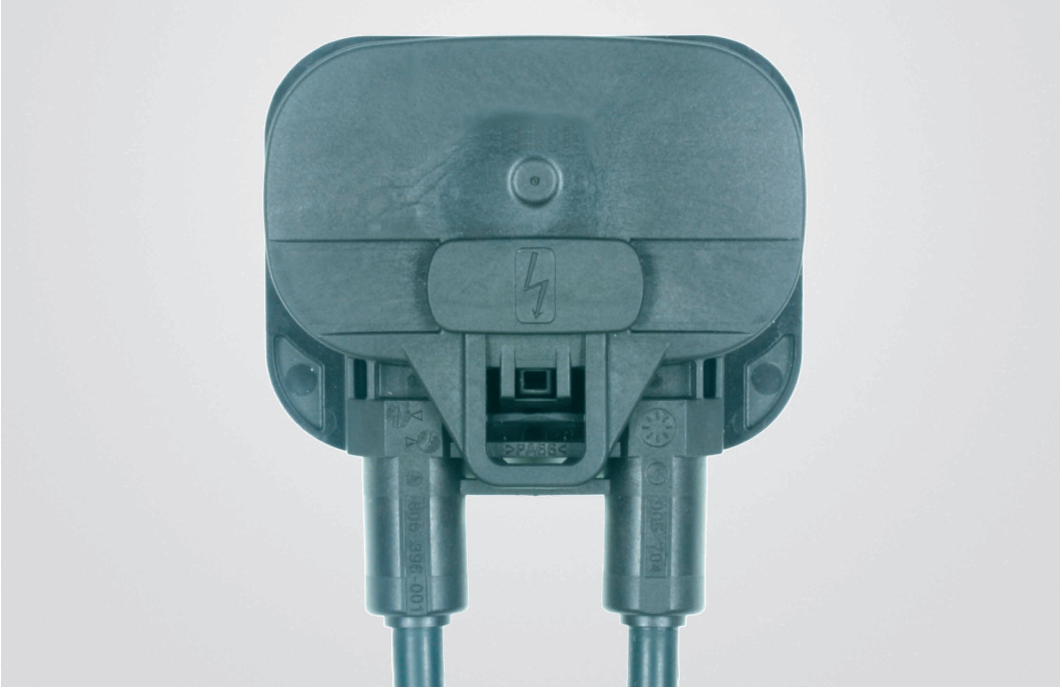
Hirschmann Renewable Energy

Resistance to ammonia

Junction box 905-704

DLG Test Report 6066F



FOKUS TEST
Mar 12 Resistance to ammonia

Manufacturer/Applicant
Hirschmann Automotive GmbH
Oberer Paspelsweg 6-8
6830 Rankweil
Austria
Telephone: +43 (0)5522 307-0
Telefax: +43 (0)5522 307-555
info@hirschmann.at
www.hirschmann.at

DLG e.V.
Test Center
Technology and Farm Inputs

Evaluation – short version

Test result (Comparison before/after ammonia climate exposure)	**Assessment***
Dielectric strength	
Requirements are satisfied.	n.e.
Insulation resistance	
Requirements are satisfied.	n.e.
Visual inspection	
Very minor alterations were ascertained, but no damage.	+

Evaluation scale
The following evaluation scale is applied in the DLG FokusTest "Ammonia resistance":

Evaluation*	Test result: Visual inspection
+ +	no alterations
+	very minor alterations
○	minor alterations

The DLG-FokusTest "Ammonia resistance PV junction box" is considered passed if the dielectric strength requirements are fulfilled and no significant alterations are ascertained in the "Visual inspection".

* Evaluation range: + + / + / ○ / – / – – (○ = standard) / n.e. = no evaluation

Main technical data (according to the manufacturer)

Construction	
PV junction box with diode	
Materials	
Housing	polyamide, weather-resistant to UV radiation and ozone
Colour	black
Fire category	according to UL94
Electrical properties	
Rated voltage	1000 VDC
Rated current	up to 10,5 A (dependent on the diode)
Current carrying capacity	20 A
Protection class	II
Dimensions	
Length / Width / Height	68 mm / 74 mm / 18 mm
Mechanical properties	
Protection mode	IP65 closed
Steam jet protection	IPX9K
Operating temperature	- 40 °C to + 85 °C
Conductor cross-section	up to 4 mm², stranded conductor

Test conditions and performance of the test

The DLG FokusTest "Ammonia resistance" was carried out as a laboratory test according to the patented "DLG test standard for solar modules in agricultural use". This laboratory test is intended to determine the ability of the PV module to withstand the effects of animal house air over a period of use of at least 20 years.

The test was carried out in a gassing chamber under the following climate conditions:

Duration of test	1500 h
Air temperature	70 °C
Rel. atmospheric humidity	70 %
Ammonia concentration	750 ppm

To assess the ammonia resistance the junction box test items were subjected to a visual inspection and electrical testing of the dielectric strength both before and after the climate test.

The electrical tests were conducted by analogy with the test sequence in Group E of Standard DIN EN 50548; VDE 0126-5:2012-02:2012-02 "Junction boxes for photovoltaic modules". They were executed by an accredited electrical engineering laboratory.

Six junction boxes including conductor and plug-in connector were available for the test.

The junction boxes were stuck on PV thin layer mini-modules.

Five test items were subjected to the DLG ammonia climate test. The sixth served as a reference sample for the visual inspection conducted for comparison purposes after the ammonia climate exposure test.

Test results

The junction box of Type “905-704” has passed the DLG-FokusTest “Resistance to ammonia”.

Based on this result it can be exected that this PV junction box is resistant to animal house air containing ammonia and that the ageing process to be expected under normal circumstances is not accelerated.

Dielectric strength

The requirements made of dielectric strength were fulfilled. All test items passed the tests with an impulse test voltage of 10,000 V and a power-frequency test voltage of 6,000 V without disruptive discharge or flashover occurring.

Notes

Faults in the dielectric strength indicate poor workmanship, design faults and the presence of foreign bodies. In order to satisfy the requirements of the standard there must not be any flashover of the test voltage during the test steps impulse test voltage and power-frequency test voltage.

There are three voltage impulses per polarity in the impulse test voltage test. AC voltage is applied for a period of one minute in the power-frequencytest voltage test.

Visual inspection

The following alterations were ascertained in the visual inspection.

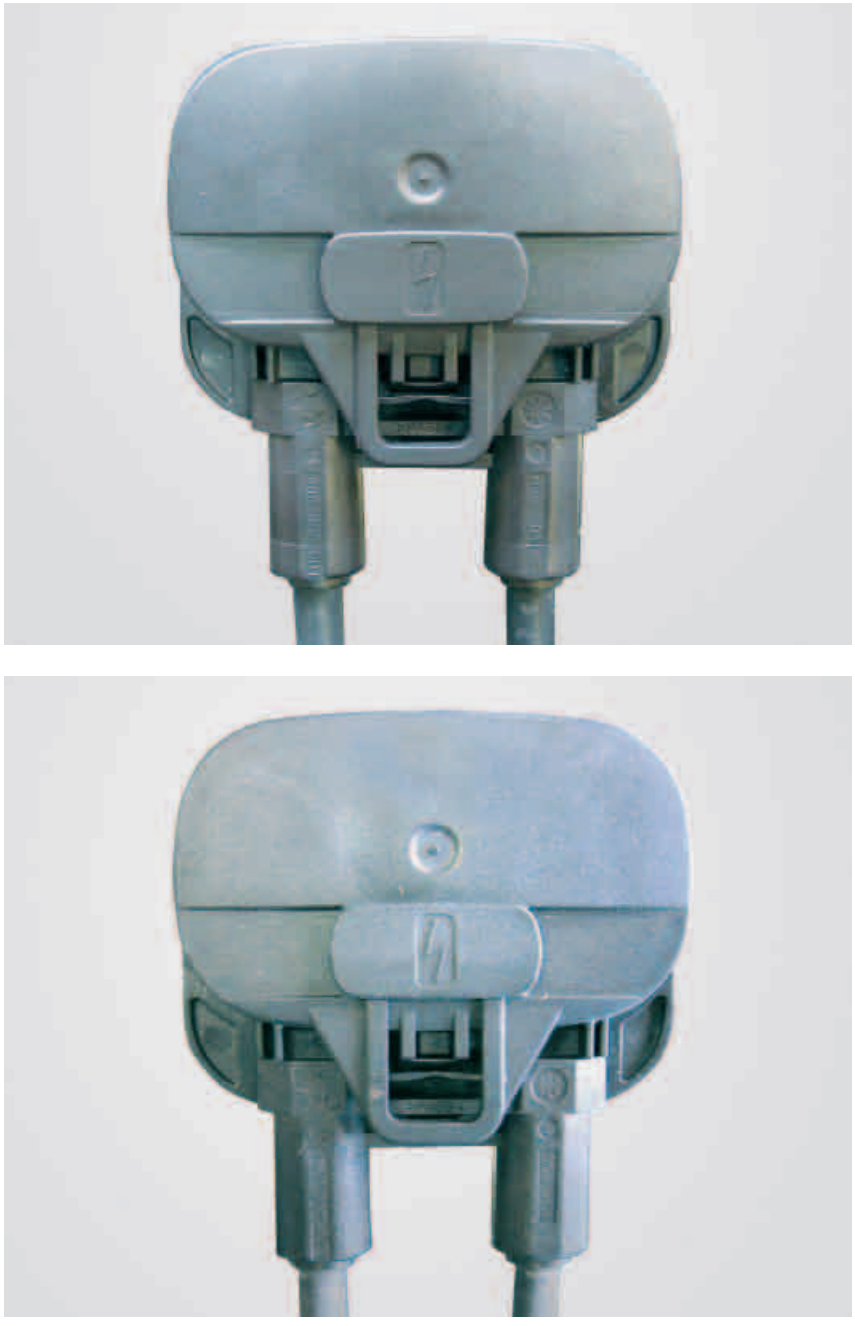
No or only very slight deposits were found on the junction boxes as a result of the climate exposure.

There was more frequent discolouring of the bonding agent, without this causing any detectable change in the properties.

The alterations were classified as very minor.

Insulation resistance under wet conditions

None of the junction boxes displayed insulation resistance below the required 400 MΩ.



Picture 2:
Comparison of a junction box in new state (above) and after the climate exposure (below)

Test

The FokusTest included a climate exposure test under laboratory conditions.

On the grounds of these results, the PV junction box of the type “905-704” satisfies the requirements with regard to the test criterion “ammonia resistance” for the award of the DLG-FokusTest label.

Other criteria were not tested.

Realization of the test

DLG e.V. –
Test Center Technology
and Farm Inputs,
Max-Eyth-Weg 1,
64823 Gross-Umstadt

Project director

Dipl.-Ing. (FH) S. Schwick, M.Sc.

Technology, safety, quality

Dipl.-Ing. W. Gramatte

ENTAM registered

ENTAM – **E**uropean **N**etwork for **T**esting of **A**gricultural **M**achines, was created from the merger of European testing sites. ENTAM’s objective is the Europe-wide distribution of test results for farmers, agricultural equipment dealers, and producers.

More information about the Network is available at **www.entam.com** or by writing. E-mail Address: **info@entam.com**

11-754
April 2012
© DLG

DLG e.V. – Test Center Technology and Farm Inputs

Max-Eyth-Weg 1, D-64823 Gross-Umstadt,
Telephone: +49 (0)69 247 88-600, Fax: +49 (0)69 247 88-690, E-mail: Tech@DLG.org,
Internet: www.DLG.org

Download of all DLG test reports at: www.DLG.org/testsagriculture.html!