

REPORT NUMBER: 131SB-MGA-2011-001

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 131SB
SCHOOL BUS PEDESTRIAN SAFETY DEVICES**

**2011 STARCRAFT QUEST SCHOOL BUS
NHTSA NO.: CB0902**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**



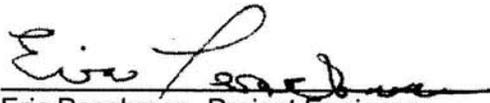
TEST DATE: FEBRUARY 14, 2011

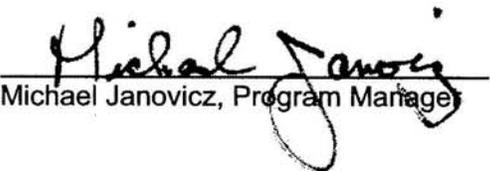
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FINAL REPORT

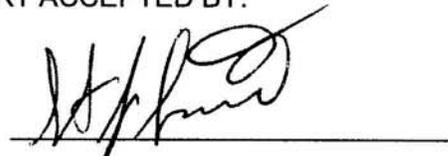
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Technical Report Documentation Page

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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted by MGA Research Corporation-Wisconsin Operations on a 2011 Starcraft Quest School Bus, NHTSA No.: CB0902, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-131SB-01 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 131, "School Bus Pedestrian Safety Devices."

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-08-D-00075.

SECTION 2
TEST DATA SUMMARY

Based on the tests performed, the 2011 Starcraft Quest School Bus, NHTSA No.: CB0902, appears to meet all of the requirements of FMVSS 131SB. See Test Summary Data Sheets on the following pages.

**FMVSS 131SB – SCHOOL BUS PEDESTRIAN SAFETY DEVICES
VEHICLE INFORMATION AND TEST SUMMARY**

Test Vehicle: **2011 Starcraft Quest School Bus**
Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
Test Date: **02/14/11**

VIN	1GB3G3BG2B1112157	Chassis Cab	Yes
No. of Stop Signal Arms	1	Rear Engine	No
Pass. Capacity (driver included)	29	Tire Size (on bus)	LT225/75R16E
Stop Signal Arm Manufacturer	Transpec Worldwide		

DATA FROM CERTIFICATION LABEL

Final Stage Manufacturer	Starcraft	Date of Mfg.	11/10
Incomplete Vehicle Manufacturer	Chevrolet	Date of Mfg.	10/10
GVWR (kg)	5,579	GAWR Front (kg)	1,950
		GAWR Rear (kg)	3,901

TEST SUMMARY

	PASS/FAIL or N/A
Dimensional Requirements (S5.1)	PASS
Surface Content and Labeling (S5.2)	PASS
Conspicuity Requirements (S5.3)	PASS
Location and Position Requirements (S5.4)	PASS
Arm Operation Requirements (S5.5)	PASS

Note: The 2011 Starcraft Quest School Bus was only equipped with one stop signal arm.

SECTION 3
COMPLIANCE TEST DATA

FMVSS 131SB – DATA SHEET 1
DIMENSIONS OF STOP SIGNAL ARM (S5.1)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

“Regular octagon” with diameter of at least 450 mm (point to point).

	Forward Signal Arm (mm)
Diameter 1	495
Diameter 2	493
Diameter 3	493
Diameter 4	494
Range (max. – min.)	2

Requirements	Yes, No, N/A
Are all octagon diameter values \geq 450 mm?	Yes
Is range of octagon diameter values \leq 12 mm?	Yes
Are all octagon chord dimensions equal within 6 mm?	Yes

Test Results		PASS/FAIL
S5.1	Dimensions of Stop Signal Arm	PASS

Recorded By: 

Approved By: 

Date: February 14, 2011

FMVSS 131SB – DATA SHEET 2
SURFACE CONTENT AND LABELING (S5.2)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

Requirements	Forward Signal Arm	
	Front Side	Aft Side
Color RED except for border & legend (Yes/No)	Yes	Yes
Color of border is WHITE (Yes/No)	Yes	Yes
Color of word "STOP" is WHITE (Yes/No)	Yes	Yes
Word "STOP" is in upper case letters (Yes/No)	Yes	Yes
Width of border (≥ 12 mm)	13.5 mm	15.0 mm
Percent of border obscured by mounting brackets, clips, or bolts, or other components ($\leq 15\%$)	0%	0%
Height of letters (≥ 150 mm)	156.0 mm	156.0 mm
Stroke width of letters (≥ 20 mm)	26.7 mm	26.5 mm

Test Results		PASS/FAIL
S5.2	Surface content and labeling	PASS

Recorded By: 

Approved By: 

Date: February 14, 2011

FMVSS 131SB – DATA SHEET 3

CONSPICUITY (S5.3)

Test Vehicle: **2011 Starcraft Quest School Bus**
Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
Test Date: **02/14/11**

The Stop Signal Arm shall comply with either S5.3.1 or S5.3.2, or both.

REFLECTORIZED MATERIAL (S5.3.1)

Requirements	Forward Signal Arm	
	Front Side	Aft Side
Entire surface of stop signal arm reflectorized except for mounting brackets, clips, bolts, or other necessary components. Front side of rearmost stop signal arm must not be reflectorized. (Yes/No)	Yes	Yes
Percent of entire surface obscured by mounting brackets, clips, bolts or other components necessary for mechanical or electrical operation. (7.5% max. each side)	0%	0%

FMVSS 131SB – DATA SHEET 3

CONSPICUITY (S5.3)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

OPTIONAL ILLUMINATED LETTERING (S5.3.1.1)

Item	Stop Signal Arm
	Forward
Does the stop sign(s) have illuminated lettering? If optional illuminated lettering is installed, the following requirements apply in addition to reflectorized surface. (Yes/No)	No

Requirements	Forward Signal Arm	
	Front Side	Aft Side
Only Red lamps used (Yes/No)	N/A	N/A
Red lamps form the complete shape of each letter of the legend. (Yes/No)	N/A	N/A
Red lamps centered within stroke of each letter (Yes/No) or Red lamps outline each letter in immediately surrounding area (Yes/No)	N/A	N/A
The shape of each letter remains constant (Yes/No)	N/A	N/A
Net stroke width \geq 15 mm (stroke width minus lamp width)	"S"	N/A
	"T"	N/A
	"O"	N/A
	"P"	N/A
Lamps on each side of the signal arm flash (60-120 flashes/min.)	N/A	N/A
Lamps current "on" time of 30% to 75% of the total flash cycle	N/A	N/A
Total current "on" time for the two terminals shall be between 90-110% of the total flash cycle.	N/A	N/A
If Xenon short-arc lamps – "off" time before each flash of at least 50% of the total flash cycle.	N/A	N/A

FMVSS 131SB – DATA SHEET 3

CONSPICUITY (S5.3)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

RED FLASHING LAMPS (S5.3.2)

Requirements	Forward Signal Arm	
	Front Side	Aft Side
Are the Red Lamps centered on the vertical centerline? (At least 2, enter quantity)	Yes – 2	Yes – 2
Is one lamp at extreme top and another at extreme bottom? (Yes/No)	Yes	Yes
Do the lamps on each side of the signal arm flash alternately? (60-120 flashes/min.) (Yes/No)	Yes – 72	Yes – 72
Lamps current “on” time of 30% to 75% of the total flash cycle. (Yes/No)	Yes – 50%	Yes – 50%
Total current “on” time for two terminals shall be between 90 and 110% of the total flash cycle. (Yes/No)	Yes	Yes
If Xenon short-arc lamps-“off” time before each flash of at least 50% of total flash cycle. (Yes/No)	N/A	N/A
Is there a symbol “DOT” on each lamp lens? (Yes/No) (Not Required)	Yes	Yes
Additional markings on lamp lenses	Transpec SAE-1-95 DOT	Transpec SAE-1-95 DOT

MARKINGS ON THE FLASHER

Make	In Power LLC	Serial No.	LOT – 1004121403
Model	SBF90	Date of Mfg.	N/A

Test Results		PASS/FAIL or N/A
S5.3.1	Reflectorized Material	PASS
S5.3.1.1	Optional Illuminated Lettering	N/A
S5.3.2	Red Flashing Lamps	PASS

Recorded By: 

Approved By: 

Date: February 14, 2011

FMVSS 131SB – DATA SHEET 4
STOP SIGNAL ARM INSTALLATION (S5.4)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

Dimensions and angles measured with Signal Arm in the extended position.

Requirements	Stop Signal Arm
	Forward
Signal arm perpendicular to side of bus (Measure angle between vertical plane of side of bus and vertical plane of the signal arm.) $90 \pm 5^\circ$	93.5°
Top edge of signal arm parallel to horizontal plane (Measure angle between vertical plane of side of bus and the top edge of the signal arm.) $90 \pm 5^\circ$	89.7°
Top edge of signal arm not more than 152.4 mm from a horizontal plane tangent to lower edge of frame of passenger window immediately behind the driver's window:	
Measure top corner closest to the school bus to the bottom edge of the window.	8 mm
Measure top corner furthest from school bus to the bottom edge of the window.	9 mm
Vertical centerline of signal arm not less than 228.6 mm away from side of bus	382 mm
Stop signal arm(s) installed on left side of bus (Yes, No, or Not Applicable)	Yes

Test Results		PASS/FAIL or N/A
S5.4	Stop Signal Arm Installation	PASS

Recorded By: 

Approved By: 

Date: February 14, 2011

FMVSS 131SB – DATA SHEET 5
STOP SIGNAL ARM OPERATION (S5.5)

Test Vehicle: **2011 Starcraft Quest School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
 Test Date: **02/14/11**

Stop Signal Arm(s) shall be automatically extended, at a minimum, whenever the red signal lamps on the bus required by FMVSS 108 are activated; except that a manual override device may be installed that prevents automatic extension.

Requirements	Stop Signal Arm
	Forward
Signal Arm(s) automatically extended when red lights are activated and override device is not activated. (Yes, No, or Not Applicable)	N/A
If a MANUAL OVERRIDE DEVICE is installed, enter applicable data below:	
Mechanism for activating the override device is within reach of the school bus driver (Yes/No)	N/A
While the override device is activated; there is a continuous or intermittent signal audible to the driver unless equipped with optional cut-off timing device (Measure duration \geq 10 min.) (Yes/No)	N/A
If audible signal is equipped with optional cut-off timing device, it sounds for at least 60 seconds while the manual override is activated. (Measure 3 times, duration \geq 60 sec.)	N/A
If audible signal is equipped with optional cut-off timing device, it automatically recycles every time the service entry door is opened while the engine is running and the manual override is engaged. (Recycle 3 times, Yes/No each cycle)	N/A

Describe location and mode of operation of the manual override control, if installed:

Test Results		PASS/FAIL or N/A
S5.5	Stop Signal Arm Operation	N/A

Recorded By: 

Approved By: 

Date: February 14, 2011

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2011 Starcraft Quest School Bus**
Test Lab: **MGA Research Corporation**

NHTSA No.: **CB0902**
Test Date: **02/14/11**

Identify the instruments used during this test and record their make, model, serial number, range, accuracy, and calibration date.

	Digital Caliper	Inclinometer	Tape Measure
Make	Mitutoyo	Digital Protractor	Stanley
Model	CD 6" CS	Pro 360	Powerlock 3M
Serial No.	07416506	002	573
Range	0 to 150 mm	0 to 360 degrees	0 to 8 m
Accuracy	0.01 mm	0.1 degree	1 mm
Cal. Date	12/28/10	Daily	12/06/10
Cal. Due	06/28/11	N/A	06/06/11

**SECTION 5
PHOTOGRAPHS**

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Test Vehicle: 2011 Starcraft Quest School Bus NHTSA No.: CB0902
Test Lab: MGA Research Corporation Test Date: 02/14/11



3/4 Frontal View from Left Side of Vehicle with Stop Signal Arm

Test Vehicle: 2011 Starcraft Quest School Bus NHTSA No.: CB0902
 Test Lab: MGA Research Corporation Test Date: 02/14/11

STARCRAFT BUS

a division of Forest River, Inc.
 COMPLETED VEHICLE MANUFACTURED BY:
 Starcraft Bus a Division of Forest River, Inc.
 2376 Century Drive, Goshen, IN 46528
 Phone: 800-348-7440
 Date of Manufacture: Nov-10

INCOMPLETE VEHICLE MANUFACTURED BY:
 Chevrolet
 1500 East Route A, Wentzville, MO 63385
 Phone: 586-492-7440
 Date of Manufacture: Oct-10
 GVWR: 12300

GAWR Front: 4300 With LT225/75R16E Tires 16 X 6.5J Rims @ 65 PSI Cold SINGLE
 GAWR Rear: 8600 With LT225/75R16E Tires 16 X 6.5J Rims @ 65 PSI Cold DUAL
 VIN: 1GB3G3BG2B1112157

VEHICLE TYPE: STARCRAFT SCHOOL BUS/QUEST
 VEHICLE MAKE: Chevrolet
 MODEL NUMBER: ETD021727
 GROSS VEHICLE WEIGHT: 8174
 Maximum Permitted Seated Passenger: 28
 Actual Configured Seating Capacity: 28
 Maximum Permitted W/C Passengers: 0
 Actual Configured W/C Capacity: 0

Approval Numbers
MIDWEST TRANSIT

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

Vehicle Certification Label

Test Vehicle: 2011 Starcraft Quest School Bus
 Test Lab: MGA Research Corporation

NHTSA No.: CB0902
 Test Date: 02/14/11

E1D0217Z1

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE.

CE VEHICULE EST CONFORME A TOUTES LES NORMES QUI UI SONT APPLICABLES EN VERTU DU REGLEMENT SUR LA SECURITE DES VEHICLES AUTOMOBILES DU CANADA EN VIGEUR A LA DATE DE SA FABRICATION.

INC. VEL MFG BY: Chevrolet

DATE: 11/1/2010

MANUFACTURED BY / FABRIQUE PAR: FOREST RIVER, Inc

VIN: 5NHSET326BD021727 1GB3G3BG2B112157 ST6917SC

GWR/PNBV: 3579KG (12300LB) TYPE/TYPE: STARCRAFT SCHOOL BUS/QUEST

DESIG. SEAT CAP./NOMBRE D'ESIGNE' DE PLACES ASSISES 28X54kg=1582 kg or 28X120lbs=3510 lb

CAVANTAGE	TIRESPREU	RINS/AVANTE	COLD INFL. PRESS/PRESS-DE GONFL. A FROID
FRONT/ AVANT () 1950 KG 4300 LB)	LT225/75R16E	16 X 6.5J	448 kPa () 65 PSI/MP () <input checked="" type="checkbox"/> SINGLE <input type="checkbox"/> DUAL
INTERM/ INTERM () 0 KG 0 LB)			0 kPa () 0 PSI/MP () <input checked="" type="checkbox"/> SINGLE <input type="checkbox"/> DUAL
REAR/ ARRIERE () 3901 KG 8600 LB)	LT225/75R16E	16 X 6.5J	448 kPa () 65 PSI/MP () <input type="checkbox"/> SINGLE <input checked="" type="checkbox"/> DUAL

Test Vehicle: 2011 Starcraft Quest School Bus NHTSA No.: CB0902
Test Lab: MGA Research Corporation Test Date: 02/14/11



Front Close Up View of Stop Signal Arm

Test Vehicle: 2011 Starcraft Quest School Bus NHTSA No.: CB0902
Test Lab: MGA Research Corporation Test Date: 02/14/11



Back Close Up View of Stop Signal Arm

Test Vehicle: 2011 Starcraft Quest School Bus
Test Lab: MGA Research Corporation

NHTSA No.: CB0902
Test Date: 02/14/11



Close Up View of System Controls

Test Vehicle: 2011 Starcraft Quest School Bus
Test Lab: MGA Research Corporation

NHTSA No.: CB0902
Test Date: 02/14/11



Switch Console Relative to the Driver Seating Position

Test Vehicle: 2011 Starcraft Quest School Bus NHTSA No.: CB0902
Test Lab: MGA Research Corporation Test Date: 02/14/11



Flasher Unit