

MRO Services

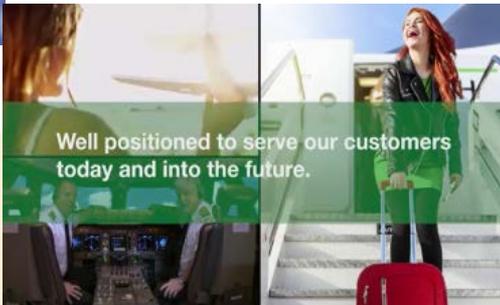
Delivering Fully Compliant, Reliable and Proven Ozone Converter Regeneration Services



Improving air quality with innovation and intelligent emission control technologies for a sustainable future.



Protecting people and equipment from unwanted pollutants with BASF's innovative catalysts solutions.



Well positioned to serve our customers today and into the future.

Improving Cabin Air Quality with BASF MRO Services

Enhanced comfort and safer in-flight operations for pilots, crew and passengers



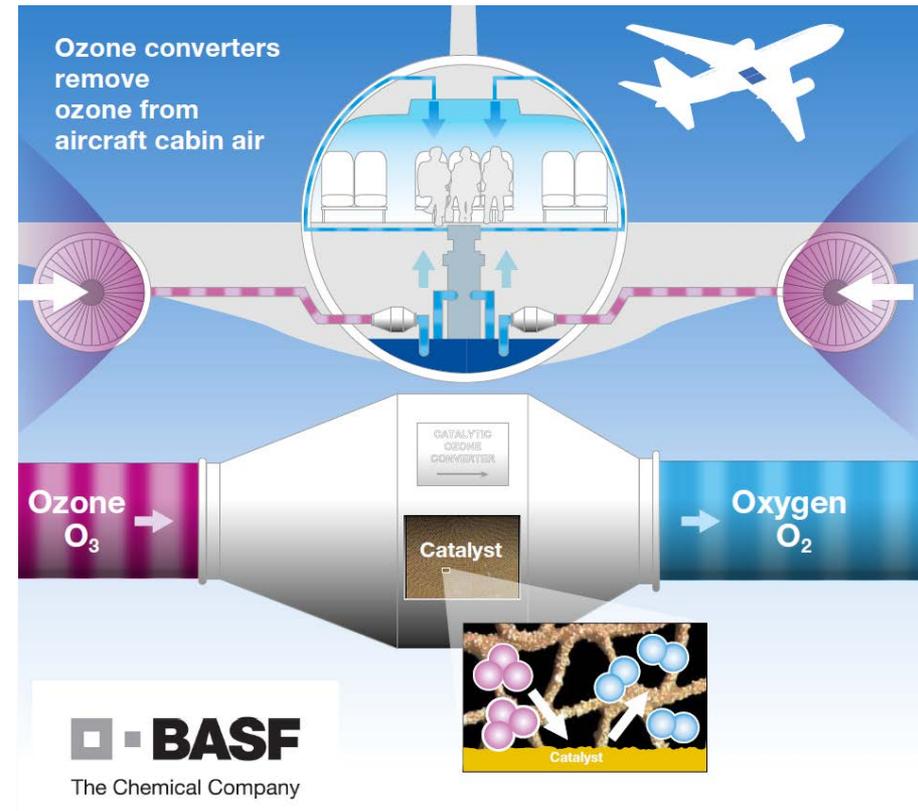
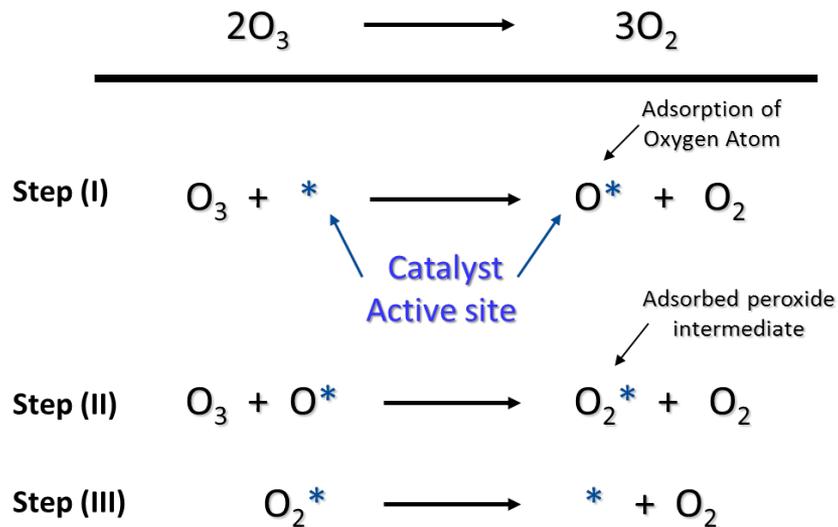
Doing our part in creating an enjoyable aircraft cabin experience.

Aircraft Air Handling System

BASF Deoxo Ozone/VOC Converters

Aircraft Environmental Control System (ECS)

- Regulates cabin air supply, pressure and temperature
- Outside air incorporated through engine bleed air (heated, pressurized)
- Catalytic ozone converter unit process bleed air in route to cabin

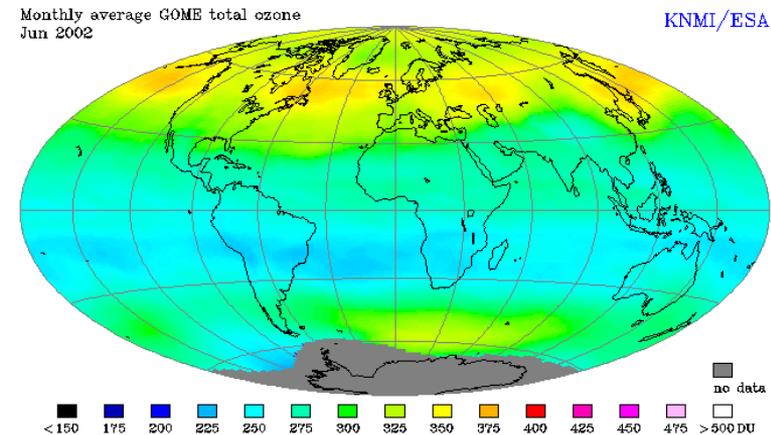


BASF Deoxo Ozone Converters Create Healthier Cabin Air

- Standard aircraft cruising altitudes from 9 km to 13 km (up to ~3 ppm O₃ possible)
- FAA in the US (EASA in the EU) regulates O₃ cabin air concentrations
 - **100 ppb** 3 hr average O₃ (up to 95% conversion)
 - **250 ppb** peak O₃

Recent in-flight evaluations (2008/2010/2013)

- Pacific & Asian Intl flights (no converter info)
 - **Failed:** 20% with **3 hr average** O₃ greater than 100 ppb
- US domestic flights *without* O₃ catalyst converter
 - **Failed:** 1/46 flights with **peak** O₃ greater than 250 ppb
 - **Concern:** 10% with **peak** O₃ greater than 100 ppb
- US domestic flights *with* O₃ catalyst converter
 - **Passed:** 100% with **3 hr average** values less than 10 ppb



Aircraft Volatile Organic Compounds (VOC) Pollutants

Optional Ozone/VOC dual function converter

- Aircraft bleed air taken from jet engine after compression, before combustion stage
- Cabin odor comfort levels affected by aircraft fluid VOCs introduced through bleed air intake
- Commonly associated with **episodic events** related to temporary seal failures or leaks of aircraft fluids
- Result in the intake of potential contaminants into bleed air
 - Engine oils
 - Hydraulic fluids
 - Cleaning/Deicing fluids
- Specific aircrew health concerns related to organophosphate compounds in the bleed air

