GUIDE YVL E.13

VENTILATION AND AIR-CONDITIONING EQUIPMENT OF A NUCLEAR FACILITY

Definitions

Authorisation

According to Section 7 r of the Nuclear Energy Act (990/1987), *the Radiation and Nuclear Safety Authority (STUK) shall specify detailed safety requirements for the implementation of the safety level in accordance with the Nuclear Energy Act.*

Rules for application

The publication of a YVL Guide shall not, as such, alter any previous decisions made by STUK. After having heard the parties concerned STUK will issue a separate decision as to how a new or revised YVL Guide is to be applied to operating nuclear facilities or those under construction, and to licensees' operational activities. The Guide shall apply as it stands to new nuclear facilities.

When considering how the new safety requirements presented in the YVL Guides shall be applied to the operating nuclear facilities, or to those under construction, STUK will take due account of the principles laid down in Section 7 a of the Nuclear Energy Act (990/1987): *The safety of nuclear energy use shall be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience and safety research and advances in science and technology.*

According to Section 7 r(3) of the Nuclear Energy Act, *the safety requirements of the Radiation and Nuclear Safety Authority are binding on the licence holder, while preserving the licence holder's right to propose an alternative procedure or solution to that provided for in the regulations. If the licence holder can convincingly demonstrate that the proposed procedure or solution will implement safety standards in accordance with this Act, the Radiation and Nuclear Safety Authority may approve the procedure or solution.*

With regard to new nuclear facilities, this Guide shall apply as of 2 November 2020 until further notice. With regard to operating nuclear facilities and those under construction, this Guide shall be enforced through a separate decision to be taken by STUK.

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1 Introduction

101. Ventilation and air conditioning equipment is used at nuclear facilities to manage the temperature, humidity and purity of indoor air and the equipment in rooms and to prevent radioactive materials from spreading inside the plant or into the environment. **[**2020-10-23 **]**

102. This Guide presents requirements for the design, manufacture, installation, commissioning, use, condition monitoring and maintenance of the ventilation and air conditioning equipment of a nuclear facility and describes the regulatory control measures applied by STUK and an authorised inspection body (AIO) to monitor compliance with the requirements. **[**2020-10-23 **]**

103. According to Section 63(1)(3) of the Nuclear Energy Act (990/1987) [1], STUK is entitled to require that nuclear fuel or the structures and components intended as parts of the nuclear facility be manufactured in a manner approved of by the Radiation and Nuclear Safety Authority, and oblige the licence holder or licence applicant to arrange for STUK sufficient opportunity to control manufacture of the fuel or such structures and components. **[**2020-10-23 **]**

104. According to Section 4(2) of the Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018) [2] and Section 5(3) of the Radiation and Nuclear Safety Authority Regulation on the Safety of Disposal of Nuclear Waste (STUK Y/4/2018) [3], *requirements set for and the actions taken to ascertain the compliance with the requirements of the systems, structures and components implementing safety functions and connecting systems, structures and components shall be commensurate with the safety class of the item in question.* **[**2020-10-23 **]**

105. According to Section 5(1) of the Radiation and Nuclear Safety Authority Regulation STUK Y/1/2018 and Section 6(1) of Regulation STUK Y/4/2018, *the design, construction, operation, condition monitoring and maintenance of a nuclear facility shall provide for the ageing of systems, structures and components important to safety in order to ensure that they meet the design-basis requirements with necessary safety margins throughout the service life and decommissioning of the facility.* **[**2020-10-23 **]**

106. Requirements related to the ventilation and air conditioning equipment of a nuclear power plant have also been set out in the following Guides:

- YVL A.3 Leadership and management for safety
- YVL A.5 Construction and commissioning of a nuclear facility

- YVL A.6 Conduct of operations at a nuclear power plant
- YVL A.8 Ageing management of a nuclear facility
- YVL A.11 Security of a nuclear facility
- YVL B.1 Safety design of a nuclear power plant
- YVL B.2 Classification of systems, structures and components of a nuclear facility
- YVL B.7 Provisions for internal and external hazards at a nuclear facility
- YVL B.8 Fire protection at a nuclear facility
- YVL C.1 Structural radiation safety at a nuclear facility
- YVL C.3 Limitation and monitoring of radioactive releases from a nuclear facility
- YVL C.6 Radiation monitoring at a nuclear facility
- YVL E.1 Authorised inspection body and the licensee's in-house inspection organisation
- YVL E.3 Pressure vessels and piping of a nuclear facility
- YVL E.6 Buildings and structures of a nuclear facility
- YVL E.7 Electrical and I&C equipment of a nuclear facility
- YVL E.8 Valves of a nuclear facility
- YVL E.9 Pumps of a nuclear facility
- YVL E.10 Emergency power supplies of a nuclear facility
- YVL E.12 Testing organisations for mechanical components and structures of a nuclear facility.

[2020-10-23 **]**

107. In addition to this Guide, other laws and decrees valid in Finland regarding ventilation and air condition equipment, such as the Decree of the Ministry of the Environment on the Indoor Climate and Ventilation of New Buildings (1009/2017) [4], and regulations issued by other authorities shall be complied with. **[**2020-10-23 **]**

2 Scope

201. This Guide applies to nuclear facilities' ventilation and air conditioning equipment belonging to safety classes 2 and 3 throughout their entire life cycle. **[**2020-10-23 **]**

202. The Guide does not apply to exhaust gas handling systems, condenser vacuum systems or leak collection systems. **[**2020-10-23 **]**

203. The requirements set forth in the Guide shall apply to the licensee and, where applicable, to the licence applicant, plant or equipment supplier and manufacturers of ventilation and air-conditioning systems. **[**2020-10-23 **]**

204. For containment isolation valves, Guide YVL E.8 shall be complied with. **[**2020-10-23 **]**

205. The requirements pertaining to system design are set out in Guide YVL B.1. **[**2020-10-23 **]**

206. The licensee may also handle ventilation and air conditioning equipment as pressure equipment in accordance with Guides YVL E.3, E.8 and E.9. **[**2020-10-23 **]**

207. Fire dampers shall comply with the requirements of Guide YVL B.8. **[**2020-10-23 **]**

208. For electrical and I&C systems of ventilation and air-conditioning equipment, Guide YVL E.7 shall be complied with. **[**2020-10-23 **]**

209. The licensee may also propose ventilation and air-conditioning equipment to be handled in accordance with Guide YVL E.6 concerning the structures of nuclear facilities. **[**2020-10-23 **]**

3 Licensee's equipment requirement specifications

3.1 General equipment requirement specification

301. The licensee shall have in place general equipment requirement specifications for ventilation and air-conditioning equipment in safety classes 2 and 3, including the general design, quality control and regulatory requirements set by the licensee. A shared equipment requirement specification may be prepared for equipment of the same type. **[**2020-10-23 **]**

302. The general equipment requirement specification for ventilation and air-conditioning equipment shall list the standards and guidelines used in design and dimensioning that are considered acceptable. **[**2020-10-23 **]**

303. With regard to the quality control requirements of the ventilation and air-conditioning equipment, the general equipment requirement specification shall describe the inspections and tests to be conducted during procurement, manufacturing, installation and commissioning. **[**2020-10-23 **]**

304. The requirements for built-to-order equipment shall be separately specified in the general equipment requirement specification if the requirements differ from the requirements set for serially manufactured equipment. **[**2020-10-23 **]**

305. General requirements for requirement specifications and configuration management are set forth in Guide YVL B.1. **[**2020-10-23 **]**

3.2 Requirement specification for equipment service place

306. The requirement specification for equipment service place shall include design requirements for the equipment derived from the plant and system levels. **[**2020-10-23 **]**

307. The requirement specifications for equipment service places of ventilation and air-conditioning equipment in safety classes 2 and 3 shall indicate the properties required from the equipment at the intended location of use. **[**2020-10-23 **]**

308. The requirement specification for equipment service place of ventilation and air-conditioning equipment shall present the safety and seismic classification of the equipment in accordance with Guide YVL B.2. **[**2020-10-23 **]**

309. The requirement specifications for equipment service places of ventilation and air-conditioning equipment shall be kept up-to-date. The update need shall be checked if there are changes at the plant or system level during design, manufacturing, installation, commissioning or operation. **[**2020-10-23 **]**

310. It shall be possible to verify the conformance of the ventilation and air-conditioning equipment against the requirement specification for equipment service place. **[**2020-10-23 **]**

311. The requirements for ventilation and air-conditioning equipment in safety classes 2 and 3 shall be traceable to the plant- and system-level requirements. **[**2020-10-23 **]**

312. The requirement specification of ventilation and air-conditioning equipment in safety class 2 shall be inspected by an expert that has not been involved in the design of the item in question. During the inspection, it shall be ensured that the requirements correspond to the plant- and system-level requirements. **[**2020-10-23 **]**

4 Manufacturer

401. The manufacturer of ventilation and air-conditioning equipment in safety classes 2 and 3 shall have in place a successfully certified management system or a management system independently assessed by a third party. **[**2020-10-23 **]**

402. The management system of the manufacturer of ventilation and air-conditioning equipment in safety class 2 shall comply with the requirements concerning the suppliers' management system presented in Guide YVL A.3 in case of built-to-order equipment. The management system may be supplemented as necessary with a delivery-specific quality plan in accordance with requirements 637–639 of Guide YVL A.3 if the requirements of Guide YVL A.3 concerning the management system are not complied with. A delivery-specific quality plan is not required when procuring serially manufactured components. **[**2020-10-23 **]**

403. The manufacturer shall have in their employ competent and experienced personnel, as well as the methods, facilities and equipment required for operation. **[**2020-10-23 **]**

404. The manufacturer shall have documented procedures for the qualification of manufacturing methods and personnel, validity of qualifications, manufacturing, testing and handling of non-conformances. **[**2020-10-23 **]**

405. The manufacturer shall have in place qualified manufacturing methods for the manufacture of components of nuclear ventilation and air-conditioning equipment or the preparedness to qualify the methods before manufacture is started. The manufacturing methods shall be qualified with the aid of procedure tests conducted under the supervision of a recognised third-party supervisor. Persons making permanent joints shall be qualified under the supervision of a recognised third-party supervisor. Recognised third parties for procedure and personal qualification include notified bodies and recognised third-party organisations (certification bodies) as defined in the Pressure Equipment Directive (2014/68/EU) [6]. In addition to certification bodies accordant with the Pressure Equipment Directive, also other accredited certification bodies shall be accepted within the scope of their area of qualification. In such a case, the accreditation shall be covered by the Multilateral Agreements (MLA) or Mutual Recognition Arrangements (MRA) entered into by FINAS and the accreditation shall be conducted against the requirements of standard EN ISO/IEC 17020, 17021, 17024 or 17065. **[**2020-10-23 **]**

406. As regards the supply chain of parts important to the safety function, the manufacturer shall ensure that subcontractors are aware of the requirements related to the delivery. **[**2020-10-23 **]**

407. Before assembly, the manufacturer shall ensure that the components manufactured by the subcontractors fulfil the requirements related to the delivery. **[**2020-10-23 **]**

5 Design

5.1 General requirements

501. The general requirements apply to all ventilation and air-conditioning equipment of nuclear facilities. Equipment type-specific additional requirements have also been set. **[**2020-10-23 **]**

502. The equipment shall be designed or selected so that the equipment service place requirements (design bases) presented in requirement specifications are met. **[**2020-10-23 **]**

503. In accordance with Guide YVL B.1, the equipment shall be protected from the effects of operational occurrences and accidents it is designed to manage. **[**2020-10-23 **]**

504. In designing or selecting equipment and their location, accessibility and the maintenance of operability during and after an accident shall be taken into account. **[**2020-10-23 **]**

505. The design solutions of the equipment shall contain proven technology, or their performance shall be experimentally demonstrated. **[**2020-10-23 **]**

506. The conformity of the equipment and its suitability for its intended application shall be demonstrated in the construction plan. **[**2020-10-23 **]**

507. The structural materials, seals and surfacing shall withstand the stresses caused by design basis operating conditions. Material selection shall ensure that corrosion, erosion, radiation or other similar detrimental phenomena do not endanger equipment operability. **[**2020-10-23 **]**

508. Ventilation and air conditioning equipment and its casing, mounting racks and seals shall be airtight so that

- bypasses do not impair the operation of the system
- the handling of radioactive or toxic gases is effective
- the spread of radioactive and toxic gases to clean areas is prevented.

[2020-10-23 **]**

509. Type-approved and ETA-approved building products can be employed in safety class 3 in accordance with the decision of approval and the related instructions issued by the manufacturer. **[**2020-10-23 **]**

510. If the decision on type approval does not cover installation of the product, installation instructions shall be prepared up for this purpose, which additionally include the quality control of installation work. **[**2020-10-23 **]**

5.2 Ducts

511. Requirements shall be set for the leaktightness of the ventilation ducts, taking into account the content of radioactive, toxic or explosive substances in the ducts, the rooms through which the ducts are conducted and the pressure difference between the ducts and their surroundings. **[**2020-10-23 **]**

512. In determining the materials and coatings for the ducts, and in designing their geometrical shape, due consideration shall be given to easy decontamination of the surfaces (inside and outside) from potential radioactivity and prevention of its dispersion. **[**2020-10-23 **]**

513. In the material selection of the ducts and their insulations, fire safety requirements shall be taken into account. **[**2020-10-23 **]**

514. The accessories of the ducts shall comply with the same fire safety and leaktightness requirements as the ducts. **[**2020-10-23 **]**

5.3 Filters

515. The filters of the exhaust air systems shall be efficient in order to reduce aerosol, particle and iodine emissions so that their efficiency/retention factor does not fall below the allowed values in the design basis operational conditions. **[**2020-10-23 **]**

516. Supply air filters shall be efficient so that requirement 5511 of Guide YVL B.1 is met. **[**2020-10-23 **]**

517. The maintenance and replacement of filters shall be possible so as to prevent the contamination of the environment or the clean side. **[**2020-10-23 **]**

518. Testing the filters at the service place shall be prepared for. **[**2020-10-23 **]**

519. In the design of the filters prequisities for laboratory testing of activated carbon in order to determine the retention factor and auto-ignition temperature shall be considered. **[**2020-10-23 **]**

520. Individual factory tests, receiving tests and periodic tests shall be performed for filter sections and activated carbon. **[**2020-10-23 **]**

521. The sections of a filter consisting of several parallel filter sections shall have similar characteristics. **[**2020-10-23 **]**

522. The filter sections shall be identifiable throughout their life cycle. **[**2020-10-23 **]**

523. The filter sections shall be handled and stored so that they retain their operability in accordance with the design bases. **[**2020-10-23 **]**

524. The storage conditions shall be determined so that the operability of the filters and filter materials is maintained. **[**2020-10-23 **]**

5.4 Control and closing devices

525. For control and closing devices and fire dampers belonging to safety classes 2 and 3, leaktightness requirements shall be determined outwards and downstream. **[**2020-10-23 **]**

526. In safety class 3, CE-marked fire dampers may be used. **[**2020-10-23 **]**

527. For damper actuators and position indication, Guide YVL E.7 shall be complied with. **[**2020-10-23 **]**

528. For control and closing devices contributing to the containment isolation function, Guide YVL E.8 shall be complied with. **[**2020-10-23 **]**

5.5 Machine units

529. Serially manufactured machine units may be addressed as a whole. **[**2020-10-23 **]**

530. Machine units that are not serially manufactured (for example, if one or more components of a serially manufactured unit are replaced or a machine unit is assembled from separate parts) shall be addressed component-specifically. **[**2020-10-23 **]**

531. When analysing machine unit failures and common cause failures, the parts of the machine unit shall be considered individual devices. **[**2020-10-23 **]**

532. For electrical and I&C equipment of machine units, Guide YVL E.7 shall be complied with. **[**2020-10-23 **]**

6 Construction plan

601. When selecting a component in safety classes 2 and 3 or procuring a spare part, the licensee shall prepare an assessment of the suitability and conformity of the component. **[**2020-10-23 **]**

602. The construction plan shall include a description of the component and its operation. **[**2020-10-23 **]**

603. The construction plan shall describe the design bases for the component, its functions, the importance of its operation for the operation of the system and its planned service places. The design data shall include all of the plant's operational states and accidents in which the component has been designed to function. **[**2020-10-23 **]**

604. The construction plan of the component shall present any type test data. **[**2020-10-23 **]**

605. The construction plan shall present operating experience essential for the acceptability of the component. **[**2020-10-23 **]**

606. The construction plan shall include a manufacturer analysis that contains information concerning the manufacturer's organisation and operations, copies of valid certification decisions and the manufacturer's recent delivery references. **[**2020-10-23 **]**

607. If special processes are used in the manufacture of safety class 2 built-to-order equipment, their manufacturing procedures and qualification data shall be included in the construction plan. **[**2020-10-23 **]**

608. If the component in question is not serially manufactured, the construction plan shall include a plan concerning the tests and inspections to be performed during the manufacturing. **[**2020-10-23 **]**

609. If necessary, the construction plan shall include a testing organisation report presenting the qualifications and approval of the testing organisation in accordance with Guide YVL E.12. **[**2020-10-23 **]**

610. The suitability of type approved building products for their intended use shall be demonstrated separately in the construction plan. **[**2020-10-23 **]**

611. The construction plan shall include a performance analysis demonstrating the operation of the equipment assembly. **[**2020-10-23 **]**

612. The construction plan of the filters shall present retention efficiency, pressure losses (for a clean filter and maximum allowable), tightness requirements (for the filter casing and mounting

frames), filter section material, filter material information, amount of coal, number of filter sections, retention time and environmental conditions. **[**2020-10-23 **]**

613. The construction plan of the fan shall present the operating method of the fan, quality of the medium (temperature, pressure, humidity), required operating point and performance curve, tightness requirements, environmental conditions and installation method as well as structural data on the shaft seals, if specific tightness requirements have been set for the fan. **[**2020-10-23 **]**

614. The construction plan of control and closing devices and fire dampers shall present the tightness requirements of the dampers outwards and downstream. **[**2020-10-23 **]**

615. The construction plan of the heating or cooling unit shall present the device type and operating principle, cooling or heating capacity and other essential design values, design pressures and drawings that give the main dimensions. **[**2020-10-23 **]**

616. The construction plan of water-cooling units shall present the properties of the refrigerant used, the cooling capacity and other essential design values of the device and an assessment of compliance with the rules set by the service place. **[**2020-10-23 **]**

617. The drawings of ventilation ducts, welding plan, part/material list and any strength calculations (pressure design, supports, seismic acceptability, etc.) shall be presented in the construction plan. **[**2020-10-23 **]**

618. STUK inspects the construction plan of safety class 2 built-to-order equipment. The construction plan of safety class 3 built-to-order equipment and serially manufactured equipment may be inspected by an AIO. **[**2020-10-23 **]**

7 Manufacture

701. The equipment shall be manufactured and the manufacturing quality shall be monitored as planned. **[**2020-10-23 **]**

702. Before the manufacture is started, the licensee shall ensure that the manufacturer has the preparedness to operate in conformity to all requirements and an approved plan is used. **[**2020-10-23 **]**

703. For air conditioning and ventilation equipment, a material certificate in accordance with standard SFS-EN 10204 [5] is required as follows:

- SC 2 built-to-order equipment, structural materials of pressure-retaining parts: 3.1
- structural materials of other equipment: 2.1
- welding filler material: 2.2.

A material certificate of a higher level shall also be approved in all cases. **[**2020-10-23 **]**

704. Structural materials for which a batch-specific material certificate is required shall be identifiable and traceable from individual melting batches up to the completed structure. **[**2020-10-23 **]**

705. The licensee shall ensure that the manufacturer assembles and submits to the licensee the manufacture result documentation for the component and the installation, operating, and maintenance instructions of the component before the device is taken into use at the facility. **[**2020-10-23 **]**

8 Construction inspection

801. The scope of the construction inspection procedures shall be proportioned to the safety significance of the component to be inspected. **[**2020-10-23 **]**

802. The construction plan shall be approved before the construction inspection. **[**2020-10-23 **]**

803. For safety class 2 equipment and built-to-order equipment of safety class 3, the construction inspection shall be performed by an AIO; for safety class 3 equipment, it shall be performed by an AIO, the licensee's in-house inspection organisation or some other organisational unit of the licensee that is independent of the designer and manufacturer and considered competent by STUK. **[**2020-10-23 **]**

804. For safety class 2 and 3 equipment, a manufacture result documentation review and visual inspection independent of the manufacturer shall be performed. **[**2020-10-23 **]**

805. The inspection in accordance with requirement 804 for a serially manufactured component may be combined with an acceptance inspection, in which case a separate construction inspection is not needed. **[**2020-10-23 **]**

9 Installation

901. The licensee shall perform a reception inspection on safety-classified equipment prior to its storage and installation. **[**2020-10-23 **]**

902. The licensee shall have a plan or procedure in place for installing a component according to which the installation takes place and the installation work quality is ensured. **[**2020-10-23 **]**

903. For safety class 2, the installation inspection shall be performed by an AIO; for safety class 3, it shall be performed by an AIO, the licensee's in-house inspection organisation or some other organisational unit of the licensee that is independent of design, manufacture and installation and considered competent by STUK. **[**2020-10-23 **]**

904. During the installation inspection, it shall be ensured that the installation is appropriate and it has been performed according to approved plans and the guidelines and principles concerning a nuclear facility. **[**2020-10-23 **]**

10 Commissioning

1001. The licensee shall have a plan or procedure in place for commissioning a component according to which the commissioning takes place and the functional capability of the component at the service place is ensured. **[**2020-10-23 **]**

1002. The licensee's in-house inspection organisation or some other organisational unit of the licensee that is independent of design, manufacture and installation and considered competent by STUK shall prepare the commissioning inspection for air conditioning and ventilation equipment in safety classes 2 and 3. For safety class 2 built-to-order equipment, the commissioning inspection shall be performed by an AIO. **[**2020-10-23 **]**

1003. The commissioning inspection may be divided into two parts: The first part reviews the documentation created before commissioning testing and determines that the component is ready for commissioning testing operation. The second part reviews the result documentation from commissioning testing. **[**2020-10-23 **]**

1004. The commissioning inspection shall verify that the installed component complies with the approved plans and any defects and faults discovered during previous inspections have been corrected. **[**2020-10-23 **]**

1005. The licensee shall request the performance of a commissioning inspection in writing well in advance of the inspection date. **[**2020-10-23 **]**

11 Operation, condition monitoring and maintenance

1101. The operating parameters and load, process and environmental conditions of air conditioning and ventilation equipment shall be monitored, and they shall be maintained within the limits of design basis operational conditions. **[**2020-10-23 **]**

1102. Air conditioning and ventilation equipment shall remain reliably operable in all design basis operating conditions during any service intervals. Overhaul needs or a failure shall be detectable before the weakening or loss of operability causes a safety risk. **[**2020-10-23 **]**

1103. Procedures shall be provided for the operation, condition monitoring and maintenance of air conditioning and ventilation equipment. **[**2020-10-23 **]**

1104. The requirements concerning the periodic testing are presented in Guide YVL A.6. **[**2020-10-23 **]**

1105. The licensee's own operating experiences or experiences gained from other nuclear facilities shall be taken into account. **[**2020-10-23 **]**

1106. Ageing management is discussed in Guide YVL A.8. **[**2020-10-23 **]**

12 Modifications

1201. Equipment modifications shall not impair the safety of the nuclear facility. The acquisition of a spare part that is significant in terms of operability is also considered a modification whenever the manufacturer, material or structure of the equipment changes. **[**2020-10-23 **]**

1202. After a modification, serially manufactured equipment shall be handled using procedures for built-to-order equipment, similarly to new equipment. **[**2020-10-23 **]**

1203. The construction plan for a modification of built-to-order equipment shall present justifications for the acceptability of the modification and the information verifying the conformance of the equipment. The safety impact of the modification shall be analysed in the construction plan for a modification of safety class 2 built-to-order equipment. **[**2020-10-23 **]**

1204. When the performance values of a component change significantly, the modification is a system modification, in which case Guide YVL B.1 shall be complied with. **[**2020-10-23 **]**

1205. System-level design shall be approved before the equipment level can be approved. **[**2020-10-23 **]**

1206. After modifications, commissioning testing shall be carried out. General requirements concerning commissioning testing are given in Guide YVL A.5. **[**2020-10-23 **]**

13 Regulatory oversight by the Radiation and Nuclear Safety Authority

1301. STUK assesses the quality control systems of the licensee/license applicant and subcontractors. **[**2020-10-23 **]**

1302. STUK participates in the audits by the licence holder at its discretion. **[**2020-10-23 **]**

1303. STUK or an AIO may oversee the manufacture by means of factory visits in the extent it deems necessary. **[**2020-10-23 **]**

1304. In connection with the system processing of ventilation and air-conditioning equipment, STUK states whether it will conduct a commissioning inspection on the systems or equipment. In general, STUK conducts the commissioning inspection on complete installed air-conditioning systems. STUK's inspection does not replace the licensee's commissioning inspection. **[**2020-10-23 **]**

1305. During inspection visits and commissioning testing, STUK oversees, in the extent it deems necessary, that the overall implementation corresponds to the approved plans and meets the required quality level. **[**2020-10-23 **]**

1306. STUK witnesses commissioning tests in the extent it deems necessary. **[**2020-10-23 **]**

1307. STUK oversees the scope and acceptability of the requirements and periodic testing concerning the operability of the equipment. **[**2020-10-23 **]**

1308. STUK applies the same principles to the supervision of modifications of nuclear facilities as to the control of the design, procurement, installation and commissioning of new equipment. **[**2020-10-23 **]**

1309. STUK reviews the documents submitted to it, specified in Chapter 14. **[**2020-10-23 **]**

14 Documents to be submitted to the Radiation and Nuclear Safety Authority

1401. The preliminary and final safety analysis reports shall present, in addition to the information required for systems by Guide YVL B.1, the key design bases of components. The requirements for submitting the report are set forth in Guide YVL B.1. **[**2020-10-23 **]**

1402. The general equipment requirement specifications of safety class 2 and 3 equipment shall be submitted to STUK for information with the construction plan or the assessment pursuant to requirement 601 at the latest. If the general equipment requirement specification has already been submitted, a reference to it shall suffice. **[**2020-10-23 **]**

1403. Requirement specifications for equipment service places shall be submitted to STUK with the construction plan at the latest, if the construction plan is to be approved by STUK. Otherwise, the licensee's assessment on the suitability of the equipment pursuant to requirement 601 shall be submitted to STUK for information before installation. **[**2020-10-23 **]**

1404. The assessment pursuant to requirement 601 shall be submitted to STUK for information before installation for serially manufactured equipment in safety classes 2 and 3 and built-to-order equipment of safety class 3. **[**2020-10-23 **]**

1405. The construction plans for safety class 2 built-to-order equipment shall be submitted to STUK for approval. The assessment pursuant to requirement 601 shall be presented as a part of the construction plan. **[**2020-10-23 **]**

1406. The safety class 2 construction plans to be submitted to STUK for approval shall be approved by STUK before the installation of the equipment. **[**2020-10-23 **]**

1407. If necessary, STUK may request the construction plans of serially manufactured safety class 2 and 3 equipment and safety class 3 built-to-order equipment for information during the system inspection. **[**2020-10-23 **]**

1408. General requirements concerning commissioning testing are given in Guide YVL A.5. **[**2020-10-23 **]**

15 ANNEX A Ventilation and air-conditioning equipment control scope and division of inspection responsibilities

Approval or witnessing	Safety Class		Requirement
	SC 2	SC 3	
Design			
Design bases	STUK	STUK	1401
General equipment requirement specification	STUK	STUK	1402
Construction plan	STUK/AIO[1)]	AIO[1)]	618, 1404–1407
Requirement specification for equipment service place or suitability analysis	STUK	STUK	312, 601, 1403–1405
Manufacturing			
Manufacturing control	AIO	LH	1303
Construction inspection	AIO	AIO/LH[2)]	803
Installation and commissioning			
Acceptance inspection	LH	LH	901
Installation construction plan and inspection	AIO	AIO/LH[2)]	903
Commissioning inspections	AIO/LH*	LH	1002
Maintenance, repairs and modifications			
Maintenance work inspection	AIO	LH	1308
Plan for repairs and modifications	STUK/AIO	AIO/LH*	1308
Inspection of repairs and modifications	AIO	AIO/LH*	1308

An AIO shall always be entitled to perform inspections stipulated on the licensee in the table.
* LH is an in-house inspection organisation or some other organisational unit of the licensee that is independent of design, manufacture and installation and considered competent by STUK.

[1)] STUK may request the construction plans in accordance with requirement 1407 for information.

[2)] Serially manufactured AIO/LH, built-to-order AIO. **[**2020-10-23 **]**

16 References

1. Nuclear Energy Act (990/1987). **[**2020-10-23 **]**

2. Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018). **[**2020-10-23 **]**

3. Radiation and Nuclear Safety Authority Regulation on the Safety of Disposal of Nuclear Waste (STUK Y/4/2018). **[**2020-10-23 **]**

4. Decree of the Ministry of the Environment on the Indoor Climate and Ventilation of New Buildings (1009/2017). **[**2020-10-23 **]**

5. SFS-EN 10204 Metallic products. Types of inspection documents. **[**2020-10-23 **]**

6. Pressure Equipment Directive (2014/68/EU). **[**2020-10-23 **]**

Definitions

Authorised inspection body (AIO)

Authorised inspection body shall refer to an independent inspection organisation approved by the Radiation and Nuclear Safety Authority under Section 60 a of the Nuclear Energy Act to carry out inspections of the pressure equipment, steel and concrete structures and mechanical components of nuclear facilities in the capacity of an agency performing public administrative duties. (Nuclear Energy Decree 161/1988, in Finnish). Authorised inspection body and authorised inspection organisation have same meaning in YVL Guides.

Special process

Special processes shall refer to manufacturing processes, the results of which cannot be directly verified by means of a product inspection or testing after manufacture; instead, any shortcomings in the process may only appear later while the product is in use. Special processes include, for instance welding, forming and heat treatment.

Ventilation

Ventilation shall refer to maintaining and improving the quality of indoor air by circulating it; in some rooms of a nuclear facility, ventilation systems are also used to limit the spread of radioactive substances.

Air-conditioning

Air-conditioning shall refer to the management of the purity, temperature, humidity and movement of indoor air by treating supply air or circulating air.

Operability

Operability shall refer to the integrity and performance of SSC in conformance with its design bases.

Location requirements

Location requirements shall refer to the requirements set on a component by its location of use at a nuclear facility. The location of use at a facility and as part of the facility's other systems sets requirements on the device in terms of the tolerance of environmental conditions, functionality, performance, and tolerance of potential accident conditions.

Requirement specification for equipment service place

Requirement specification for equipment service place shall refer to the equipment requirement

specification prepared for the planned service place. The requirement specification for equipment service place supplements the general equipment requirement specification.

Equipment assembly

Equipment assembly shall refer to a uniform and functional entity consisting of several components.

Modification

Modification shall refer to introducing changes to a system, structure or component so that it no longer corresponds to previous specifications.

Serially manufactured component

Serially manufactured component shall refer to a component which has not been designed particularly based on the customer's specification but it is procured from an existing product line of the manufacturer. Typically one is manufactured in large quantities, and can be used for other applications, too. Functionality, structure, dimensions, materials, manufacturing process and quality of the component do not essentially differ within and between production lots.

Built-to-order product

Built-to-order product shall refer to a product designed and manufactured for a special application as single pieces or in small manufacturing batches.

Type approval (building products)

Type approval for building products shall refer to a voluntary approval procedure for building products in use in Finland that are legislated in the Decree on the Type Approval of Certain Construction Products. Type approval shows that a building product meets its required essential technical requirements with respect to the purpose of use stated by the manufacturer. A manufacturer who so wishes may apply for type approval for a building product subjected to the Decree on the Type Approval. Type approval is granted by a type organisation authorized by the Ministry of the Environment. Type approval requires certification of the production control. The type approval is mandatory for the building inspection authorities, which means that a type approved building product can be used in a construction work.

Manufacturer

Manufacturer shall refer to an individual or organisation responsible for the design, manufacture, testing, inspection and installation of equipment or sets of assemblies. A manufacturer may subcontract one or more of the said tasks under its responsibility.

Spare part

Spare part shall refer to a back-up part for an SSC that can be used to restore the reduced or

lost operability to the required level.

General equipment requirement specification

General equipment requirement specification shall refer to a document that includes general equipment group-specific design and quality control requirements for safety classes 1, 2 and 3. When an equipment is procured, the requirements set out in this document will be completed with site-specific requirements.