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HYBRID INFLATOR : ACH-2 (9)

1. Product and Company Identification:

1.1. Product identification : Hybrid inflator ACH-2.0x, ACH-2.1x, ACH-2.2x, ACH-2.3x, ACH-2.4x, ACH-2.5x, ACH-2.6x and ACH-2.7x. "x" stands for all versions.

1.2. Intended use: Pyrotechnic article used for automotive safety (Airbag)

1.3. Manufacturers :

Autoliv LIVBAG
18 Route du Beuzit
29590 Pont de Buis, France.
Tél : +33.(0)2.98.81.30.00.
Fax : +33.(0)2.98.73.05.04.
E-mail : liv.reception@autoliv.com

Other manufacturers :

Autoliv Romania IRO
Str. Bucegi nr.8
500053 Brasov, Romania

Autoliv IBC
250 American way
Brigham city, Utah 84302

1.4. Emergency phone number of approved company:

ORFILA (I.N.R.S.) Tél : +33.(0)1.45.42.59.59. (France)

2. Hazards Identification.

2.1. Classification de l'article

2.1.1. Classification in compliance with regulation (EC) n° 1272/2008 [CLP]

Non applicable, classe 9 for transport

2.1.2. Classification in compliance with regulation (US) OSHA [HCS]

Non applicable, manufactured article

2.2. Labelling

Non applicable, classe 9 for transport

2.3. Other hazards

The inflator is not dangerous if correctly handled. When ignited, gases are ejected radialy from the diffusion chamber and the metallic parts could reach 200°C.

In order to prevent unintentional ignition the handling and storage instructions must be adhered to (See Chapter 7). Mechanical reworking, or introduction of electrical energy is forbidden as well as shock waves, impacts, shocks and heating.

After functioning the inflator becomes inert, but direct contact to skin or eyes of any free pyrotechnic residues should be avoided, as should inhalation and ingestion.

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3. Composition and ingredient information

3.1. Substances : non applicable

3.2. Mixtures inside object :

The inflator is a closed and hermetic object; data about substances filled in are given for information in case of rupture of external body.

	Propellant	Autoignition material	Initiator	CAS #	CE #
Substances	% max	% max	% max		
Additives	10	15	10	-	-
Aluminium (metal)	-	-	10	7429-90-5	231-072-3
Boron	-	-	20	7440-42-8	231-151-2
Glass fiber	10	-	-	65997-17-5	266-046-0
Basic Copper Nitrate (BCN)	30	40	-	12158-75-7	439-590-3
Guanidinium nitrate	65	50	-	506-93-4	208-060-1
Potassium perchlorate	20	5	65	7778-74-7	231-912-9
Potassium nitrate	-	-	60	7757-79-1	231-818-8
Titanium dihydride (TiH2)	-	-	35	7704-98-5	231-726-8
Zirconium	-	-	20	7440-67-7	231-176-9
Copper oxide II	15	-	-	1317-38-0	215-269-1
Nitrocellulose	-	95	-	9004-70-0	-
Nitrotriazolone (NTO)	-	20	-	932-64-9	213-254-4

If gas generator is ruptured and propellant material is present, see ASP MSDS n°118.
If initiator is ruptured and ignition material is present, see NCS SDS N°61.

3.3. Object

Total weight composition :

Ingredients	**%**	**ACGIH-TLV**	**OSHA-PEL**
Metallic components:	85-95	NA (non applicable)	NA
Gas	2-15	NA	NA
Pyrotechnic components:	5-15	NE (non evaluated)	NA

Technical description :

The ACH-2.x hybrid inflator consists of an ignition chamber, a mixing and combustion chamber and a diffusion chamber.
The ignition chamber holds:
- an electrical squib with a maximum of 600mg of active substance,
The mixing and combustion chamber holds:
- a maximal pyrotechnic load in bulk or grain, of 20 grams,
The mixing and combustion chamber, with a maximum volume of 350 cm3, is pressurised at 80 MPa maximum (at ambient temperature), with a mixture of compressed gases, Argon and Helium.
The diffusion chamber includes vents in order to split the combustion gases.
The housing of the inflator is metallic, inert and electrically conductive.

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4. First Aid Measures.

4.1. First aid description

Following inhalation:

Consult a doctor if massive inhalation of combustion gases occurs. If inflator is ignited in a closed room this should be sufficiently aired

Following contact with eyes:

Wash eyes with clean water, and consult a doctor

4.2. Most important symptoms/effects, acute and delayed

When handled as intended, the inflator shows no hazardous behaviour

4.3. Indication of immediate medical attention and special treatment needed, if necessary

Non applicable

5. Fire fighting Measures.

In case of fire, keep away from fire.

5.1. Extinguishing media

Extinction by water is very difficult in view of the short combustion time, however it would stop the fire from spreading

5.2. Specific hazards arising from object

This inflator will be activated at a temperature greater than those mentioned in section 9.

Even after a fire, inflators must be considered as active; so they must be ignited.

5.3. Protective actions for fire-fighters

Fire near the storage area:

Evacuate the danger area. Spray storage area and containers with water.

Fire in the storage area:

Evacuate the danger area. Fight the fire from a safe distance and spray the non ignited inflators, to cool them.

6. Accidental release measures.

6.1. Personal precautions, protective equipment and emergency procedures

See section 7 et 8

6.2. Environmental precautions

No specific precautions

6.3. Methods and materials for containment and cleaning up

Collect released inflators, and wet them to reduce their reactivity. Damaged inflators should be sent back to the manufacturer in approved packaging in accordance with the certificate of transportation (see chapter 14), and correctly labelled.

7. Handling and storage

7.1. Precautions for safe handling

Inflators must be handled with care and only by personnel properly trained for the task. Never try to mount damaged inflators or to repair them. Never machine, drill, weld, solder or heat an inflator. Indeed the inflator contains materials sensitive to impact, friction and temperature. Therefore, the above mentioned actions could lead to unexpected inflator functioning.

Take measures to prevent electrostatic charge.

Never expose inflators to chemicals which could harm them.

When handled as intended, the inflator shows no hazardous behaviour.

This advice is only part of the many recommendations and instructions to be followed.

7.2. Conditions for safe storage, including any incompatibilities

Store inflator only in storage and transportation approved containers. Never store the inflator above +60°C, for a long time, or in humid conditions. Never store inflators in areas with strong electromagnetic fields. Fire extinguishers must always be available in the storage area.

Take measures against electrostatic charge (adequate discharge capacity, e.g. concrete floors, grounding of the storage facility).

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8. Exposure control / Personal protection

8.1. Control parameters

Non applicable to a closed and hermetic object

8.2. Exposure controls

8.2.1.Appropriate engineering controls :

Non applicable to a closed and hermetic object

8.2.2.Individual protection measures, such as personal protective equipment (PPE):

8.2.2.1. Eye/face protection :

Safety goggles or visor (EN166).

8.2.2.2. Skin protection :

Hand protection : gloves against mechanical hazards (EN388),
Skin protection other than hands : working clothes (with cotton).

8.2.2.3. Respiratory protection:

Limited risk due to confined substance inside inflator body.

8.2.2.4. Thermal hazards:

Non applicable.

8.2.2.5. Exposure controls relative to environmental protection:

Limited risk due to confined substance inside inflator body.

9. Physical and Chemical Properties

9.1. Information on essential physical and chemical properties

Non applicable to a closed and hermetic object

9.2. Other information

Functioning temperature	*mini :-40°C, maxi : +90°C*
Electrical features :	
All fire current	*800 - 1200 mA durant 2 ms à –35 °C*
No fire current	*200 - 500 mA durant 10 secondes à +85 °C*
Auto-ignition temperature	*>190°C*
Gas tank opening temperature	*>115°C*
Integrity of inflator	*Impossible dismantling without deterioration*

10. Stability and reactivity

If correctly handled, and stored, this inflator is stable and presents no danger.

10.1. Hazardous decomposition products

When ignited this inflator could give off low levels of CO, CO2 and NOx

10.2. Sensibility to external environment *(tests according to norm ISO12097-3)*

Drop test (height 1,2 m at ambient temperature)	*No functioning observed*
Mechanical shock test (100 g at - 35 °C, + 20 °C, + 85 °C)	*No functioning observed*
Vibration test with thermal cycle (400 cycles / 500 Hz / 24 h / - 35 °C, + 85 °C)	*No functioning observed*
Climatic ageing test (- 35 °C, + 70 °C – 95 % HR, + 105 °C)	*No functioning observed*
High temperature storage (400 hours à 107 °C)	*No functioning observed*
Electrostatic discharges 25 kV, 500 pF, 5 kΩ / Acc.to MIL STD 1512 method 205	*No functioning observed*

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11. Toxicological information

There is no risk in handling an undamaged inflator.
Contains Perchlorate Material – Special Handling May Apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate

12. Ecological information

Do not dispose into the environment.

13. Disposal considerations

Active inflators (non ignited) can be destroyed by an approved organization. In case of problems, contact LIVBAG.
Code according to Annex II of Article R 541-8 of French Environment code and European Regulation 1013/2006/EC: 16 01 10* explosive components (e.g. air bags).

14. Transportation Information

14.1. UN number : UN3268
14.2. UN proper shipping name : SAFETY DEVICES
14.3. Transport hazard class(es) : 9
14.4. Packing group : -
14.5. Environmental hazards : None
14.6. Special precautions for users :

By land :

Packaging instruction P 902 and LP902

By see :

Packaging instruction P 902
intervention number : FS supplied by the loader
stowing and separation : category A

By air :

Packaging instruction : 961
Code of emergency intervention IDC : 9L
Authorised for Commercial flight : maximum 25kg net per parcel
Authorised for Cargo flight : maximum 100kg net per parcel

15. Regulatory information

European Directive 2013/29/EU on the harmonization of the laws of the Member States relating to the making available on the market of pyrotechnic articles.

16. Miscellaneous

This « Safety Data Sheet » was edited by the LIVBAG Technical department according to regulations valid at that date and to their knowledge at that time.
The information given in this document cannot therefore considered as exhaustive.
It is the responsibility of anyone handling these manufactured goods to:
- Draft his own security rules about handling, and manufacturing, taking the contents of this "Safety Data Sheet" into consideration together with any other unknown risks that the product or its functioning might present.
- Reproduce in all documentation that he might prepare, referring to the product or to the materials in which the product is incorporated, the appropriate safety instructions including the hazard warnings given above, and inform the next purchaser, handler, or user.
LIVBAG's Technical department is at the disposition of those who require further information.