STUK

GUIDE **ST 1.8** / 25 JANUARY 2016

QUALIFICATIONS AND RADIATION PROTECTION TRAINING OF PERSONS WORKING IN A RADIATION USER'S ORGANIZATION

This Guide is valid as of 15 March 2016 until further notice.
It replaces Guide ST 1.8, Qualifications of persons working in radiation user's organization and radiation protection training required for competence, issued on 17 February 2012.

Helsinki 2016
ISSN 0789-4368
ISBN 978-952-309-309-6 (pdf)
ISBN 978-952-309-310-2 (html)

STUK • **SÄTEILYTURVAKESKUS**
STRÅLSÄKERHETSCENTRALEN
RADIATION AND NUCLEAR SAFETY AUTHORITY

Osoite/Address • Laippatie 4, 00880 Helsinki
Postiosoite / Postal address • PL / P.O.Box 14, FIN-00881 Helsinki, FINLAND
Puh./Tel. (09) 759 881, +358 9 759 881 • Fax (09) 759 88 500, +358 9 759 88 500 • www.stuk.fi

Authorization

The Radiation Act stipulates that the party running a radiation practice is responsible for the safety of the operations. The responsible party is obliged to ensure that the level of safety specified in the ST Guides is attained and maintained.

Under section 70, paragraph 2, of the Radiation Act (592/1991), STUK – Radiation and Nuclear Safety Authority (Finland) issues general instructions, known as Radiation Safety Guides (ST Guides), concerning the use of radiation and operations involving radiation.

Translation. In the event of any differences in interpretation of this guide, the Finnish and Swedish versions shall take precedence over this translation.

1 General

This Guide sets out the requirements concerning the qualifications and competence of persons working in radiation user's organizations as well as the requirements concerning the radiation protection training required for their qualifications and competence. In addition, this Guide sets out the requirements for training organizations that arrange competence exams for radiation safety officers together with the respective preparatory training. This Guide applies to uses of radiation requiring a safety licence.

The provisions concerning STUK's authorization to stipulate the qualifications required of persons working in radiation user's organizations and to investigate compliance with the said stipulations are laid down in section 18 of the Radiation Act. The requirements for radiation user's organizations are set out in Guide ST 1.4.

2 The responsible party shall ensure that its personnel is qualified and trained in radiation protection

The party running a radiation practice (hereafter the responsible party) shall be responsible for ensuring that all personnel working in the radiation user's organization and other workers involved in the use of radiation are qualified as required and that they have received appropriate radiation protection training and have been introduced to their duties appropriately.

2.1 Radiation safety officer

The competence areas and qualification requirements of radiation safety officers are presented in Appendix A in this Guide. To qualify, radiation safety officers are required to take radiation protection training, the content and extent of which are set out in Appendix B. The command of the contents of the training is demonstrated in exams. Such exams are arranged by training organizations approved by STUK (see Chapter 5). In conventional dental X-ray practices, a dentist, physician or hospital physicist who has received radiation protection training according to Guide ST 1.7 may be named as the radiation safety officer.

When granting a safety licence, STUK may require that a radiation safety officer candidate take supplementary training if more than five years have elapsed since the candidate took the radiation safety officers' competence exam, and the candidate has not worked as a radiation safety officer during that time. When assessing the need for supplementary training, attention is paid to the competence area and the radiation safety officer candidate's practical experience in corresponding duties as well as his/her training during the past five years.

In the case of a particularly demanding practice such as the operation of an accelerator laboratory or the production of radioactive substances, the competence and training requirements of the radiation safety officer will be case-specifically considered by STUK according to the safety requirements of the practice. STUK will arrange a separate exam if this is deemed necessary in order to verify the competence of a radiation safety officer candidate.

A person serving as deputy to a radiation safety officer must also possess the qualifications specified in Appendix A in this Guide.

Guide ST 1.4 specifies when a deputy should be nominated for a radiation safety officer.

2.2 On-site radiation safety person

In industrial radiography, on-site radiation safety persons shall have completed the radiation safety officers' competence exam in the competence areas required of the radiation safety officers in charge of the respective practices. In other practices, the responsible party must ensure that on-site radiation safety persons receive radiation protection training corresponding to their duties as on-site radiation safety persons. On-site radiation safety persons are also required to have a good knowledge of all operations in their places of use.

Situations in which on-site radiation safety persons

must be nominated are presented in Guide ST 1.4. On-site radiation safety persons working in industrial radiography are also described in Guide ST 5.6.

2.3 Individuals involved in the use of radiation and other persons in health care

Medical physics expert
Medical physics experts shall, as a rule, have completed specialization training as hospital physicists, including the qualification to serve as radiation safety officers in the area of general use of radiation in the medical sector.

In X-ray practices in health care, medical physics experts may also be physicists approved by STUK case by case, or other individuals with suitable higher education degrees. In these cases, STUK will, upon application, issue separate decisions to approve the medical physics experts. The appropriate documents shall be delivered to STUK so that it can be determined whether the proposed person meets the qualification requirements. A suitable university degree generally refers to a higher university degree with a major in physics, technical physics, medical technology or some other comparable and suitable major. The candidate must also be qualified to serve as a radiation safety officer in the area of general use of radiation in the medical sector. Further, the candidate shall have experience in radiation protection, quality assurance, and determining patient doses for X-ray examinations.

Qualified expert
Hospital physicists qualified to serve as radiation safety officers in the area of general use of radiation in the medical sector may serve as qualified experts in the use of radiation in health care.

Physician responsible for a procedure involving exposure to radiation
Physicians shall possess qualifications consistent with the character of the procedures for assessing the justification and optimization thereof, and also for contributing to the interpretation of the results of the procedures.

Physician issuing referrals for procedures or examinations involving exposure to radiation, physician interpreting the results, and person performing procedures or examinations involving exposure to radiation
Physicians and persons performing examinations and procedures shall be qualified as required and have sufficient radiation protection training.

The required expertise in medical physics and the qualifications of a medical physics expert are laid down in sections 15 and 26 of the Decree of the Ministry of Social Affairs and Health on the medical use of radiation (423/2000, hereinafter referred to as the MSAH Decree).

Nominations of qualified experts are discussed in Guide ST 1.4.

The requirements relating to the qualifications and the radiation protection training of physicians issuing referrals for procedures involving exposure to radiation in health care, of physicians responsible for procedures, and of performers of procedures, are laid down in Chapter 5 of the MSAH Decree. Radiation protection training is treated in more detail in Guide ST 1.7.

2.4 Individuals involved in the use of radiation in industry, research, education and trade

Qualified expert
STUK will determine the competence requirements for qualified experts case by case and arrange a separate radiation safety exam if this is necessary to verify the competence of a qualified expert candidate.

Other persons involved in the use of radiation
No special requirements are set concerning the competences of other persons, but it is recommended that their radiation safety training include, as applicable, the same issues as does the training of the radiation safety officer in that particular competence area.

2.5 Medical practitioner responsible for medical surveillance

The medical surveillance of workers in category A may be conducted only by a medical practitioner ascertained by a competent authority*) to be qualified to perform such examinations.

The regulations concerning medical practitioners responsible for the medical surveillance of workers in category A (practitioners performing the medical surveillance) and the competences of these practitioners are laid down in Section 33 of the Radiation Act and Section 13 of the Radiation Decree (1512/1991). More detailed instructions concerning the ascertaining of competences are given in Guide ST 7.5.

3 Personnel shall receive supplementary training in radiation protection

The responsible party shall ensure that all persons working in the radiation user's organization or otherwise involved in the use of radiation regularly receive supplementary radiation protection training.

If a person performs multiple duties in a radiation user's organization (serving, for example, as the radiation safety officer and as a qualified expert) the person is required to complete, over a period of five years, the amount of supplementary training required for his/her most demanding duty. The training must cover the person's various duties, and it must be specified in accordance with the person's most demanding duty.

3.1 The use of radiation in health care

The objectives relating to the contents and amount of supplementary training for workers engaged in uses of radiation in health care are presented in Guide ST 1.7. In addition to this, radiation safety officers and medical physics experts shall receive no less than 20 hours of supplementary training over a period of five years.

The radiation protection training requirements for health care staff are presented in the MSAH Decree.

3.2 The use of radiation in industry, research, education, trade and veterinary X-ray practices

The supplementary training shall, where necessary, include revision of previous learning, changes in the particular competence area, amendments to radiation legislation, and revisions of ST Guides. The training shall also include the most essential and latest information on the effects of radiation and on developments in equipment. The training may be guided training (demonstrations, group work, guided practical exercises) or participation in training events. A part of the supplementary training may also consist of independent study.

The responsible party shall maintain records of the details of the supplementary training (content and amount of training) of all staff working in the radiation user's organization so that this supplementary training can be verified for each employee for a period of no less than five years.

It is a good practice to design a supplementary training programme and to monitor its implementation. When the supplementary training programme is designed, attention should be paid to the competence areas and to the training needs imposed by the duties. If a supplementary training programme contains independent study, the proportion of this shall be specified in advance, and all such work shall be documented.

Supplementary training in radiation protection over a period of five years shall comprise

- no less than 20 hours for a qualified expert
- no less than 10 hours for a radiation safety officer
- no less than 5 hours for other individuals working in the radiation user's organization or otherwise involved in the use of radiation.

*) At the time of approval of this Guide, STUK.

4 Objectives of a radiation safety officer's training

When granting a safety licence, STUK requires that the radiation safety officer candidate present a certificate indicating that the candidate has completed the radiation safety officers' competence exam. For the exam to be considered as completed, the candidate's performance is required to show that the candidate masters the issues presented in this Guide and is competent to undertake the duties of a radiation safety officer.

Radiation safety officers' competence training shall provide the trainees with the skills required for working as radiation safety officers in their particular competence areas. On the basis of their training, radiation safety officers shall have sufficient knowledge of e.g. the following issues:

- the responsibilities and duties of the responsible party as regards the use of radiation
- the role and duties of the radiation safety officer as well as the communication among experts, on-site radiation safety persons, and the responsible party
- radiation sources, radiation appliances, and methods in use in the practice and the respective radiation safety and security arrangements required
- applications for safety licences
- planning a radiation user's organization and drafting an organization description
- the identification of risks relating to the practices and making provisions for abnormal events
- assessments of the sufficiency of radiation shieldings and the appropriateness of radiation protection measures
- applicable radiation legislation, ST Guides and other provisions concerning the use of radiation
- helping and instructing staff to work safely at a place of use of radiation.

Exercises included in the training should cover, depending on the competence area:

- classification of workers and working areas
- assessment of the sufficiency of radiation shieldings and the appropriateness of radiation protection measures
- introduction to radiation appliances and meters used in the relevant competence area
- radiation measurements and assessing radiation exposures in the environment of the radiation sources and appliances used in the practice; demonstration of shielding effects of the radiation shields
- in health care, determining the dose to which a patient is exposed
- identification of risks relating to the practice, making provisions for abnormal events, and procedures in the case of abnormal events.

It is recommended that radiation safety officers' competence training be given in separate courses rather than included in other courses. However, if radiation safety officer training is integrated into other training courses, the relevant course descriptions shall clearly state which parts of the courses are required as radiation safety officers' competence training.

Radiation safety officers' competence training may consist of separate courses completed at different training organizations (see Item 5.3). This is a possible arrangement in cases in which the training organization is not capable of arranging internally all the training required for a particular competence area under this Guide. For example, practical training might be undertaken in a different training organization.

5 The right to arrange competence exams for radiation safety officers shall be applied for

STUK will grant the right to arrange radiation safety officers' competence exams to training organizations upon application provided that their training, arranging of examinations and certification procedures have been shown to comply with this Guide. The approval remains in force for five years at a time. After this period the approval may be renewed upon application.

5.1 Applying for the right to arrange competence exams

The STUK website (www.stuk.fi) provides a form[**)] and instructions[**)] for applications for the right to arrange competence exams for radiation safety officers. Should any data concerning the training organization, the training or the arranging of the exams change after approval, STUK shall be notified in writing of all the changes.

There is a list of the currently approved training organizations on the STUK website.

5.2 Quality of training

The training organization is responsible for the quality of the training provided and for ensuring that its trainers are qualified to provide radiation safety officers' competence training.

A responsible person shall be nominated in the training organization to ensure that the supplied training complies with the requirements of this Guide.

The trainers shall be competent in view of the competence area they teach, and their own skills and proficiencies shall be at least as high as those of their trainees. Trainers are required to keep their radiation protection knowledge up-to-date. In the course of five years in the competence areas in health care, trainers are required to have no less than 20 hours of supplementary training in radiation protection, and in other competence areas involving the use of radiation, no less than 10 hours.

5.3 Documentation of training

The training organization shall produce a description of the radiation safety officer's competence training it provides. The description shall explain the contents of the training, its extent, the required literature and the proficiency level the examinees have reached when completing the radiation safety officers' training and competence exam. In addition, a detailed comparison chart is required so that it can be verified that the training includes all items listed in Appendix B in this Guide. The description of the training and the comparison chart shall be annexed to the application for the right to arrange competence exams.

[**)] In Finnish.

If a part of a training course (see Chapter 4, last paragraph) is to be undertaken in some other training organization, the organization applying for the right to arrange training shall include in its application a description by the other training organization concerning the part of the training that is to be arranged there, and a detailed comparison chart which shows how the requirements of this Guide will be fulfilled.

All independent study in radiation officers' competence training shall also be documented. It shall be clearly defined for the students which topics, materials and amounts they can study independently.

If the radiation officers' competence training takes only the minimum amount of time (e.g. 15 hours in the competence areas of the use of unsealed sources and sealed sources and X-ray appliances in industry, research and education) and the individual has no other radiation protection training, the minimum amount in its entirety shall consist of guided training.

The required reading shall include at least radiation legislation and all ST Guides for the competence area in question. In addition to these, lecture notes and other materials may also be used.

5.4 Arranging an exam

Exams shall be arranged for individuals who have received radiation safety officers' competence training. Exams are held in order to test how the individuals would be able to apply their skills as radiation safety officers in practical situations. The training organizations may decide upon the questions in their exams, their number and their acceptance criteria. Course literature may be allowed in the examination room. If this is the case, the exam questions and the acceptance criteria must be created differently than they are created for exams in which books are not allowed.

Radiation safety officers' competence exams may be arranged so that exams in more than one competence area can be completed in a single session.

A certificate must be issued of an acceptable completion of the exam. The certificate shall indicate the organization granting it, the name and personal identification number of the passed examinee, and the competence area which the

certificate concerns. In addition, the certificate must mention section 18 of the Radiation Act under which the exam was arranged. It is a good practice to show the contents and amount of training on the certificate (e.g. on the reverse side). The certificate shall be signed by a person authorized to sign on behalf of the training organization or by a person authorized by the training organization to sign these certificates, such as the person in charge of the training.

If the radiation safety officers' competence exam forms part of a vocational qualification, the vocational certificate must specify that this exam has been completed, or otherwise the arranging party must issue a separate certificate of the acceptable completion of the radiation safety officers' competence exam.

5.5. Earlier exam certificates and approvals

When issuing safety licences, and under the conditions presented in Item 2.1., STUK shall still approve exam certificates of radiation safety officers acquired before this Guide entered into force.

Foreign radiation protection training certificates cannot be accepted as radiation safety officers' competence exam certificates in Finland, because for example, Finnish legislation is not taught elsewhere.

The rights to arrange competence training for radiation safety officers, issued to training organizations, are still valid until the dates given in the decision documents. If such practices are intended to continue after the date indicated, a new application shall be submitted to STUK well in advance, preferably no later than one month before the expiry of the approval, indicating how the training and exams will meet the requirements in this Guide.

Individuals indicated as radiation safety officers in currently valid safety licences may continue in their duties after this Guide comes into force. They shall receive regular supplementary training as stipulated in Chapter 3 in this Guide.

APPENDIX A

Qualification reguirements and competence areas of radiation safety officers

The competence areas and qualification requirements of radiation safety officers in practices requiring safety licences are as follows:

1 X-ray practices in health care

- radiologist
- hospital physicist
- physician who has completed the radiation safety officers' competence exam

2 Nuclear medicine

- hospital physicist
- specialist in clinical physiology and nuclear medicine who has completed the radiation safety officers' competence exam

3 Radiotherapy

- hospital physicist
- specialist in oncology and radiotherapy who has completed the radiation safety officers' competence exam

4a Conventional dental X-ray practices

- dentist
- physician
- hospital physicist

4b Other dental X-ray practices

- dental specialist
- radiologist
- hospital physicist
- dentist or physician who has completed the radiation safety officers' competence exam

5 General use of radiation in the medical sector

- hospital physicist

6 Installation, repair and servicing of radiation appliances and sources in health care

- person who has completed the radiation safety officers' competence exam

In order to cover the installation, repair and servicing of electrically operated radiation appliances, the responsible party must retain the services of a person who is qualified under the relevant electrical safety statutes to manage the installation, repair and servicing of such appliances.

The radiation safety officers' competence exam for area number 6 is valid for testing and trial use in connection with the manufacturing of radiation appliances provided that no patients are exposed to radiation. Clinical trial use in connection with patient examinations requires, depending on the type of practice and device, the radiation safety officers' competence exam and qualifications for areas number 1–5.

7 Veterinary x-ray practices

- veterinarian who has completed the radiation safety officers´ exam or other person who has completed the exam and has training in veterinary sciences, veterinary X-ray practices or X-ray practices in health care

The radiation safety officers' competence exams for areas number 1 and 5 are also valid for this competence area.

8 Use of unsealed sources in industry, research and education

- person who has completed the radiation safety officers' competence exam

9 Use of sealed sources and x-ray appliances in industry, research and education

- person who has completed the radiation safety officers' competence exam

10 Industrial radiography

- person who has completed the radiation safety officers' competence exam

11 Other practices

When the practice involves trade in radiation sources, the radiation safety officer shall have completed the exam in area number 2, 3, 5, 6, 8, 9 or 10. When the practice involves trade in X-ray appliances which are used in health care or veterinary medicine, the radiation safety officer shall have completed the exam in area number 6, or according to appliances sold in area number 1, 4, 5 or 7.

When the practice involves the installation, repair or servicing of radiation appliances and radiation sources in industry, the radiation safety officer shall have completed the exam in any area number 6, 9 or 10.

When radioactive materials are transported, all requirements shall be observed regarding the driver's qualifications under the relevant statutes on the transportation of dangerous goods.

APPENDIX B

Content and extent of a radiation safety officer's training

Radiation protection training leading to the qualification of a radiation safety officer shall include the issues specified in this appendix for each competence area, weighted according to the demands of the relevant practice.

All competence areas shall include the following **general issues**:

- fundamentals of radiation physics, the biological effects of radiation, radiation risks, radiation quantities and units, radiation sources
- general knowledge of radiation appliances and their uses and quality assurance
- measurement of radiation, measurement methods, principles of radiation dose calculation, dose determination by calculation
- general principles of radiation protection
- radiation protection legislation, regulatory control of the use of radiation, safety licensing, exemption of a use of radiation from safety licensing, the notification obligation
- organizational arrangements in the use of radiation, radiation safety and security arrangements in places of use of radiation, safety culture
- radiation protection of workers and other individuals
- records, storage and decommissioning of radiation sources and appliances
- qualifications and radiation protection training of staff
- competence area -specific exercises relating to the duties of radiation safety officers (see Chapter 4).

In addition to these general issues, the competence areas shall include the **competence area -specific issues** marked with X in the table below. The total extent of the training (general and competence area -specific issues) per competence area is also given in the table.

Table. General and competence area -specific issues and the total extent of training per competence area as required for radiation safety officer training.

	Competence areas									
	X-ray practices in health care	**Nuclear medicine**	**Radio-therapy**	**Other dental X-ray practices**	**General use of radiation in the medical sector**	**Installation, repair and servicing of radiation appliances and sources in health care**	**Veterinary x-ray practices**	**Use of unsealed sources in industry, research and education**	**Use of sealed sources and x-ray appliances in industry, research and education**	**Industrial radiography**
The total extent of the training (general and competence area -specific issues))	25 h	25 h	25 h	25 h	85 h	15 h	10 h	15 h	15 h	15 h
General issues to be covered in training (see list above)	X	X	X	X	X	X	X	X	X	X
Competence area -specific issues to be covered in training										
General knowledge of radiation sources and radiation appliances in use in the competence area, their manipulation and quality assurance	X	X	X	X	X	X	X	X	X	X
Radiation safety arrangements specific to a competence area at a place of use of radiation	X	X	X	X	X	X	X	X	X	X
The identification of risks relating to the practices and making provisions for abnormal events	X	X	X	X	X	X	X	X	X	X
General knowledge of examinations/treatments in the competence area	X	X	X	X	X	X	X			
General knowledge of patient doses and factors affecting patients' radiation safety, the radiation protection of a patient	X	X	X	X	X	X				
General knowledge of radionuclide/radiotherapy dosimetry		X	X		X					
Symptoms and treatment of acute radiation syndrome		X	X		X					

Continued

	Competence areas									
	X-ray practices in health care	**Nuclear medicine**	**Radio-therapy**	**Other dental X-ray practices**	**General use of radiation in the medical sector**	**Installation, repair and servicing of radiation appliances and sources in health care**	**Veterinary x-ray practices**	**Use of unsealed sources in industry, research and education**	**Use of sealed sources and x-ray appliances in industry, research and education**	**Industrial radiography**
General knowledge of the chemistry of radioactive substances		X	X		X			X		
Trade in radiation sources		X	X		X	X		X	X	X
Treatment of radioactive waste		X	X		X	X		X	X	
Radioactive discharges		X			X			X		
Radiation safety in the installation, repair and servicing of radiation appliances and sources	X	X	X		X	X		X	X	X
General knowledge of transportation of radioactive substances and their transfers on the responsible party's premises		X	X		X	X		X	X	X
Decontamination		X	X		X			X		