FEDERATION INTERNATIONALE
DE L'AUTOMOBILE

Homologation N°

EX.010 · 00

Certificat d'homologation pour les systèmes d'extinction plombés dans les voitures de course
Homologation certificate for motor sport fire extinguisher systems

FIA SPORT
27 JUIN 2000

1. GENERALITES / GENERAL

101. Constructeur / Manufacturer: TOTAL WALTHER GmbH Feuerschutz und Sicherheit

102. Adresse / Address: Waltherstraße 51
D 51069 Köln (Cologne) - Germany

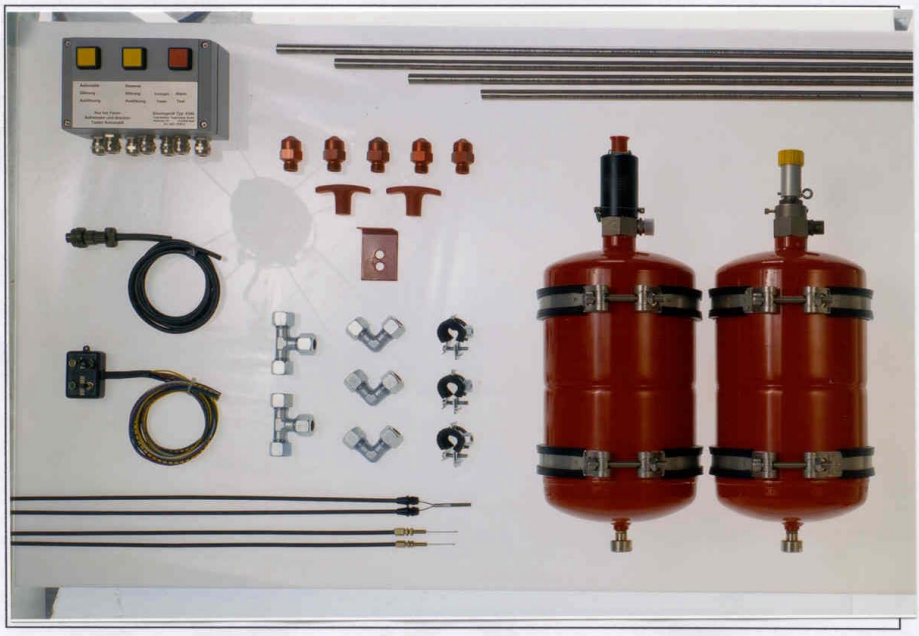
103. Nom du système / System name: MicroDrop-Vehicle Extinguishing system

104. Dénomination commerciale / Commercial name: MicroDrop-Vehicle Extinguishing system

105. Véhicules pouvant être équipés de ce système (Le cas échéant, indiquez si ce système est valide pour tous les groupes)
Vehicule for which the system may be used (Indicate if the system is valid for all groups):

N, GT, ST, Car Size T1, T2, T3
A, CN, E
B, C3, Rallycross

106. Photo du sytème complet
Photo of the complete system



Constructeur / Manufacturer: TOTAL WALTHER

Nom du système / System name: MICRODROP

EX.010-00

2. DESCRIPTION DU SYSTEME / SYSTEM DESCRIPTION

201. Agent extincteur / Extinguishant: - towasol AB-30 or
- water + 3% towalex AFFF 3% F

202. Capacité totale du système / Complete Capacity of the system: 8 Litres / Kg
4 Litres Cockpit +
4 Litres Engine +
tank compartment

203. Norme à partir de laquelle a été approuvé l'agent d'extincteur / Standard from which the extinguishant has been approved: DIN-EN 2

204. Couleur de l'étiquette indiquant le type d'extincteur utilisé / Colour of the label showing the type of extinguishant used: silver (dull)

205. Pression d'utilisation / Fill pressure: 15 Bar

206. Pression minimale / Min Pressure: 10 Bar

207. Si le système est normalement non pressurisé, définir le type de pressurisation / If system is normally unpressurised define type of pressurisation :

Nitrogen

---

208. Taille de la bonbonne / Size of the bottle — Diamètre / Diameter: 160 mm — Hauteur / Height: 400 mm

209. Poids de la bonbonne / Weight of the bottle: 2,3 Kg (excluding 4 l of extinguishing agent)

210. Système de déclenchement / Activation system

Manuel / Manual	Electrique / Electric	Automatique / Automatic
X	X	X

Cocher la mention utile
Tick off as applicable

211. Gamme de température d'utilisation / Operating temperature range: ____ °C -30 - +60°C with towasol AB - 30
+4 - +60°C with to water + towalex AFFF 3%F

212. Nombre d'ajutage minimum dans le compartiment moteur / Minimum number of nozzles in the engine compartment: 4

3. ENGAGEMENT DU FABRICANT / MANUFACTURER'S RECOGNITION

Je déclare que le système décrit ci-dessus :
- est conforme à la norme FIA sur les systèmes d'extinction plombés dans les voitures de courses
- a passé, sous ma supervision, avec succès l'ensemble des tests décrit dans la norme FIA

I declare that the system described above :
- is in conformity with the FIA standard for motor sport fire extinguisher systems
- has passed, under my supervision, all the tests described in the standard

Date	Nom et signature Name and signature	Visa d'approbation Endorsement stamp
07.03.2000	Dr. U. Schremmer i.V. B. Ungers	TOTAL WALTHER GmbH FEUERSCHUTZ UND SICHERHEIT WALTHERSTRASSE 51 51069 KÖLN TELEFON (02 21) 67 85-0

ANNEXES / APPENDICES :

- Rapport de test / Tests report
- Instruction d'installation / Installation instructions
- Instruction de maintenance / Maintenance instructions

We have send you all tests report, installation instruction and maintanance instruction, complete on following dates:

- 01. March 1999
- 10. August 1999
- 03. November 1999

MANUAL

MicroDrop® Fire Extinguishing System for Vehicles

Manufactured by: TOTAL WALTHER GmbH
Feuerschutz und Sicherheit
Waltherstr. 51
D-51069 Cologne (Dellbrück)

Tel.: +49 221 6785-0
Fax: +49 221 6785-612

Operation of the MicroDrop® Fire Extinguishing System for Vehicles

The system can be operated manually or electrically, from the inside or from the outside. The container valves immediately open to release a foam solution stored at 16bar. The solution then runs through the piping system to the ONS FS1.4 fine mist nozzles.

The fine mist nozzles disperse the extinguishing medium in a spray with a 75° cone angle. The droplets range from 20 to 200 µm.

The small droplets have a large surface area to extract heat and cool the flames. Heat radiation is also absorbed quickly and effectively, so the fire is contained.

The spraying time of the extinguishing system is at least 10 seconds for the tank and engine compartments and at least 15 seconds for the passenger compartment.

The extinguishing agent containers are constructed such that their contents are fully released with the vehicle in any position.

Once the system has discharged the equipment needs to be serviced, the inside of the pipe system must be rinsed and the system needs to be recommissioned (see Service and Maintenance Instructions).

The system is suitable for installation in cars, motor boats and yachts, as well as in all sorts of vehicles, for example buses and construction vehicles.

To design a system for a particular application or for advice about vehicle protection systems, contact Total Walther Feuerschutz GmbH in Cologne.

MicroDrop® Fire Extinguishing System for Vehicles:
Functional Characteristics

The MicroDrop fire extinguishing system consists of the following main components:

- container for extinguishing medium with fast opening valve
- nozzle piping system
- ONS watermist nozzles
- electric and manual releases

1. General

The MicroDrop system is a fixed low pressure water mist fire extinguishing system that disperses the extinguishing medium (a water foam solution) as a fine mist through specially designed and patented extinguishing nozzles. The system works with the vehicle in any position and produces droplets measuring between 20 and 200µm at a pressure of 4 to 16 bar. The system has been shown to extinguish fires in the passenger, tank or engine compartments that burn for up to 20 seconds before the system is released.

The MicroDrop system uses the high heat absorption capacity of finely divided water for rapid control of fires to protect the driver inside the passenger compartment. A high percentage of the heat radiation is absorbed.

As a wide range of fuels could be present, such as two star lead-free petrol, three star super lead-free petrol, four star lead-free/leaded petrol as well as summer and winter diesel fuels, a certain percentage of an aqueous film forming foam is added for fast control of the fire and to support the extinguishing process.

Any danger of a flashback caused by hot surfaces inside the vehicle is minimized by the aqueous film and the consequent separation of atmospheric oxygen from the fuel. This was confirmed by an extensive series of tests (cf Report No. 16410/431/94). The minimum amount of 4 litres of water used for fire extinguishing (foam solution) ensures a spraying time of at least 10 seconds (with a maximum of 7 nozzles per extinguishing medium container) inside the engine and tank compartments and of at least 15 seconds (with a maximum of 5 nozzles per extinguishing medium container) inside the passenger compartment when using a pipe system cross section of 8mm.

Design and installation is in accordance with the certification No. 16410/431/94, issued by DMT Gesellschaft für Forschung und Prüfung mbH/Institut fur Brand- und Explosionsschutz. The extinguishing medium poses no danger to life or the environment.

Note: As a general rule, compounds created by pyrolysis are toxic. Water mist can wash out pyrolitic comporids.

The individual components of the Extinguishing System are described below.

2. Extinguishing medium container (complete)

The patented extinguishing medium container has separate water and compressed gas compartments and is designed for a nominal operating pressure of ≤ 16bar.

The water chamber and the pressurising gas chamber are separated by a flexible, elastic membrane, so the foam solution is under pressure with the container in any attitude and can be fully discharged.

The volume of the extinguishing medium is 4 litres, the water pressure and propellant pressure are 15bar. The propellant is industrial dry nitrogen.

The container is constructed such that foam premix filling and nitrogen filling can be carried out separately.

A further component of the extinguishing medium container is the ONS quick release valve with an adapter and a membrane seal of internal diameter 8mm to release the extinguishing medium.

The quick release valve can be opened manually with a Bowden cable or a lever as well as electrically with a release element (pyrotechnic fuse).

The compressed gas container is closed by a test valve, and the actual gas pressure is permanently displayed on a pressure gauge.

The container is fixed using specially designed fittings. These allow the container to be installed in the most appropriate position in the vehicle.

3. Nozzle Piping Network

The nozzle piping network consists of 10×1mm Enneto copper piping (stainless steel and other materials can also be supplied) and is connected by 90° screw pipe connectors and T-pieces. The piping network is designed for a nominal operating pressure of ≤ 16bar.

Other piping material can be supplied on request only if it passes certain fire tests and is accepted by the installer of the system.

The nozzle piping network is protected from vibrational damage by using pipe clamps with rubber profiles, Ø 10mm.

To protect the piping network from flames, low and high temperatures as well as vehicle fuel, oil and grease, a corrugated pipe of 9.8×13mm is fitted around the pipes.

Installation of the pipe system is carried out according to local conditions and the availability of mounting places. For this, fixing points must be selected that maximise the integrity of the Fire Extinguishing System even after an accident.

The extent of the nozzle piping network depends on the number and size of the areas to be protected. To prevent pipe screw connections from working loose, twin edged olives with a soft sealing element should be used.

4. Watermist nozzles (ONS)

Specially designed and patented watermist nozzles with a K factor of 1.4 are used (ONS FS 1.4). Water flow: $Q = K \times \sqrt{p}$ where p = water pressure in bar

The spraying angle is 75°.

The special nozzle design generates droplets of 20-200µm at a horizontal distance of 1.5-2 m. The horizontal and the vertical distance between nozzles must not exceed 1.20m. The distance between the nozzles and the protected object or obstacle should be as large as possible for the optimal extinguishing performance.

The number of watermist nozzles employed in an extinguishing area depends on the volume to be protected, taking into consideration a required volumetric extinguishing intensity of 0.07l/m³×s.

The arrangement of the nozzles in relation to the fire should be such that:

- an even and appropriately dense distribution of water mist inside the protected space is achieved,
- the seat of the fire or the protected space is surrounded by an envelope of water mist,
- no parallel flows of water mist to the flame can occur,
- heat is not radiated back to the surface of the fuel,
- no spray shadows occur inside the protected space.

NOTE

If in any doubt about the arrangement of the watermist nozzles inside the protected space, or other aspects of the system installation, it is strongly advised that the manufacturer and/or the distributor of the system be consulted.

5. Electric and manual release mechanism

The MicroDrop extinguishing system can be released manually by the Bowden cable that is fitted to the release lever of the container valve by an angle sheet. Single and twin Bowden cables are used. Fit the Bowden cable inside the vehicle so as to be safe from damage. There is an external lever to pull the cable.

In addition, an automatic electronic release panel can be installed. The release panel controls two alarm and release lines and has a potential-free relay to cut out the engine. The release panel has an independent energy supply.

For street vehicles, control of the release of the extinguishing system can be done through the vehicle battery. The individual lines are monitored for line breakage or interruption. If an independent power source is used, the 12V battery is monitored for its charging condition.

Failure of any one function results in a visual alarm that can be reset by the user. (RESET function). There is also a visual indication of the container valve release.

The use of electronic heat detectors for identifying a fire and for triggering the extinguishing system is also possible and they can be installed if desired.

NOTE

We reserve the right to alter the extinguishing system to incorporate any technical improvements.

Service and Maintenance Notes

Service and maintenance as well as refilling of the extinguishing medium container is carried out by:

1. TOTAL WALTHER GmbH
   Feuerschutz und Sicherheit
   Waltherstr. 51
   D-51069 Cologne

   Tel. + 49 221 6785-0
   Fax + 49 221 6785-612

2. Lösch- und Sicherheitstechnik für
   Sport- und Rennfahrzeuge Fred Meyer
   Aue 4
   51519 Odenthal

   Tel. + 0171 470 8802

1. Each time the fire extinguishing system is operated the nozzle pipe system and the watermist nozzles must be rinsed with clean uncontaminated water until no foaming agent or anti-freeze residues are visible.

2. The entire system has to be serviced annually (check for leaks, density, readiness, pressure and damage).

3. The foam solution must be replaced every two years.

4. After the extinguishing system has been triggered the extinguishing medium container must be refilled and primed with a nitrogen pressure of 15bar. The system must then be recommissioned.

5. The extinguishing medium containers must be checked every two years, including on the inside. Depending on their condition, replacement should be considered.

6. As a rule, extinguishing agent containers can be used for up to ten years if regularly serviced and maintained and if they have suffered no damage during this period. We recommend replacing the container at the end of this period.

Special Notes about the extinguishing agent

- **Extinguishing agent for +4°C to +60°C:**

  To water free from contamination add 3% of an aqueous film forming foam agent (towalex AFFF 3% manufactured by TOTAL WALTHER Löschmittel GmbH, Ladenburg)

- **Low Temperature extinguishing agent for –30°C to +60°C:**

  Use a freeze-protected premix solution, towasol AB –30 manufactured by TOTAL WALTHER Löschmittel GmbH, Ladenburg).

Installation instructions

- for extinguishing agent containers
- for pipes networks
- watermist nozzles
- manual release

1. Extinguishing agent container

First mount the container securely against slippage with the opening at the top. Then fill the container with 4 litres of foam solution or 4 litres of foam-protected premix.

Next screw in the ONS quick action valve with a torque of 75 ± 15 Nm using a sealing ring and Loctite AVX (blue) to complete the seal.

Set the tension for the manual release using the pressure screw. Adjust the release moment to 4Nm. Seal the hardened wire with lead.

Turn the container 90°. Secure the check valve with O-ring seal in the base of the container with Loctite AVX (red) and a torque of 10 Nm.

Now fill the container with nitrogen (dry) to a pressure of 15bar. After this fit the 0-21 bar pressure gauge. The pointer of the pressure gauge should be just above the 15bar mark. Next fit the Bowden manual release cable.

Warning!

Only an official distributor may install the extinguishing agent cylinders. These are normally supplied filled and pressurised.

2. Pipes, watermist nozzles and release

Prior to installation identify the number of extinguishing areas, where the pipes, nozzles and extinguishing agent containers should be placed (use a rubber profile of diameter 160mm to check the space is sufficiently large for the containers), and where these parts can be fixed to the car..

Tighten the hinged bolt clamp around the container with a torque of 3,5Nm.

Next install the Ermeto pipe network and the ONS FS1.4 nozzles. To do this, fit the appropriate pipe screw connectors (twin edged olives with plastic seal) with a torque of 45Nm ± 5Nm. The parts of the pipe system between the screw connectors are protected by plastic corrugated piping.

Attach the pipe network to the container with a torque of 15 ±3 Nm.

Ensure that the pipe network is installed as far as possible in the centre of the vehicle. Unter no circumstances should the sill area be chosen. Fasten the pipe network with clips in places that are safe from interference or vibration.

Install each fine mist nozzles so that is as much space as possible between the nozzle and an obstacle or the protected object, so that the mist can spread to cover a large volume. Align the nozzles to spray mist directly onto the parts most at risk or shielded from indirect spray.

Take care when mounting the nozzles that with a spraying angle of 75° and a maximum horizontal throw of 2m no spray shadows occur.

The distance between extinguishing nozzles and spray obstacle or protected object should be as large as possible. The minimum distance is 300mm.

Install the Bowden cables (inside and outside) for operating the extinguishing system using the angle sheet (red) for the inside cable (the angled sheet should be used as a drilling jig). For the outside cable two 9mm drill holes should be made in the body.

For plastic bodies above 2mm thickness, fit a 2mm steel or aluminium sheet, since the Bowden clips will not engage greater thicknesses.

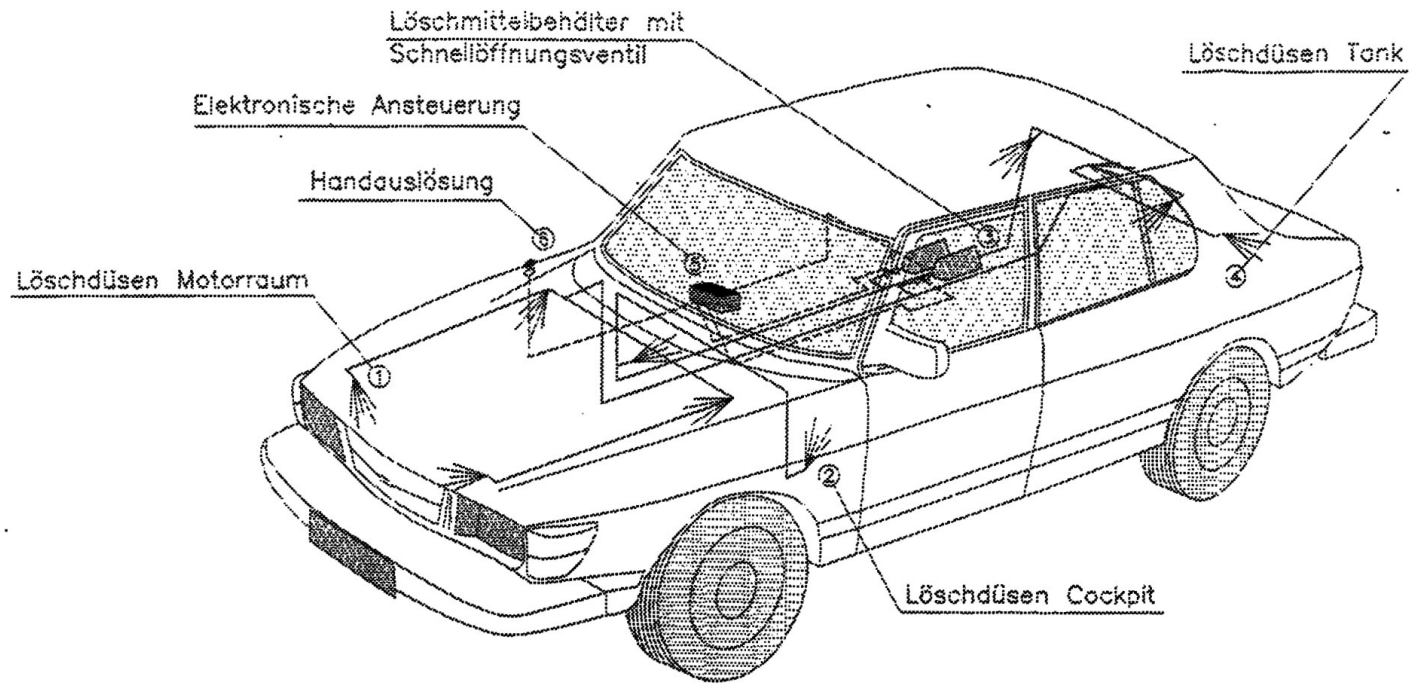
Install the electronic automatic release and monitoring panel so that it can be reached and seen by the driver. Run cables so that they are safe from damage.

Where an automatic fire detector is used (heat detector) it should be installed near the critical point or where detection is possible at any time. Install the entire system such that service and maintenance work can be carried out on the components of the system at any time.

Finally mount pre-assembled extinguishing medium container. Then connect the Bowden cable or the electric cable to the appropriate places.

MicroDrop® Fire Extinguishing System - Technical Data

Type	Low pressure water mist fire extinguishing system	
Requirements	• ONS approved • components BAM, VdS and TÜV certified • FIA approved • ABE applied for	
Fire classification	A, B	
Extinguishing agent	Water with 3% foam agent or Freeze-protected premix solution	
Application	+4 °C ... + 60 °C without anti-freeze protection -30 °C ... + 60 °C with freeze-protected premix solution	
Extinguishing medium container	operating pressure	15bar
	test pressure	30bar
	volume	5litres
	amount of extinguishing agent	4litres
	diameter	160mm
	length with valve	approx. 400mm
	valve	ONS valve
	weight with 1 container	approx. 7kg
	weight with 2 containers	approx. 13kg
	constant pressure gauge for container pressure	
	propellant	nitrogen
electronic control	2 alarm lines (monitored) 12 Volt through internal or external battery (charge state of battery is monitored) 2 release lines (monitored) 1 potential-free relay for engine cut-off	
release	electric or manual	
Pipe network	Ermeto 10×1mm, copper or stainless steel pipe (automatical as option is possible)	
nozzles	MicroDrop® ONS-FS 1,4	
minimum volumetric extinguishing intensity	0.07 $l/m^3 \times s$	



Maßstab

Änderung

Gezeichnet: 23.11.94 ABE:

Geprüft

Datum Planung

TOTAL WALTHER Feuerschutz GmbH
Köln-Deitzück