



**ICIM S.p.A. a socio unico**

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 Capitale Soc EUR. 260.000,00 int. versato ed esistente  
 C.F./P. IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 - R.E.A. n. 1596292

<b>Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results</b>						<b>Licence Number</b>		<b>121BN/0</b>							
						<b>Date issued</b>		<b>2013-09-10</b>							
						<b>Issued by</b>		<b>ICIM S.p.A.</b>							
<b>Licence holder</b>		<b>Isomorph Production S.r.l.</b>				<b>Country</b>		<b>Italy</b>							
<b>Brand (optional)</b>						<b>Web</b>		<a href="http://www.isomorph-production.it">www.isomorph-production.it</a>							
<b>Street, Number</b>		<b>TecnoAREA, Autorporto, 208</b>				<b>E-mail</b>		<b>info@isomorph.it</b>							
<b>Postcode, City</b>		<b>33100 Gorizia</b>				<b>Tel</b>									
<b>Collector Type</b>						<b>Concentrating collector</b>									
<b>Collector name</b>						<b>Power output per collector</b> Gb = 850 W/m <sup>2</sup> ; Gd = 150 W/m <sup>2</sup> $\vartheta_m - \vartheta_a$									
						<b>Gross area (A<sub>G</sub>)</b>	<b>Gross length</b>	<b>Gross width</b>	<b>Gross height</b>	<b>0 K</b>	<b>10 K</b>	<b>30 K</b>	<b>50 K</b>	<b>70 K</b>	<b>70 K</b>
						m <sup>2</sup>	mm	mm	mm	W	W	W	W	W	W
<b>Specchio Lineare II</b>						14,50	6.070	2.390	1.600	10.419	10.323	10.097	9.828	9.514	9.514
<b>Power output per m<sup>2</sup> gross area</b>						<b>719</b>	<b>712</b>	<b>696</b>	<b>678</b>	<b>656</b>	<b>656</b>				
<b>Performance parameters test method</b>						<b>Steady state - outdoor</b>									
<b>Performance parameters (related to AG)</b>						$\eta_{0,hem}$	a1	a2							
<b>Units</b>						-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
<b>Test results</b>						<b>0,719</b>	<b>0,625</b>	<b>0,004</b>							
<b>Incidence angle modifier test method</b>						<b>Quasi dynamic - outdoor</b>									
<b>Bi-directional incidence angle modifiers</b>						<b>No</b>									
<b>Incidence angle modifier</b>						<b>Angle</b>	10°	20°	30°	40°	50°	60°	70°	80°	90°
<b>Transversal</b>						$K_{\theta T, coll}$	1,00	1,00	1,00	1,00	1,01	1,03	1,06	1,00	0,00
<b>Longitudinal</b>						$K_{\theta L, coll}$	1,00	1,00	1,00	1,00	1,01	1,03	1,06	1,00	0,00
<b>Heat transfer medium for testing</b>						<b>Water-Glycole</b>									
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>						<b>dm/dt</b>	<b>0,014</b>					<b>kg/(sm<sup>2</sup>)</b>			
<b>Maximum temperature difference for thermal performance calculations</b>						$(\vartheta_m - \vartheta_a)_{max}$	<b>70</b>					<b>K</b>			
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\vartheta_a = 30^\circ\text{C}</math>)</b>						$\vartheta_{stg}$	<b>100</b>					<b>°C</b>			
<b>Effective thermal capacity, incl. fluid (per gross area, A<sub>G</sub>)</b>						<b>C/m<sup>2</sup></b>	<b>8,09</b>					<b>kJ/(Km<sup>2</sup>)</b>			
<b>Maximum operating temperature</b>						$\vartheta_{max, op}$	<b>80</b>					<b>°C</b>			
<b>Maximum operating pressure</b>						$p_{max, op}$	<b>300</b>					<b>kPa</b>			
<b>Testing laboratory</b>						<b>Eurofins Modulo Uno S.p.A.</b>									
<b>Test report(s)</b>						<b>M1.13.NRG.0292/50478-rev3</b>									
						<b>www.eurofins.it</b>									
						<b>Dated</b>									
						<b>17/09/2013</b>									
<b>Comments of testing laboratory</b>						<b>Datasheet version: 5.01, 2016-03-01</b>									
*Due to the special construction of the collector, the maximum temperature the absorber can reach (stagnation conditions) is limited to 100°C by means of an active control system. Test results according to EN 12975-2. Datasheet current issue date: 2016-11-29						 <b>Stamp &amp; signature of test lab</b> 									



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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	121BN/0
	Issued	2013-09-10

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
Specchio Lineare II		18.334	17.212	15.897	16.246	15.021	13.676	11.672	10.627	9.543	12.529	11.443	10.274
Annual output per m <sup>2</sup> gross area		1.264	1.187	1.096	1.120	1.036	943	805	733	658	864	789	709
Fixed or tracking collector		2-axis tracking											
Annual irradiation on collector plane		2609 kWh/m <sup>2</sup>			2386 kWh/m <sup>2</sup>			1634 kWh/m <sup>2</sup>			1625 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		Tracking			Tracking			Tracking			Tracking		
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 <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

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	1000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using steel ball (maximum drop height)	--	m

Energy Labelling Information			
	Reference Area, A <sub>sol</sub> (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area A <sub>sol</sub>	
Specchio Lineare II	14,50	Collector efficiency ( $\eta_{col}$ )	69 %
		Remark: Collector efficiency ( $\eta_{col}$ ) 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 $\eta_{col}$ is based on reference area (A <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>	
		Zero-loss efficiency ( $\eta_0$ )	0,719 --
		First-order coefficient (a <sub>1</sub> )	0,63 W/(m <sup>2</sup> K)
		Second-order coefficient (a <sub>2</sub> )	0,004 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	1,01 --
		Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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.	