

## Technical sheet of GlaciAid

### „Foam extinguishing spray special MG-400 MK2“

Extinguishing spray GlaciAid is formed by seamless cylindrical container made of aluminum. The whole outside and inside surface of container is covered by coat of resistant paint; on the outside with text and graphic information including detailed instruction and important warnings on quality folding plastic label. Details for individual MK series will be specified in accordance with safety data sheet, technical data sheet and product sheet for each version.

Upper part of container has conical ending with the vent pressed in. On the vent the plastic sprayer is mounted, which ensures foaming of the mixture and its dispersing with optimal volume of distribution. Extinguishing media is found in special pouch inside container and is not in contact with the container nor the propellant, so it is possible to guarantee maximum lifetime of used extinguishing medium - premix as stated by the manufacturer. In between the walls of the container and the pouch there is pressurized propeller ensuring expulsion of extinguishing medium in case of its use. Spray is provided with removable plastic covering, which protects spraying vent. Spray is fully operational in every position.

### Technical parameters

- **extinguishing medium:** special premix ABS, Li-ion
- **contain of extinguishing medium:** 400 ml / 415g
- **weight of complete container including the cover and nuzzle:** 105 g
- **fire stream range:** 2 m optimal, up to 4 m maximal
- **action time:** 13 s
- **operating temperature range:** -5 °C to +50 °C
- **discharge gas:** air 9 bar at +20 °C
- **expiration:** 2 years of legal guarantee + 4 years of full function guarantee by manufacturer
- **date of production and batch number:** see the bottom of container
- **shape of fire stream:** aerosol of foamed fine and coarser drops in the form of moderately widening cone, distribution approx. 30 ml/s
- **extinguishes fire classes:** A, B, C up to 3bar, E up to 400V, F, Li-ion accumulators
- **working position:** fully in all
- **possibility to suspend extinguishing:** anytime by loosening the pressure on nozzle
- **possibility to restore extinguishing:** anytime by pressing on the nozzle till emptying the contents

In accordance with §504 of civil code, exact composition of extinguishing medium and it's manufacturer(s) are trade secret of Glaci-Aid  
s.r.o. Internal corporate name of extinguishing medium is MG-Li for spray version MK2. Important customer information is always listed in Safety data sheet of the spray and on its label.

Fulfillment of trade secret: classification of extinguishing medium composition is competitively important and it is not common knowledge; its disclosure may influence business results of company; it is connected with production company; extinguishing medium composition presents facts normally inaccessible in corresponding business circles; composition is properly concealed by production company.

## Specification for extinguishing each fire class

Article 1)

**Class A** - solids burning with flames or by moldering

Start the extinguishing process by pointing the flow of extinguishing medium to the center of burning item and then continue the application so the burning item is evenly covered by extinguishing mixture. It is recommended to apply the extinguishing medium in discontinuous, several seconds long doses. Burning wall should be extinguished from the bottom up. All in approx. 1 m distance.

*According to conversion of anticipated efficiency by extinguishing medium manufacturer, extinguishing medium for 400 ml volume has extinguishing efficiency 2,5A. Tested by extinguishing medium manufacturer on prescribed test limits for fire class A.*

Article 2)

**Class B** - flammable liquids or substances liquefying by burning

Starting extinguishing distance is the fire stream range of the spray, followed by approaching the fire as it extinguishes. Apply the extinguisher without interruption till the fire is extinguished and the spray emptied. Subsequent emptying of spray residue to fire site works as prevention of reignition and cools the fire site.

When extinguishing fires of liquids, avoid too short distances, which can cause splashing the burning liquid over by fire flow. Optimal distance is 1.5 - 2 m.

**In case of fire of freely spilled flammable liquid** apply gradually to burning area from one edge across the center of burning area to the other edge.

**In case of flammable liquid fire in bordered area** it is recommended to apply the extinguishing media indirectly, i.e. over the side of container so the foamed extinguishing medium flows to the surface of burning liquid, where it spreads and stops the fire.

**Burning flammable liquids which are flowing out** are to be extinguished downwards from the outlet.

*According to conversion of anticipated efficiency by extinguishing medium manufacturer, extinguishing medium for 400 ml volume has extinguishing efficiency 13B. Tested by extinguishing medium manufacturer on prescribed test fire for fire class B.*

Extinguishing medium efficiency for nonpolar burning liquids is outstanding. Extinguishing medium can be used also for extinguishing of polar liquids, but its efficiency is lowered due to lower volume of extinguishing medium.

Article 3)

**Class C** - gases up to device's operation pressure of 3 bar

Firefighting for gas devices consists in "knocking off" the flame by extinguisher pressure near the place of gas leak and in cooling/extinguishing the surrounding area to prevent reignition of leaking gas.

Flow of extinguisher (according to circumstances of fire and safety factors of personnel) can be pointed to gas leakage a) under 45° angle

b) in the direction of leakage c) under 90 ° to the direction of leakage. If possible apply from 1 m distance.

**Safety information:**

Immediately after extinguishing of flame it is necessary to shut off the gas supply to prevent possible accumulation of leaking gas and consequent explosion! In case it is impossible to safely shut off the gas supply it is recommended to let the leaking gas burn and extinguish or cool down only the surrounding items.

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Article 4)

**Class E** - devices under electrical voltage up to operation voltage 400 V

These fires should be extinguished from the minimum 1 m distance.

Includes common household equipment under voltage 230 V or 400 V.

**Non-conductivity is ensured by double technical specification:**

Because of construction of the spray, where the extinguishing medium is separated completely from possibly conductive parts of product.

Because of special nozzle, which from safe distance 1 m ensures absolute "separation" of extinguishing flow and thus prevents so called "down stream" voltage transfer.

Article 5)

**Class F** - fires of fats, oils and kitchen appliances even under voltage

If possible, shut down the heat source under the burning container (shut down the burner, unplug the deep fryer).

Starting extinguishing distance is the same as fire stream range (approx. 2 - 2,5 m) under approx. 40° angle. Continue with application of extinguisher while approaching the fire as it extinguishes.

Extinguishing medium should be applied in circular motion over the inner circumference of container without interruption until the fire extinguishes and the spray is emptied. Emptying the whole spray into the fire site cools it and forms thorough foam cover.

**Safety information:**

When extinguishing fires of fat, avoid too short distances, which can cause splashing the burning fat over by fire flow. Optimal distance is 2 - 2,5 m with gradual approaching.

In case of extinguisher application into the burning fat it is necessary to anticipate short-term heightening of flames caused by extinguishing of fat and by reaction of medium with fire, and thus it is necessary to keep starting extinguishing distance, which is the same as fire stream range, i.e. at least 1.5 meters.

According to standard, in first 2 seconds of firefighting the temporary heightening of flames can be over 2 meters from the surface, after 2 s this heightening must be less than 2 m from the surface. According to manufacturer tests spray meets the limits.

*According to conversion of anticipated efficiency by extinguishing medium manufacturer, extinguishing medium for 400 ml volume has extinguishing efficiency 5F. Tested by extinguishing medium manufacturer on prescribed test fire for fire class F.*

Article 6)

**Li-ion** - fires of lithium ion accumulators, batteries and sets

Extinguishing spray may be used to extinguish/moderate of fires of lithium-ion accumulators and batteries, including accupacks of hybrid vehicles and electric cars, PCs and laptops using li-ion technology, li-ion chargers for charging of accumulators and all other technologies which use lithium-ion sources for power supply or charging.

Extinguishing medium needs to get to the source of fire - upper parts of accumulators/batteries, where their flammable contents burn through the pressed in upper plus part. This part is damaged by the fire itself and by subsequent heat; the pressed in area of accumulator/batterie opens and flames flares out accompanied by overall grow of temperature and possible fire of surrounding area.

Starting extinguishing distance depends on safe distance from such a fire. It depends on fire extent, training, knowledge of fire

protection of and the availability of firefighting gear for intervening person (protection shields, goggles, gloves, respirators or firefighting suit etc.) If the firefighting is done by non-professional person, he must maintain his own safety first and try to extinguish the fire from safe distance, i.e. the fire stream range followed by gradual approaching the fire.

The big advantage of extinguishing spray is its full functionality in all positions and thus the possibility to get extinguishing media exactly to place where it is most efficient. Extinguishing stream should be applied to the area of flame outburst from the accumulators/batteries.

**Informational test of spray version MK2 (and extinguishing medium MG-Li used in it) at SZÚ Brno for extinguishing of Li-ion accumulators:**

**Extinguished object:** accupack consisting of charged accumulators 18650

**Accumulator protection:** none, industrial version

**Individual accumulator capacity:** 2.6 to 3.6 Ah

**Individual accumulator voltage:** 2.8 to 4.25 V

**Number of accumulators in accupack:** 30 pcs

**Size of accupack:** 5 x 6 pcs of accumulators

**Weight of accupack:** 1430 g

**Orientation of accumulators in accupack:** upright, plus contacts up

**Initiation of accupack fire:** ignited flammable non-polar liquid on water surface, placed under the accupack so the upper parts of flames envelop the whole accupack placed on the fireproof grate

**Time of initiation liquid burning:** till igniting of accupack

**Initiation liquid volume:** as required for ignition of accupack

**Time of accupack burning without the flammable liquid to start of extinguishing:** up to 1 minute

**Time of extinguishing the accupack as required by extinguishing spray manufacturer:** till depletion of extinguishing medium without time restriction

**Result of accupack extinguishing as required by extinguishing spray manufacturer:** extinguished

**Test results of extinguishing of accupack in accordance with test of SZÚ Brno:**

Bundle of accumulators 18650 was ignited over the flammable liquid, individual accumulators were burning with flying sparks, remaining accumulators were yellow-hot and fusing together, the burning process took place inside the accumulators, subsequently the initializing flammable liquid was removed, and the extinguishing process started.

**"Li-ion accupack was EXTINGUISHED within 10 minutes and cooled by extinguisher so it was possible to place unprotected palm on it."**

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**Test protocol number:** 39-15153/M (SZÚ Brno)

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**In:** Brno

**Signature, stamp:**