



**BUREAU OF
DANGEROUS
GOODS**

U.S. Requirements for Transport of UN3356, Chemical Oxygen Generators March Newsletter

While nearly twenty-two years have passed since the tragic crash of ValuJet Flight 592 in the Florida Everglades, the lessons learned still carry great relevance to the dangerous goods transportation community. As a shipment of improperly prepared and uncommunicated chemical oxygen generators was identified as the catalyst in that accident, in the years since we have seen renewed emphasis on training, recognition of undeclared dangerous goods and additional restrictions on transporting these articles.

Chemical oxygen generators are widely used to generate oxygen for respiratory support, for example in aircraft, spacecraft, submarines and other scenarios that call for breathing apparatus. Upon activation of the device, a chemical reaction is initiated during which both heat and oxygen are generated. Initiation of the reaction can be achieved by a percussion device, friction device or electric wire, and typically relies on a small explosive charge that is triggered when the device is activated.

As the dangers associated with these devices include simultaneous generation of heat and oxygen, strict safeguards are in place requiring, among other things, the incorporation of means to prevent inadvertent activation during transport. These safety measures are detailed in 49 CFR §173.168(c) and are critical to ensuring safety in transport. This section also requires the use of rigid outer packaging that is capable of meeting both the *Flame Penetration Resistance Test* specified in 49 CFR Part 178 Appendix E, and the *Thermal Resistance Test* as specified in 49 CFR Part 178 Appendix D, commonly referred to as "DOT31FP" packagings.

All of the modal dangerous goods transport regulations state that a chemical oxygen generator containing an explosive actuating device may be transported only when excluded from Class 1 in consideration of the nature and character of explosive substance contained, in strict accordance with the UN classification scheme for explosives.

In the United States, classification of explosives requires approval from the national authority, which is the Associate Administrator for Hazardous Materials Safety at the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration, and US law prohibits transport of explosives without this approval. The approval process is explained in 49 CFR §173.156; upon successful completion an approval document is issued to the device's manufacturer. This approval document specifies the classification details of the device, and also includes a 10-digit product reference number with the letters "EX" as a prefix (aka EX number).

Which brings us to the US approval requirements for shipping UN3356...

49 CFR §173.168(a) states that a chemical oxygen generator that is transported with an explosive or non-explosive means of initiation attached must be classed and approved by the Associate Administrator in accordance with the U.S. approval process for explosives. Further, §172.320 requires that the assigned EX number is marked on the package, or alternately shown in association with the Proper Shipping Name description on the dangerous goods shipping paper / declaration. (This information is reiterated in U.S. Variation USG-18 of the IATA Dangerous Goods Regulations.)

What does this mean for U.S. shipments of UN3356?



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A chemical oxygen generator that has not been previously activated will have a means of initiation attached. (NOTE: Used/expended chemical oxygen generators are FORBIDDEN for air transport.)

Therefore, when offering UN3356 with a means of initiation attached for transportation to, from or within United States' territory, the material must be packaged in accordance with the applicable requirements of 49 CFR, and the EX number assigned to the device must be shown on the shipping paper or on the package (or both). If you are not in possession of the EX number, you must obtain it from the manufacturer or supplier in order to comply with the U.S. requirements.

-Written by Sandra Harding of BDG