U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA
1200 New Jersey Avenue SE.
Washington, DC 20590

BY EMAIL AND U.S. MAIL

Mr. Steve Gold
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NEF101-sly
EA16-003

Dear Mr. Gold,

As you are aware, on July 13, 2015, the Office of Defect Investigation ("ODI") of the National Highway Traffic Safety Administration ("NHTSA" or the "Agency") opened a Preliminary Evaluation (PE15-027) to investigate certain air bag inflators designed by ARC Automotive, Inc. ("ARC"). NHTSA opened its defect investigation after learning of two driver air bag inflator field ruptures involving ARC designed inflators. On August 4, 2016, NHTSA upgraded the defect investigation to an Engineering Analysis (EA16-003) to further investigate allegations of inflator ruptures involving ARC driver air bag inflators. ODI upgraded the investigation after learning of an ARC inflator field rupture in Canada, which resulted in a fatality. The investigation scope was subsequently expanded when NHTSA learned of frontal passenger air bag inflator ruptures in testing.

NHTSA is issuing this recall request letter to notify you that the Agency has tentatively concluded that a defect related to motor vehicle safety exists in the frontal driver and passenger air bag inflators under investigation that were produced before installation of borescopes on all toroidal inflator manufacturing lines in January 2018 ("subject inflators"), and to demand that ARC issue a Part 573 Recall Report addressing that safety defect.

Background on NHTSA's Investigation

The subject inflators are hybrid, toroidal inflators[1] supplied to Tier 1 air bag module suppliers for incorporation in their completed air bag modules. Through January 2018, 67 million of the subject driver and passenger frontal air bag inflators have been supplied to approximately six Tier 1 air bag system manufacturers. Delphi (acquired by Autoliv) manufactured approximately 11 million of the inflators under a licensing agreement with ARC, which manufactured the remainder of the subject inflators. The subject inflators have been incorporated into air bag

[1] A hybrid inflator uses stored gas that is excited by the propellant to fill the air bag cushion. Toroidal inflators are round, non-cylindrical inflators.

modules used in vehicles manufactured for sale or lease in the United States by at least 12 vehicle manufacturers.

NHTSA's PE investigation focused on understanding the inflator specifications, manufacturing process, ideal performance, potential failure modes, and usage. Based on information gathered during that analysis, NHTSA determined that a field recovery program was required, and the Agency began to work with the relevant stakeholders.

As described above, ODI upgraded the PE to an EA after learning of an ARC inflator field rupture in Canada, which resulted in a fatality. EA16-003 was opened to investigate the potential for driver air bag inflators manufactured by ARC to rupture during frontal air bag deployment resulting in the forceful propulsion of metal fragments into the vehicle compartment. The investigation was subsequently expanded to include frontal passenger air bag inflator following testing ruptures.

ARC is among the companies that have been required to report field ruptures of air bag inflators under NHTSA's Standing General Order (SGO) 2015-02 and as subsequently amended. To further facilitate its investigation, NHTSA issued an additional Standing General Order (SGO 2016-01) to ARC with additional reporting requirements, including preliminary notifications to NHTSA within 24 hours and an expanded scope of reportable incidents (including ruptures during testing). Since the opening of EA16-003, the Agency has learned of multiple additional ARC inflator field ruptures involving the forceful propulsion of metal fragments into the passenger compartment, as further described below.

As has been publicly described, during the manufacturing process of the subject inflators, the inflator center support is friction welded to the upper and lower pressure vessels. A possible byproduct of the friction welding process is known as weld slag (also known as weld flash). Weld slag, if it is loose, along with any other debris inside the inflator center support will follow the air flow out of the exit orifice during a triggered air bag deployment.

ARC's inflator design is such that during a triggered deployment, the stored gas, excited by the propellant, has a single path through the exit orifice to exit the inflator and fill the air bag cushion. Should any debris of sufficient size be in the inflator center support, the exit orifice could become blocked. Blockage of the exit orifice could cause over pressurization of the air bag inflator. Over pressurization of the inflator has the potential to cause it to rupture resulting in metal fragments being forcefully propelled into the passenger compartment.

In January 2018, ARC completed installation of borescopes on all toroidal inflator manufacturing lines. The borescope is used to detect excessive weld slag or other debris in the inflator center support mitigating the possibility of a field rupture due to exit orifice blockage. To date, the Agency is not aware of a testing or field rupture, associated with this alleged defect, of any toroidal ARC air bag inflator built after the installation of the borescope on all toroidal inflator manufacturing lines.

In April 2018, the field recovery test program for frontal driver air bag (DAB) inflators manufactured by ARC was completed. Test samples for model year (MY) 2001-2006 vehicles manufactured by a subset of manufacturers that used air bag modules assembled with ARC

inflators were collected from salvage yards. Testing was conducted in compliance with an agreed upon protocol at ARC's facilities in Knoxville. More than 900 inflators were deployed. The selected number was chosen to give a statistical .99 reliability and .99 confidence level to the results. The results were analyzed on a binomial scale of whether the inflator ruptured. No anomalies were detected in any of the deployments. None of the tested inflators ruptured.

To date, manufacturers have chosen to address the pre-borescope blockage issues and Lot Acceptance Test failures by recalling the specific lot associated with certain ruptures. *See* Recalls 17V-189, 17V-529, 19V-019, 21V-782, 22V-246, 22E-040, 22V-543.

RECALL NUMBER	DATE	COMPANY	MODEL YEAR / MODELS	RECALL POPULATION
17V-189	3/17/2017	BMW	2017MY X5 sDrive35i, X5 xDrive35i, X5 xDrive50i, X5 xDrive35d, and X5 xDrive40e	36
17V-529	8/28/2017	FORD	2017MY MUSTANG AND F150 PICK-UP	650
19V-019	12/21/2018	GENERAL MOTORS	2010-2011MY CHEVROLET MALIBU	1145
21V-782	10/7/2021	GENERAL MOTORS	2008-2017MY BUICK ENCLAVE 2013-2017MY CHEVROLET TRAVERSE	555
22V-246	4/14/2022	GENERAL MOTORS	2015MY BUICK ENCLAVE, GMC ACADIA, CHEVROLET TRAVERSE	2687
22E-040	5/19/2022	GENERAL MOTORS	DRIVER AIR BAG SERVICE REPLACEMENT PARTS	74
22V-543	7/27/2022	VOLKSWAGEN	2016MY VARIOUS AUDI AND VW VEHICLES	1216

In August 2022, NHTSA held a meeting with the affected manufacturers that used toroidal, hybrid driver and frontal passenger air bag inflators designed by ARC (i.e., the inflators that are the subject of NHTSA's EA16-003 investigation). The purpose of the meeting was to assess information learned to date from the investigation and discuss potential next steps. NHTSA sent Information Request letters to the affected manufacturers to refresh the data on frontal passenger air bag inflator usage and performance collected in 2020 and to collect data on frontal driver air bag inflator usage and performance as a result of that meeting. ARC was sent an IR letter to collect specific data on the operation of the borescope and any modifications to process and procedure made since installation.

Recall Request

Despite the growing number of ruptures related to this blockage issue in the subject population demonstrating a safety defect, ARC has not made a defect determination that would require a recall of this population. Based on currently available information, NHTSA has tentatively concluded that a defect related to motor vehicle safety exists in the subject frontal driver and

passenger air bag inflators and demands that ARC issue a Part 573 Recall Report addressing that safety defect.

The National Traffic and Motor Vehicle Safety Act defines motor vehicle safety as "the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of crashes occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident and includes nonoperational safety of a motor vehicle." 49 U.S.C. § 30102(8). A defect that occurs in an essential component of a piece of motor vehicle equipment, such as in this matter involving a frontal air bag inflator, presents an unreasonable risk to safety. *See United States v. General Motors Corp*., 561 F.2d 923, 929 (D.C. Cir. 1977) ("*Pitman Arms*").

A motor vehicle or component contains a "defect" if it is subject to a significant number of failures in normal operation. *See United States v. General Motors Corp*., 518 F.2d 420, 427 (D.D.C. 1975) ("*Wheels*"). To establish that a significant number of failures exist, the Agency need only show that the figure is more than *de minimis*. *See id.* at 438 n.84. The Agency must also show that the failure condition occurred under circumstances which, in the absence of a defect, would not have occurred. *See United States v. General Motors Corp*., 841 F.2d 400, 412 (D.C. Cir. 1988) ("*X-Cars*"). An air bag inflator that ruptures when deploying in a vehicle is plainly defective. At a minimum, the following seven domestic field events involving subject driver and passenger inflators are more than *de minimis*:

- On January 29, 2009, a driver side air bag inflator ruptured in a (MY) 2002 Chrysler Town and Country minivan in Ohio. The air bag module was produced by Key Safety Systems and used a dual stage ARC inflator. The inflator was manufactured in Knoxville. The driver was severely injured during the incident.

- On April 8, 2014, a driver side air bag inflator ruptured in a MY 2004 Kia Optima in New Mexico. The air bag module was manufactured by Delphi and had a single stage ARC inflator. The inflator was manufactured in Knoxville. The driver sustained injuries to her face and legs.

- On September 22, 2017, a driver side air bag inflator ruptured in a 2010 Chevrolet Malibu in Pennsylvania. The air bag module was produced by ZF-TRW and used a dual stage ARC inflator. The inflator was manufactured in Xian, China. The driver sustained facial and head injuries.

- On August 15, 2021, a driver side air bag inflator in a 2015 Chevrolet Traverse ruptured in Michigan. The air bag module was produced by Toyoda Gosei and used a dual stage ARC inflator. The inflator was manufactured in Reynosa, Mexico. The air bag module was a replacement module. The vehicle had been in a prior frontal collision and the original air bag module deployed with no issue. The original air bag module was, also, produced by Toyoda Gosei and used a dual stage ARC inflator. The driver sustained fatal injuries.

- On October 20, 2021, a driver side air bag inflator in a 2015 Chevrolet Traverse ruptured in Kentucky. The air bag module was produced by Toyoda Gosei and used a dual stage ARC inflator. The inflator was manufactured in Reynosa, Mexico. The driver sustained facial injuries.

- On December 18, 2021, a passenger side air bag inflator ruptured in a 2016 Audi A3 e-Tron in California. The air bag module was produced by Joyson Safety Systems and used a dual stage ARC inflator. The inflator was manufactured in Reynosa, Mexico. The driver and passenger were injured.

- On March 22, 2023, a driver side air bag inflator in a 2017 Chevrolet Traverse ruptured in Michigan. The air bag module was produced by Toyoda Gosei and used a dual stage ARC inflator. The inflator was manufactured in Reynosa, Mexico. The driver sustained facial injuries.

Based on certain of these field incidents, vehicle manufacturers conducted the recalls listed above.

In addition, NHTSA is aware of at least two field incidents outside the United States:

- On July 11, 2016, a driver side air bag inflator ruptured in a MY 2009 Hyundai Elantra in Canada. The air bag module was produced by Mobis and used single-stage ARC air bag inflator. The inflator was manufactured in Xian, China. The driver sustained fatal injuries.

- On October 16, 2017, a passenger side air bag inflator ruptured in a MY 2015 Volkswagen Golf in Turkey. The air bag module was produced by Key Safety Systems (now known as Joyson Safety Systems) and used a single stage ARC inflator. The inflator was manufactured in Knoxville. The driver sustained no injuries. There was no passenger in the vehicle.

The subject inflators pose an unreasonable risk of death or injury that may result from an item of motor vehicle equipment that, when not defective, is designed to save lives. Air bag inflators that project metal fragments into vehicle occupants, rather than properly inflating the attached air bag, create an unreasonable risk of death and injury. Accordingly, the Agency makes this demand that ARC immediately submit to NHTSA a Part 573 Recall Report that identifies a safety defect in the subject driver and passenger air bag inflators.

NHTSA's request that ARC conduct a safety recall does not constitute a formal conclusion by NHTSA with respect to the evidence in its investigative file. Also, this recall request does not constitute an initial or final decision that the subject inflators contain a safety defect pursuant to 49 U.S.C. § 30118, an order to recall vehicles, or a decision that ARC violated the law.

If ARC decides not to conduct the requested recall, it must provide ODI with a full explanation of its decision, including any additional analysis of the problem beyond ARC's past presentations. If ARC fails to initiate a recall, the Agency may proceed to an initial decision that

this air bag inflator contains a safety defect, pursuant to 49 U.S.C. § 30118(a), and may take other appropriate action. An initial decision will be accompanied by the publication of a Federal Register notice describing the alleged safety defect and the ODI investigation and scheduling a public meeting.

ARC's written response to this letter referencing the identification codes in the upper right-hand corner on page 1 of this letter, must be submitted to this office no later than **MAY 11, 2023**, by email to sharon.yukevich@dot.gov. It is important that ARC respond to this letter on time. This letter is being sent pursuant to 49 U.S.C. § 30166, which authorizes this Agency to conduct investigations and require the submission of reports that may be necessary to enforce Chapter 301 of Title 49 of the U.S. Code. Failure to respond promptly and fully to this letter may be construed as a violation of 49 U.S.C. § 30166, which could subject ARC to civil penalties pursuant to 49 U.S.C. § 30165.

If you have any questions about this letter, please contact Sharon Yukevich of my staff at 202-366-4925. If you have any questions regarding the recall procedures, please contact Mr. Alexander Ansley of my staff at 202-493-0481.

Sincerely,

STEPHEN ANTHONY RIDELLA

Digitally signed by STEPHEN ANTHONY RIDELLA
Date: 2023.04.27 16:24:04 -04'00'

Stephen A. Ridella, Ph.D.
Director
Office of Defects Investigation

cc: Chris Grigorian, counsel for ARC Automotive, Inc.
R. Nicholas Englund, counsel for ARC Automotive, Inc.