

**International Foundation
High Altitude Research Stations
Jungfrauoch + Gornergrat HFSJG**
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Sensitive measurements in progress at the Sphinx

Your activities may jeopardize the integrity of ongoing measurements at the Jungfrauoch

Please take a moment to read this:

If you are a scientist conducting experiments at the Jungfrauoch, or a technician on maintenance duty, or just a visitor getting a tour through the labs — your activities can potentially harm the quality of the many ongoing measurements. The purpose of this information pamphlet is to give you a list of substances/activities that may cause problems without your being aware of it. Please take a moment to look at this and check whether any of your activities could cause a problem for the ongoing measurements. Some of the trace gas measurements are in the sub-ppt mixing ratio level, so any small quantities of these substances brought to the lab can cause a problem.

Example of problem devices and compounds are **coolers/refrigerators** (cooling substances), **foams** (structural, insulation for coolers), **metered dose inhalers** (asthma sprays), **solvents** (for painting or cleaning dirty surfaces) **fire retardants and extinguisher** substances, **old sports shoes** (NIKE), **calibration -, buffer -, and carrier gases** used for your instruments, and **smoke** (cigarettes). The use of these substances in the entire Sphinx area may be problematic, especially near air inlets. Some of these substances may not be avoidable but your report of their presence is extremely valuable to us.

In general, keep your presence at the upper-most level of the Sphinx at a minimum despite the spectacular view.

It is **absolutely prohibited to smoke (or to light any kind of fires)** on the outer platforms to avoid contamination of aerosol measurements.

Below is a list of compounds that may be problematic.

Fluorocarbons (HFCs), halogenated chlorofluorocarbons (HCFCs), chlorofluorocarbons (CFCs), perfluorated hydrocarbons, halons, SF₆

used as cooling agents, foaming agents, propellants in sprays, fire testing equipment, fire extinguishing equipment.

contact: martin.vollmer@empa.ch

Common name	Formula	Alternative names/mixtures	use
HFCs			
HFC-134	CH ₂ FCF ₃		Cooling, foams
HFC-152a	CH ₃ CHF ₂		foams
HFC-125	CHF ₂ CF ₃		cooling
HFC-143a	CH ₃ CF ₃		
HFC-365mfc	CH ₃ CF ₂ CH ₂ CF ₃		foams
HFC-245fa	CHF ₂ CH ₂ CF ₃		foams
HFC-236fa	CF ₃ CH ₂ CF ₃		
HFC-227ea	CF ₃ CHFCCF ₃		Inhalers, fire extinguishers, calibration gas for nephelometers
R-XXX, e.g. R-404, R-407 and similar	Blends of above HFCs		cooling
HCFCs			
HCFC-22	CHClF ₂		Cooling, foams
HFC-141b	CH ₃ CCl ₂ F		foams
HFC-142b	CH ₃ CClF ₂		cooling
Halons			
H-1211	CBrClF ₂		
H-1301	CBrF ₃		
H-2402	CBrF ₂ CBrF ₂		
PFCs and SF₆			
PFC-116	C ₂ F ₆		
carbon tetrafluoride	CF ₄		
sulfur hexafluoride	SF ₆		Old sports shoes, calibration gases, electrical insulator
CFCs			
CFC-12	CCl ₂ F ₂	F-12, R-12	Cooling (old refrigerators)
CFC-11	CCl ₃ F	F-11, R-11	foams
CFC-113	CCl ₂ FCClF ₂	F-113, R-113	Cleaning of electronic parts, lasers
CFC-114	CClF ₂ CClF ₂	F-114, R-114	
CFC-115	CClF ₂ CF ₃	F-115, R-115	
methyl bromide	CH ₃ Br		
methyl chloride	CH ₃ Cl		
chloroform	CHCl ₃		
trichloro-ethylene	CH ₃ CCl ₃		cleaning
carbon tetrachloride	CCl ₄		cleaning
dichloromethane	CH ₂ Cl ₂		
trichloro-ethene	CHClCCl ₂	TCE	solvents
perchloro-ethene	CCl ₂ CCl ₂	PCE	solvents

Other important substances:

Common name	Formula	Use	Contact
Volatile organic compounds (VOCs)			martin.vollmer@empa.ch
butane			
pentane			
hexane			
xylol			
benzene			
toluene			
isoprene			
hydrogen	H ₂		
carbon monoxide	CO	Cigarette smoke, calibration and buffer gases	martin.steinbacher@empa.ch
carbon dioxide	CO ₂	Emissions of CO ₂ , combustion	leuenberger@climate.unibe.ch
methane	CH ₄		martin.steinbacher@empa.ch
ozone	O ₃	chemiluminescence	martin.steinbacher@empa.ch
nitrous oxide	N ₂ O		martin.steinbacher@empa.ch
nitrogen oxides	NO _x		martin.steinbacher@empa.ch

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