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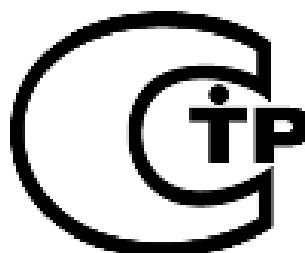
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**WATER SPRAY FIRE EXTINGUISHING MODULES
WSFEM-13.5-GZ-VD (t°C = -10;-30;-50)**



Passport

and manual instructions

WSFEM-13.5-GZ-VD (t°C = -10;-30;-50) PS

1 PURPOSE

1.1 The present technical requirements cover water spray fire extinguishing modules WSFEM-13.5-GZ-VD ($t^{\circ}\text{C} = -10; -30; -50$) (hereinafter referred to as WSFEM), intended for extinguishing and localization of fires class A and electrical equipment under tension up to 1000V.

1.2 WSFEM are not intended for extinguishing of the following fires:

- Substances reacting with water (alkaline and alkaline-earth metals);
- Substances burning of which can occur without air access.

1.3 WSFEM can be made in normal modification with temperature range of operation from -10 to $+50^{\circ}\text{C}$, -30 to $+50^{\circ}\text{C}$ and -50 to $+50^{\circ}\text{C}$. WSFEM operation is admitted when relative humidity not more than 95% under the temperature of 25°C .

1.4 WSFEM is intended to extinguish both the local seats of fire and all the premises on square.

1.5 WSFEM is an executive element in automatic and autonomous fire extinguishing sets.

1.6 WSFEM is a reused product.

1.7 Liquid fire extinguishing substance (hereinafter referred to as FES) is ejected by the gas generated with a gas-generating element - a cold gas source (CGS): CGS-13.5(M)-01 SIAV 066614.025.000 TU.

1.8 Examples of WSFEM marking (model) records when ordered:

WSFEM-13.5-GZ-VD-01-01 ($t^{\circ}\text{C} = -10$) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -10 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-02-01 ($t^{\circ}\text{C} = -10$) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -10 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-01-02 ($t^{\circ}\text{C} = -10$) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -10 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-02-02 ($t^{\circ}\text{C} = -10$) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -10 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-01-01 ($t^{\circ}\text{C} = -30$) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -30 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-02-01 ($t^{\circ}\text{C} = -30$) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -30 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-01-02 ($t^{\circ}\text{C} = -30$) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -30 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-02-02 ($t^{\circ}\text{C} = -30$) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -30 to $+50^{\circ}\text{C}$;

WSFEM-13.5-GZ-VD-01-01 (t°C = -50) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -50 to +50°C;

WSFEM-13.5-GZ-VD-02-01 (t°C = -50) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 2.5 up to 4 m, temperature range of operation from -50 to +50°C;

WSFEM-13.5-GZ-VD-01-02 (t°C = -50) TU 4854-024-54572789-16 – frame model No. 01 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -50 to +50°C;

WSFEM-13.5-GZ-VD-02-02 (t°C = -30) TU 4854-024-54572789-16 – frame model No. 02 for fire extinguishing from a height 4 up to 6 m, temperature range of operation from -50 to +50°C;

WSFEM(S)-13.5-VD... TU 4854-024-54572789-16 is autonomous modular water spray firefighting set for all modifications of WSFEM.

Notes:

1) WSFEM frame models differ from each other only by dimensions with the same capacity;

2) Temperature range of operation of autonomous modular sets designated with “S” letter must not exceed the range from -40 to +50°C.

2 TECHNICAL CHARACTERISTICS

2.1 Technical characteristics of WSFEM are given in Table 1.

Table 1

Name	Value
1 Case capacity, lit	15±0.2
2 Dimensions, mm, not more than:	
a) Model 01	
- diameter	340
- height	385
b) Model 02	
- diameter	282
- height	450
3 WSFEM mass without FES, kg, not more than	8.8
4 Volume, dm ³ (mass, kg) of FES in WSFEM with the following thermal range of operation:	
- from -10 to +50°C	13.5 ^{+0,2} (14.5 ^{+0.22})
- from -30 to +50°C	13.5 ^{+0,2} (15.4 ^{+0.23})
- from -50 to +50°C	13.5 ^{+0,2} (16.3 ^{+0.24})
5 WSFEM total mass, kg, not more than, for the following thermal range of operation:	
- from -10 to +50°C	23.5
- from -30 to +50°C	24.4
- from -50 to +50°C	25.3

Continuation of Table 1

6 WSFEM fast action (time from the moment of sending impulse to a triggering element of the module to the moment of FES ejecting out of the module), s, not more than	3
7 Duration of FES emission, s, not more than	3
8 FES flow rate through the spray nozzle, kg/s, not less than, for the following temperature range of operation: - from -10 to +50°C - from -30 to +50°C - from -50 to +50°C	4.83 5.13 5.43
9 Maximal working pressure, MPa	3.5
10 Safety valve opening pressure	4.0...4.9
11 Protected square for fires class A, m ² : - height from 2,5 to 4 m - height from 4 to 6 m	26.4 30.2
12 Circuit characteristics of electric triggering unit: - safe current of testing circuit, A, not more than - operating current, A, not less than: - electric resistance, Ohm	0.03 0.2 8...16
13 Resource of triggering, times, not less than	10

3 COMPLETENESS OF SET

3.1 WSFEM set to be supplied consists of:

- a) WSFEM TU 4854-024-54572789-16 – 1 item;
- b) Spray nozzle - 1 item;
- c) Additives to the water at the rate of preparation of 13.5 dm³ of FES according to set temperature range of operation of the device;
- d) Passport and Manual instructions - 1 copy.
- e) WSFEM package –1 item.

4 DESIGN AND OPERATION PRINCIPLE

4.1 WSFEM-13.5 design

4.1.1 WSFEM (See Figure 1) consists of a case **1** filled with FES, inside which a gas-generating device **2** is placed. CGS **3** with electrical-triggering element **4** is placed inside a hermetic case of gas-generating device. Lower throat of a case is overlapped with shear membrane **5** which is pressed by nut **6**. Spray nozzle **7** is connected with nut **6** through a filter element. Bracket **8** is placed in upper part of frame for module mounting to a ceiling. Mouth **9** and safe valve **10** are also placed in upper part of a case. WSFEM has earth connector **11**.

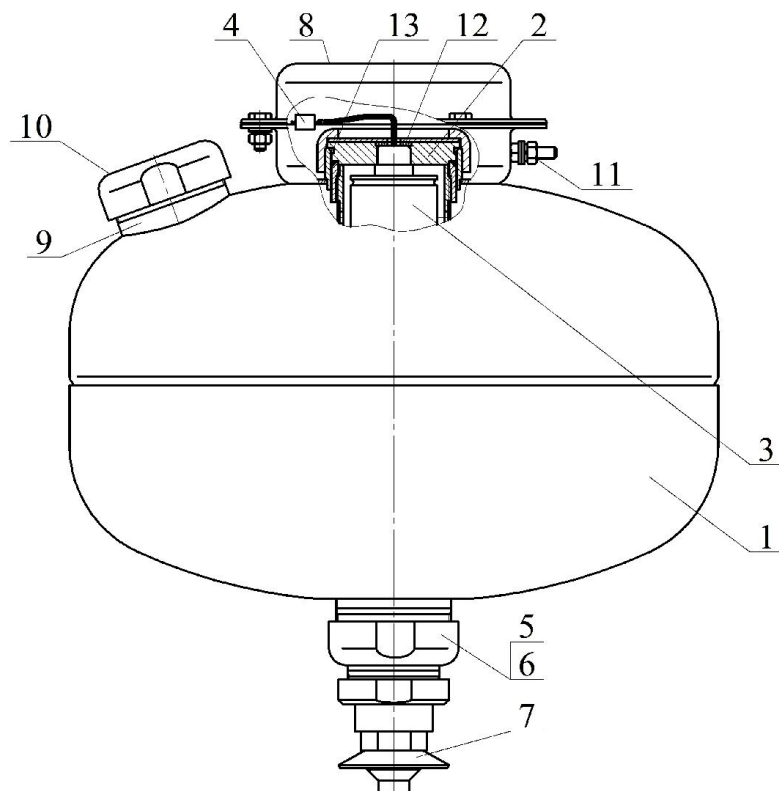


Figure 1

4.1.2 WSFEM is actuated with a current pulse which can be generated by:

- Receiving/control, fire alarm, and safeguard devices;
- Manual start button;
- Electronic launching devices (for example, automatic and autonomous signaling-and-triggering device USPAA-1 TU 4371-032-00226827-99, signaling-and-triggering device USP-101 TU 4371-004-21326303-96).

4.1.3 Autonomous modular set WSFEM(S)-13.5 performs functions of fire detection and suppression automatically without usage of external power supply elements and control systems.

4.2 Operation principle

4.2.1 After sending electric pulse to the outputs of the triggering element 4, the CGS 3 generates gas which creates pressure inside WSFEM case to rupture membrane 5 and eject a sprayed jet of FES into a burning area through spray nozzle 7.

4.3 Design and operation principle of autonomous modular set WSFEM(S)-13.5

4.3.1 WSFEM(S)-13.5 design

4.3.1.1 Electronic launching unit 5 (thermal launching device) is mounted on a bracket 1, fastened with nut 2 on earth clamp 3 of module frame 4 (see Figure 2). Electrical triggering element CGS outputs 5 inserted in PVC pipe are connected with electronic launching unit 4 through a hermetic input.

4.3.2 WSFEM(S)-13.5 operation principle

4.3.2.1 In case of fire origin and ambient temperature raising (72 ± 5)°C in zone of WSFEM placement an electric pulse is supplied from electronic launching unit 4 to electrical triggering element outputs 5. Then CGS generates a gas which creates pressure inside WSFEM case to rupture membrane and emit of sprayed FES into a burning zone through spray nozzle. Simultaneously with electrical signal emission to electrical

triggering element of CGS, a fire alarm loop circuit is closed to supply a signal about WSFEM launch. Wires of a fire alarm loop circuit are connected with electronic launching unit through a hermetic input.

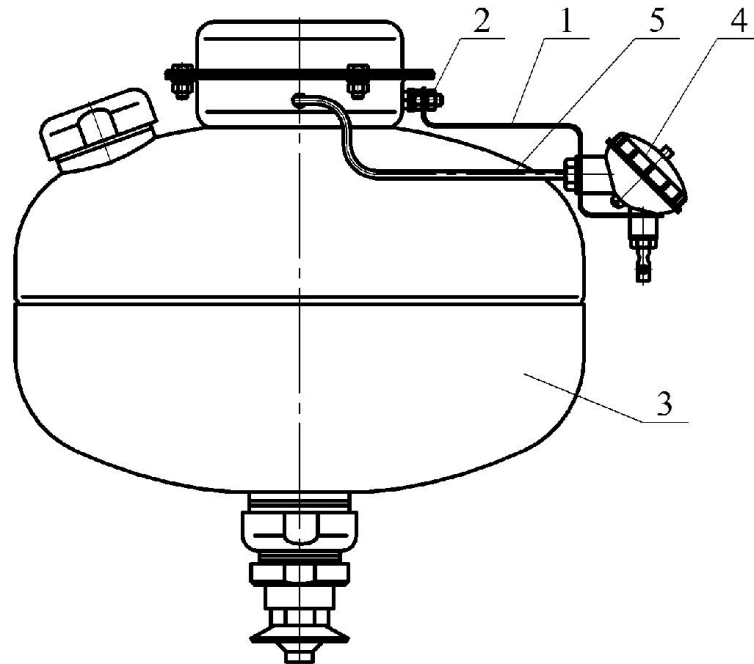


Figure 2

Attention! To return an electronic launching unit into initial stage after launch it is necessary to take out a power supply element out of the unit under temperature lower than 65°C and insert it back again after 2 minutes.

5 SAFETY MEASURES

5.1 The staff who was allowed to operate WSFEM should study this Passport and observe its requirements

5.2 Before switching ON the module, the output ends of the triggering element should be closed by twisting not less than twice and sealed. Connect WSFEM only after grounding. Electric safety while assembling WSFEM should be provided by observing the requirements of PUE, PTEEP, POT RM-016-2001/RD 153-34.0-03.150-00 and PZSE.

5.3 After detecting the module defects (dents, cracks, through holes, FES leakage) during the operation or after its service life, WSFEM should be sent to the factory-manufacturer or utilized according to p. 9 of the present Passport.

5.4 It is not allowed:

- keeping WSFEM near heat sources;
- effecting of rainfalls, direct sunlight, aggressive media, moisture;
- shocking the case of WSFEM;
- dropping from the height more than 1.5 m;
- dismantling of WSFEM, making any changes in its construction and its off-label use;
- using of WSFEM with damaged case (dents, cracks, through holes, FES leakage);
- aiming of WSFEM spray nozzle towards a human when working with module;

- performing any fire tests without a concordance of experimental works program or without a presence of a representative of a company-manufacturer:

- WSFEM operation with damaged spray nozzle.

5.5 It is forbidden to carry out any repair works when WSFEM case is pressurized or CGS is connected.

5.6 Charging, recharging and technical examination of WSFEM should be performed at the factory-manufacturer of WSFEM or in organizations having a license for such kind of activity.

6 PREPARATION OF WSFEM TO OPERATION, LAYOUT AND MOUNTING

6.1 Unpack WSFEM, and examine the integrity of case, membrane, and safety valve.

6.2 Check a circuit integrity of electrical triggering element with a safe current pointed in p. 12, Table 1.

6.3 Fasten the bracket **8** (See Figure 1) on the ceiling. Coordinates of holes in the bracket are shown in Figure 3.

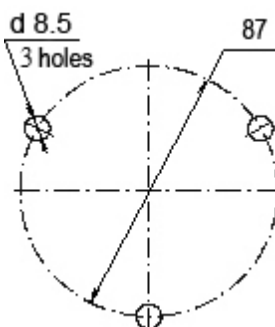


Figure 3

6.4 Attach WSFEM case with the bracket and fasten the connection with nuts.

6.5 FES preparation

6.5.1 Pour a water into a clean container (polyethylene, polypropylene, etc.) according to GOST 6709-72, SanPiN 2.1.4.1074-01 (water temperature should be $+(15...25)^{\circ}\text{C}$). The volume of water poured must correspond to the requirements of Table 2 for different modifications of WSFEM.

6.5.2 Open the packages with powdery additive to water, and pour it into the container with water, then stir it until a full dissolution.

Safety measures: when FES preparing according to p. 6.5.2 it is necessary to use individual protection means according to GOST 12.4.011-89 (respirator, gloves, and protective glasses) and follow the personal hygiene rules.

6.5.3 Pour the FES solution obtained into aperture of upper throat **9** (see Figure 1). For a final preparation of FES applied to WSFEM-13.5-GZ-VD ($t^{\circ}\text{C} = -10; -30$) open a package with a liquid additive and pour it into aperture of upper throat **9**. The solution obtained according to p. 6.5.2 for WSFEM-13.5-GZ-VD ($t^{\circ}\text{C} = -50$) is a final FES. Place a safe valve **10** into throat aperture. Tighten the nut firmly from above.

Note: It is allowed to carry out FES filling before WSFEM mounting on a ceiling. In this case it is necessary to limit maximally the number of device overturns or inclinations.

Attention! It is strongly prohibited to store the additives in non-hermetic package before WSFEM filling.

Attention! It is strongly prohibited to increase the volume of FES in WSFEM.

Table 2

WSFEM Designation	Water Volume, dm ³
WSFEM-13.5-GZ-VD-01-01(t°C = -10), WSFEM-13.5-GZ-VD-02-01(t°C = -10), WSFEM-13.5-GZ-VD-01-02(t°C = -10), WSFEM-13.5-GZ-VD-02-02(t°C = -10)	10.7 ^{+0.2}
WSFEM-13.5-GZ-VD-01-01(t°C = -30), WSFEM-13.5-GZ-VD-02-01(t°C = -30), WSFEM-13.5-GZ-VD-01-02(t°C = -30), WSFEM-13.5-GZ-VD-02-02(t°C = -30)	9.45 ^{+0.2}
WSFEM-13.5-GZ-VD-01-01(t°C = -50), WSFEM-13.5-GZ-VD-02-01(t°C = -50), WSFEM-13.5-GZ-VD-01-02(t°C = -50), WSFEM-13.5-GZ-VD-02-02(t°C = -50)	8.8 ^{+0.2}

6.6 Fasten nozzle-spray 7 firmly (see figure 1).

6.7 When installing an autonomous modular device WSFEM(S)-13.5 the following additional works should be performed:

6.7.1 Check a condition of electronic launching unit regarding the absence of mechanical damages by a visual control.

6.7.2 Fasten bracket 1 with nut 2 (see Figure 2) on WSFEM case.

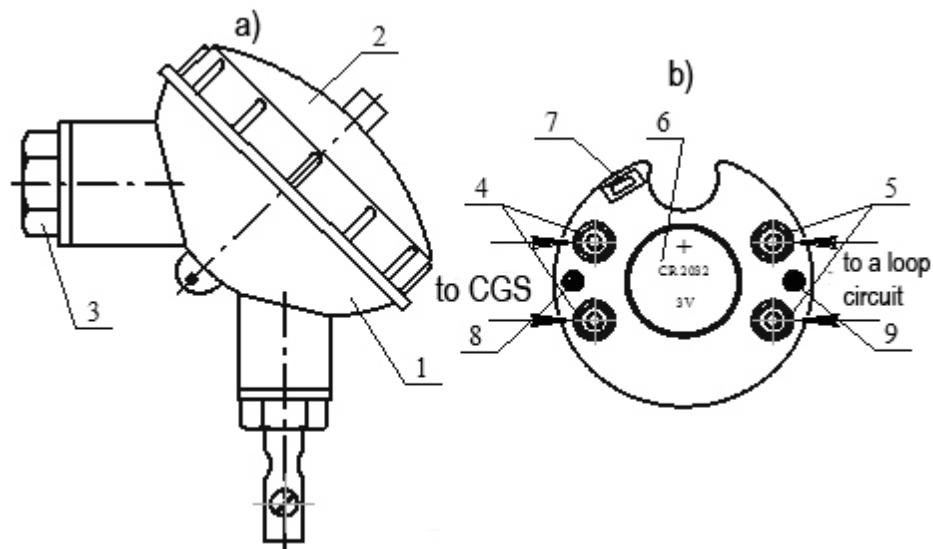


Figure 4

6.7.3 Turn off cover 2 and screw 3 from case 1 of electronic launching unit (see Figure 4). Lead wires of CGS electrical triggering element and, if necessary, wires of a

fire alarm loop circuit in hermetical input of electronic launching unit through holes of screw 3 (see Figure 4) and bracket 1 (see Figure 2). Fasten electronic launching unit on the bracket with screw 3 according to Figure 2.

Note: the range of voltage in a fire alarm loop circuit must be from 12 to 70V of DC or AC with maximal current limitation 100 mA.

6.7.4 Connect wires of CGS electrical triggering element and a fire alarm loop circuit to terminals 4, 5 in a case electronic launching unit accordingly. Scheme of output stage of a fire alarm loop circuit line signal control with end device is shown at Figure 5.

6.7.5 Observing polarity install a power supply element 6. The type of power supply element is GR2032 (Navigator, RENATA or Energizer).

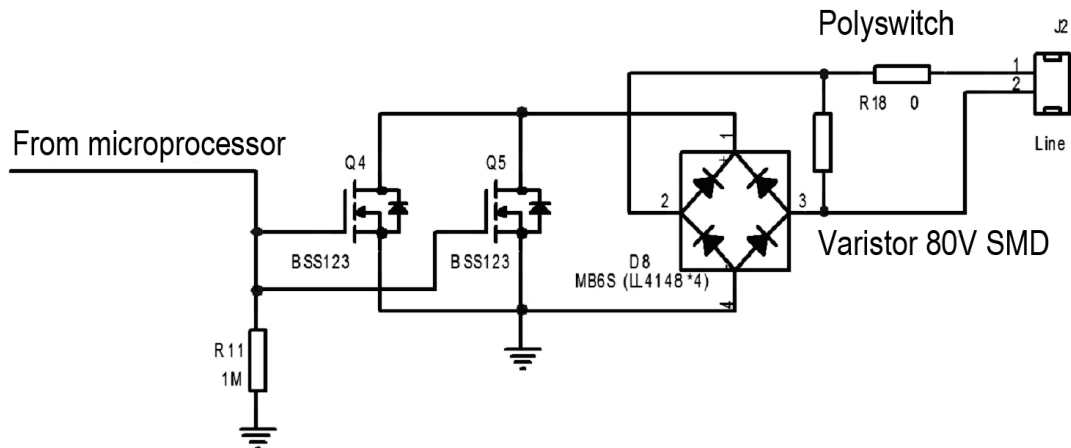


Figure 5

6.7.6 Carry out testing of electronic launch unit. By pushing control button 7 ensure in power supply element and WSFEM launching circuit integrity:

- When correct operation three pulses are emitted on indicator 8 (of green color) with 100 ms duration within 1 sec;
- When insufficient voltage of power supply element three pulses are emitted on indicator 9 (of red color) with 100 ms duration within 1 sec;
- When there is a short circuit of “bridge” of CGS electrical triggering element (resistance less than 8 Ohm) five pulses are emitted on indicator 9 (of red color) with 100 ms duration;
- When there is a disconnection of “bridge” of CGS electrical triggering element (resistance more than 20 Ohm) four pulses are emitted on indicator 9 (of red color) with 100 ms duration.

When holding button 7 further testing is not performed, light signals emission continues with period of 5...6 sec.

6.7.7 Turn cover 2 on case 1 of electronic launching unit and perform an installation of autonomous modular device on a ceiling according to pp. 6.3...6.6.

6.8 The configuration of sprayed FES dispersion and image of an area where a fire extinguishing is achieved are shown at Figure 6 and Table 2.

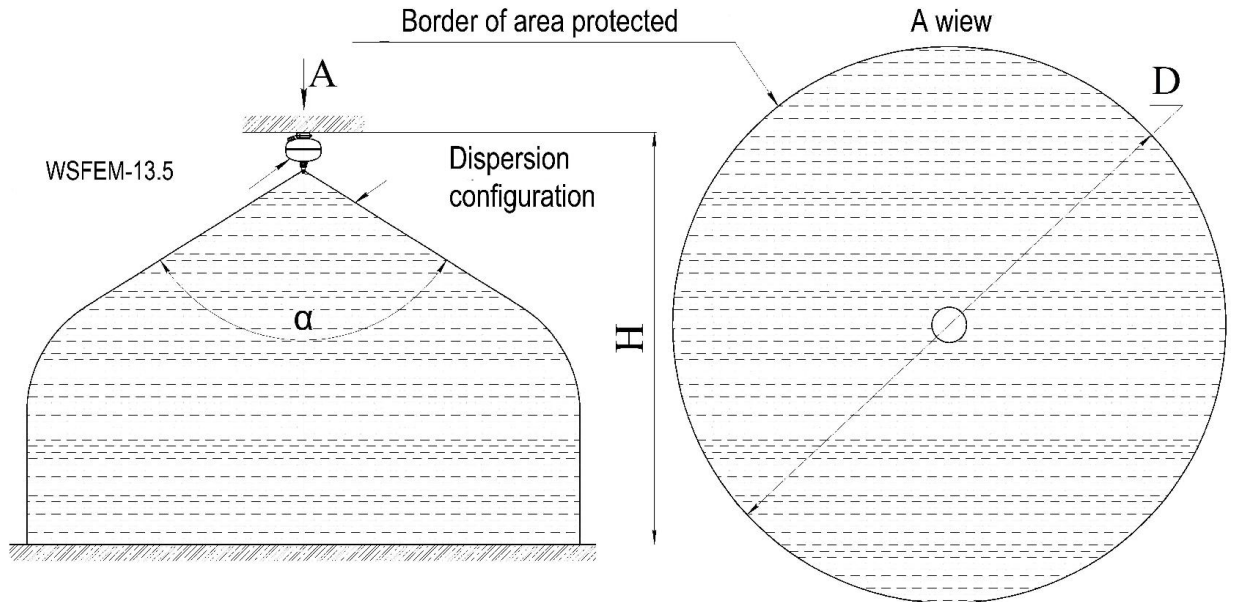


Figure 6

Table 3

WSFEM Designation	Height of Installation (H), m	Angle of dispersion α , deg.	Diameter D, m	Square to be Protected, m^2
WSFEM-13.5-GZ-VD-01(02)-01 ($t^{\circ}C = -10$), WSFEM-13.5-GZ-VD-01(02)-01 ($t^{\circ}C = -30$), WSFEM-13.5-GZ-VD-01(02)-01 ($t^{\circ}C = -50$)	from 2.5 to 4	118	5.8	26.4
WSFEM-13.5-GZ-VD-01(02)-02 ($t^{\circ}C = -10$), WSFEM-13.5-GZ-VD-01(02)-02 ($t^{\circ}C = -30$), WSFEM-13.5-GZ-VD-01(02)-02 ($t^{\circ}C = -50$)	from 4 to 6	95	6.2	30.2

7 MAINTENANCE

7.1 Special technical maintenance during fixed service life is not required. Examine visually a case regarding the absence of dents, damages and FES leakage; spray nozzle regarding the absence of deformation and damages of construction: integrity of the disk (membrane) of safety valve and WSFEM grounding available **once a quarter**. If the case and safety valve membrane are not intact, replace the module. In case of spray nozzle damage replace the nozzle out of order to a new one supplied from a factory-manufacturer on base on special order.

7.2 For autonomous modular device WSFEM-13.5(S) the following operations are held additionally:

- a) Electronic launching unit testing in accordance with requirements of p. 6.7.6;
- b) Visual inspection of electronic launching unit aiming to ensure:
 - Reliability of mounting on WSFEM;
 - Reliability of electrical connection contacts;
 - Absence of dust, mud, foreign objects on a case and contacts.

Defects revealed should be eliminated.

7.3 Recharging after actuation should be carried out by WSFEM factory-manufacturer or by enterprises having a license for such kind of activity.

7.4 The delivery set for WSFEM recharging (see Figure 1):

- gas generating device (pos. 2) – 1 item;
- membrane of SIAV 634231.001.002 drawing (pos. 5) – 1 item;
- membrane of SIAV 634231.001.091 drawing for safety valve (pos. 10) – 1 item;
- rubber ring 050-054-25 GOST 9833-73 for safety valve (pos. 10) – 1 item;
- rubber washer o SIAV 634233.006.023 drawing (pos. 12) – 1 item;
- rubber ring 058-062-25 GOST 9833-73 (pos. 13) – 1 item;
- metal net of filtrating element in front of nozzle-spray (pos. 7) – 1 item;
- water additives at the rate of preparation of 13.5 dm³ of FES according to device set temperature range of operation;

7.5 Checking and recharging notes are made on WSFEM case (with a label or ticket fastening) and in WSFEM manual (see Annex A).

8 STORAGE AND TRANSPORTATION

8.1 Conditions of WSFEM transportation and storage must correspond to Ozh-4 GOST 15150-69 conditions.

8.2 The MPP transportation in the factory packing at temperatures of -50°C to plus 50°C is allowed by all kinds of transport according to the rules of transporting the goods by this kind of transport and taking into account transport conditions – harsh environment (G), GOST 23170-78.

8.3 When WSFEM is stored and transported, conditions preventing from mechanical damage, direct sunlight, rainfalls and aggressive media should be provided.

9 UTILIZATION OF WSFEM AFTER FIXED SERVICE LIFE

9.1 Works for utilization should be performed by a factory-manufacturer or at enterprises having a license for such kind of activity.

9.2 Perform WSFEM disassembling.

9.3 WSFEM case utilization should be performed by scrapping.

9.4 FES is environmentally harmless therefore pour it out into domestic sewage for utilization.

9.5 CGS utilization should be performed as following.

9.5.1 In premises equipped with influx-and-extract ventilation carry out CGS actuation. For this purpose place the CGS in a pipe exceeding its length not less that 1.5 times, and inner diameter of pipe should be more that the outer CGS diameter not less that 1.4 times. The pipe fastens firmly horizontally or vertically overlapping lower aperture with incombustible support. Place the CGS without protruding of its top or bottom part from the pipe. Connect the wires of electrical triggering element to a constant

power source which corresponds to p. 12, table 1 of the present manual. Carry out actuation distantly with absence of people in premises.

9.5.2 After actuation make sure that the premises have been ventilated to a safe concentration or use isolating respiratory protective means when entering the premises. Extract the CGS from a clamp wearing heat-shielding mittens and utilize the CGS by means of scrapping.

10 WARRANTY

10.1 The factory-manufacturer guarantees the correspondence of WSFEM to the requirements of technical specification if the Customer observes operation, transportation and storage conditions.

10.2 Service life is stated to be 10 years and is estimated from the date of WSFEM accepting by Quality Department of the factory-manufacturer.

10.3 Guarantee service life is 2 years from the date of Quality Department acceptance.

10.4 The factory-manufacturer is not responsible for:

- Misoperation if the owner does not observe operation rules;
- Negligent storage and transportation of WSFEM;
- Passport loss;
- After reexamination carrying out, WSFEM recharging according to p. 7.3 of the present Passport, if they are carried out not at a factory-manufacturer;
- Fixed service life exceeding from the moment of Quality Department acceptance of a company-manufacturer.

11 CERTIFICATE OF ACCEPTANCE AND SALE

Water spray fire extinguishing module

- WSFEM-13.5-GZ-VD-01-01(t°C = -10) WSFEM-13.5-GZ-VD-01-02(t°C = -10)
- WSFEM-13.5-GZ-VD-02-01(t°C = -10) WSFEM-13.5-GZ-VD-02-02(t°C = -10)
- WSFEM-13.5-GZ-VD-01-01(t°C = -30) WSFEM-13.5-GZ-VD-01-02(t°C = -30)
- WSFEM-13.5-GZ-VD-02-01(t°C = -30) WSFEM-13.5-GZ-VD-02-02(t°C = -30)
- WSFEM-13.5-GZ-VD-01-01(t°C = -50) WSFEM-13.5-GZ-VD-01-02(t°C = -50)
- WSFEM-13.5-GZ-VD-02-01(t°C = -50) WSFEM-13.5-GZ-VD-02-02(t°C = -50)
- WSFEM(S)-13.5-GZ-VD-01-01(t°C = -10) WSFEM(S)-13.5-GZ-VD-01-02(t°C = -10)
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- WSFEM(S)-13.5-GZ-VD-01-01(t°C = -30) WSFEM(S)-13.5-GZ-VD-01-02(t°C = -30)
- WSFEM(S)-13.5-GZ-VD-02-01(t°C = -30) WSFEM(S)-13.5-GZ-VD-02-02(t°C = -30)
- WSFEM(S)-13.5-GZ-VD-01-01(t°C = -50) WSFEM(S)-13.5-GZ-VD-01-02(t°C = -50)
- WSFEM(S)-13.5-GZ-VD-02-01(t°C = -50) WSFEM(S)-13.5-GZ-VD-02-02(t°C = -50)
- (tick off the necessary)

Corresponds the requirements of TU 4854-024-54572789-16 and is considered to be fit for use.

Product quality is confirmed by a certificate of conformity
No. C-RU.PB97.V.00403, valid till 20.06.2021

Batch No _____

Manufacturing date _____
(month, year)

Inspector signature and stamp _____

Sold _____
(name of the Seller)

Sale date _____

Shop stamp

