

# Handelsblatt

<https://www.handelsblatt.com/unternehmen/industrie/streit-in-der-luftfahrt-gefaehrliche-kabinenluft-nervengifte-in-10-000-metern-hoehe-/26060578.html>

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Handelsblatt

## **Dangerous cabin air: Nerve poisons at 10,000 metres altitude**

**The air in civil aircraft is potentially harmful to health. Finally, an EU standard is to come - a weak compromise is emerging.**

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Paris. Already on their way to the runway, the pilots of British Airways flight BA-466 from London to Madrid noticed a strange chemical smell in the cockpit on February 16 this year. The cabin crew confirmed this outside the cockpit, but the 319 took off as planned, and the smell disappeared after about two minutes. But then, as the jet approaches Spain, the pilots feel increasingly tired. The flight attendants also look exhausted, and the service mishaps are increasing. Nevertheless, Flight BA-466 can still land in Madrid about two hours after take-off as planned. There, the medical service immediately orders the personnel to be connected to an oxygen supply for 20 minutes. incidents like this can be found again and again on portals such as the AviationHerald, a flight safety website that is considered to be serious. It's no wonder: Since 1955, people have known that cabin air can be harmful to health. It's not about the corona virus, it's about chemistry: what we breathe at an altitude of ten kilometers is what is known as bleed air. Only then is half of the cabin air recycled and filtered. Bleed air can be contaminated with a cocktail of toxic substances, including burnt residues of engine and hydraulic oil

65 years, thousands of illnesses and hundreds of studies after the first warning about tapped air, the EU now wants to finally adopt a standard. According to information from the Handelsblatt, the EU standards authority CEN wants to finalise a proposal in September, which will then be adopted by the bodies.

This will put an end to the six-year-old dispute between trade unions and consumer associations on the one hand and industry and airlines on the other. The problem is that a compromise for a standard is emerging that will have hardly any bite - at least there will be a standard for the first time

ever. It sounds like a staircase joke, but it isn't: So far, the EU has a standard for the quality of the air that compressors suck in. But not for the air that passengers breathe in for many hours - and pilots and flight attendants will breathe it for the rest of their working lives. As early as 1955, the American Henri A. Reddall of the US Engineers Association SAE wrote: "The air coming out of the compressors of some turbojet engines with high compression ratios is contaminated because the compressor air is discharged internally with engine oil. External leakage of oil or other fluids where such fluids can enter the engine air intake can also cause contamination.

As an anti-wear agent and to reduce abrasion, substances are added to the synthetic oils in aircraft engines whose toxicity is known and which are therefore prohibited on the ground but not in the air. Anyone who flies more often has experienced how it suddenly smells of kerosene or chemicals. If this occurs on a large scale, it is a so-called "fume event".

### **Unions wrangling with the industry**

For six years, work has finally been underway on such a standard, under the responsibility of a committee of the European Standardization Authority CEN. The work is being done in camera. One does not even know who is represented in the CEN committee. Internally, there were a lot of internal problems at first, if Vincent Edery is to be believed. The Frenchman is a key figure in the struggle for better air above the clouds: he heads "TC436", the committee of the EU standards authority CEN, which has been negotiating discreetly since 2015.

Edery talks openly about the conflicting interests in his committee: "The unions wanted to prescribe to the manufacturers a technology that avoids the polluting substances at source - the transition to a system in which no more air is conducted from the engines into the cabin. But the manufacturers did not agree to this, the Frenchman soberly states.

The workers also wanted to prescribe activated carbon and high-performance filters and sensors that would sound the alarm if any pollutants were to be detected during the flight. This is not likely to happen either: "The standard will not prescribe anything," judges Edery. Although it is "our intention to limit the concentration of toxic gases", the new standard, if it is actually agreed, "does not prescribe, explains, describes how it could be done".

CEN works according to the delegation principle. The secretariat for "TC 436" has been handed over to the French standards authority AFNOR, which has entrusted the work to BNAE, the "Aerospace Standards Office", of which Edery is a member.

The expert Marina Epis also works at BNAE. She does not beat about the bush, openly saying that the concerns of trade unions and consumers have made the technology more expensive, "and if the standard is too expensive to apply, manufacturers do not apply it". A CEN standard is only binding if the EU Commission prescribes it.

The European aircraft manufacturer Airbus has no reason to worry anyway: "Nowhere is the air quality better than in an aircraft," says CEO Guillaume Faury. The EU aviation safety authority EASA has found in studies that the cabin air measured in experiments is harmless, in some cases better

than in offices or classrooms. The EASA study also points out that "there is currently no demonstrable link between cabin air and health problems".

And because this is the case, there is no need for sensors for pollutants on board, concludes the French expert Epis. But how can you know that the cabin air is safe at all times if it is not measured at all during the flight? Epis truncates and then says with astonishing frankness: "I can't explain that to you either."

She doesn't have to. Because in addition to the discussions about standards, there is the normative power of the factual: There are about 25,000 civil jets in the world, and they all use bleed air.

The regulators like the FAA and the European EASA could force manufacturers to change, but don't think about it, Judith Anderson regrets. She represents the European Transport Workers' Federation (ETF) in the CEN committee.

Aircraft and engine manufacturers and the airlines have the upper hand in haggling over the standard: without consensus in the secret consultations, nothing will happen in the coming years, but if the critics waive certain requirements, "we can at least make some progress with a standard," says Anderson. Better maintenance, better training and awareness-raising of workers should be prescribed. After all, whether a seal in the engine just holds or is perfectly tight can make a big difference.

### **The industry rejects the allegations**

One of Anderson's hopes is for sensors that would sound the alarm if there were pollutants in the cabin air. They would at least be strongly recommended in the new text under discussion, although probably not mandatory. "We have a fleet of aircraft for the next 40 years with the air coming out of their engines, and we have to deal with that, even if we actually have more far-reaching goals," says Anderson, explaining her pragmatism, which she does not want to see as capitulation.

The EU consumer association ANEC is much tougher on the standard: "The document can even be dangerous because it creates a false sense of security".

Over the years, various studies have shown that flying personnel suffer above average from disorders such as dizziness, depression or miscarriages. The Federal Aircraft Accident Investigation Bureau reports 663 incidents involving contaminated tap air in the period 2006 to 2013. In some of these cases there was a "high probability of accidents".

But the air sovereignty on this issue is clearly held by the manufacturers and the airlines. "They deny the connection with the air being tapped, just as the harmfulness of asbestos or cigarettes has long been denied," criticises the European Trade Union Confederation ETUC.

Neither in the USA nor in Europe is there a uniform, stringent reporting obligation for incidents involving polluted air. That is why there is no clear register, and that is why the defenders of the engine air can claim, in a nutshell, that the technology is beyond any doubt. Expert Anderson has analysed data from the US Federal Aviation Administration (FAA). According to the data, there was

one serious incident per 5000 flights in which oil smoke or mist was emitted from the air supply. That's 5.4 incidents per day where the bleed air carries toxic components.

But what about the reference by Airbus and Lufthansa to the EASA study, according to which "the air quality of measurement flights is comparable to that of indoor spaces such as classrooms or offices"? The study exists, but its results are based on only 69 test flights with specially prepared machines - probably too few to be representative. Another EASA study warns of the lubricating oils that are burned at very high temperatures (pyrolysis) in aircraft engines and then forced into the cabin air: "Prolonged exposure to pyrolysis products can exacerbate their potential neurotoxicity... Current data suggest that the nervous system is the most sensitive to the potential effects of the turbine's pyrolysis products.

### **There are alternatives to bleed air**

The EU authority for aviation security, Airbus and Lufthansa do not say so, therefore urges a practicable standard for the cabin air, as it informs the Handelsblatt: "This includes the description of measurement methods, the chemical compounds to be measured and their limit values. The present draft standard must be "sharpened up". Incidentally, the introduction to the draft currently under discussion states: "The oils used in aircraft engines...and the ultra-fine particles produced can increase the transport of toxins to the brain."

Scientists like the Australian Chris Winder speak of "aerotoxic syndrome": "A growing number of flying personnel develop symptoms such as dizziness, fatigue, nausea, disorientation, confusion, visual disturbances, lethargy and muscular rigidity as a result of short and long-term exposure. Nerve toxins are a "major issue in aviation safety", especially when people are frequently exposed to them.

The last thing you want to see in an airplane are pilots who have impaired vision or lose their orientation. It always comes back to that, Susan Michaelis states in an article for the World Health Organization (WHO). Michaelis, who, like Anderson, represents the ETF, has investigated several hundred cases of pilots of a regional aircraft, the Bae146/Avro-RJ: "Nearly two-thirds of Bae146/Avro-RJ pilots have reported immediate complaints, 30 of 274 Bae146/Avro-RJ pilots have reported medium and long-term health effects of air pollution, cardiovascular complaints, disorders of the nervous system or digestive tract.

It is difficult to understand why industry and airlines do not solve the problem by making design changes in the truest sense of the word. Is it the cost? After all, there are alternatives to bleed air, in the Dreamliner from the air supply does not come from the engines. And suppliers are working on a combination of activated carbon filters and catalytic converters that promise to remedy the problem.

"Thou shalt not draw breath for the cabin from engines"

Neither Boeing nor Airbus likes to talk about this topic. Even when asked, Boeing does not want to say whether it is planned to generally install the system without "bleed air" in the future and whether it is more expensive. Airbus refuses to comment on the issue and simply says: "Airbus is pursuing technical progress in all areas related to cabin air" Lufthansa says in no uncertain terms: "We do not consider it sensible to turn away from bleed air."

French engineer Amine Mehel from the Estaca School of Engineering believes that the learning curve in the aviation industry is simply too flat: "The car industry has understood that indoor air quality is a major issue for consumers and is funding many studies on it. The airplane manufacturers would disagree.

In September, the CEN committee, which Ederly chairs, will have formulated the draft. So there may soon be a standard which will bring small progress but no solution. The experts will continue to debate, with pilots and passengers continuing to breathe potentially polluted air.

"But the technical imperative is actually quite simple," Expert Anderson: "You shouldn't draw air for the cabin from engine outlets, and if you do, you should at least put a filter between the engine and the human being."