

GENERAL DYNAMICS
 Ordnance and Tactical Systems
 326 IBM Road
 Building 862
 Williston, Vermont 05495

Special Process Audit - ASTM E1444-01 - Standard Practice for Magnetic Particle Examination

Supplier Information:

Supplier Code: _____ Supplier Address: _____
 Supplier Name: Element Materials Technology Charlotte Street: 1200A Westinghouse Blvd.
 Quality Contact: Charles Beasley City: Charlotte
 Phone Number: 704-588-1131 State: NC
 Fax Number: N/A Zip Code: 28273

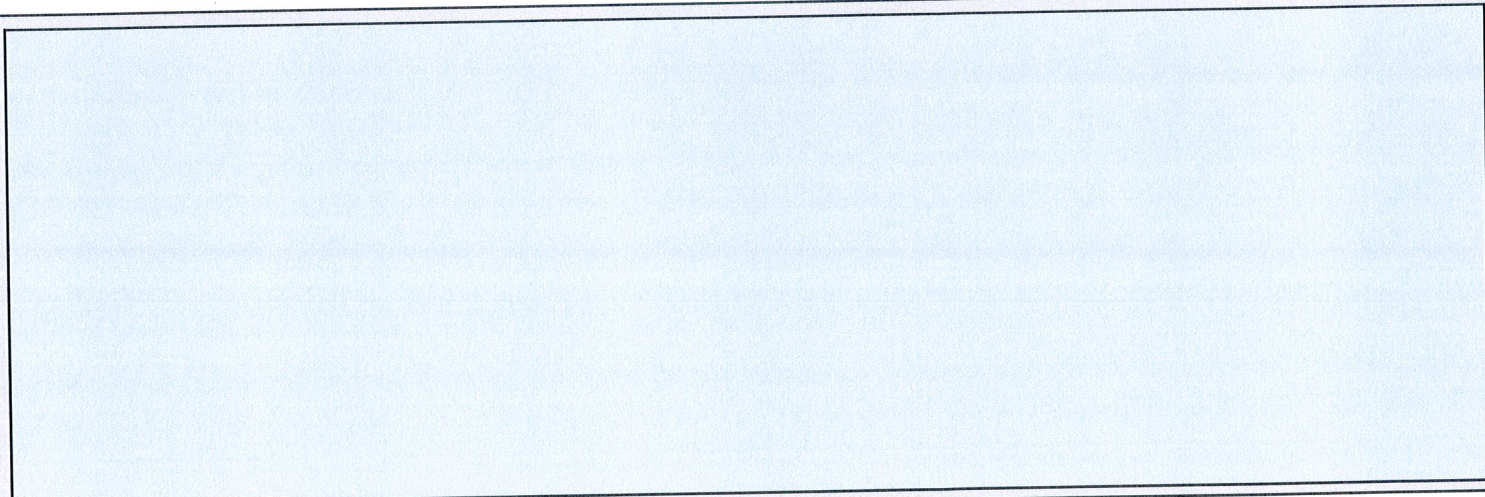
SEP Supplier: Yes No % Government Business N/A
 Years in Business 30 Number of shifts: 1 2 3
 Housekeeping is adequate Yes No Floor space is adequate Yes No
 Government Source Inspection (GSI) is on site Yes No GSI is resident Yes No
 Number of employees 45 (Production) Number in Quality 4
 Delegated active Material Review Board Yes No Delegated By Management

Audit Information:

Audit Date: 3/22/16
 Reason for Audit: New Supplier Recertification Corrective Action Follow Up
 Approval Method: On-Site Audit Supplier Self Audit

	Person(s) contacted:	Name	Title
1	Charles Beasley ;	<u>Charles A. Beasley</u>	<u>Quality Manager</u>
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____

Auditor: Charles Moore Auditor Phone Number: 828-273-3609
 Auditor Signature: Charles W Moore 03-22-2016



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Audit Notes:

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Audit and Quest # ()	Question	ACC Y / N / N/A	Comments - Document objective evidence reviewed for each item.
1.0 Scope			
1 (1.1)	This specification of proper revision is readily available on premises.	Y	Available on server at any PC workstation in lab. Verified
2.0 Referenced Documents			
2 (2.1 thru 2.3)	Referenced specifications are readily available and of correct revision.	Y	Available on server at any PC workstation in lab. Verified
3.0 Terminology			
3 (3.1 thru 3.2.8)	Inspection personnel are thoroughly familiar with the descriptions of terms specific to this standard.	Y	Training records available. Verified
4.0 Significance and Use			
4 (4.1)	Basic principles of magnetic particle inspection are clearly described in a written procedure.	Y	SOP 42.00, Rev. 5: MPI IAW ASTM E1444.
5.0 General Practice			
5 (5.1)	Is there a written procedure that specifies acceptance criteria either specifically or by reference to other applicable documents such as MIL-STD-1907?	Y	Sample test report verified.
6 (5.2)	Are personnel performing examinations certified in accordance with ASNT Personnel Qualification SNT-TC-1A or MIL-STD-410?	Y	-Training records available. Verified, employee records.
	Are personnel making accept / reject decisions qualified to Level II or Level III?	Y	-All techs are Level II or higher.
	Are adequate records of training, education and certification maintained by a Level III?	Y	-Available in Quality office with open access by Level III.
	Are Level I and Level II personnel recertified at intervals not exceeding 3 years?	Y	-Records available.
	Are records of annual vision examinations maintained?	Y	-Records available.

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<p>7 (5.4)</p>	<p>Does the written procedure include the following elements?</p> <p>A. Procedure identification number and date it was written.</p> <p>B. Identification of parts to which the procedure applies.</p> <p>C. Sequence of magnetic particle examination as related to manufacturing process, if applicable.</p> <p>D. Identification of test parts used for system performance verification.</p> <p>E. Areas of part to be examined.</p> <p>F. Part preparation required before testing.</p> <p>G. Positioning of the item with respect to the magnetizing equipment.</p> <p>H. Type of magnetizing current and the equipment to be used.</p> <p>I. Method of establishing the magnetization (head coil, prods, yoke, cable, wrap, etc.).</p> <p>J. Directions of magnetization to be used, the order which they are applied and any demagnetization procedures to be used between shots (if applicable).</p> <p>K. The current level, or the number of ampere turns to be used and the duration of its application.</p> <p>L. Type of magnetic particle material (wet or dry, visible or fluorescent, etc.) and the method and equipment to be used for its application and, for the case of wet particles, the particle concentration limits.</p> <p>M. Post inspection demagnetization and cleaning requirements.</p>	<p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p> <p>Y</p>	<p>SOP 42.00 Rev. 5 Items A thru M (per applicable section of SOP 42.00)</p>
<p>8 (5.5)</p>	<p>Is magnetic particle examination performed after the completion of all operations that could cause surface or near surface defects?</p>	<p>Y</p>	<p>Yes, where provided by the customer.</p>
<p>9 (5.6)</p>	<p>Are inspection results recorded and maintained which include, traceability to specific parts or lot inspected?</p>	<p>Y</p>	<p>Verified sample work order.</p>

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10 (5.7)	<p>List the equipment used (Brand and Type):</p> <p><u>MX Industrial 0-95 Amp Mag. Part. Inspection Bench</u></p> <p><u>Parker Research 50-60Hz Contour Probe (Mag Yoke)</u></p> <p><u>RB Annis Pocket Magnetometer (Gauss Meter)</u></p> <hr/> <p>which is adequate for ensuring reliable results, does not damage parts and is safe to operate.</p>		Records available. Verified calibration records.
11 (5.7.1)	<p>What types of current are used?</p> <p>A. Full-wave rectified AC. B. Half-wave rectified AC. C. AC.</p>	A & C	SOP 42.00 Sect. 6.2.1
12 (5.7.2, 5.7.2.1, 5.7.3)	<p>When inspecting with nonfluorescent particles, is the visible light intensity at the surface of the part maintained at a minimum of 1000 1X (100 ft. candles)?</p> <p>Is a darkened area used for fluorescent magnetic particle inspection with a maximum ambient visible light level of 20 1x (2ft. candles)?</p> <p>When inspecting with fluorescent particles is the black light intensity at the surface of the part maintained at a minimum of 1000 mw/cm squared?</p>	Y Y Y	SOP 42.00 Sect. 5.6
13 (Table 1) (5.8 - 5.8.5, 7.1.1 - 7.1.5.4)	<p>Are the following required verification and intervals checked and recorded if applicable?</p> <p>A. Black light intensity - 1 day. B. Ambient light intensity - 1 day. C. Visible light intensity - 1 day. D. System performance - 1 day. (test piece or Ketos Ring) E. Wet particle concentration - 8 hrs of every shift. F. Water break test - 1 day. G. Wet particle contamination - 1 week. H. Ammeter accuracy - 6 mo. I. Timer control - 6 mo. J. Quick break - 6 mo. K. Dead weight check - 6 mo.</p>	Y	As required at time of testing related to customer specifications.
6.0 Specific Practice			
14 (6.1.1)	Are parts demagnetized before inspection, if prior operations have produced a residual magnetic field?	Y	Only where applicable or specified by customer. SOP 42.00 Sect. 6.1.1
15 (6.1.2)	Are parts to be inspected essentially smooth, clean, dry and free of oil, scale, machining marks, or other contaminants or conditions that might interfere with the effectivity of the inspection?	Y	SOP 42.00 Sect. 6.1.2

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16 (6.2 thru 6.2.8)	Which method of magnetization are used? A. Direct - head and tail stocks, prods, clamps. B. Indirect - coils, cable wraps, yokes, central conductor. C. Induced - inductively coupling a part to an electrical coil.	A & B	SOP 42.00 Sect. 6.2.4 & 6.2.5
17 (6.3 thru 6.3.7.4)	Which of the following are used to determine adequate field strength? A. Testing parts having known or artificial defects of the type, size and location specified in the acceptance requirements. B. Using a hall-effect probe gaussmeter capable of measuring the peak values of the tangential field. C. Formula.	A,B&C	SOP 42.00 Sect. 6.3
18 (6.4.1)	A. When using dry particles, is the current initiated prior to the particles being applied and terminated after power application and any excess blown off? B. When using wet particles, is the stream of suspension diverted from the part simultaneously with or slightly before energizing the magnetic circuit? Are a minimum of two shots of current being applied?	Y	SOP 42.00 Sect. 6.4.3
		Y	SOP 42.00 Sect. 6.4.4
19 (6.4.2)	The Residual Magnetization Method may be used only when specifically approved by the contracting agency or when it has been documented that it can detect defects or artificial defects in test parts.	Y	IAW customer requirements per PO.
20 (6.6)	If required by the written procedure, are permanent records maintained of the location, direction and frequency of indications by methods outlined in paragraphs 6.6.1 through 6.6.4?	Y	SOP 42.00 Sect. 6.5.3
21 (6.7.1)	Are parts properly demagnetized after final magnetic particle inspection?	Y	SOP 42.00 Sect. 6.6.1
22 (6.7.2)	Are parts properly cleaned after final magnetic particle inspection?	Y	SOP 42.00 Sect. 6.6.2

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7.0 Quality Control			
23 (7.2)	Are parts and / or accompanying records properly marked after inspection?	Y	Where required by the customer PO.
24 (7.3)	When using fluorescent materials, inspectors shall not wear eye glasses that are photochromic or that have permanently darkened lenses.	Y	SOP 42.00 Sect. 5.6.5
25 (7.4)	All safety precautions taken.	Y	SOP 42.00 Sect. 4
26 (7.5)	Before performing fluorescent magnetic particle examination. Personnel must wait at least one (1) minute after entering a darkened area for their eyes to adjust to the low-level lighting.	Y	SOP 42.00 Sect. 5.6.6