VLITEX GMBH

TEST RESULT

CONTROLLED BURNING OF CAR BATTERY MODULES BY USING A VLITEX FIRE BLANKET

MAGNA ACTS GmbH & Co. KG

VLITEX

Test conducted on 27.07.2020

VLITEX GMBH

Specialised in the development and distribution of technical textiles made of glass fibre fabric.

Products for environmentally friendly and resource-saving fire protection and fire fighting.

Extinguishing blanket in response to the increased requirements for e-car fires, in close cooperation with the Würzburg Fire Brigade School, Magna Steyr and local fire brigades.

Market launch of the car fire blanket: 2020

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ACTS GMBH & CO. KG

Die ACTS GmbH & Co. KG is an independent test laboratory and impartial service provider within Magna Steyr Deutschland GmbH.

Testing under the highest possible objectivity and uninfluenced test results take top priority.

Test management: Markus Straub
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MAGNA
ACTS GmbH & Co. KG

TEST RESULTS BURNING BATTERY MODULES
OVERVIEW

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- BATTERY FIRE EXTINGUISHING TEST WITH VLITEX FIRE BLANKET
- VLITEX FIRE BLANKET
- SUMMARY OF THE EXPERIMENTAL SETUP
- GOAL OF THE TEST
- TEST PROCEDURE
- SUMMARY OF THE TEST
- CONCLUSION

BATTERY FIRE EXTINGUISHING TEST
WITH THE VLITEX FIRE BLANKET

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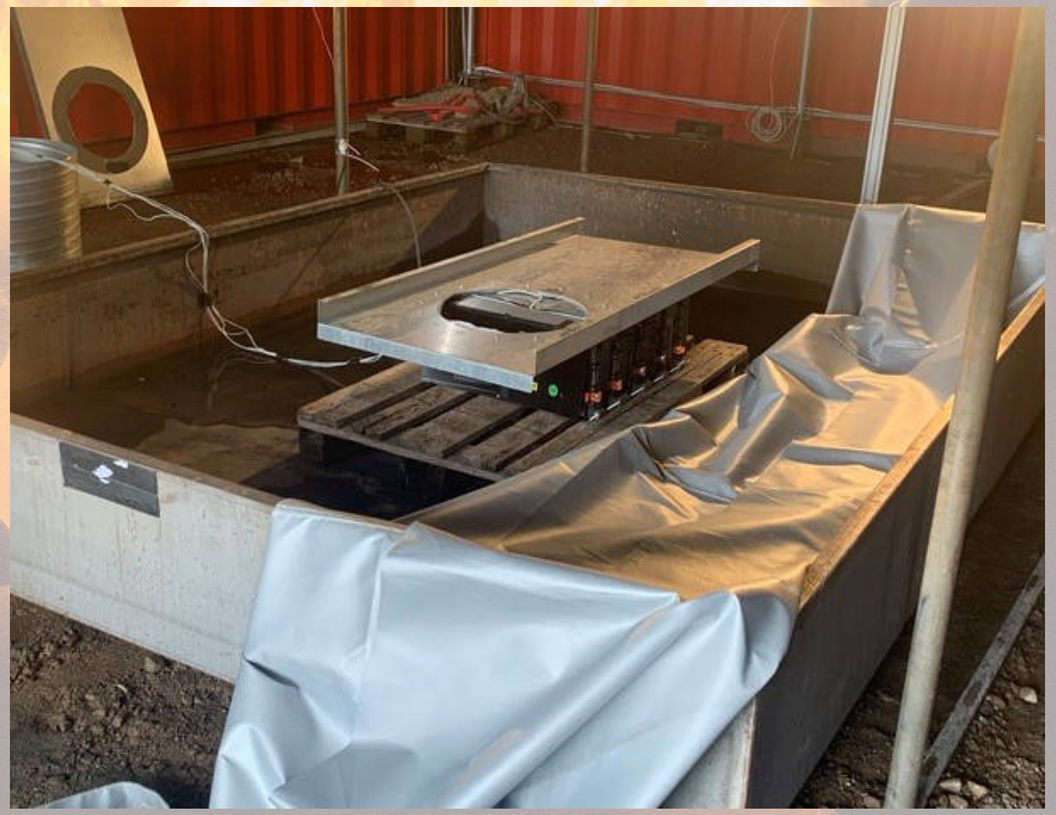
ATTENDEES

Magna Steyr
VLITEX GmbH Firefighting School Würzburg Local Firefighting Station Karlstein

LOCATION

Test centre of
ACTS Advanced Car Technology Systems GmbH & Co. KG



BATTERY FIRE DELETION ATTEMPT
THE VLITEX FIRE BLANKET

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FACTS & FIGURES

Material: High temperature fiberglass fabric with grey silicone coating on both sides

Dimensions: 6 x 8 m

Weight: around 27 kg

Temperature resistance: over 1.000 °C

Registered utility model protection

BATTERY FIRE DELETION ATTEMPT
SUMMARY OF THE EXPERIMENTAL SETUP

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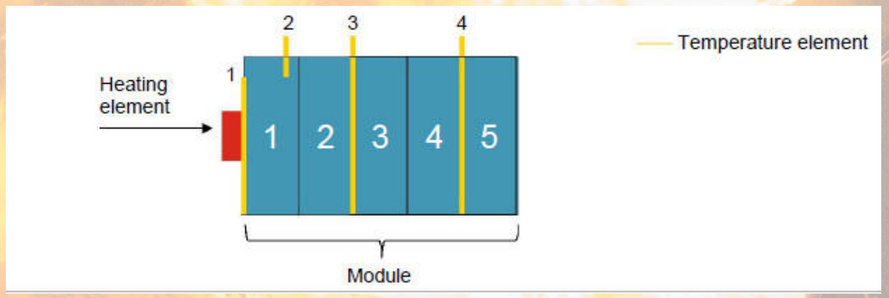
SETUP

There were five battery modules with prismatic cells (150 Ah, each with a capacity of 7 kW) built into a system.

The first module was heated up with 650 W until the thermal runaway reaction started.



BATTERY FIRE DELETION ATTEMPT
GOAL WHEN USING THE FIRE BLANKET

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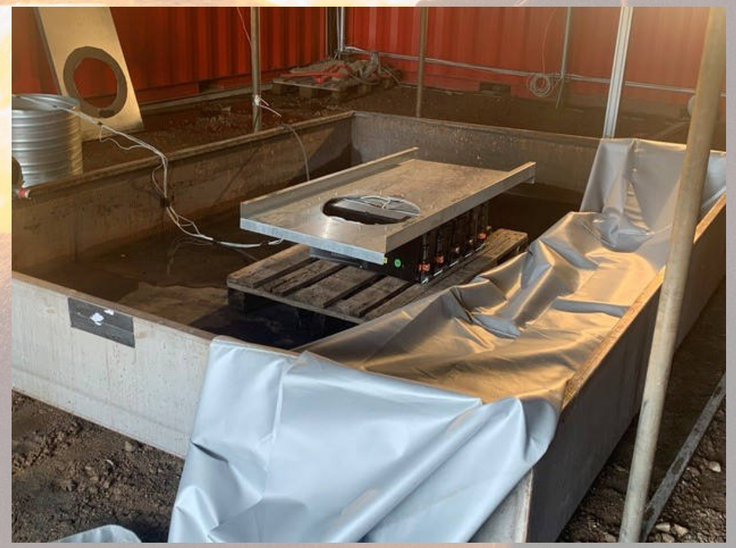
GOAL OF THE TEST

During tests without a fire blanket, extreme temperatures occurred in the vicinity of the modules > 700 °C. In addition, there were measured peak temperatures far above 1000 °C. The fire could be controlled only by flooding the modules.

The following options are now to be tested using a fire blanket:

1. Keep heat generation in the immediate vicinity of the modules below 200 °C (heat shield).
2. Controlled burning at lower temperatures - without the need for flooding
3. Extinguishing blanket encloses smoke and gases (chimney)



BATTERY FIRE DELETION ATTEMPT
TEST PROCEDURE

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BAT_Temp_1 (°C) ACT	BAT_Temp_2 (°C) ACT	BAT_Temp_3 (°C) ACT	BAT_Temp_4 (°C) ACT
315.98	153.36	21.53	42.29

Comment:

- 2 modules are going through a 'Thermal Runaway'
- Ambient temperature ~ 220 °C (thermal image camera)

-> Use of the fire blanket, to lower the ambient temperature

BAT_Temp_1 (°C) ACT	BAT_Temp_2 (°C) ACT	BAT_Temp_3 (°C) ACT	BAT_Temp_4 (°C) ACT
549.31	272.69	31.77	27.28

Comment:

- Fire blanket is easy to handle
- Strong smoke development in the first moment
- Immediate cooling effect, ambient temperature drops, although the module temperatures rise significantly

BAT_Temp_1 (°C) ACT	BAT_Temp_2 (°C) ACT	BAT_Temp_3 (°C) ACT	BAT_Temp_4 (°C) ACT
301.59	440.71	32.32	36.21

Comment:

- Smoke development disappears after a short time
- Surface temperature is at 120 °C
- Ambient temperature < 100 °C
- Fire blanket blows up slightly when cells "explode"

BATTERY FIRE DELETION ATTEMPT
SUMMARY OF THE TEST

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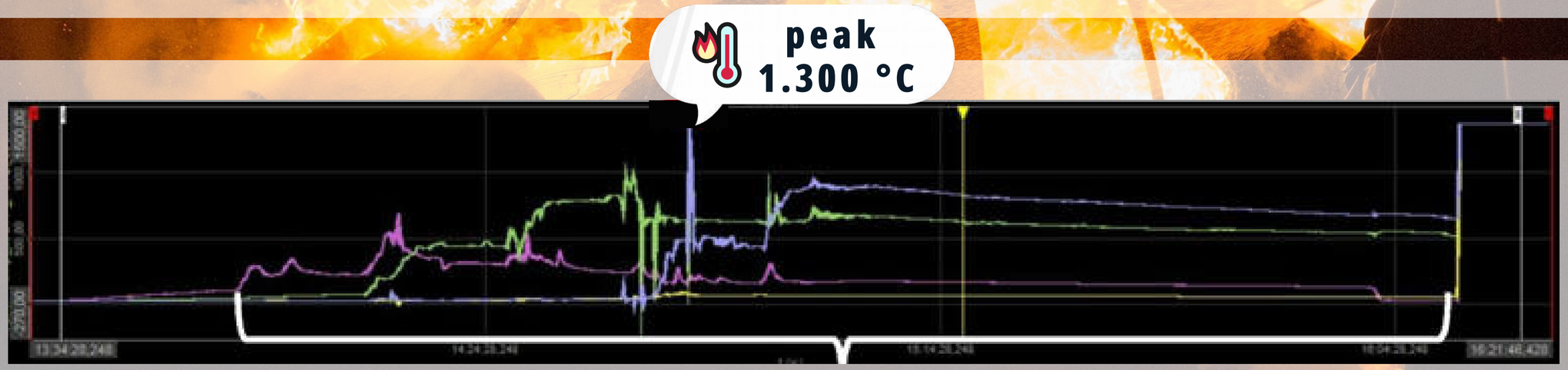
OBSERVATIONS

- The fire blanket has withstood the peak temperature of 1.300°C
- Overall, the fire blanket survived the fire unscratched
- Ambient temperature ~120°C



BATTERY FIRE DELETION ATTEMPT
CONCLUSION BY ACTS

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"THE GOALS WE SET FOR THE FIRE BLANKET WERE MET."

1. Keep heat development in the immediate environment below 200 °C (heat shield)
2. Controlled burning at lower temperatures - without the need for flooding
3. Fire blanket traps smoke and gases (smoke trap)

"HOWEVER, WE STILL SEE POSSIBILITIES OF OPTIMIZATION FOR USE."

- Defined gas-/pressure escape option
- Weighted edges so that the blanket does not move in the event of gas leakage / volume increase

Note: Both points have beet technically resolved in the meantime.

"THE FIRE BLANKET IS A VERY GOOD PRODUCT WHICH WE MAINLY RECOMMENT AS A FIRST-CLASS PROTECTION USING IN PARKING GARAGES, E-BIKE LOADING STATIONS, HOME STORAGE OR PRODUCTION LINES."

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