

## CEC Test Report: Mitrex M310-RF041F Modules

**Report Number:** 22062-PR-E-001  
**Report Date:** 2022-10-13  
**Test Period:** 2022-09-26 to 2022-10-12  
**Project ID:** 22062 (CFV), 001239 (Customer PO)  
**Customer:** Hadi Khatibzadezad / Mitrex  
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Report Prepared by:	Report Reviewed by:
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### Project Summary

CFV Labs conducted CEC testing on **M310-RF041F** modules produced by **Mitrex**. An incoming inspection report, sample images and EL images were provided separately to the customer.

### Results

*Estimated performance uncertainties (k=2) on silicon modules are:  $I_{sc} \pm 1.4\%$ ,  $V_{oc} \pm 0.7\%$ ,  $I_{mp} \pm 1.8\%$ ,  $V_{mp} \pm 1.2\%$ ,  $P_{mp} \pm 1.9\%$   
 Estimated temperature coefficient uncertainties (k=2):  $\alpha I_{sc} \pm 10\%$ ,  $\beta V_{oc} \pm 5\%$ ,  $\gamma P_{mp} \pm 5\%$   
 Estimated NOCT measurement uncertainty (k=2):  $\pm 2.7^\circ C$*

Test	Parameter	Symbol	Units	Value
NOCT	Nominal Operating Cell Temperature	NOCT	$^\circ C$	48.8
Performance at STC	Maximum power	$P_{max}$	Watts	314.97
	Voltage at maximum power	$V_{pmax}$	Volts	40.19
	Current at maximum power	$I_{pmax}$	Amps	7.837
	Open circuit voltage	$V_{oc}$	Volts	48.51
	Short circuit current	$I_{sc}$	Amps	8.207
Performance at Low Irradiance	Voltage at maximum power	$V_{pmax, low}$	Volts	38.94
	Current at maximum power	$I_{pmax, low}$	Amps	1.573
Performance at NOCT	Voltage at maximum power	$V_{pmax, NOCT}$	Volts	36.83
	Current at maximum power	$I_{pmax, NOCT}$	Amps	6.283
Temperature Coefficients	Coefficient $\beta$ at $V_{oc}$	$\beta_{Voc}$	$\%/^\circ C$	-0.2728
	Coefficient $\alpha$ at $I_{sc}$	$\alpha_{Isc}$	$\%/^\circ C$	+0.0286
	Coefficient $\gamma$ at $P_{max}$	$\gamma_{Pmax}$	$\%/^\circ C$	-0.3654

## Sample Information

*Sample Labeling & Test Flow Assignment:*

Module ID	Module Type	Serial Number	Test Flow Assignment
22062-004	M310-RF041F	MIT22A23809	Outdoor - NOCT
22062-003	M310-RF041F	MIT22A23786	Indoor - Performance

*Construction Details:*

Module Type	Length [m]	Width [m]	Thickness [mm]
M310-RF041F	2.036	0.996	40

*Nameplate Values:*

Module Type	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	Max Sys Volt [V]	Fuse Rating [A]
M310-RF041F	8.03	48.5	7.64	40.6	310	1000	20

## Result Applicability

*The following table summarizes the module types/models that this test report and LTM data can be applied to:*

LTM	Rated Power of LTM [W]	Group 1 / Sub-Group 1		
		Module Series	Min. Rated Power [W]	Max. Rated Power [W]
M310-RF041F	310	MXXX-RF041F	280	325

## Procedures

The procedures for the testing in this report are summarized in the following table:

Test Name	Standard / Procedure	CFV Accreditation
Incoming Inspection	CFV	NA
Visual Inspection	IEC 61215:2005 §10.1	ISO 17025
Electroluminescence Imaging	IEC TS 60904-13:2018	ISO 17025
Preconditioning	IEC 61215:2005, Clause 5	ISO 17025
Performance at STC	IEC 61215:2005 §10.6.3.1	ISO 17025
Performance at Low Irradiance	IEC 61215:2005 §10.7	ISO 17025
Performance at NOCT	IEC 61215:2005 §10.6.3.2	ISO 17025
Temperature Coefficients	IEC 61215:2005 §10.4	ISO 17025
NOCT	IEC 61215:2005 §10.5	ISO 17025

## Procedure Notes

For all I-V measurements (including temperature coefficients) the following details apply:

- Spectral Mismatch Factor** 1.000
- Measurement Mode** Forward and reverse sweeps
- Measurement Duration** 25 ms forward, 25 ms reverse
- Flash Profile Type** Plateau
- Averaging** Three I-V measurements are obtained and averaged.

## Equipment and Calibration

Equipment and calibration information is available upon request.

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