



## Section 1: Identification of the article and of the company/undertaking

### 1.1 Product identifier

Pyrotechnic articles for vehicles (micro gas generators / air bag inflators / air bag modules / seat-belt pretensioners / actuators / igniters / semi-finished products), hereafter called articles.

### 1.2 Relevant identified uses of the articles and uses advised against

These articles shall only be used for safety devices in vehicles.

### 1.3 Details of the supplier of the safety data sheet

*Name, address and telephone number of the supplier.*

ZF Automotive Germany GmbH, Industriestrasse 20, DE – 73553 Alfdorf, Phone  
+49 7172 302-0

### 1.4 Emergency telephone number

*Emergency telephone number and office hours (if availability is limited)*

+49 7172 302-0

## Section 2: Hazards identification

These articles contain pyrotechnic components that are hermetically sealed off from the environment. These cannot be released under normal or reasonably foreseeable conditions of use including proper disposal. Integrated compressed gas containers: gases are under high pressure. Articles featuring unpressurized containers still may contain pyrotechnic components.

### 2.1 Classification of the article

Pyrotechnic article (explosive article, 1.4)

H204: Fire or projection hazard.

### 2.2 Label elements

Signal word:

Warning

Hazard statements:

H204: Fire or projection hazard.



Precautionary statements:

P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

P250: Do not subject to grinding/shock/drop/friction.

P370+380: In case of fire: Evacuate area.

P374: Fight fire with normal precautions from a reasonable distance.

### 2.3 Other hazards

- Risk of uncontrolled activation in case of fire, heat, electrostatic discharge, induction through electromagnetic fields, or greater mechanical load (e.g. shocks or falls).
- Risk from hazardous projectiles, quickly moving parts and/or high-speed gas beams released through activation.
- Risk of burn injuries in case of direct contact with articles heated by activation or with their reaction products (particles and gases).
- Risk of fire development if articles heated by activation come into contact with combustible or flammable material.
- Risk of eye and respiratory tract irritation from reaction products.
- Risk of blast trauma from high-volume noise impulses during activation.
- Risk of frostbite injuries from released gases that are stored under high pressure.

## Section 3: Composition / information on ingredients

These articles contain pyrotechnic components that are hermetically sealed off from the environment. These cannot be released under normal or reasonably foreseeable conditions of use including proper disposal. All housing parts are positively connected to each other. They shall only be opened by destroying the whole entity.

### 3.1 Substances

Not applicable. This product is classified as an article.

### 3.2 Mixtures

Not applicable. This product is classified as an article.

## Section 4: First aid measures

### 4.1 Description of first aid measures

General first-aid rules shall be followed.

- If reaction products are inhaled:
  - Supply fresh air.
- If reaction products/activated articles come into contact with skin:



Rinse affected area with clear water.  
Keep burns cool and free of germs.  
Cover open wounds using sterile material.

- If reaction products come into contact with eyes:  
Rinse eyes with clear water.

#### 4.2 Most important symptoms and effects, both acute and delayed

Activation may have the following effects:

- Risk of injury from hazardous projectiles, quickly moving parts and/or released high-speed gas beams.
- Blast trauma.
- Burns.
- Frostbite injuries due to contact with an activated compressed gas container or with compressed gases released from a compressed gas container.

**4.3 Indication of any immediate medical attention and special treatment needed** Not applicable.

### Section 5: Firefighting measures

#### 5.1 Extinguishing media

**Suitable extinguishing media:** standard extinguishing media (e.g. water, powder, foam, carbon dioxide).

**Extinguishing media which must not be used for safety reasons:** none known.

#### 5.2 Special hazards arising from the article

In case of fire, the articles may cause delayed activations. There is a risk of injuries from hazardous projectiles and loud bangs due to activation.

#### 5.3 Advice for firefighters

Extinguish the fire at a safe distance. Risk of hazardous projectiles.

### Section 6: Accidental release measures

#### 6.1 Personal precautions, protective equipment and emergency procedures

Ensure self-protection in case of emergency.  
If possible, take measures against electrostatic charge.  
Avoid heat, fire, friction, shocks, and sparks.

#### 6.2 Environmental precautions



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Do not allow to enter waters, sewage system and soil.

### 6.3 Methods and material for containment and cleaning up

Take up, pack and clean up mechanically.

Ensure disposal by an authorized specialist company.

### 6.4 Reference to other sections

Sections 8 and 13 are to be followed.

## Section 7: Handling and storage

### General provisions:

Following an activation or fire load, ensure that only completely activated articles are left (i.e. all stages of the article have been activated or the compressed gas containers are depressurized, respectively). Articles that have not been completely activated are unrestrictedly subject to the prevailing rules and regulations regarding pyrotechnics and dangerous goods.

### 7.1 Precautions for safe handling

- Personal protective equipment see subsection 8.2. Do not improperly connect to an electrical power source or to an inappropriate measuring device. Only approved connections to onboard electronics in the vehicle and test devices designated for this purpose are permitted.
- Do not use the articles following falls or any other mechanical load.
- Do not open the articles; do not undertake any repair or repair attempts.
- The state of construction provided by the manufacture at the time of delivery must not be changed or modified.
- Do not remove existing jumpers.
- Keep away from chemicals.
- Keep away from ignition sources; protect against heat and sparks.
- Take measures to prevent electrostatic charge.
- Avoid using sources of electromagnetic radiation (e.g. radiotelephones or mobile phones) in the close vicinity (approx. 2m).
- Safeguard articles against theft and unauthorized use.
- Carry and lay down air bag modules with the bag facing upwards. As far as possible, do not reach into the opening area. Keep the deployment area free and do not block it.
- When dealing with seat-belt pretensioners or with actuators featuring pistons, keep the action range free and do not reach into it.



- Do not modify or cover exhaust ports.
- Keep mechanically movable parts of the articles away from the body.

## 7.2 Conditions for safe storage, including any incompatibilities

- Follow national and regional rules and regulations for storage.
- Store dry and in the permitted packaging in rooms specifically provided for this.
- Take measures against electrostatic charge (adequate discharge capacity, e.g. concrete floors, grounding of the storage facility).
- Protect against sources of heat, sparks, open flames, or shocks.
- Safeguard against theft and unauthorized use.
- Do not store together with combustible or oxidizing substances or mixtures.

## 7.3 Specific end use(s)

The articles must only be used for the designated purpose given by the manufacturer.

## Section 8: Exposure controls / personal protection

### 8.1 Control parameters

Not applicable.

### 8.2 Exposure controls

#### When handling non-activated articles:

- Respiratory protection: not applicable.
- Hand protection: not applicable.
- Protective and hygiene measures: not applicable.
- Limit values / environmental exposure control: not applicable.

#### When activating articles, e.g. for testing purposes or disposal, or when handling articles that have not been completely activated:

Activate articles only in rooms and facilities specifically provided for this.

Use suitable exhaust system.

- In case of dust deposits, rooms shall be cleaned regularly using moisture; hand and eye protection are recommended (alkaline or acid reaction of the combustion products may be possible when extinguishing with water).



- Respiratory protection: appropriate respiratory protection must be worn if occupational exposure limit values (e.g. CO, NO<sub>x</sub>) are exceeded.
- Hand protection: strictly avoid contact with activated, hot articles. Protective gloves made of cotton or leather when handling after activation.
- Ear protection: wear ear protection when activating the articles.
- Protective and hygiene measures: do not inhale reaction products, avoid skin contact, and, if applicable, wash off with water.

## Section 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Not applicable to articles.

### 9.2 Other information

Not applicable to articles.

## Section 10: Stability and reactivity

### 10.1 Reactivity

Risk of activating articles in case of improper handling.

### 10.2 Chemical stability

When handled and stored properly, no hazardous reactions are anticipated.

### 10.3 Possibility of hazardous reactions

Risk of injuries due to unintended activation.

### 10.4 Conditions to avoid

Moisture, high temperatures, fire, ignition sources, sparks, impact, electrostatic charging.

### 10.5 Incompatible materials

Acids, alkalines.

### 10.6 Hazardous decomposition products

During proper handling/usage/storage the articles are not subject to a decomposition process.



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## Section 11: Toxicological information

### 11.1 Information on toxicological effects

When used properly, no health effects are anticipated.

These articles contain pyrotechnic components that are hermetically sealed off from the environment. These cannot be released under normal or reasonably foreseeable conditions of use including proper disposal.

## Section 12: Ecological information

When used properly, no environmental effects are anticipated.

These articles contain pyrotechnic components that are hermetically sealed off from the environment. These cannot be released under normal or reasonably foreseeable conditions of use including proper disposal.

### 12.1 Toxicity

Not applicable.

### 12.2 Persistence and degradability

Not applicable.

### 12.3 Bioaccumulative potential

Not applicable.

### 12.4 Mobility in soil

Not applicable.

### 12.5 Results of PBT and vPvB assessment

Not applicable.

### 12.6 Other adverse effects

Not applicable.

## Section 13: Disposal considerations

### 13.1 Waste treatment methods

- Articles that have not been activated or only partially activated must only be disposed of by authorized specialist companies and in accordance with prevailing rules and regulations (see also section 7 "Handling and storage").



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- Waste code: 16 01 10 explosive components (e.g. from air bags).
- Articles that have not been activated or only partially activated must not be shredded together with the end-of-life vehicle.
- Any articles damaged by fire, heat or an accident shall be handled as non-activated articles.
- Only articles that have been completely activated may be used for recycling purposes.

### Section 14: Transport information

In accordance with ADR/RID (road/rail), IMDG (sea) and ICAO/IATA (air freight):

Classification is based on the type of article, packaging and, if applicable, the existing assignment by the responsible authority. The shipper shall be responsible for the correct classification of dangerous goods. Section 14 cannot provide any final or binding statement and it will not exempt the shipper from the duty to autonomously assign the classification for each single transportation instance. Subsections 14.1 - 14.3 have been subsumed. National special arrangements need to be followed.

#### 14.1 – 14.3 UN number, UN proper shipping name, Transport hazard class(es)

##### Air bag modules / air bag inflators / seat-belt pretensioners:

UN 0432, Articles, pyrotechnic, 1.4S

UN 0503, Safety devices, pyrotechnic, 1.4G

UN 3268, Safety devices, 9

##### Semi-finished products:

UN 0323, Cartridges, power device, 1.4S

UN 0431, Articles, pyrotechnic, 1.4G

UN 0432, Articles, pyrotechnic, 1.4S

UN 0503, Safety devices, pyrotechnic, 1.4G

UN 3268, Safety devices, 9

#### 14.4. Packing group

Not applicable.

#### 14.5. Environmental hazards

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Not applicable.

#### **14.6. Special precautions for user**

None.

#### **14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

### **Section 15: Regulatory information**

#### **15.1 Safety, health and environmental regulations/legislation specific for the article**

National provisions how pyrotechnic articles for vehicles shall be placed on the market. National and international rules and regulations need to be respected.

#### **15.2 Chemical safety assessment**

Not applicable.

### **Section 16: Other information**

All components and their substance information shall be provided by IMDS (International Material Data System) or similar systems.

The information in this Safety data sheet solely describes the safety requirements of the product and is leaned on the present state of our knowledge, not claiming, however, completeness.

All product details and instructions contained in this Safety data sheet shall be made available to users, employees and all other persons who deal with this product prior to its use. This Safety data sheet shall only be forwarded in unmodified form. In order to avoid any risks, the user shall follow all instructions for safe storage and handling.