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Gutachten-Nr. / Expertise No:
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Translation into English language. You can read the original German text on the German internet page.

EXPERTISE

Object: Test of Propellant Bottles for Premium-Seal AIO
with Reference to Thermal Behaviour and
Functionality

Expert: Ober-Ing. Dipl.-Ing. (FH) Franz Nowakowski

Commissioned by: Mr. Hartl, Premium Vertriebs GmbH

In written form on: 07.05.07

Execution on: 22.05.07 at ADAC in Landsberg/Lech and
28.05.07 in the laboratory of Dekra Umwelt GmbH

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1. Preamble

According to the written order of Mr. Hartl dated May 7th, 2007, the following tests – listed below – have been performed at ADAC engineering centre in Landsberg/Lech on May 22nd, 2007.

As ordered the following tests have been conducted:

- Testing and characteristics of the propellant containers at temperatures up to 80°C in the heating cabinet and with pressure measurements during 24 hours. These tests have been made in the laboratory of DEKRA Umwelt GmbH at Stuttgart.
- Behaviour and functionality of the propellant for puncture kit Premium Seal AIO at temperatures of minus 30°C. These tests have been made in the cold chamber of the ADAC engineering centre at Landsberg/Lech.

Premium Vertriebs GmbH had allocated bottles of propellant with a contents of 500 ml and 800 ml for these tests.

In respect to the progression of the air pressure at minus 30°C, driving tests on a chassis dynamometer test bench have been carried out in the cold chamber.

2. Procedure

Two wreaths with 500 ml each have been made available for the tests. One bottle of compressed air was white with a transparent filling-hose.

The second bottle of compressed air was yellow with a special cold-/heat-resistant filling-hose made of PTFE,

Propellant bottles with a contents of 500 ml and 800 ml have been made available for the cold test.

3. EXPERT STATEMENT

3.1 Technical Data of the Test Vehicle in the Cold Chamber

Licence-plate number:	S – OH 6014
Vehicle manufacturer:	DaimlerChrysler AG
Vehicle type:	Vito 111 CDI
Level of motorisation:	140 kW / 2987 ccm (diesel-engined vehicle)
Serial identification number:	WDF63960513104653
Initial registration:	03.05.2005
Tyre equipment:	225/60 R 16

3.2 Result of the Test in the Heating Cabinet

The test results in respect to the performance of the propellant bottles in the heating cabinet at a room temperature and at a temperature of 80°C are mentioned in attached test report No. 77982/07 of DEKRA Umwelt GmbH (annex A).

After 24 hours of conditioning at 80°C a gas pressure of 18 bar at the white propellant bottle and a gas pressure of 20 bar at the yellow propellant bottle have been measured.

The transparent filling-hose of the white bottle burst at 18 bar. The hose connection disconnected from the spray nozzle of the yellow bottle at 20 bar.

As specified more closely below the transparent filling-hose of the white bottles is not intended for the puncture aid. This also because of the assumption that the filling-hose might harden and burst at a temperature of minus 30°C.

For expert purposes it would be advisable to still improve the hose connection of the temperature-resistant PTFE-hose at higher pressures.

3.3 Coldness Test at the ADAC

The vehicle Mercedes Vito has been pre-chilled for 24 hours at a temperature of minus 30°C in the cold chamber of the ADAC engineering centre at Landsberg/Lech before the test of the propellant took place.

The temperature in the cold chamber was written down during testing the propellant. The temperature sequence is attached in annex B.

Amongst others the light thermal fluctuation of the base temperature of minus 30°C occurs because of the temporary opening of the entrance door by the testing personnel.

At a temperature of minus 30°C following air pressures at the rear tyre of the vehicle have been determined by means of a calibrated gauge. This happened before the tests have been carried out.

At the rear left: 2,4 bar
At the rear right: 2,4 bar

Subsequently following filling quantities of propellant have been poured into the rear tyres:

At the rear left: 800 ml
At the rear right: 500 ml

After an adequate filling time the following air pressures have been determined:

Position of the tyre	Quantity of propellant	Archieved air pressure	Filling time
rear left	800 ml	1,2 bar	2`15"
rear right	500 ml	0,8 bar	1`20"

The achieved air pressure can be increased by warming of the propellant canister on the heating resp. at the motor. With this warming a higher output pressure is obtained.

Subsequent to the filling test there was a driving-in of 5 minutes on the running drum with a speed of 50 km/h.

A running of constantly 70 km/h followed the driving-in in phases of 5 minutes at a time up to an end time of 20 minutes.

Please find below the air pressures after the driving-in phase and the test-runs subject to the time with additional information about the driving speeds:

Position of the Tyre	minutes	driving-in 5 minutes at 50 km/h	70 km/h test-run after		
			10 minutes	15 minutes	20 minutes
Rear left		2,6 bar	3,2 bar	3,5 bar	3,6 bar
Rear right		2,4 bar	2,8 bar	3,0 bar	3,0 bar

After these tests at a temperature of minus 30°C the vehicle was driven out of the cold chamber and it has been warmed up at a temperature of + 24°C out of doors.

Subsequently a driving on the motorway has been made over a distance of 13,5 kilometres and with a speed of constantly 80 km/h at an outdoor temperature of 24°C.

Afterwards the air pressures of the rear tyres have been detected. The values are as follows:

Rear left:	4,4 bar
Rear right:	3,3 bar

3.4 Miscellaneous

Comparison of the Pressure Gauge

During the tests different and variously adjusted and calibrated pressure gauges have been compared with the pencil type pressure gauge used by Premium Vertriebs GmbH.

During the comparative test two pencil type pressure gauges, which are identical in construction, have been used. Both pencil type pressure gauges produced reproducible identical print results.

Please find the comparison of the pressure gauges in the chart listed below:

Calibrated, portable DEKRA pressure gauge of ADAC	Premium Seal pencil type pressure gauge	Calibrated pressure gauge
2,4 bar	2,4 bar	2,4 bar

The comparison of the pressure gauges shows that the pencil type pressure gauge – provided by Premium Seal GmbH for its puncture kit – is subject to the gauging of a larger spot test definitely suitable for the puncture kit. In each case the measurements have been carried out at temperatures of minus 30°C and plus 24°C.

4. RESULT AND SUMMARY

During the testing of the propellant of Premium Seal AIO the following criteria have been noticed:

The propellant in the reinforced yellow bottle with the temperature-resistant filling-hose is suited up to a temperature of plus 80°C. Merely a minor improvement of the fastening of the filling-hose to the hose connection of the spray nozzle is necessary.

According to the expert there was a proper functionality in respect to the setup of the internal pressure of the tyre after a running-in of 5 minutes at a speed of 50 km/h during the coldness test at a temperature of minus 30°C.

After running approximately 20 minutes with a speed of 70 km/h there have been air pressures of 3,0 bar at 500 ml filled-in propellant and 3,6 bar at 800 ml filled-in propellant.

In the following test at a temperature of plus 24°C (test-run on the motorway) there have been air pressures of 3,3 bar at 500 ml and 4,4 bar at 800 ml filled-in propellant.

Considering– as mentioned in the operating instructions of the pressure additive – that the run to the next garage or tyre-service will be not faster than 80 km/h, the measured air pressures are safe by all means.

The attached chart (annex C) documents the temperature test of the tyre of a passenger car at a speed of 180 km/h. This test had been made by the tyre industry. It is sure that such a critical temperature of 120°C will not be reached with Premium Seal AIO with a maximum speed of 80 km/h.

Therefore the achieved air pressures of 3,0 bar at a contents of 500 ml and 3,6 bar at a contents of 800 ml at a temperature of minus 30°C can be considered as safe enough.

The transparent flexible house, which is used at the white propellant bottle, is hardening at a temperature of minus 30°C in such way that there is a risk of breakage. The usage of the temperature-resistant PTFE-hose is a good solution.

Altogether it is to indicate positively – in respect to the concept - to fill in propellant and puncture-additive in two separated bundles into the tyre to receive the necessary pressures. The very short time for filling-in guarantees a good ease of use when repairing punctures. Such the PREMIUM-SEAL AIO-system is outclassing the application with a compressor. (Also see DEKRA-Expertise No.: 222/0450 701616 1804465152).

Also the provided pencil type pressure gauge for checking purposes of the achieved air pressures for the end-user seems to be quite accurately in view of the comparative test of two pencil type pressure gauges with calibrated and adjusted pressure gauges.

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by the Chamber of Commerce (IHK)
for Munich and Upper Bavaria
officially authorised and sworn expert
for tires and wheels as well as
damages at technical goods made of
vulcanised rubber at motorcars



Die Druckgasflaschen wurden bei 80°C im Trockenschrank 24h gelagert.



Anschließend wurde der Sprühkopf mit einem Manometer verbunden und der Druck bei 80°C gemessen.