



<b>Summary of EN 12976 Test Results,</b> annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK	<b>Registration No.</b>	<b>SKM 9909/1</b>
	Registernummer	
	Num. d'enregistrement	
	<b>Date / Datum / Date</b>	<b>02/07/12</b>

<b>Company / Firma / Société</b>	<b>A.S.T. SOLAR INDUSTRY</b>	<b>Country/Land/Pays</b>	<b>Greece</b>
<b>Street / Straße / Rue</b>	<b>78, Str. G. KATSANDRI</b>	<b>Website</b>	<b><a href="http://www.a-s-t.gr">www.a-s-t.gr</a></b>
<b>Postal Code, Place / PLZ, Ort / Code postal, Place</b>	<b>13678 AXARNAI</b>	<b>E-mail</b>	<b><a href="mailto:info@a-s-t.gr">info@a-s-t.gr</a></b>
		<b>Tel. / Fax</b>	<b>+030 210 2443790 / 210 24771</b>

<b>System classification / G / F</b>	
<b>Flow principle / G / F</b>	<b>Thermosyphon / G / F</b>
<b>Direct / indirect / G / F</b>	<b>Indirect / G / F</b>
<b>Press. principle / G / F</b>	<b>Closed / G / F</b>
<b>Drain back/down / G / F</b>	<b>No drain (always filled) / G / F</b>
<b>Storage location / G / F</b>	<b>Int. collector-storage / G / F</b>
<b>Storage position / G / F</b>	<b>Vertical / G / F</b>
<b>Int. back-up / G / F</b>	<b>None / G / F</b>
<b>If other: / G / F</b>	<b>English / Deutsch / Francais</b>
<b>EN12976 type / G / F</b>	<b>Solar only / G / F</b>

<b>Collector(s) / Kollektor(en) / Capteur(s)</b>					<b>Storage(s) / Akkumulator(en) / F</b>						
<b>Company / Hersteller / Manufactuer</b> <b>A.S.T. SOLAR INDUSTRY</b>					<b>Company / Hersteller / Manufactuer</b> <b>A.S.T. SOLAR INDUSTRY</b>						
<i>Keymark reg. no. (optional)</i>											
<b>Model</b> Bezeichnung Modèle	<b>Per module / G / F</b>				<b>No. modules</b> G F	<b>Model</b> Bezeichnung Modèle	<b>Total volume</b> G F	<b>Gross diameter/width</b> Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	<b>Höhe (Außenmaß)</b> Höhe (Außenmaß) epaisseur hors tout	<b>Back-up heated volume</b> G F	<b>El. back-up power</b> G F
	<b>Aperture area (Aa)</b> Aperturfläche (Aa) Superficie d'entrée (Aa)	<b>Gross length</b> Länge (Außenmaß) Longueur Hors tout	<b>Gross width</b> Breite (Außenmaß) Largeur hors Tout	<b>min - max</b>							
AST	1.77	0.98	1.979	1 - 1	AST	98	400	910	-	-	
AST	2.15	1.179	1.979	1 - 1	AST	134	480	910	-	-	

<b>Controller / G / F</b>			<b>Fluid / G / F</b>		
<b>Company/Hersteller/Manufacteur</b> <b>none</b>			<b>Company/Hersteller/Manufacteur</b>		
<b>Model / Bezeichnung / Modèle</b> <b>none</b>			<b>Model / Bezeichnung / Modèle</b> <b>Ethylic Alcohol</b>		
<b>Functions</b>	<b>English</b>		<b>Freezing point</b>		
G	<b>Deutsch</b>		G -60 °C		
F	<b>Francais</b>		F		

<b>System family overview / G / F</b>						
<b>Collector</b> G F	<b>No. collectors / G / F</b>					
	<b>Storage / G / F</b>					
	AST COMPACT 110	AST COMPACT 150	0	0	0	
AST COMPACT 110	1					
AST COMPACT 150		1				
0						
0						
0						

<b>Testing Laboratory / Prüflaboratorium / Laboratoire d'essais</b>	<b>NCSR "DEMOKRITOS"- SOLAR &amp; ENERGY SYSTEMS LAB</b>
<b>Website</b>	<b><a href="http://www.solar.demokritos.gr">www.solar.demokritos.gr</a></b>
<b>Test report id. number / Prüberichtnummer / F</b>	<b>4107DQ1, 6046DE1, 6048DE1</b>
<b>Date of test report / Datum G / date F</b>	<b>25/04/2012, 18/06/2012</b>

<b>Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire</b>	 N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belessiotis Tel: +210 6503815 - Fax: +210 6544599 153 10 Ag. Paraskevi - Attiki - Greece
<b>English</b>	
<b>Deutsch</b>	
<b>Francais</b>	

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System family overview / G / F												
Collector type G F	Number of collectors / G / F											
	Storage type / G / F											
	AST COMPACT 110	AST COMPACT 150										
AST COMPACT 110	1											
AST COMPACT 150		1										

Name of system konfiguration / G / F					AST COMPACT 110		
Collector type G F	AST COMPACT 110	No. collectors G F	1	Storage type G F	AST COMPACT 110		

Calculated annual results / G / F												
Location G F	Daily draw-off litres/day / G / F /											
	80	110	140	80	110	140	80	110	140	80	110	140
	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d
	Q <sub>d</sub> kWh/y			Q <sub>L</sub> kWh/y			f <sub>sol</sub> %			Q <sub>par</sub> kWh/y		
Stockholm, SE	1,244	1,708	2,172	624	691	716	50.3	40.5	33.0			
Würzburg, DE	1,191	1,638	2,085	638	731	764	53.6	44.6	36.7			
Davos, CH	1,349	1,848	2,356	929	1,016	1,042	69.0	55.0	44.4			
Athens, GR	929	1,270	1,621	772	929	1,042	83.5	73.2	64.2			

Perf. indicators G F	Q <sub>d</sub>	Heat demand / G / F
	Q <sub>L</sub>	System output / G / F
	f <sub>sol</sub>	Q <sub>L</sub> /Q <sub>d</sub> ; solar fraction / G / F
	Q <sub>par</sub>	Elec. for pumps/controllers / G / F

Ref. conditions G F	Stockholm					Würzburg DE					Davos CH					Athens GR					
	G	1,156					1,226					1,682					1,717				
	T <sub>a</sub>	7.5					9.0					3.2					18.5				
	T <sub>c</sub>	8.5					10.0					5.4					17.8				
	ΔT <sub>c</sub>	2.1 - 14.9					7.0 - 13.0					4.6 - 6.2					10.4 - 25.2				

G	kWh/m <sup>2</sup>	Annual irradiation South, 45° / G / F
T <sub>a</sub>	°C	Annual mean air temp. / G / F
T <sub>c</sub>	°C	Annual mean cold water temp. / G / F
ΔT <sub>c</sub>	°C	Seasonal variation of T <sub>c</sub> / G / F
T <sub>h</sub>	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side G F	kPa	Max. operating press. - tank side G F	1,000 kPa
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Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	Demokritos
Website	www.solar.demokritos.gr
Test report id. number / Prüberichtnummer / F	4107DQ1, 6046DE1, 6048DE1
Date of test report / G / F	25/04/2012, 18/06/2012
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Français	
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		<b>Tel. / Fax</b>	<b>+99 210 2443790 / 210 2477</b>

System family overview / G / F									
Collector type	Number of collectors / G / F								
	Storage type / G / F								
G									
F									
AST COMPACT 110	1								
AST COMPACT 150		1							

<b>Name of system konfiguration / G / F</b>				<b>AST COMPACT 150</b>
<b>Collector type</b>	<b>AST COMPACT 150</b>	<b>No. collectors</b>	<b>1</b>	<b>Storage type</b>
G		G		G
F		F		F
				<b>AST COMPACT 150</b>

Calculated annual results / G / F																		
Location	Daily draw-off litres/day / G / F /																	
	110			140			170			110			140			170		
G	l/d			l/d			l/d			l/d			l/d			l/d		
F	Qd kWh/y			Qd kWh/y			QL kWh/y			f <sub>sol</sub> %			Q <sub>par</sub> kWh/y					
Stockholm, SE	1,708	2,172	2,637	885	972	1,007	51.8	44.8	38.2									
Würzburg, DE	1,638	2,085	2,532	902	1,016	1,069	55.1	48.7	42.2									
Davos, CH	1,848	2,356	2,856	1,323	1,428	1,463	71.6	60.6	51.2									
Athens, GR	1,270	1,621	1,962	1,086	1,253	1,375	85.5	77.3	70.1									

<b>Perf. indicators</b>	<b>Q<sub>d</sub></b>	<b>Heat demand / G / F</b>										
	<b>Q<sub>L</sub></b>	<b>System output / G / F</b>										
	<b>f<sub>sol</sub></b>	<b>Q<sub>L</sub>/Q<sub>d</sub>; solar fraction / G / F</b>										
	<b>Q<sub>par</sub></b>	<b>Elec. for pumps/controllers / G / F</b>										

<b>Ref. conditions</b>		Stockholm	Würzburg DE	Davos CH	Athens GR			
	G	1,156	1,226	1,682	1,717			
	G	Ta	7.5	9.0	3,2	18.5		
	F	Tc	8.5	10.0	5.4	17.8		
	F	ΔTc	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2		

G	kWh/m <sup>2</sup>	<b>Annual irradiation South, 45° / G / F</b>					
Ta	°C	<b>Annual mean air temp. / G / F</b>					
Tc	°C	<b>Annual mean cold water temp. / G / F</b>					
ΔTc	°C	<b>Seasonal variation of Tc / G / F</b>					
Th	45°C	<b>Desired (mix. valve) temp. / G / F</b>					

<b>Max. operating press. - collector side</b>		kPa	<b>Max. operating press. - tank side</b>		1,000	kPa
G			G			
F			F			

<b>Testing Laboratory / Prüflaboratorium / Laboratoire d'essais</b>	<b>Demokritos</b>
<b>Website</b>	<b>www.solar.demokritos.gr</b>
<b>Test report id. number / Prüberichtsnummer / F</b>	<b>4107DQ1, 6046DE1, 6048DE1</b>
<b>Date of test report / G / F</b>	<b>25/04/2012, 18/06/2012</b>
<b>Test method / G / F</b>	<b>ISO 9459-5 (DST)</b>

<b>Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire</b>	
<a href="#">English</a> <a href="#">Deutsch</a> <a href="#">Français</a>	 N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belessiotis Tel: +210 6503815 - Fax: +210 6544592 153 10 Ag. Paraskevi - Attiki - Greece