CERTIFICATE

Certificate number	17021 Rev.1	Replaces	17021 Rev.0
Issued	08/04/2022	First edition	10/02/2017
Report number	PKC0001762	Expiry date	14/12/2026
Page	1 of 1	Contract number	PKC0003652

Product Certificate Solar Thermal Products

License holder: **Pleion S.p.A.**
Via Venezia 11 – 37053 Cerea (VR), Italy

Production site(s): Pleion S.p.A.
Via Venezia 11 – 37053 Cerea (VR), Italy

Product Solar thermal system

Model(s): EGO 110; EGO 150; EGO 180; EGO 220; EGO 260

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:

- EN 12976-2:2006
  Thermal solar systems and components - Factory made systems - Part 2: Test methods

Specific CEN Keymark Scheme Rules for Solar Thermal Products SKN_N0444R5.

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.

Chief Operating Officer
Giampiero Belcredi

Kiwa Cermet Italia S.p.A.
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PRD N° 069B

Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.		Country	Italy	
Brand (optional)			Website	www.pleion.it	
Street	Via Venezia 11		E-mail	info@pleion.it	
Postal Code	37053	Cerea (VR)	Tel. / Fax	+39	0442320295

System classification	
Application(s)	Hot water
Solar loop, circulation principle	Thermosyphon
Direct solar loop / heat exchanger	Direct
Open, vented or closed solar loop	Closed
Drain back/down	Always filled (no drain)
Store location	Int. collector-store
Store orientation (of main axis)	Horizontal
Type of auxiliary heating (internal back-up heat)	None
If other auxiliary/internal back-up heating, please specifiy:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)				Heat store(s)							
Company	Pleion S.p.A.			Company	Pleion S.p.A.						
Keymark lic.no. if available				*Keymark lic.no. if available*							
Collector name	Per module			Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power	
	Gross Area (Ag)	Gross length	Gross width								
	m^2	mm	mm		litres	mm	mm	mm	litres	kW	
EGO 110	1.52	2136	711	EGO 110	105	1870					
EGO 150	1.93	2136	906	EGO 150	140	1870					
EGO 180	2.35	2136	1101	EGO 180	175	1870					
EGO 220	2.77	2136	1296	EGO 220	210	1870					
EGO 260	3.18	2136	1491	EGO 260	245	1870					

Solar loop controller		Solar loop fluid	
Keymark lic.no. if available		Recommended/required	
Company		Company	
Name		Name	
Solar loop pump - power range	W to W	Freezing point	°C

System family overview

Collector name	Number of collectors in each configuration for each store																					
	Store name																					
	EGO 110						EGO 150						EGO 180						EGO 220						EGO 260					
EGO 110	1																													
EGO 150							1																							
EGO 180													1																	
EGO 220																			1											
EGO 260																									1					

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15

Comments of test lab
Additional test reports: RP.2016.SYS.191a.1 issued by ENEA - Centro Ricerche Trisaia on 21/12/2016. Aperture area of collectors: EGO 110: 1.09 m^2; EGO 150: 1.48 m^2; EGO 180: 1.86 m^2; EGO 220: 2.25 m^2; EGO 260: 2.64 m^2.

ENEA
TERIN-STSN
Dr. Vincenzo Sabatelli

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.		Country	Italy	
Brand (optional)			Website	www.pleion.it	
Street	Via Venezia 11		E-mail	info@pleion.it	
Postal Code	37053	Cerea (VR)	Tel. / Fax	+39	0442320295

System family overview

Collector name	For each storage and collector size, give number of collectors					
	EGO 110	EGO 150	EGO 180	EGO 220	EGO 260	
EGO 110	1					
EGO 150		1				
EGO 180			1			
EGO 220				1		
EGO 260					1	

Name of system configuration					EGO 110		
Collector name	EGO 110	No. Collectors	1	Storage name	EGO 110		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		4461	1829		0.41	6134	2104		0.34	7808	2186		0.28
WürzburgDE		4278	2013		0.47	5882	2365		0.40	7487	2459		0.33
Davos CH		4840	2663		0.55	6655	3011		0.45	8471	3121		0.37
Athens GR		3325	2466		0.74	4571	3043		0.67	5818	3362		0.58
Optional OP													

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional OP		
	G	1,157	1,230	1,684	1,736			
	Ta,ave	7.5	9.0	3.2	18.5			
	Tc,ave	8.5	10.0	5.4	17.8			
	± ΔTc	6.4	3.0	0.8	7.4			

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	400	kPa	Max. operating press. - tank side	400	kPa

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15
Test method	ISO 9459-2 (CSTG)

Comments of test lab	
Additional test report: RP.2016.SYS.191a.1.	ENEA TERIN-STSN Dr. Vincenzo Sabatelli

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.		Country	Italy	
Brand (optional)			Website	www.pleion.it	
Street	Via Venezia 11		E-mail	info@pleion.it	
Postal Code	37053	Cerea (VR)	Tel. / Fax	+39	0442320295

System family overview

Collector name	For each storage and collector size, give number of collectors				
	EGO 110	EGO 150	EGO 180	EGO 220	EGO 260
EGO 110	1				
EGO 150		1			
EGO 180			1		
EGO 220				1	
EGO 260					1

Name of system configuration					EGO 150		
Collector name	EGO 150	No. Collectors	1	Storage name	EGO 150		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6134	2529		0.41	7808	2833		0.36	9481	2947		0.31
WürzburgDE		5882	2782		0.47	7487	3168		0.42	9091	3313		0.36
Davos CH		6655	3682		0.55	8471	4064		0.48	10286	4209		0.41
Athens GR		4571	3401		0.74	5818	4007		0.69	7065	4403		0.62
Optional OP													

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional OP		
	G	1,157	1,230	1,684	1,736			
	Ta,ave	7.5	9.0	3.2	18.5			
	Tc,ave	8.5	10.0	5.4	17.8			
	± ΔTc	6.4	3.0	0.8	7.4			

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	400	kPa	Max. operating press. - tank side	400	kPa

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15
Test method	ISO 9459-2 (CSTG)

Comments of test lab

Additional test report: RP.2016.SYS.191a.1.

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TERIN-STSN
Dr. Vincenzo Sabatelli

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.	Country	Italy
Brand (optional)		Website	www.pleion.it
Street	Via Venezia 11	E-mail	info@pleion.it
Postal Code	37053 Cerea (VR)	Tel. / Fax	+39 0442320295

System family overview

For each storage and collector size, give number of collectors

Collector name	EGO 110	EGO 150	EGO 180	EGO 220	EGO 260
EGO 110	1				
EGO 150		1			
EGO 180			1		
EGO 220				1	
EGO 260					1

Name of system configuration				EGO 180	
Collector name	EGO 180	No. Collectors	1	Storage name	EGO 180

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		7808	3227		0.41	9481	3521		0.37	11154	3676		0.33
WürzburgDE		7487	3549		0.47	9091	3926		0.43	10695	4131		0.39
Davos CH		8471	4698		0.55	10286	5056		0.49	12101	5253		0.43
Athens GR		5818	4334		0.74	7065	4931		0.70	8312	5386		0.65
Optional OP													

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional OP		
G	1,157	1,230	1,684	1,736			
Ta,ave	7.5	9.0	3.2	18.5			
Tc,ave	8.5	10.0	5.4	17.8			
± ΔTc	6.4	3.0	0.8	7.4			

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	400	kPa	Max. operating press. - tank side	400 kPa

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15
Test method	ISO 9459-2 (CSTG)

Comments of test lab

Additional test report: RP.2016.SYS.191a.1.

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TERIN-STSN
Dr. Vincenzo Sabatelli

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Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.		Country	Italy	
Brand (optional)			Website	www.pleion.it	
Street	Via Venezia 11		E-mail	info@pleion.it	
Postal Code	37053	Cerea (VR)	Tel. / Fax	+39	0442320295

System family overview

For each storage and collector size, give number of collectors

Collector name	EGO 110	EGO 150	EGO 180	EGO 220	EGO 260
EGO 110	1				
EGO 150		1			
EGO 180			1		
EGO 220				1	
EGO 260					1

Name of system configuration		EGO 220	
Collector name	EGO 220	No. Collectors	1
Storage name	EGO 220		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9481	3930		0.41	11154	4252		0.38	13942	4484		0.32
WürzburgDE		9091	4321		0.48	10695	4727		0.44	13369	5037		0.38
Davos CH		10286	5734		0.56	12101	6120		0.51	15126	6405		0.42
Athens GR		7065	5268		0.75	8312	5892		0.71	10390	6621		0.64
Optional OP													

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional OP
	G	1,157	1,230	1,684	1,736	
	Ta,ave	7.5	9.0	3.2	18.5	
	Tc,ave	8.5	10.0	5.4	17.8	
	± ΔTc	6.4	3.0	0.8	7.4	

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	400	kPa	Max. operating press. - tank side	400	kPa

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15
Test method	ISO 9459-2 (CSTG)

Comments of test lab

Additional test report: RP.2016.SYS.191a.1.

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Dr. Vincenzo Sabatelli
[signature]

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 4.5, 2017-10-24

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Summary of	EN12976-2	test results	Certification No.	17021 Rev.1
Annex to Solar KEYMARK Certificate			Issued	2022-04-08

Company	Pleion S.p.A.		Country	Italy	
Brand (optional)			Website	www.pleion.it	
Street	Via Venezia 11		E-mail	info@pleion.it	
Postal Code	37053	Cerea (VR)	Tel. / Fax	+39	0442320295

System family overview

Collector name	For each storage and collector size, give number of collectors				
	EGO 110	EGO 150	EGO 180	EGO 220	EGO 260
EGO 110	1				
EGO 150		1			
EGO 180			1		
EGO 220				1	
EGO 260					1

Name of system configuration					
Collector name	EGO 260	No. Collectors	1	Storage name	EGO 260

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		11154	4642		0.42	13942	5097		0.37	16730	5283		0.32
WürzburgDE		10695	5101		0.48	13369	5693		0.43	16043	5932		0.37
Davos CH		12101	6760		0.56	15126	7318		0.48	18151	7544		0.42
Athens GR		8312	6215		0.75	10390	7178		0.69	12468	7845		0.63
Optional OP													

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional OP		
	G	1,157	1,230	1,684	1,736			
	Ta,ave	7.5	9.0	3.2	18.5			
	Tc,ave	8.5	10.0	5.4	17.8			
	± ΔTc	6.4	3.0	0.8	7.4			

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	400	kPa	Max. operating press. - tank side	400	kPa

Testing Laboratory	ENEA - Centro Ricerche Trisaia
Website	www.trisaia.enea.it
Test report id. number	RP.2016.SYS.191.1
Date of test report	2016-12-15
Test method	ISO 9459-2 (CSTG)

Comments of test lab	
Additional test report: RP.2016.SYS.191a.1.	ENEA TERIN-STSN Dr. Vincenzo Sabatelli

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 4.5, 2017-10-24