



National Aeronautics and  
Space Administration

**NOT  
MEASUREMENT  
SENSITIVE**

MSFC-STD-2905  
REVISION C  
EFFECTIVE DATE: June 21, 2006

---

**George C. Marshall Space Flight Center**  
Marshall Space Flight Center, Alabama 35812

QD01

**MULTIPROGRAM/PROJECT COMMON-USE  
DOCUMENT**

**MSFC TAILORING GUIDE FOR NASA-STD-8739.4,  
CRIMPING, INTERCONNECTING CABLES, HARNESS,  
AND WIRING**

Approved for Public Release; Distribution is Unlimited.

**CHECK THE MASTER LIST—  
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE**  
MSFC - Form 454 (Rev. October 1992)

<b>Multiprogram/Project Common-Use Document QD01</b>		
<b>Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring</b>	<b>Document No.: MSFC-STD-2905</b>	<b>Revision: C</b>
	<b>Effective Date: June 21, 2006</b>	<b>Page 2 of 8</b>

### DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		02/05/99	Initial release.
Revision	A	01/12/01	Reformat document to new template. Replace MIL-STD-1686 with ANSI/ESD S20.20-1999. Added paragraphs 5.10 and 5.11.
Revision	B	04/18/05	Updated document per NASA Headquarters Rules Review. Updated "SCOPE" to reflect changes due to reorganizations of the Safety & Mission Assurance (S&MA) and Engineering Directorates. Updated "APPLICABLE DOCUMENTS" to remove canceled, or add replacement documents. Updated "Red Plague" Control Plan requirements.
Revision	C	06/21/06	Updated "Training Resources" information in paragraph 5.6. Updated the "Table of Contents".

CHECK THE MASTER LIST VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<b>Multiprogram/Project Common-Use Document QD01</b>		
<b>Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring</b>	<b>Document No.: MSFC-STD-2905</b>	<b>Revision: C</b>
	<b>Effective Date: June 21, 2006</b>	<b>Page 3 of 8</b>

## FOREWORD

This standard sets forth MSFC tailoring requirements for NASA-STD-8739.4. These requirements shall be invoked by drawings and specifications for flight hardware and critical support equipment.

<b>Multiprogram/Project Common-Use Document QD01</b>		
<b>Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring</b>	<b>Document No.: MSFC-STD-2905</b>	<b>Revision: C</b>
	<b>Effective Date: June 21, 2006</b>	<b>Page 4 of 8</b>

CONTENTS

<u>PARAGRAPH</u>	<u>PAGE</u>
<u>DOCUMENT HISTORY LOG</u> .....	2
<u>FOREWORD</u> .....	3
1. <u>SCOPE</u> .....	5
2. <u>APPLICABLE DOCUMENTS</u> .....	5
3. <u>DEFINITIONS</u> .....	5
4. <u>GENERAL REQUIREMENTS</u> .....	6
5. <u>DETAILED REQUIREMENTS</u> .....	6
6. <u>NOTES</u> .....	8

Multiprogram/Project Common-Use Document QD01		
Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring	Document No.: MSFC-STD-2905	Revision: C
	Effective Date: June 21, 2006	Page 5 of 8

## 1. SCOPE

1.1 Scope. This tailoring guide sets forth the Marshall Space Flight Center (MSFC) exceptions to the use of NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring, dated February 1998. This tailoring guide was prepared jointly by the Safety, Reliability & Quality Assurance (SR & QA) Policy and Assessment Department and the Electrical, Electronic, and Electromechanical (EEE) Parts, Packaging & Assembly Branch of the Instrument & Payload System Department. This guide shall be used on contracts and for in-house work.

## 2. APPLICABLE DOCUMENTS

### 2.1 Marshall Space Flight Center (MSFC).

<u>Document Number</u>	<u>Title</u>
MSFC-RQMT-2918	Requirements for Electrostatic Discharge Control
MSFC-STD-2903	MSFC Tailoring Guide for NASA-STD-8739.3, Soldered Electrical Connections

### 2.2 NASA

<u>Document Number</u>	<u>Title</u>
NASA-STD-8739.3	Soldered Electrical Connections
NASA-STD-8739.4	Crimping, Interconnecting Cables, Harness, and Wiring

### 2.3 American National Standards Institute.

<u>Document Number</u>	<u>Title</u>
ANSI/ESD S20.20-1999	ESD Association Standard for the Development of an Electrostatic Discharge Control Program for –Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

## 3. DEFINITIONS

3.1 Acronyms used in this standard. The acronyms used in this standard are defined as follows:

ANSI	American National Standards Institute
EEE	Electrical, Electronic, and Electromechanical
ESD	Electrostatic Discharge

CHECK THE MASTER LIST VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<b>Multiprogram/Project Common-Use Document QD01</b>		
<b>Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring</b>	<b>Document No.: MSFC-STD-2905</b>	<b>Revision: C</b>
	<b>Effective Date: June 21, 2006</b>	<b>Page 6 of 8</b>

MSFC      Marshall Space Flight Center

SR&QA    Safety, Reliability, and Quality Assurance

#### 4. GENERAL REQUIREMENTS

None.

#### 5. DETAILED REQUIREMENTS

The following exceptions to NASA-STD-8739.4 shall apply.

5.1 In paragraph 5.2.1, change the vision test frequency to every 3 years.

5.2 Exclude paragraph 5.3, Certification Levels.

5.3 In paragraph 5.4.3.a, exclude “Level B”.

5.4 Exclude paragraph 5.6.2 and replace with the following: “Recertification shall include demonstration of proficiency. Demonstration of proficiency shall be accomplished by retraining/retest, sample preparation/inspection, or a documented audit of actual work performed. The recertification procedure shall be documented by the supplier.”

5.5 Modify paragraph 5.6.3.d to require recertification every three years.

5.6 Replace paragraph 5.7 titled “Training Resources” with the following: “Training shall be obtained from a school approved by a technical advisor and the MSFC Certifying Officer. Contact the MSFC Certifying Officer within the Safety and Mission Assurance (S&MA) organization for an approved training school.”

5.7 Replace paragraph 6.4, Electrostatic Discharge Requirements, with the following: “The supplier shall implement an electrostatic discharge (ESD) Control Program. ESD requirements shall be in accordance with ANSI/ESD-S20.20-1999 or other approved ESD control procedures. This program shall define the ESD control requirements for any activity that tests, inspects, services, manufacturers, installs, packages, labels or otherwise processes ESD sensitive parts or assemblies. All personnel who handle static-sensitive parts and assemblies shall have been trained in the proper procedures and in the use of appropriate protective equipment to prevent ESD damage. ESD requirements for MSFC in-house work shall be in compliance with MSFC-RQMT-2918, Requirements for Electrostatic Discharge Control.”

Multiprogram/Project Common-Use Document QD01		
Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring	Document No.: MSFC-STD-2905	Revision: C
	Effective Date: June 21, 2006	Page 7 of 8

5.8 Add the following as paragraph 6.11, **Red Plague Control**: “The use of silver plated wire shall require the implementation of a red plague control plan as outlined below. This requirement shall also be imposed upon vendors whose product contains silver plated wire.

#### 6.11.1 Control Plan Summary

1. The assembly process shall be conducted in a controlled environment where the dew point is not attained. If the dew point is attained during assembly, the operation shall be stopped and the hardware relocated to a dry area as soon as possible to avoid damage to the hardware which could result in it being scrapped or discarded.

2. Before use in hardware construction, the wire shall be inspected for sufficient plating and the existence of “red plague” (i.e., reddish brown discoloration or corrosion of the conductors).

3. For solder terminations, the insulation shall be left on the wire until assembly, at which time the wire shall be stripped and tinned immediately to minimize the exposure time of the silver to the atmosphere. **NOTE:** Wires used for crimp terminations shall not be tinned.

4. During wire assembly the bend radius shall be controlled to a minimum of one (1) diameter to avoid overstressing which could result in cracking of the insulation and/or silver plating.

5. Wire ends shall be recapped before the wire is returned to storage.

6. Silver plated wire shall be stored in a controlled environment where the dew point is not attained.

7. Nonaqueous solvents shall be used for flux removal.

#### 6.11.2 Wire Manufacturing Controls

The following controls shall be imposed on the manufacturer of any silver plated:

1. Traceability to the plating bath so that a defective lot of wire can be definitely isolated.

2. Dry processing of insulation and dry dielectric testing to prevent the possibility of introducing moisture inside the insulation.

<b>Multiprogram/Project Common-Use Document QD01</b>		
<b>Title: MSFC Tailoring Guide For NASA-STD-8739.4, Crimping, Interconnecting Cables, Harness, and Wiring</b>	<b>Document No.: MSFC-STD-2905</b>	<b>Revision: C</b>
	<b>Effective Date: June 21, 2006</b>	<b>Page 8 of 8</b>

3. Shipping and storage of finished wire with the ends capped to prevent diffusion of air and water vapor into the wire through open ends.

4. Prohibition of water quenching. Only an oil quench, dry processing and sealing are to be used. Such sealing is to include end capping and/or desiccation as soon as possible.

5. The wire manufacturer shall provide certification of the above.

In the event that item 5 cannot be obtained from the wire manufacturer, the receiving inspection procedure for silver plated wire shall be expanded to include cutting six (6) feet of wire from each end, cross-sectioning the wire, and conducting a metallographic inspection for the presence of cuprous oxide.

5.9 Change the last sentence of 13.4.1 to the following: “Solder connection requirements and accept/reject criteria shall be in accordance with NASA-STD-8739.3 as tailored by MSFC-STD-2903”.

5.10 In the last sentence of paragraph 18.2.6.c, change “minimum” to “maximum”.

5.11 In paragraph 19.1.4, delete items d through i and k through m.

5.12 Delete paragraph 19.3 and 19.5.

## 6. NOTES

This document replaces MSFC-STD-2905 dated April 18, 2005.



PACKAGE NO. 10443R

DOCUMENTATION RELEASE LIST  
 GEORGE C. MARSHALL SPACE FLIGHT CENTER

MSFC CODE IDENT 14981/339B2  
 ISSUE DATE FEB 22 2007

C H	DOCUMENT NUMBER	DRL DRL DSH REV	TITLE	CCBD NO.	PCN	PC	EFFECTIVITY
*	MSFC-STD-2905	202 -	MSFC TAILORING GUIDE FOR NASA-STD-8739.4, CRIMPING, INTERCONNECTING CABLES, HARNESS, AND WIRING	000-00-0000	0000000	ZA	NONE

CHG NO.	CHG REV	CHG NOTICE	RESPONSIBLE ENGINEER	RESPONSIBLE ORGANIZATION	ACTION DATE	DESCRIPTION
			MARK STRICKLAND	CR30	02/12/99	BASELINE RELEASE
*	1	DCN000	EUGENA GOGGANS	E003	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	-			

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