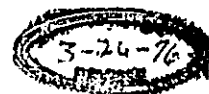


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MSFC-STD-366B
March 15, 1976
Supercedes
MSFC-STD-366A
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GEORGE C. MARSHALL SPACE FLIGHT CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
STANDARD

PENETRANT INSPECTION METHOD

This specification has been approved by the George C. Marshall Space Flight Center (MSFC) and is mandatory for use by MSFC and associated contractors.

1. SCOPE

1.1 This specification covers the requirements governing inspection of materials and parts by the penetrant method.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue of sublevel documents in effect on the date of invitation for bids or request for proposals shall apply.

SPECIFICATION

Military

MIL-I-6866B, Amndt 2 Inspection, Penetrant Method of

STANDARD

Military

MIL-STD-410D Nondestructive Testing Personnel, Qualification and Certification

PUBLICATION

Government

NHB 8060.1A,
Test 13

Ambient Liquid Oxygen
and Pressurized Liquid
and Gaseous Oxygen
Mechanical Impact Tests

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.

3. DEFINITIONS

See Military Specification MIL-I-6866 for applicable definitions.

4. GENERAL REQUIREMENTS

4.1 Requirements - The requirements set forth in specification MIL-I-6866 shall govern, with the following exceptions.

4.2.1 Critical Process Designation - Ref MIL-I-6866, paragraph 5.1; add -

The penetrant inspection method is hereby designated a critical process. The contractor shall document the process specification/procedure and supportive information substantiating his procedure as specified herein, beginning with precleaning preparation and extending through post-inspection cleaning and marking. He shall provide a copy to the Government Procuring Agency for approval prior to process implementation. This does not relieve the contractor of his responsibility for the effective performance of required penetrant inspection or the quality of his product.

4.2.2 Qualification of Inspection Personnel - Ref MIL-I-6866, paragraph 5.8, revise first sentence -

All penetrant inspection personnel shall be qualified in accordance with MIL-STD-410D and as specified herein.

4.2.3 Deviation/Relief - Ref MIL-I-6866, Section 5; add -

When the contractor encounters circumstances of design, manufacturing processes sequencing, materials selections, etc., which could cause damage to or degradation of the parts/materials, as a result of full implementation of this specification, he shall submit a request for relief/deviation to the Government Procuring Agency. This request for relief/deviation shall identify the requirements of this specification which, in the contractor's opinion, might degrade or damage the part/material and shall recommend an alternate approach. The request shall contain substantiating rationale to support the contractor's position and to assess those alternates proposed. If deviation/relief from the requirements of this specification are adjudged warranted, the contractor will be so advised via the Contracting Officer.

5. DETAILED REQUIREMENTS

5.1 Requirements - The requirements set forth in specification MIL-I-6866 shall govern, with the following exceptions.

5.1.1 Article Degradation - Ref MIL-I-6866, paragraph 3.1; add-

Materials employed in the penetrant inspection procedure shall be evaluated by the contractor to assure that the article being inspected is not degraded (ie, precleaning and masking, inspection, post-inspection cleaning and marking materials.)

5.1.2 Oxidizer Compatibility - Ref MIL-I-6866, paragraph 3.2; delete and replace with -

When penetrant inspection is to be performed on parts/materials which are intended for service where contact will be made with a strong oxidizer, such as in liquid oxygen lines or tanks, all of the materials employed in the penetrant inspection procedure (ie, precleaning and masking, inspection, post-inspection cleaning and marking) must be tested for impact sensitivity, prior to use, as specified in NHB 8060.1A, Test 13. Only those materials passing this test shall be employed. Batch testing shall be employed to assure batch compliance; traceability, storage and handling methods which will not negate such testing shall be employed. Procedures for performing testing and controlling acceptable materials shall be included in the critical process procedure, required in paragraph 4.2.1.

5.1.3 Precleaning - Ref MIL-I-6866, paragraph 5.2; delete and replace with -

When inspecting by the penetrant method or methods, all surfaces of basic material and parts shall be free from any rust, scale, welding flux, burrs, feather edges, smeared metal, spatter, grease, paint, carbon, plating, engine varnish, oily film, dirt and other contaminants which could tend to mask defects or give irrelevant indications. Abrasive blasting shall be used to clean metals only if the surface of the metal is to be subsequently cleaned by etching/descaling to remove any residual abrasive or peened metal which might seal surface defects. Paint shall be removed by chemical removers and not by abrasive methods whenever possible. All descaling/etching solutions must be neutralized and flushed from the surface of the part or material, as these cleaners affect fluorescence of penetrant. All parts must be thoroughly dried before application of penetrant. All parts/materials which have been previously machined or mechanically cleaned shall be etched to remove all smeared metal that could mask defects. When required, steels and other high strength, highly heat-treated parts shall be etched to remove smeared metal, and baked within 1 hour after etching. Baking of steel shall be at 375°F for 3 hours to remove hydrogen; for other metals it shall be the time and temperature specified for the particular metal. After baking, and prior to penetrant application, parts shall be cooled below 150°F or the maximum temperature specified by the manufacturer for application of penetrant, whichever is lower. When cleaning plastic materials, solvents which adversely affect these materials shall not be used.

5.1.4 Post-Inspection Cleaning - Ref MIL-I-6866, paragraph 5.5; add -

After inspection is completed, all parts and materials shall be cleaned to assure removal of the materials employed in the inspection operations.

5.1.5 Marking - Ref MIL-I-6866, paragraph 6.1; add -

Parts which are designated for use in oxidizer systems, assemblies, etc., shall not be marked with organic dyes or inks, or other materials which are not compatible with oxidizers such as LOX.

Notice: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operations, the United States Government thereby incurs no responsibility nor obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be

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Custodian:
NASA-George C. Marshall
Space Flight Center

Preparing Activity:
George C. Marshall
Space Flight Center

Latest revisions to specification are indicated by a solid bar in the right-hand border.

FILE NO. MSFC-STD-366

202 -

DR060PRO

PACKAGE NO. 10443R

DOCUMENTATION RELEASE LIST
GEORGE C. MARSHALL SPACE FLIGHT CENTERMSFC CODE IDENT 14981/339B2
ISSUE DATE FEB 22 2007

PAGE 1

C H	DOCUMENT NUMBER	DRL DRL DSH REV	TITLE	CCBD NO.	PCN	PC	EFFECTIVITY
*	MSFC-STD-366	202 -	STANDARD FOR PENETRANT INSPECTION METHOD	000-00-0000	0000000	M	NONE

CHG NO.	CHG REV	CHG NOTICE	RESPONSIBLE ENGINEER	RESPONSIBLE ORGANIZATION	ACTION DATE	DESCRIPTION
	B	DCN000	R. SCHWINGHAMMER	EH01	02/03/94	AMENDMENT 01 TO REVISION 'B' RELEASED 12/13/77.
	B	DCN000	R. SCHWINGHAMMER	EH01	02/03/94	REVISION 'B' RELEASE.
*	1 B	DCN000	EUGENA GOGGANS	EO03	02/22/07	DOCUMENT RELEASED THRU PDS. NO LONGER TRACKED IN ICMS.

CHECKER

N/A
02/15/07

(FINAL)

PACKAGE NO: 10443R

PROGRAM/PROJECT: MULTI

LAST UPDATED: 02/22/07

NOMENCLATURE: MSFC-STD- GOING TO NONE EFFECTIVITY

ECR NO:	PCN:	CCBD NO:	DATE PREPARED:
EO03-0000	0000000	000-00-0000 SB3-00-0000	02/22/07

DWG SIZE	DRAWING NUMBER	DWG REV	EPL/DRL/DDS NUMBER	DWG REV	EPL DSH	EPL REV	EO DASH NUMBER	EO REV	PART NUMBER
			MSFC-HDBK-1453		202	-			
			MSFC-HDBK-1674		202	-			
			MSFC-HDBK-2221		203	-			
			MSFC-HDBK-505		202	-			
			MSFC-HDBK-670		202	-			
			MSFC-MNL-1951		209	-			
			MSFC-PROC-1301		202	-			
			MSFC-PROC-1721		202	-			
			MSFC-PROC-1831		202	-			
			MSFC-PROC-1832		202	-			
			MSFC-PROC-404		202	-			
			MSFC-PROC-547		202	-			
			MSFC-QPL-1918		204	-			
			MSFC-RQMT-1282		202	-			
			MSFC-SPEC-1198		202	-			
			MSFC-SPEC-1238		202	-			
			MSFC-SPEC-1443		202	-			
			MSFC-SPEC-164		202	-			
			MSFC-SPEC-1870		202	-			
			MSFC-SPEC-1918		203	-			
			MSFC-SPEC-1919		206	-			
			MSFC-SPEC-2083		202	-			
			MSFC-SPEC-2223		202	-			
			MSFC-SPEC-2489		206	-			
			MSFC-SPEC-2490		205	-			
			MSFC-SPEC-2491		203	-			
			MSFC-SPEC-2492		203	-			
			MSFC-SPEC-2497		211	-			
			MSFC-SPEC-250		202	-			
			MSFC-SPEC-445		202	-			
			MSFC-SPEC-504		202	-			
			MSFC-SPEC-521		202	-			
			MSFC-SPEC-548		202	-			
			MSFC-SPEC-560		202	-			
			MSFC-SPEC-626		202	-			
			MSFC-SPEC-684		202	-			
			MSFC-SPEC-708		202	-			
			MSFC-SPEC-766		202	-			
			MSFC-STD-1249		202	-			
			MSFC-STD-1800		202	-			
			MSFC-STD-246		202	-			
			MSFC-STD-2594		203	-			

DOCUMENTATION PACKAGE/ROUTING REPORT

02/22/07 DR120PR0 PAGE 2

PACKAGE NO: 10443R

DWG SIZE	DRAWING NUMBER	DWG REV	EPL/DRL/DDS NUMBER	DWG REV	EPL DSH	EPL REV	EO DASH NUMBER	EO REV	PART NUMBER
			MSFC-STD-2903		202	-			
			MSFC-STD-2904		202	-			
			MSFC-STD-2905		202	-			
			MSFC-STD-2906		202	-			
			MSFC-STD-2907		202	-			
			MSFC-STD-366		202	-			
			MSFC-STD-383		202	-			
			MSFC-STD-486		202	-			
			MSFC-STD-506		203	-			
			MSFC-STD-531		202	-			
			MSFC-STD-557		202	-			
			MSFC-STD-561		203	-			
			MSFC-STD-781		202	-			

SUBMITTED BY ENGINEERING AREA:	BASIC	CHANGE	PARTIAL	COMPLETE	CLOSES	ACTION
EO03		X		X		EO03

PREPARED BY:
EUGENA GOGGANS
12/19/06

SUBMITTED BY:

CONCURRENCE:

TRANSMITTAL DATES

TO RELEASE DESK 02/22/07 10:00
TO MSFC DOC REP 02/22/07 00:00

REMARKS:

2007 FEB 22 AM 11:22

MSFC DOCUMENTATION REPOSITORY - DOCUMENT INPUT RECORD

I. GENERAL INFORMATION

1. APPROVED PROJECT: <i>Multi-Program</i>	2. DOCUMENT/ DRAWING NUMBER: <i>MSFC-STD-366</i>	3. CONTROL NUMBER:	4. RELEASE DATE: <i>03-26-1976</i>	5. SUBMITTAL DATE: <i>08-14-2003</i>
6. DOCUMENT/DRAWING TITLE: <i>Standard for Penetrant Inspection Method</i>			7. REPORT TYPE: <i>Guideline</i>	
8. CONTRACT NUMBER / PERFORMING ACTIVITY: <i>NA</i>	9. DRD NUMBER: <i>NA</i>	10. DPD / DRL / IDRD NUMBER: <i>NA</i>		
11. DISPOSITION AUTHORITY (Check One): <input checked="" type="checkbox"/> Official Record - NRRS <i>8/12/A</i> <input type="checkbox"/> Reference Copy - NRRS 8/5/A/3 (destroy when no longer needed)	12. SUBMITTAL AUTHORITY: <i>Dave Brown</i>	13. RELEASING AUTHORITY: <i>MBellwood</i>		
14. SPECIAL INSTRUCTIONS: <i>Multi-program document outlining application of penetrant for inspection of materials.</i>				
15. CONTRACTOR/SUBMITTING ORGANIZATION, ADDRESS AND PHONE NUMBER: <i>Dave Brown ED 32 MSFC, AL 35812 (256) 544-7622</i>		16. ORIGINATING NASA CENTER: <i>MSFC</i>		
		17. OFFICE OF PRIMARY RESPONSIBILITY: <i>ED 32</i>		
18. PROGRAMMATIC CODE (5 DIGITS): <i>Multi</i>			19. NUMBER OF PAGES: <i>5</i>	

II. ENGINEERING DRAWINGS

20. REVISION:	21. ENGINEERING ORDER:	22. PARTS LIST:	23. CCBD:
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III. REPORTS, SPECIFICATIONS, ETC.

24. REVISION: <i>B</i>	25. CHANGE: <i>I</i>	26. VOLUME:	27. BOOK:	28. PART:	29. SECTION:
30. ISSUE:	31. ANNEX:	32. SCN:	33. DCN:	34. AMENDMENT:	
35. APPENDIX:	36. ADDENDUM:	37. CCBD:	38. CODE ID:	39. IRN:	

IV. EXPORT AND DISTRIBUTION RESTRICTIONS

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V. ORIGINATING ORGANIZATION APPROVAL

40. ORG. CODE: <i>ED 32</i>	41. PHONE NUMBER: <i>544-7622</i>	42. NAME: <i>Dave Brown</i>	43. SIGNATURE/DATE: <i>Dave Brown</i>
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VI. TO BE COMPLETED BY MSFC DOCUMENTATION REPOSITORY

44. RECEIVED BY: <i>Jammy Wise</i>	45. DATE RECEIVED: <i>10-15-03</i>	46. WORK ORDER:
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