

SID-IIs SBL D Service Bulletin

Overview

In December 2006, The National Highway Traffic Safety Administration (NHTSA) issued a Final Rule announcing the agency's regulation on anthropomorphic test devices to add specifications and qualification requirements for the SID-IIs Standard Build Level D (SBL D) 5th percentile adult female crash test dummy. This document provides a background summary of the dummy development, and an overview of the standard build levels, part number changes and purchasing options FTSS has to offer in connection with this ruling.

Background

SID-IIs was jointly developed in 1994 and 1995 by First Technology Safety Systems (FTSS) and the Occupant Safety Research Partnership (OSRP) of the USCAR program.

The first SID-IIs dummy was built in 1995 as an “Alpha Prototype” design level and in 1998 after extensive testing was upgraded to a “Beta+” level to improve the dummy's overall biofidelity. Further testing was conducted globally by automotive manufacturers and suppliers and further enhancements were designed into the dummy in July 2000. On September 7, 2000, the “Production Level”, approved by the committee members of the OSRP, was released.

In April 2002, reports published by the Insurance Institute for Highway Safety (IIHS), specified the **SID-IIs SBL C** dummy in their new movable deformable SUV type barrier test protocols with the side curtain air bag systems. The National Highway Traffic Safety Administration (NHTSA) and the industry continued their evaluations of the SID-IIs for possible consideration into a future upgrade of Federal Motor Vehicle Safety Standard (FMVSS) 214.

On May 12, 2004, Jeffrey W. Runge, MD & Administrator for NHTSA, announced the agency's Notice for Proposed Rulemaking (NPRM) to upgrade the Federal Motor Vehicle Safety Standard (FMVSS) 214, United States Side Impact Occupant Protection Standard.

On December 8, 2004, NHTSA issued a Notice of Proposed Rule Making (NPRM) for the **SID-IIs FRG** under 49CFR, Part 572 Subpart “V”. In this NPRM, NHTSA listed test requirements and corridors for the verification tests.

First Technology Safety Systems (FTSS) worked with the SAE and OSRP to prepare comments and recommend corridors based on a larger database to NHTSA before the March 8, 2005 deadline.

As a result of the NPRM feedback, industry commented and suggested a SID-IIs SBL D to NHTSA for the regulation. The SBL D design that was taken into consideration is now referred to as the **“OSRP SBL D”** SID-IIs dummy. Within this Service Bulletin, contents of the design changes will be detailed.

49 CFR Part 572, Docket No. NHTSA 25442

On December 14, 2006, NHTSA issued a Final Rule announcing the agency's regulation on anthropomorphic test devices to add specifications and qualification requirements for the 5th percentile adult female crash test dummy, the **SID-IIs Build Level D** test dummy.

The final rule states, "if you wish to petition for reconsideration of this rule, your petition must be received by January 29, 2007."

Summary of Changes and Options

The SID-IIs dummy development has evolved through the years, which is the reasoning for the Background Summary provided. This portion of the Service Bulletin will outline an overview of the Standard Build Levels, Part Number Changes and Purchasing Options FTSS has to offer.

Standard Build Level and Part Number Changes

The current structure of the FTSS part numbers for the dummies, and some components will require changes due to what is listed in the NHTSA drawing package.

Part Number Changes Effective February 1, 2007				
Final Rule	Part Number		Description	Details
	OSRP D	SBL C		
180-0000	180-0000-D	180-0000-C	SID-IIs Dummy, Tested/Certified, Non-Instrumented	All SBL's have different components and Final Rule SBL D is tested to different corridors than the SBL C and OSRP D
180-1000 180-1002	180-1000-C 180-1002-C	180-1000-C 180-1002-C	Head Assembly, Tested/Certified Head Skin, Tested/Certified	Same components used for each SBL, however Final Rule SBL D is tested to different corridors than the SBL C and OSRP D
180-2000 180-2001	180-2000-C 180-2001-C	180-2000-C 180-2001-C	Neck Assembly, Tested/Certified Neck Molded, Tested/Certified	Same components used for each SBL, however Final Rule SBL D is tested to different corridors than the SBL C and OSRP D
180-3000	180-3000-D	180-3000-C	Upper Torso Assembly, Tested/Certified	Different components for each SBL. Final Rule and OSRP SBL D have the same components, but are tested to different corridors. SBL C has different components, but is tested to the same corridors as OSRP SBL D
180-RSVP 180-3355	180-RSVP-D 180-3355-D	180-RSVP-C 180-3355-C	Rib Set, Tested/Certified Shoulder Rib, Tested/Certified	The damping material is different between SBL C and Final Rule and OSRP SBL D dummies. However, Final Rule SBL D is tested to different corridors than the SBL C and OSRP D dummies
180-4000	180-4000-D	180-4000-D	Lower Torso Assembly, Tested/Certified	Different components which are tested to different corridors for Final Rule SBL D vs. SBL C and OSRP D
180-4343	180-4343-D	180-4343-D	Pelvis Flesh, Tested/Certified	Same components used for each SBL, however Final Rule is tested to different corridors than SBL C and OSRP D
180-4450-3	180-4450-2	180-4450-2	Pelvic Plugs, Tested/Certified, tested to 3mm Pelvic Plugs, Tested/Certified, tested to 2mm	Same components used for each SBL. The Final Rule SBL D includes pelvic plugs tested/certified to a 3 mm certification. SBL C and OSRP D level include the pelvic plugs tested/certified to a 2 mm certification
180-4320-1 180-4320-2			Iliac Wing, Left Iliac Wing, Right	The Final Rule SBL D includes the iliac wings using Material #2* with an interface plate
180-4325			Iliac Wing Interface Plate	The Final Rule SBL D includes a new test requirement
	180-4322-1 180-4322-2	180-4322-1 180-4322-2	Iliac Wing with standoff, Left Iliac Wing with standoff, Right	SBL C and OSRP D level include the iliac wings using Material #3* with stand-off design

*An issue was recently discovered with the iliac wing load cells where the load path was being shorted by over-tightening the mounting screws, squeezing the iliac wing material into the gage area. In addition to this issue, the material used for the iliac wings was discontinued in April 2004 (Material #1), and the replacement material was found to be softer (Material #2). In May 2006, FTSS identified a

new material which has properties similar to the original material under quasi-static test conditions (Material #3). To address the load path shorting issue, FTSS proposed a new iliac wing insert design with integral standoffs. After evaluation with a series of tests, OSRP recommended the new insert design (with standoffs) using the new material (Material #3).

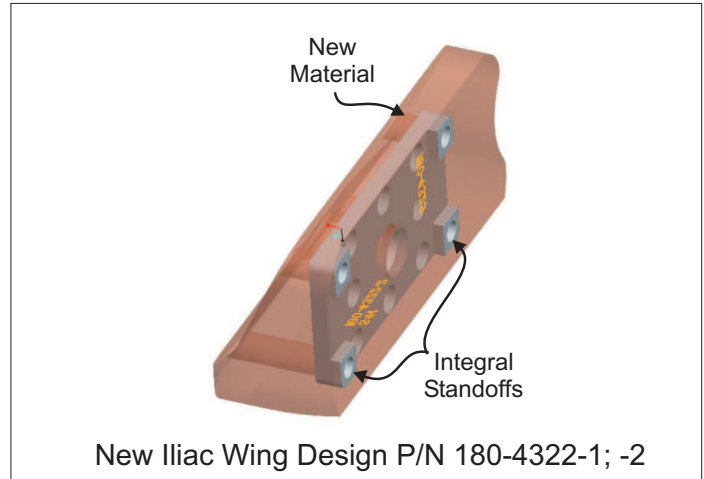
Current Dummy Part Numbers:			
Part Number	Description	SBL	Comments
181-0000	SIDIIs FRG Dummy	A	No longer applicable
180-0000	SIDIIs SBL C Dummy	C	This will change to the Final Rule Part Number
180-0000-D	SIDIIs SBL D Dummy (OSRP)	D	This will remain the OSRP Current Level D

Part Number Changes Effective February 1, 2007:			
Part Number	Description	SBL	Comments
180-0000	SIDIIs SBL D Dummy (Final Rule)	D	This is the Part Number listed in the NHTSA Drawing Package
180-0000-C	SIDIIs SBL C Dummy	C	IIHS Version - may incorporate some OSRP D Designs
180-0000-D	SIDIIs SBL D Dummy (OSRP)	D	OSRP Version - components and corridor differences from Final Rule D

Iliac Wing Material Summary

	Material #1	Material #2	Material #3
Manufacturing Period	Obsolete Original up to April 19, 2004 No S/N	Replacement April 20, 2004 - May 31, 2006 No S/N	Driven by OSRP June 1, 2006 - Present S/N 511 - 583
Final Rule SBL D		Iliac Wing: P/N 180-4320-1 P/N 180-4320-2 With Interface Plate: P/N 180-4325	
OSRP D			Iliac Wing with Stand Off P/N 180-4322-1 P/N 180-4322-2
SBL C	Iliac Wing: P/N 180-4320-1 P/N 180-4320-2 Original Build - April 19, 2004	Iliac Wing: P/N 180-4320-1 P/N 180-4320-2 April 20, 2004 - January 31, 2006	IIHS adopted Iliac Wing w/Stand-Off P/N 180-4322-1 P/N 180-4322-2 as of February 1, 2007

P/N = Part Number
S/N = Serial Number



Iliac Wing Design

As stated previously, FTSS changed the material of the SIDIIs Iliac Wings in April 2004. After review of the NHTSA Final Rule drawing package, it was confirmed the iliac wings used in the NHTSA testing were manufactured using Material #2.

As FTSS was working on a new design of the iliac wing to rectify the load path issue, NHTSA implemented an interface plate to be used with the original iliac wing design. NHTSA tested using the interface plate and implemented a new Pelvis Iliac Impact Test (see Corridor section for details).

Corridor Summary

For the NHTSA Final Rule, component tests were conducted on the head, neck, shoulder, thorax with arm, thorax without arm, abdomen, pelvis acetabulum, and iliac regions.

The repeatability assessment was made in terms of CV (Coefficient of Variance):

CV <5%	=	Excellent
CV 5% - 8%	=	Good
CV 8% - 10%	=	Acceptable
CV >10%	=	Unacceptable

NHTSA rated the SIDIIs repeatability and reproducibility as Excellent to Good.

Provided below is a summary of the Calibration Corridors based on the SBL dummies FTSS has manufactured. Highlighted in red are the differences between the NPRM SIDIIs FRG and the Final Rule SBL D calibration corridors.

There is a new test requirement which is the Pelvis Iliac Impact Test. This requires an impactor face that has a rectangular flat surface with dimension of 50.8 mm x 88.9 mm with a depth of at least 76 mm. NHTSA ran iliac impact tests using the originally designed iliac wing (180-4320-1 and 180-4320-2), using Material #2, with an interface plate (P/N TE-385-30). The corridors supplied are based on the use of this assembly.

All full body impact tests are to be conducted on the WorldSID bench, except for the Pelvis-Iliac Impact Test.

Head Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	18.9 - 25.6	20.6 - 22.2	20.6 - 22.2	18.9 - 25.6	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Resultant Acceleration (g)	115 - 145	125 - 145	115 - 135	115 - 145	115 - 137
Longitudinal Acceleration (g)	(-15) - (+15)	(-15) - (+15)	(-15) - (+15)	(-15) - (+15)	(-15) - (+15)
Unimodal (%)	< 10	< 15	< 15	< 10	< 15

Neck Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	18.9 - 25.6	20.6 - 22.2	20.6 - 22.2	18.9 - 25.6	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Test velocity (m/s)	5.51 - 5.63	5.51 - 5.63	5.51 - 5.63	5.51 - 5.63	5.51 - 5.63
Pendulum Velocity					
@ 10 ms	2.10 - 2.70	2.20 - 2.80	2.20 - 2.80	2.10 - 2.70	2.20 - 2.80
@ 15 ms	3.00 - 3.80	3.40 - 4.10	3.20 - 3.90	3.00 - 3.80	3.30 - 4.10
@ 20 ms	4.20 - 5.20	4.50 - 5.40	4.30 - 5.20	4.20 - 5.20	4.40 - 5.40
@ 25 - 60 ms	5.00 - 6.40	NA	NA	5.00 - 6.40	NA
@ 25 ms	NA	5.50 - 6.10	5.20 - 6.00	NA	5.40 - 6.20
@ 25 - 100 ms	NA	5.20 - 6.20	5.50 - 6.50	NA	5.50 - 6.20
Max D-plane rotation (degree)	72 - 82	74 - 79	72 - 81	72 - 82	71 - 81
Time of peak rotation (ms)	NA	50 - 70	55 - 70	NA	50 - 70
Rotation Decay time to 0 degree (ms)	60 - 83	NA	NA	60 - 83	NA
Max Occipital Moment (N-m)	(-43) - (-36)	(-45) - (-40)	(-42) - (-36)	(-43) - (-36)	(-44) - (-36)
Moment decay time to 0 N-m (ms)	NA	113 - 123	116 - 129	NA	102 - 126
Moment decay time to 10 N-m (ms)	90 - 98	NA	NA	90 - 98	NA
Time of last peak to maximum rotation (ms)	< 14	NA	NA	< 14	NA
Maximum forward potentiometer rotation (degree)	59 - 72	NA	NA	59 - 72	NA
Time of maximum forward potentiometer rotation	61 - 73	NA	NA	61 - 73	NA
Max rearward potentiometer rotation (degree)	47 - 56	NA	NA	47 - 56	NA
Time of maximum rearward potentiometer rotation	62 - 73	NA	NA	62 - 73	NA

Shoulder Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	20.6 - 22.2	NA	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2
Relative Humidity (%)	10 - 70	NA	10 - 70	10 - 70	10 - 70
Probe Velocity (m/s)	4.41 - 4.59	NA	4.20 - 4.40	4.20 - 4.40	4.30 - 4.50
Probe Force (kN)	1.60 - 2.40	NA	1.90 - 2.30	1.90 - 2.30	NA
Probe Acceleration (g)	NA	NA	(13.9 - 16.9)*	NA	14 - 18
Max Shoulder Deflection (mm)	27 - 39	NA	29 - 36	29 - 36	30 - 37
T1 Acceleration - Y Axis (g)	NA	NA	NA	NA	17 - 19

* equivalent probe acceleration

*NHTSA Docket No. 18865

**OSRP SIDIIIs Task Group Meeting Minutes dated June, 2006

Thorax Test With Arm Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Probe Velocity (m/s)	6.57 - 6.84	6.6 - 6.8	6.6 - 6.8	6.6 - 6.8	6.6 - 6.8
Probe Force (kN)	4.10 - 4.70	NA	4.0 - 5.0	4.10 - 4.90	NA
Probe Acceleration (g)	(30 - 34.3)*	30 - 36	(29.3 - 36.6)*	NA	31 - 36
Shoulder Deflection (mm)	30 - 42	28 - 34	32 - 40	32 - 40	31 - 40
Upper Rib Deflection (mm)	23 - 35	23 - 28	25 - 32	24 - 32	26 - 32
Middle Rib Deflection (mm)	29 - 44	28 - 33	31 - 39	31 - 39	30 - 36
Lower Rib Deflection (mm)	33 - 40	31 - 36	33 - 41	33 - 41	32 - 38
Upper Spine Acceleration - T1 (g)	34 - 48	40 - 46	36 - 45	36 - 44	34 - 43
Lower Spine Acceleration - T12 (g)	30 - 38	37 - 41	29 - 36	28 - 36	28 - 35

* equivalent probe acceleration

Thorax Test Without Arm Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Probe Velocity (m/s)	4.2 - 4.4	4.2 - 4.4	4.2 - 4.4	4.2 - 4.4	4.2 - 4.4
Probe Force (kN)	1.80 - 2.30	NA	2.0 - 2.45	2.0 - 2.50	NA
Probe Acceleration (g)	(13.1 - 16.8)*	16 - 19	(14.7 - 17.9)*	NA	14 - 18
Upper Rib Deflection (mm)	32 - 42	33 - 39	32 - 39	32 - 40	33 - 40
Middle Rib Deflection (mm)	40 - 51	38 - 43	37 - 46	38 - 46	39 - 45
Lower Rib Deflection (mm)	34 - 47	33 - 39	34 - 42	34 - 42	36 - 43
Upper Spine Acceleration (g)	13 - 18	14 - 18	13 - 19	13 - 18	14 - 17

Abdomen Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In		
			Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Probe Velocity (m/s)	4.41 - 4.59	4.2 - 4.4	4.2 - 4.4	4.2 - 4.4	4.3 - 4.5
Probe Force (kN)	1.30 - 1.90	NA	1.6 - 2.0	1.6 - 2.0	NA
Probe Acceleration (g)	(9.5 - 13.9)*	13 - 16	(11.7 - 14.7)*	(11.7 - 14.7)*	12 - 15
Upper Rib Deflection (mm)	44 - 55	36 - 42	39 - 48	40 - 48	39 - 47
Lower Rib Deflection (mm)	44 - 56	36 - 42	37 - 46	38 - 46	37 - 46
Upper Spine Acceleration (g)	5 - 9	NA	6 - 9	6 - 9	NA
Lower Spine Acceleration - T12 (g)	9 - 13	11 - 15	9 - 13	9 - 13	11 - 14

* equivalent probe acceleration

Pelvis - Acetabulum Impact Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In		
			Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Temperature (°C)	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2	20.6 - 22.2
Relative Humidity (%)	10 - 70	10 - 70	10 - 70	10 - 70	10 - 70
Probe Velocity (m/s)	6.57 - 6.84	6.6 - 6.8	6.6 - 6.8	6.6 - 6.8	6.6 - 6.8
Probe Force (kN)	5.0 - 7.2	NA	5.4 - 6.6	5.4 - 6.6	NA
Probe Acceleration (g)	(36.5 - 52.5)*	45 - 49	(39.6 - 48.4)*	(39.6 - 48.4)*	38 - 47
Peak Pelvis Acceleration (g)	46 - 60	NA	46 - 57	46 - 56	41 - 50
Peak Pelvis Acceleration after 5 ms (g)	NA	42 - 46	NA	NA	NA
Peak Acetabulum Force (kN)	NA	3.882 - 4.270	3.9 - 4.8	3.9 - 4.8	3.8 - 4.6
Peak Iliac Wing Force (N)	NA	524 - 730	NA	NA	NA

* equivalent probe acceleration

Pelvis - Iliac Impact Test Parameter	OSRP SBL C	NPRM FRG	FTSS Proposal In		
			Response to FRG NPRM*	OSRP SBL D**	Final Rule SBL D***
Test Parameter					
Temperature (°C)	NA	NA	NA	NA	20.6 - 22.2
Relative Humidity (%)	NA	NA	NA	NA	10 - 70
Probe Velocity (m/sec)	NA	NA	NA	NA	4.2 - 4.4
Probe Acceleration (g)	NA	NA	NA	NA	34 - 40
Peak Lateral Pelvis Acceleration (g)	NA	NA	NA	NA	27 - 33
Peak Iliac Force (kN)	NA	NA	NA	NA	3.7 - 4.5

Filter Class	All Build Levels
Head Acceleration	CFC 1000
Neck Rotation Potentiometers	CFC 60
Neck Pendulum T1, T12 and Pelvis Acceleration	CFC 180
Neck Forces and Moments (Moc)	CFC 600
Pelvis, Shoulder, Thorax and Abdomen Impactor Accelerations	CFC 180
Acetabulum and Iliac Forces	CFC 600
Shoulder, Thorax and Abdomen Deflection	CFC 600

*NHTSA Docket No. 18865

**OSRP SIDIs Task Group Meeting Minutes dated June, 2006

***NHTSA Docket No. 25442

Test Equipment Requirements for Final Rule SBL D

The following test equipment is needed for the Final Rule SIDIIs SBL D Dummy:

<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>	<u>Comments</u>
TE-103-BIO	Head Suspension Cable	1	Also used for BioSID & ES-1
180-9000	SIDIIs Headform	1	Includes bracket, hardware and Two (2) rotary potentiometers
W50-82200	Pendulum Verification Bench	1	Same as the WorldSID Bench, used in conjunction with Thorax Fixture
TE-385	Full Body Impact Probe*	1	Includes new Iliac Wing End Block (P/N TE-385-30)
IF-507	Ilium Crest Load Cell	1 Req'd	Two (2) Recommended, Required as part of the New Pelvic-Iliac Test
IF-520	Acetabulum Load Cell	1 Req'd	Two (2) Recommended, Required as part of the Pelvic-Acetabulum Test
TE-300-10	Level Assembly, SID-IIs	1	For the Shoulder, Thorax and Abdomen Tests
TE-2515	H Point Locator Assembly	1	

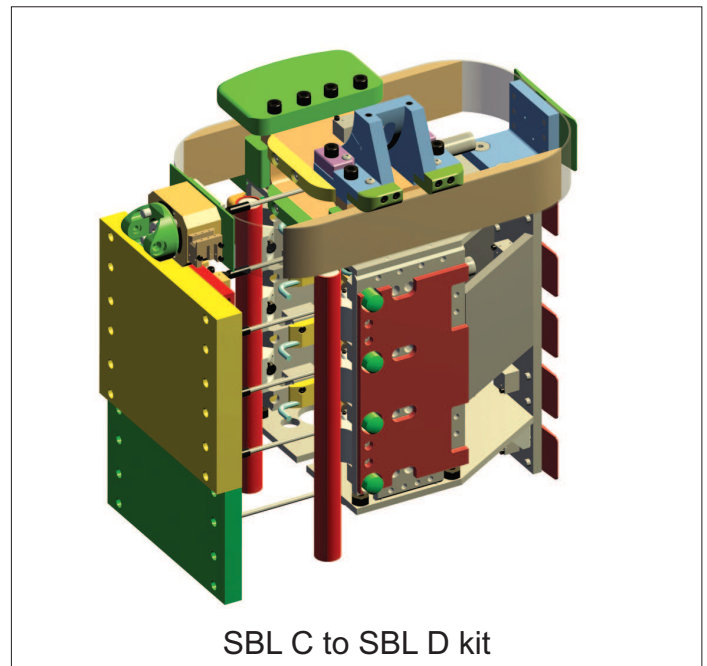
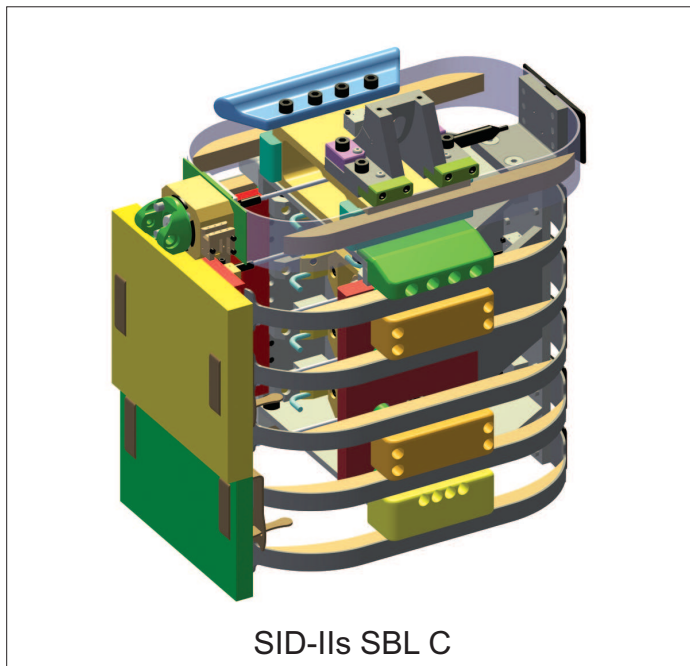
*The TE-390 Impact Probe (wood head) cannot be upgraded to meet the Final Rule Full Body Impact Probe. The Full Body Impact Probe (P/N TE-385) includes an aluminum head and as of February 1, 2007 will include the Iliac Wing End Block (P/N TE-385-30). If the TE-385 has already been purchased, the only additional requirement will be P/N TE-385-30.

All full body impact tests are to be conducted on the Pendulum Verification Bench (P/N W50-82200), except for the Pelvis-Iliac Impact Test.

Purchasing Options

FTSS is pleased to offer the following options:

Part Number	Description	Quantity	Comments
180KIT-FRG-D	Upgrade Kit FRG to D	1	For customers that currently have the SIDIIs FRG dummy with 3/8" potentiometers
180KIT-FRG-D2	Upgrade Kit FRG to D Less 1/2" Potentiometers	1	For customers that currently have the SIDIIs FRG dummy with 1/2" potentiometers
180KIT-C-D	Upgrade Kit C to D	1	For customers that currently have the SIDIIs SBL C dummy with 3/8" potentiometers
180KIT-C-D2	Upgrade Kit C to D Less 1/2" Potentiometers	1	For customers that currently have the SIDIIs SBL C dummy with 1/2" potentiometers
180-4320-1 180-4320-2	Iliac Wing, Left Iliac Wing, Right	1 1	For customers that currently have a SIDIIs Dummy with Iliac Wings that were manufactured with Material #1 or Material #3 (see dates specified above)
180-4325	Iliac Wing Interface Plate	2	New part required in the Final Rule Drawing Package to be used with the Iliac Wings (material #2)
180-4450-3	Pelvic Plugs T/C to 3 mm	2	Same part as 180-4450-2, but tested to new 3 mm test specifications as part of the Final Rule
180-0000-RGA	SIDIIs Dummy Recalibration	1	For customers that would like to return their current dummy to FTSS for upgrade and recalibration to the NHTSA Final Rule Corridors



Below is a summary of the contents of the Upgrade Kits from FRG and SBL C to D. Please note - the upgrade kits do not currently include all the components required in the Final Rule SBL D dummy. The reason we are not changing the Upgrade Kits is due to the different Iliac Wing options. Furthermore, FTSS has issued a free upgrade offer to customers that have purchased an upgrade kit from November 17, 2006 through April 31, 2007 to the Final Rule drawing package that was released on December 14, 2006. Therefore if an upgrade kit is purchased within this time frame, the customer will have the option of choosing which iliac wing is preferred and FTSS will supply the pelvic plugs tested to the 3mm specification.

<u>Part Number</u>	<u>Description</u>	<u>Qty.</u>
180KIT-FRG-D	SID-IIs Upgrade Kit from FRG to SBL D	1
Include the following components:		
180-3140	Spine Box, Modified	1
180-3625	Neck Mount Block Assembly	1
180-3614	Upper Rib Stop	2
180-3622-EN	Lower Rib Pad, Upper Torso, Modified	2
180-3613	Middle Rib Stop	4
180-3616	Lower Rib Stop	2
180-3881	Potentiometer 1/2" Assembly	6
180-3310	Linear Pot Hook Assembly Lower Ribs, Enhanced	5
180-3220-1	Rib Stop Assembly, A	1
180-3320-2	Rib Stop Assembly, B	1
9000545	Screw, SHCS 1/4-20 x 2-1/2	4
9000151	Screw, SHCS 10-32 x 3/4	32
9000654	Screw, SHCS 4-40 x 7/16	5
9000137	Screw, SHCS 10-32 x 5/8	6
180-3815	Lower Half Neck Assembly, Load Cell Replacement	1

180KIT-FRG-D2	SID-IIs Upgrade Kit from FRG to SBL D Less Potentiometers	
<i>Includes the same components as above, less the 180-3881 Potentiometers</i>		

180KIT-C-D	SID-IIs Upgrade Kit from SBL C to SBL D	1
Include the following components:		
180-3140	Spine Box, Modified	1
180-3625	Neck Mount Block Assembly	1
180-3501	Sternum	1
180-3622-EN	Lower Rib Pad, Upper Torso, Modified	2
180-3881	Potentiometer 1/2" Assembly	6
180-3310	Linear Pot Hook Assembly Lower Ribs, Enhanced	5
180-3220-1	Rib Stop Assembly, A	1
180-3320-2	Rib Stop Assembly, B	1
9000545	Screw, SHCS 1/4-20 x 2-1/2	2
9001370	Screw, SHCS 1/4-20 x 2-3/4	2
9000654	Screw, SHCS 4-40 x 7/16	5
9000137	Screw, SHCS 10-32 x 5/8	6
9000133	Screw, SHCS 1/4-20 x 1	2
180-3355	Shoulder Rib & Damping Material Assembly	1
180-3369	Rib Stop, Upper Shoulder	1
180-3370	Rib Stop, Lower Shoulder	1
9000272	Screw, FHCS 4-40 x 5/8	4
180-3451	Thorax Pad	1
180-3452	Abdominal Pad	1
6000004	Cable Ties 7.4"	10
180-3004	Rib Stiffener, Lower	5
180-3003	Rib Stiffener, Shoulder	1
180-3815	Lower Half Neck Assembly, Load Cell Replacement	1

180KIT-C-D2	SID-IIs Upgrade Kit from SBL C to SBL D Less Potentiometers	
<i>Includes the same components as above, less the 180-3881 Potentiometers</i>		

Instrumentation Recommendation

Although the NHTSA 49CFR, Part 571.214 Final Rule has not yet been published, FTSS is recommending that the same instrumentation be used on the SID-IIs SBL D dummy as specified in the NPRM, as follows:

Part Number	Description	Quantity
350/120 ohm		
IF-205 / IF-206	6-Axis Upper Neck	1
IF-255 / IF-209	6-Axis Lower Neck	1
IF-344 / IF-343	3-Axis Shoulder	1
IF-414 / IF-416	6-Axis Lumbar Spine	1
IF-507 / IF-505	Uniaxial Ilium Crest	1
IF-520 / IF-519	Uniaxial Acetebulum	1
IF-529 / IF-521	Uniaxial Pubic	1
IF-614 / IF-607	Uniaxial Femur (L/R), Set	1
IF-625 / IF-627	6-Axis Femur (L/R), Set	1

Part Number	Location	Quantity	Comments
IE-116 7264C-2000			
Uniaxial Accelerometers			
	Head	3	
	Shoulder	3	
	Upper Arm	3	
	Lower Arm	3	
	T1	3	
	Ribs	18	3 on each rib, total of 6 ribs (3) thorax, (2) Abdomen & (1) Shoulder Struck Side Primary
	Ribs	15	3 on each rib, total of 5 ribs (3) thorax & (2) abdomen Struck Side Redundant No redundant on shoulder rib
	Ribs	15	3 on each lower rib, total of 5 ribs Includes T4 and T12 Non-struck side (spine box)
	Pelvis	3	
	Total:	66	

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