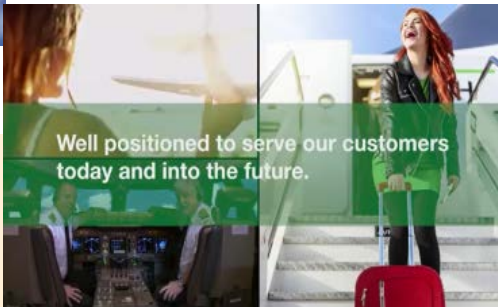


MRO Services

Delivering Fully Compliant, Reliable and Proven Ozone Converter Regeneration Services



Improving Cabin Air Quality with BASF MRO Services

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

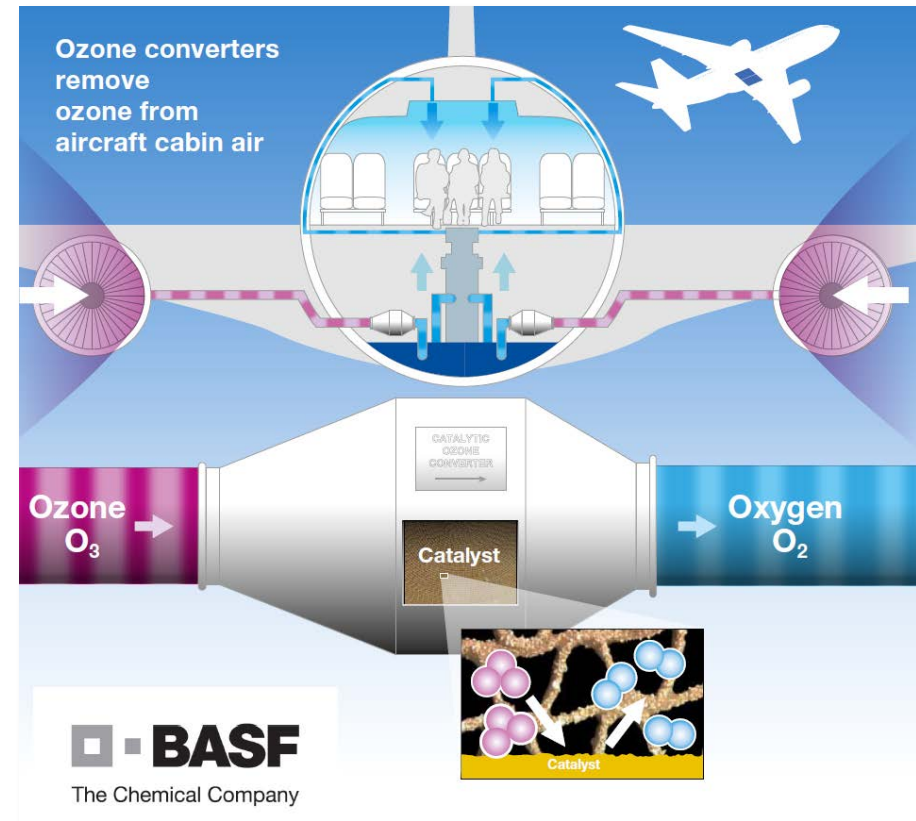
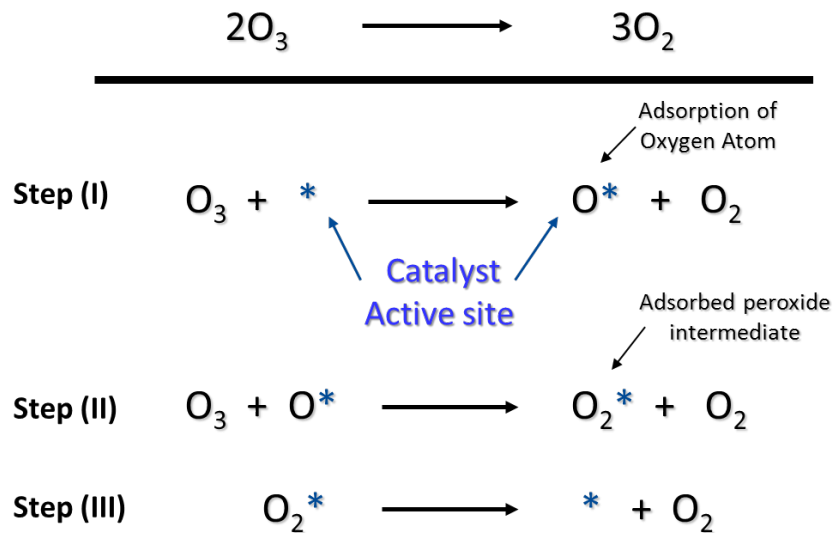


Aircraft Air Handling System

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

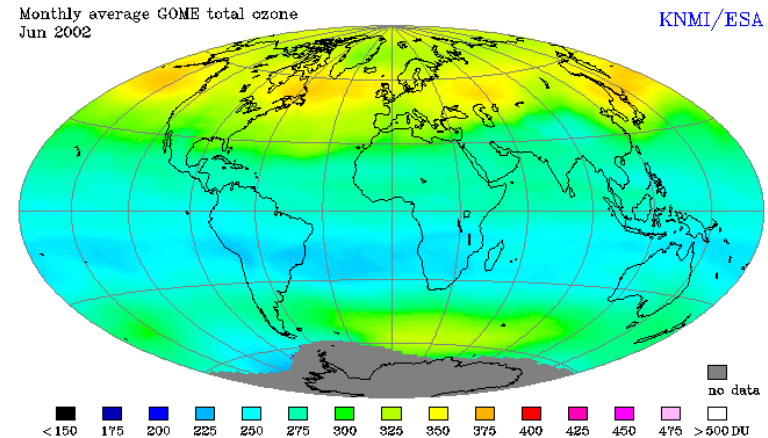


BASF Deoxo Ozone Converters Create Healthier Cabin Air

- 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

