



# IEC 62716:2013

## Ammonia corrosion testing of photovoltaic (PV) modules

Confirmation of test results

**Ref.:** 10056/2017-40205

**Applicant:** SolarWorld Americas, Inc.  
25300 NW Evergreen Rd, Hillsboro OR 97124, USA

**Product:** Crystalline silicon Photovoltaic (PV)-Modules

**Type:** A) Sunmodule Plus SWA XXX mono Y  
A) Sunmodule Plus SWA XXX poly Y  
B) Sunmodule SWA XXX XL mono Y  
B) Sunmodule SWA XXX XL poly Y  
C) Sunmodule Protect SWA XXX mono Y  
C) Sunmodule Protect SWA XXX poly Y  
D) Sunmodule Bisun SWA XXX duo  
E) Sunmodule Bisun SWA XXX XL duo

XXX in the type replace the power in watt and can be any number between:

200 – 320 for A), C), D); 260 – 360 for B), E).

Y in the type replaces a potential suffix and can be black or clear.

**Manufacturer:** SolarWorld Americas, Inc.

**Standard:** IEC 62716 ed.1.0

**Test conditions:** As given in IEC 62716 ed. 1.0

**1st test section:** Testing time 8 h  
NH<sub>3</sub> Concentration: 6667 ppm  
Chamber temperature: 60°C  
Rel. humidity: 100%

**2nd test section:** Testing time 16 h  
NH<sub>3</sub> Concentration: 0 ppm  
Chamber temperature: 25°C  
Rel. humidity: 75 %

**Total testing time** 480 h (20 cycles)



## Pass criteria

Visual inspection:	No findings which may affect safety
Power degradation:	< 5 %
Dry Insulation:	> 40 MΩm <sup>2</sup>
Wet insulation:	> 40 MΩm <sup>2</sup>
Bonding path resistance:	< 0,1 Ω
Bypass diode functionality test:	Bypass diodes shall remain functional

## Summary of test results:

**Visual inspection:** No findings which affect safety

**Maximum power degradation:** allowed < 5 %  
measured max. 0,43 %

The measured degradation is below the allowed degradation.

**Dry insulation resistance:** required  $\geq 23,81 \text{ M}\Omega$   
measured min. 500 MΩ

The measured dry insulation resistance is above the limit.

**Wet insulation resistance:** required  $\geq 23,81 \text{ M}\Omega$   
measured min. 416 MΩ

The measured wet insulation resistance is above the limit.

**Bonding path resistance:** required < 0,1 Ω  
measured max. 0,011 Ω

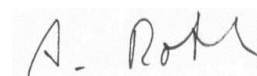
The measured bonding path resistance is below the limit.

**Bypass diode functionality test:** Bypass diodes remain functional

The complete test results are given in the Test Reports No.:  
TRPVM-2017-40205-4, TRPVM-2017-40205-5 and TRPVM-2017-40205-6

## VDE Renewables GmbH

  
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