## AUTOCERTIFICAZIONE DEL COSTRUTTORE

*(ai sensi del D.M. 07 agosto 2025 e del D.P.R. n. 445/2000)*

La sottoscritta società PLEION s.p.a., dichiara che gli apparecchi della tipologia INTERVENTO III.D – art.8, comma 1, lettera d, elencati nell'allegato A e immessi sul mercato dalla stessa, soddisfano:

- **i requisiti tecnici,** richiesti nel **DM 07 agosto 2025, misurati secondo le metodologie previste dalla specifica normativa tecnica di riferimento:**

**III.D) Solare termico**

- Impianti prefabbricati Factory Made, normativa di riferimento: UNI EN 12976

Rappresentante legale: Adalberto Scarrone

Pleion S.p.A. - Società con unico Socio
Via Venezia, 11 - 37053 CEREA (VR)
Tel. 0442 320295 E-mail: info@pleion.it
pleion@pec.pleion.it
Capitale sociale € 500.000 i.v.
C.F., P.I. e R.I. di VR 03820120230
R.E.A. 368332

## AUTOCERTIFICAZIONE DEL COSTRUTTORE

*(ai sensi del D.M. 07 agosto 2025 e del D.P.R. n. 445/2000)*

## ALLEGATO A

## ELENCO APPARECCHI CONFORMI AL CONTO TERMICO
## (con relativi dati tecnici)

| PRODOTTO | SOLAR KEYMARK | QL [MJ/anno] | AG [$m^2$] | Aa [$m^2$] | PRODUCIBILITA' SPECIFICA [kWht/$m^2$ anno] | ANNI GARANZIA |
|---|---|---|---|---|---|---|
| EGO 110 | 17021 Rev.1 | 2365 | 1,52 | 1,09 | 603 | 5 |
| EGO 150 | 17021 Rev.1 | 3168 | 1,93 | 1,48 | 595 | 5 |
| EGO 180 | 17021 Rev.1 | 3926 | 2,35 | 1,86 | 586 | 5 |
| EGO 220 | 17021 Rev.1 | 4727 | 2,77 | 2,25 | 584 | 5 |
| EGO 260 | 17021 Rev.1 | 5693 | 3,18 | 2,64 | 599 | 5 |
| EGO PRIME 110 | 15558 Rev.2 | 2365 | 1,28 | 1,09 | 603 | 5 |
| EGO PRIME 150 | 15559 Rev.2 | 3168 | 1,68 | 1,48 | 595 | 5 |
| EGO PRIME 180 | 15560 Rev.2 | 3926 | 2,08 | 1,86 | 586 | 5 |
| EGO PRIME 220 | 15561 Rev.2 | 4727 | 2,48 | 2,25 | 584 | 5 |
| EGO PRIME 260 | 15562 Rev.2 | 5639 | 2,88 | 2,64 | 593 | 5 |
| FREE S 150.1.20 | 011-7S3285 A | 4120 | 2,02 | 1,83 | 625 | 5 |
| FREE S 200.1.20 | 011-7S3285 A | 5023 | 2,02 | 1,83 | 762 | 5 |
| FREE S 300.2.25 | 011-7S3285 A | 9435 | 5,04 | 4,64 | 565 | 5 |

Rappresentante legale: Adalberto Scarrone

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R.E.A. 368332

TÜVRheinland®
DIN CERTCO
Genau. Richtig.

# CERTIFICATE

| | |
|---|---|
| **Certificate holder** | **Pleion S.P.A.**<br>**Via Venezia 11**<br>**37053 Cerea VR**<br>**ITALY** |
| **Production facility** | Argos |
| **Product** | Solar collectors |
| **Type, Model** | 120.1.15,-17,-19,-20, 150.1.15,-20,-23,-25<br>150.2.15, 170.1.19, -20,-25, 170.2.15<br>200.1.20,-23,-25,-27,-29, 200.2.15,-20<br>250.1.25,-29, 250.2.15,-20, 300.1.29<br>300.2.15,-20,-25,-29, 300.3.25<br>brand: FREE S |
| **Testing basis** | DIN EN 12976-1:2022-03<br>DIN EN 12976-2:2019-11<br>SOLAR KEYMARK Scheme Rules SKN N0444R7 (2024-01) |
| **Mark of conformity** | |
| **Registration No.** | 011-7S3285 A |
| **Valid until** | 2029-05-31 |
| **Right of use** | This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number.<br><br>See annex for further information. |

2025-04-29

Dr. Ina Förster
Certification Body

DAkkS Deutsche Akkreditierungsstelle D-ZE-11125-01-01

GESELLSCHAFT FÜR KONFORMITÄTSBEWERTUNG MBH DIN CERTCO

# ANNEX



| | |
|---|---|
| **Certificate** | 011-7S3285 A dated 2025-04-29 |
| **Technical Data** | See data sheet, part of the test report of 2025-04-22 |
| **Testing laboratory/ Inspection body** | Universität Stuttgart<br>Institut für Gebäudeenergetik, Thermotechnik und Energie-speicherung<br>Pfaffenwaldring 6-6 a<br>70569 Stuttgart<br>GERMANY |
| **Test report(s)** | 23SYS156/20EM03 dated 2025-04-22 |

| Summary of | EN12976-2 | SOLAR SYSTEM test results | Licence Number | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

| System classification | |
|---|---|
| Application(s) | Hot water |
| Solar loop, circulation principle | Thermosyphon |
| Direct solar loop / heat exchanger | Heat exchanger |
| Open, vented or closed solar loop | Closed |
| Drain back/down | Always filled (no drain) |
| Store location | Outdoor |
| Store orientation (of main axis) | Horizontal |
| Type of auxiliary heating (internal back-up heat) | Electric |
| If other auxiliary/internal back-up heating, please specifiy: | n/a |
| Solar+supplementary OR Solar-only / Solar pre-heat | Solar only / Solar preheat |

**Collector(s)**

| Company | Pleion SPA |
|---|---|
| *Keymark lic.no. if available* | *011-7S3295 F* |

| Collector name | Per module: Gross Area (AG) | Per module: Gross length | Per module: Gross width |
|---|---|---|---|
| | m² | mm | mm |
| KSF-S15 | 1.51 | 1503 | 1007 |
| KSF-S17 | 1.68 | 1420 | 1183 |
| KSF-S19 | 1.96 | 1503 | 1305 |
| KSF-S20 | 2.02 | 2006 | 1007 |
| KSF-S23 | 2.24 | 1893 | 1183 |
| KSF-S25 | 2.52 | 2006 | 1257 |
| KSF-S27 | 2.67 | 2261 | 1183 |
| KSF-S29 | 2.92 | 2006 | 1457 |

**Heat store(s)**

| Company | Pleion SPA |
|---|---|
| *Keymark lic.no. if available* | - |

| Store name | Total nominal volume | Gross height | Gross width | Gross depth | Auxiliary heated volume | Electrical aux. heating power |
|---|---|---|---|---|---|---|
| | litres | mm | mm | mm | litres | kW |
| S 120 | 120 | 500 | 1000 | - | - | - |
| S 150 | 150 | 500 | 1250 | - | - | - |
| S 170 | 170 | 530 | 1250 | - | - | - |
| S 200 | 200 | 580 | 1250 | - | - | - |
| S 250 | 250 | 580 | 1650 | - | - | - |
| S 300 | 300 | 580 | 1800 | - | - | - |

**Solar loop controller**

| *Keymark lic.no. if available* | - |
|---|---|
| Company | - |
| Name | - |
| Solar loop pump - power range | - W to - W |

**Solar loop fluid**

| Recommended/required | Required | |
|---|---|---|
| Company | n/a | |
| Name | n/a | |
| Freezing point | n/a | °C |

**System family overview**

| Collector name | Number of collectors in each configuration for each store: Store name | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S 120 | | | | | | S 150 | | | | | | S 170 | | | | | | S 200 | | | | | | S 250 | | | S 300 | | |
| KSF-S15 | 1 | | | | | | 2 | 1 | | | | | 2 | | | | | | 2 | | | | | | 2 | | | 2 | | |
| KSF-S17 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KSF-S19 | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | |
| KSF-S20 | 1 | | | | | | 1 | | | | | | 1 | | | | | | 1 | 2 | | | | | 2 | | | 2 | | |
| KSF-S23 | | | | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | |
| KSF-S25 | | | | | | | 1 | | | | | | 1 | | | | | | 1 | | | | | | 1 | | | 2 | 3 | |
| KSF-S27 | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| KSF-S29 | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 | | | 2 | 1 | |

| Testing Laboratory | TZS/IGTE |
|---|---|
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |

**Comments of test lab**

No comments



DIN CERTCO ● Alboinstraße 56 ● 12103 Berlin, Germany
Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de

| Summary of | EN12976-2 | test results | Certification No. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

**Parameters for systems extrapolation (Annex D)**

| Collector of measured system | | Storage tank of measured system | |
|---|---|---|---|
| $A_{ref}$ [$m^2$] | 2.52 | Volume [l] | 147 |
| $\eta_0$ | 0.725 | $A_{hx}$ [$m^2$] | 0.75 |
| $a_1$ [$W/Km^2$] | 3.620 | Piping | |
| $a_2$ [$W/Km^2$] | 0.006 | | |
| IAM (50º) | 0.980 | $U_{loop,p}$ | 0.91 |

**System parameters**

| Name of System Configuration | Tested/Extrapol | $A_c$* [$m^2$] | $u_c$* [$W/Km^2$] | $U_s$ [W/K] | $C_s$ [MJ/K] | $S_c$ [-] | $D_L$ [-] | $f_{aux}$ [-] |
|---|---|---|---|---|---|---|---|---|
| 120.1.15 | Extrapol | 1.138 | 6.293 | 1.085 | 0.429 | 0.175 | 0.173 | - |
| 120.1.17 | Extrapol | 1.260 | 6.215 | 1.085 | 0.429 | 0.175 | 0.173 | - |
| 120.1.19 | Extrapol | 1.503 | 6.115 | 1.085 | 0.429 | 0.175 | 0.173 | - |
| 120.1.20 | Extrapol | 1.515 | 6.097 | 1.085 | 0.429 | 0.175 | 0.173 | - |
| 150.1.15 | Extrapol | 1.156 | 6.293 | 1.302 | 0.537 | 0.175 | 0.173 | - |
| 150.1.20 | Extrapol | 1.521 | 6.097 | 1.302 | 0.537 | 0.175 | 0.173 | - |
| 150.1.23 | Extrapol | 1.681 | 6.040 | 1.302 | 0.537 | 0.175 | 0.173 | - |
| 150.1.25 | Extrapol | 1.912 | 5.982 | 1.302 | 0.537 | 0.175 | 0.173 | - |
| 150.2.15 | Extrapol | 2.281 | 5.905 | 1.302 | 0.537 | 0.175 | 0.173 | - |
| 170.1.19 | Extrapol | 1.481 | 6.115 | 1.394 | 0.608 | 0.175 | 0.173 | - |
| 170.1.20 | Extrapol | 1.519 | 6.097 | 1.394 | 0.608 | 0.175 | 0.173 | - |
| 170.1.25 | Tested | 1.509 | 6.441 | 1.394 | 0.608 | 0.175 | 0.173 | - |
| 170.2.15 | Extrapol | 2.282 | 5.905 | 1.394 | 0.608 | 0.175 | 0.173 | - |
| 200.1.20 | Extrapol | 1.522 | 6.097 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.1.23 | Extrapol | 1.688 | 6.040 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.1.25 | Extrapol | 1.897 | 5.982 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.1.27 | Extrapol | 2.005 | 5.956 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.1.29 | Extrapol | 2.221 | 5.918 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.2.15 | Extrapol | 2.287 | 5.905 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 200.2.20 | Extrapol | 3.045 | 5.807 | 1.551 | 0.716 | 0.175 | 0.173 | - |
| 250.1.25 | Extrapol | 1.906 | 5.982 | 1.953 | 0.894 | 0.175 | 0.173 | - |
| 250.1.29 | Extrapol | 2.230 | 5.918 | 1.953 | 0.894 | 0.175 | 0.173 | - |
| 250.2.15 | Extrapol | 2.298 | 5.905 | 1.953 | 0.984 | 0.175 | 0.173 | - |
| 250.2.20 | Extrapol | 3.085 | 5.807 | 1.953 | 0.894 | 0.175 | 0.173 | - |
| 300.1.29 | Extrapol | 2.253 | 5.918 | 2.104 | 1.073 | 0.175 | 0.173 | - |
| 300.2.15 | Extrapol | 2.301 | 5.905 | 2.104 | 1.073 | 0.175 | 0.173 | - |
| 300.2.20 | Extrapol | 3.068 | 5.807 | 2.104 | 1.073 | 0.175 | 0.173 | - |
| 300.2.25 | Extrapol | 3.818 | 5.750 | 2.104 | 1.073 | 0.175 | 0.173 | - |
| 300.2.29 | Extrapol | 4.436 | 5.718 | 2.104 | 1.,073 | 0.175 | 0.173 | - |
| 300.3.25 | Extrapol | 5.834 | 5.672 | 2.104 | 1.073 | 0.175 | 0.173 | - |

| | |
|---|---|
| Testing Laboratory | TZS/IGTE |
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

| Comments of test lab | |
|---|---|
| No comments | Stamp & signature of test lab |

*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. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

**System family overview**

**For each storage and collector size, give number of collectors**

| Collector name | S 120 | S 150 | S 170 | S 200 | S 250 | S 300 |
|---|---|---|---|---|---|---|
| KSF-S15 | 1 | 2 1 | 2 | 2 | 2 | 2 |
| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

| Name of system configuration | | | | | 150.1.20 | |
|---|---|---|---|---|---|---|
| Collector name | KSF-S20 | No. Collectors | 1 | Storage name | S 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 | 0 | 6107 | 3505 | 0 | 57 | 7772 | 4034 | 0 | 52 | 9437 | 4388 | 0 | 47 |
| WürzburgDE | 0 | 5854 | 3530 | 0 | 60 | 7450 | 4120 | 0 | 55 | 9047 | 4560 | 0 | 50 |
| Davos CH | 0 | 6628 | 5269 | 0 | 80 | 8435 | 6031 | 0 | 72 | 10243 | 6515 | 0 | 64 |
| Athens GR | 0 | 4545 | 4118 | 0 | 91 | 5784 | 4928 | 0 | 85 | 7023 | 5583 | 0 | 80 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**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 | | | |
|---|---|---|---|---|---|---|---|---|
| | 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 | 1 000 | kPa | Max. operating press. - tank side | 800 | kPa |
|---|---|---|---|---|---|

| | |
|---|---|
| Testing Laboratory | TZS/IGTE |
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

**Comments of test lab**

No comments

Stamp & signature of test lab

*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. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

**System family overview**

| Collector name | For each storage and collector size, give number of collectors | | | | | |
|---|---|---|---|---|---|---|
| | S 120 | S 150 | S 170 | S 200 | S 250 | S 300 |
| KSF-S15 | 1 | 2 1 | 2 | 2 | 2 | 2 |
| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

| Name of system configuration | | | | | 200.1.20 | |
|---|---|---|---|---|---|---|
| Collector name | KSF-S20 | No. Collectors | 1 | Storage name | S 200 | |

**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 | 0 | 9437 | 4511 | 0 | 48 | 11103 | 4796 | 0 | 43 | 13878 | 5024 | 0 | 36 |
| WürzburgDE | 0 | 9047 | 4668 | 0 | 52 | 10643 | 5023 | 0 | 47 | 13304 | 5322 | 0 | 40 |
| Davos CH | 0 | 10243 | 6689 | 0 | 65 | 12050 | 7025 | 0 | 58 | 15063 | 7290 | 0 | 48 |
| Athens GR | 0 | 7023 | 5682 | 0 | 81 | 8263 | 6255 | 0 | 76 | 10328 | 7013 | 0 | 68 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**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 | | | |
|---|---|---|---|---|---|---|---|---|
| | 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 | 1 000 | kPa | Max. operating press. - tank side | 800 | kPa |
|---|---|---|---|---|---|

| | |
|---|---|
| **Testing Laboratory** | TZS/IGTE |
| **Website** | www.igte.uni-stuttgart.de |
| **Test report id. number** | 23SYS156/2OEM03 |
| **Date of test report** | 2025-04-22 |
| **Test method** | ISO 9459-5 (DST) |

**Comments of test lab**

No comments

Stamp & signature of test lab

*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. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

**System family overview**

| Collector name | For each storage and collector size, give number of collectors | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S 120 | S 150 | S 170 | S 200 | S 250 | S 300 |
| KSF-S15 | 1 | 2 1 | 2 | 2 | 2 | 2 |
| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

| Name of system configuration | | | | | 300.2.25 | |
|---|---|---|---|---|---|---|
| Collector name | KSF-S25 | No. Collectors | 2 | Storage name | S 300 | |

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

| Location | Qd,sh | Daily drawoff 250 l | | | | Daily drawoff 300 l | | | | Daily drawoff 400 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 | 0 | 13878 | 8355 | 0 | 60 | 16654 | 9326 | 0 | 56 | 22206 | 10592 | 0 | 48 |
| WürzburgDE | 0 | 13304 | 8355 | 0 | 63 | 15965 | 9435 | 0 | 59 | 21287 | 10984 | 0 | 52 |
| Davos CH | 0 | 15063 | 12547 | 0 | 83 | 18076 | 14027 | 0 | 78 | 24101 | 15810 | 0 | 66 |
| Athens GR | 0 | 10328 | 9564 | 0 | 93 | 12394 | 11055 | 0 | 89 | 16525 | 13336 | 0 | 81 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**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 | | | |
|---|---|---|---|---|---|---|---|---|
| | 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 | 1 000 | kPa | Max. operating press. - tank side | 800 | kPa |
|---|---|---|---|---|---|

| | |
|---|---|
| Testing Laboratory | TZS/IGTE |
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

**Comments of test lab**

No comments

Stamp & signature of test lab

*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. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
| Postal Code | 14122 | 37053 CEREA (VERONA) | Tel. / Fax | +39 | 347 7532906 |

**System family overview**

| Collector name | For each storage and collector size, give number of collectors | | | | | |
|---|---|---|---|---|---|---|
| | S 120 | S 150 | S 170 | S 200 | S 250 | S 300 |
| KSF-S15 | 1 | 2 1 | 2 | 2 | 2 | 2 |
| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Name of system configuration | | | | | 150.1.20 |
|---|---|---|---|---|---|
| Collector name | KSF-S20 | No. Collectors | 1 | Storage name | S 150 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Load profile | M | L | XL | XXL | |
|---|---|---|---|---|---|
| Annual heat demand (kWh) | 1523 | 2799 | 4427 | 5626 | |
| Auxiliary heat contribution | | Qnonsol | | | section 5.9.3.6, see note 1 |
| Average climate (kWh) | 32 | 359 | 1126 | 1802 | Strasbourg |
| Cold climate (kWh) | 293 | 745 | 1555 | 2240 | Helsinki |
| Hot climate (kWh) | 0 | 0 | 434 | 1075 | Athens |
| Qaux (kWh) | - | - | - | - | section 5.9.3.4, see note 1 |
| Comply to the load profile (Yes/No) | - | - | - | - | section 5.10.6 , see note 1 |
| ηwh_nonsol (%) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qelec (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qfuel (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| V40, measured (l) | - | - | - | - | section 5.10.7, see note 1 |

| Auxiliary thermostat setting | - | ºC | Effective power of auxiliary heater | - | kW |
|---|---|---|---|---|---|

Note 1: Clause of EN 12976-2:2017

| Testing Laboratory | TZS/IGTE |
|---|---|
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

| Comments of test lab | |
|---|---|
| No comments | Stamp & signature of test lab |



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Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de

| Summary of | EN12976-2 | test results | Certification No. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
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| Collector name | For each storage and collector size, give number of collectors | | | | | |
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| KSF-S15 | 1 | 2 1 | 2 | 2 | 2 | 2 |
| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Name of system configuration | | | | | 200.1.20 |
|---|---|---|---|---|---|
| Collector name | KSF-S20 | No. Collectors | 1 | Storage name | S 200 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Load profile | M | L | XL | XXL | |
|---|---|---|---|---|---|
| Annual heat demand (kWh) | 1523 | 2799 | 4427 | 5626 | |
| Auxiliary heat contribution | | Qnonsol | | | section 5.9.3.6, see note 1 |
| Average climate (kWh) | 23 | 307 | 1039 | 1705 | Strasbourg |
| Cold climate (kWh) | 290 | 710 | 1503 | 2178 | Helsinki |
| Hot climate (kWh) | 0 | 0 | 311 | 943 | Athens |
| Qaux (kWh) | - | - | - | - | section 5.9.3.4, see note 1 |
| Comply to the load profile (Yes/No) | - | - | - | - | section 5.10.6 , see note 1 |
| ηwh_nonsol (%) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qelec (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qfuel (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| V40, measured (l) | - | - | - | - | section 5.10.7, see note 1 |

| Auxiliary thermostat setting | - | ºC | Effective power of auxiliary heater | - | kW |
|---|---|---|---|---|---|

Note 1: Clause of EN 12976-2:2017

| Testing Laboratory | TZS/IGTE |
|---|---|
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

| Comments of test lab | |
|---|---|
| No comments | Stamp & signature of test lab |



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| Summary of | EN12976-2 | test results | Certification No. | 011-7S3285 A |
|---|---|---|---|---|
| Annex to Solar KEYMARK Certificate | | | Issued | 2025-04-22 |

| | | | | | |
|---|---|---|---|---|---|
| Company | PLEION SPA | | Country | ITALY | |
| Brand (optional) | FREE S | | Website | http://www.pleion.it | |
| Street | VIA VENEZIA 11 | | E-mail | zeno.benciolini@pleion.it | |
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**System family overview**

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| KSF-S17 | 1 | | | | | |
| KSF-S19 | 1 | | 1 | | | |
| KSF-S20 | 1 | 1 | 1 | 1 2 | 2 | 2 |
| KSF-S23 | | 1 | | 1 | | |
| KSF-S25 | | 1 | 1 | 1 | 1 | 2 3 |
| KSF-S27 | | | | 1 | | |
| KSF-S29 | | | | 1 | 1 | 2 1 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Name of system configuration | | | | | 300.2.25 |
|---|---|---|---|---|---|
| Collector name | KSF-S25 | No. Collectors | 2 | Storage name | S 300 |

**Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013**

| Load profile | M | L | XL | XXL | |
|---|---|---|---|---|---|
| Annual heat demand (kWh) | 1523 | 2799 | 4427 | 5626 | |
| Auxiliary heat contribution | | Qnonsol | | | section 5.9.3.6, see note 1 |
| Average climate (kWh) | 0 | 0 | 0 | 67 | Strasbourg |
| Cold climate (kWh) | 84 | 167 | 495 | 899 | Helsinki |
| Hot climate (kWh) | 0 | 0 | 0 | 0 | Athens |
| Qaux (kWh) | - | - | - | - | section 5.9.3.4, see note 1 |
| Comply to the load profile (Yes/No) | - | - | - | - | section 5.10.6 , see note 1 |
| ηwh_nonsol (%) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qelec (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| Qfuel (kWh) | - | - | - | - | section 5.9.3.5 , see note 1 |
| V40, measured (l) | - | - | - | - | section 5.10.7, see note 1 |

| Auxiliary thermostat setting | - | ºC | Effective power of auxiliary heater | - | kW |
|---|---|---|---|---|---|

Note 1: Clause of EN 12976-2:2017

| Testing Laboratory | TZS/IGTE |
|---|---|
| Website | www.igte.uni-stuttgart.de |
| Test report id. number | 23SYS156/2OEM03 |
| Date of test report | 2025-04-22 |
| Test method | ISO 9459-5 (DST) |

| Comments of test lab | |
|---|---|
| No comments | Stamp & signature of test lab |



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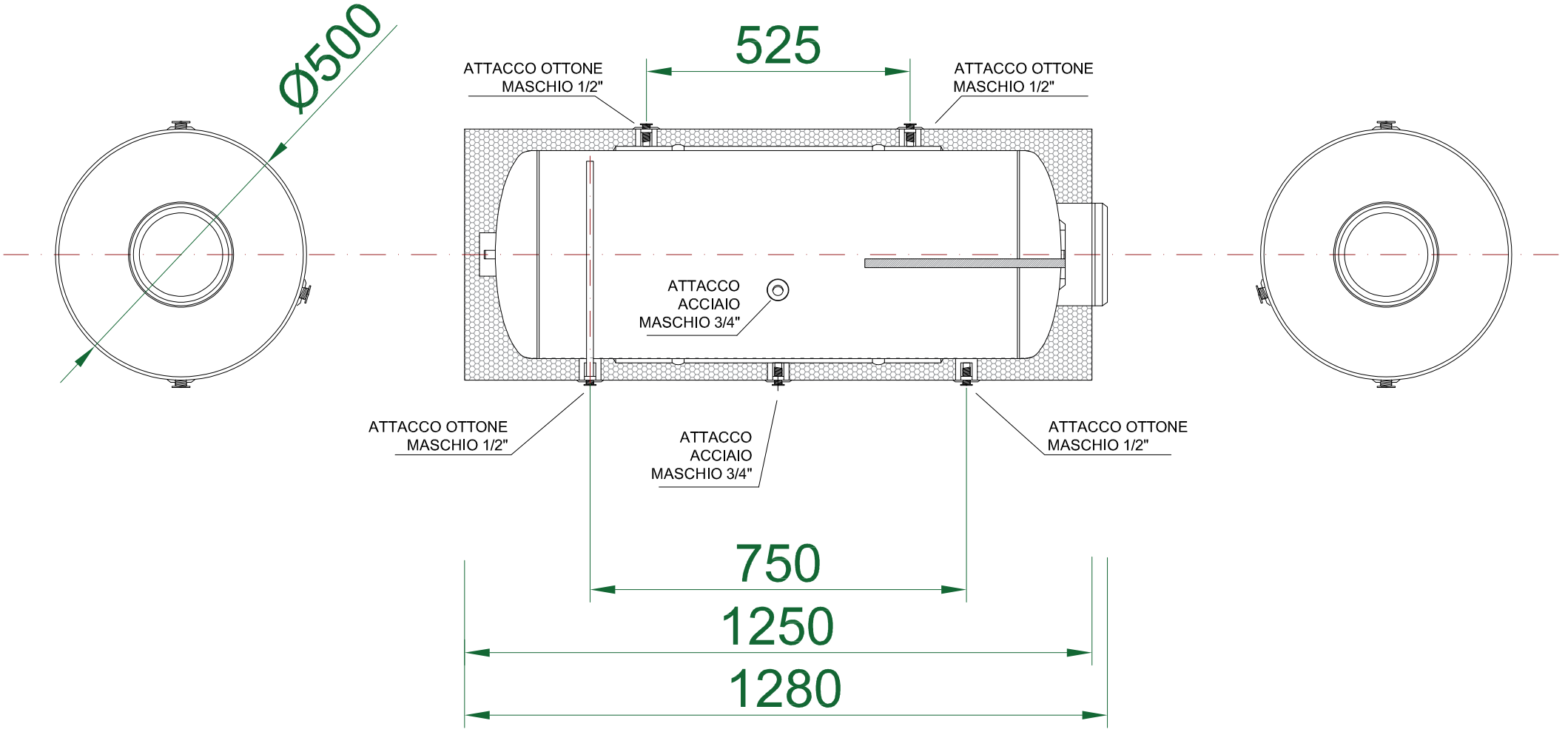
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# MODELLO S 150

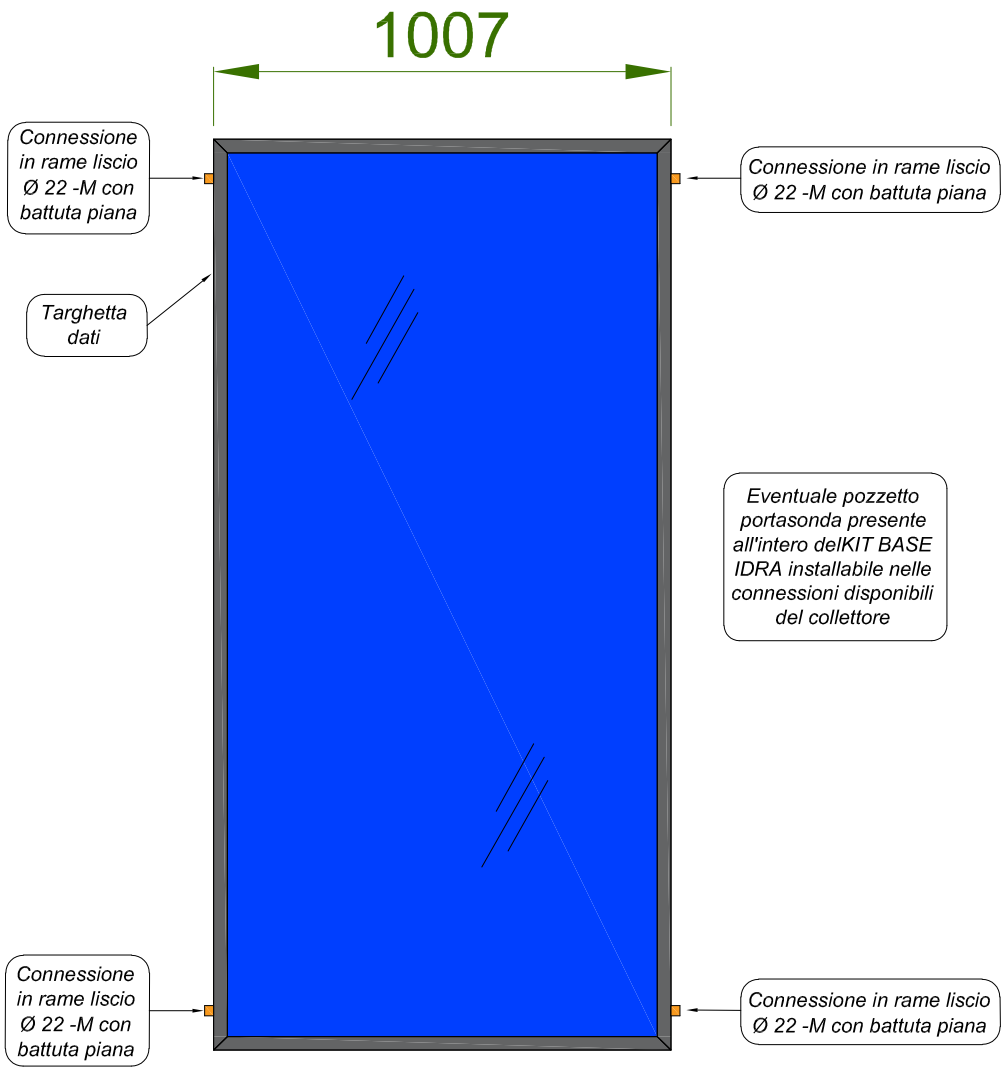
PLEION
Passion and Innovation make the difference

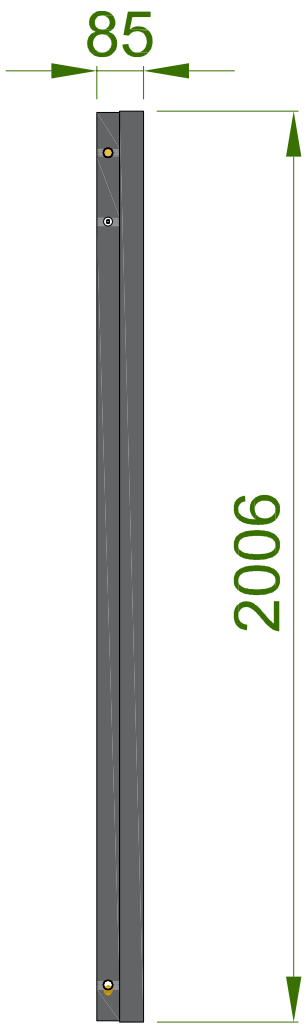
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OGGETTO :
Collettore Piano ACCUMULO

09.12.24






# DATI TECNICI KSF S20

Collettore solare piano PLEION KSF S 20, costituito da un'ampia superficie assorbente in grado di catturare e trasformare in calore la radiazione solare, con innovativo vetro che massimizza la quantità di radiazione solare assorbita. Il telaio è realizzato con profili saldati, in alluminio di spessore maggiorato che conferiscono alla struttura stabilità, robustezza e protezione al deterioramento. Assorbitore in alluminio, saldato al circuito in rame con tecnologia laser. Circuito interno in rame a singola arpa dotato di distributori orizzontali di mandata e ritorno, con arpa dotata di 8 canali verticali. Copertura in vetro temprato altamente resistente, classe U1 certificato secondo EN 12975-2.
Isolamento interno in lana di roccia per garantire le proprietà di isolamento nel tempo. Installazione su tetto a falda, piano e verticale con struttura triangolare. Collegabili da standard in serie fino a 6 collettori. Su richiesta si studiano soluzioni particolari.
Connessioni idrauliche 4 attacchi in RAME LISCIO diametro 22 mm, attacco maschio. Per il collegamento è necessario il SET BASE IDRA (per l'installazione singola o del primo collettore, composto da tappo, sonda ad immersione e guarnizioni) ed il SET PLUS IDRA (per la serie di due collettori, composto da 2 giunti d'espansione con guarnizioni)

| | | |
|---|---|---|
| DIMENSIONI (lunghezza x larghezza x profondità) | [mm] | 2006x1007x85 |
| SUPERFICIE LORDA | [m²] | 2,02 |
| SUPERFICIE APERTURA | [m²] | 1,83 |
| SUPERFICIE ASSORBIMENTO | [m²] | 1,80 |
| PESO A VUOTO | [kg] | 40,0 |
| CONTENUTO DI LIQUIDO | [l] | 1,90 |
| PRESSIONE MASSIMA DI ESERCIZIO | [bar] | 10 |
| ISOLAMENTO LANA MINERALE | [mm] | 40 inf./ 10 lat. |
| COEFF. DI TRASMISSIONE $a_1$ (rif. superficie LORDA) | [W/m²K] | 3,31 |
| COEFF. DI TRASMISSIONE $a_2$ (rif. superficie LORDA) | [W/m²K²] | 0,011 |
| RENDIMENTO OTTICO $\eta_0$ (rif. superficie LORDA) | [-] | 71,5 |
| COEFF. ASSORBIMETO | [%] | 95 |
| COEFF. EMISSIONE | [%] | 5 |
| COEFF. TRASMISSIONE | [%] | 91 |
| TUBO COLLETTORE DI DISTRIBUZIONE | [Ø] | 22 |
| SPESSORE VETRO | [mm] | 4 |
| MASSIMA TEMPERATURA DI STAGNAZIONE | [°C] | 230 |
| INCLINAZIONE MINIMA | [°] | 15 |
| INCLINAZIONE MASSIMA | [°] | 75 |
| POTENZA DI PICCO COLLETTORE SOLARE | [W] | 1444 |
| FATTORE DI CORREZZIONE ANGOLO DI INCIDENZA | [K50°] | 0,98 |
| CERTIFICATO SOLAR KEYMARK | | 011 - 7S1491 F |
| VALORE ENERGIA WURZBURG SKM - Tm 50°C | [kWh] | 941 |

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*OGGETTO :*
Collettore Piano KSF S20

05.12.24