

<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>21241719.002</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	21241719	Seite 1 von 9 Page 1 of 9	
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	637965	<b>Auftragsdatum:</b> <i>Order date:</i>	06 October 2017		
<b>Auftraggeber:</b> <i>Client:</i>	FT Technologies Ltd. (for add. information see page 3)				
<b>Prüfgegenstand:</b> <i>Test item:</i>	Ultrasonic wind sensor				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	FT722-A-FF				
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Hail impact test				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	following IEC 61215-2:2016  "Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures"				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	25 October 2017	Detaillierte Fotodokumentation Seite 3 und / oder Anlage zu diesem Bericht   Detailed photo documentation page 3 and / or appendix to this report			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	see "List of test samples"				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	12 November 2017 – 14 November 2017				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Cologne				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	Solar Energy Assessment Center				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Siehe Sonstiges / See Other				
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>			
01 December 2017      Jürgen Sommer / Project Manager		01 December 2017      Ulrich Fritzsche / Team Manager			
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b>		The responsibility of the final test evaluation is not setting of tasks; function test is documented by manufacturer			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:    1 = sehr gut            2 = gut            3 = befriedigend            4 = ausreichend            5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n)    F(ail) = entspricht nicht o.g. Prüfgrundlage(n)    N/A = nicht anwendbar    N/T = nicht getestet Legend:    1 = very good            2 = good            3 = satisfactory            4 = sufficient            5 = poor P(ass) = passed a.m. test specification(s)    F(ail) = failed a.m. test specification(s)    N/A = not applicable    N/T = not tested					
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

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**Liste der verwendeten Prüfmittel**  
**List of used test equipment**

<b>Prüfmittel</b> <i>Test equipment</i>	<b>Prüfmittel-Nr. / ID-Nr.</b> <i>Equipment No. / ID-No.</i>	<b>Nächste Kalibrierung</b> <i>Next calibration</i>
Hail impact facility	2658	-
Scale	3093	-
Ambient sensors	2057	-

All equipment used for tests, including equipment for subsidiary measurements having a significant effect on the accuracy or validity of the result of the test is calibrated before being put into service.  
The laboratory has an established programme and procedure for the calibration of its equipment according to EN ISO/IEC 17025 (Reg. no.: D-PL-11120-01-00).

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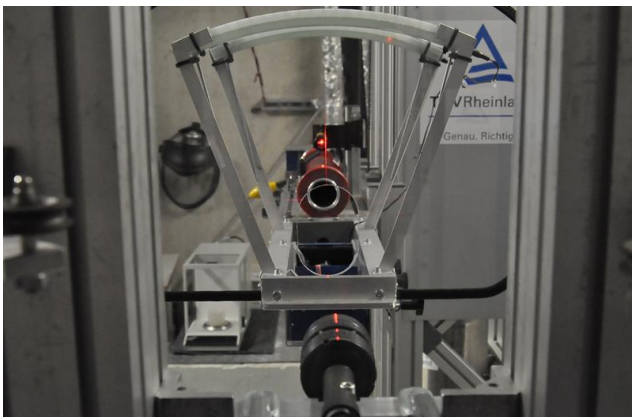
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**Produktbeschreibung**  
**Product description**

1	<b>Name/Adresse des Herstellers</b> <i>Name/Address of manufacturer</i>	FT Technologies Ltd.  Sunbury House, Brooklands Close Sunbury-on-Thames, TW16 7DX United Kingdom
2	<b>Name/Adresse des Berichtsinhabers</b> <i>Name/Address of owner of report</i>	FT Technologies Ltd. (see Point 1)
3	<b>Handelsname</b> <i>Brand name</i>	FT722-A-FF
4	<b>Zeichnungs-Nr.</b> <i>Drawing document number</i>	see document "A9458 (06/10/2017) – Hail Test Specification for FT742 – FT722"
5	<b>Sonstiges</b> <i>Additional information</i>	Test sequences developed together with manufacturer; Technical evaluation is part of manufacturer  The test result is also valid for FT722 and FT742 series; see also <i>General remarks</i>

Test set up

Test set up



Example of impact

Final visual inspection



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Absatz	<b>following IEC 61215-2:2016</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

-	<b>Result summary table</b>			
Test	Date [DD Month YYYY]		Summary of main test results	—
	Start	End		
Impact resistance	13 November 2017		No visual conspicuousness detectable	P
Final inspection (only visual)	14 November 2017		Minor visual conspicuousness detectable	P
Supplementary information:				
<ul style="list-style-type: none"> <li>All results are related to the final procedure discussed with manufacturer</li> </ul>				

-	<b>Final evaluation</b>		
In four-eyes principle; by		J. Sommer U. Fritzsche	
Overview of single evaluation results			
<b>Evaluation of hail withstand (only recommendation)</b>			
Properties of component	Hail withstand class	Ice ball diameter	—
Visual nature / look (>0.5 m)	HW 5	50 mm	
Visual nature / look (<0.5 m)	HW 5 with minor conspicuousness on surface coating	50 mm	
Additional evaluation; not setting of task			
Function	performed by manufacturer		
Supplementary information: -			

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-	<b>List of test samples</b>		
Test Sample Picking	by		—
	Manufacturer (random selected while test)		
Sample No.	Sample S/N	Remarks / constructional characteristics	
20170004042	9001-406	FT722-D-FF	Alternative hail impact test
20170004043	9000-057	FT722-A-FF	Relevant hail impact test
20170004044	9000-033	FT742-A-PM	Physical inspection for possible adaption of results
20170004045	9000-359	FT742-A-DM	
Supplementary information: -			

-	<b>Visual inspection (Initial)</b>		
Test date [DD/MM/YYYY]	12/11/2017		—
Sample No.	Nature and position of initial findings		
20170004042	No visual damages or conspicuousness detectable		P
20170004043			P
20170004044			P
20170004045			P
Supplementary information: -			

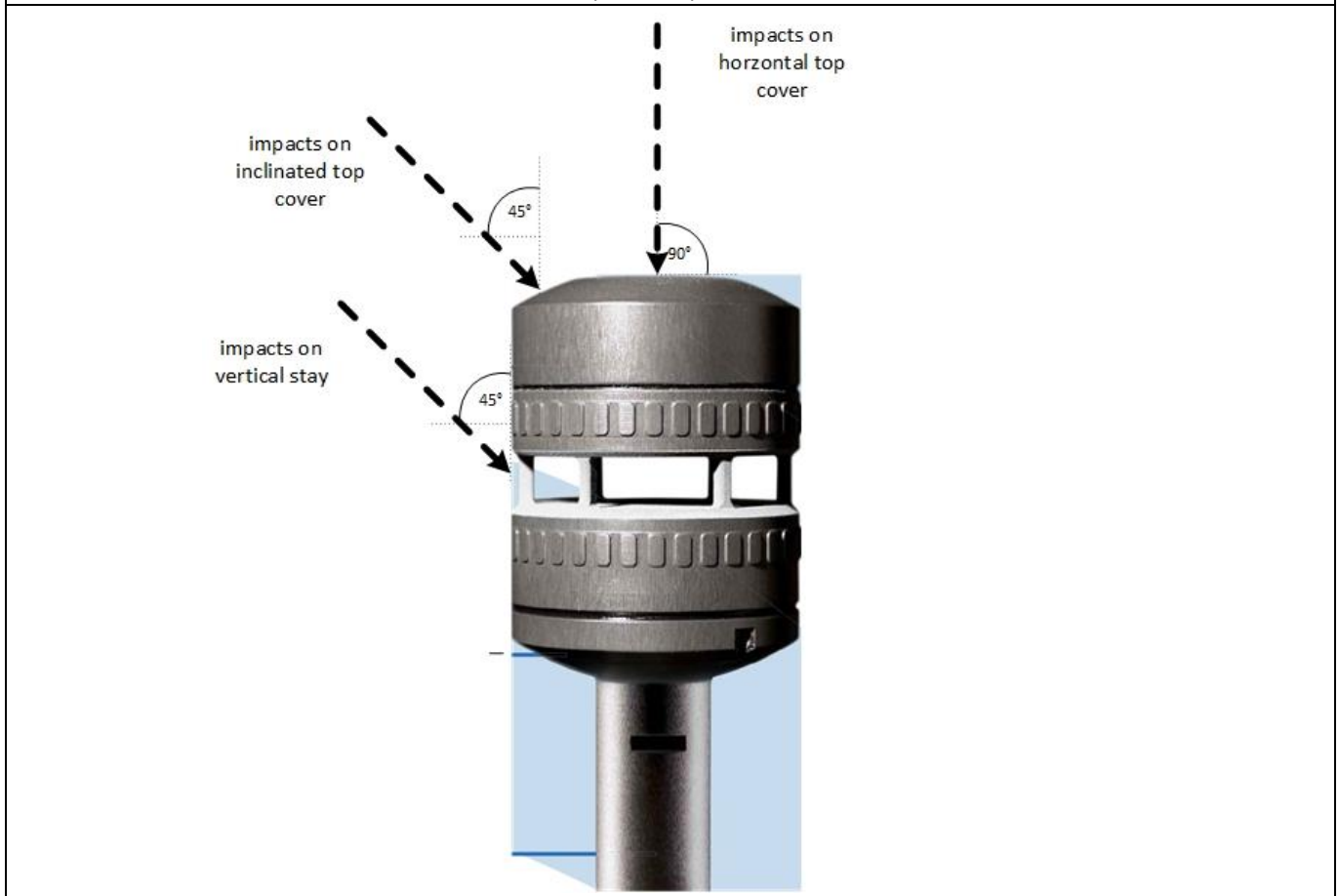
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- **Impact resistance test (general)**

Method used for impact resistance	following IEC 61215-2:2016
Sample tilt angle [° from horizontal]	90 and 45
Direction of shoot [°]	0 (horizontal)
Impact angle [° from sample surface]	45 to 90
Distance (sample to center of v <sub>0</sub> -meas.) [mm]	500 to 700
Ice ball production [week of the year]	31 (hermetically sealed)
Storage temperature of ice ball [°C]	-20
Diameter of ice ball [mm]	50
Weight of ice ball [g]	56.9 +/- 5%
Velocity of ice ball [m/s]	30.8 +/- 5%
Impact energy (at least) [J]	27

Description of impact location



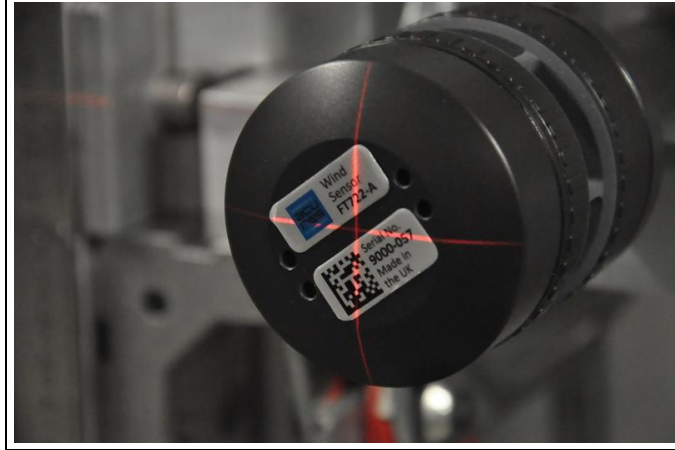
Supplementary information: -

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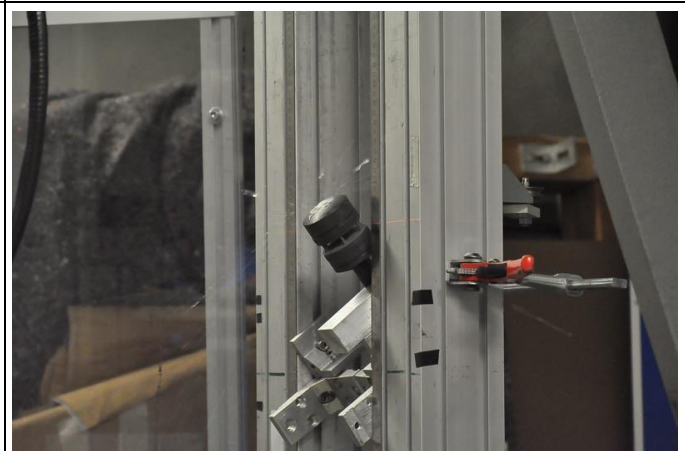
- **Test set up**

Example of impact position (Top 90) Example of impact (Top 90)



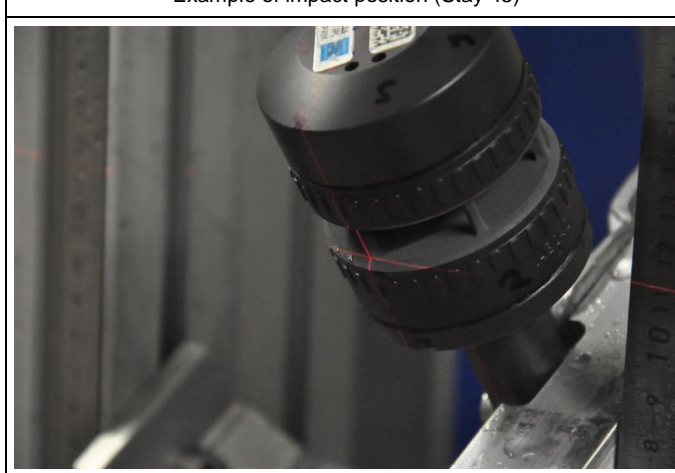
Example of impact position (Top 45)

Example of impact (Top 45)



Example of impact position (Stay 45)

Example of impact (Stay 45)



Supplementary information: -

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- **Impact resistance test**

Test date [DD/MM/YYYY] <small>Day code</small>	13/11/2017	—
Sample-No. <small>ID code</small>	20170004043 <sup>4043</sup>	
Ambient conditions (mean) [°C and % RH]	24.2 and 41.3	

- **Impact resistance test – Result table**

Sample ID	Impact information				Mass of ball [g]	Velocity of ball [m/s]	Impact energy [J]	—	
	Day	No.	Location-No. & diameter [mm]	Surface description & sample angle [°]					
4043	a	1	1	50	Top 90	55.90	31.23	27.26	P
		2	2			57.89	31.88	29.42	P
		3	3			57.89	31.34	28.43	P
		4	4			57.75	31.28	28.25	P
		5	5			57.70	31.16	28.01	P
	Change of impact position								—
	a	6	1	50	Top 45	55.87	31.28	27.33	P
		7	2			58.18	32.01	29.81	P
		8	3			57.66	31.29	28.23	P
		9	4			56.90	30.96	27.27	P
		10	5			56.98	31.05	27.47	P
	Change of impact position								—
	a	11	1	50	Stay 45	57.08	30.99	27.41	P*
		12	2			57.86	31.02	27.84	P
		13	3			57.40	30.83	27.28	P*
14		4	57.64			31.71	28.98	P	
15		5	57.71			31.54	28.70	P*	

End of test sequence —

Supplementary information: -



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-	<b>Final inspection (general)</b>		
Test date [DD/MM/YYYY]	24/05/2017		—
Sample-No.	Potential problem	Evaluation	—
20170004043	Technical problems	*Not setting of tasks; evaluated by manufacturer	N/A (N/T)
	Visual problems (distance; >0.5 m)	No visual conspicuousness with 50 mm diameter ice balls	HW5*
	Visual problems (near; < 0.5 m)	Minor conspicuousness on surface coating with 50 mm diameter ice balls	
	Individual additional remarks: No influence by conspicuousness on surface expected		—
Supplementary information: -			

-	<b>General remarks and supplementary information</b>		
Measuring uncertainties			—
<b>All results only refer to the test samples that were subjected to testing.</b>			
The extended total measuring uncertainty is: $u(k=2) \leq \pm 2.5 \%$			

Related test reports / documents			—
Document "A9458 (06/10/2017) - Hail Test Specification for FT742 – FT722"			

Others				—
The result of the tested sample is also equivalent to:				
FT722-D-FF	FT722-A-FF	FT742-D-FF	FT742-A-FF	
FT722-D-PM	FT722-A-PM	FT742-D-PM	FT742-A-PM	
		FT742-D-DM	FT742-A-DM	