



SURFACE VEHICLE INFORMATION REPORT

SAE J2915 AUG2011

Issued 2011-08

H-III5F Spine Box Update to Eliminate Noise

RATIONALE

The Hybrid III Dummy Family Task Force has recommended a change to the H-III5F dummy to fix a design defect that causes data artifacts. This report is needed to document the problem and the solution to this problem recommended by the task force.

FOREWORD

In the late 1980's the *Centers for Disease Control* (CDC) awarded Ohio State University a grant to develop multi-sized test dummies based on the Hybrid III design. To aid in this endeavor, the Mechanical Human Simulation Subcommittee of the Society of Automotive Engineers (SAE) formed a Task Group to define the specifications for an adult size small female dummy which would have, at least, the same level of biofidelity and measurement capacity as the 50th Hybrid III dummy. Throughout the 1990's this Small Female dummy was revised and improved until it was finally fully defined by a drawing package by NHTSA and adopted in U.S. Federal Regulations as a part of the Code of Federal Regulations Part 572. The 2002 version of this drawing package defines the currently regulated version of this dummy today.

At the December 11, 2007 meeting of the SAE Hybrid III Dummy Family Task Force, data was presented showing that there was a problem with the 2002 version of the design of the spine box for the Small Female dummy which could cause mechanical noise artifacts in sled and crash test data. Possible solutions to this problem were discussed, and it was agreed to develop a new spine box design to eliminate the possibility of this noise being generated. A new design was discussed, prototypes built and tested, and the design revised until, at the January 13, 2009 meeting, it was agreed to document the design in an Information Report so that it can be recommended by the Task Force.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2011 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: <http://www.sae.org>

**SAE values your input. To provide feedback
on this Technical Report, please visit
http://www.sae.org/technical/standards/J2915_201108**

TABLE OF CONTENTS

1.	SCOPE AND PURPOSE	3
2.	REFERENCES.....	3
2.1	Applicable Documents	3
2.1.1	SAE Publications.....	3
2.2	Related Publication	3
2.2.1	Federal Publication	3
3.	ABBREVIATIONS	3
4.	TECHNICAL REQUIREMENTS.....	4
4.1	2002 Regulation Spine Box	4
4.1.1	Description of Problem	4
4.1.2	Tests Demonstrating Problem	4
4.1.3	Interim Measure	6
4.2	Recommended Spine Box Update	6
4.2.1	Description of Solution	6
4.2.2	Drawings	7
4.2.3	Tests Demonstrating Acceptability.....	15
5.	NOTES.....	16
5.1	Marginal Indicia	16
	APPENDIX A - RELEVANT 2002 REGULATION DRAWINGS.....	21
	APPENDIX B - STOP-GAP SCREW TIGHTENING PROCEDURE.....	26
	FIGURE 1 - SPINE ROCKING ON SCREWS	4
	FIGURE 2 – SLED DATA DEMONSTRATING PROBLEM.....	5
	FIGURE 3 - BARRIER CRASH DATA DEMONSTRATING THE PROBLEM	6
	FIGURE 4 - DESIGN OF UPGRADED SPINE BOX.....	7
	FIGURE 5 - 880105-1045 SHEET 1 OF 3	8
	FIGURE 6 - 880105-1045 SHEET 2 OF 3	9
	FIGURE 7 - 880105-1045 SHEET 3 OF 3	10
	FIGURE 8 - 880105-1047	11
	FIGURE 9 - SID-070-6.....	12
	FIGURE 10 - 880105-1045-MOD.....	13
	FIGURE 11 - 880105-1048	14
	FIGURE 12 - 880105-1049	15
	FIGURE 13 - EVALUATION SERIES TEST PLAN.....	17
	FIGURE 14 - EVALUATION SERIES RESULTS SUMMARY	18
	FIGURE 15 - EVALUATION SERIES GRAPHS	19
	FIGURE 16 - EVALUATION SERIES KINEMATICS	20

1. SCOPE AND PURPOSE

This Information Report documents the problems with the 2002 regulated version of the spine box, and defines a recommended solution to resolve the problem.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE EA-25 User's Manual for the Small Adult Female Hybrid III Test Dummy

2.2 Related Publication

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 Federal Publication

Available from the Superintendent of Documents, U.S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

Code of Federal Regulations Part 572 Test Dummies Specifications - Anthropomorphic Test Dummy for Applicable Test Procedures

Available from Reprographic Technologies, 9107 Gaither Road, Gaithersburg, MD 20877, (301) 419-5070 as well as from the Department of Transportation Docket Management System

Parts Lists and Drawings Part 572 Subpart O – Hybrid III 5th Percentile Small Adult Female Crash Test Dummy (H-III5F Alpha Version) – June 2002

3. ABBREVIATIONS

H-III5F	Hybrid III 5 th Percentile Small Female Crash Test Dummy
Hybrid-III AF05 (in Figure 13)	Hybrid III 5 th Percentile Small Female Crash Test Dummy
SHCS	Socket Head Cap Screw
FHCS	Flat Head Cap Screw
NHTSA	National Highway Traffic Safety Administration - of the United States Department of Transportation