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INSTRUCTION No3/08
for the use of disinfectant “Sabisept M”
(LLC Research Development Company “Sabina-Grand”, Russia**)**
for disinfection of railway an underground objects

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Instruction is developed by Federal State Unitary Enterprise "All-Russian Scientific Research Institute of Railway Hygiene of Rospotrebnadzor".

This instruction concerns disinfectant detergent «Sabisept M», (LLC Research Development Company "Sabina-Grand", Russia), in accordance with specification 9392-001- 74518126 2005.

The instruction is targeted at cleaning teams at railways and underground systems, conductors at passenger carriages of long distance trains and interregional trains, officers of the departments of preventive disinfection (DPD FSIPH) of railways and underground systems.

1. Sphere of application

Disinfectant detergent «SABISEPT M» can be applied for preventive, current and final disinfection of premises, furniture, sanitary-technical equipment at any stationary and mobile railway and underground objects of Russia including railway stations, underground stations, passenger carriages of different types, cafes and other objects which are under municipal supervision.

Under preventive disinfection of carriages and stations carried out by conductors and cleaning teams one should understand sanitary cleaning of the object with the use of disinfectant detergents and wiping surfaces.

2. Состав и свойства дезинфицирующего средства «SABISEPT M».

2.1 Disinfectant deteregent «SABISEPT M» is transparent liquid of the color ranging from transparent to yellow. The active agents of the disinfectant detergent «Sabisept M» are alkyldimetilbenzylammonia chloride – 12% and basic nitrile – 3.5%, besides, it includes neonol and other components. It is easily washed away with water. pH 2% of the detergent solution – 5.6 – 8.0.

Storage life of the detergent in the open producers' package is 5 years, working solutions – 14 days on condition of storing in closed package. After long term storage appearance of small amounts of sediment is possible. The detergent preserves its qualities after freezing and further thawing.

The detergent is produced in polymer bottles of 1 dm ³ and containers of 3 and 5 dm³.

2.2. Sabisept M» has the wide range of antimicrobial action in respect of gram-negative and gram-positive bacteria (including mycobacteria of tuberculosis); all known human pathogenic viruses (including causative agents of acute respiratory infections, serum hepatitis, HIV, poliomyelitis, viruses of "atypical pneumonia", "avian flu" and etc.); pathogenic fungi like Candida, Tricophytin, Aspergillus.

The detergent preserves its qualities after freezing and further thawing

2.3. The detergent «SABISEPT M" in regard to the parameters of acute toxicity in accordance with the State Standard 12.1.007-76 on injection into the stomach is referred to the third class of moderately dangerous substances, on applying onto the skin and on parenteral introduction it is referred to the forth class of low hazardous substances. The detergent in its native form has irritating effect in case of direct contact on skin, conjunctiva, has weak sensobilizing effect. The limit of irritating effect on conjunctiva is 1.0%, on skin – 2%. Detergent vapor (10% solutions and less) on one-time inhalant effect is low-hazardous and is referred to the forth class of low hazardous substances.

Maximum allowable concentration (MAC) in the air of the working zone for alkyldime-tilbenzylammonia chloride is 1 mg/m³

MAC in the air of the working zone for the basic nitrile is 2 mg/m ³.

2.4. The detergent Средство «SABISEPT M» does not damage surfaces of colored decorative plastic (paper foliated, glass-fiber plastic); embossed surfaces of hardly inflammable vinilis-leather, marble, wooden surfaces (anti –pyrirate, anti-septate), rubber for handrails, nap polyether fireproof cover and on the other surfaces of railway and underground objects.

2.5. For preventive disinfection it is recommended to use polymer containers of the volume ranging from 1 dm^3 to 5.0 dm^3 . For preparation of working concentrations one should attach measuring flask (in the form of the cap on the basis of 5 ml on 10 litres of water) to the polymer container in accordance with Table 1.

3. Preparation of Working Solutions of the Disinfectant Detergent «SABISEPT M».

3.1. Working solutions of the disinfectant detergent for carriages are prepared by the representatives of sanitary service only at handling railway plants; for railway stations, other stationary objects in separate premises. For preparation of solutions one should add exact quantity of concentrate (measuring

containers should be attached) to the measured quantity of drinking water of room temperature in accordance with calculations presented in Table 1. Working solutions after their preparation should be placed into polymer containers only.

Table 1

Preparation of working solutions of disinfectant detergent «SABISEPT M»

Concentration of the Solution (%) for:			Amount of the detergent (ml) necessary for preparation of			
The detergent	Active agents		1 litre of working solution		10 litres of working solution	
	ADBC	Amine	Detergent (ml)	Water (ml)	Detergent (ml)	Water (ml)
1.0	0.12	0.03	10.0	990.0	10.0	9900.0
2.0	0.24	0.07	20.0	980.0	200.0	9800.0

4. Application of the disinfectant detergent «SABISEPT M» for preventive disinfection

4.1. Preventive disinfection of the railway and underground objects is carried out by wiping with working solutions of the detergent at handling railway plants.

4.2. For preventive disinfection of walls, surfaces at railway and underground objects including passenger and administration carriages, underground carriages, one should use 1.0% solutions (of the detergent) of disinfectant «SABISEPT M» calculated on the basis of 150 ml on 1 m^2 of the processed surface. The contact time is 60 minutes.

For disinfection of sanitary technical equipment, litter bins, one should use 1.0% solution of the detergent «SABISEPT M» after two times of wiping with the interval of 15 minutes. Total contact time is 60 minutes. Norm of consumption in case of two times of wiping is 300 ml on 1 m^2. Wet cleaning at railway and underground objects after disinfection with the detergent «SABISEPT M» (that is washing away the disinfectant from the processed surfaces) is not required. In case of dripping on the processes surfaces after exposition they are wiped with dry disinfected cleaning tools.

4.3. Modes of preventive disinfection of railway and underground objects are presented in Teble 2. Mode of disinfection of cleaning tools is presented in Instruction No1 for application of the detergent «SABISEPT M» at medical preventive treatment institutions developed in Federal State Unitary Enterprise All-Russian Scientific Research Institute of Railway Hygiene of Rospotrebnadzor.

Table 2. Modes of preventive disinfection of railway and underground objects with the detergent **«SABISEPT M»**

Object for disinfection	**Concentration of working solution for the detergent %**	**Disinfection time, min. (exposition)**	**Mode of disinfection**

Long distance passenger trains and interregional trains (walls, niches, berths, overhead racks, fold –back seats, tables, inner window surfaces, inner and outer surfaces of lockers, doors, handles, handrails walls).	1.0	60	One time wiping
Cafes and dining cars (surfaces, walls, floor, stands, chairs, inner window surfaces, handrails, doors, floor).	1.0	60	One time wiping
Carriage of luxury trains (floor, inner window surfaces, walls, overhead racks, doors and door handrails, covered with vinilis-leather chairs, stands and tables in cafes, floor.	1.0	60	One time wiping
Sinks for dishwashing (in cafes, in the conductor's section and so on)	1.0	60	One time wiping
Soft chairs and berths covered with furniture cloth including nap fire-proof cloth.	2.0	60	Two times of wiping with the interval 2-3 minutes
Railway stations - surfaces and chairs in waiting halls, baggage rooms, hairdresser's, parenting rooms, cafes, floor.	1.0	60	One time wiping
Underground stations and trains (floor, walls, chairs, glass, handrails, marble surfaces and so on).	1.0	60	One time wiping
Official stationary objects, leisure rooms for locomotive teams, preventoriums.	1.0	60	One time wiping
Cleaning tools	2.0	60	Soaking
WCs in trains, at the stations, in the underground (sanitary-technical equipment, walls, floor). Bins, containers for litter collecting.	1.0	60	Two times of wiping with the interval 15 minutes.

4.4 Long distance passenger trains and interregional trains. Taking into account the specificity and unlike other objects among long distance passenger trains one differentiates 2 types of preventive disinfection: partial – intertrip and complete preventive processing.

Under partial preventive processing one understands intertrip (at handling railway plants).

Under complete preventive processing of long distance passenger trains one should understand train processing at handling railway plants (no less than 1 time in a quarter), which requires dispatching of all bed linen (mattresses, cushions and blankets) for inner disinfection and further disinfection of inner surfaces of the trains.

Preventive disinfection with working solutions of the detergent «SABISEPT M» is carried out at handling railway plants in accordance with the modes presented in Table № 2, and is carried out with cleaning tissues moistened with the detergent working solution. In passengers' and in conductors' sections walls, niches, sleeping births, tables, inner window surfaces, outer and inner surfaces of lockers, doors, handles, sinks for dishwashing in conductors' sections, floor are to be processed. In the corridor walls, fold-back seats, inner window surfaces, containers for litter collecting, entrance doors, carriage handrails, walls.

In WC – the sanitary technical equipment. After this, cleaning tools are soaked in 2% solution of the disinfectant detergent «SABISEPT M» at exposition for 60 minutes, and then it is washed with clean water and dried.

In long distance passenger trains passengers should be provided mainly with disposable table ware. Sanitary processing of other tableware is carried out by washing it with warm water and baking soda, mustard, dishwashing detergents for domestic use.

During trips only sinks in a conductor's section, litter bins and sanitary technical equipment of WCs are processed with the disinfectant «SABISEPT M».

4.5 Dining cars and cafes in long distance passenger trains and interregional trains**.** At handling railway plants preventive disinfection is carried out by wiping all inner train surfaces including walls, floor, tables, stands, chairs, inner window surfaces, handrails, doors, sanitary-technical equipment in WCs floors with the disinfectant «SABISEPT M» in accordance with the modes recommended in Table 2. Cleaning tools after use are soaked in 2% solution of the detergent «SABISEPT M» at exposition for 60 minutes, and then they are washed with clean water and dried.

4.6**.** Carriages of luxury electrical trains. Preventive disinfection with detergent solution «SABISEPT M» is carried out daily at handling railway plants in accordance with the modes presented in Table 2. There are to be processed: floor, inner window surfaces, walls, overhead racks, doors, door handrails, covered with vinilis leather chairs, stands and tables in cafes, sanitary technical premises and equipment.

During intertrip processing of chairs covered with nap fire-proof cloth they undergo vacuum cleaning. Chairs should have head support which should be changed after each trip.

4.7. Administration carriages and special carriages. At handling railway plants one should arrange processing of inner premises as in section "Long Distance Passenger Trains".

4.8. Railway stations**.** At railway stations preventive disinfection of passenger premises is carried out with wiping in accordance with the modes presented in Table 2 in the following schedule:

5.1 Walls in passengers' waiting halls– 1 time a week;
- Sofas and chairs in waiting halls, cashier's encounters – 2 times a week;
- Sanitary-technical equipment and WC premises – 1 time a day;
- Cafes, hairdresser's, baggage rooms– 1 time a day;
- Parenting rooms (PR) - 1 time a day.

In case of appearance of negative epidemiological situation, disinfection of all passenger and administrative premises with the detergent «SABISEPT M» should be carried out no less than 1 time a day. In PR – 3 times a day. WC and sanitary technical equipment are processed no less than 3 times a day, and walls in WCs at the height no less than 1.5 meters above the floor. Especially thoroughly cleaning tools should be processed.

4.9. Underground stations and trains. In case of preventive disinfection of underground stations it is recommended to use working solutions of the «SABISEPT M» (see Table 2). Preventive disinfection of stations is carried out every day by cleaning teams. Preventive disinfection of underground trains (floor, walls, chairs, ceilings, glass, and handrails) is carried out at handling railway plants in accordance with СП 2.5.1337-03.

4.10. Official stationary objects including leisure rooms for locomotive teams and preventoriums. For preventive disinfection it is recommended to use daily the detergent solution in accordance with the modes presented in Table 2.

5. Application of the detergent «SABISEPT M» for focal (current and final) disinfection.

Disinfectant detergent «SABISEPT M» can be used in epidemiological cases for current disinfection of infectious or suspicious diseases or final disinfection (after treatment of patient's infectious suspicious diseases).

In case infectious or suspicious diseases occur during the trip conductors are to inform the head of the train.

Current and final disinfection in epidemiological cases in carriages, stations, is carried out by spraying arranged by institutions dealing with disinfection activity – in accordance with the modes stated in "Instruction No1" for the disinfectant detergent «SABISEPT M» (LLC Research and Development Company "Sabina –Grand", Russia) in medical preventive treatment institution and in infectious developed in Federal State Unitary Enterprise All-Russian Scientific Research Institute of Railway Hygiene of Rospotrebnadzor.

6. Safety measures

6.1. Preparation of working solutions and all works with it should be carried out with protection of hand skin with rubber gloves.

6.2. One should avoid direct contact of the concentrate and working solutions with skin and eyes.

6.3. Preventive disinfection of passenger objects should be carried out by wiping surfaces of the premises. It is permissible to carry it out in people's presence.

6.4. On working with solutions using the method of soaking containers are to be closed with covers.

6.5. On working with the detergent one should observe the rules of personal hygiene. It is prohibited to smoke, drink, and take in food. After work the face and hands are to be washed with soap.

6.6.The detergent should be stored in closed containers far from food products and pharmaceuticals, out of children's reach.

7. First Aid in Case of Accidental Poisoning

7.1. In case of direct contact of the detergent with eyes one should washed the eyes with large amounts of water for 10-15 minutes, drop in 30% solution of sulfacyl sodium.

7.2. In case of direct contact of the detergent with skin it should be washed away with soap.

7.3. In case of taking the detergent in one should drink several glasses of water, then take in 10-20 crushed absorbent carbon. Do not nauseate!

7.4. In case it is necessary one should contact the doctor.

8. Transportation and Storage Conditions

8.1. The detergent is transported by railway and automobile transport in covered vehicles in accordance with the rules of goods transportation valid for the corresponding means of transport.

8.2. The detergent is stored in the producer's package at the temperature not higher than plus 40ºC far from the sources of light. It is possible to transport the detergent at the temperature ranging from minus 30ºC to plus 40ºC. In case of detergent freezing it should be kept at the temperature of plus 20-40ºC till occurrence of homogeneous transparent solution. After its thawing the detergent preserves its activity and does not lose its qualities.

8.3. In case large amounts of the detergent is poured out it should be diluted with large amounts of water or be absorbed with noninflammable substances (sand, rasping, waste cloth, silica gel),be collected into containers and sent to utilization. Cleaning of the poured detergent should be carried out in special uniform: rubber apron, rubber boots and personal protection equipment for hand skin (rubber gloves), eyes (protection glasses), respiratory organs (multifunctional respirators of the type РУ 60 М, РПГ-67 with the plug of В type).

Pouring the detergent into the collecting system is permissible only if it is diluted.

9. PHYSICAL –CHEMICAL AND ANALYTICAL METHODS OF QUALITY CONTROL OF DISINFECTANT DETERGENT «SABISEPT M»

9. Physical – Chemical Methods of Detergent Control

9.1. The detergent is controlled in accordance with parameters in Table 3.

Table 3 – Physical –Chemical Parameters of Detergent Control

Parameters	Norm

Appearance	Transparent liquid with the coloration ranging from color-less to yellow
of basic nitrile and basic nitrile hydrochloride in conversion to basic nitrile, %	3.0 – 4.0
Mass concentration of alkyldimetilbenzylammonia chloride, %	11.0 – 13.0
the detergent with mass concentration of 2% at 20 ºC, unit pH	5.6 – 8.0

9.1. Defining the appearance.

The state of appearance is defined visually by placing 50 cm^3 of the analyzed product into a dry cylinder and watching it at the passing light.

9.1. Defining of mass concentration of basic nitrile and basic nitrile hydrochloride in conversion to basic nitril

Equipment, reagents, solutions

Ionometer or pHmeter of any brand with permissible deviation of no less than 0.05 units pH.

Electrodes: indicatory, glass, auxiliary – silver chloride (or calomel).

Magnet mixer

Laboratory scales of the forth class of accuracy.

Burette of the volume 10 cm^3

Laboratory glassware

Cylinder of the volume of 50 cm^3

Distilled water

Hydrochloric acid, solution of concentration with (HCI) = 0.5 mole/dm^3

Sodium hydrate of concentration with (NaOH) = 0.5 mole/dm^3

Isopropyl alcohol

Analysis carrying out

One should weight 10 –12 g of the tested product in the glass of 100 or 250 cm^3 (results of weighing in grams are taken down up to the second decimal sign). 40 cm^3 of isopropyl alcohol is added to the glass and carried out potentiometer titration of basic nitrile hydrochloride with the solution of sodium hydrate while mixing with magnet mixer. Then to the obtained solution one should add 1-2 ml of sodium hydrate solution, mix and carry out potentiometer titration with the solution of hydrochloric acid.

The curve of potentiometer titration with the solution of hydrochloric acid has two potential jumps: the first one corresponds to neutralization of the excessive amount of sodium hydrate, the second one - to neutralization of total amount of basic nitrile occurred as a result of titration of basic nitrile hydrochloride and the amine contained in the product test. Near the point of equilibrium the solution of the titrate is added in portions of 0.1 cm^3, the volume of titrate of the corresponding point of equilibrium is calculated with the method of second derivative coefficient.

Results processing

Mass concentration of basic nitrile hydrochloride (X_1) in percentage in accordance with the formula:

$$X_1 = \frac{V_1 \cdot M_{BNH} \cdot 0{,}5 \cdot 100}{m \cdot 1000}, \text{ where}$$

V_1 is the volume of solution of sodium hydrate with exact concentration of 0.5 mole/dm^3, spent on titration of basic nitrile hydrochloride, cm^3

M_{BNH} is average molecular mass of basic nitrile hydrochloride calculated in accordance with the formula: M_{BN} + Mнcl, equal to M_{BN} + 36.5;

M_{BN} is molecular mass of basic nitrile (stated in the passport for the detergent);

m is the mass of the analyzed product, g.

Mass concentration of the basic nitrile and basic nitrile hydrochloride in conversion to basic nitrile (X_2) is calculated in percentage according to the formula:

$$V_2 \cdot M_{BN} \cdot 0.5 \cdot 100$$

$$X_2 = \frac{\text{----------}}{m \cdot 1000}, \text{ where}$$

V_2 is the volume of solution of hydrochloric acid of exact concentration of 0.5 mole/dm^3 spent on titration of the total amount of basic nitrile resulted from titration of basic nitrile hydrochloride with sodium hydrate and the amine contained in the product;

M_{BN} is molecular mass of basic nitrile (stated in the passport for the detergent);

m is the mass of the analyzed product, g..

For the result of the analysis one should take the average value of the results of two parallel definitions, absolute deviation between which does not exceed the permissible deviation, equal to 0.2 % in case confidence probability is P=0.95.

8.4. Measuring of mass concentration of alkyldimetilbenzylammonia chloride.

Equipment, glassware, reagents

Laboratory scales of general use of the 2nd class of accuracy

Measuring flasks of the following volumes 100, 200, 250, 500, 1000 cm^3

Flask of Кн. type of 100 cm^3

Glass of 100 cm^3

Cylinder of 10.25 cm^3

Pipettes of 2, 5, 10 cm^3

Burette of 5, 10 cm^3 with scale interval of 0.02 cm^3

Sodium chloride, chemically pure, of the solution with concentration of (NaCl)= 0.1 mole/dm^3.

Silver nitrate, solution of concentration ($AgNO_3$) = 0.1 mole/dm^3.

Ethanol

Isopropyl alcohol

Indicator: fluoresceine in accordance with the normative document, alcoholic solution of mass concentration 1 g/dm^3 or fluoresceine - sodium (uranin) in accordance with the normative document, water solution of mass concentration of 1 g/dm^3.

Distilled water

Preparation for analysis

Preparation of the solution of sodium chloride of concentration (NaCl)= 0.1 mole/ dm^3.

0.5845 g of sodium chloride is weighed and transferred to the measuring flask of 100 cm^3, then distilled water is added, weighing is dissolved and diluted up to the mark with distilled water and thoroughly mixed.

Preparation of the solution of silver nitrate with concentration of ($AgNO_3$) = 0.1 mole/dm^3: 1.6987 g. of silver nitrate is weighed, transferred to the measuring flask of 100 cm^3 , them distilled water is added, and diluted up to the mark with water and thoroughly mixed.

The prepared solution is stored in dark glassware.

Fixing concentration of the solution of silver nitrate

2 (5) cm^3 of the solution of sodium chloride is placed into the conic flask, then distilled water is added into the flask up to 20 cm^3. 10 cm^3 of isopropyl alcohol and 2-3 drops of indicator. The content of the flask is titrated with the solution of silver nitrate while intensive mixing. In the point of equilibrium there is the transfer of yellow-green coloration into rose-red. The average volume of the solution of silver nitrate (two titrations) spent on titration. The deviation between volumes of silver nitrate spent on titration should not exceed 0.04 cm^3.

Concentration of the solution of silver nitrate C in mole/dm^3, calculated according to the formula:

$$C = \frac{0,1 \cdot V_1}{V_2}, \text{ where:}$$

0.1 – concentration of the solution of sodium chloride, mole/dm^3

V_1 – volume of the solution of sodium chloride taken for titration, cm^3;

V_2 – volume of the solution of silver nitrate spent on titration, cm^3.

Analysis carrying out

0.5000 ± 0.0200 g of the detergent is weighed in the conic flask, 20 cm^3 of distilled water is added, then 10 cm^3 of isopropyl alcohol and 2-3 drops of indicator are added and titrated with the solution of silver nitrate on intensive mixing till the transfer of coloration from green-yellow to rose-red.

Results processing.

Mass concentration of alkyldimetilbenzylammonia chloride X_3 in % is calculated according to the formula:

$$X_3 = \frac{V \cdot C \cdot M \cdot 100}{m \cdot 1000} - X_1 \cdot \frac{M}{M_{BNH}}$$, where:

V is volume of the solution of silver nitrate spent on titration, cm^3;

C is concentration of the solution of silver nitrate, mole/dm^3;

M is average molecular mass of alkyldimetilbenzylammonia chloride (stated in the passport for the detergent),

m is the mass of the detergent weighing, g;

X_1 is the mass concentration of basic nitrile chloride (p.6.3), %,

For the result of analysis one should take an average value of two parallel measurements, absolute deviation between which should not exceed 0.2% in case confidence probability is P = 0.95.

Permissible absolute total deviation of the measuring results is ± 0.4% in case confidence probability is P = 0.95.

9.2. Measuring the parameter of the hydrogen ions activity

Measuring the parameter of the hydrogen ions activity, pH of water solution of the detergent with mass concentration of 2% is carried out in accordance with the State Standard P 50550.-93 with potentiometer method.