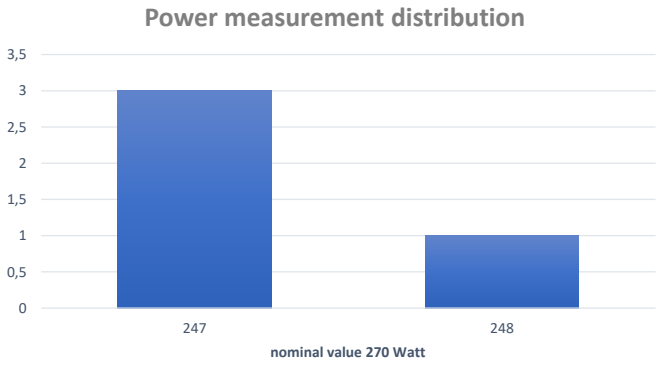
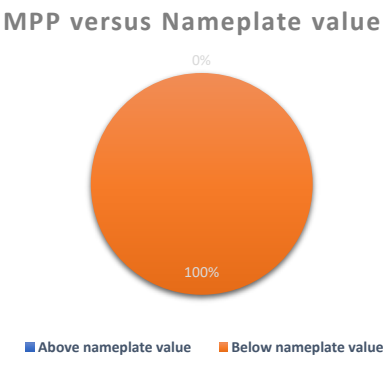
SOLARTESTER TEST REPORT

Project Details			
Client	**R&H Solartechnik Dresden GmbH**	**Test Date**	woensdag 9 december 2020
Test Location	Kaiserslautern	**Operator**	Rogier Vugts
Address	Denisstraße 12-14		
	67663 Kaiserslautern		
	Germany		

Module Details			
Module Brand	Talesun	**Number of modules tested**	4
Module Type	TP660P-270	**Number of Modules in project**	
Nominal power STC (nameplate)	270	**Percentage of batch/Container**	
Number of cells per module	60		
Calibration module	C52908191230110389232362		

Average power at STC	Lowest STC power	Highest STC power	Module classification
246,88 Watt	246,41 Watt	247,69 Watt	100% Class A
91,4% of nom	91,3% of nom	91,7% of nom	0,00% Class B
-8,56% deviation	-8,74% deviation	-8,26% deviation	0,00% Class C
			0,00% Class D





Conclusion	
Power Measurement	The test shows average module power is 8.56% lower than nameplate value.
Electroluminescence imaging	Modules have been classified as Class A , no class B, C or D

Detailed test results Electroluminescence imaging			
Evaluation protocol:	Standard MBJ / TÜV version 3.4 - www.solartester.nl/downloads		
Cell classification		**# cells found**	**percentage**
Unmarked	No abnormalities	234	97,50%
EL green	Uncritical cracks; do not lead directly to a degradation of the module. Other cracks and cell breaks are acceptable if they are not able to disconnect cell areas larger than 1 %.	4	1,67%
EL yellow	Critical: All cell areas that can potentially disconnect cell areas larger 1 % and smaller 20 % from power supply or which already do so.	0	0,00%
El red	Very critical: Cell breaks that can potentially disconnect more than 20% of the cell area from the power supply are classified in the 'very critical' category and marked red. This category includes above all comminuted or fan-like breaks. Red cells lead directly to the classification of a PV module in the class C	0	0,00%
El blue	Other EL abnormalities (shunts, dark cells, printing failures, edge contamination, ...). This category includes all defects which have occurred in the module manufacturing process and which have no negative impact on performance within the lifetime of the photovoltaic module. Such defects are normally uncritical and marked blue, since the power loss of the cell is already entered in the performance specified by the manufacturer. Consequential damages are not expected.	0	0,00%

Module Classification			
		# of modules	**percentage**
A	less than 10% green marked cells, no yellow or red	2	50,00%
B	less than 20% green marked cells, less than 10% yellow, no red, total # marked cells less than 20%	0	0,00%
C	more than 20% green marked, more than 10% yellow marked, less than 10% red marked, total # marked cells less than 30%	0	0,00%
D	more than 10% red marked, total # marked cells more than 30%	0	0,00%

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Flash / EL Data summary

ModuleID	ParameterSetName	Judgement	MPP@STC	ELRed	ELYellow	ELGreen	ELBlue	CommentJudgment
PI660E1005923917	Talesun / TP660P-270	CLASSA	246,47	0	0	0	0	
PI660E1005873917	Talesun / TP660P-270	CLASSA	247,69	0	0	2	0	
PI660E1003413917	Talesun / TP660P-270	CLASSA	246,95	0	0	0	0	
PI660E1003033917	Talesun / TP660P-270	CLASSA	246,41	0	0	2	0	