

Radiation protection during pregnancy

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Excerpts from: BEK no. 823 of 31/10/1997

Executive Order on dose limits for ionizing radiation

[In Danish <https://www.retsinformation.dk/eli/lta/1997/823>]

Chapter 3, section 4

Dose limits at work and during education

§ 4. When a female worker or woman in education has announced that she is pregnant, the protection of the unborn child shall correspond to the protection of individuals in the population. The working conditions of the pregnant woman must therefore be such that the equivalent dose to the unborn child is as low as reasonably possible and that it will be unlikely that this dose will exceed 1 mSv as a result of working during the rest of the pregnancy.

2. In the instruction they receive on the dangers of working around ionizing radiation, women with childbearing potential should be made particularly aware of the importance of early notification of pregnancy to the employer.

3. Appendix 2 gives examples of the possibility of controlling exposure to radiation in connection with pregnancy, see also section 11, subsection. 5, regarding dose monitoring of pregnant women.

Chapter 7, section 11

Dose monitoring of workers, etc.

5. The dose monitoring of pregnant women must be organized in such a way that after the announcement of the pregnancy it will be possible to assess the equivalent dose for the unborn child for the rest of the pregnancy. The maximum measurement period for the personal dosimeters mentioned in section 4, point 2 is in this case 1 month, unless it is assessed that the equivalent dose to the unborn child for the rest of the pregnancy is certainly less than 1 mSv, see. Appendix 2.

Appendix 2

Control of exposure to radiation during pregnancy

In the instruction they receive on the dangers of working around ionizing radiation, women with childbearing potential should be made particularly aware of the importance of early notification of pregnancy to the employer.

Once a woman has notified the employer that she is pregnant, the protection of the unborn child must be equivalent to the protection of individuals in the population. The working conditions of

the pregnant woman must therefore be such that the equivalent dose to the unborn child is as low as reasonably possible and that it will be unlikely that this dose will exceed 1 mSv as a result of work during the rest of the pregnancy.

Following the announcement of pregnancy, it is therefore necessary that the responsible manager, in collaboration with the pregnant woman, assess the size of the dose for the unborn child for the rest of the pregnancy. If the woman's working conditions do not change significantly, such an assessment could naturally be based on the woman's working conditions before the time of pregnancy and the radiation exposure that has been associated with this. In addition, it will be necessary to look at the possibility of radiation doses above 1 mSv for the unborn child, as a result of unintended events and accidents in the workplace.

Depending on the overall assessment of the possibility of radiation exposure of the unborn child during pregnancy, the following may apply:

Dose is estimated with certainty to be less than 1 mSv

The pregnant woman can continue with the previous work tasks without special measures to reduce the radiation exposure and its monitoring.

The dose must be assumed to be less than 1 mSv

The pregnant woman can continue with the previous work tasks, possibly supplemented with special measures to reduce the possibility of radiation exposure and a measurement period of not more than 1 month for dose monitoring.

The dose must be assumed to be greater than 1 mSv

The pregnant woman must be moved to other work tasks with less likelihood of radiation exposure, if necessary supplemented with a measurement period of not more than 1 month for dose monitoring, or the pregnant woman may be moved to other work that does not result in exposure to ionizing radiation.

If the pregnant woman continues with work tasks where a personal dosimeter must be worn in accordance with Appendix 4, the measurement period for these must be 1 month, according to the executive order section 11, point 5. In addition, an electronic personal dosimeter that allows the continuous radiation dose to be continuously displayed will be suitable. Where work allows, electronic personal dosimeters that emit a beep for each addition to the registered dose or an alarm at a pre-set dose rate level will also be able to provide information on in which work situations the radiation exposure is greatest.

The relationship between the recorded dose on a personal dosimeter or an electronic personal dosimeter and the dose to the unborn child depends very much on the type and energy of the external radiation. In general X-ray diagnostics, for example, it can be assumed that the registered dose of a personal dosimeter carried on the stomach is at least twice as large as the current equivalent dose for the unborn child, so that a measured dose of 2 mSv corresponds to 1 mSv to the unborn child. Similarly, there will also be very large differences between the dose to the pregnant woman herself and the unborn child after ingestion of radioactive substances, depending on the radioactive substance and chemical compound in question and at what time

during pregnancy the ingestion takes place. Further information and guidance on these matters, including the choice and use of electronic personal dosimeters, can be obtained by contacting the National Institute of Radiation Hygiene.

Below is information for both X-ray and radioactivity areas for which types of work with radiation sources, based on general experience of working conditions, it can be expected that the dose to the unborn child will normally exceed 1 mSv or be less than 1 mSv.

X-rays

Use of X-ray systems and accelerators, where the dose to the unborn child can be expected to exceed 1 mSv:

- X-ray diagnostic systems for medical use
- X-ray diagnostic systems for veterinary use
- Industrial X-ray systems
- Accelerators for technical irradiation
- Ion accelerators for implantation, research, isotope production, etc.
- Electron accelerators for the production or production of X-rays or synchrotron radiation

Use of X-ray systems and accelerators, where the dose to the unborn child can be expected to be less than 1 mSv:

- Dental X-ray systems
- Skin therapy systems
- Depth therapy facilities
- X-ray analysis systems
- Accelerators for medical radiation therapy

Radioactivity

Work with radioactive sources, where one can expect from external radiation that the dose to the unborn child may exceed 1 mSv:

- Manufacture, dispensing and administration of radioactive medicinal products
- Scintigraphy of patients
- Intra-cavitary and interstitial therapy
- Gamma radiography in open facilities
- Work with mobile humidity and density meters
- Work with more than 10 MBq of a high energy gamma emitter (approx. 1-2.5 MeV, e.g. Na-22, Co-60 and Br-82) for approx. 1 hour pr. week
- Working with more than 50 MBq of a medium energy gamma emitter (approx. 0.5-1 MeV, e.g. Co-58, Zn-65, I-131 and Ir-192) for approx. 1 hour pr. week
- Working with more than 100 MBq of a low energy gamma emitter (approx. 0.05-0.2 MeV, e.g. Co-57, Rb-86, Tc-99m, I-123 and I-125) for approx. . 1 hour pr. Week

Work with open radioactive sources, where from internal radiation one can expect that the dose to the unborn child may exceed 1 mSv:

- Iodination with I-125
- Care of therapy patients (e.g. I-131 and Sr-89)
- Work (wet operations) with more than 5 MBq of a medium or high energy beta emitter (e.g. P-32) due to accidental ingestion of the radioactive substance
- Work (wet operations) with more than 50 MBq of a soft beta emitter (e.g. C-14, S-35 and P-33) due to accidents leading to ingestion of the radioactive substance

Work with open radioactive sources where the dose to the unborn child can be expected to be less than 1 mSv:

- Radioimmunoassay (RIA kit)

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Further information

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Email: sst@sst.dk

Dose rate

1 mSv can be converted to "maximum acceptable dose rate" by assuming a 20-hour presence in a laboratory per week for 9 months, corresponding to: 1.4 μ Sv / h.

RADOS personal dosimeter

Delivered upon notification of pregnancy. It is expected that this is always carried in the laboratory and other places where there may be radiation.

See: https://www.laurussystems.com/wp-content/uploads/RAD-60_User_Manual.pdf for the manual

