

16 May 2006

# **Partial Discharge Test** on reverse side foils of PV modules according to IEC 60664-1, IEC61730

Company / Examined foil:

Medico, Inc.		
Foil 19: E/2PET/E clear		
EVA clear	102 micron	outside
PET	51 micron	
EVA clear	102 micron	cell side

\* The EVA is not part of the directly encapsulation of the PV cells

Number of measurements: 10

Extinction voltage		Deviation from the mean value (%)
Min. value in (V)	1223	-2,3
Mean value in (V)	1252	
Max. value in (V)	1277	2,0

The mean value minus the experimental standard deviation will be used to calculate the max. permissible voltage.

Experimental standard deviation: 16 V

Calculation of the max. permissible operating voltage on the basis of the ascertain values  
Basis: IEC 60664-1

$$U_{max} = U_e \times 1,414 / 1,2 \times 1,25$$

1,414: Calculation of the peak value  
1,2 Safety factor (humidity, temperature, etc.)  
1,25 Safety factor (double or reinforced insul.)

Maximum permissible system voltage	1165 VDC
------------------------------------	----------

Testzentrum Energietechnik  
TÜV Innenschutz und Energiesysteme GmbH, Am Grauen Stein, D-51105 Köln, Germany

Regenerative Energien

*Handwritten signature*

*Handwritten signature*

15 July 2004

# Partial Discharge Test

on reverse side foils of PV modules  
according to IEC 60664-1

Company / Examined foil:

MADICO, Inc.	
<b>Madico TPE w/c</b>	(0,200mm)
Tedlar (PVF)	38 my
LamAd	6 my
Polyester (PET)	50 my
LamAd	6 my
EVA	100 my
	out side
	cell side

Number of measurements: 10

Extinction voltage		Deviation from the mean value (%)
Min. value in (V)	952	5,2
Mean value in (V)	1004	
Max. value in (V)	1071	6,7

The mean value minus the experimental standard deviation will be used to calculate the max. permissible voltage.

Experimental standard deviation: 34 V

Calculation of the max. permissible operating voltage on the basis of the ascertain values  
Basis: IEC 60664-1

$$U_{max} = U_e \times 1,414 / 1,2 \times 1,25$$

1,414 Calculation of the peak value  
1,2 Safety factor (humidity, temperature, etc.)  
1,25 Safety factor (double or reinforced insul.)

Maximum permissible system voltage	915 VDC
------------------------------------	---------

*M. Kestmann*

*B. Belu*

Testzentrum Energietechnik  
TUV Immissionsschutz und Energiesysteme GmbH, Am Grauen Stein, D-51105 Köln, Germany

Regenerative Energien