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(R) Glossary of Automotive Inflatable Restraint Systems

RATIONALE

This glossary is updated to include changes in technology and remove definitions that are no longer commonly used. Sections 3 and 4 were consolidated into one section to ease location of definition, and many references were removed that were deeded unnecessary in support of this document.

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.

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http://www.sae.org/technical/standards/J1538_201001

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/USCAR-2-5 Performance Specification for Automotive Electrical Connector Systems, November 2007

SAE/USCAR-24 USCAR Inflator Technical Requirements and Validation, June 2004

SAE/USCAR-28 USCAR Initiator Technical Requirements and Validation, June 2005

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 the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854-1331, 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 AHAAH (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. 3.69)

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. 3.168)

3.5 Airbag System

(See Inflatable Restraint System. 3.143)

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 throughout 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 3.79.

3.11 ARU (Auditory Risk Unit)

Reference SAE J2531 “Impulse Noise from Automotive Inflatable Devices.”

3.12 Augmented Inflator

(See Hybrid Inflator. 3.129)

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 3.69)

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 3.239) 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 3.50 and Vented Bomb 3.254.) 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 Bridged Plug

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

3.36 Bridgewire

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

3.37 Brisance

The shattering effect achieved by pyrotechnic functioning of the initiator.

3.38 Bruceton

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

3.39 Burning Rate

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

3.40 Burst Test

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

3.41 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.

3.42 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.

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

Curtain Airbag – generally fitted into the roof rails of the vehicle on both the driver and passenger sides. Designed for head protection in side impact crashes. May also be designed for ejection mitigation in side impact and/or rollover crashes.

3.44 Can

(See Housing, Module 3.128)

3.45 Canister

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

3.46 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.

3.47 CCT "Continuing Conformance Testing"

(See also LAT, 3.162).

3.48 Charge Cup

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

3.49 Charge Sleeve

(See Ignition Charge Holder 3.135.)

3.50 Closed Bomb

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

3.51 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.

3.52 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.

3.53 Common Pin

(See Shield Pin 3.221.) In a metallic Squib, an initiator Pin bonded to the Bridge and electrically common to the Charge Cup.

3.54 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.

3.55 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.

3.56 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).

3.57 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.

3.58 Connector

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

3.59 Connector Port

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

3.60 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.

3.61 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.

3.62 Consolidation Ram

(See Press Pin. 3.196)

3.63 Cook-Off

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

3.64 Cook-Off Temperature

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

3.65 Corrosive Burning

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

3.66 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.

3.67 Crazing

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

3.68 Cruciform

(See Hexaform 3.126 and Octaform 3.178.) A cross-shaped indentation stamped into the bottom of a Charge Cup to provide for controlled opening of same during ballistic function.

3.69 Cushion

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

3.70 DAB

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

3.71 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.

3.72 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.

3.73 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.

3.74 Demand-to-Fire Signal

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

3.75 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.

3.76 Deployment

The activation of an inflatable restraint device.

3.77 Deployment Door

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

3.78 Device-Under-Test (DUT)

An initiator that is undergoing a test.

3.79 Disarmed

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 sufficiently depleted such that a Demand-to-Fire Signal or any other circuit fault condition could not function the initiator. To Disarm a firing circuit means to bring the circuitry to the Disarmed state and to maintain the circuitry in this state. Compare to Armed.

3.80 Drop Test

The release of an airbag module or inflator from a specified height and orientation, onto a surface, (generally a steel plate supported by concrete), to determine if a device inadvertently functions or becomes compromised as a result of the gravitational impact.

3.81 Dual-Stage Inflator

Inflator design that can produce more than one performance output. Can also be called a multi-stage inflator.

3.82 Dud

(See also Misfire 3.166.) An initiator that has failed to function when a valid ALLFIRE Signal was applied. See MIL-HDBK-83578. To cause the initiator's electrical sensitivity to diminish through the use of electrical and physical environments.

3.83 ECS “Electronic Crash Sensor”

(See also Crash Sensor 3.66)

3.84 EDR “Event Data Recorder”

A memory device that records selected pre-crash and/or crash information.

3.85 Effluent Test

A measurement of airborne solids and/or gas composition from an airbag inflator or module in a ballistic tank, test tank, chamber or vehicle. (See also SAE J1794 - Monitoring of Effluent Composition in a Fixed Chamber Volume (100 ft3) and Changes During the First 20 Minutes After Device Deployment)

3.86 Electrical Sensitivity Test

A quantal response test intended to furnish estimates of the initiator's sensitivity to an electrical stimulus signal having one continuously adjustable parameter. The response variate is two-valued, {0, X}, with the 0-value indicating that the initiator did not fire and the X-value indicating that the initiator did fire upon application of the stimulus signal. The stimulus may be a Switched Constant-Current Signal, Switched Thévenin Signal, or other such defined electrical circuit signal. See ALLFIRE Specification, Bruceton, Langlie, and Neyer D-Optimal. See also Marriott (1990).

3.87 Electrical Type

A letter code designation for an electrical specification set that includes the Bridge Circuit Resistance, the ALLFIRE Sensitivity Specification and the NOFIRE Sensitivity Specification.

3.88 Electrically Correct Inert

An inert initiator having an in specification Bridge Circuit Resistance.

3.89 Electrode

(See Pin 3.190.)

3.90 Electro-Explosive Device (EED)

Any device (squib, initiator, detonator, cartridge, gas generator, actuator, etc.) that is operated by an electrical demand-to-fire signal. See MIL-HDBK-83578.

3.91 Electronic Initiator

An initiator that responds to digitally encoded signals to arm, self-test, disarm, and fire.

3.92 Electrothermal Response

(See Thermal Transient 3.245.) A nondestructive test intended to measure an initiators bridge circuit voltage-time response, V(t), to a low power Switched Constant-Current Signal.

3.93 Electrothermally Correct Inert

An Electrically Correct Inert device having the following properties: (1) the Bridge Circuit Resistance (BCR) falls within a prescribed BCR specification band before and after a prescribed Monitor Current environment is applied, (2) the Bridge remains intact following a prescribed direct current NOFIRE signal pulse, and (3) the Bridge fuses to an open-circuit condition following a prescribed ALLFIRE signal pulse.

3.94 EMC

Electromagnetic Compatibility: The ability of electronic equipment to operate in its intended environment without suffering or causing unacceptable degradation of performance as a result of unintentional electromagnetic radiation of response.

3.95 EMI

Electromagnetic Interference: The electromagnetic phenomena which, either directly or indirectly, may degrade the performance of an electronic receiver, system, or component.

3.96 EMI Test

Electromagnetic Interference Test: A test to evaluate the response of an electronic receiver or system when exposed to electromagnetic interference.

3.97 EMS

Electromechanical Sensor: A sensor that reacts mechanically to crash forces to allow electrical current flow.

3.98 Encoder/Decoder Subsystem

In an Electronic Initiator's Bus Interface Module, the electronic circuitry that (1) manages digital data exchanges via the vehicle Restraint Bus, (2) provides for electrostatic discharge and transient pulse protection, (3) stores the device's bus address, (4) monitors the Ignition Subsystem's Ignition State, (5) provides internal power management functions, and (6) controls the Ignition Subsystem for the purpose of running diagnostic self-test sequences, arming the initiator, disarming the initiator and firing the squib on command.

3.99 Energetic Material

(See also Gas Generant 3.114) Pyrotechnic material used in airbag inflators.

3.100 Energy Dump Dissipater

In a Bus Interface Module's Ignition Subsystem, a dissipative circuit element used as a discharge bleeder resistance during disarming. See IEEE Std 100-1992, "Bleeder."

3.101 Energy Storage Capacitor

In a Bus Interface Module's Ignition Subsystem, a capacitor that supplies energy to the squib upon closure of the appropriate circuit switch(es).

3.102 Enhancer Assembly

A Pyrotechnic charge housed in a containment that is distinct from the Squib. (also called Output Shell.)

3.103 ESD

Electrostatic Discharge: An electrical stress environment resulting from the accumulation of a static charge and the rapid discharge of same.

3.104 European Standard Connector

(See also Latchpin 3.158.) A connector and connector-port interface convention, the latter having a socket diameter of 10 mm.

3.105 Eyelet

In a metal Plug, the machined ring-shaped component that mates with the Charge Cup.

3.106 Ferrite Balun

An RFI Suppression Filter implemented by passing the initiator's bridge Circuit conductors (Leadwires or Pins) through parallel channels in a block of glossy ferrimagnetic material, thus constructing a 2-turn common mode choke. (also called ferrite bead.)

3.107 Fireset

An electrical test instrument that generates an initiator firing pulse having operator selected attributes, e.g., pulse amplitude, duration, etc.

3.108 First Light

In a Ballistic Test of an initiator, the first observed emission of optical energy following a demand-to-fire signal.

3.109 First Pressure

In a Closed Bomb Ballistic Test of an initiator, the first observation of chamber pressurization following a demand-to-fire signal.

3.110 Flow Agent

An additive to a particulate material intended to enhance or improve its flow characteristics.

3.111 FMVSS

Federal Motor Vehicle Safety Standard, issued by the NHTSA (National Highway Traffic Safety Administration) – a branch of the US Department of Transportation.

3.112 Functional Gas Seal Test

A Closed Bomb quantal response test intended to test the Initiator's gas seal against the pressures generated in the bomb. The response variate is two-valued: leak or no-leak.

3.113 Gas Composition Tests

(See Effluent Test 3.85)

3.114 Gas Generant

(See Energetic Material 3.99) A solid phase material that rapidly oxidizes to produce the gas that inflates the airbag.

3.115 Gas Generator

(See Inflator Assembly 3.144) An Initiator that primarily emits high pressure gas to operate a piston, linear or rotary, for providing motive power in a Pretensioner.

3.116 Getter

An additive to a pyrotechnic charge that facilitates execution of the Leak Test by slowly absorbing and desorbing the leak detection gas.

3.117 Glass-to-Metal-Seal (GTMS)

A construction sometimes used for Plugs that provides for gastight seams between one or more Pins and between the pins and the Eyelet.

3.118 Green Gas

The gaseous and particulate emissions from a Gas Generator that are considered to be non-toxic and non-hazardous.

3.119 Hangfire

Any abnormal delay in the pyrotechnic functioning of an initiator following a Demand-to-Fire Signal. A Hangfire is said to occur if an initiator is functioned with a valid ALLFIRE Signal and the observed Ballistic Function Time exceeds the pulse duration called out in the relevant ALLFIRE Specification.

3.120 Hazard Class

The category of hazard assigned to a hazardous material.

3.121 HazMat (Hazardous Material)

A substance or material (including airbag inflators and/or modules) that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has been designated as hazardous under Section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103)

3.122 Head Airbag (HAB)

Airbag designed to protect the head (see also CAB 3.43, SABIC 3.216,and IC 3.131)

3.123 Header

(See Plug 3.191.)

3.124 Heat Shield

Components of module or cushion to protect the cushion from hot inflator gas.

3.125 Heated Gas Generator

An inflator that contains a pressurized mixture of combustible and inert gases.

3.126 Hexaform

(See Cruciform 3.68.) A symmetric indentation pattern stamped into the bottom of a Charge Cup to provide for controlled opening during ballistic function. The pattern is that corresponding to the three crossing lines that connect opposing vertices of a regular hexagon.

3.127 Hotwire Device

An Electro-Explosive Device incorporating a Bridgewire.

3.128 Housing, Module

Mounting plate or housing portion of a module assembly, that supports the inflator, cushion, and cover.

3.129 Hybrid Inflator

An inflator that uses a combination of gas-generating materials and stored gas to provide inflation of an airbag.

3.130 Hydroburst

A destructive test, using pressurized liquid to determine structural integrity of an inflator.

3.131 I.C.

Inflatable Curtain airbag: An inflatable restraint system which deploys along the side windows to protect occupants during certain crashes.

3.132 Igniter

a. An Initiator that emits flame, a flux of burning particles and shock energy for igniting gas generant propellants in an Inflator Assembly.

b. “Article containing one or more explosive substances used to start deflagration of an explosive train.” 49 CFR §173.59.

c. “An assembly generally consisting of electrically resistive material and pyrotechnics used to initiate a combustion.” Compare to Gas Generator 3.115.

3.133 Igniter Tube

A structural cylinder containing the ignition materials.

3.134 Ignition Charge

A temperature-sensitive pyrotechnic composition designed to ignite with contact heating, usually at a well defined temperature. The first pyrotechnic composition in an ignition train that ignites. Compare to Output Charge.

3.135 Ignition Charge Holder

An Initiator component mounted on the Plug's Ballistic Face that supports a compacted Ignition Charge, holding same in contact with the Bridge. (Also called Charge Sleeve.)

3.136 Ignition Droplet

An ignition charge that is applied to the Bridge in liquid form and subsequently cured or dried to form a solid adhering mass.

3.137 Ignition Element

An ignition subsystem consisting of the Bridge and an abutting Ignition Charge.

3.138 Ignition Material

Typically, a solid material composed of both oxidizer and fuel elements, which ignites the gas generant when it burns. The material is generally powder or granular in form.

3.139 Ignition State

The vector describing the combined state of the Ignition Subsystem’s Energy Storage Capacitor, i.e., charged so as to be Armed, Disarmed, or Indeterminate, and the conduction condition (open or closed) of all switches in the charging and discharging circuits involving the Energy Storage Capacitor and the Squib. See IEEE Std 100-1992, “System State.”

3.140 Ignition Subsystem

In an Electronic Initiator, the electronic circuitry that controls (1) charging of the Energy Storage Capacitor, (2) discharging of same, (3) detecting the charge state of same, and (4) routing stored power to either the internal Energy Dump Dissipater (see 3.100) or to the Squib at the direction of the Encoder/Decoder Subsystem.

3.141 Impact Test

An impact to a component or system to determine ability to sustain loads.

3.142 Inert

(See Electrically Correct Inert 3.88.) A device that is completely free of energetic material.

3.143 Inflatable Restraint System (IRS)

A system consisting primarily of a sensor or sensors, diagnostics, inflator(s), and module(s) which inflates a cushion in certain vehicle crashes to assist in reducing injury to occupant(s).

3.144 Inflator Assembly

A device which produces or stores the gas for inflating cushions.

3.145 Informational Firing

The measurement of Ballistic Function Time for an unexpended initiator that is presumed to have been degraded by a previous test, e.g., a device that survived an Electrical Sensitivity Test. Data is reported in seconds.

3.146 Initiator

General term for an Electro-explosive Device incorporating a Squib, an electrical insulation system, features for electrical connection to the vehicle wiring harness, e.g., Leadwires or a Connector Port, and features for attachment to an inflator or to a pretensioner. Initiators are classified by application as Igniters or as Gas Generators.

3.147 Inner Cover

An inner structural airbag cover sometimes used with a protective or outer cover.

3.148 Insulation Cover

For an initiator, the cup-shaped thermoplastic or thermoset component that electrically insulates the exterior surface of the Charge Cup alone.

3.149 Insulation Jacket

For an initiator, the thermoplastic or thermoset structure that electrically insulates the Bridge Circuit from the device's external surface and/or mounting features.

3.150 Insulation Resistance

The direct current electrical resistance between any initiator pin and any other feature that is not electrically bonded to the Bridge Circuit. The measurement is conducted at conditions of prescribed voltage and duration to verify that electrical breakdown has not occurred. Initiator pins may be shunted for the test. Data is reported in megohms.

3.151 Integrierte Zund Einheit (IZE)

(See Electronic Initiator 3.91.) Integrated Ignition Unit.

3.152 Isolated Pin

An initiator pin bonded directly to the bridge and electrically common to no other conductor.

3.153 Joule Effect

The evolution of thermal energy produced by an electric current in a conductor as a consequence of the electric resistance of the conductor. IEEE STD-100-1992.

3.154 Jumper

A wiring harness component consisting of a multi-conductor cable subassembly, terminated at one end with a single inline connector that mates with the vehicle wiring harness, and terminated at the other end with one or more connectors to mate with initiator Connector Ports.

3.155 Knee Air Bag (KAB, IKB)

A separate cushion that is inflated to help provide restraint to the occupant's lower torso through the femurs. An inflatable knee bolster (IKB).

3.156 Knee Bolster

A structural device to help control occupant kinematics and femur force. Also called Knee Bar, Knee Bumper, or Knee Blocker. Knee Bolster is the preferred term.

3.157 Langlie

An Electrical Sensitivity Test as described in MIL-STD-331 B, Test D2 (Projectile Fuse Arming Distance), § 5.1.2 (Langlie Method).

3.158 Latchpin

An initiator feature implemented as a molded thermoplastic structure that is designed to engage with a European Standard Connector.

3.159 Leadwire

An electrical cable having thermoplastic insulation sheath over a stranded copper conductor, the latter typically AWG #18 or #20.

3.160 Leak Rate Specification (Squib)

A performance specification stating the maximum leak rate that will be allowed for the squib's pyrotechnic material chamber. The statement identifies a leak detection fluid, the test pressure differential across the squib's chamber wall, and the test methods. Validation generally requires separate nondestructive detection tests for gross and fine leaks.

3.161 Locking Groove

An initiator connector port feature intended to receive connector locking tabs.

3.162 Lot Acceptance Test (LAT)

A test or sequence of tests required to demonstrate specification compliance of a squib or initiator lot.

3.163 LRD (Low Risk Deployment)

Reference to favorable results in an Inflatable Restraint System deployment test performed to determine the relative risk to an occupant solely as a result of the deployment.

3.164 Mechanically Correct Inert

An inert device that conforms to cited specifications for dimensions external materials, and colors.

3.165 Microgas Generator (MGG)

(See Gas Generator, 3.115)

3.166 Misfire

The failure of an initiator to function when a valid ALLFIRE Signal was applied.

3.167 Mode

(See Pin 3.190 and Case 3.46.) The circuit connection method by which an electrical signal from a 2-terminal source is impressed upon the electrical conductors of an initiator as in pin-to-pin (pp), pin-to-case, and shorted-pins-to-case.

3.168 Module Assembly

An inflatable restraint assembly consisting of an inflator, cushion, housing, and protective cover.

3.169 Module Deployment Test

A component level test of an airbag module, in which the module is deployed. Refer to SAE J1630.

3.170 Monolithic Bridge

A Bridge formed as a planar feature imposed on a single monolithic “chip.” The term includes screen printed thick resistive film on ceramic substrate, vacuum deposited thin resistive film on ceramic substrate, diffusion doped semiconductor junction devices on silicon substrates, etc.

3.171 National Institute for Occupational Safety and Health (NIOSH)

A U.S. Government agency responsible for conducting research and making recommendations for the prevention of work related illnesses and injuries. NIOSH was established by the Occupational Safety and Health Act of 1970. Website: http://www.cdc.gov/niosh/.

3.172 Neyer D-Optimal

An Electrical Sensitivity Test as described in Neyer (1994) and MIL-STD-331C, Test G1 (in draft). See MIL-HDBK-83578.

3.173 NHTSA (National Highway Traffic Safety Administration)

An agency of the Executive Branch of the U.S. Government, part of the Department of Transportation. Its mission is to save lives, prevent injuries, and reduce economic costs due to road traffic crashes. Its activities include writing and enforcing safety, theft resistance, and fuel economy standards for motor vehicles. Website: http://www.nhtsa.dot.gov/

3.174 NIHL (Noise Induced Hearing Loss)

Reference SAE J2531 “Impulse Noise from Automotive Inflatable Devices.”

3.175 NOFIRE Specification

A performance specification stating the maximum amplitude of an electrical pulse that will not activate the initiator at a given reliability and confidence over a range of temperatures with full details of the firing circuit being given. The specification is validated by an Electrical Sensitivity Test.

3.176 Non-Destructive Sequencing

For an Electronic Initiator undergoing a validation test, the condition of being connected to an active Vehicle Restraint Bus, being electrically energized and processing a prescribed sequence of bus commands that cause the device to recurrently cycle through all possible non-destructive internal states.

3.177 Non-Serviceable Connector

A connector designed for onetime insertion into the Connector Port. The connector can not be removed from the port without incurring visible damage. It is not intended for disconnection in the field. Compare to Serviceable Connector.

3.178 Octaform

(See also Cruciform. 3.68) A symmetric indentation pattern stamped into the bottom of a Charge Cup to provide for controlled opening of same during ballistic function. The pattern is that corresponding to the four crossing lines that connect opposing vertices of a regular octagon.

3.179 OOP

Out-Of-Position occupant. Reference SAE J1980. (See also LRD, 3.163)

3.180 OPW

One Piece Woven: A seamless cushion where the seams are woven into the design to help contain gas, and create shape in an airbag module (as opposed to “cut-and-sewn” cushions).

3.181 Output Charge

A pyrotechnic composition intended to provide the initiator’s main ballistic effect. The last pyrotechnic composition in an ignition train that ignites. Compare to Ignition Charge.

3.182 Output Shell

(See Enhancer Assembly 3.102.)

3.183 Overhang

The portion of a Bridgewire that is located near the bridge weld points and is suspended over the metallic features of the Plug, i.e., the pin and/or the header.

3.184 PAB

Passenger Airbag.

3.185 Particulate Composition Tests

A measurement of effluent solids from an inflator and/or module system.

3.186 Pellet

A compacted unit of gas generant that is used in the inflator.

3.187 Peltier Effect

The absorption or evolution of thermal energy at a junction, e.g., a p-n semiconductor junction, through which an electric current flows. IEEE STD-100-1992.

3.188 Petal

A sector shaped portion of a charge cup bounded, in part, by the stamped indentations on same.

3.189 Pill

(See Pellet. 3.186)

3.190 Pin

A metal terminal electrically bonded to a Bridge node. Pins are usually formed from 1.0 mm diameter wire. (Also called Electrode 3.89.)

3.191 Plug

An initiator subassembly incorporating the Pins and features for mounting the Bridge and Charge Cup thereto. Plugs may be constructed as insert molded thermoplastic parts or as Glass-to-Metal-Seals. (also called Header.)

3.192 Polarity Independence

An initiator is said to be polarity independent if its electrical or functional response to a DC signal does not differ significantly with a change in the polarity of said signal. Initiators may exhibit small signal effects due to thermocouple junction potentials and still fall within the scope of this definition.

3.193 Popcorn

Term referring to a pin-style initiator formed from a Squib seated within a biconical-shaped electrical insulation jacket, aka European format initiator.

3.194 Porosity

A measurement of gas permeability of the bag fabric.

3.195 Post-Fire Resistance

For an expended initiator, the Bridge Circuit Resistance at a specified time following the onset of the ALLFIRE Signal.

3.196 Press Pin

A press tool used to compress a pyrotechnic charge into a Charge Cup or Ignition Charge Holder.

3.197 Primer

A pyrotechnic initiator assembly that starts the ignition sequence through mechanical means.

3.198 Propellant

(See Gas Generant (preferred term). 3.114)

3.199 Protected Gap

(See Spark Gap 3.232.) In an initiator, any physical line path situated between two electrical conductors that is entirely or partially within the pyrotechnic material chamber. The electrical Breakdown Voltage of this gap is designated as V_p.

3.200 Protective Cover/Outer Cover

Also called Decorative Cover, Trim Cover, or Deployment Door. An enclosure for the module assembly which serves to protect the cushion from dirt and wear during handling and in the vehicle environment.

3.201 Protective Gap

(See Spark Gap 3.232.) An electrical breakdown (spark) feature consisting of two conductors and a dielectric region (commonly air) separating them. It is located physically outside of the pyrotechnic chamber and is electrically parallel to the Protected Gap. The electrical breakdown voltage of this gap is designated as V_s. See IEEE STD-100-1992.

3.202 Pyrotechnic

(See Energetic Material 3.99.) A material or chemical composition that rapidly combusts or decomposes to release heat, light and gas.

3.203 Pyrotechnic Inflator

An inflator that generates gas by combustion of pyrotechnic materials. It does not contain stored gas.

3.204 Radio Frequency Interference (RFI)

Radio frequency energy of sufficient magnitude to affect operation of the initiator. Radio Frequency Interference of sufficient magnitude to have an influence on the operation of other electronic equipment.

3.205 Reaction Can

(See Housing, Module 3.128)

3.206 Readiness Indicator

A device, also called airbag lamp/light, in the instrument panel that indicates the condition of the restraint system electrical circuits.

3.207 Rear Support

A structural feature of a Gas Generator that implements the Connector Port.

3.208 RF Absorbed Power Environment

A test environment where the prescribed RF stress is required to be fully absorbed by the RFI Suppression Filter in the DUT (initiator), i.e., the power flow is transmitted across the filter's input port plane.

3.209 RF Induced Power Environment

A test environment where the RF signal power is transformer coupled into a circuit consisting of the DUT (initiator) and a wiring harness segment. See SAE J1113-4.

3.210 RF Radiated Power Environment

A test environment where the RF signal power is radiated at the DUT (initiator) from a signal source equipped with an antenna.

3.211 RFI Suppression Filter

A 2-port inline low-pass filter incorporated in the initiator's Bridge Circuit to attenuate RF signal energy. The filter, a common mode choke, is typically built into leadwire-style initiators or into the connector mating to pin-style initiators.

3.212 Rise Time (Electrical)

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

3.213 Rollover Curtain Module

An Inflatable Curtain module designed to activate in a rollover to help provide occupant protection.

3.214 RRAB “Roof Rail Airbag”

(See Inflatable Curtain (I.C.) 3.131)

3.215 SAB (Side Airbag)

(See Side Airbag, 3.226)

3.216 SABIC

Side Airbag Inflatable Curtain - designed to reduce the risk of occupant injury and/or ejection during certain side impact crashes.

3.217 Safing Sensor

A sensor that provides confirmation of a crash, but does not discriminate severity.

3.218 Secondary Sensor

(See Safing Sensor. 3.217)

3.219 Service Life

The minimum time that it can be expected to be fully capable with regard to established performance specifications.

3.220 Serviceable Connector

A connector that may be repeatedly inserted and removed from the Connector Port without incurring damage. Compare to Non-Serviceable Connector.

3.221 Shield Pin

(See Common Pin. 3.53)

3.222 Shock Tube

a. An instrument designed to measure the ballistic velocity and intensity of the atmospheric shock wave resulting from pyrotechnic functioning of an initiator.

b. An explosive shock wave transmission line constructed as a flexible thermoplastic tube with an explosive composition coated in the inside surface.