

Certificate number	16223 Rev.0	Replaces	-
Issued	13/03/2019	First edition	13/03/2019
Report number	PKC0003156	Expiry date	12/03/2024
Page	1 of 1	Contract number	PKC0003504

Product Certificate Solar Thermal Products

License holder: **Idrocalor S.r.l.**
Piazza A. Moro 17, Int.1 – 35030 Rubano (PD), Italy

Production site(s): Idrocalor S.r.l.
Via L. Einaudi 38 – 35030 Saccolongo (PD), Italy

Product Solar thermal collector

Model(s): EOS TH

Kiwa Cermet Italia hereby declares that the product can be considered complying to the testing requirements and is entitled to use the Solar Keymark Label, based upon the following aspects:

Laboratory testing of the solar thermal products, which are performed by an accredited laboratory in accordance to ISO/IEC 17025 -see annex-, using the following standards:

- ISO 9806:2013
Solar Energy – Solar Thermal Collectors – Test Methods

Specific CEN Keymark Scheme Rules for Solar Thermal Products R.31.

Periodic Inspection of the Factory site(s) performed by Kiwa Cermet Italia.

A description of the test results is given in the annex to this certificate.

This certificate is issued in accordance with the Kiwa Cermet Italia regulations.

Publication of the certificate is allowed.

The validity of this certificate is subject to the positive result of periodic surveillance visits.


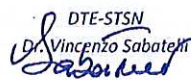
The validity of this certificate can be verified on request at the following e-mail address: energy@kiwacermet.it.

Any total or partial reproduction of this document in any form, without Kiwa Cermet Italia express authorization, is prohibited.

Kiwa Cermet Italia S.p.A.
Società con socio unico, soggetta
all'attività di direzione e
coordinamento di Kiwa Italia
Holding Srl
Via Cadriano, 23
40057 Granarolo dell'Emilia (BO)
Tel +39.051.459.3.111
Fax +39.051.763.382
E-mail: info@kiwacermet.it
www.kiwa.it

Chief Operating Officer
Giampiero Belcredi




Annex to Solar Keymark Certificate		Licence Number		16223 Rev.0									
		Date issued		2019-03-13									
		Issued by		Kiwa Cermet Italia S.p.A.									
Licence holder		Idrocalor S.r.l.		Country		Italy							
Brand (optional)				Web		http://www.idrocalor.com							
Street, Number		Piazza A. Moro 17, Int.1 Rubano (PD)		E-mail		info@idrocalor.com							
Postcode, City		35030, Rubano (PD)		Tel		+39 049 8015744							
Collector Type				Concentrating collector									
Collector name		Gross height mm	Gross area (A _g) m ²	Gross length mm	Gross width mm	Aperture area (A _a) m ²	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s θ _m - θ _a						
							0 K W	10 K W	30 K W	50 K W	70 K W	101 K W	
EOS TH		3,880	3.863	3,500	2,010	3.715	2,985	2,955	2,826	2,604	2,290	1,609	
Power output per m ² gross area							773	765	732	674	593	417	
Performance parameters test method		Steady state - outdoor											
Performance parameters (related to A _g)		η ₀ , b	a1	a2	a3	a4	a5	a6	a7	a8	Kd		
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ² K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-		
Test results		0.909	0.47	0.030	0.000	0.00	0	0.000	0.00	0.0E+00	0.00		
Incidence angle modifier test method		Steady state - outdoor											
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal		K _{ET, coll}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00		
Longitudinal		K _{EL, coll}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00		
Heat transfer medium for testing		Water											
Flow rate for testing (per gross area, A _g)		dm/dt	0.043		kg/(sm ²)								
Maximum temperature difference during thermal performance test		(θ _m -θ _a) _{max}	71.4		K								
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	196		°C								
Maximum operating temperature		θ _{max, op}	100		°C								
Maximum operating pressure		p _{max, op}	200		kPa								
Testing laboratory		ENEA Centro Ricerche Trisaia					http://www.trisaia.enea.it						
Test report(s)		RP.2019.COL.204.2					Dated		20/02/2019				
Comments of testing laboratory		Performance parameters refers to direct normal irradiance (DNI). Flow rate according to manufacturer specification. Collector is provided of active protection controls that prevent damage in any climate class.						Datasheet version: 6.0, 2018-10-30  DTE-STSN 					
Kiwa Cermet Italia S.p.A. • Via Cadriano, 23 • 40057 Granarolo dell'Emilia (BO) • Italy Tel: +39 0514593111 • Fax: +39 051763382 • E-Mail: info@kiwacermet.it • www.kiwa.it													

Annex to Solar Keymark Certificate	Licence Number	16223 Rev.0
Supplementary Information	Issued	2019-03-13



Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_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
EOSTH		5,215	4,776	3,978	4,465	3,855	3,051	3,689	3,204	2,487	3,444	3,008	2,372
Annual output per m ² gross area		1,351	1,237	1,031	1,157	999	790	956	830	644	892	779	615
Fixed or tracking collector		2-axis tracking											
Annual irradiation on collector plane		2609 kWh/m ²			2386 kWh/m ²			1634 kWh/m ²			1625 kWh/m ²		
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 ϑ_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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information			
Collector heat transfer medium	Water-Glycole		
The collector is deemed to be suitable for roof integration	No		
The collector was tested successfully under the following conditions:			
Climate class (A+, A, B or C)			--
G (W/m ²) >	ϑ_a (°C) >	H_x (MJ/m ²) >	
Maximum tested positive load			Pa
Maximum tested negative load			Pa
Hail resistance using steel ball (maximum drop height)			m
Additional collector attribute(s)			
<input type="checkbox"/> Using external power source(s) for normal operation	<input checked="" type="checkbox"/> Active or passive measure(s) for self-protection		
<input type="checkbox"/> Co-generating thermal and electrical power	<input type="checkbox"/> Wind and/or infrared sensitive collector(s) (WISC)		
<input type="checkbox"/> Façade collector(s)			

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	
EOSTH	3.863	{F)-(O)-(CL)-(A:Ø,L)-(C:Ø,L)-(D)	
		{F)-(O)-(CL)-(A:Ø,L)-(C:Ø,L)-(D)	
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
Collector efficiency (η_{col})	71%	Zero-loss efficiency (η_0)	0.77
		First-order coefficient (a_1)	0.47
		Second-order coefficient (a_2)	0.030
		Incidence angle modifier IAM (50°)	0.85
Remark: Collector efficiency (η_{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 ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		Remark: The data given in this section are related to collector reference area (A_{sol}) 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.	

Kiwa Cermet Certification For Thermal (TH) Solar Collector Constructional Data Form

Customer Data:		
License holder	Production site	Trademark
Idrocalor S.r.l. Piazza A. Moro 17, Int.1 – 35030 Rubano (PD), Italy	Idrocalor S.r.l. Via L. Einaudi 38 – 35030 Saccolongo (PD), Italy	  TORMENE 1907 INDUSTRIAL OVENS eosth solar energy catcher Built under licence of: greenetica

Product General / Technical Data:	
Collector type	Concentrating collector
Model name	EOS TH
Dimensions: gross length x gross width x gross height (mm)	3500x2010x3880
Gross area (m ²)	3,863
Aperture area (m ²)	3,715
Absorber area (m ²)	0,089
Weight of empty collector (kg)	5 (absorber) 750 (total weight)
Collector loop flow range (kg/s)	0,16/0,55
Max. Operating pressure (kPa)	200
Max. operating temperature (°C)	100
Stagnation temperature (°C) at 1000 W/m ² and 30°C	196
Fluid capacity (l) (volume of heat transfer fluid)	0,08
Heat transfer fluid (heat transfer medium)	Water-glycole

Kiwa Cermet Certification For Thermal (TH) Solar Collector Constructional Data Form

List of critical components (as applicable):			
Component	Manufacturer	Model name	Technical data
Transparent cover - glass (only for flat plate glazed collector)	NA	NA	<ul style="list-style-type: none"> Thickness = NA Cover solar transmittance (%) at normal incidence (air mass 1.5) = NA
Transparent cover - vacuum tube (only for evacuated tube collector)	NA	NA	<ul style="list-style-type: none"> Thickness = NA Cover solar transmittance (%) at normal incidence (air mass 1.5) = NA
Absorber plate	Greenetica	EOS-P02	<ul style="list-style-type: none"> Thickness = 20 mm Material = aluminium anodized Absorber - fin width = Absorber - fin thickness = Solar absorptance $\alpha = 0,54$ Hemispherical emittance $\varepsilon = 0,75$ Surface treatment = black paint
Manifold (header pipe)	NA	NA	<ul style="list-style-type: none"> Manifold diameter or dimensions = NA
Risers (absorber tubes) (only for flat plate collector)	NA	NA	<ul style="list-style-type: none"> Number of risers = NA Riser diameter or dimensions = NA Distance between risers = NA
Heat pipe (only for evacuated tube collector with heat pipe technology)	NA	NA	<ul style="list-style-type: none"> Fluid content = NA Internal pressure = NA
U pipe (only for evacuated tube collector with U pipe technology)	NA	NA	<ul style="list-style-type: none"> Fluid content = NA Internal pressure = NA
Insulation	Aspen Aerogels	Pyrogel xte	<ul style="list-style-type: none"> Back insulation thickness = 30 mm Side insulation thickness = 10 mm
Casing (box)	NA	NA	NA



Kiwa Cermet Certification For Thermal (TH) Solar Collector Constructional Data Form

Diffusion barriers (between absorber and insulation material)	NA	NA	NA
Reflectors (only for evacuated tube collector and concentrating collector)	Reflex S.p.A.	RFX001	<ul style="list-style-type: none">• Material: mirror glass• Geometry: parabolic• Focal length: 1810 mm• Reflector number: 2• Tracking system: 2-axis
Heat conductive paste (only for evacuated tube collector)	NA	NA	NA
Electronic unit (only for concentrating collector)	//	//	PLC
Protection systems	//	//	Temperature sensor Flow switch Anemometer
Other components (e.g.: sealing / adhesive material / rubber parts / plastic parts)	NA	NA	NA

Key:

NA = not applicable;

// = not declared by the manufacturer.

Copy of marking plate: -

Kiwa Cermet Italia S.p.A.
Business Sector Solar & Renewable Energies

Signature: 