

REPORT NUMBER: NCAP305I-MGA-2016-005

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FMVSS No. 305 Indicant Test**

**VOLVO CAR CORPORATION
2016 Volvo XC90 T8 Inscription 5-Door SUV
NHTSA No.: O20165903**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: April 25, 2016

Report Date: June 14, 2016

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Approval Date: June 14, 2016

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Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

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| 16. Abstract An FMVSS No. 305 Indicant test, in conjunction with an NCAP frontal barrier impact test was conducted on the subject 2016 Volvo XC90 T8 Inscription 5-Door SUV in accordance with the specifications of the applicable Office of Crashworthiness Standards Test Procedures for the generation of consumer information for the New Car Assessment Program (NCAP). No test failures were reported. | | | |
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TABLE OF CONTENTS

| <u>Section</u> | | <u>Page No.</u> |
|-----------------------|---|---------------------|
| 1 | Purpose of Test | 1 |
| 2 | Summary of Test Results | 2 |
| 3 | Data Sheets | 3 |
| <u>Data Sheet</u> | | <u>Page No.</u> |
| 1 | Test Vehicle Specifications | 4 |
| 2 | Pre-Impact Data | 6 |
| 3 | Pre-Impact Electric Isolation Measurements and Calculations | 7 |
| 4 | Post-Impact Data | 9 |
| 5 | Static Rollover Test Data | 11 |
| <u>Appendix</u> | | |
| A | Photographs | A-1 |

SECTION 1 PURPOSE OF TEST

An FMVSS No. 305 Indicant test, in conjunction with an NCAP frontal barrier impact test was conducted on the subject 2016 Volvo XC90 T8 Inscription 5-Door SUV.

The Indicant test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure, dated January 31, 2012 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 305, "Electric-Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection" for the purpose of providing consumer information.

This FMVSS No. 305 Indicant test is part of the MY 2016 New Car Assessment Program Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract DTNH22-12-D-00258.

SECTION 2 SUMMARY OF TEST RESULTS

A frontal barrier impact test was performed by MGA Research Corporation on a 2016 Volvo XC90 T8 Inscription 5-Door SUV on April 25, 2016. Electrical isolation measurements were taken immediately post-impact and observations were made related to electrolyte spillage and battery retention. A static rollover was subsequently performed on the subject vehicle and electrical isolation measurements were taken at each stage of the rollover.

Based on the test results, the 2016 Volvo XC90 T8 Inscription 5-Door SUV appears to meet the requirements for electrolyte spillage, electrical isolation, and battery retention during FMVSS No. 305 Indicant testing.

Data sheets, along with pre-test and post-test photographs of the test vehicle, are included in this report to document the test.

TEST NOTES

None

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

**SECTION 3
DATA SHEETS**

**DATA SHEET 1
TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

TEST VEHICLE INFORMATION

| | |
|----------------------------|---|
| Year/Make/Model/Body Style | 2016 Volvo XC90 T8 Inscription 5-Door SUV |
| NHTSA No. | O20165903 |
| Color | Luminous Sand Metallic |
| Odometer Reading | 15km / 9mi |

DATA FROM CERTIFICATION LABEL

| | | | |
|---------------------|-----------------------|-----------------|------|
| Manufactured By | VOLVO CAR CORPORATION | GVWR (kg) | 3010 |
| Date of Manufacture | 02/16 | GAWR Front (kg) | 1420 |
| VIN: | YV4BC0PL0G1074794 | GAWR Rear (kg) | 1628 |

ELECTRIC VEHICLE PROPULSION SYSTEM

| | |
|---|--|
| Type of Electric Vehicle (Electric/Hybrid): | Gasoline-Electric Hybrid |
| Electric Energy Storage/Device: | Lithium-Ion (Li-Ion) Battery |
| Nominal Voltage (V): | 355 V |
| Is this vehicle equipped with an Automatic Propulsion Battery Disconnect? | Yes |
| Physical Location of the Automatic Propulsion Battery Disconnect: | Physically contained within the Energy Storage System. |
| Auxiliary Battery Type: | 12 V Lead Acid Battery |

**DATA SHEET 1 (CONTINUED)
TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

ELECTRIC ENERGY STORAGE CONVERSION/DEVICE SYSTEM DATA (COTR SUPPLIED)

| | | |
|--|---|-------------------------------|
| Electrolyte Fluid Type: | LiPF6 in Organic Carbonate Solution | |
| Electrolyte Fluid Specific Gravity: | 1.2 (g/cc) | |
| Electrolyte Kinematic Viscosity: | 3 (cP) @ 25° C | |
| Electrolyte Fluid Color: | Colorless or Pale Yellow Liquid | |
| Electric Energy Storage/Conversion System Coolant Type, Color, Specific Gravity (if applicable): | Water Glycol, Color: Green | |
| Location of Battery Modules: | <input type="checkbox"/> | Inside Passenger Compartment |
| | <input checked="" type="checkbox"/> | Outside Passenger Compartment |
| | The high-voltage battery is mounted under the center console. | |

ELECTRIC ENERGY STORAGE CONVERSION/DEVICE STATE OF CHARGE

| | |
|---|---------|
| <i>For all battery types:</i> | |
| Voltage range corresponding to useable energy of the battery: | |
| Minimum State of Charge: | N/A |
| Maximum State of Charge: | 398 V |
| 95% of Maximum State of Charge: | 378.1 V |
| Test Voltage - No less than 95% of maximum State of Charge: | 387.1 V |
| <i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> | |
| Voltage range corresponding to useable energy of the battery: | |
| Minimum State of Charge: | |
| Maximum State of Charge: | |
| Test Voltage – Maximum practicable State of Charge within Normal Operating Range: | |

**DATA SHEET 2
PRE-IMPACT DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

| | |
|--|---|
| Details of Vehicle Chassis Ground Point(s) & Location(s) | Mounting Bolt at Manual Service Disconnect Housing. |
|--|---|

ELECTRIC ENERGY STORAGE/CONVERSION TEST POINTS

| | |
|---|---------------------------------------|
| Details of Electric Energy Storage/Conversion System Test Points: | Manufacturer Supplied "Breakout Box". |
|---|---------------------------------------|

**DATA SHEET 3
PRE-IMPACT ELECTRIC ISOLATION MEASUREMENTS & CALCULATIONS**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

VOLTMETER INFORMATION

| | |
|--------------------------------|------------------|
| Make: | Fluke |
| Model: | 177 |
| Serial Number: | 22600211 |
| Internal Impedance Value (MΩ): | > 10 MΩ < 100 pF |
| Resolution (V): | .001 Volts |
| Last Calibration Date: | 3/2/2016 |

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the “ready-to-drive” (propulsion system energized) position.

If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

| | |
|---------|-------|
| Vb (V): | 387.1 |
|---------|-------|

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

| | |
|---------|-------|
| V1 (V): | 25.8 |
| V2 (V): | 361.1 |

**ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO
VEHICLE CHASSIS ACROSS RESISTOR**

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

| | |
|---------|---------|
| Ro (Ω): | 180,700 |
|---------|---------|

| | |
|---------------------|------|
| V1' (V) Pre-Impact: | 7.6 |
| V2' (V) Pre-Impact: | 17.1 |

DATA SHEET 3 (CONTINUED)
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

| | |
|--|-----------|
| V1' (V): | 7.6 |
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$ | |
| Ri1 (Ω): | 6,489,257 |
| V2' (V): | 17.1 |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$ | |
| Ri2 (Ω): | 3,894,859 |
| Ri = The lesser of Ri1 and Ri2 | |
| Ri Pre-Test (Ω): | 3,894,859 |
| Ri/Vb (Ω/V): | 10,062 |
| Minimum Electrical Isolation Value is 500 Ω/V | |

| Is the measured Electrical Isolation Value: | Yes, Pass | No, Fail |
|--|-----------|----------|
| ≥500 Ω/V without electrical isolation monitoring | | |
| ≥100 Ω/V with electrical isolation monitoring | X | |

**DATA SHEET 4
POST-IMPACT DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

VOLTMETER INFORMATION

| | |
|--|------------------|
| Make: | Fluke |
| Model: | 177 |
| Serial Number: | 22600211 |
| Internal Impedance Value (MΩ): | > 10 MΩ < 100 pF |
| Nominal Propulsion Battery Voltage (Vb) (V): | 355 |

**ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM
VOLTAGE LOCATION OF MEASUREMENT**

Measurement is made from the side of the automatic disconnect connected to the electric powertrain.

| | |
|---------|-----|
| Vb (V): | 8.5 |
|---------|-----|

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

| | | | | | | | |
|-------|------|---|--------------|---|---------|----|---|
| V1 = | 7.4 | V | Impact Time: | 1 | Minutes | 38 | s |
| V2 = | 0.9 | V | Impact Time: | 1 | Minutes | 50 | s |
| V1' = | 6.1* | V | Impact Time: | 1 | Minutes | 43 | s |
| V2' = | 0.8 | V | Impact Time: | 1 | Minutes | 58 | s |

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

| | | | | | | | |
|--|---------|-----|--------------|---|---------|----|---|
| $Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']$ | | | | | | | |
| Ri1 = | 43,193 | Ω | Impact Time: | 1 | Minutes | 38 | s |
| $Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']$ | | | | | | | |
| Ri2 = | 208,307 | Ω | Impact Time: | 1 | Minutes | 50 | s |
| Ri = The lesser of Ri1 and Ri2 | | | | | | | |
| Ri = | 43,193 | Ω | Impact Time: | 1 | Minutes | 38 | s |
| Ri/Vb = electrical Isolation Value/Nominal Battery Voltage | | | | | | | |
| Minimum Electrical Value is 500 Ω/V | | | | | | | |
| Ri/Vb = | 112 | Ω/V | Impact Time: | 1 | Minutes | 38 | s |

| | | |
|--|-----------|----------|
| Is the measured Electrical Isolation Value: | Yes, Pass | No, Fail |
| ≥500 Ω/V without electrical isolation monitoring | | |
| ≥100 Ω/V with electrical isolation monitoring | X | |

*V1' measurement was taken before naturally occurring electrical capacitance was allowed to dissipate, giving an incorrectly large value. The measurements indicate electrical isolation of the propulsion battery; however the required $Ri/Vb \geq 500$ is not met.

**DATA SHEET 4 (CONTINUED)
POST-IMPACT DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

ELECTRIC ENERGY STORAGE/CONVERSION DEVICE

| | Inside Passenger Compartment | Outside Passenger Compartment |
|--|------------------------------|-------------------------------|
| Location of Electric Energy Storage/Conversion Device: | | X |

| | Yes, Pass | No, Fail |
|---|-----------|----------|
| All Components of Electrical Energy Storage/Conversion Device remained attached to the vehicle with at least one mounting location. | X | |

| Describe Electric Energy Storage/Conversion Device movement within the passenger compartment [Supply photographs as appropriate]: |
|---|
| Not Applicable |

| | Yes, Fail | No, Pass |
|---|-----------|----------|
| Has the Electric Energy Storage/Conversion Device moved within the passenger compartment? | | X |

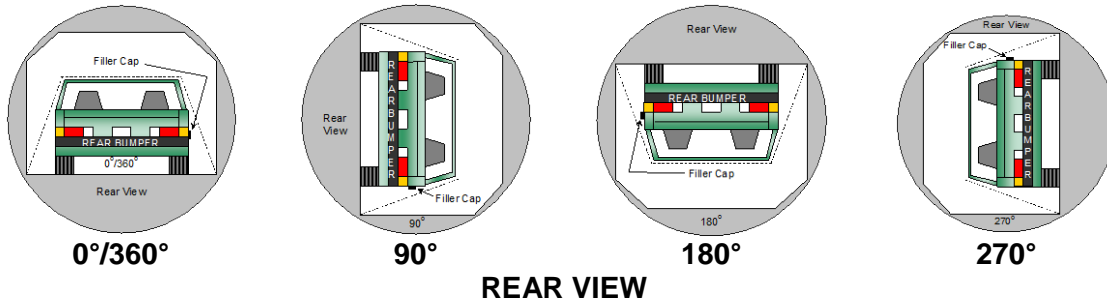
| Describe intrusion of an outside Electric Energy Storage/Conversion Device into the passenger compartment [Supply photographs as appropriate]: |
|--|
| No Intrusion |

| | Yes, Fail | No, Pass |
|---|-----------|----------|
| Has an outside Electric Energy Storage/Conversion Device intruded into the passenger compartment? | | X |

| | Yes, Fail | No, Pass |
|---|-----------|----------|
| Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment? | | X |

**DATA SHEET 5
STATIC ROLLOVER TEST DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV
 NHTSA No. O20165903



**DETERMINATION OF ELECTRIC ENERGY STORAGE/CONVERSION DEVICE
ELECTROLYTE COLLECTION TIME PERIOD**

| Rollover Stage | Rotation Time (spec. 1-3 min) | | | | FMVSS 301 Hold Time | | Total Time | | | | Next Whole Minute Interval | |
|----------------|-------------------------------|---------|----|---------|---------------------|---------|------------|---------|----|---------|----------------------------|---------|
| 0° - 90° | 1 | minutes | 51 | seconds | 5 | minutes | 6 | minutes | 51 | seconds | 7 | minutes |
| 90° - 180° | 1 | minutes | 52 | seconds | 5 | minutes | 6 | minutes | 52 | seconds | 7 | minutes |
| 180° - 270° | 1 | minutes | 51 | seconds | 5 | minutes | 6 | minutes | 51 | seconds | 7 | minutes |
| 270° - 360° | 1 | minutes | 50 | seconds | 5 | minutes | 6 | minutes | 50 | seconds | 7 | minutes |

**ACTUAL TEST VEHICLE ELECTRIC ENERGY STORAGE/CONVERSION DEVICE
ELECTROLYTE SPILLAGE**

| Rollover Stage | Electric Energy Storage/Conversion Device Electrolyte Spillage (L) | Spillage Location |
|----------------|--|-------------------|
| 0° to 90° | 0 | Not Applicable |
| 90° to 180° | 0 | Not Applicable |
| 180° to 270° | 0 | Not Applicable |
| 270° to 360° | 0 | Not Applicable |

Total Spillage: 0 L

| | Yes, Fail | No, Pass |
|---|-----------|----------|
| Is the total spillage of Electric Energy Storage/Conversion Device electrolyte greater than 5.0 Liters? | | X |
| Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment? | | X |

**DATA SHEET 5 (CONTINUED)
STATIC ROLLOVER TEST DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

VOLTMETER INFORMATION

| | |
|--|------------------|
| Make: | Fluke |
| Model: | 177 |
| Serial Number: | 22600211 |
| Internal Impedance Value (MΩ): | > 10 MΩ < 100 pF |
| Nominal Electric Energy Storage/Conversion Device Voltage (Vb) (V): | 355 |
| Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test. | |

ELECTRICAL ISOLATION MEASUREMENT

| | | | | | | | | |
|-------|------|---|------|-------|---|---------|----|---|
| V1 = | 7.5 | V | 0° | Time: | | Minutes | | s |
| V1 = | 4.9 | V | 90° | Time: | 2 | Minutes | 44 | s |
| V1 = | 6.1 | V | 180° | Time: | 2 | Minutes | 29 | s |
| V1 = | 4.9 | V | 270° | Time: | 2 | Minutes | 53 | s |
| V1 = | 4.9 | V | 360° | Time: | 3 | Minutes | 3 | s |
| V2 = | 0.9 | V | 0° | Time: | | Minutes | | s |
| V2 = | 3.2 | V | 90° | Time: | 2 | Minutes | 50 | s |
| V2 = | 2.5 | V | 180° | Time: | 2 | Minutes | 34 | s |
| V2 = | 3.3 | V | 270° | Time: | 2 | Minutes | 58 | s |
| V2 = | 3.3 | V | 360° | Time: | 3 | Minutes | 8 | s |
| V1' = | 6.2* | V | 0° | Time: | | Minutes | | s |
| V1' = | 0.2 | V | 90° | Time: | 3 | Minutes | 0 | s |
| V1' = | 0.1 | V | 180° | Time: | 2 | Minutes | 45 | s |
| V1' = | 0.2 | V | 270° | Time: | 3 | Minutes | 6 | s |
| V1' = | 0.2 | V | 360° | Time: | 3 | Minutes | 16 | s |
| V2' = | 0.8 | V | 0° | Time: | | Minutes | | s |
| V2' = | 0.2 | V | 90° | Time: | 3 | Minutes | 5 | s |
| V2' = | 0.1 | V | 180° | Time: | 2 | Minutes | 53 | s |
| V2' = | 0.2 | V | 270° | Time: | 3 | Minutes | 13 | s |
| V2' = | 0.2 | V | 360° | Time: | 3 | Minutes | 24 | s |
| Vb = | 8.5 | V | 0° | Time: | | Minutes | | s |
| Vb = | 8.5 | V | 90° | Time: | 2 | Minutes | 38 | s |
| Vb = | 8.5 | V | 180° | Time: | 2 | Minutes | 23 | s |
| Vb = | 8.5 | V | 270° | Time: | 2 | Minutes | 49 | s |
| Vb = | 8.5 | V | 360° | Time: | 2 | Minutes | 59 | s |

*V1' measurement was taken before naturally occurring electrical capacitance was allowed to dissipate, giving an incorrectly large value. The measurements indicate electrical isolation of the propulsion battery; however the required $R_i/V_b \geq 500$ is not met.

**DATA SHEET 5 (CONTINUED)
STATIC ROLLOVER TEST DATA**

Test Vehicle: 2016 Volvo XC90 T8 Inscription 5-Door SUV NHTSA No.: O20165903

ELECTRICAL ISOLATION CALCULATION

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

| | | | | | | | | |
|---|------------|-----|------|-------|---|---------|----|---|
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$ | | | | | | | | |
| R _{i1} = | 42,435 | Ω | 0° | Time: | | Minutes | | s |
| R _{i1} = | 7,019,642 | Ω | 90° | Time: | 2 | Minutes | 44 | s |
| R _{i1} = | 15,285,443 | Ω | 180° | Time: | 2 | Minutes | 29 | s |
| R _{i1} = | 7,106,304 | Ω | 270° | Time: | 2 | Minutes | 53 | s |
| R _{i1} = | 7,106,304 | Ω | 360° | Time: | 3 | Minutes | 3 | s |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$ | | | | | | | | |
| R _{i2} = | 210,817 | Ω | 0° | Time: | | Minutes | | s |
| R _{i2} = | 6,860,953 | Ω | 90° | Time: | 2 | Minutes | 50 | s |
| R _{i2} = | 14,918,592 | Ω | 180° | Time: | 2 | Minutes | 34 | s |
| R _{i2} = | 6,959,688 | Ω | 270° | Time: | 2 | Minutes | 58 | s |
| R _{i2} = | 6,959,688 | Ω | 360° | Time: | 3 | Minutes | 8 | s |
| R _i = The lesser of R _{i1} and R _{i2} | | | | | | | | |
| R _i = | 42,435 | Ω | 0° | Time: | | Minutes | | s |
| R _i = | 7,019,642 | Ω | 90° | Time: | 2 | Minutes | 44 | s |
| R _i = | 15,285,443 | Ω | 180° | Time: | 2 | Minutes | 29 | s |
| R _i = | 7,106,304 | Ω | 270° | Time: | 2 | Minutes | 53 | s |
| R _i = | 7,106,304 | Ω | 360° | Time: | 3 | Minutes | 3 | s |
| R _i /V _b = Electrical Isolation Value/Nominal Battery Voltage Minimum Electrical Isolation Value is 500 Ω /V | | | | | | | | |
| R _i /V _b = | 110 | Ω/V | 0° | Time: | | Minutes | | s |
| R _i /V _b = | 17,724 | Ω/V | 90° | Time: | 2 | Minutes | 44 | s |
| R _i /V _b = | 38,539 | Ω/V | 180° | Time: | 2 | Minutes | 29 | s |
| R _i /V _b = | 17,979 | Ω/V | 270° | Time: | 2 | Minutes | 53 | s |
| R _i /V _b = | 17,979 | Ω/V | 360° | Time: | 3 | Minutes | 3 | s |

| | | |
|--|-----------|----------|
| Is the measured Electrical Isolation Value: | Yes, Pass | No, Fail |
| ≥500 Ω/V without electrical isolation monitoring | | |
| ≥100 Ω/V with electrical isolation monitoring | X | |

**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

| | | <u>Page No.</u> |
|----------------|---|-----------------|
| Photo No. 001 | Auxiliary Power Module Warning Label | A-1 |
| Photo No. 002 | Power Inverter Warning Label | A-1 |
| Photo No. 003 | First Responder Warning Label | A-2 |
| Photo No. 004 | First Responder Warning Location | A-2 |
| Photo No. 005 | Other Vehicle Label(s) Related to Electrical Propulsion System | A-3 |
| Photo No. 006 | Manual High Voltage Service Disconnect in Place | A-3 |
| Photo No. 007 | Manual High Voltage Service Disconnect Removed | A-4 |
| Photo No. 007a | Manual High Voltage Service Disconnect Removed | A-4 |
| Photo No. 008 | Pre-Impact View of Propulsion Battery | A-5 |
| Photo No. 009 | Post-Impact Front View of Propulsion Battery | A-5 |
| Photo No. 010 | Post-Impact Rear View of Propulsion Battery | A-6 |
| Photo No. 011 | Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules | A-6 |
| Photo No. 012 | Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules | A-7 |
| Photo No. 013 | Pre-Impact View of Propulsion Battery Module(s) | A-7 |
| Photo No. 014 | Post-Impact View of Propulsion Battery Module(s) | A-8 |
| Photo No. 015 | Pre-Impact View of Electric Propulsion Drive | A-8 |
| Photo No. 015a | Pre-Impact View of Electric Propulsion Drive | A-9 |
| Photo No. 016 | Post-Impact View of Electric Propulsion Drive | A-9 |
| Photo No. 016a | Post-Impact View of Electric Propulsion Drive | A-10 |
| Photo No. 017 | Pre-Impact View of High Voltage Interconnect(s) | A-10 |
| Photo No. 018 | Pre-Impact View Propulsion Battery Venting System(s) | A-11 |
| Photo No. 019 | Pre-Impact View of Other Visible Electric Propulsion Components | A-11 |
| Photo No. 020 | Pre-Impact View of Ground Lead Attached | A-12 |
| Photo No. 021 | Pre-Impact View of High Voltage Leads Attached | A-12 |
| Photo No. 022 | Pre-Impact Close-Up View of High Voltage Leads Attached | A-13 |
| Photo No. 023 | Pre-Impact View of Installed Impact Interface Port | A-13 |
| Photo No. 024 | Post-Impact View of Installed Impact Interface Port | A-14 |
| Photo No. 025 | Pre-Impact View of Other Test Devices | A-14 |
| Photo No. 026 | Post-Impact View of Other Test Devices | A-15 |
| Photo No. 027 | FMVSS No. 305 Static Rollover at 90° | A-15 |
| Photo No. 028 | FMVSS No. 305 Static Rollover at 180° | A-16 |
| Photo No. 029 | FMVSS No. 305 Static Rollover at 270° | A-16 |

| | | <u>Page No.</u> |
|---------------|--|-----------------|
| Photo No. 030 | FMVSS No. 305 Static Rollover at 360° | A-17 |
| Photo No. 031 | Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery | A-17 |
| Photo No. 032 | Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery | A-18 |
| Photo No. 033 | Post-Impact Propulsion Battery System Mounting and/or Intrusion Failure(s) | A-18 |
| Photo No. 034 | Post-Impact View of Battery Component Intrusion | A-19 |
| Photo No. 035 | Post-Impact View of Battery Module Movement or Retention Loss | A-19 |
| Photo No. 036 | Post-Impact View of Propulsion Battery Electrolyte Spillage Location | A-20 |
| Photo No. 037 | Post-Test View of Propulsion Battery Electrolyte Spillage Location | A-20 |
| Photo No. 038 | As Delivered Right Front $\frac{3}{4}$ View of Impact Vehicle | A-21 |
| Photo No. 039 | As Delivered Left Rear $\frac{3}{4}$ View of Impact Vehicle | A-21 |
| Photo No. 040 | Vehicle's Certification Label | A-22 |
| Photo No. 041 | Vehicle's Tire Information Placard or Label | A-22 |



Photo No. 001 - Auxiliary Power Module Warning Label



Photo No. 002 - Power Inverter Warning Label

PHOTOGRAPH NOT APPLICABLE

Photo No. 003 - First Responder Warning Label

PHOTOGRAPH NOT APPLICABLE

Photo No. 004 - First Responder Warning Location

PHOTOGRAPH NOT AVAILABLE

Photo No. 005 - Other Vehicle Label(s) Related to Electrical Propulsion System



Photo No. 006 - Manual High Voltage Service Disconnect in Place



Photo No. 007 - Manual High Voltage Service Disconnect Removed



Photo No. 007a - Manual High Voltage Service Disconnect Removed



Photo No. 008 - Pre-Impact View of Propulsion Battery



Photo No. 009 - Post-Impact Front View of Propulsion Battery



Photo No. 010 - Post-Impact Rear View of Propulsion Battery

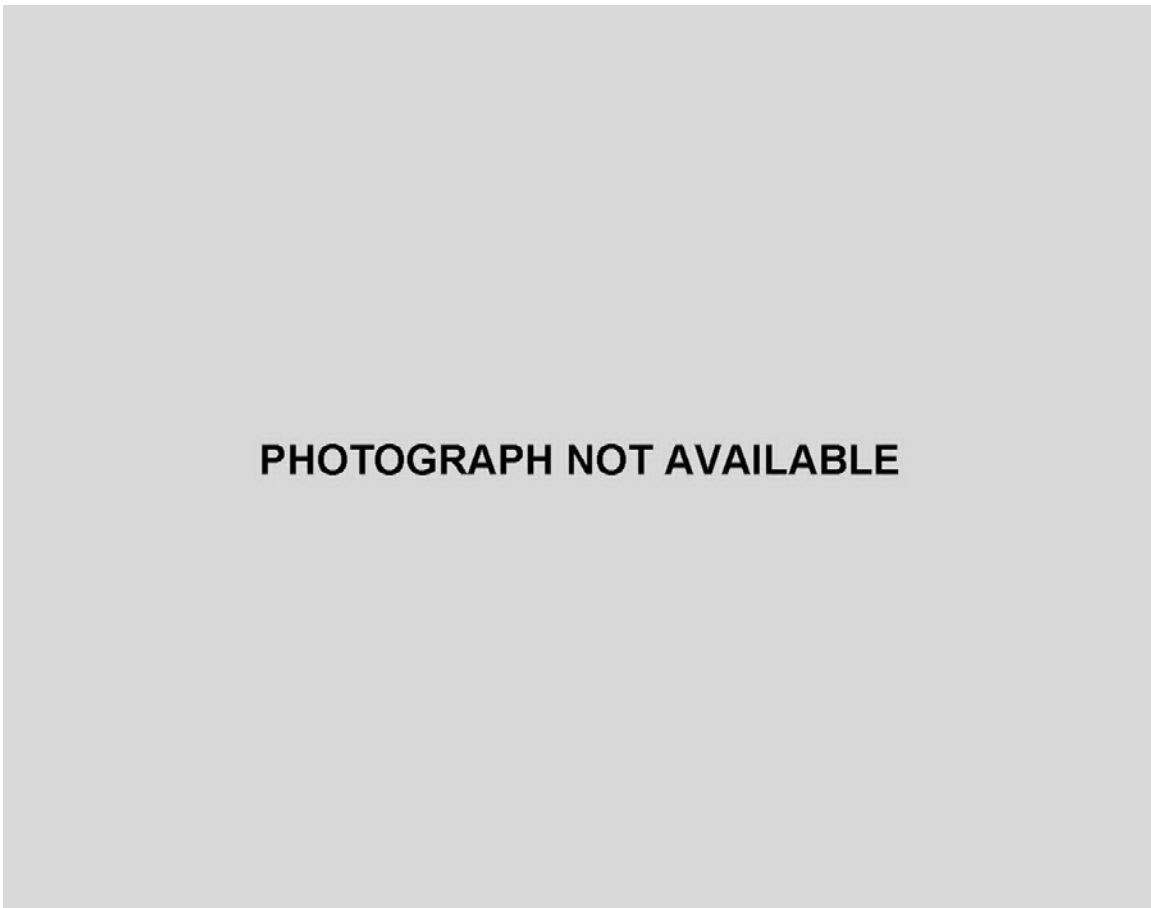


Photo No. 011 - Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules



Photo No. 012 - Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

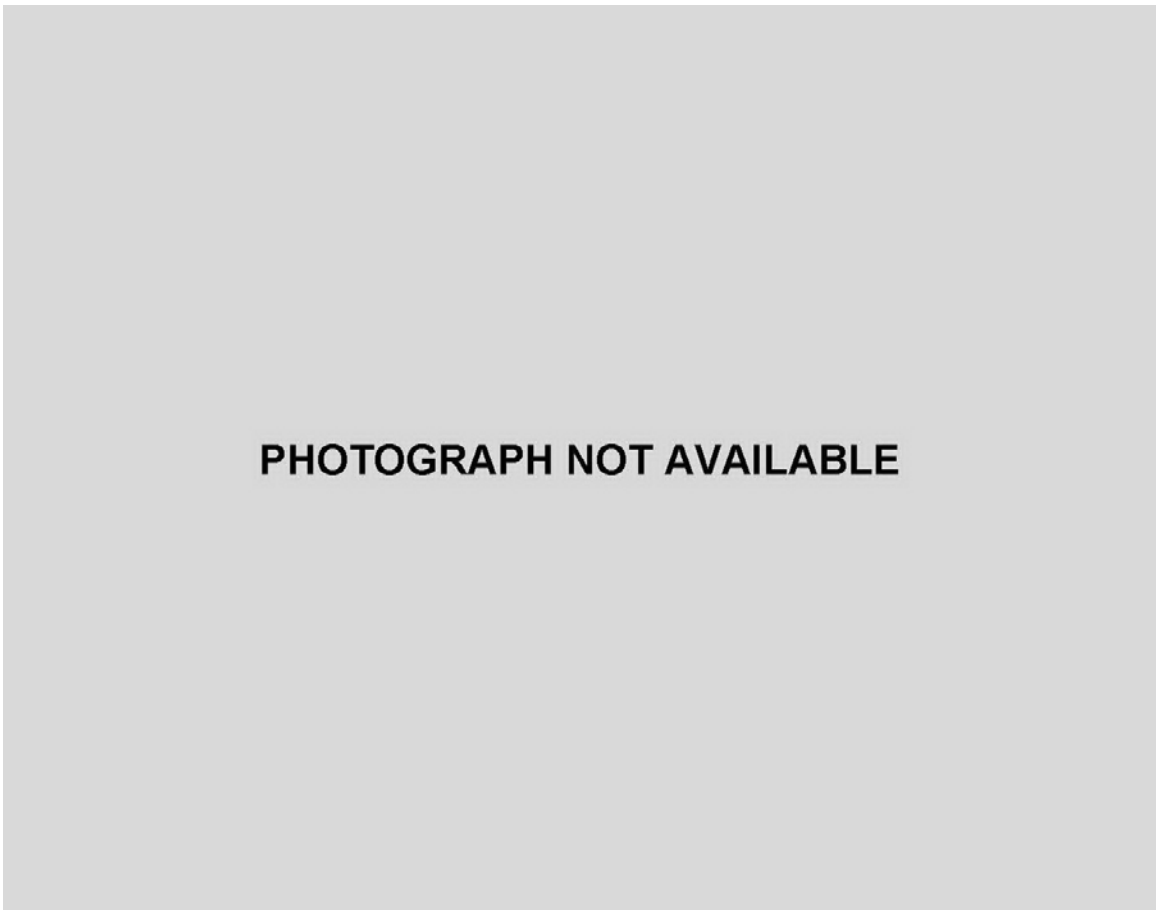


Photo No. 013 - Pre-Impact View of Propulsion Battery Module(s)



Photo No. 014 - Post-Impact View of Propulsion Battery Module(s)

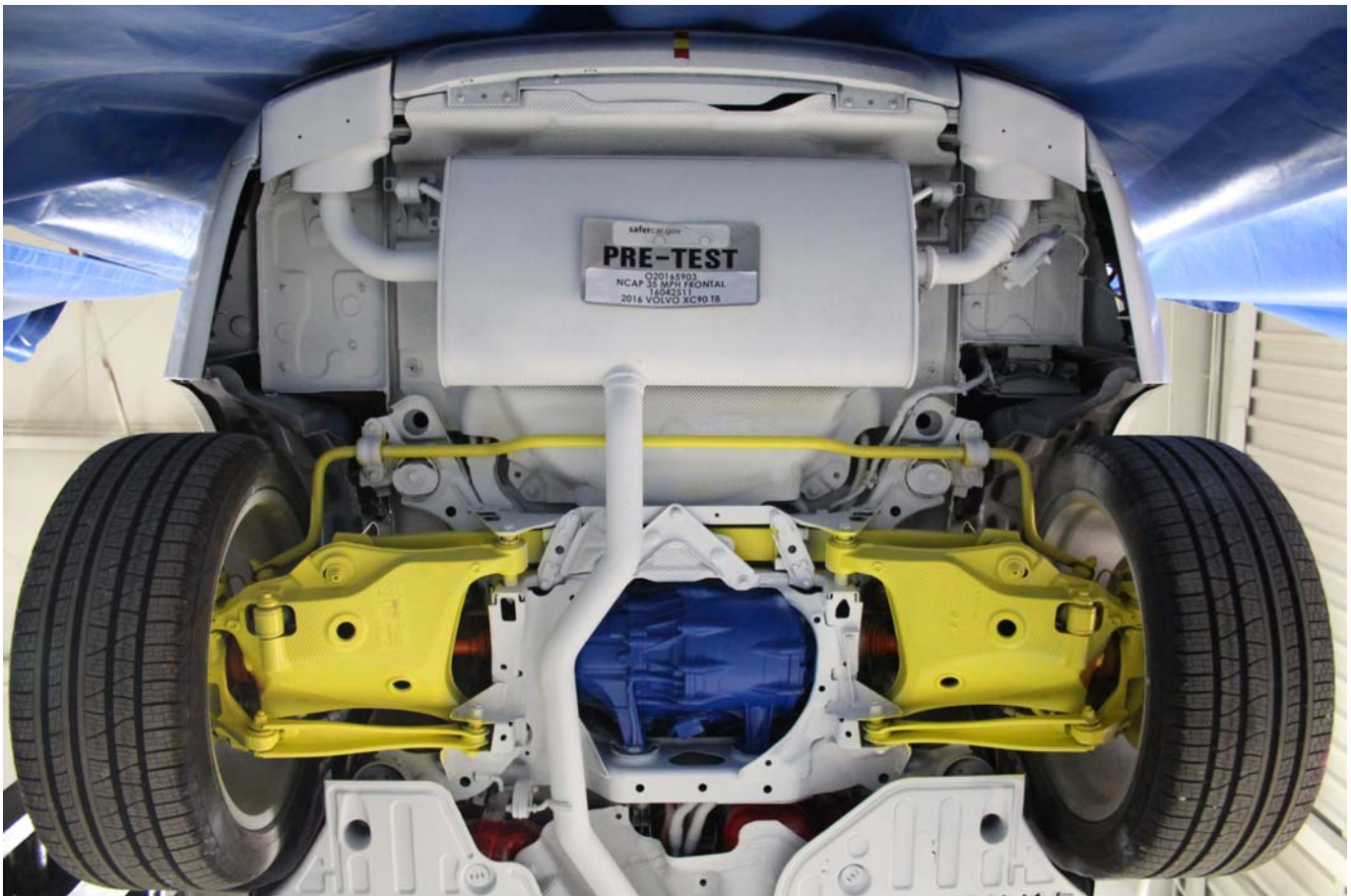


Photo No. 015 - Pre-Impact View of Electric Propulsion Drive

PHOTOGRAPH NOT APPLICABLE

Photo No. 015a - Pre-Impact View of Electric Propulsion Drive



Photo No. 016 - Post-Impact View of Electric Propulsion Drive

PHOTOGRAPH NOT APPLICABLE

Photo No. 016a - Post-Impact View of Electric Propulsion Drive

PHOTOGRAPH NOT APPLICABLE

Photo No. 017 - Pre-Impact View of High Voltage Interconnect(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 018 - Pre-Impact View Propulsion Battery Venting System(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 019 - Pre-Impact View of Other Visible Electric Propulsion Components



Photo No. 020 - Pre-Impact View of Ground Lead Attached

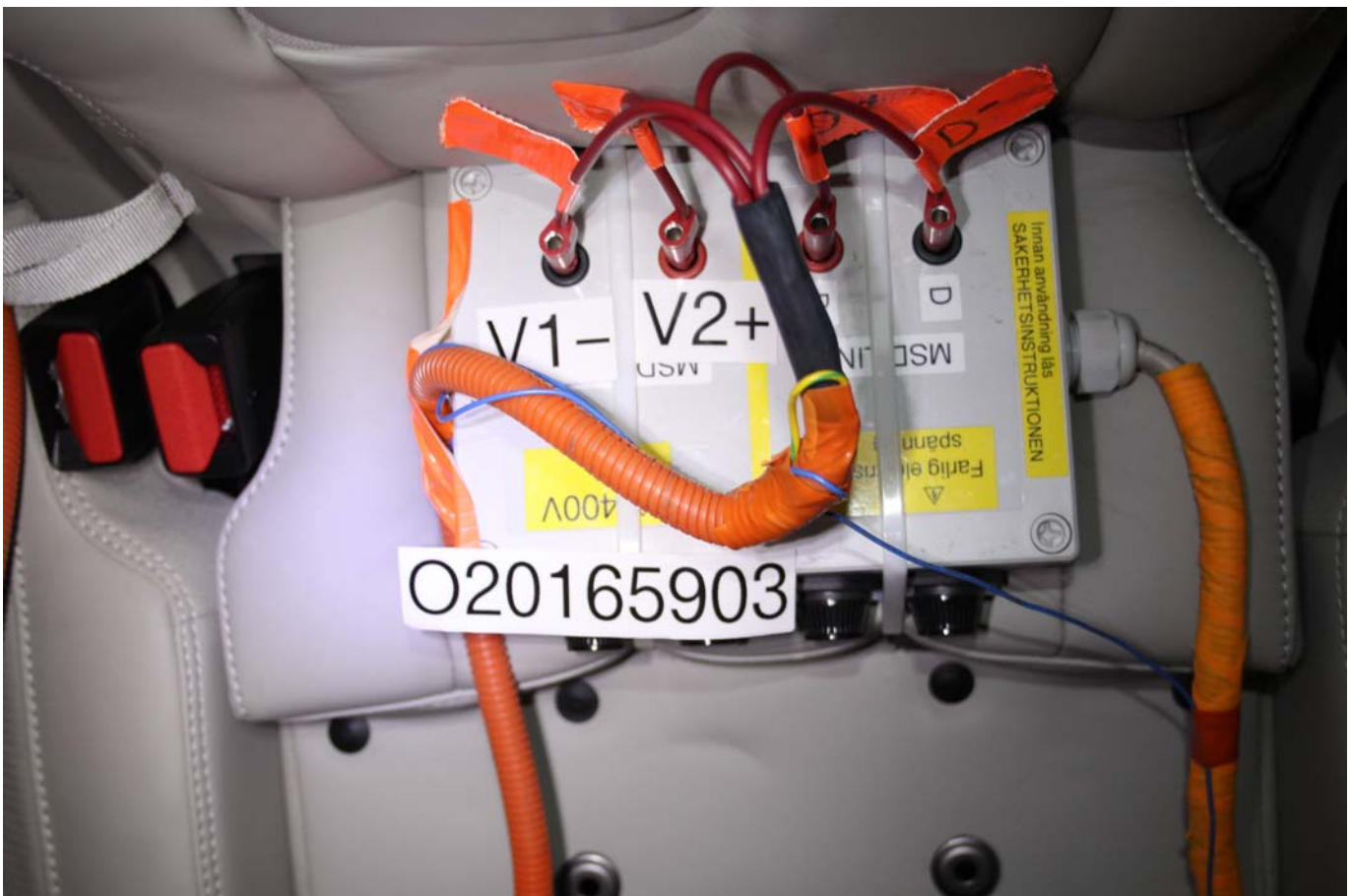


Photo No. 021 - Pre-Impact View of High Voltage Leads Attached

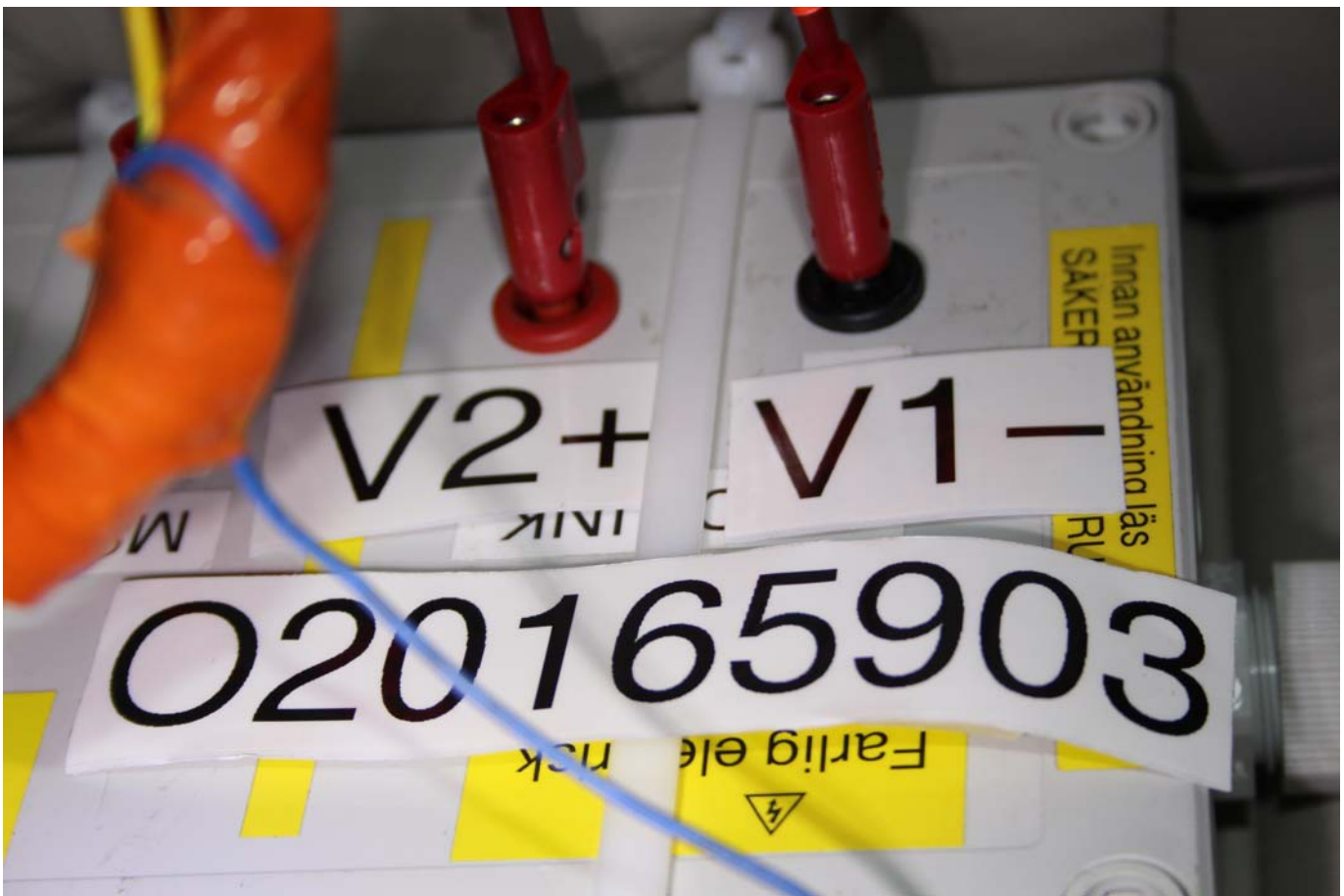


Photo No. 022 - Pre-Impact Close-Up View of High Voltage Leads Attached

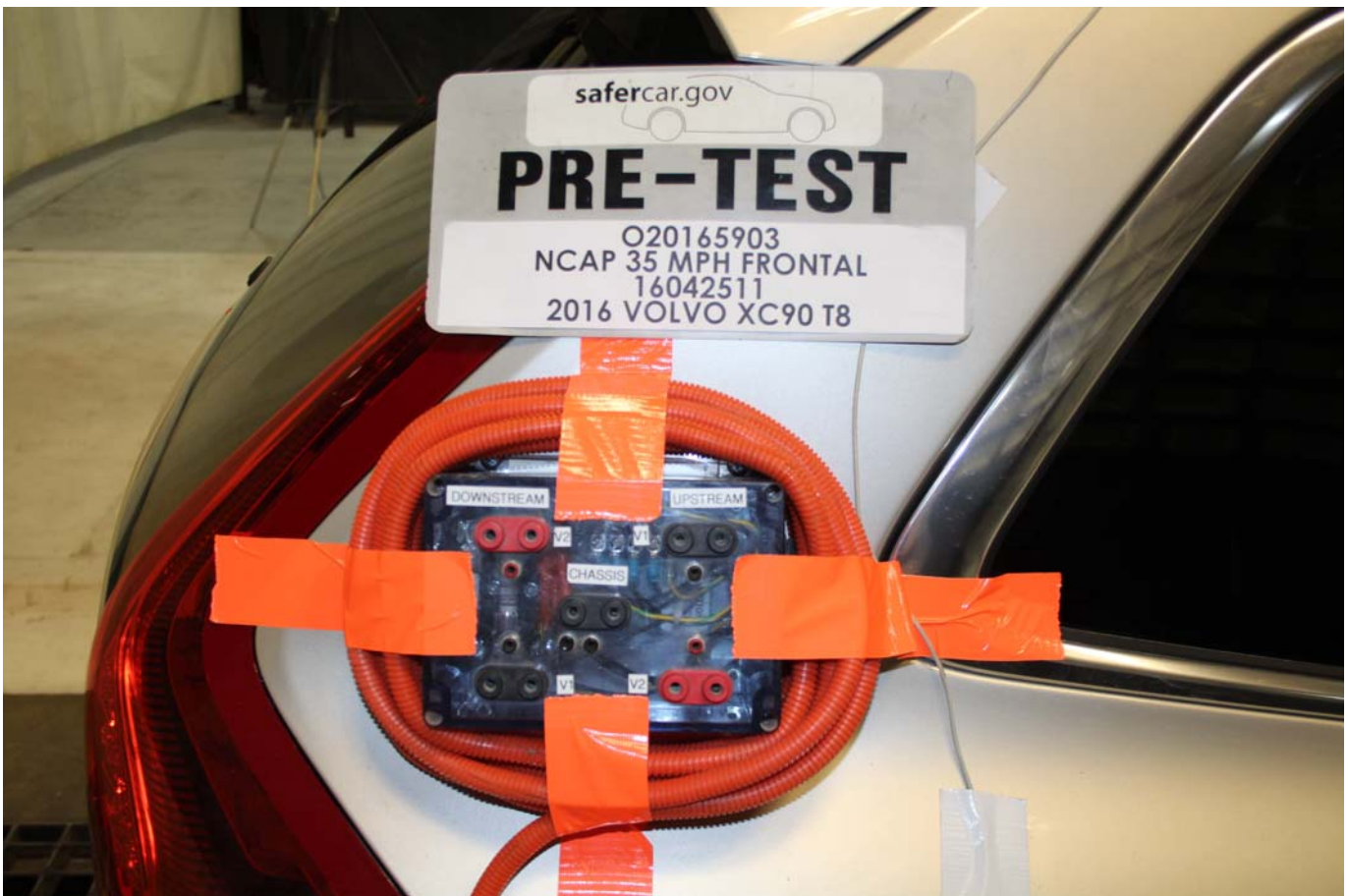


Photo No. 023 - Pre-Impact View of Installed Impact Interface Port

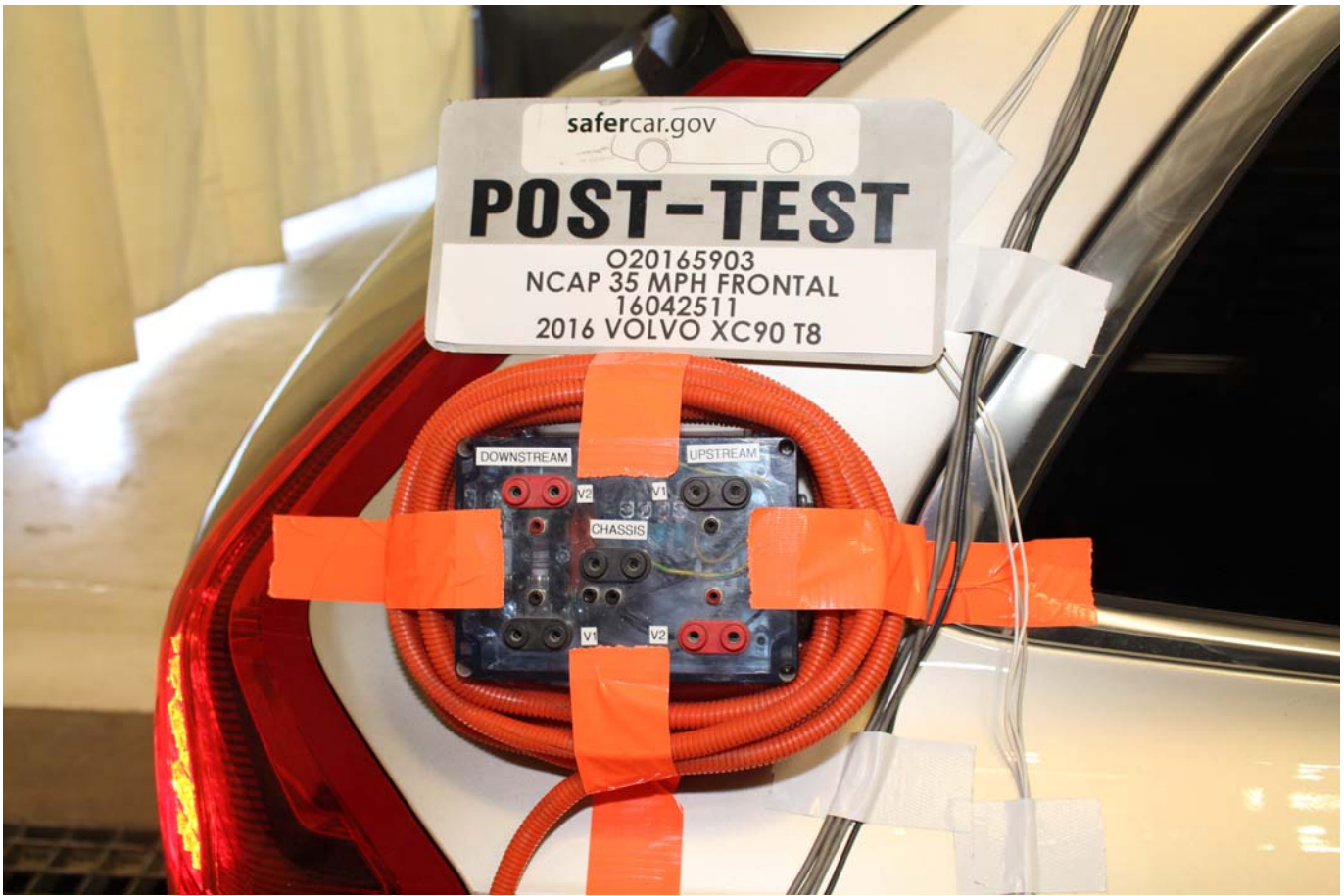


Photo No. 024 - Post-Impact View of Installed Impact Interface Port

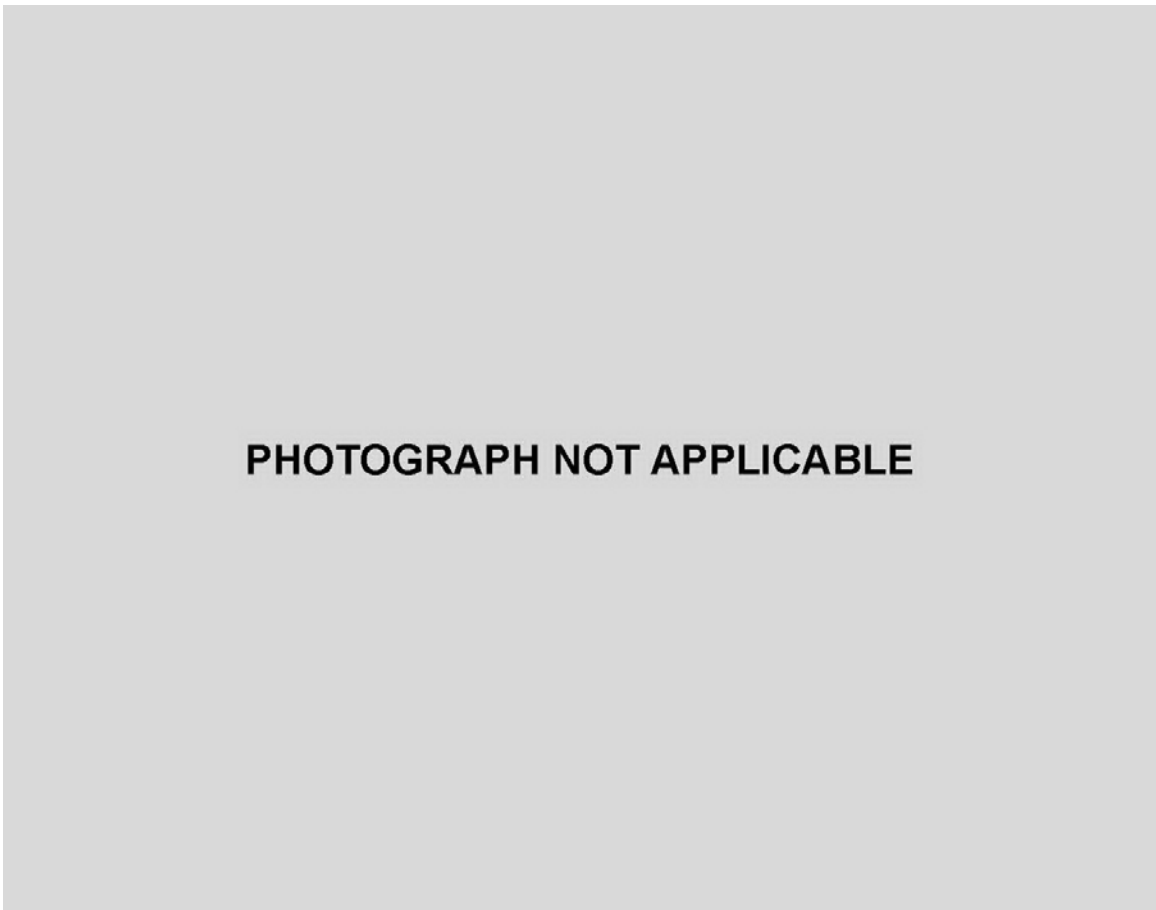


Photo No. 025 - Pre-Impact View of Other Test Devices

PHOTOGRAPH NOT APPLICABLE

Photo No. 026 - Post-Impact View of Other Test Devices



Photo No. 027 - FMVSS No. 305 Static Rollover at 90°



Photo No. 028 - FMVSS No. 305 Static Rollover at 180°

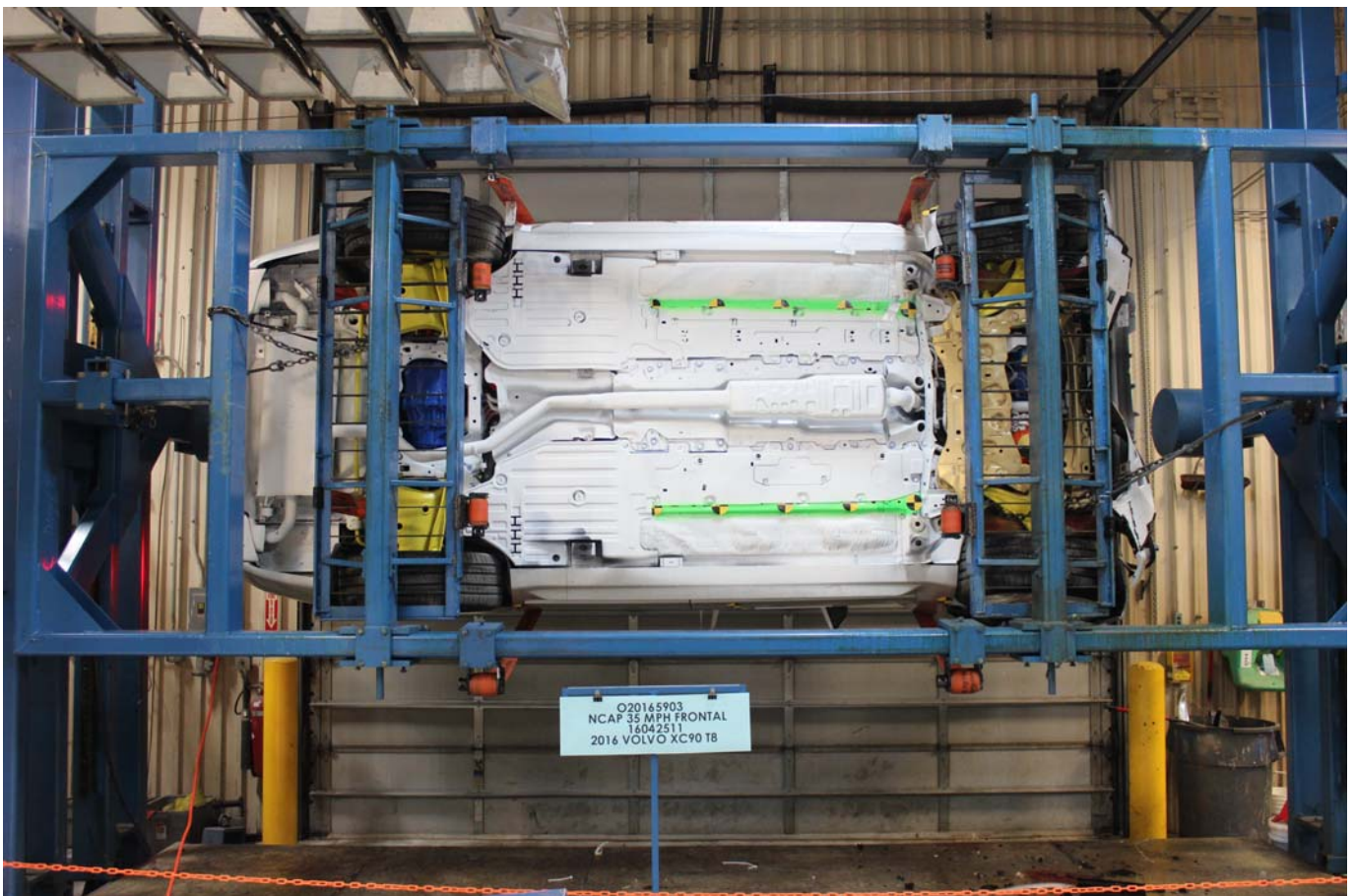


Photo No. 029 - FMVSS No. 305 Static Rollover at 270°



Photo No. 030 - FMVSS No. 305 Static Rollover at 360°



Photo No. 031 - Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Photo No. 032 - Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Photo No. 033 - Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 034 - Post-Impact View of Battery Component Intrusion

PHOTOGRAPH NOT APPLICABLE

Photo No. 035 - Post-Impact View of Battery Module Movement or Retention Loss

PHOTOGRAPH NOT APPLICABLE

Photo No. 036 - Post-Impact View of Propulsion Battery Electrolyte Spillage Location

PHOTOGRAPH NOT APPLICABLE

Photo No. 037 - Post-Test View of Propulsion Battery Electrolyte Spillage Location




Photo No. 038 - As Delivered Right Front ¾ View of Impact Vehicle



Photo No. 039 - As Delivered Left Rear ¾ View of Impact Vehicle

MFD BY VOLVO CAR CORPORATION DATE: 02/16

VIN: YV4BCOPL0G1074794 MARKET CODE: 31 GVWR: 6635 LB
 PRESSURE FRONT: 42PSI, 290KPA COLD GAWR FRONT: 3130 LB
 PRESSURE REAR: 42PSI, 290KPA COLD GAWR REAR: 3590 LB
 TIRES: 275/40R21 RIM: 9Jx21x38.5 COLOUR: 719—16
 THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
 VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT
 ON THE DATE OF MANUFACTURE SHOWN ABOVE. TYPE: MPV

VOLVO  31416485

020165903

Photo No. 040 - Vehicle's Certification Label

 **TIRE AND LOADING INFORMATION**

SEATING CAPACITY | TOTAL 7 | FRONT 2 | REAR 5

The combined weight of occupants and cargo should never exceed :550kg or 1210lbs.

| TIRE | SIZE | COLD TIRE PRESSURE | SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION |
|-------|-----------|--------------------|---|
| FRONT | 275/40R21 | 290kPa, 42psi | |
| REAR | 275/40R21 | 290kPa, 42psi | |
| SPARE | NONE | NONE | |

VOLVO 31416488

020165903

Photo No. 041 - Vehicle's Tire Information Placard or Label