SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE STANDARD

SAE AS7100/1

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Submitted for recognition as an American National Standard

NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM (NADCAP)

SURVEY CHECKLISTS FOR THE NDT SUPPLIERS ACCREDITATION PROGRAM

1. Scope

1.1 This standard includes the forms to be used by a third party to survey a nondestructive test facility with respect to penetrant, magnetic particle, ultrasonic, and/or radiographic methods.

2. References

2.1 Applicable Documents

2.1.1 SAE Publications

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001

AS7001 - National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Description
AS7002 - National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Rules for Implementation
AS7003 - National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Operation
AMS-2641 - Vehicle, Magnetic Particle Inspection, Petroleum Base

2.1.2 ASNT Publications

Available from The American Society for Nondestructive Testing, 4153 Arlingate Plaza, Caller #28518, Columbus, OH 43228-0518.

Recommended Practice No. SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing

2.1.3 **ASTM Publications**

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 95	Test Method for Water in Petroleum Products and Bituminous Materials by Distillation
ASTM E 155	Reference Radiographs for Inspection of Aluminum and Magnesium Castings
ASTM E 186	Reference Radiographs for Heavy-Walled (2 - 4-1/2 in. (51 - 114 mm)) Steel Castings
ASTM E 192	Reference Radiographs of Investment Steel Castings for Aerospace Applications
ASTM E 317	Practice for Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Systems Without the Use of Electronic Measurement Instruments
ASTM E 428	Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Inspection
ASTM E 446	Reference Radiographs of Steel Castings Up to 2 in. (51 mm) in Thickness

2.1.4 **Military Publications**

Available from Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.1.5 **Military Standards**

MIL-STD-410	Nondestructive Personnel Qualification and Certification
MIL-STD-453	Inspection, Radiographic
MIL-STD-2154	Inspection, Ultrasonic, Wrought Metals, Process for
MIL-STD-6866	Inspection, Liquid Penetrant
MIL-STD-45662	Calibration Systems Requirements

2.1.6 **Military Specifications**

DOD-F-87935	Fluid, Magnetic Particle Inspection, Suspension Medium (Metric)
MIL-I-25135	Inspection Materials, Penetrants

3. **Requirements**

3.1 Survey information has been divided into parts as follows:

Appendix A - SURVEY OF NONDESTRUCTIVE TEST FACILITY

This part contains general information that would be collected for a survey of any company for any of the four basic NDT methods.

Appendix B - PENETRANT SURVEY

Appendix C - MAGNETIC PARTICLE SURVEY

Appendix D - ULTRASONIC SURVEY

3.1 (Continued):

Appendix E - RADIOGRAPHY SURVEY

These survey forms cover information not included in Appendix A required for completion of a survey for the particular method being accredited. These forms shall be used in conjunction with and become part of the SURVEY OF NDT FACILITY form (Appendix A).

3.1.1 These forms are appended to this standard.

3.1.2 In completing these forms, surveyors are to be advised that

(a) Each question requires an answer.

(b) The intended response shall be circled.

(c) When a blank line is provided, the required data shall be shown.

(d) If the answer references an attachment, it shall become a part of the survey record and shall show the survey identification number on each page.

(e) Not applicable (N/A) responses are intended for items that are not required based on the materials/requirement in use at the facility. All other N/A responses must be explained.

(f) All discrepancies shall be documented by completing the Supplier Corrective Action Request form (AS7100/1, Page A-2) during the exit interview.

PREPARED BY THE
PRI NADCAP COUNCIL

SURVEY NO. _____

APPENDIX A
SURVEY OF NONDESTRUCTIVE TEST FACILITY

COMPANY: _____ SURVEY DATE: _____

DIVISION: _____ PHONE: _____

ADDRESS: _____ FACILITY: _____

CITY/STATE/ZIP: _____ _____

NATURE OF BUSINESS: _____

IN-HOUSE PRODUCTS ONLY: _____ ACCEPTS OUTSIDE WORK: _____

TOTAL EMPLOYEES: _____ QA PERSONNEL: _____ NDT: _____
Exclude NDT Certified

SQUARE FEET OF WORK AREA: _____ NO. OF SHIFTS WORKED: _____

CONTACTS	POSITION

SURVEYED FOR ACCREDITATION

METHOD	RECOMMENDED	NOT RECOMMENDED	DATE
PENETRANT			
MAGNETIC PARTICLE			
RADIOGRAPHY			
ULTRASONIC			
OTHER:			

COMMENTS: _____

_____

_____

_____

Attach additional sheets if required.

REASON FOR VISIT

INITIAL SURVEY: _____ FOLLOW-UP SURVEY: _____ REACCREDITATION SURVEY: _____

SURVEYOR'S SIGNATURE: _____ DATE: _____

CORRECTIVE ACTION VERIFIED: _____ DATE: _____
Surveyor

SURVEY NO. _____

SUPPLIER CORRECTIVE ACTION REQUEST

It Has Been Determined That The Following Items Are Not In Compliance:
Attach exhibits as applicable.

ITEM #	NON-COMPLIANCE

Attach extra sheets as required.

SURVEYOR'S SIGNATURE: _____ DATE: _____

NON-COMPLIANCES HAVE BEEN REVIEWED WITH THE UNDERSIGNED SUPPLIER'S REPRESENTATIVE:

_____ TITLE: _____ DATE: _____

CORRECTIVE ACTION RESPONSE

ITEM #	PLANNED CORRECTIVE ACTION	WILL COMPLETE BY

Attach extra sheets as required.

THESE CORRECTIVE ACTIONS WILL BE ACCOMPLISHED AT NO EXPENSE TO THE U.S. GOVERNMENT, CUSTOMER, SURVEYING ORGANIZATION, OR MEMBER ORGANIZATIONS

SURVEYOR'S SIGNATURE: _____ DATE: _____

SUPPLIER REPRESENTATIVE: _____ DATE: _____

TITLE: _____

(This page shall be completed by the surveyor and the supplier's representative as part of the exit interview.)

A1. SYSTEM:

A1.1 Are all applicable specifications available?
(To include, but not limited to the following)

(a)	Customer	YES	NO
(b)	Industry specifications (ASTM, SAE, etc.)	YES	NO
(c)	U.S. Government specifications	YES	NO
(d)	Company specifications	YES	NO
(e)	Other: _____	YES	NO

A1.2 Is there a system in place to update specifications and remove obsolete documents? YES NO

A1.2.1 Is there evidence of compliance to the procedure? YES NO

A1.3 Unique Customer Requirements:

(a) Is there a system in place to ensure that unique customer requirements are implemented? YES NO

(b) Who has the responsibility for identifying and implementing these requirements?

_____
(function and title)

(c) How are these requirements documented?

_____

(d) How are these requirements communicated to the inspectors?

_____

(e) How are these requirements kept up to date with respect to the revision specified by the customer?

_____

(f) Does this system appear to be adequate? YES NO

A1. SYSTEM: (Continued)

A1.4	Does the supplier have a self-audit procedure?	YES	NO	
A1.5	Are all rejected parts adequately segregated until rework and reinspection/disposition has been completed?	YES	NO	
	Describe the system _____			
A1.6	Do inspection stamps contain the following:			
	(a) Letter symbol for the method applied?	YES	NO	
	(b) The facility identifier?	YES	NO	
	(c) The inspector's identification number?	YES	NO	
A1.7	Are parts too small for stamping identified by packaging or tagging?	YES	NO	
A1.8	Are accepted parts marked by type and acceptance class, when specified by the inspection procedure?	YES	NO	N/A
A1.9	Has a system been established for issuance, recall, and traceability of inspection stamps?	YES	NO	
A1.10	Is there a system in place that provides for, acceptance, control, inspection, and return of parts per applicable purchase order?	YES	NO	
A1.11	Is there a system in place to ensure that sub-tier suppliers (e.g. calibration services, cleaning and etching processors, etc.) comply with prime contractor requirements?	YES	NO	

A2. PERSONNEL RECORDS:

A2.1	Is a written procedure for qualification and certification of NDI personnel available for review on site?	YES	NO	
	Document Title: _____			
	Document Number: _____ Date Approved: _____			
A2.2	Are records of qualification and certification of inspection personnel complete, accurate, and available for review and contain the following?	YES	NO	
	(a) Name of certified individual?	YES	NO	
	(b) Level of certification?	YES	NO	
	(c) Limitations?	YES	NO	
	(d) Date of certification or recertification?	YES	NO	
	(e) Expiration date of certification?	YES	NO	
	(f) Records of training, experience, and examinations?	YES	NO	
	(g) Signature of qualifying examiner?	YES	NO	
	(h) Signature of authorized representative of outside agency, if utilized?	YES	NO	N/A
	(i) Signature of authorized employer's representative attesting to certification if different from (g)?	YES	NO	N/A
A2.3	Have general, specific, and practical tests been given within the last 3 years and are on file and available for review?			
	(a) Level I and Level II	YES	NO	
	(b) Level III	YES	NO	
	(c) Does the grading system conform to the requirements of MIL-STD-410?	YES	NO	
	(d) Do tests meet the requirements of Mil-Std-410?	YES	NO	
	If not, what requirements are met? _____			
	(e) Are tests periodically revised or changed?	YES	NO	

A2. PERSONNEL RECORDS: (Continued)

A2.3 (Continued):

(f) Do questions represent the applicable level of certification? YES NO

(g) Do the "specific" examination questions reflect the equipment and procedures used within this facility? YES NO

A2.4 Are records of eye test results current for inspection personnel and available for review? YES NO

(a) Near vision, at least one eye: Ortho-Rater 8 or Jaeger #2 @ 12 inches. YES NO

(b) Color vision normal for colors in applicable method. _____ YES NO

(c) Are eye tests given annually? YES NO

A2.5 Are written recertification examinations given every three years for Level I and Level II personnel? YES NO

A2.7 Are Level III certified personnel available? YES NO

(a) Certified MIL-STD-410 Level III? YES NO

If yes, by whom? _____

(b) Certified ASNT Level III? YES NO

If yes, give ASNT Certification Number: _____

(c) Other YES NO

If yes, by whom? _____

A2.8 Do Level I personnel accept/reject parts? If yes, explain (Attach extra sheet) YES NO

A2.9 Is a training course outline for each level in place and does it address the following:

(a) Adequate technical theory for the method? YES NO

(b) Specifications and procedures? YES NO

(c) Techniques? YES NO

(d) Equipment, calibration, and standards? YES NO

(e) Materials? YES NO

(f) Training hours? YES NO

(g) Instructor requirements? YES NO

A2. PERSONNEL RECORDS: (Continued)

A2.10 Is there a written policy describing conditions under which certification will be revoked? YES NO

A2.11 Is there a policy for requalification of personnel that fail the certification/recertification tests or have had their certifications revoked? YES NO

A3. INSPECTION REPORTS/RECORDS/PROCEDURES:

A3.1 Does the written procedure, general or specific, contain the following information as applicable:

(a) The procedure I.D. number, applicable program, if program specific, and the date the procedure was approved? YES NO

(b) The part number, material, shape and dimensions significant to the part to be examined? YES NO

(c) Equipment to be used? YES NO

(d) Materials to be used? YES NO

(e) Surface preparation (finishing, cleaning, pickling)? YES NO

(f) Applicable acceptance class and zone per engineering drawing specification? YES NO

(g) A statement to the effect that quality assurance provisions will be met? YES NO

(h) A statement to the effect that the procedure complies with all applicable specification requirements? YES NO

(i) A statement to the effect that all personnel are qualified and certified to the applicable contract requirements? YES NO

(j) Records and methods of marking parts after inspection? YES NO

Stamp ____, Tag, ____, Dye ____, Other _____

(k) Approved deviations are listed and validated? YES NO

A3.2 Any evidence of unauthorized specification, drawing, or procedure changes? YES NO

A3. INSPECTION REPORTS/RECORDS/PROCEDURES: (Continued)

A3.3 Are technique cards prepared by the Level II or III and approved by the Level III in the applicable inspection method? YES NO

A3.4 Are inspection reports supplied with each part or lot of parts and signed by the authorized certified person? YES NO

A3.5 Is an inspection record maintained for records of all parts submitted for NDI? YES NO

If answer to 3.5 is No, describe how the above information is recorded:

_____

_____

_____

_____

_____

_____

Attach additional sheets if required.

A3.6 Is a system in place to insure inspection records are maintained per purchase or contract requirements? YES NO

A3.7 Are procedures for material handling and processing defined and adequate, i.e., titanium, beryllium, etc? YES NO

A3.8 Does documentation of inspection, as a minimum, cover the following?

(a) Part number and serial number, if applicable? YES NO

(b) Number of parts in lot? YES NO

(c) Number inspected and number accepted? YES NO

(d) Date of the inspection? YES NO

(e) I.D. of inspector performing the inspection? YES NO

(f) Material description? YES NO

(g) Nature of discrepancy and rejection tag number, if applicable? YES NO

A3. INSPECTION REPORTS/RECORDS/PROCEDURES: (Continued)

A3.9 Do inspection reports contain the following as a minimum:

(a)	NDT facility name?	YES	NO
(b)	Date of inspection?	YES	NO
(c)	Part number and serial number if applicable?	YES	NO
(d)	Number of parts in lot, number inspected, number accepted?	YES	NO
(e)	Applicable specification number/acceptance criteria?	YES	NO
(f)	Rejection tag number, if applicable?	YES	NO
(g)	Signature of authorized person?	YES	NO

A3.10 Is a work order or shop traveler in use that shows?

(a)	Product identification traceable to applicable purchase order number, part number, or product specification?	YES	NO
(b)	Applicable specification and procedure?	YES	NO
(c)	Inspection method?	YES	NO
(d)	Inspection acceptance of operation performed?	YES	NO
(e)	Quantity Inspected?	YES	NO
(f)	Correct sequence of fabrication and inspection operations?	YES	NO

A3.11 Were any non-certified/in-training personnel observed performing operations without proper supervision? YES NO

A4. CALIBRATION:

A4.1 Is a system in place to assure equipment calibration and control? YES NO

A4.2 Is calibration performed in-house? YES NO

Is calibration performed by an outside service? YES NO

Who supplies the calibration service?

Name: _____

Address: _____

_____

Attach extra sheets as required.

A4. CALIBRATION: (Continued)

A4.3	Does the system specify calibration intervals?	YES	NO
A4.4	Is equipment properly tagged?	YES	NO
	(a) Date last calibrated?	YES	NO
	(b) Date of next calibration?	YES	NO
	(c) Any out-of-date calibrations observed?	YES	NO
	(d) Calibration not required?	YES	NO
	(e) Calibration before use?	YES	NO
A4.5	Do calibration and maintenance records include:		
	(a) Inventory of equipment requiring calibration?	YES	NO
	(b) Manufacturer's name, model, and serial number of each item in inventory?	YES	NO
	(c) Calibration frequency?	YES	NO
	(d) Reference to procedure and calibration standard used?	YES	NO
	(e) Date last calibrated and date of next calibration?	YES	NO
	(f) Name of individual performing the calibration?	YES	NO
	(g) If out of tolerance, what actions were taken with hardware and equipment?		

Attach additional sheets if required.

A5. FACILITIES:

A5.1	Is the equipment arranged to permit a uniform and controlled flow of materials and/or parts through the shop?	Poor	Fair	Good	Excellent
A5.2	Is housekeeping neat and orderly?	Poor	Fair	Good	Excellent
A5.3	Is the inspection area properly lighted or protected to assure acceptable inspection conditions?	Poor	Fair	Good	Excellent
A5.4	Is the inspection area free of contamination or materials that may interfere with the inspection process?	Poor	Fair	Good	Excellent
A5.5	Are facilities available for application of protective coatings?			YES NO	N/A
A5.6	Is there evidence of part damage due to handling?			YES NO	
A5.7	Is material/part storage adequate to preclude damage?			YES NO	

A5.8 Surveyors General Impression: (Attitude, behavior, are employees neat, busy, etc.)

A5.9 Supplier's Comments:

SURVEY NO. _____

APPENDIX B
PENETRANT SURVEY

Instructions to the Surveyor:

This form shall be used in conjunction with and shall become a part of the SURVEY OF NDT FACILITY form (Appendix A).

Each question requires an answer.
Circle the intended response.
Fill in data when a blank line is provided.
If the surveyor's answer references an attachment, it shall become part of this survey record. The survey identification number shall be recorded on each page of every attachment.
Not applicable (N/A) responses are intended for items that are not required based on the materials/equipment in use at this facility.
All other N/A responses shall be explained.
Document any discrepancies by completing the Supplier Corrective Action Request form (AS7100/1, Page A-2) during the exit interview.

Parenthetical information is the reference paragraph from MIL-STD-6866.

B1. MATERIALS AND EQUIPMENT:

B1.1 List all penetrant materials used at this facility (4.4.1).

Level or Group	Type/Method/Form	Manufacturer	Pen.	Emul.	Dev.	Listed on QPL?	
_____	_____	_____	____	_____	____	YES	NO
_____	_____	_____	____	_____	____	YES	NO
_____	_____	_____	____	_____	____	YES	NO
_____	_____	_____	____	_____	____	YES	NO
_____	_____	_____	____	_____	____	YES	NO

B1.2 List the procedure for qualification of penetrant inspection materials if other than MIL-I-25135.

_____

_____

B1.3 Does the facility have traceability to the manufacturer's certifications for each batch of penetrant, emulsifier, and developer in use? YES NO

B1.4 List the tank sizes (length x width x depth, units of feet).

Level or Group	Penetrant	Emulsifier	Developer	Inspection Booth
_____	___x___x___	___x___x___	___x___x___	___x___x___
_____	___x___x___	___x___x___	___x___x___	___x___x___
_____	___x___x___	___x___x___	___x___x___	___x___x___
_____	___x___x___	___x___x___	___x___x___	___x___x___
_____	___x___x___	___x___x___	___x___x___	___x___x___
_____	___x___x___	___x___x___	___x___x___	___x___x___

B1.5 Is spray penetrant application available for larger parts? YES NO

B1.6 Is automated equipment in use at this facility? YES NO

B1.7 List the generic types of parts that are penetrant inspected at this facility.

Manual Processing Equipment	Automated Processing Equipment
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B1.8 List the largest size part that can be penetrant inspected by this facility. (_____in.) x (_____in.) x (_____in.)

B2. PROCEDURES:

B2.1 NDT Facility Written Procedure (4.6):

B2.1.1 Do detailed written procedures exist to document penetrant inspection requirements for various categories of parts? YES NO

a) Do the procedures include controls to ensure that the customer specific requirements are met? YES NO

b) Is responsibility clearly assigned for review of customer specific requirements and planning to implement any such unique requirements. YES NO

c) How are customer specific requirements for processing parameters and acceptance criteria documented and communicated to the inspectors?

_____

_____

B2.1.2 Does the procedure include:

(a)	An identification number, applicable program, material category, or part number(s)?	YES	NO	
(b)	Date of approval and approval by a Level III?	YES	NO	
(c)	Requirement that all personnel are qualified and certified to appropriate level?	YES	NO	
(d)	Equipment to be used including any unique requirements for automated vs. manual equipment?	YES	NO	N/A
(e)	Requirements for precleaning and/or etching process including materials, processing times, metal removal, and drying parameters?	YES	NO	
(f)	Brand name and specific type of penetrant, sensitivity level, emulsifier, developer, and classifications in accordance with MIL-I-25135?	YES	NO	
(g)	Complete processing parameters for the penetrant inspection materials including dwell times, application methods, drying times, concentrations, temperatures, and controls to prevent excessive drying or overheating, as appropriate?	YES	NO	
(h)	Method of removing excess penetrant and of drying the surface prior to applying the developer, spray water nozzle type, water pressure, and water temperature?	YES	NO	
(i)	Method of developer application, length of developing time, drying time and temperature for aqueous wet developer?	YES	NO	
(j)	Evaluation procedure including blacklight intensity, white light intensity, dark adaptation time, prohibition of photochromatic lenses, acceptance criteria, and controls for mechanical evaluation and solvent cleaning evaluation?	YES	NO	
(k)	Identification of the components or areas within a component to be inspected?	YES	NO	
(l)	Any special equipment required including type and intensity of light, if different from standard processing?	YES	NO	N/A
(m)	Complete postcleaning procedures?	YES	NO	
(n)	Method and location of marking?	YES	NO	
(o)	Method for control of software or programming used for automated processing equipment?	YES	NO	N/A

(p) Statement to the effect that the procedure complies with the applicable specification requirements? YES NO

(q) System to ensure that the process control tests and checks are performed? YES NO

B2.1.3 Does the procedure provide a means to ensure that the appropriate work instructions (including sequence of operations, processing parameters, technique information, unique requirements) are made available to inspection personnel on the shop floor? YES NO

B2.1.4 Obtain examples of the following forms:

(a) Copy of completed technique card or procedure.

(b) Copy of completed shop traveler or work order.

(c) Copy of completed NDT report format.

B3. LABORATORY PROCESS CONTROLS:

B3.1 Penetrant Brightness Test (5.8.4.1.1):

(a) Is a means documented to ensure that the fluorescent brightness of in-use penetrant is being tested? YES NO

(b) At what frequency is this test being performed? QUARTERLY OTHER ____

(c) Is the test procedure in accordance with MIL-I-25135, 4.5.7? YES NO

(d) What is the minimum acceptable limit? 90% OTHER ____

(e) Are records of this test on file and do they indicate acceptable results? YES NO

(f) List the date of most recent test and the measured brightness. DATE _____ BRIGHTNESS _____

B3.2 Water Content of Water-Washable Penetrants (5.8.4.1.2):

(a) Is a means documented to ensure that the water content or water tolerance of in-use Method A is being tested? YES NO N/A

(b) At what frequency is this test being performed? MONTHLY OTHER ____

(c) What test procedure is used? ASTM D95 OTHER ____

(d) What is the maximum acceptable limit used? 5% OTHER ____

(e) Are records of this test on file and do they indicate acceptable results? YES NO

(f) List the date of most recent test and the water content. DATE _____ CONTENT _____

B3.3 Water Content of Lipophillic Emulsifiers (5.8.4.2.2):

(a) Is a means of documented to ensure that the water content or water tolerance of in-use Method B emulsifier is being checked? YES NO N/A

(b) At what frequency is this check being performed? MONTHLY OTHER ____

(c) What test procedure is used? ASTM D95 OTHER ____

(d) What is the maximum acceptable limit used? 5% OTHER ____

(e) Are records of this check on file and do they indicate acceptable control? YES NO

(f) List the date of most recent test and the water content. DATE _____ CONTENT _____

(g) Can the facility properly demonstrate this check? YES NO

B3.4 Concentration of Hydrophillic Emulsifiers (5.8.4.2.3):

(a) Is a means documented to ensure that the concentration of in-use Method D emulsifier is being checked? YES NO N/A

(b) At what frequency is this check being performed? WEEKLY OTHER ____

(c) What instrument is used? REFRACTOMETER OTHER ____

(d) What are the acceptance limits? ±3% OTHER ____

(e) Are records of this check on file and do they indicate acceptable control? YES NO

(f) List the date of most recent check and the concentration. DATE _____ CONCENTRATION _____

(g) Can the facility properly demonstrate this check? YES NO

B3.5 Concentration of Aqueous Developer (5.8.4.3.2):

(a) Is a means documented to ensure that the concentration of in-use Form b and c developer is being checked? YES NO N/A

(b) At what frequency is this check being performed? WEEKLY OTHER ____

(c) What test instrument is used? HYDROMETER OTHER ____

(d) What are the acceptance limits? _____

(e) Are records of this check on file and do they indicate acceptable control? YES NO

(f) List the date of most recent check and the concentration. DATE _____ CONCENTRATION _____

(g) Can the facility properly demonstrate this check? YES NO

B3.6 Dryer Controls (5.4):

(a) Is dryer oven in use at the facility? YES NO

(b) Is the dryer oven temperature controlled? YES NO

(c) At what frequency is calibration of the temperature controller being performed? _____

(d) Is the calibration current? YES NO

(e) List the type of temperature controller. _____

(f) List the date of the last calibration. _____

(g) List the date of the next scheduled calibration. _____

B3.7 Black Light Meters:

(a) List the type and model of blacklight meter. _____

(b) At what frequency is calibration of the meter being performed? _____

(c) List the tolerance for calibration. _____

(d) Describe the method or procedure for calibration. _____

_____

(e) Is the calibration current? YES NO

(f) List the date of the last calibration. _____

(g) List the date of the next scheduled calibration. _____

B3.8 White Light Meters:

(a) List the type and model of white light meter. _____

(b) At what frequency is it calibrated? _____

(c) What is the tolerance for calibration? _____

(d) Is the calibration current? YES NO

(e) List the date of the last calibration. _____

(f) List the date of the next scheduled calibration. _____

B4. PENETRANT AREA PROCESS CONTROLS:

B4.1 Precleaning (5.1):

(a) Is equipment in place to ensure that parts are adequately cleaned to remove grease, oil, scale, rust, etc and dried prior to penetrant inspection? YES NO

(b) List the precleaning methods used and types of contaminant encountered.

Alloy	Cleaning Method

B4.2 Pre-Penetrant Etching (5.1.4):

(a) Does the facility have the capability to perform pre-penetrant etching in-house? YES NO

(b) List the alloy groups (i.e., steel, stainless steel, aluminum, etc.) and etching solutions.

Alloy	Etching Solution

(c) Are process controls in place to ensure consistent etch rates (i.e., temperature solution activity, etc)? YES NO

(d) Do operator instructions adequately address circumstances requiring pre-penetrant etching? YES NO

(e) Do operator instructions adequately describe the etching process procedure? YES NO

(f) List the name and address of subcontract etching facilities.

B4.3 Penetrant System Performance (5.8.3):

(a) Is a means documented to ensure that the system performance is checked? YES NO

(b) At what frequency is this check being performed? DAILY/SHIFT OTHER ____

(c) List the type of known defect standard and the acceptance criteria for each level or group.

(d) Are records of this check on file and do they indicate acceptable control? YES NO

(e) List the date of most recent check. _____

(f) Can the facility properly demonstrate this check for each sensitivity level in use? YES NO

(g) Is a means documented to ensure that the known defect standard is periodically checked to prevent degradation of its sensitivity? YES NO

(h) How often is this check performed? MONTHLY OTHER ____

B4.4 Sensitivity of In-Use Penetrant (5.8.4.1.4):

(a) Is a means documented to ensure that the sensitivity change of in-use penetrants is checked? YES NO N/A

(b) At what frequency is this check being performed? MONTHLY OTHER ____

(c) List the type of known defect standard and the acceptance criteria for each level or group.

_____

_____

_____

_____

(d) Are records of this check on file and do they indicate acceptable control? YES NO

(e) List the date of most recent test. _____

(f) Is a means documented to ensure that the known defect standard is periodically checked to prevent degradation of its sensitivity? YES NO

(g) List the date of the most recent check. _____

B4.5 Removability of Water-Washable Penetrants (5.8.4.1.3):

(a) Is a means documented to ensure removability testing for in-use water-washable penetrant? YES NO N/A

(b) At what frequency is this test being performed? MONTHLY OTHER ____

(c) Is the test procedure in accordance with MIL-I-25135 (4.5.16.2)? YES NO

(d) Are records of this test on file and do they indicate acceptable results? YES NO

(e) List the date of the most recent test. _____

(f) Can the facility properly demonstrate this test? YES NO

B4.6 Penetrant Application (5.2):

(a) Are the temperatures of penetrant materials and parts maintained between 40 and 120°F? YES NO

Other range? _____

(b) Does a means exist for controlling penetrant dwell time? YES NO

(c) When the temperature of the parts or penetrant is below 50°F, is the penetrant dwell time doubled? YES NO N/A

(d) Are electrostatic spray operations controlled to ensure complete coverage of parts? YES NO N/A

(e) Are the content of all tanks labeled, tanks covered (as appropriate), and all tanks in the system arranged to prevent mixing of materials? YES NO

B4.7 Use of Emulsifier (5.3.2.1 and 5.3.4.2):

(a) Does a means exist for controlling emulsifier dwell time? YES NO N/A

(b) Are application methods of emulsifiers properly controlled? YES NO N/A

B4.8 Removability of Emulsifiers (5.8.4.2.1):

(a) Is a means documented to ensure that removability is checked for in-use emulsifier? YES NO N/A

(b) At what frequency is this check being performed? WEEKLY OTHER ____

(c) Is the test procedure in accordance with MIL-I-25135? YES NO

(d) Are records of this check on file and do they indicate acceptable control? YES NO

(e) List the date of most recent check. _____

(f) Can the facility properly demonstrate this check? YES NO

B4.9 Penetrant Removal (5.3):

(a) Is the rinse water controlled to provide a coarse, conical spray? YES NO

(b) What is the rinse water temperature control range? 50-100°F OTHER ____

(c) How is the rinse water temperature monitored? _____

(d) At what frequency is calibration being performed on the temperature monitor? _____

(e) Is the rinse water temperature monitor calibration current? YES NO

(f) What is the rinse water pressure control range? 40 psi max OTHER ____

(g) How is the water pressure monitored? _____

(h) At what frequency is calibration being performed on the pressure monitor? _____

(i) Is the rinse water pressure monitor calibration current? YES NO

(j) Are hydro-nozzles used only for Level 1 and 2 sensitivity? YES NO N/A

(k) What is the air pressure range on the hydro-air gun? 25 psi max OTHER ____

(l) How is the air pressure monitored? _____

(m) At what frequency is calibration being performed on the air pressure monitor? _____

(n) Is the air pressure monitor calibration current? YES NO

(o) Is penetrant removal performed under a black light? YES NO

(p) List the calibration dates for:

	Last	Next
- Water temperature monitor	____	____
- Water pressure monitor	____	____
- Air pressure monitor	____	____

B4.10 Dry Developer Characteristics (5.8.4.3.1):

(a) Is a means documented to ensure that the in-use dry developer is being checked? YES NO N/A

(b) At what frequency is this check being performed? DAILY OTHER ____

(c) Does this check ensure that the developer is not caked and that recycled dry developer has not picked up excessive fluorescent material? YES NO

(d) Are records of this check on file and do they indicate acceptable control? YES NO

(e) List the date of most recent check. _____

(f) Can the facility properly demonstrate this check? YES NO

(g) Does the facility have a system to periodically add/replace developer? YES NO

B4.11 Aqueous Developer Characteristics (5.8.4.3.2):

(a) Is a means documented to ensure that the characteristics of in-use aqueous developer are being checked? YES NO N/A

(b) At what frequency is this check being performed? DAILY OTHER ____

(c) Does this check ensure that the aqueous developer uniformly wets the parts and that it does not contain fluorescent material? YES NO

(d) Are records of this check on file and do they indicate acceptable control? YES NO

(e) List the date of most recent check. _____

(f) Can the facility properly demonstrate this check? YES NO

B4.12 Black Light Measurements (5.8.1):

(a) Is a means documented to ensure that blacklight intensity is checked? YES NO

(b) At what frequency is this check being performed? DAILY OTHER ____

(c) What is the minimum acceptable limit? 800 $\mu W/cm^2$ at 15 in
OTHER ____

(d) Are records of this check on file and do they indicate acceptable results? YES NO

(e) List the date of most recent check and the recorded blacklight intensity. DATE _____
INTENSITY _____

(f) Can the facility properly demonstrate this check? YES NO

B4.13 White Light Measurements (4.5.2):

(a) Is a means documented to ensure that background white light is controlled for Type I and III penetrants? YES NO

(b) At what frequency is it checked? _____

(c) What is the maximum acceptable limit? 2 ft-candles
OTHER ____

(d) Are records of this check on file and do they indicate acceptable results? YES NO

(e) List the date of most recent check. _____

(f) Can the facility properly demonstrate this check? YES NO

(g) Is the white light in the undarkened inspection area maintained at 100 foot-candles or more? YES NO

B4.14 Inspection Area:

(a) Is a magnifying glass available for evaluating indications? YES NO

(b) List magnifying power. (ie. 3X, 10X) _____

(c) Is a boroscope available for evaluating indications? YES NO

(d) Are calibrated measuring scales available for sizing indications? YES NO

(e) Is the area free of fluorescent material or other contamination that may interfere with the inspection process? YES NO

B5. COMPLIANCE:

Select a minimum of 3 lots of parts at random from current production to determine compliance with these requirements. These parts should be selected to represent a variety of customer requirements and several different types of processing equipment if more than one penetrant line is in use at this facility. Investigate the purchase order specifications to identify any unique acceptance, process control, or procedure requirements applicable to these parts. Witness the facility's ability to perform inspection of these parts in accordance with the requirements.

NOTE: If no parts are available during the survey, this demonstration may be waived provided another NDT method is successfully demonstrated and a system is in place to accomplish the remainder of this compliance section.

Part Description	Customer	Specification	Compliance
_____	_____	_____	YES NO
_____	_____	_____	YES NO
_____	_____	_____	YES NO

B5.1 Customer Specifications:

(a)	Is the facility using the appropriate specification and revision as required by the purchase order?	YES	NO
(b)	Are the unique requirements appropriately made available to the penetrant inspectors?	YES	NO

B5.2 Cleaning and Etching:

(a)	Are parts properly cleaned and/or etched in accordance with customer requirements?	YES	NO
(b)	Are parts dry prior to penetrant application?	YES	NO

B5.3 Penetrant Application:

(a)	Are parts properly masked, when required?	YES	NO
(b)	Are precautions taken to ensure that parts are completely covered with the penetrant?	YES	NO
(c)	Are parts properly drained?	YES	NO
(d)	Is dwell time adequately controlled?	YES	NO
(e)	If parts exceed maximum dwell time, are parts re-dipped?	YES	NO
(f)	Is the correct class of penetrant used?	YES	NO

B5.4 Penetrant Removal:

(a)	Are parts washed under black light?	YES	NO	
(b)	Is the light adequate to permit good washing?	YES	NO	
(c)	When washing a basket of parts, is the wash water allowed to continually fall on the balance of the parts?	YES	NO	
(d)	Is emulsifier contact time adequately controlled? How? _____	YES	NO	N/A
(e)	List the type of emulsifier and the emulsification time used. _____			
(f)	If hydrophilic emulsifier is used, are the pre-rinse parameters (i.e., temperature, pressure, and time) documented and controlled?	YES	NO	N/A

(g) If hydrophilic emulsifier is used, are concentrations kept below:
35% for application by immersion, and
5% for application by spray? YES NO N/A

(h) Is entire part flooded with water prior to reaching maximum contact time? YES NO N/A

B5.5 Developer Application:

(a) Is a developer in use at this facility? YES NO

(b) When aqueous developers are used, is excess water removed from the parts prior to developer application? YES NO N/A

(c) When applying the developer, are the parts completely covered? YES NO

(d) Is air used to remove excess dry developer? YES NO N/A
List the air pressure used. _____ psi

(e) Are parts thoroughly dry prior to application of dry developer? YES NO N/A

(f) If aqueous soluble developers are used in combination with Type I, Method A or any Type II penetrant, is specific customer documentation or approval on file? YES NO N/A

(g) Is the developing time adequately controlled? YES NO
List the developing time. _____ minutes

B5.6 Evaluation:

(a) Did inspectors allow at least 1 minute to condition their eyes to the darkness? YES NO

(b) Is the background white light less than 2 foot-candles as measured at the inspection surface with the blackight on? YES NO

(c) Are black lights providing adequate illumination of at least 1000 µW/cm at surface of components being inspected? YES NO

(d) List the blacklight intensity measured at the time of this survey. _____ $\mu W/cm^2$ @ _____ INCHES

(e) Did the inspector evaluate every indication and reject parts containing relevant indications of defects that exceed the acceptance limits? YES NO

(f) Are all rejectable indications marked on the part and recorded on the appropriate paperwork? YES NO

(g) Is all pertinent paperwork traceable to the part? YES NO

(h) If approval for metal removal has been obtained from the customer, are all areas etched prior to processing and reinspection? YES NO N/A

(i) Are the specific accept/reject criteria readily available to the inspector? YES NO

(j) Do the accept/reject criteria properly reflect the customer/drawing criteria? YES NO

B5.7 Post Cleaning:

(a) Is an adequate post process cleaning operation performed? YES NO

B5.8 Inspector Qualification (4.3):

(a) Are the inspection personnel certified to the correct levels for the work they are performing? (review personnel records) YES NO

B5.9 Marking (5.9.5):

(a) Are the parts marked in accordance with the specification? YES NO

(b) Mark with the appropriate ink stamp (symbol and color) below:

100% of Lot Inspected

Accept Reject

Sample from Lot Inspected

Accept Reject

B5.10 Additional Observations:

List any additional observations, as appropriate.

B6. SURVEY CRITIQUE:

B6.1 NDT Facility: Please critique and comment on the survey form and survey procedure. Specific examples to illustrate your concerns and opinions would be appreciated. Your comments may be submitted anonymously, if you so desire. Send response to:

Operations Manager
NADCAP Technical Division
PRI
400 Commonwealth Drive
Warrendale, PA 15096-0001

B6.2 Survey Observations: Surveyor - Use this page to furnish additional information or data, when required.

SURVEY NO. _____

APPENDIX C
MAGNETIC PARTICLE SURVEY

Instructions to the Surveyor:

This form shall be used in conjunction with and shall become a part of the SURVEY OF NDT FACILITY form (Appendix A).

Each question requires an answer.
Circle the intended response.
Fill in data when a blank line is provided.
If the surveyor's answer references an attachment, it shall become part of this survey record. The survey identification number shall be recorded on each page of every attachment.
Not applicable (N/A) responses are intended for items that are not required based on the materials/equipment in use at this facility.
All other N/A responses shall be explained.
Document any discrepancies by completing the Supplier Corrective Action Request form (AS7100/1, Page A-2) during the exit interview.

OFFICE AREA ITEMS

C1. MATERIALS AND SPECIFICATIONS:

C1.1 List all magnetic particles used at this facility.

Manufacturer	Type	Conforms To
_____	_____	_____
_____	_____	_____

C1.2 Is a manufacturer's certification available? YES NO

C1.3 Does the liquid vehicle used for carrying magnetic particles in the wet process conform to the requirements of: YES NO

AMS 2641 _____

DoD-F-87935 _____

Other (CUSTOMER APPROVAL REQUIRED) _____

C1.4 Are certifications available for the suspension carrier? YES NO

C1.5 Complete EQUIPMENT LIST on page C-11 or attach separate list that defines magnetic particle inspection equipment.

C2. PROCEDURES:

C2.1 Have copies been obtained of the following:

(a) Copy of traveler or work order? YES NO

(b) Copy of technique card? YES NO

(c) Copy of NDT Report? YES NO

C2.2 Have written procedures been prepared for all parts by Level II or III and been approved by Level III in magnetic particle inspection? YES NO

C2.3 Are miscellaneous small parts such as bolts, washers, pins, etc. combined in, and controlled by, general written procedures? YES NO N/A

C2.4 Does the written procedure, general or specific, contain the following information as a minimum:

(a) Controls to ensure that customer specific requirements are met? YES NO

(b) An identification number or part number? YES NO

(c) Dated approval by a Level III? YES NO

(d) Certification requirements for inspection personnel? YES NO

(e) Equipment to be used? YES NO

(f) Type of magnetization to be used? YES NO

(g) Number of turns for fixed coil? _____

(h) Type of particles to be used?

Manufacturer: _____
Fluorescent: _____ Nonfluorescent: _____
Color: _____ Wet: _____ Dry: _____
If more than one, attach additional sheet.

(i) Pulse duration? YES NO

(j) Magnitude of current? YES NO

(k) Direction of magnetic field? YES NO

(l) Statement that the equipment has a variable current control with 30 or more points? YES NO

(m)	State current limits of the magnetizing unit?	YES	NO	
(n)	Details of demagnetization procedures, including the use of the magnetic field indicators?	YES	NO	
C2.5	If coating or plating is permitted prior to inspection, is the coating thickness 0.003 inches thick or less?	YES	NO	N/A

C3. LABORATORY PROCESS CONTROLS:

C3.1	Are records maintained for the following tests:			
(a)	Particle Concentration?	YES	NO	
(b)	Comparison Tests?	YES	NO	
(c)	Viscosity Check?	YES	NO	
(d)	Ammeter Output Check?	YES	NO	
(e)	Shunt Meter Test?	YES	NO	
(f)	Internal Shorting?	YES	NO	
(g)	Ultraviolet (Black) Light Intensity?	YES	NO	N/A
(h)	White Light Intensity?	YES	NO	N/A
C3.2	Is there a procedure in place to discard the suspension when any of the following conditions exist:	YES	NO	N/A
Under Black Light 1.	A noticeable reduction in fluorescence of the magnetic particles?	YES	NO	N/A
2.	Vehicle containing noticeable fluorescence?	YES	NO	N/A
3.	Vehicle milky or blue-white in color?	YES	NO	N/A
Under White Light 4.	Noticeable reduction in brilliance or color of the magnetic particles?	YES	NO	N/A
5.	Vehicle which is turbid, discolored, or contains foreign particles?	YES	NO	

C3.3 Are records of black light meter calibration available for review? YES NO

(a) Is calibration current? YES NO

(b) Calibration Frequency: Biannual _____ Other _____

C3.4 Are records of white light meter calibration available for review? YES NO

(a) Is Calibration Current? YES NO

(b) Calibration Frequency: Biannual _____ Other _____

C3.5 Is the Ketos ring certified and in good condition? YES NO

C3.6 Are all field indicators calibrated? YES NO

(a) Interval _____

(b) Accuracy Requirement _____

(c) Last Calibration Date _____

C3.7 Is the black light intensity checked with a suitable light meter? YES NO N/A

(a) Type & model _____

C3.8 Do the black lights used for magnetic particle inspection exhibit intensity greater than or equal to 1000 µW/cm2 when measured at the inspection surface? YES NO N/A

(a) Measured Intensity _____

C3.9 Is white light intensity checked with a suitable light meter? YES NO N/A

(a) Type & model _____

C3.10 At what interval is the test meter shunt calibrated?

(a) Interval _____

(b) Traceable to NIST? YES NO

C3.11 At what interval is an internal shorting test performed? (Set machine at maximum current and activate with no conductor between heads. There should be no deflection of the meter.)

(a) Interval _____

C3.12 Is a test meter/shunt combination available for calibrating the ampere meters of magnetizing equipment? YES NO

Manufacturer: _____ Model: _____

C3.13 At what interval is the magnetic particle machine ammeter and output checked? (The test meter/shunt combination and ammeter shall not differ by more than 5% nor may the ohmmeter be off by 10% at the unit's maximum output.)

(a) Interval _____

C3.14 Is the pulse duration of the magnetization current flow controlled from 0.5 to 1.0 second? YES NO

(a) Duration _____

C3.15 At what interval is the pulse timer calibrated for a 0.5 second pulse? YES NO

(a) Interval _____

C3.16 At what interval is the timing device used to calibrate the pulse timer calibrated?

(a) Interval _____

(b) Traceable to NIST? YES NO

C4. INSPECTION AREA:

C4.1 Is a timing device available for use in calibrating the unit timer? YES NO

Manufacturer: _____ Model: _____

C4.2 Is equipment checked to assure a current decay rate sufficient for quick break magnetization? YES NO N/A

(a) Interval _____

(b) Amperage _____

C4.3	Is the inspection performed following all processes that would adversely affect the part (Heat Treat, Forming, Machining, Welding, etc)?	YES	NO	
C4.4	Are all parts cleaned prior to magnetic particle inspection as applicable to remove paint, scale, oil dirt and other foreign materials that may interfere with the MP inspection process?	YES	NO	
C4.5	Are parts masked as required to protect faying and/or bearing surfaces?	YES	NO	
C4.6	When required, are small openings leading to internal cavities properly plugged?	YES	NO	N/A
C4.7	Are technique cards (written procedures) on file in the inspection area for all parts to be inspected and available to inspectors?	YES	NO	
C4.8	Is magnetic particle inspection performed to approved written procedures?	YES	NO	
C4.9	Are solutions agitated prior to inspections and are sensitivity checks made to assure that magnetic particles are in suspension?	YES	NO	
C4.10	Magnetization Process - Circular			
	(a) Are central conductors available?	YES	NO	
	(b) Is a central conductor used in all cases where inspection of inside surfaces of cylindrically shaped parts is required?	YES	NO	N/A
	(c) When current is passed through the part itself, is care exercised to prevent burning at the electrode contact areas?	YES	NO	N/A
	(d) Are copper braided pads used between the part and the electrode contact?	YES	NO	N/A
C4.11	Are flexible cables used to induce circular magnetic fields?	YES	NO	N/A
	If "Yes", is a specific written procedure available and approved by authorized customer personnel?	YES	NO	N/A
C4.12	Are copper braid pads in use on the heads when passing current directly through the part to prevent arcing?	YES	NO	

C4.13 Magnetization Process - Longitudinal

(a) Is the part positioned inside the coil as close as possible to the coil inside surface with the long axis of the part parallel to the axis of the coil? YES NO N/A

C4.14 Is yoke equipment used only when applicable and in accordance with approved written procedures? YES NO N/A

C4.15 Are prods, clamps, leaches and other similar devices, when used according to approved written procedures, equipped with copper braid to prevent arcing of part surface? YES NO N/A

C4.16 Do inspectors accustom their eyes to darkness for a suitable time before performing any inspections requiring the use of black light? YES NO

(a) Duration _____

C4.17 Are aids such as magnifiers, mirrors, boroscopes and high intensity lights available for evaluating indications in interior areas of parts not readily accessible with standard lighting equipment? (List - Page C-11) YES NO N/A

C4.18 Are flux density measurements taken with field strength indicators as required? YES NO

Flux density measurements are taken with the following field strength indicator(s):

(a) Manufacturer: _____ Model: _____

(b) Manufacturer: _____ Model: _____

C4.19 Do personnel performing magnetic particle inspections wear glasses with photocromatic lenses? YES NO

C4.20 Evaluation Process

(a) Does the inspector evaluate every relevant indication? YES NO

(b) Does the inspector compare relevant indications with acceptance criteria? YES NO

(c) Are precautions taken when parts are handled during inspection not to smear or obliterate indications? YES NO

(d) Are indications not meeting the acceptance criteria marked on the part and recorded on the appropriate paperwork? YES NO

(e) Are all inspection results recorded and traceable to the hardware? YES NO

C4.21 Demagnetization

(a) Are parts demagnetized between successive operations if residual magnetism might interfere with the interpretation of indications? YES NO

(b) After demagnetization, are all parts tested with a magnetic field indicator? YES NO

(c) Are coil and/or box type demag units AC operated? (List - Page C-11.) YES NO N/A

(d) Are all parts demagnetized following magnetic particle inspection and exhibit no more than 2 Gauss or per customer specification as determined by the use of a field meter? YES NO

(e) Are procedures in place to eliminate circumferencial magnetization? YES NO

C4.22 Are all parts cleaned after magnetic particle inspection? YES NO

(a) Method _____

C4.23 After inspection and appropriate cleaning, are all parts coated with preservative oil (or antiseize compound as required) to prevent rusting? YES NO

C5. EQUIPMENT AND MATERIALS PERFORMANCE:

C5.1 Will AC yokes lift a minimum of 10 pounds with yoke spacing of 2 to 4 inches? (List - Page C-11.) YES NO N/A

C5.2 Will DC yokes or permanent magnet yokes lift 30 pounds with yoke spacing of 2 to 4 inches, or 50 pounds with spacing of 4 to 6 inches? (List - Page C-11.) YES NO N/A

C5.3 Is the magnetic particle system effectiveness checked by testing the Ketos ring (or equivalent) showing the required holes per amperage setting for the particular type of particles being used? (List if device is different.) YES NO

Wet Method	Dry Method
#3 Hole @ 1400 Amps	#4 Hole @ 1400 Amps
#5 Hole @ 2500 Amps	#6 Hole @ 2500 Amps
#6 Hole @ 3400 Amps	#7 Hole @ 3400 Amps

(a) Interval _____

C5.4 Are records of Ketos Ring hole numbers observed within the specified amperage (3.6) available for review? YES NO

C5.5 Is a demonstration part with a known defect used to verify the equipment and material sensitivity on a daily basis? YES NO

C5.6 Are black and white light intensity checks being performed and values recorded? YES NO

C5.7 Is the magnetic particle inspection area equipped with white light with intensity equal to or greater than 100 foot-candles when checked at the inspection surface? YES NO N/A

C5.8 Is the maximum ambient white light in the fluorescent magnetic particle test area less than or equal to 2 foot-candles? YES NO N/A

C5.9 The concentration level for wet magnetic particle bath is maintained at:

(a) Fluorescent _____

(b) Non-fluorescent _____

C5.10 Is the suspension concentration tested at least once during each shift? YES NO

C5.11 Is a sample of new solution saved each time mixed? YES NO

C5.12 Does the viscosity of the magnetic particle suspension exceed 5.0 centistokes maximum at any operating temperature? YES NO

C6. COMPLIANCE:

Select parts at random from current production to determine compliance with these requirements. These parts should be selected to represent a variety of customer requirements and several different types of processing equipment if more than one magnetic particle line is in use at this facility. Investigate the purchase order specifications to identify any unique acceptance, process control, or procedure requirements applicable to these parts. Witness the facility's ability to perform inspection of these parts in accordance with the requirements.

NOTE: If no parts are available during the survey, this demonstration may be waived provided another NDT method is successfully demonstrated and a system is in place to accomplish the remainder of this compliance section.

C6.1 Customer Specifications:

(a)	Is the facility using the appropriate specification and revision as required by the purchase order?	YES	NO
(b)	Are unique requirements made available to the magnetic particle inspectors?	YES	NO

Part Description	Customer	Specification	Compliance
			YES NO
			YES NO
			YES NO

Comments:

EQUIPMENT LIST

Magnetic Particle Inspection Units (Stationary)

Manufacturer	Model	Length	Output (Max)	Quick Break	Condition

Magnetic Particle Inspection Units (Portable)

Manufacturer	Model	Type	Output (Max)	Tax Switch	Condition

Yokes

Manufacturer	Model	Perm or AC	Output (Max)		Condition

Demagnetizing Units

Manufacturer	Model	Perm or AC	Output (Max)		Condition

Inspection Aids

C7. SURVEY CRITIQUE:

C7.1 NDT Facility: Please critique and comment on the survey form and survey procedure. Specific examples to illustrate your concerns and opinions would be appreciated. Your comments may be submitted anonymously, if you so desire. Send response to:

Operations Manager
NADCAP Technical Division
PRI
400 Commonwealth Drive
Warrendale, PA 15096-0001

C7.2 Survey Observations: Surveyor - Use this page to furnish additional information or data, when required.

SURVEY NO. _____

APPENDIX D
ULTRASONIC SURVEY

Instructions to the Surveyor:

This form shall be used in conjunction with and shall become a part of the SURVEY OF NDT FACILITY form (Appendix A).

Each question requires an answer.
Circle the intended response.
Fill in data when a blank line is provided.
If the surveyor's answer references an attachment, it shall become part of this survey record. The survey identification number shall be recorded on each page of every attachment.
Not applicable (N/A) responses are intended for items that are not required based on the materials/equipment in use at this facility.
All other N/A responses shall be explained.
Document any discrepancies by completing the Supplier Corrective Action Request form (AS7100/1-1A, Page A-2) during the exit interview.

Parenthetical information is the reference paragraph from MIL-STD-2154.

D1. RECORDS:

D1.1	Are verification records available to verify correctness of manufactured reference standards made after September 30, 1982? (5.3.3)	YES	NO	N/A
D1.2	Are certifications including Set Points and DAC curves available for commercial blocks made prior to September 30, 1982 for each instrument/transducer combination? (5.3.3)	YES	NO	N/A
	(a) Are metrology or layup inspection data and/or radiographic data to verify holes are in proper alignment as required for the reference standards in use? (5.3.3.1)	YES	NO	
	(b) Is there available comparison amplitude plots of all holes or notches showing amplitude linearity to class size (indicate linear amplifier or linear dB presentation)? (5.3.3.2)	YES	NO	
	(c) For cylindrical standards, is there a listing of angle of incidence or offset distance D for maximum amplitude responses for all grades, or metrology repair of FBH size material thickness and notch size when applicable? (5.3.3.3)	YES	NO	N/A
	(d) Are measured surface finishes (RMS, AA or RHR) of ultrasonic test standards available? (5.3.3.4)	YES	NO	
	(e) Is there certification that standards material is of proper alloy and type (heat treat), and free of discontinuities detrimental to reliable response from reference standard? (5.3.3.5)	YES	NO	

(f) Is there a chart available with dimensions showing location of all reference holes or notches? (5.3.3.6) YES NO

D1.3 Are calibration records available of ASTM E317 calibrations for ultrasonic equipment in use? (5.2.1) YES NO N/A

(a) Other calibration procedure? _____

_____

(b) Are records available for traceability of area amplitude Block to NIST. YES NO N/A

D1.4 Are maintained records of transducer evaluations available? (5.2.5) YES NO

(a) Are all transducers serialized? YES NO

(b) Are beam profiles made for all immersion transducers? YES NO

D1.5 Are inspection records kept on file? (5.5.3) YES NO

D1.6 Do records show which instrument, transducer combination is used on each part? YES NO

D1.7 Are records available and up-to-date on the following:

(a) Are preventative maintenance checks made on equipment? YES NO

(b) Are preventative maintenance checks current? YES NO

(c) Is equipment certified to appropriate specification? YES NO

D1.8 When parts are serialized, are the serial numbers recorded on all shop paperwork and inspection records? YES NO

D1.9 Do work instructions indicate correct procedure references? YES NO

D2. METHOD:

D2.1 Is the couplant (water) free of visible air bubbles and other foreign materials which could interfere with the ultrasonic tests? (5.1.1.1) YES NO

(a) Is corrosion inhibiting agent added? YES NO

Mfgr: _____ NAME _____

(b) Is wetting agent added? (If Required.) YES NO

Mfgr: _____ NAME _____

(c) Is the filtering system adequate? YES NO N/A

D2.2	Do written procedures include: (4.3)			
	(a) Set-up and calibration?	YES	NO	
	(b) Entry angle of beam?	YES	NO	
	(c) Scanning operation (speed, index, directions, etc.)?	YES	NO	N/A
	(d) Technique for evaluating indications?	YES	NO	
	(e) Is it adequate?	YES	NO	
	(f) Attenuation/area amplitude checks?	YES	NO	
	(g) Level III approval?	YES	NO	
D2.3	Are reference standards representative of the material and part configuration being tested? (5.1.2)	YES	NO	
D2.4	If through transmission is employed, are transducers properly aligned?	YES	NO	N/A
	(a) Are templates used?	YES	NO	N/A
D2.5	Are amplitude/distance response curves plotted for all transducer and instrument combinations, (DAC)?	YES	NO	
D3.	CONTROLS:			
D3.1	Are applicable detailed procedures and techniques and/or scan plans available to inspectors in inspection area?	YES	NO	
D3.2	Do some customers require approval on test standards for the parts to be inspected?	YES	NO	
D3.3	Is there a procedure in place for obtaining customer approval (If Required)?	YES	NO	N/A
D3.4	Are standards available of the correct material for the material to be inspected?	YES	NO	
D3.5	Are all standards and/or drawings of standards clearly identified as to material type, hole or notch size, angle and depth of hole?	YES	NO	
D3.6	Are system performance checks being performed prior to and immediately after each inspection, after any change in instrument settings or modules, and at 2 hour intervals during continuous operation? (5.5.2)	YES	NO	

Other _____

D3.7 Are audible alarms and/or recorders being used along with visual monitoring of ultrasonic unit when inspecting plate, bar, forged billets, or materials with regular shapes and parallel surfaces? (5.2.3) YES NO

D3.8 Are all parts dried and coated with corrosion protective material per customer requirements, before they are stacked, nested or placed in contact with one another in any way? (5.4.17) YES NO N/A

D3.9 Are visual inspection and surface preparation adequate prior to inspection for compatible ultrasonic practice? (5.4.7) YES NO

D3.10 Is calibration on ultrasonic inspection units current? (Enclosure I) YES NO

(a) Are stickers affixed indicating same? YES NO

D3.11 Are controls available to assure that material being tested has an adequate surface condition? YES NO

D4. EQUIPMENT/FACILITIES:

D4.1 Instruments:

(a) Complete Enclosure I Equipment List

(b) Is the processor's test system equipped with the following:

Recorder?	YES	NO
Automatic Marking?	YES	NO
Tachometer?	YES	NO
Gating System?	YES	NO
Water System Filter and/or deaerating system?	YES	NO

(c) Testing System is capable of auto or manual operation _____

(d) Processor utilizes the following methods

Contact _____ Squirter _____

Immersion _____ Bubbler _____

(e) Capabilities

"A" Scan _____ Pulse Echo _____
"B" Scan _____ Resonance _____
" C" Scan _____ Thru-Transmission _____

D4.2	Are voltage regulators/surge protectors used to control fluctuations? (5.2.4)	YES	NO	
D4.3	Are handling fixtures, turntables, etc., adequate for parts being processed?	YES	NO	
D4.4	Are curved surface shoes and standards available for contact inspection? (5.3.1.2)	YES	NO	
D4.5	Does manipulating equipment provide for measurable angular control of search units in degrees? (5.2.9)	YES	NO	
D4.6	Are immersion tanks of sufficient size to permit proper placement of parts with relationship to search unit? (5.2.8)	YES	NO	N/A
D4.7	Is scanning and indexing equipment adequate to ensure complete coverage of part? (5.2.9)	YES	NO	N/A
D4.8	Does the facility have C-scan recording capability?	YES	NO	
D4.9	Is scanning equipment controlled and maintained to preclude backlash, wobble, etc.?	YES	NO	N/A
D4.10	Is round bar inspection equipment available?	YES	NO	
	(a) Is rotating device syncronized with scan motion?	YES	NO	
D4.11	If required, are facilities available for drying parts after inspection?	YES	NO	N/A
D4.12	Are adequate materials handling systems available?	YES	NO	
	Forklifts _____			
	Overhead _____ Y/N Capacity _____ pounds			
D4.13	Does facility possess standard reference blocks? (5.1.2)	YES	NO	
	(a) Complete Enclosure II			
D4.14	Is storage area of reference standards adequate?	YES	NO	
D4.15	Is there evidence of mishandling of reference standards, (corrosion, pitting, etc.,)?	YES	NO	
D4.16	Transducers (5.2.5)			
	(a) Complete enclosure III transducer list.			
	(b) Are transducers stored in a protected area?	YES	NO	

D5. PROCESS:

D5.1	Do inspectors follow the planning and other procedures?	YES	NO
D5.2	Are the surfaces of parts to be inspected free from scale, dirt, oil, or other contaminants that would interfere with the inspection operations? (5.4.7)	YES	NO
D5.3	Is the surface roughness of the parts to be inspected adequate for the level of inspection to be performed? (5.4.6)	YES	NO
D5.4	When indications are located, are they evaluated individually to determine maximum response? (5.4.16)	YES	NO
D5.5	Are gates, alarms and recorders properly used?	YES	NO
D5.6	Is water adequately circulated and filtered?	YES	NO N/A

D6. COMPLIANCE:

Select parts at random from current production to determine compliance with these requirements. These parts should be selected to represent a variety of customer requirements and several different types of processing equipment if more than one ultrasonic line is in use at this facility. Investigate the purchase order specifications to identify any unique acceptance, process control, or procedure requirements applicable to these parts. Witness the facility's ability to perform inspection of these parts in accordance with the requirements.

NOTE: If no parts are available during the survey, this demonstration may be waived provided another NDT method is successfully demonstrated and a system is in place to accomplish the remainder of this compliance section.

Part Description	Customer	Specification	Compliance
_____	_____	_____	YES NO
_____	_____	_____	YES NO
_____	_____	_____	YES NO

D6.1 Customer Specifications: (4.1)

(a)	Is the facility using the appropriate specification and revision as required by the purchase order?	YES	NO
(b)	Are the unique requirements appropriately made available to the ultrasonic inspectors?	YES	NO

D7. SURVEY CRITIQUE:

D7.1 NDT Facility: Please critique and comment on the survey form and survey procedure. Specific examples to illustrate your concerns and opinions would be appreciated. Your comments may be submitted anonymously, if you so desire. Send response to:

Operations Manager
NADCAP Technical Division
PRI
400 Commonwealth Drive
Warrendale, PA 15096-0001

D7.2 Survey Observations: Surveyor - Use this page to furnish additional information or data, when required.

ULTRASONIC SURVEY
(Enclosure #1)

LIST OF EQUIPMENT

D1. INSTRUMENTATION:

	Manufacturer	Model	Type	Calibration Due Date
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				

D2. IMMERSION TANKS:

	Length	Width	Depth
(a)			
(b)			
(c)			
(d)			
(e)			

D3. BRIDGES:

	Manufacturer	Model	Type	Axis of Movement X, Y, Z
(a)				
(b)				
(c)				
(d)				
(e)				

D4. RECORDERS:

	Manufacturer	Model	Type	Paper Width
(a)				
(b)				
(c)				
(d)				
(e)				

ULTRASONIC SURVEY
(Enclosure #1)
(Continued)

D5. TURNTABLE:

Diameter	Run Out To Bridge	Flatness To Bridge	Perpendicularity To Search Tube

D6. MANIPULATOR:

Number of Axis	Accuracy

D7. TUBE/BAR TRANSPORT EQUIPMENT:

	Manufacturer	Model
(a)		
(b)		