



## WORKPLACE HAZARDS

Fume Events (ref ICAO) from Oil or Hydraulic Fluid



# WHAT ARE TOXIC FUMES

Toxic Fumes happen when engine oil or hydraulic fluid fumes contaminate ventilation air supplied to the cabin/flight deck (mostly function of design; also, maintenance).

Not usually any visible signs – just a “**bad smell**” can be routine, low-level transient or less-frequent but higher – level and longer lasting.

Typical – no visible signs



Unusual – visible haze



**\*\*Always investigate SMOKE!!**

Synthetic oils were invented in 1952 so you can say this is when the problems with fumes accelerated. Airlines, AC manufactures, and engine manufactures were aware!

Late 90's AFA became aware of these issues!

## Investigation into headaches reported by United and AA flight attendants on the DC-10 (Gaume, 1973)

### ANALYTICAL CONSIDERATIONS CONCERNED WITH CEPHALAGIA ON THE DC-10

The presence of a pungent, acrid, sour, disagreeable or irritating odor has been described as beginning immediately after engine start by various airlines' Cabin Crews, by Douglas engineering, flight test and product support personnel during flights they have made aboard the DC-10 at various times. United and American Airlines have both raised the question as to the cause of headaches in Cabin Attendants (C.A.'s) on board the DC-10. United Cabin Attendants have made statements that their passengers have requested more aspirin for headaches during DC-10 flights than on other United aircraft. One Douglas man on a DC-10 flight to Tulsa developed a moderately severe headache, and when the C.A. discovered he was from Douglas, railed at him for the headaches caused by the DC-10.



## FAST-FORWARD TO 2023

Crews **continue to report fume events**, sickness, flight safety issues

Only one **bleed-free air supply system** design (B787)

No **bleed air filters on the** cabin air (only one option for B757 flight deck)

No **sensors** to alert crews to oil fumes

Limited or off topic **training** for crews to recognize/respond to fume events\*

No standardized FA crew fume event **reporting** system – \*\*NK Only our pilots have the form.

Can seriously compromise **flight safety/crew health**

They happen **daily**

They are **preventable**



- Let's Talk about \*training. Spirit is one of four AFA carriers (of 19) that has training for “AQEs” in their initial and AR training programs. This has been beneficial for our Flight Attendants to understand, recognize and report these workplace hazards. We also have a section in our FAM 14.3.14. This was introduced in FAM 19.01; However, AFA wants to focus just on the Toxicity of oil and hydraulic fumes.
- **What is Air Quality?**
- Air quality refers to the degree to which the air is **suitable or clean** enough for humans or the environment. Good air quality means the air is **FREE from harmful substance**.
- **Air Quality Event**
- An Air Quality Event is one where you may be **exposed to anything harmful or toxic** in your environment or workspace like on the aircraft.
- **Odors**
- We know that cabin odors are frequent and come from many sources. Some are just downright dirty these are considered “normal” and do NOT affect the air quality. Breathing something that **causes immediate discomfort or medical symptoms** are ones you need to worry about.
- *Be cautious to olfactory fatigue this can reduce your awareness to a toxic exposure.*



- Cabin air is **NOT** fresh air.
- Constant Outside - Air must **be compressed in either the aircraft engines or the APU** (Auxiliary Power Unit) This compressed air is what gets supplied to your working environment through the cabin and flight deck air vents. The engine/APU compressors are extremely hot, and they are **both lubricated with oil**. While in a normal state oil is not toxic when inhaled, but when it is heated the elements of the oil change and it becomes **TOXIC**. This is what is referred to as a **TOXIC Fume Event**; as the **heated oil contaminates the bleed air**.
- There have been many incidents where the crews describe an unusual odor which is later confirmed to be oil fumes in the bleed air stream – They may feel unwell, the pilots will don oxygen, the flight may be diverted, met by paramedics, and the crew might go to hospital. **According to the FAA's service difficulty reporting (SDR) system at least 0.86 flight crews per day reported issues with fumes** during flight requiring mechanical service.
- **But there is usually no fire, no smoke.**

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## **Common Odors:**

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Cabin initiated odors include unclean garbage cans(*why you should tie the bags*)

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Dirty diapers

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General smells in the cabin or LAV

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Sweaty /not showered passengers (*leaving the beach to catch that flight*) or those with Medical Concerns, this is where our Carriage Laws may come into play.

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Food unusual or spoiled

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Vomit (*This must be reported to be cleaned properly and disinfected for BBP or other viruses and bacteria*)

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## **Cleaning agents / Air Fresheners:**

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While we utilize these items on our AC, when **overused**, they can cause temporary irritation. Our Jet Scent states on the bottle “Do not Overspray” The Celest Squares states on the back to leave the deodorizer in the foil packet and just open to release the fragrance.

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**Outside sources:** these may permeate the entire cabin as air comes in from the front and exits in the aft)

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Jet exhaust (waiting to take off and at the gate)

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Burned rubber

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Sweet smell from deicing fluid

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**These items while unpleasant will NOT usually cause injury or illness**

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**Note:** if you smell fuel/diesel especially at the gate notify the CA this could be from a fuel spill.

Items you will **rarely** or **NEVER** encounter onboard the AC include rotten or undercooked meat, detergents, and even garbage dumps. (Note: \*RSW)

From time to time, you may have a chemical smell of a passenger painting their nails-this is considered a hazmat **ORM-D**

Campfires smoky odors may intense if flying over an active fires.

Musty and moldy smells may be present during rains storms/high humidity

But again, **these will rarely cause symptoms!**

Hydraulic Fluid has been described as **acrid**

**Toxic/Oily odors-**

**TN-600** has been described as **fresh paint, driving through a carwash, anti-freeze, markers**

Each person will create a memory of what they smell, some have described the **Mobi-Jet oil like a wet dog, dirty sock** due to an additive added to the oil.



We know many toxic fume events from the packs are **during engine power changes** (Take off / Final Descent) . This is when the aircraft's engines can reach temperatures in excess of 500 degrees Fahrenheit.

This is also what we refer to as “**sterile flight deck**” – Refer to your **FAM 6.5** Captains Briefing for interruptions to the Flight Deck as only safety-critical communication is allowed.





- **During the Flight/Cruise**

- You will need to investigate odors, as oil and hydraulic toxic fumes **will not be in one row or one area..** You may also display immediate onset of symptoms. Use the AFA check list to form a consensus and Notify the CA.
- Compressed Air is supplied by **two packs** on our Aircraft. Pack #1 supplies the FD & the first part of the AC. Pack #2 is the back part of the AC and AFT galley. **Faulty engine seals and overservicing are the primary cause** for the leaching of oil into the engine causing a Toxic fume event.
- If it is not in the front CALL the CA so they can isolate the pack **and start the air extraction process to minimize your exposure.** IF you call from the AFT, communicate with the Lead and inform them of the call so when the CA calls back, they are aware. Also report any medical information to the lead and utilize MedLink forms as needed.
- Our FAM has instructions for intentional release of fumes and chemicals in the AC, this is specific to certain rows/areas in the AC not Toxic fumes coming from the air vents. **Follow your FAM** for HAZMAT and Chemical release in the cabin.

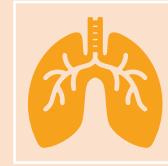
# THE PILOTS RESPONSIBILITY

- ✓ SHUT OFF THE APPROPRIATE PACK/FOLLOW COM PROCEDURE
- ✓ CALL MEDAIR OR MEDLINK IF REQUIRED  
(PLZ FILL OUT MEDLINK FORM QUICKLY)
- ✓ Follow FOM procedures
- ✓ Debrief Entire crew
- ✓ IF CONTINUING IN AC MAKE SURE AIRWORTHY
- ✓ Make sure to use CRM





According to the quick reference guide for health care providers \*



Health Effects of toxic fumes: The most common symptoms reported are acute respiratory, neurological, systemic and/or psychiatric symptoms. They typically occur **within minutes to a few hours** following the contaminated bleed-air event.



The **primary exposure pathway is inhalation**. Some crewmembers describe low-level chronic exposures to fumes (e.g., routine and transient fumes on engine start up).



Treatment: Promptly remove the individual from the aircraft environment and other airborne contaminants such as diesel exhaust, jet fuel, and cleaning products. **Respiratory effects should be treated according to the standard protocols for acute chemical inhalation, carbon monoxide poisoning.** Symptoms may include headaches, slowed thinking, confusion, nausea, dizziness, breathlessness, Fatigue/Collapse, Loss of consciousness, metallic taste.

*\*Robert Harrison, MC MPH, University of California San Francisco, Funding provided the Federal Aviation Administration Office of Aviation Medicine as part of a collaborative project.*




- **Immediate Medical attention may be provided by EMS** at the gate. For liability issues EMS will transfer you to a hospital if they feel your symptoms are life threatening. The CA can arrange for this.
- For symptoms that **do not** need immediate medical attention call Medaire They are an **Advisement service** provided by the company. You will speak to a service tech who may confer with a nurse if needed. However, they can also source medical treatment facilities. If you sought medical attention, they would also clear you to return to base.
- It is very important that you speak to a Inflight Supervisor **and follow all directions by HR**. HR may require you to get a medical clearance from an occupational therapy facility (Concentra) to return to active duty. Do **NOT** miss this step as you may be removed from future trips.
- Most common symptoms include **nausea, vomiting, eye irritation, throat irritation, trouble breathing and dizziness**.

# What is a Safety Data Sheet

A Safety Data Sheet (SDS), or Material Safety Data Sheet (MSDS), is a standardized document that contains crucial occupational safety and health information. It is mandated by the [International Hazard Communication Standard \(HCS\)](#). According to this standard, chemical manufacturers must communicate the hazard information of their chemicals to those who handle them, and one way to achieve this is by providing a Safety Data Sheet. These sheets are comprehensive and cover essential details such as chemical properties, potential health and environmental hazards, recommended protective measures, as well as safety precautions for proper storage, handling, and transportation of chemicals.

These are beneficial in doctors treating you and understanding what caused your symptoms.



**TURBONYCOIL 600**  
Safety Data Sheet  
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations  
Date of issue: 11/25/2014    Revision date: **02/22/2017**    Version: 1.1

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**SECTION 1: Identification**

**1.1. Identification**

|              |                   |
|--------------|-------------------|
| Product form | : Mixtures        |
| Trade name   | : TURBONYCOIL 600 |
| Product code | : TN600-1         |

**1.2. Recommended use and restrictions on use**

|                              |                  |
|------------------------------|------------------|
| Use of the substance/mixture | : Industrial use |
|------------------------------|------------------|

**1.3. Supplier**

NYCO AMERICA LLC  
3900 East Indiantown Road  
Suite 607- No. 161  
Jupiter, FL 33477  
T 1-877-872-6926  
[info@nycoamerica.com](mailto:info@nycoamerica.com) - [www.nycoamerica.com](http://www.nycoamerica.com)

**Spirits oil and hydraulic fluid SDS are available on the official Spirit-AFA website and by scanning the QR code on the Fume card.**



The effects from long-term, low-level exposures are not well understood, but animal models suggest **inhalation of these fumes may affect multiple organ systems**

US Poison Centers are mostly aware of this syndrome and are uniquely positioned to track and report these events as liaisons to FAA and other public health and flight safety advocacy groups.  
**KEEP CALLING THEM!**



## WHAT HAS AFA BEEN DOING

- **New Fume information awareness** cards distributed to all AFA carriers with specifics for each airline
- Judith Anderson AFA-International's Industrial Hygienist has been busy raising awareness with pilots, mx groups and ARFF
- **Working with Clem Furlong on creating a blood test for TCPs**
- **AFA-I sits on four cabin air committees**
- AFA-I **provides feedback to the FAA** on their cabin air webpages
- AFA-I contributed to **medical protocol** – to be published soon
- **Filed petition for rulemaking** to improve main fume even reporting rule





## 2022 Aircraft Rescue & Fire Fighting Working Group Annual Conference **CALL FOR PAPERS**

Last August, thanks to a referral from Spirit ASHSC, Mari-Rene Alu, Judith Anderson (AFA-I) presented at a conference of airport fire chiefs across the country.

Airport firefighters are sometimes required to meet aircraft because of a “fume event” even though there’s no fire, no smoke, no haze – just oil fumes. The reports usually conclude “no problem”, but they aren’t told anything about fume events.

# MEDICAL PROTOCOL FOR CREWS EXPOSED TO FUMES



Since 2008, we have encouraged our members to take the **FAA-funded medical protocol to all medical appointments**. It is helpful to convince docs that fumes are “real” but not very detailed.



AFA provides additional information – bulletin titled “What your doctor needs to know” - <http://ashsd.afacwa.org/docs/docinfo.pdf>  
Also available on the Spirit-AFA website.



In 2023, a more detailed medical protocol will be published that crews can share with their doctors to assist in their medical care/testing and treatment

# GET YOUR CARD!

## WHAT TO DO IF YOU BREATHE FUMES ONBOARD:

**A FUME EVENT is when engine oil or hydraulic fluid contaminates the ventilation air supply** to the cabin and/or flight deck. Even if there is **no visible haze or smoke**, breathing those **fumes can be hazardous**, so be informed and report them. Initial symptoms can include headache, confusion, dizziness. Some symptoms can be delayed.

Scan the QR code to report fumes/get help.



**IDENTIFY SOURCE of FUMES** – air vents or cabin item? If from **air vents**, could be oil or hydraulic fluid which contain a complex mixture of chemicals, some of which are toxic. Most oil fumes often smell like dirty socks. TN600 oil smells like solvents. Hydraulic often smells acrid.

If fumes are coming from air vents, **REPORT THAT** to the pilots. **ALSO, REPORT:** (1) type of smell; (2) where in the cabin; (3) phase of flight when noticed; and (4) whether anyone has symptoms/being treated. **IF NEEDED**, request EMTs meet the flight. **KNOW** your company procedures, including **oxygen use** onboard. **REPORT** these workplace hazards to your supervisor and AFA. **DOCUMENT** what happened with all necessary paperwork. Keep a log of your symptoms. Get **MEDICAL ATTENTION**, if needed.

Keep this fume event card on your lanyard.  
Scan the QR code to report fumes/get help.



Association of Flight Attendants-CWA, AFL-CIO | [afacwa.org/fume\\_events](http://afacwa.org/fume_events)

- **Spirit Ticket Center**

- A special section has been created under ASHS for reporting Toxic Fumes events with an option for AFA-CWA to file on your behalf to OSHA.

The screenshot shows the Spirit Ticket Center website. At the top left is the logo with the text "My Union" and "My Voice" flanking a central emblem, with "Spirit Airlines" below it. At the top right, it says "Guest User | Sign In". Below the logo is a navigation bar with four items: "Support Center Home" (with a house icon), "Knowledgebase" (with a book icon), "Open a New Ticket" (with a ticket icon), and "Check Ticket Status" (with a checkmark icon). Below the navigation bar is a search bar with the placeholder text "Search our knowledge base" and a green "Search" button. To the right of the search bar are two buttons: a blue "Open a New Ticket" button and a green "Check Ticket Status" button. The main content area features a heading "Welcome to the AFA Support Center!" followed by a paragraph: "In order to streamline support requests and better serve you, we utilize a support ticket system. Every ticket filed is assigned a unique ticket number which you can use to track the progress and responses online. For your reference we provide complete archives and history of all your tickets. A valid email address is required to submit a ticket." To the right of this text is a box titled "Featured Questions" containing a list of links: "How to Contact a Union Representative", "Schedule Adjustment Period (SAP)", "How Lines are Built", "What does 'Not Available' in Opentime Pot mean?", and "Listing Yourself as NRSA on a Deadhead".

# TCP BLOOD TEST - UPDATE

## Tricresyl phosphate

Also found in: [Acronyms](#), [Encyclopedia](#).

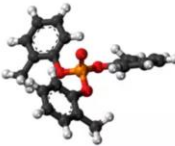
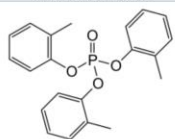
**Tricresyl phosphate (TCP)**, is a mixture of three isomeric **organophosphate** compounds most notably used as a **fire retardant** and in manufacturing for **lacquers** and **varnishes** as a **plasticizer**. It is a colorless, viscous liquid, although commercial samples are typically yellow. It is virtually insoluble in water, but easily soluble in organic solvents like **toluene**, **hexane**, and **diethylether** among others. It was synthesized by Alexander Williamson in 1854 upon reacting **phosphorus pentachloride** with **cresol** (a mixture of para-, ortho-, and meta- isomers of methylphenol), though today's manufacturers can prepare TCP by mixing cresol with **phosphorus oxychloride** or **phosphoric acid** as well. TCP, especially the all-ortho isomer, is the causative agent in a number of acute poisonings. Its chronic toxicity is also of concern. The ortho-isomer is rarely used on its own due to its extremely toxic nature outside of laboratory studies that require isomeric purity, and is generally excluded from commercial products where TCP is involved.

### Isomers

The most dangerous isomers are considered to be those containing ortho isomers, such as tri-ortho-cresyl phosphate, TOCP. The World Health Organization stated in 1990 that "Because of considerable variation among individuals in sensitivity to TOCP, it is not possible to establish a safe level of exposure" and "TOCP are therefore considered major hazards to human health."<sup>[1]</sup> Therefore, strenuous efforts have been made to reduce the content of the ortho isomers in commercial TCP if there is a risk of human exposure.<sup>[2]</sup> However, researchers at the [University of Washington](#) found that non-ortho TCP isomers present in synthetic jet engine oils do inhibit certain enzymes.<sup>[3]</sup>

Health calamities from TCP

Tri-ortho-cresyl phosphate



### Names

Other names  
 tri-o-cresyl phosphate  
 TOCP  
 tritolyl phosphate  
 tri-o-tolyl ester of phosphoric acid

### Identifiers

CAS Number • [0-78-30-8](#) ✓  
 • mixed isomers: [1330-78-](#)

- Since 2007, Prof. Clem Furlong at the Univ. WA has been developing a test to enable crews to prove exposure to TCPs onboard.
- TCPs are added to most engine oils. They are heated and supplied to the breathing air as ultrafine (tiny!) particles. Science suggests partly the size of the particles, partly the fact that they're neurotoxic, partly repeated low-level exposure for crews – can cause neurological symptoms.
- **April 2023, Furlong and team appear to have identified the modified protein in the blood that is specific to TCPs.** Blood samples from crews in fume events have it. Blood from someone who hasn't flown in > month does not. The results still need to be confirmed, but good news!

# CABIN AIR SAFETY ACT 2023

## A BILL

To improve the safety of the air supply on aircraft, and  
for other purposes.

1 *Be it enacted by the Senate and House of Representa-*  
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Cabin Air Safety Act  
5 of 2023”.

If passed, would  
require annual  
training for

crews, mechanics,  
and airport first  
responders

to respond to  
and report fume  
events.

Plus standardized  
reporting, FAA  
response,  
sensors, etc.

QUESTIONS???????