

Safety Standards

of the
Nuclear Safety Standards Commission (KTA)

KTA 2101.3 (2015-11)

Fire Protection in Nuclear Power Plants
Part 3: Fire Protection of Mechanical and Electrical
Plant Components

(Brandschutz in Kernkraftwerken
Teil 3: Brandschutz an maschinen- und elektrotechni-
schen Anlagen)

The previous version of this safety
standard was issued in 2000-12

If there is any doubt regarding the information contained in this translation, the German wording shall apply.

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KTA SAFETY STANDARD

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Fire Protection in Nuclear Power Plants Part 3: Fire Protection of Mechanical and Electrical Plant Components

KTA 2101.3

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PLEASE NOTE: Only the original German version of the present safety standard represents the joint resolution of the 35-member Nuclear Safety Standards Commission (Kerntechnischer Ausschuss, KTA). The German version was made public in Bundesanzeiger (BA nz) of January 8, 2016.

Copies of the German versions of KTA safety standards may be mail-ordered through Wolters Kluwer Deutschland GmbH (info@wolterskluwer.de). Downloads of the English translations are available at the KTA website: www.kta-gs.de

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Comments by the Editor:

Taking into account the meaning and usage of auxiliary verbs in the German language, in this translation the following agreements are effective:

shall	indicates a mandatory requirement,
shall basically	is used in the case of mandatory requirements to which specific exceptions (and only those!) are permitted. It is a requirement of the KTA that these exceptions - other than those in the case of shall normally - are specified in the text of the safety standard,
shall normally	indicates a requirement to which exceptions are allowed. However, exceptions used shall be substantiated during the licensing procedure,
should	indicates a recommendation or an example of good practice,
may	indicates an acceptable or admissible method within the scope of the present safety standard.

Basic Principles

(1) The safety standards of the Nuclear Safety Standards Commission (KTA) have the task of specifying those safety-related requirements which shall be met with regard to precautions to be taken in accordance with the state of science and technology against damage arising from the construction and operation of the plant (Sec. 7, para. (2), subpara. (3) Atomic Energy Act - AtG) in order to attain the protective goals specified in AtG and the Radiological Protection Ordinance (StrlSchV) and further detailed in the Safety Requirements for Nuclear Power Plants (SiAnf) and the SiAnf-Interpretations.

(2) The Safety Requirements for Nuclear Power Plants (SiAnf) Appendix 3 "Internal and external events as well as external hazards" states among others that protective measures against fires inside the nuclear power plant must be provided. The basic requirements regarding fire protection measures are detailed in the safety standard KTA 2101.1. The fire protection of structural components is detailed in safety standard KTA 2101.2 and the fire protection of mechanical and electrical components in the present safety standard. All three parts of the safety standard series KTA 2101 must be considered in the planning and execution of fire protection measures.

Note:

The additionally relevant KTA safety standards are specified in safety standard KTA 2101.1.

(3) The present safety standard is prepared based on the assumption that the building codes, fire protection laws and fire protection regulations of the individual German states (Länder), the German Workplace Ordinance, the German Accident Prevention Regulations (UVV) of the trade unions and other public law regulations are complied with. If the specifics of the nuclear power plant require deviations from laws, ordinances or other public law regulations or from the German Accident Prevention Regulations (UVV), then, in each individual case, the particular procedures specified in these regulations regarding deviations and exemptions must be followed.

1 Scope

This safety standard applies to nuclear power plants with light water reactors.

Note:

Further scope-related specifications are detailed in safety standard KTA 2101.1.

2 Definitions

Note:

Applicable definitions are specified in safety standard KTA 2101.1.

3 Fire Protection Measures for Mechanical and Technical Components and Facilities

3.1 General Requirements

Insofar as the measures specified under Sections 3.2 and 3.3 cannot be applied to the extent necessary to ensure the required protection in the event of fire, additional measures shall be specified regarding fire detection (e.g., by installing additional fire detectors) and regarding firefighting (e.g., by installing stationary fire extinguishing systems).

3.2 Fire Prevention Measures

3.2.1 Components containing combustible liquid or gaseous materials

(1) Hot parts in close proximity to components containing combustible materials shall basically be avoided. If this is not possible due to system-technological or usage-related requirements, measures shall be introduced to avoid an ignition of leakages (e.g., thermal insulation, double concentric pipe, encapsulation, local extraction).

(2) Oil and fuel supplies shall be designed such that their fluids cannot leak onto any plant components with a surface temperature higher than 200 °C.

(3) The systems containing combustible liquid or gaseous operating materials shall normally be provided with equipment for leakage detection (e.g., filling level monitors in case of liquid materials, pressure monitors in case of gaseous materials) and, if applicable, for the draining of leakages.

(4) Vessels containing larger amounts of combustible fluids shall be provided with collecting facilities. The volume of the collecting facilities shall be specified considering the maximum possible non-isolatable leakage amount of the largest individual vessel and, in the case of stationary water-based fire extinguishing systems, also of the accumulated fire-fighting agent.

Note:

Vessels containing larger amounts are, e.g., vessels of the external oil supply as well as the fuel oil tanks of the emergency power generating facilities.

(5) Combustible materials escaping from safety valves shall be safely drained off.

(6) It is not admissible to use cutting ring fittings for pressure-retaining pipes containing combustible liquid or gaseous materials.

3.2.2 Pumps

(1) In the case of an external lubricant supply, the amount of oil from leakages shall be minimized. In this context, measures for monitoring the oil level or oil pressure shall be provided. As soon as the amount of supplied oil falls below a minimum value to be specified, the oil supply shall automatically be shut off.

(2) In the case reactor coolant pumps and associated motors are provided with an integrated oil supply, the pumps shall be equipped with a collecting facility for the entire oil amount of the largest individual supply vessel.

(3) In the case of integrated oil supplies with cooling equipment inside the oil tank, the level in the oil tank shall be monitored. When the maximum admissible level is reached, the cooling water supply to the oil cooler shall be shut off.

(4) The oil supply lines of the reactor coolant pumps shall be designed against external events considering safety standard KTA 2101.1 Sec. 3.3. This shall basically also apply to the oil tank including the auxiliary equipment. In the case of an external oil supply, the oil tank including the auxiliary equipment in the same room does not need to be designed against external events, provided, it is demonstrated that the structural elements separating the firefighting sub-compartment of the oil tank compartment remain functional even after an external event and that the oil collection pan continues to be leak tight.

(5) In the case of reactor coolant pumps with an external oil supply, the design shall incorporate constructional measures that will prevent an uncontrolled release of oil.