

**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 |

General Questions/Contacts:

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