



# Complete revision of the Radiological Protection Ordinances

In order to better protect the population and the environment from ionising radiation the legal bases for radiological protection have been modified to conform to the new international directives. At its meeting on 26 April 2017 the Federal Council adopted the relevant ordinances for radiological protection. They entered into force on 1 January 2018.

## What is new for aircraft operators?

### Initial Situation

In the course of their work in the air aircrew personnel are exposed to an increased level of cosmic radiation. Data from Germany show that they accumulate an average annual dose of more than 2 mSv. According to the revised Radiological Protection Ordinance (RPO), aircrew personnel are therefore considered to be occupationally exposed to radiation if their professional activity in the air may result in an annual dose of 1 mSv.

This new regulation is based on a Directive of the European Atomic Energy Community, the Euratom Basic Safety Standards Directive<sup>[1]</sup>. Based on recommendations from the International Commission on Radiological Protection (ICRP), the Directive stipulates fundamental safety standards for protection against ionising radiation. The Directive provides for the radiation exposure of aircrew to be determined if it is liable to reach 1 mSv per year.

### Terms

1. **Occupationally exposed persons:** Air crew personnel are considered to be occupationally exposed to radiation if the effective annual dose (whole body dose) of **1 mSv** may be exceeded 1 mSv during professional activity or training.

For aircraft with a maximum flight level (service ceiling) of 6 000 m (20 000 feet) or less, it can be assumed that the effective annual dose will be less than 1 mSv. In this case there is no need to monitor the radiation doses.

If the aircraft operator provides proof that the air crew personnel cannot reach an effective dose of 1 mSv per year, the requirement to monitor radiation doses individually is waived, even for flight levels of over 6 000 m.

2. **Categories A and B:** Air crew personnel who are occupationally exposed to radiation usually belong to category B. Persons exposed to an effective dose of more than 6 mSv per year are assigned to category A. However, there is no difference in the dose monitoring, the categories serve to help the supervisory authorities to prioritise their activity and enable harmonisation with the EU.

*RPO Art. 51, 52*

[1] <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013L0059&from=DE>

## Young persons and pregnant women

3. Persons under 16 years of age must not be occupationally exposed to radiation. An annual limit value of **6 mSv** applies to persons aged between 16 and 18 (must not be in category A).
4. Pregnant women may only be employed as persons occupationally exposed to radiation if it is ensured that the effective dose of **1 mSv** is not exceeded for the unborn child during the period running from the awareness of pregnancy up to the birth.
5. At their request pregnant women must be **released** from their duties of flight service.
6. Women must be regularly informed of the risks of radiation exposure for the unborn child.

*RPO Art. 53*

## What are the new obligations of the aircraft operators?

The obligation for dosimetry (determining the radiation dose) falls upon aircraft operators that have employed aircrew in an employment relationship under Swiss law who may receive an effective dose from cosmic radiation of more than 1 mSv per year on board the aircraft during the flight. Accordingly, companies that operate Swiss aircraft (aircraft that are registered in the Swiss aircraft registry pursuant to Art. 52 of the Civil Aviation Act of 21 December 1948; CAA; SR 748.0) and/or companies established in Switzerland which operate aircraft that are registered in another country are aircraft operators that are subject to the obligation.

The aircraft operators must:

7. designate those persons occupationally exposed to radiation in the company and inform them regularly of the expected radiation doses, the applicable dose limit values and the health risks.
8. carry out an individual calculated determination (dosimetry) of the radiation doses accumulated in Switzerland and abroad for all persons occupationally exposed to radiation. Doses are to be determined on a monthly basis.
9. notify FOCA and Suva if it is suspected that a dose limit has been exceeded within one working day (see point 4, pregnant women).
10. bear the costs of the dosimetry.
11. inform the persons occupationally exposed to radiation of their dosimetry results.
12. after the ending of the employment relationship issue a written summary of all doses (annual doses) to persons occupationally exposed to radiation.
13. report the measured dosimetry data semi-annually to the Central Dose Registry at the FOPH. The report must be in an XML-format as specified by the FOPH. The first report of the dosimetry data must be sent to the FOPH by the end of June 2019. All data as of 01.01.2018 must be reported.

14. These reports have to include the following data:
- a. Surname, First names and previous names;
  - b. Date of birth;
  - c. Social insurance number;
  - d. Gender;
  - e. Name, address and company UID (business identification number);
  - f. Dose values determined in Switzerland and abroad;
  - g. Field of activity → PILOT or CABINCREW
  - h. Activity; → AVIATION
  - i. Category (A or B).

RPO Art. 51, 64, 65, 73

## Which software may be used to calculate the doses?

15. The RPO stipulates that the software used must correspond to the state of the art. According to FOCA and FOPH the following software packages meet this requirement:

ACD Helios 1.0  
AVIDOS 2.0  
CARI-7 and CARI-7A (Federal Aviation Administration, USA)  
EPCARD Version 3.34  
EPCARD Version 5.4.3  
GloboLog Version 2.0  
IASON FREE with the software components FREEBackend Version 1.3.0 and FREEDu Version 1.3.1  
IASON FREE 2.0.0  
PANDOCA Version 1.1.1  
PCAir Version PCAire DLL v1.2.0.21 and Calculation DLL v1.1.0.1  
SIEVERT Version 2.4.5

Subject to the agreement of FOCA and FOPH, other software may also be used.

RPO Art. 62

## May a service provider be used for the dose calculation?

16. The dose calculation may be carried out internally or by a recognised Swiss dosimetry service. As at present no service provider for flight dosimetry exists in Switzerland, it is possible – subject to the agreement of the FOPH – to appoint a service provider in a foreign country. The provider must have available sufficient personnel with a knowledge of flight dosimetry, and be able to demonstrate recognition, certification or accreditation in its country of origin for calculating and reporting flight personnel doses.

RPO Art. 64, 66

Further information can be found under: [www.strahlenschutzrecht.ch](http://www.strahlenschutzrecht.ch)