

RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF NUCLEAR SHIPS AND NUCLEAR SUPPORT VESSELS

PART VII SPECIAL SYSTEMS

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RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF NUCLEAR SHIPS AND NUCLEAR SUPPORT VESSELS

Rules for the Classification and Construction of Nuclear Ships and Nuclear Support Vessels developed by Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established approval procedure and come into force on 1 October 2022.

The present edition is based on the 2022 edition of the Rules for the Classification and Construction of Nuclear Ships and Floating Facilities and on the 2017 edition of the Rules for the Classification and Construction of Nuclear Support Vessels, taking into account Circular Letters No. 110-312-1-1695c dated 04.02.2022 and No. 110-312-1-1702c dated 14.02.2022, amendments and additions developed immediately before publication.

The Rules set down specific requirements for the nuclear ships, nuclear support vessels and supplement the Rules for the Classification and Construction of Sea-Going Ships and the Rules for the Equipment of Sea-Going Ships of Russian Maritime Register of Shipping.

The Rules are published in the following parts:

- Part I "Classification";
- Part II "Safety Standards";
- Part III "Hull";
- Part IV "Stability. Subdivision";
- Part V "Fire Protection";
- Part VI "Nuclear Steam Supply Systems";
- Part VII "Special Systems";
- Part VIII "Electrical and Automation Equipment";
- Part IX "Radiation Safety";
- Part X "Physical Security".

REVISION HISTORY

(purely editorial amendments are not included in the Revision History)

For this version, there are no amendments to be included in the Revision History.

1 GENERAL

1.1 This Part sets down requirements for special systems of the nuclear ships, nuclear support vessels¹ and ships intended for storage of radioactive waste.

1.2 The following systems are subject to the Register technical supervision:

- .1** controlled area drain system;
- .2** compressed air and gas system;
- .3** fuel system of stand-by and emergency diesel generators;
- .4** containment pressure reducing system;
- .5** special ventilation;
- .6** decontamination system;
- .7** facilities for the LRW reception, transfer and discharge.

1.3 Definitions and explanations relating to adopted abbreviations and terms are given in Part I "Classification".

1.4 In respect of anything not mentioned in this Part, the systems shall meet the requirements given in Part VIII "Systems and Piping" of the Rules for the Classification and Construction of Sea-Going Ships².

¹ Hereinafter referred to as "the NS vessels".

² Hereinafter referred to as "the Rules for the Classification".

2 GENERAL REQUIREMENTS

2.1 The pipelines outside the containment which contain or might contain radioactive substances shall be fitted with double shut-off valves and leakage detectors. In the pipelines with diameter more than 15 mm, provision shall be made that one of shut-off valves is remotely operated and actuated automatically, where necessary.

2.2 There shall not be connections between the ship general systems and systems, which contain or might contain radioactive substances. When such connections are inevitable, they shall be fitted with double shut-off valves, and drainage shall be provided for the pipeline section between the valves.

2.3 The systems carrying radioactive media shall be fitted with seamless pipes made of corrosion-resistant materials, glandless instruments and bellows sealed fittings. All the connections shall be welded.

2.4 Pumps and pipelines shall be provided with biological protection, where necessary.

2.5 Spaces, which are likely to be contaminated with liquid radioactive substances, shall be fitted with bilge wells and bilge alarms.

3 SPECIAL BILGE SYSTEM FOR CONTROLLED AREA

3.1 The controlled area special bilge system shall be provided with means capable to prevent emission of radioactive fluids.

3.2 Special bilge system for controlled area on the nuclear ships shall be designed for operation at SC1 — SC4. Compartments shall be drained into special containers.

3.3 The controlled area special bilge system shall be independent of the ship's bilge system.

3.4 Special bilge system for controlled area spaces on the NS vessels shall be provided with means capable to ensure an appropriate sealing level of the spaces.

Used as such means may be shut-down valves installed on suction pipes of the bilge system of the sealed spaces. The valves shall have local and remote position indicators with information displayed in the main handling operations control room and valve control station. It is recommended that these valves be remote controlled (the drive shall be located outside the sealed space).

3.5 The spaces located above the bilge tank level may be drained by gravity. To prevent bilge water from flowing back and its discharge into other spaces through scuppers in case the tanks are overfilled, non-return valves shall be installed on the bilge pipes or valves on the scuppers shall be of non-return shut-off type.

3.6 The bilge system in the controlled area spaces shall be of a closed-circuit type and shall be equipped with the special built-in tanks for waste radioactive water collection and storage, and scuppers provided with a valve and its closed position indicators.

Waste water bilge wells in the controlled area spaces shall be fitted with removable lattice preventing wells from contamination with foreign objects, and fitted with water-presence indicators, information being displayed in the central control station or main handling operations control room.

Waste water drainage by gravity is allowed into the spaces of the same category (in terms of ionizing radiation and radioactive contamination) located below, provided the decks (platforms) of those spaces are not watertight. Otherwise the pipes for water intake from the bilge wells shall be equipped with non-return shut-off valves.

3.7 The throughput of the bilge pipes and scuppers shall provide fast water removal from the spaces. The scuppers shall be arranged so as to prevent stagnant areas formation in any operating position of the vessel hull.

3.8 For drainage of the controlled area spaces located at the level of the bilge tanks or below, vacuum-drainage or another method of total bilge water removal shall be used. Vacuum drainage is also recommended for the spaces above the controlled area. For vacuum drainage of the spaces provision shall be made for a vacuum pump of the type approved by the Register with a suitable tank for vacuum creation. The pump shall be controlled, its operation and vacuum in the vacuum tank shall be monitored from the local station and central control station (main handling operations control room). For drainage of concealed areas use shall be made of hoses with slot nozzles and places for their connection shall be provided. On NS vessels provision shall be made for vacuum drainage of boxes containers and other facilities for irradiated fuel assemblies individual storage and transportation.

3.9 Waste water of different radioactivity level, as well as alkaline and acid decontamination water shall be segregated. Bilge collecting tanks for medium radioactive water storage shall be shielded.

Medium radioactive water tanks and pipes shall be concentrated in places most distant from accommodation and service spaces, control stations, and machinery spaces.

3.10 The design of bilge collecting tanks shall comply with the requirements of 6.1.1, Part IX "Radiation Safety".

The bilge collecting tanks and vacuum tank shall be fitted with level indicators with low level light signalling, and upper level light and sound signalling led to the central control station (main handling operations control room), washing and entire drainage facilities, and sampling devices.

Air pipes may be combined only within one watertight compartment and only for tanks of bilge water of the same specific radioactivity category.

Where controlled area spaces are drained by gravity, the air pipes of the bilge tanks shall be led above the deck of the uppermost drained space. In case of vacuum drainage, the air pipes of the bilge tanks shall be led to the deck where the drainage vacuum pump tank is installed.

3.11 The bilge tanks shall be drained by electrically driven pumps of watertight construction, having the adequate capacity, or by squeezing the water with compressed air (gas) or other means approved by the Register.

Where compressed air (gas) is used, inadmissible pressure increase shall be prevented in the bilge tanks.

3.12 The vacuum pump tank shall be drained into a special bilge system or directly into the LRW tank. Where the vacuum tank is drained with compressed air, a safety device shall be provided preventing inadmissible pressure increase therein.

4 COMPRESSED AIR AND GAS SYSTEMS

4.1 The compressed air systems of the nuclear ship for service of the SSS critical auxiliary equipment or to be used for control purposes shall be supplied with air from two independent compressors, each compressor shall be capable of keeping the system operational.

4.2 Every compressed air system operating as a part of the reactor safety system shall include at least two separate air cylinders having capacity sufficient for system requirements.

4.3 Compressed air shall be cleaned and dried and its temperature shall be maintained at a specified level.

4.4 For process needs provision shall be made on the NS vessel for special compressed air or gas supply systems segregated from the vessel's similar systems. In order to supply compressed air to the system, an independent air compressor of appropriate parameters and capacity shall be provided and installed outside the controlled area. Compressed air from the compressor shall be supplied through a non-return shut-off valve to an intermediate air receiver installed in the controlled area. The non-return shut-off valve shall be installed directly on the bulkhead bounding the controlled area and shall be located outside the controlled area.

For redundancy purposes and in case of small compressed air consumption for process needs, it is allowed to supply the air from the vessel's system. In this case, the air shall also be supplied to an intermediate air receiver installed in the controlled area through a non-return shut-off valve (for its installation, refer to above). A reducing valve and a safety valve shall be installed directly before the non-return shut-off valve (outside the controlled area), where necessary.

The equipment and installation of the intermediate air receiver shall comply with the requirements of Part X "Boilers, Heat Exchangers and Pressure Vessels" of the Rules for the Classification.

4.5 Connections of the compressed air and gas pipes with other pipes and with fittings within the controlled area shall be welded. The pipes and air receivers shall be made of materials allowing multiple decontamination or they shall have an appropriate coating. Apart from the shut-down valves, non-return valves shall be installed on the open ends of the pipes.

Provision shall be made for a branch pipe (pipe connection) for compressed air or gas delivery from the outside. The branch pipe (connection) shall be installed before the non-return valve outside the controlled area.

4.6 Compressed air (gas) in contact with radioactive compounds, upon being used, shall be removed through air ducts of the special ventilation system.

4.7 Gas bottles of non-explosive process gases (nitrogen, helium) shall be installed in specially equipped spaces in special groups connected to the appropriate pipes. Connection to standard transport cylinders is allowed. The space where the gas bottles are installed shall provide their protection against heating from foreign sources. The location of such spaces and exits therefrom shall be such that personnel can quickly leave the space in case of oxygen-replacing gases spontaneous release therein. The space shall be located outside the controlled area.

4.8 Where provision is made for gas (nitrogen, helium) storage in fixed gas bottles, their equipment and installation shall comply with the requirements of Part X "Boilers, Heat Exchangers and Pressure Vessels" of the Rules for the Classification.

4.9 Provision shall be made for periodical surveys and hydraulic tests of the fixed air and gas bottles without dismantling thereof.

4.10 The equipment necessary for process gas (nitrogen, oxygen, acetylene, etc.) generation and storage as well as for gas and electric welding shall be located outside the controlled area on the NS vessels. The equipment installation shall be agreed with the Register.

4.11 Process gases shall be supplied through independent pipes to independent and segregated stations and then directly to work areas through removable pipes.

4.12 On the NS vessels provision shall be made for receiving of non-explosive process gases (nitrogen, helium) from the outside or their transfer to the serviced ship or to the shore through separate detachable pipes.

Gas transfer shall be forced. Installation of the vessel's gas compressors shall comply with the requirements of Part IX "Machinery" of the Rules for the Classification.

**5 SPECIAL REQUIREMENTS FOR FUEL SYSTEM OF STAND-BY
AND EMERGENCY DIESEL GENERATORS**

5.1 Fuel system shall be designed so as similar-type failure shall not cause failure of all generator sets.

5.2 Daily service fuel tanks shall be placed as close to diesel generators as possible.

5.3 Stand-by and emergency diesel generators of the nuclear ship shall use the same fuel. Fuel storage tanks shall allow its mutual transfer.

5.4 Stand-by diesel generators shall have enough fuel to provide operation at full load considering expected length of the ship voyages.

5.5 Fuel in emergency diesel generators shall provide operation for at least 30 days after any emergency state, including SC4.

6 CONTAINMENT PRESSURE REDUCING SYSTEM

6.1 When the project provides for the containment pressure reducing system to be actuated in case of emergency release of coolant out of the primary circuit, it shall be capable of maintaining operability in case the main electric generators fail.

6.2 The system shall remain in permanent readiness and be capable of automatic actuation if increase in containment pressure is above the specified limit.

When proper justification is provided, remote actuation of the system may be permitted.

6.3 When sprinkler systems are used for pressure reducing, they shall be arranged on the principle of hydrophore, except for the case, when it is proven that the system is actuated in time during which pressure in the containment does not reach critical values taking into account a single-failure criterion.

6.4 When installation on board the ship is completed, the pressure reducing system and its components shall be tested in operation.

6.5 Design of the pressure reducing system shall allow for periodical surveys and tests in operation on board the ship in service.

6.6 The pressure reducing system components (expansion tanks, bubbling chambers, etc.) may be located in compartments connected to the containment, provided those compartments are similar to the containment structure as related to protection against emission of radioactive substances.

7 SPECIAL VENTILATION SYSTEM

7.1 An independent special ventilation system shall be provided for spaces where radioactive contamination might occur. The ventilation systems of the controlled area spaces and supervised areas shall be isolated from each other and the rest of ventilation systems, including a space heating system where air heaters are used.

In addition to the requirements of this Chapter, the system shall comply with the requirements of Part VIII "Systems and Piping" of the Rules for the Classification insofar as they do not conflict with these requirements.

7.2 Directed air flow from spaces where probability of contamination is less into those spaces where probability of contamination is higher by creating appropriate vacuum therein shall be provided in the controlled area spaces where radioactive contaminations exists during operation. Reduced pressure shall be maintained even with one entrance opened.

7.3 The special ventilation system may be either a combined system (exhaust and supply) or a purely exhaust system. The categories of spaces equipped with supply and exhaust ventilation, vacuum in the spaces, its pressure, temperature, humidity and the number of air changes shall comply with the applicable sanitary rules.

7.4 Ventilation ducts of the controlled area spaces of different categories in terms of radioactive contamination or ionizing radiation levels shall be segregated.

7.5 The containment ventilation system structure shall provide for closed-circuit and open-circuit running.

7.6 The containment ventilation system on the nuclear ships shall be fitted with automatic shut-off valves for quick closing air channels under emergency states (SC2, SC3 and SC4).

7.7 Air from the containment of the nuclear ships shall be discharged via channels equipped with radioactivity monitoring instruments and warning devices.

7.8 The special ventilation system shall be fitted with twin filters for discharged air cleaning from aerosols and other radioactive particles, including for ventilation of the containment on the nuclear ships into atmosphere after SC3 and SC4. In this case, any possibility of air discharge bypassing the filters shall be prevented.

Exhaust duct filters of the special ventilation system shall be provided with spare filtering cartridges, shall be readily accessible and provided with the appliances for their safe replacement.

7.9 After cleaning, the air shall be discharged from the controlled area through a special ventilation mast, which effective emission height is specified by the sanitary regulations. In any case, however, air discharged from the special ventilation system shall be prevented from re-entry into air intakes of the ship's ventilation.

Devices for continuous monitoring of the discharged air volume and radioactivity shall be provided at the ventilation mast outlet.

7.10 Layout for ventilation air intake of ship spaces shall be selected so as to prevent intake of discharged radioactive gases. Air intakes shall be provided with filters to prevent dust or foreign particles penetration into the controlled area spaces.

7.11 Exhaust and intake ventilation units of the spaces where radioactive contaminations occur or might occur shall be located in isolated enclosures.

7.12 Redundancy of the supply and exhaust ventilation fans and heat exchangers of the special ventilation system shall be provided. One of the backup fans shall be started automatically once the running fans fail. Ventilation system outlet closures shall be remotely controlled from spaces outside the controlled area.

7.13 When the ventilation system is not in operation, the air shall be prevented from flowing through the ventilation ducts from spaces of higher contamination to those of lower contamination.

7.14 The special ventilation system in spaces where radioactive contamination may occur, shall be made of the materials suitable for multiple decontamination.

All ventilation system components (ventilation ducts and pipes, filter bodies, etc.) shall not hinder decontamination of the adjacent structures and equipment.

The number of flanged connections in the system within the controlled area shall be minimized. No flanged connections, holes, etc. are allowed inside the controlled area.

7.15 In spaces intended for high-activity materials storage or treatment as well as in places of likely release of gases or aerosols, local air extraction directly from work places shall be arranged. In this case, the first cascade of aerosol filters may be located in the same space.

The ventilation system of the spaces where irradiated fuel assemblies storage facilities are located, where high radioactive waste is or may be kept shall be capable to maintain an air temperature in these spaces not in excess of 55 °C, unless other requirements for irradiated fuel assemblies and high radioactive waste storage conditions are specified.

7.16 Upon its manufacture and installation on board, the special ventilation system shall be tested for leak tightness.

7.17 General control of the special ventilation system shall be effected from the central control station (main handling operations control room). Local control stations shall be provided to control separate parts of the systems.

It is recommended that provision be made for interlocking of electric fans start and stop with opening and closing of the appropriate fittings.

7.18 Emergency ventilation system shall be provided for radioactive gases and aerosols concentration quick reduction in enclosed spaces of the NS vessel. As the emergency ventilation mobile filtering unit or another arrangement of the type approved by the Register may be used. The capacity and number of air changes to be provided by the emergency ventilation system as well as its filters resolving power are governed by the volume of the controlled area largest enclosed space where the highest concentration of radioactive gases or aerosols might occur. The emergency ventilation system shall be started from the main handling operations control room. Where a mobile unit is used as an emergency ventilation system it shall be local and remote controlled.

8 DECONTAMINATION SYSTEM

8.1 Decontamination technical means shall be provided on board the nuclear ships and NS vessels for radioactive contamination removal as well as for containment and immobilization of not easily removable radioactive contaminants. The means to be used depend on the particular purpose of the ship and are subject to consideration by the Register in each particular case.

8.2 For decontamination and washing of the spaces, tanks, handling equipment and ship's structures where radioactive contamination might arise, decontamination and washing systems shall be provided.

The decontamination system shall include:

storage tanks for concentrated ingredients of decontaminating solutions;

solution-making stations;

pipes to supply solutions, washing water, high-purity water and steam to decontaminated objects;

pipes for decontaminating water drainage into collecting tanks, different for acid and alkaline waters.

8.3 For needs associated with preparation of decontaminating solutions and washing of decontaminated surfaces, process water supply system shall be provided to supply water to the solution-making stations and appropriate process spaces. Washing water may be drained to a bilge tank of the special bilge system.

8.4 Decontaminating water (alkaline and acid) bilge tanks shall be of the built-in type. Their design shall comply with the requirements of 6.1.5, Part IX "Radiation Safety". Besides, they shall be provided with fittings and pipes for spraying water supply thereto and internal spraying means.

8.5 The system of reception and supply of acids and alkalis to the decontaminating solution-making station shall be safe in operation and shall prevent their spillage. Liquid components shall be supplied to the storage tanks by a closed-circuit method. The liquid component and ready solution storage tanks shall be of the built-in type, and their design shall comply with the requirements of 6.1.5, Part IX "Radiation Safety". The tanks shall be made of the materials suitable for aggressive alkaline and acid media storage and shall be located in isolated spaces equipped with spraying system and exhaust ventilation.

Where dry components are used for making decontaminating solutions, they shall be kept in watertight package in special store rooms equipped with exhaust ventilation and located in the vicinity of the solution-making station. Acid and alkaline components shall be kept separately. They shall be supplied to the solution-making tanks from outside.

8.6 The decontaminating solution-making station and associated store rooms and storage facilities shall be located outside the controlled area. Where many equipment items shall be decontaminated, provision shall be made on the ships for a special decontamination space located within the controlled area and equipped with baths, racks and local decontamination stations, where decontaminating solutions, process water, steam and compressed air supply shall be provided. Besides, local cargo-handling gear grips, stoppers, platforms and similar items necessary for large-sized equipment transportation and handling shall be provided.

The nomenclature of decontamination space equipment is decided by the ship's designer and is subject to approval by a competent authority.

The decontamination space and equipment installed therein shall have a corrosion-resistant coating or shall be made of corrosion-resistant materials.

The decontamination space on the NS vessels shall be equipped with facilities of communication with the main handling operations control room and exhaust ventilation from all local decontamination stations and baths, which is capable to provide the necessary number of air changes. Filters shall be provided for exhaust air cleaning capable to clean the air up to the standards required by the sanitary rules and norms.

8.7 The components and ready decontaminating solutions shall be pumped with special facilities to be controlled from the local stations.

9 LRW RECEPTION, TRANSFER AND DISCHARGE SYSTEM

9.1 Pipes of the LRW reception, transfer and discharge systems shall be independent of other piping and made of corrosion-resistant steels. Pipe connections with other pipes and fittings shall be welded (except for removable pipes). The system shall be provided with arrangements for preventing pressure increase above design values.

Fittings shall be of bellows type with branches to be welded and fitted with local position indicators and alarm with extreme position indication.

Independent pipes shall be provided for reception, storage, treatment and discharge of medium and low radioactive LRW.

9.2 Fittings of process systems dealing with the LRW pumping shall be positioned in an enclosure provided with biological shielding and controlled from the valve control station adjacent to the fitting enclosure.

The valve control station shall be fitted with information means referred to in 2.24.3 — 2.24.5, Part IX "Radiation Safety". The fitting enclosure shall have a coating suitable for multiple decontaminations.

The length of the pipes and the number of fittings shall be minimized. The fittings shall have bellows seals. The pumps for liquid media shall be electrically driven and have watertight construction.

9.3 The LRW reception on board the NS vessel, transfer from one tank into another or for treatment and discharge shall be only forced (except overflow or leak collection systems). LRW may be conveyed either by electric pumps of watertight construction or by compressed air (gas) supply directly to the LRW storage tanks of a nuclear ship or NS vessel. In the latter case, the system supplying compressed air (gas) to the LRW storage tanks shall provide a working medium supply both from the vessel's own sources and from the outside sources.

9.4 Where electric pumps are used for the LRW reception and discharge, provision shall be made on board for at least two pumps of watertight construction made of corrosion-resistant materials, preventing radioactive water leaks in the course of treatment. A bypass system automatically preventing a pressure increase in the pipes (in case of operation of quick-closing devices on the discharge pipe, etc.) shall be provided for each pump.

The pumps shall be installed in a special pump room. At least two pumps totally independent of the LRW systems with low volumetric radioactivity of the pumped media shall be provided for medium radioactive waste pumping. These pumps shall be either installed in specially protected rooms or have additional biological shielding.

The pumps shall be started and stopped, and their operation shall be controlled from the control station located outside the pump room and from the main handling operations control room (central control station), which shall have two-way communication between them, with the ship served and with the shore.

9.5 Where electric pumps for the LRW transfer are designed in such a way that their operation requires priming with the working medium, their start shall be interlocked with an indicator showing availability of water in the pumps, and their stopping — with a low level alarm for the LRW storage tanks.

9.6 When discharging LRW overboard the NS vessel, contamination of the ship and environment shall be excluded. The waste shall be transferred through two separate pipelines, where one pipeline shall be used for medium-radioactivity LRW, the other one — for low-radioactivity LRW.

The LRW system shall provide waste reception and discharge on either side, using both the served ship's facilities and vessel's own facilities.

Removable lines of an approved design shall be used for the LRW reception and discharge from one ship to another and to the shore. Trays with water draining into the LRW collection system shall be provided at connection points of removable pipelines. Branches for joining removable pipelines shall be arranged in a special-purpose station/ enclosure near sides.

Prior to starting operations, removable pipelines shall be subject to leak tests.

Removable pipelines shall be capable of being decontaminated, washed and completely drained without being disconnected from the LRW discharge pipeline.

The LRW reception and discharge fittings shall be combined in common reception-discharge stations located on either side, shall be local- and remote-controlled and shall have position indicators. The LRW fittings and pipes on their entire length shall have biological shielding, where necessary.

The station equipment shall prevent the LRW spillage in the course of transfer or in emergencies involving damage of the lines. Provision shall be made for quick-closing isolating devices for prompt isolation of the pipes in case of breaks or spontaneous disconnection of removable lines. These arrangements shall be capable of automatic actuation upon the low pressure signal. The LRW discharge pipelines shall be remotely isolated from central control station (main handling operation control room) and from discharge station.

The LRW reception-discharge station shall have:

- .1 tight closure of all openings in the ship's outside structures (sides, upper deck);
- .2 connection of pipes for washing and decontamination of the station room, its equipment and systems;
- .3 connections for compressed air supply for purging and emptying of the LRW systems and removable lines;
- .4 heating system preventing icing where leaks are likely to occur in the course of handling operations carried out in winter time and freezing of the systems themselves;
- .5 twin mechanical filters on waste reception-discharge pipe;
- .6 coamings in side openings so high as to prevent LRW from flowing overboard in case of leakages or damages or spontaneous disconnection of removable lines. The places for removable line connection shall be away from outside openings; means shall be provided for fixing the lines and preventing them from dropping overboard;
- .7 handling devices for lines transfer outside and their reception back;
- .8 local barriers (trays) to contain likely spillages of LRW;
- .9 connection of vacuum drying system;
- .10 means for measuring activity of received and discharged LRW;
- .11 necessary biological shielding where equipment and systems are arranged;
- .12 communication with the main handling operation control room and valve control station.

All detachable equipment shall be kept in special spaces located next to the stations. All materials used in the station structures and equipment installed or coatings used therein shall be resistant to corrosive media and be suitable for multiple decontamination.

9.7 Provision shall be made for removable lines flushing and drying by supplying flushing water and compressed air to the LRW discharge system after the last bellows valve.

Fittings of the flushing water and compressed air supply systems shall be of non-return shut-down type and shall be installed directly on the LRW pipeline. All connections of removable lines shall be of quick-release type, but preventing any LRW leaks.

A possibility shall be available to test the removable lines for leak tightness upon their assembly before operations begin.

9.8 In order to reduce contamination of pipes and storages, mechanical filters or other water cleaning means shall be installed in the suction and discharge parts of the LRW transfer system.

Provision shall be made for safe replacement of mechanical filters and their transportation to the storage.

The NS vessels intended for handling cores and radioactive waste are recommended to be equipped with a treatment in order to decrease specific activity level of LRW to be stored.

Russian Maritime Register of Shipping

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of Nuclear Ships and Nuclear Support Vessels
Part VII
Special Systems**

FAI "Russian Maritime Register of Shipping"
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