



SURFACE VEHICLE INFORMATION REPORT

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Glossary of Automotive Inflatable Restraint Systems

RATIONALE

This glossary is updated to reflect changes in technology and remove definitions that are no longer commonly used.

FOREWORD

This glossary is prepared to serve as a basis for improving the communication and understanding of automobile inflatable restraint systems. Representatives from automobile manufacturers, government agencies, and restraint system suppliers have assisted in this compilation of the terms and descriptions.

1. SCOPE

The terms included in the Glossary are general in nature and may not apply to all manufacturers' systems. All terms in Section 3 apply to automotive inflatable restraint systems in general which are initiated by an electric or mechanical stimulus upon receipt of a signal from a sensor.

These terms are intended to reflect existing designs and the Glossary will be updated as information on other types of systems becomes available.

Appendix A is included to identify terminology that is no longer in common use or specifically applicable to inflatable restraint systems, but was published in the December 2001 version of SAE J1538.

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 International

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE/USCAR2-5 Performance Specification for Automotive Electrical Connector Systems

SAE/USCAR24-2 USCAR Inflator Technical Requirements and Validation

SAE/USCAR28 Initiator Technical Requirements and Validation

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Documents

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2.1.2 Federal Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, <http://www.access.gpo.gov/nara/cfr/cfr-table-search.html#page1>.

49 CFR 171.8 Definitions and Abbreviations

2.1.3 IEEE Publication

Available from IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08854-4141, Tel: 732-981-0060, www.ieee.org.

IEEE STD-100-1992 The New IEEE Standard Dictionary of Electrical and Electronics Terms (Institute of Electrical and Electronics Engineers, New York, 1993)

3. INFLATABLE RESTRAINT TERMINOLOGY (ALPHABETICAL) - GENERAL

3.1 AHAH (Auditory Hazard from Airbags - Human)

Name given to the human ear model from Army Research Laboratory (ARL). Reference SAE J2531 "Impulse Noise from Automotive Inflatable Devices.

3.2 AIRBAG

(See Cushion. 3.70)

3.3 AIRBAG CONTROL MODULE (also called ACM, ACU, AECM, ECU, ECM, ORC, RCM, or SDM)

An electronic module that provides one or more of the following; airbag deployment signal, airbag deployment logic, and/or airbag system diagnostics.

3.4 AIRBAG MODULE ASSEMBLY

(See Module Assembly. 3.170)

3.5 AIRBAG SYSTEM

(See Inflatable Restraint System. 3.145)

3.6 ALLFIRE PULSE

The particular signal applied to a device in order to ensure activation within defined statistical and confidence intervals for a prescribed parameter envelope; i.e., time, temperature, etc. The electrical signal cited in the ALLFIRE Specification statement.

3.7 ALLFIRE SIGNAL

Any electrical signal that is calculated to function the initiator with a known reliability based on a validated ALLFIRE Specification.

3.8 ALLFIRE SPECIFICATION

A performance specification stating the minimum amplitude of an electrical pulse that will activate the initiator at a given reliability and confidence over a range of temperatures with full details of the firing circuit being given.

3.9 ALLFIRE SUFFICIENT

An electrical circuit is said to be ALLFIRE Sufficient with respect to a given initiator ALLFIRE Specification if it can be proven that the circuit will operate the initiator with a reliability equal to or exceeding that expressed in the specification over the range of environmental conditions expressed in the specification.

3.10 ARMED

For an initiator firing circuit as implemented in a Fireset, in a vehicle Electronic Control Unit, or in an Electronic Initiator, the condition whereupon (1) the local energy storage reservoir is adequately charged, and (2) the associated switching circuitry is ready to immediately service a Demand-to-Fire Signal. To Arm a firing circuit means to bring the circuitry to the Armed state and to maintain the circuitry in this state. Compare to Disarmed 3.81.

3.11 ARU (Auditory Risk Unit)

Reference SAE J2531 "Impulse Noise from Automotive Inflatable Devices."

3.12 AUGMENTED INFLATOR

(See Hybrid Inflator. 3.131)

3.13 AUTOIGNITION MATERIAL (AIM)

A pyrotechnic material placed inside of an inflator that causes activation of the inflator at a predetermined temperature threshold.

3.14 AUTOIGNITION TEMPERATURE

For an Energetic Material, The Autoignition Temperature of a chemical is the lowest temperature at which a material will ignite without an external source of ignition.

3.15 BAG

(See Cushion 3.70)

3.16 BAG FOLD

Description of the pattern, or sequence, by which a bag is folded for containment within an airbag module assembly.

3.17 BALLISTIC FACE

The surface of a Plug that supports the Bridge.

3.18 BALLISTIC FUNCTION TIME (BFT)

The observed duration between the onset of an ALLFIRE Signal applied to an initiator and the first indication of ballistic functioning (flash, sound, pressure, etc). Data is reported in seconds.

3.19 BALLISTIC PEAK PRESSURE

In a Closed Bomb Ballistic Test of an initiator, the maximum pressure observed. Data is reported in Pascals.

3.20 BALLISTIC PRESSURE

The pressure-time response of an initiator fired in a Closed Bomb during a Ballistic Test. Data is reported in Pascals.

3.21 BALLISTIC RISE TIME

The time interval measured from occurrence of the First Pressure event until the time when a sensor registers a specified percentage of the recorded Ballistic Peak Pressure, typically 80% or 95% in a "Ballistic Test" of an initiator in a "Closed Bomb". Data is reported in seconds.

3.22 BALLISTIC TANK

(See Tank Test 3.242) Test device used to measure ballistic performance of an inflator, refer to SAE J2238. Generally, pressure versus time is recorded.

3.23 BALLISTIC TEST

Test to measure the performance of a gas generating device (inflator). Generally, pressure versus time is recorded.

3.24 BALLISTOMECHANICALLY CORRECT

An electroexplosive device that conforms to cited specifications for dimensions, external materials, colors, and ballistic performance, but may deviate from electrical requirements.

3.25 BAM (Bundesanstalt für Materialforschung und Prüfung)

The Federal Institute for Material Research and Testing, Berlin, Federal Republic of Germany. This agency is Competent Authority for Europe. Website: <http://www.bam.de>.

3.26 BARRIER TEST

Vehicle crash test, with a fixed or moving barrier, to evaluate vehicle performance and occupant crash protection.

3.27 BINDER

An additive intended to agglomerate one or more materials in a pyrotechnic composition.

3.28 BOMB

(See also Closed Bomb 3.51 and Vented Bomb 3.257.) A fixture designed to accommodate an initiator and (optionally) a sensor for a Ballistic Test.

3.29 BONDWIRE

A solid electrical conductor, typically Gold or Aluminum, used to bond a Monolithic Bridge to adjoining electrical conductors.

3.30 BONFIRE TEST

The exposure of inflator and/or module assemblies to fire or associated high temperatures to determine structural integrity and/or hazardous effects when auto ignition occurs.

3.31 BREAKDOWN VOLTAGE

The voltage at which a disruptive electrical discharge takes place through or over the surface of a dielectric. See IEEE STD-100-1992.

3.32 BRIDGE

A 2-terminal element that heats an abutting pyrotechnic Ignition Charge to its reaction temperature when an electrical current is compelled to flow through same. The heating may result from the Joule Effect if the bridge is resistive or from the Peltier Effect if the bridge incorporates a junction of dissimilar conductive materials. The term applies to implementations in the form of Bridgewires and Monolithic Bridges.

3.33 BRIDGE CIRCUIT

The electrical network consisting of the Bridge and the initiator's electrical terminations.

3.34 BRIDGE CIRCUIT RESISTANCE (BCR)

The direct current (DC) electrical resistance of a 2-terminal initiator. Data is reported in ohms with test temperature noted.

3.35 BRIDGE REACTION TIME (BRT)

The period of time elapsed from the onset of the firing current to first indication of pyrotechnic ignition as observed in the voltage trace accompanying the firing current pulse.

3.36 BRIDGED PLUG

A subassembly comprised of a Plug with a Bridge bonded thereon.

3.37 BRIDGEWIRE

A Bridge formed from a length of drawn resistance wire. See MIL-HDBK-83578.

3.38 BRISANCE

The shattering effect achieved by pyrotechnic functioning of the initiator.

3.39 BRUCETON

An Electrical Sensitivity Test as described in MIL-STD-331B, Test D2 (Projectile Fuse Arming Distance), §5.1.4 (Bruceton Method).

3.40 BURNING RATE

The rate at which a solid pyrotechnic composition burns normal to its surface at a specified ambient pressure and temperature.

3.41 BURST TEST

A pressurization test to determine strength of structural members (e.g., inflator assembly, bag).

3.42 BUS COMMAND

A serially encoded message generated by the Restraint Control Module or Test Set and received by the Electronic Initiator via the Vehicle Restraint Bus.

3.43 BUS INTERFACE MODULE (BIM)

In an Electronic Initiator, the electronic circuit package comprised of (1) the Encoder/Decoder Subsystem and (2) the Ignition Subsystem, said package providing a communications and control interface between the Vehicle Restraint Bus and the Initiator's pyrotechnic Squib.

3.44 CAB (also called IC, SABIC, RRAB, and HAB)

Curtain Airbag (CAB) – Generally fitted into the roof rails of the vehicle on both the driver and passenger sides. Provides a level of head impact protection and ejection mitigation depending on cushion design characteristics, crash characteristics, and the vehicle's crash sensing capabilities

3.45 CAN

(See Housing, Module 3.130)

3.46 CANISTER

A sealed device (generally hermetic) containing ignition train (initiator and/or propellant) and/or gas generant. May contain an inner filter.

3.47 Case

An electrical node as designated on the initiator's electrical schematic diagram, usually corresponding to a metallic mounting component or housing that is electrically isolated from the Bridge Circuit.

3.48 CCT "Continuing Conformance Testing"

(See also LAT, 3.164).

3.49 CHARGE CUP

An initiator component providing containment for the one or more of the pyrotechnic charges (also called Charge Can).

3.50 CHARGE SLEEVE

(See Ignition Charge Holder 3.137.)

3.51 CLOSED BOMB

A Bomb having a fixed-volume chamber that is gastight over the full pressurization range for the initiator being tested.

3.52 COAXIAL

A metallic squib or initiator is said to be coaxial if the pyrotechnic chamber has no more than two distinct electrical conductors, one being the metal casing that contains and encompasses the pyrotechnic material, and the other being an electrically isolated metal electrode, with the Bridge being bonded to each conductor so as to span an insulating gap between the two. Thus, any electrical potential applied between the two conductors results in a proportional current circulating through the Bridge Circuit. The term is used in the topological sense and does not imply physical symmetry of the squib components about a common axis. Compare to Twinaxial.

3.53 COLD GAS INFLATOR

An inflator that contains a non-flammable gas mixture, and no pyrotechnics beyond the initiator. No heat is generated to expand or add to the gas that is stored in the inflator.

3.54 COMMON PIN

(See Shield Pin 3.223.) In a metallic Squib, an initiator Pin bonded to the Bridge and electrically common to the Charge Cup.

3.55 COMPATIBILITY GROUP LETTER

A designated alphabetical letter used to categorize different types of explosive substances and articles for purposes of stowage and segregation. See 49 CFR §171.8.

3.56 COMPETENT AUTHORITY

"A national agency responsible under its national law for the control or regulation of a particular aspect of the transportation of hazardous materials (dangerous goods)." 49 CFR §171.8.

3.57 COMPETENT AUTHORITY LETTER

A letter issued by a Competent Authority (typically the DOT) that assigns the United Nations Proper Shipping name, Number and Explosive Classification Code for explosives and explosives devices. See 49 CFR §173.56 (New explosives definition and procedures for classification and approval).

3.58 CONNECTION STYLE

The initiator style as it pertains to the method of electrical connection to the vehicle wiring harness, e.g., leadwire-style, pin-style.

3.59 CONNECTOR

A device that connects the vehicle wiring assembly to airbag components and associated hardware.

3.60 CONNECTOR PORT

A socket shaped initiator feature that includes the squib pins, accommodates a mating electrical connector, and frequently includes a shorting clip.

3.61 CONNECTOR POSITION ASSURANCE (CPA)

A connector feature that provides an indication that the connector is locked into the initiator's connector port. See SAE/USCAR-2.

3.62 CONSOLIDATION PRESSURE

In initiator manufacturing, the pressure applied to a pyrotechnic charge by a Press Pin. In a finished initiator, the effective loading borne by the charge in situ.

3.63 CONSOLIDATION RAM

(See Press Pin. 3.198)

3.64 COOK-OFF

The thermal decomposition of an initiator's energetic material caused by externally applied heat.

3.65 COOK-OFF TEMPERATURE

The lowest temperature at which Cook-Off is observed. Report data in °C. See MIL-HDBK-83578.

3.66 CORROSIVE BURNING

The deflagration of an oxidizer rich propellant in a vessel such that exposed metal surfaces are eroded by an oxidation reaction.

3.67 CRASH SENSOR

A device designed to measure inputs, such as acceleration or intrusion, velocity, and displacement for the purpose providing data to the control module for initiating electronically activated restraint systems.

3.68 CRAZING

In a Monolithic Bridge, a fine fracture pattern observed following the application of high voltage test signals.

3.69 CRUCIFORM

(See Hexaform 3.128 and Octaform 3.180.) A cross-shaped indentation stamped into the bottom of a Charge Cup to provide for controlled opening of same during ballistic function.

3.70 CUSHION

A flexible membrane forming an enclosed volume that receives the gas from an inflator, designed to help restrain an occupant in certain crashes.

3.71 DAB

Driver Airbag – primarily used to help protect the driver in certain frontal crashes.

3.72 DECAY TIME (Electrical)

For a constant amplitude electrical pulse, the time interval observed for the trailing edge to fall from 90% to 10% of the pulse's peak amplitude.

3.73 DEFLAGRATION

The chemical decomposition (burning) of an energetic material in which the reaction zone advances into the un-reacted material at a slower rate than a sonic signal will propagate in the un-reacted material. See MIL-HDBK-83578.

3.74 DEFLAGRATION TIME

The period of time between Bridge Reaction Time (BRT) and the opening of the initiator cup/ can, defined by either "First Light" or "First Pressure".

3.75 DEGRADATION

An initiator is said to be degraded by a conditioning environment if, for a sample of initiators that have been conditioned and then evaluated with subsequent performance tests, a statistical analysis would refute the claim that 0.999 of the parent population of conditioned devices would comply with all performance specifications. The analysis does not rely on performance data from an Unconditioned sample.

3.76 DEMAND-TO-FIRE SIGNAL

General term for a firing pulse applied to a DUT, not necessarily known to comply with the ALLFIRE Specification.

3.77 DEPARTMENT OF TRANSPORTATION (D.O.T.)

Classifies for shipping hazardous materials. The D.O.T. is the competent authority for the United States. Refer to U.S. Department of Transport 49 CFR Section §173.54, for classifications.

3.78 DEPLOYMENT

The activation of an inflatable restraint device.

3.79 DEPLOYMENT DOOR

The protective and/or decorative cover through which the airbag deploys.

3.80 DEVICE-UNDER-TEST (DUT)

An initiator that is undergoing a test.