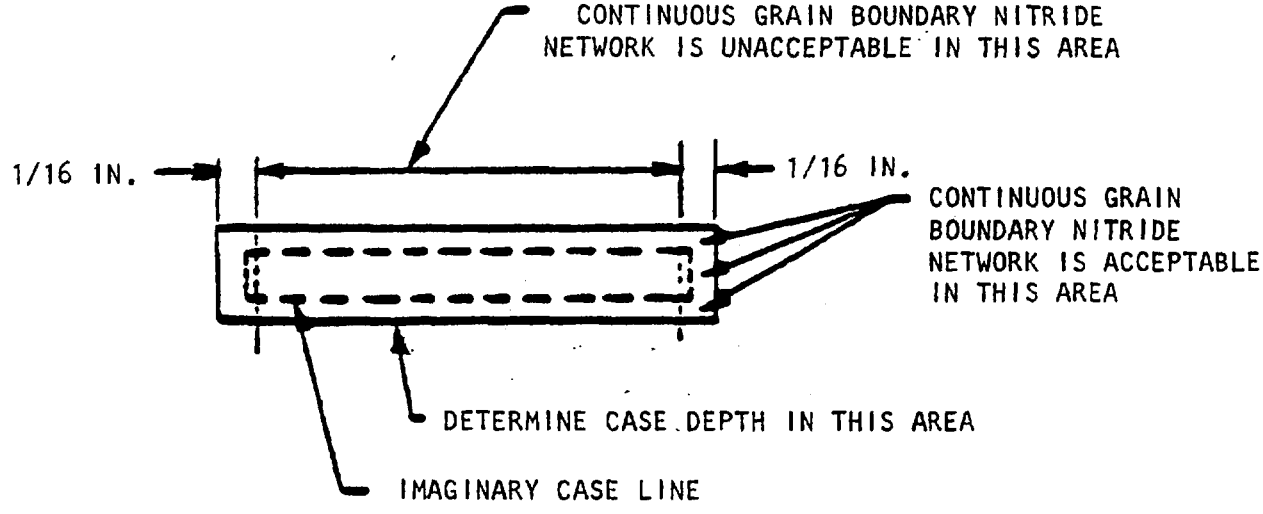
FLAT TEST COUPON PER FIGURE 3

BISECT THE COUPON AT A PLANE PERPENDICULAR TO THE PARALLEL SURFACES.

FIGURE 4. Method of sectioning test coupons.



CROSS SECTION OF SIMULATED GEAR COUPON



CROSS SECTIONS OF FLAT TEST COUPON

FIGURE 5. Cross sections of test coupons for metallographic examination of grain boundary network acceptance criteria.

TABLE I. Heat treat cycles prior to nitriding.

Material specification	Core hardness Rockwell HRA scale	Heat treatment required
AMS 6322	63.5-66.5	M1PD-G-62410 L234D
AMS 6412	63.5-66.5	M1PD-G-62410 L234D
AMS 6415	63.5-66.5	M1PD-G-62410 L234D
AMS 6470	67.5-70.5	M1PD-G-62410 L234A
AMS 6471	67.5-70.5	M1PD-G-62410 L234A
AMS 6475	63.5-66.5*	M1PD-G-62410 L234
AMS 6487	74.0-77.0	M1PD-G-62410 L234B

* Core hardness after nitriding is HRA 69.5-71.5

TABLE II. Nitrided case depth stock allowance.

Diametral pitch	Case depth range (inch) (1)	Maximum grinding stock allowance (inch)
- - - -	.005 - .008	0.001
- - - -	.008 - .012	0.0015
20.00 - 24.99	.010 - .015	0.0025
16.00 - 19.99	.012 - .018	0.003
12.00 - 15.99	.014 - .021	0.004
- - - -	.016 - .024	0.0045
9.00 - 11.99	.018 - .028	0.005

Note:

(1) The maximum case depth on unground splines (class 1 and 2) may exceed the table value by an amount equal to the maximum grinding stock allowance rounded to the nearest 0.XXX inch.

TABLE III. Double cycle processing for nitriding.

Material	As-Nitrided case depth (inch)	First stage (975°F ± 10) Time (hours)	First stage (975°F ± 10) Percent dissociation	Second stage (1035°F ± 15) Time (hours)	Second stage (1035°F ± 15) Percent dissociation
AMS 6470, AMS 6471	0.006-0.008	6	20-35	-	--
	0.009-0.012	5	20-35	5	83-86
	0.012-0.015	5	20-35	20	83-86
	0.015-0.018	6	20-35	26	83-86
	0.018-0.021	6	20-35	36	83-86
	0.020-0.024	8	20-35	50	83-86
	0.022-0.028	8	20-35	60	83-86
AMS 6475	0.011-0.015	5	20-35	25	83-86

Custodian:
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Preparing activity:
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Project No. MFFP-A261

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1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-STD-1876(AT)	Nitriding, Gaseous Atmosphere Processing for

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
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5. PROBLEM AREAS

a. Paragraph Number and Wording:

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6. REMARKS

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