



## **SAFETY ALERT 2017-11**

**Issue 01**

**Date of Issue: 16<sup>th</sup> October 2017**

### **SUBJECT:**

DANGER OF CHEMICAL OXYGEN GENERATORS AND OTHER HAZARDOUS MATERIAL CONTAINED IN AIRCRAFT COMPONENTS OR USED IN MAINTENANCE

### **REFERENCE PUBLICATIONS:**

[UAE Federal Act No. 20 \(1991\)](#)

CAR PART VI CHAPTER 2

ICAO Doc 9284: TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

[FINAL REPORT AAIS Case No AIFN/0014/2013](#)

### **REASON:**

Most commercial passenger aircraft use chemical oxygen generators to provide passengers with emergency supplemental oxygen in the event of a high altitude cabin depressurisation. The chemical oxygen generators, housed in metal cans, include an activation device, chemical core, and oxygen outlet. Pulling the activation pin releases a spring-powered striker that ignites a small explosive inside the generator, initiating an exothermic chemical reaction that generates oxygen. As the reaction progresses through the sodium chlorate core, the surface temperature of the metal cylinder can reach 230 to 260 °C.

Chemical oxygen generators have a limited useful life, after which they must be replaced. Even when they have exceeded useful life, expired oxygen generators can still be actuated and are still hazardous. Because the generators contain an explosive device, a sodium chlorate oxidizer, and sometimes small amounts of other hazardous materials, oxygen generators are classified as a hazardous material. Shipping regulations pertaining to all modes of transport require that oxygen generators be equipped with two means of preventing unintentional activation. Unspent and spent oxygen generators are forbidden on passenger aircraft.

Since 2013, two cases of serious incidents leading to violation of the ICAO Doc 9284 (Technical Instructions for the Safe Transport of Dangerous Goods by Air) have been reported and investigated by the UAE General Civil Aviation Authority (GCAA) involving chemical oxygen generators transported on a passenger aircraft:

- a) The first incident report can be consulted [here](#).
- b) On 29<sup>th</sup> June 2017, an aviation maintenance organisation in coordination with freight forwarding agencies offered for air transport a cargo shipment containing ten Aircraft Passenger Service Units (PSUs) from United Arab Emirates to the United Kingdom on passenger aircraft, where as per the current ICAO Doc 9284 (Technical Instructions for the Safe Transport of Dangerous Goods by Air) and the IATA Dangerous Goods Regulations, these generators are forbidden for transport on passenger aircraft unless certain special provisions are complied with.



Many irregularities and non-compliances were found during the investigation carried out by the GCAA:

- 1) The PSUs had been mis-declared as UN1072 Oxygen Compressed whereas they must have been declared as UN3356 Chemical Oxygen Generators;
- 2) The PSUs had been transported on passenger aircraft;
- 3) The shipment was found with discrepancies in the documentation, packaging, marking and labelling;
- 4) The PSUs were not secured and have been shipped without the safety pin/cap attached; and
- 5) One of the PSU was labelled as “UNSERVICEABLE”, which as per Special Provision A111 of the Dangerous Goods Regulations is FORBIDDEN for air transport.

These serious incidents must remind the aviation community with the unfortunate crash of [ValuJet flight 592](#) in 1996 as a fire in the cargo compartment “initiated by the actuation of one or more oxygen generators being improperly carried as cargo”. The ValuJet flight 592 crash resulted in the death of all 110 passengers and crew onboard. The NTSB, in its findings, stated, “Given the potential hazard of transporting oxygen generators and because oxygen generators that have exceeded their service life are not reusable, they should be actuated before they are transported”.

This Safety Alert is issued to:

- a) alert aircraft operators, maintenance organisations and all other entities of the necessity to comply in all respects to UAE Civil Aviation Regulations Part VI, Chapter 2 – Transport of Dangerous Goods by Air and implement a programme to handle chemical oxygen generators and any other hazardous materials in accordance with recommended practices; and
- b) stress on the importance of the GCAA and NTSB findings during those investigations.

*This Safety Alert is information only, recommendations are not mandatory. At this time, the safety concern described in this Safety Alert does not warrant the issuance of a Safety Decision. However, it is the responsibility of the concerned organisations / individuals<sup>1</sup> to implement them and the GCAA may during its oversight activities verify the means concerned organisations / individuals have established to: (1) comply with applicable Dangerous Good Regulation which states that “No person or entity may offer or accept dangerous goods for air transport unless those goods are properly identified, classified, packaged, marked, labelled and documented as required...”; and (2) prevent any occurrence of the safety concern described in this Safety Alert.*

## RECOMMENDATIONS:

### Recommendation No. 1:

UAE and Foreign Aircraft Operators should:

- a) review their operations system to:
  - i. ensure compliance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air or equivalent when the maintenance organisation is not located in the UAE or certified by the GCAA; and
  - ii. report, to the GCAA, any dangerous goods occurrence leading to a non-compliance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air;

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<sup>1</sup> The GCAA would like to remind that any non-compliance with regulation related to Transport of Dangerous Goods is an offence against the safety of aircraft - Article 55(3) of [Federal Act No. 20 \(1991\)](#) refers.



- b) *not accept any Dangerous Goods for air transportation if not processed through one of the GCAA Dangerous Goods Certified Freight Forwarders and/or Cargo Agencies<sup>2</sup>;*
- c) *amend their procedures and relevant operational manuals to ensure that chemical oxygen generators are transported in strict compliance with the Dangerous Goods regulations;*
- d) *amend their procedures and relevant operational manuals to ensure that chemical oxygen generators that have exceeded their service life are not transported unless they have been actuated and their oxidizer core has been depleted;*
- e) *disseminate a warning notice to their concerned staff, contractors and sub-contractors to effectively communicate the potential danger posed by such generators if not transported in accordance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air;*
- f) *develop and implement a programme to ensure that other aircraft components which classified as dangerous goods are properly identified, declared and that effective means are established to safely handle those component after they are removed from aircrafts. Coordination between aircraft and component OEMs, Aircraft Operator and Maintenance Organisation is essential to ensure that the programme is effective; and*
- g) *review the adequacy of current industry practice and, if warranted, develop and implement a system requiring items delivered to shipping and receiving areas and stores areas to be properly marked identified and classified as dangerous goods or non-dangerous goods including the establishment of procedures for tracking the handling and disposition of dangerous goods.*

**Recommendation No. 2:**

*Maintenance Organisations<sup>3</sup> should:*

- a) *review their operations system to:*
  - i. *ensure compliance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air or equivalent when the maintenance organisation is not located in the UAE or certified by the GCAA; and*
  - ii. *report, to the GCAA, any dangerous goods occurrence leading to a non-compliance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air;*
- b) *not accept any Dangerous Goods for air transportation if not processed through one of the GCAA Dangerous Goods Certified Freight Forwarders and/or Cargo Agencies<sup>2</sup>;*
- c) *amend their procedures and relevant operational manuals to ensure that chemical oxygen generators are transported in strict compliance with the Dangerous Goods regulations;*
- d) *amend their procedures and relevant operational manuals to ensure that chemical oxygen generators that have exceeded their service life or reported faulty are not transported unless they have been actuated and their oxidizer core has been depleted in accordance with the manufacture instruction and clear documentation provided to confirm this action;*

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<sup>2</sup> List of GCAA Dangerous Goods Certified Freight Forwarders and/or Cargo Agencies is available at [dangerousgoods@gcaa.gov.ae](mailto:dangerousgoods@gcaa.gov.ae)

<sup>3</sup> This recommendation applies to all organisations certified in accordance with CAR-145 or CAR-ORG.



- e) *disseminate a warning notice to their concerned staff, contractors and sub-contractors to effectively communicate the potential danger posed by such generators if not transported in accordance with CAR PART VI CHAPTER 2, Transport of Dangerous Goods by Air;*
- f) *develop and implement a programme to ensure that other aircraft components which classified as dangerous goods are properly identified, declared and effective and clear instructions are established to safely handle those component after they are removed from aircrafts. Coordination between aircraft and component OEMs, Aircraft Operator and Maintenance Organisation is essential to ensure that the programme is effective;*
- g) *review the adequacy of current industry practice and, if warranted, develop and implement a system requiring items delivered to shipping and receiving areas and stores areas to be properly marked, identified and classified as dangerous goods or non-dangerous goods including the establishment of procedures for tracking the handling and disposition of dangerous goods;*
- h) *ensure that maintenance personnel, including mechanics, shipping, receiving and store personnel are provided with initial and recurrent Dangerous Goods training material commensurate with their job responsibilities; and*
- i) *ensure that routine work cards used during maintenance of aircraft:*
  - i. *provide, for those work cards that call for the removal of any component containing hazardous materials, instructions for disposal of dangerous goods or a direct reference to the maintenance manual provision containing those instructions; and*
  - ii. *include a signature block on any work card that calls for handling a component containing dangerous goods.*

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