



Technical Report No.: 51006 – 24 – TAC
Test method: UN Regulation No. 67.04
Manufacturer / Order party: HybridSupply GmbH
Product under test: 107649-BOM

TECHNICAL REPORT No. 51006 – 24 – TAC

Test according to UN Regulation No. 67.04

Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system

Test method: UN Regulation No. 67.00 – date of entry into force: 1987-06-01
including all amendments up to and including:
UN Regulation No. 67.04, supplement 2 – date of entry into force: 2023-09-24

Objectives: Document for the manufacturer

I. Technical data

- 0.1.1. Order party: HybridSupply GmbH
Roggenhorster Str. 9b
23556 Lübeck
Germany
- 0.1.2. Manufacturer: HybridSupply Industrial GmbH
Roggenhorster Str. 9b
23556 Lübeck
Germany
- 0.2. Product under test: CAMPKO – GAS BOTTLE HOLDER SET
Type: 107649-BOM
- 0.3. Test required: FEM analysis – dynamic test of the product
according to UN Regulation No. 67, paragraph
17.4.6

II. Test report

1. Test conditions

- 1.1. Test sample: CAMPKO – GAS BOTTLE HOLDER
107649-BOM

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- 1.1.1. Technical data from the manufacturer: Geometry of simulation model and all parts and dimensions were based on delivered files:
 2024-02-27:
 gas-bottle-holder.STEP
 refillable gas bottle weight overview.pdf
 2024-04-04:
 107649 (2024-3-27 HybridSupply.pdf
 CAMPKO gas bottle holder v4.pdf
- 1.1.1.1. Weight of the gass bottle: CAMPKO Steel 36L 80% fill stop*
 Net weight: 18.6 kg
 Total weight – 80% filled 33.29 kg
- CAMPKO Steel 36L 80% fill stop was used in the test. It was chosen as worstcase according to it's weight. Therefore, the test covers all the bottle types of Attachment No. 1
- 1.1.1.2. Materials: See Attachment No. 2
 1.1.1.3. Installation instructions: See Attachment No. 3

1.1.2. FEM representation of the test sample:

Simulation:	Loading direction:	Acceleration [g]:
A008a*	X	20
A009a	-X	20
A010a	Y	20
A011a	-Y	20

Number of elements: 22 265

Number of nodes: 23 266

Materials: See Figure 1 and Table 1

*Variant A008a was chosen as worst case variant. It was chosen according to the strain values present after the dynamic loading test.

- 1.2. Test procedures used: FEM simulation representing the dynamic test of the product according to UN Regulation No. 67.04, paragraph 17.4.6

1.2.1. Test description:

Loading of the gas bottle both in transverse and longitudinal direction by acceleration field of 20g. See the loading curve in Figure 2.



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1.2.2. Approval criteria: UN Regulation No. 67.04, paragraph 17.4.6

The gass bottle shall be mounted and fixed so that the acceleration can be absorbed (without damage occurring) when the containers are full.

1.3. Measuring and test equipment: PAMCRASH 2016 (ESI Group)
 ANSA & META (Beta CAE Systems)

1.4. Test track or site: TÜV SÜD Czech s.r.o., Prague
 Czech Republic

2. Test results

The structure was loaded in accordance with UN Regulation No. 67.04, paragraph 17.4.6. For the results of the worst case simulation variant see figures 4 - 7 on pages 7 - 9. The tested sample did meet the approval criteria of paragraph 1.2.2. above.

3. Specimen submitted to test on: 2024-02-29

4. Date of test: 2024-03-06

III. Other documentation

Figures: Page 5 - 9

Tables: Page 9

IV. Attachments

Attachment No. 1: refillable gas bottle weight overview.pdf No. of pages: 1

Attachment No. 2: 107649 (2024-3-27 HybridSupply.pdf No. of pages: 14

Attachment No. 3: CAMPKO gas bottle holder v4.pdf No. of pages: 8

Measuring and test equipment and test site meet the requirements of the applicable legislation. This report shall never be reproduced incomplete and without a written permission of the testing laboratory (except for use in the type-approval or approval documentation).



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V. Final assessment

The described sample in tested items

complies

with the requirements of UN Regulation No. 67.04, paragraph 17.4.6.

This technical report consists of pages No. 1 to 9 and 23 pages of attachments.

A handwritten signature in blue ink, appearing to be 'P. Záruba'.

Petr Záruba
Report author

A handwritten signature in blue ink, appearing to be 'V. Bursík'.

Vít Bursík
Profit Center Manager

Prague, 2024-04-15