

# Fire suppression system for engine compartment

Issued to

**Lehavot Production and Protection Ltd**

12125 Lehavot Habashan, Israel

## Product and product name

Fire suppression system, BUS Shield

## Type

Dry chemical based fire suppression system  
Extinguishing agent: ABC 94

## Technical data/Performance/Classification

See appendix to this certificate.

## Certificate

The product described above fulfils the requirements in RISE Certification rules regarding Fire suppression systems in engine compartments of buses and coaches, SPCR 183. The certification is based on the manufacturer's technical file and type tests performed in accordance with standards specified in the appendix to this certificate.

## Marking

Marking shall show SPCR 183, RISE logo, manufacturer's logo, the number of this certificate, the name of the product, its serial number, the name of the manufacturer and RISE P-symbol. See appendix for details.

## Validity

This certificate is valid until not longer than 9<sup>th</sup> July 2023

## Miscellaneous

The manufacturer's in-house inspection is under surveillance by RISE in accordance with section 4 and 5 of SPCR 183. Other terms and conditions are set out in section 6 of SPCR 183.

Johan Åkesson

Martin Tillander

Certificate No. SC0195-18 | issue 1 | 2018-07-09

RISE Research Institutes of Sweden AB | Certification  
Box 857, SE-501 15 Borås, Sweden  
Phone: +46 10-516 50 00  
certifiering@ri.se | www.ri.se

2017-08-24



7P00263-05



### Product information

#### Technical data of the tested suppression system

Table 1 shows technical data of the suppression system tested for 4 m<sup>3</sup> engine compartment volumes. The system may be scaled to fit the size of a specific engine compartment according to the scaling rules in SPCR 183.

Table 1, Technical data of the tested fire suppression systems

|  |   |
|--|---|
| Manufacturer                                 | Lehavot Production and Protection Ltd                                     |
| Fire suppression system name                 | BUS Shield (8 kg)   |
| Extinguishing agent name                     | ABC 94  |
| Extinguishing agent type                     | Dry chemical  |
| Extinguishing agent mass                     | 8,00 kg   |
| Extinguishing agent container                | VPS 8 ABC Agent cylinder 8 kg   |
| Extinguishing agent container article number | (P/N) 40921009  |
| Propellant gas                               | Nitrogen  |
| Mass of propellant gas                       | 240 g   |
| Extinguishing agent container pressure       | 30 bar  |
| Extinguishing agent delivery hose            | Flexible hose ½" (PTFE Coated stainless steel mesh) SAE 100R 14A          |
| Extinguishing agent delivery pipes           | Stainless steel pipes. Inner diameter 9 mm (approx. ¾")                   |
| Type of nozzles                              | 6 pcs. "PTZ-6"<br>1 pcs. "3 Grooves"                                      |
| Number of nozzles                            | 7   |
| Distance to the most remote nozzle           | 7,1 m   |
| Total length of agent delivery system        | 10,9 m  |
| Number of fittings                           | 6 pcs. Straight fittings<br>6 pcs. Tee fittings<br>24 pcs. Elbow fittings |

### Performance - Tested fire scenarios according to SP Method 4912

A summary of the results can be found in Table 2. The test numbers refer to SP Method 4912. More information about the tests is shown in the test report.

Table 2, Results

| Test | Air flow              | Test scenario category   | Results |
|------|-----------------------|--|---------|
| 1    | 0 m <sup>3</sup> /s   | High fire load test<br>Minimum operating temp. test<br>T <sub>min</sub> = -40 °C | Pass    |
| 2    | 0 m <sup>3</sup> /s   | Low fire load test   | Pass*   |
| 3    | 0 m <sup>3</sup> /s   | Hidden fire test   | Pass    |
| 4    | 0.5 m <sup>3</sup> /s | Class A-fire test  | Pass    |
| 5    | 1.5 m <sup>3</sup> /s | High fire load test  | Pass    |
| 6    | 1.5 m <sup>3</sup> /s | Low fire load test   | Pass*   |
| 7    | 1.5 m <sup>3</sup> /s | Hidden fire test   | Pass    |
| 8    | 3 m <sup>3</sup> /s   | High fire load test  | -       |
| 9    | 3 m <sup>3</sup> /s   | Low fire load test   | -       |
| 10   | 3 m <sup>3</sup> /s   | Hidden fire test   | -       |
| 11   | 0 m <sup>3</sup> /s   | Hot surface re-ignition  | Pass    |

\* Passed with an amount of agent reduced by 20% compared to the ordinary amount of agent.

Table 3, Rating according to SP Method 4912

| Category                             | Category Rating |
|--------------------------------------|-----------------|
| 1 High fire load                     | 2               |
| 2 Low fire load                      | 2               |
| 3 Class A-fire                       | 1               |
| 4 Hidden fire                        | 2               |
| 5 Hot surface re-ignition protection | 73 seconds      |
| <b>Total Rating</b>                  | <b>7</b>        |

### Component tests

In addition to fire tests components in the fire suppression system need to be verified and tested through international standards as specified below.

Table 4, results

| Property   | Standard                            | Result |
|--|-------------------------------------|--------|
| Mechanical stress resistance (vibration and shock) | ISO 16750-3:2007 (Test VII)         | Pass   |
| Corrosion resistance                               | ISO 21207, test method B (3 cycles) | Pass   |

### Conditions

Electrical equipment included in the system shall have a classification of at least IP65, and tested in accordance with IEC 60529:1989/A1:2009/COR3:2009.

A risk assessment in accordance with SPCR 183 section 3.2 shall be made prior to equipment being placed into service. The risk assessment shall be made by personnel having documented experience for the task.

It is the responsibility of the suppression system manufacturer to assure compliance of its suppression system components with legal requirements and vehicle manufacturer requirements.

The marking of the product shall be legible and durable and be placed adjacent to the engine compartment and be designed as below. The size of the sign shall be 40 x 60 mm.

Marking plate template:

