


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		<b>011-7S2388 P</b>							
						Issued		2014-06-10							
Company holding the		Dachziegelwerke Nelskamp GmbH				Country	Germany								
Brand (optional)						Website	www.nelskamp.de								
Street, street number		Waldweg 6				E-mail	ahessberger@pa-id.de								
Postal Code / City, province		46514 Schermbeck				Tel/Fax	49 (0) 6027 40728 -42 / -99								
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - un-glazed									
Thermal / photo voltaic hybrid collector? (PVT collector)						Yes									
Integration in the roof possible ? (manufacturers declaration)						Yes									
Collector name	Aperture area (Aa) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m <sup>2</sup>	Power output per collector module									
						Gb = 850 W/m <sup>2</sup> ; Gd = 150 W/m <sup>2</sup> ; Tm-Ta = 2 K									
						Wind velocity									
						<1 m/s	1.5 m/s	3 m/s							
W	W	W													
Nelskamp MS 5 2Power	0.64	400	1.965	23	0.79	248	227	205							
Performance test method						Liquid heating collector - quasi-dynamic - outdoor									
Performance parameters related to aperture area						η <sub>0b</sub>	c <sub>1</sub>	c <sub>2</sub>	c <sub>3</sub>	c <sub>4</sub>	c <sub>6</sub>	K <sub>d</sub>			
Units						-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	s/m	-			
Test results - Flow rate and fluid see note 1						0.404	6.222	0.000	1.743	0.117	0.019	0.936			
Bi-directional incidence angle modifiers?						No	<i>K<sub>θ</sub> values are obligatory for 50°.</i>								
Incidence angle modifiers K <sub>θ</sub> (θ)						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
						K <sub>θ</sub> (θ)	1.00	1.00	1.00	0.99	0.94	0.93	0.62	-	0.00
Incidence angle modifier not bi-directional - leave fields blank															
Stagnation temperature - Weather conditions see note 2						T <sub>stg</sub>	80		°C						
Effective thermal capacity						ceff = C/Ag	57.64		kJ/(m <sup>2</sup> K)						
Max. intende operation temperature - see note 3						T <sub>max,op</sub>	60		°C						
Max. operation pressure - see note 3						p <sub>max,op</sub>	400		kPa						
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m <sup>2</sup> aperture area															
Flow rate	kg/(s m <sup>2</sup> )	-	-	-	-	-	-	-	-	-	-	-			
Pressure drop, ΔP	Pa	-	-	-	-	-	-	-	-	-	-	-			
Optional weather data		Location		-				Link		-					
Testing Laboratory		TZS ITW University of Stuttgart													
Website		www.itw.uni-stuttgart.de													
Test report id. number		13COL1175				Date of test report		2014.06.10							
During the test GDIF/GTOT was always between		0		and		1									
Comments of testing laboratory:															
Power output per collector module is calculated with netto longwave irradiance of 0 W/m <sup>2</sup>															
Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode')															
Note 1	Flow rate	0.020	kg/(s m <sup>2</sup> )	Fluid	Water										
Note 2	Irradiance, G = 1000 W/m <sup>2</sup> ; Ambient temperature, Ta=30 °C														
Note 3	Given by manufacturer														
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Datasheet version: 4.06, 2014-01-15															



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2388 P
	Issued	10.06.2014

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			
Nelskamp MS 5 2Power	307	34	1	124	8	0	112	10	0	132	15	0			

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	Gtot kWh/m <sup>2</sup>	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/m <sup>2</sup>
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)