

# AENOR

## Keymark Certificate Solar thermal energy



078/000018

AENOR certifies that the organization

### IMS CALEFACCION, S.L.

registered office PI RIO GALLEG0, CL G PARCELA 28-1 50840 SAN MATEO DE GÁLLEGO  
(Zaragoza - España)

supplies Solar collectors

in compliance with UNE-EN 12975-1:2006 (EN 12975-1:2006)

Trade Mark ML 2310, ML 2310 H, ML 2493, ML 2493 H, ML 2510, ML 2510 H, ML 2672,  
ML 2672 H, ML 2700, ML 2700 H, ML 2890, ML 2890 H

Technical information Specified in Annexes to the Certificate

Production site PI RIO GALLEG0, CL G PARCELA 28-1 50840 SAN MATEO DE GÁLLEGO  
(Zaragoza - España)

Certification scheme In order to grant this Certificate, AENOR has tested the product and has  
verified the quality system implemented for its manufacture. AENOR  
performs these tasks periodically while the Certificate has not been  
cancelled, in accordance with Specific Rules RP 078.01.

This certificate supersedes 078/000018, dated 2016-10-05

First issued on 2011-10-05  
Modified on 2017-11-23  
Validity date 2021-10-05

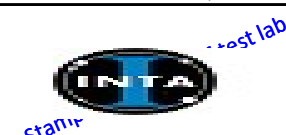
Rafael GARCÍA MEIRO  
Chief Executive Officer

Original Electronic Certificate

AENOR INTERNACIONAL S.A.U.  
Génova, 6. 28004 Madrid. España  
Tel. 91 432 60 00.- www.aenor.com

Product certification body accredited by ENAC, number 01/C-PR002.078



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		078/000018							
					Date issued		2017-11-23							
					Issued by		AENOR							
Licence holder		IMS CALEFACCION, S.L.			Country		SPAIN							
Brand (optional)		CPC			Web		www.imsheating.com							
Street, Number		PI RIO GALLEG0, CL G PARCELA 28-1			E-mail		jmontero@cpcsolar.com							
Postcode, City		50840, SAN MATEO DE GALLEG0 (ZARAGOZA)			Tel		+34 976684128							
Collector Type					Flat plate collector, glazed									
Collector name					Gross area (A <sub>G</sub> )	Gross length	Gross width	Gross height	Power output per collector G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> ϑ <sub>m</sub> - ϑ <sub>a</sub>					
					m <sup>2</sup>	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	70 K
					W	W	W	W	W	W				
ML 2310					2,48	2.000	1.245	77	1.902	1.813	1.634	1.456	1.277	1.277
ML 2310 H					2,48	1.245	2.000	77	1.902	1.813	1.634	1.456	1.277	1.277
ML 2493					2,67	2.150	1.240	77	2.048	1.952	1.760	1.567	1.375	1.375
ML 2493 H					2,67	1.240	2.150	77	2.048	1.952	1.760	1.567	1.375	1.375
ML 2510					2,68	2.000	1.340	77	2.056	1.959	1.766	1.573	1.380	1.380
ML 2510 H					2,68	1.340	2.000	77	2.056	1.959	1.766	1.573	1.380	1.380
ML 2672					2,85	2.300	1.240	77	2.186	2.083	1.878	1.673	1.468	1.468
ML 2672 H					2,85	1.240	2.300	77	2.186	2.083	1.878	1.673	1.468	1.468
ML 2700					2,88	2.150	1.340	77	2.209	2.105	1.898	1.691	1.483	1.483
ML 2700 H					2,88	1.340	2.150	77	2.209	2.105	1.898	1.691	1.483	1.483
ML 2890					3,10	2.305	1.345	77	2.378	2.266	2.043	1.820	1.597	1.597
ML 2890 H					3,10	1.345	2.305	77	2.378	2.266	2.043	1.820	1.597	1.597
Power output per m <sup>2</sup> gross area					767	731	659	587	515	515				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η <sub>0,hem</sub>	a <sub>1</sub>	a <sub>2</sub>							
Units					-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results					0,767	3,600	0,000							
Incidence angle modifier test method					Steady state - outdoor									
Bi-directional incidence angle modifiers					No									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K <sub>θT, coll</sub>					0,88				0,00
Longitudinal					K <sub>θL, coll</sub>					0,88				0,00
Heat transfer medium for testing					Water-Glycole									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt		0,020		kg/(sm <sup>2</sup> )					
Maximum temperature difference for thermal performance calculations					(ϑ <sub>m</sub> -ϑ <sub>a</sub> ) <sub>max</sub>		70		K					
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; ϑ <sub>a</sub> = 30 °C)					ϑ <sub>stg</sub>		101		°C					
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )					C/m <sup>2</sup>		8,1		kJ/(Km <sup>2</sup> )					
Maximum operating temperature					ϑ <sub>max, op</sub>		120		°C					
Maximum operating pressure					p <sub>max, op</sub>		1000		kPa					
Testing laboratory					INTA			http://www.inta.es						
Test report(s)					CA/RPT/4451/013/INTA/11 Ed. 01			Dated		26/09/2011				
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
ML 2310 is the representative collector for the family. Collectors tested according to EN 12975-2:2006.														
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Product certification body accredited by ENAC, number 01/C-PR002.078														



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000018
	Issued	2017-11-23

**Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$ , based on ISO 9806:2013 test results**

Collector name	Standard Locations $\vartheta_m$	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
ML 2310		2.880	2.099	1.499	2.216	1.622	1.169	1.613	1.114	765	1.747	1.190	806
ML 2310 H		2.880	2.099	1.499	2.216	1.622	1.169	1.613	1.114	765	1.747	1.190	806
ML 2493		3.101	2.259	1.614	2.385	1.747	1.259	1.736	1.199	824	1.881	1.282	868
ML 2493 H		3.101	2.259	1.614	2.385	1.747	1.259	1.736	1.199	824	1.881	1.282	868
ML 2510		3.112	2.268	1.620	2.394	1.753	1.263	1.743	1.204	827	1.888	1.286	871
ML 2510 H		3.112	2.268	1.620	2.394	1.753	1.263	1.743	1.204	827	1.888	1.286	871
ML 2672		3.310	2.412	1.723	2.546	1.865	1.343	1.853	1.280	879	2.007	1.368	926
ML 2672 H		3.310	2.412	1.723	2.546	1.865	1.343	1.853	1.280	879	2.007	1.368	926
ML 2700		3.345	2.437	1.741	2.573	1.884	1.358	1.873	1.294	888	2.029	1.382	936
ML 2700 H		3.345	2.437	1.741	2.573	1.884	1.358	1.873	1.294	888	2.029	1.382	936
ML 2890		3.600	2.623	1.874	2.770	2.028	1.461	2.016	1.392	956	2.184	1.488	1.007
ML 2890 H		3.600	2.623	1.874	2.770	2.028	1.461	2.016	1.392	956	2.184	1.488	1.007
Annual output per m <sup>2</sup> gross area		1.161	846	604	893	654	471	650	449	308	704	480	325
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
Mean annual ambient air temperature		18,5°C			3,2°C			7,5°C			9,0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature  $\vartheta_m$  (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

### Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	C	--
Maximum tested positive load	1006	Pa
Maximum tested negative load	1006	Pa
Hail resistance using steel ball (maximum drop height)	-	m

### Energy Labelling Information

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$		
ML 2310	2,48	Collector efficiency ( $\eta_{col}$ )	62	%
ML 2310 H	2,48	<i>Remark: Collector efficiency (<math>\eta_{col}</math>) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m<sup>2</sup>, expressed in % and rounded to the nearest integer. Deviating from the regulation <math>\eta_{col}</math> is based on reference area (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.</i>		
ML 2493	2,67			
ML 2493 H	2,67			
ML 2510	2,68			
ML 2510 H	2,68			
ML 2672	2,85			
ML 2672 H	2,85			
ML 2700	2,88			
ML 2700 H	2,88	Zero-loss efficiency ( $\eta_0$ )	0,767	--
ML 2890	3,10	First-order coefficient ( $a_1$ )	3,60	W/(m <sup>2</sup> K)
ML 2890 H	3,10	Second-order coefficient ( $a_2$ )	0,000	W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0,88	--
<i>Remark: The data given in this section are related to collector reference area (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.</i>				