Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S016 R
		Issued	2015-02-03

Company holding the	GREENoneTEC Solarindustrie		Country	Österreich	
Brand (optional)			Website	www.greenonetec.com	
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Postal Code / City, province	9300	St. Veit a.d. Glan	Tel/Fax	+43	4241 28 136-0 / 4214 28 136-250

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

Collector name	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
	m²	mm	mm	mm	**m²**	W	W	W	W	W
VRK 14	2.23	1 647	1 558	107	**2.57**	1 425	1 407	1 355	1 279	1 181
VRK 10	1.60	1 650	1 120	108	**1.85**	1 022	1 010	972	918	847

Performance test method	Liquid heating collector - quasi-dynamic - outdoor								
Performance parameters related to aperture	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	0.636	0.654	0.013	0.000	0.000	0.000	1.030		

Bi-directional incidence angle modifiers?	Yes	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θT) transversal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θT)	1.02	1.03	1.05	1.07	1.09	1.18	1.29	0.65	0.00
Incidence angle modifiers Kθ(θL) longitudinal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θL)	1.00	1.00	0.98	0.95	0.89	0.73	0.49	0.25	0.00

Stagnation temperature - Weather conditions see note 2	Tstg	272	°C
Effective thermal capacity	ceff = C/Ag	30.187	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	13COL1159, 14COL1193, 14COL1193Q	Date of test report	26.08.2013, 01.08.2014, 04.11.2014,

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

Comments of testing laboratory:

none

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	011-7S016 R
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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
VRK 14	2 565	2 323	1 977	2 225	1 931	1 580	1 613	1 381	1 108	1 734	1 491	1 199
VRK 10	1 840	1 667	1 418	1 596	1 385	1 134	1 158	991	795	1 244	1 070	860

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.

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ScenoCalc version: Ver. 4.06 (Jan, 2014)