Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S2659 F
		Issued	2016-06-02

Company holding the	ThermoFlux Deutschland GmbH		Country	Deutschland
Brand (optional)			Website	www.thermoflux.info
Street, street number	Friedrich-Naumann-Str. 55		E-mail	info@thermoflux.info
Postal Code / City, province	99974	Mühlhausen	Tel/Fax	+49 (0)3601 - 408922 200 / (0)3601 - 408

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module Gb = 850 W/m²; Gd = 150 W/m² Tm-Ta				
						0 K	10 K	30 K	50 K	70 K
Collector name	m²	mm	mm	mm	**m²**	W	W	W	W	W
TFK Premium 2.3	2.13	2 043	1 143	80	**2.34**	1 766	1 669	1 467	1 250	1 020

Performance test method	Liquid heating collector - quasi-dynamic - outdoor							
Performance parameters related to aperture area	η0b	c1	c2	c3	c4	c6	KΘd	
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	s/m	-	
Test results - Flow rate and fluid see note 1	0.83**	4.441**	0.008**	0.000	0.000	0.000	0.992**	

Bi-directional incidence angle modifiers?	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers KΘ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	KΘ(θ)	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.33	0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	177	°C
Effective thermal capacity	ceff = C/Ag	12.62	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	-	°C
Max. operation pressure - see note 3	pmax,op	1000	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m²)	-	-	-	-	-	-	-	-	-	-
Pressure drop, ΔP	Pa	-	-	-	-	-	-	-	-	-	-

Optional weather data	Location	-	Link	-
Testing Laboratory	TZS, ITW University Stuttgart			
Website	http://www.itw.uni-stuttgart.de			
Test report id. number	10COL871/1OEM11	Date of test report	2016.06.02	

During the test GDIF/GTOT was always between	0	and	1

Comments of testing laboratory:

** Werte beziehen sich auf die Ergebnisse im Annex B des Prüfberichtes 10COL871/1OEM11

** values are to the results in annex B of the test report 10COL871/1OEM11

η0b = 0.830 = F' (τα)en c1= a1 c2= a2 η0 = 0.826

Note 1	Flow rate	0.020	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2659 F
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Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)											
	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
TFK Premium 2.3	2 853	1 984	1 283	2 124	1 440	901	1 570	1 003	601	1 721	1 091	644

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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

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ScenoCalc version: Ver. 4.06 (Jan, 2014)