



Summary of EN 12976 Test Results, 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	Registration No.	011-7S1853 A
	Registernummer	
	Num. d'enregistrement	
	Date / Datum / Date	01.02.2012

Company / Firma / Société	Rheem Australia Pty Ltd	Country/Land/Pays	West Australia
Street / Straße / Rue	112 Pilbara Street	Website	www.rheem.com.au
Postal Code, Place / PLZ, Ort / Code postal, Place	6106 Welshpool Perth	E-mail	joe.costanzo@rheem.com.au
		Tel.	+61 893 514 234

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

Collector(s) / Kollektor(en) / Capteur(s)					Storage(s) / Akkumulator(en) / F					
Company / Hersteller / Manufactuer Rheem					Company / Hersteller / Manufactuer Rheem					
Keymark reg. no. (optional) 011-7S456 F										
Model Bezeichnung Modèle	Per module / G / F				Model Bezeichnung Modèle	Total volume G F litres	Gross diameter/width Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout Höhe (Außenmaß) Höhe (Außenmaß) epaisseur hors tout	Back-up heated volume G F litres	El. back-up power G F kW	
	Aperture area (Aa) Aperturfläche (Aa) Superficie d'entrée (Aa)	Gross length Länge (Außenmaß) Longueur Hors tout	Gross width Breite (Außenmaß) Largeur hors Tout	No. modules G F min - max						
C	1.86	1.936	1.022	1 - 3	180C	160	1494	510	0	0
					300C	260	2310	510	0	0

Controller / G / F			Fluid / G / F		
Company/Hersteller/Manufacteur	-		Company/Hersteller/Manufacteur	Solahart	
Model / Bezeichnung / Modèle	-		Model / Bezeichnung / Modèle	Solahart Hartguart (propylene glycol)	
Functions G F	-		Freezing point G F	-35 °C	

System family overview / G / F									
Collector G F C	No. collectors / G / F								
	Storage / G / F								

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number / Prüberichtnummer / F	10SYS82/10EM01
Date of test report / Datum G / date F	01.02.2012

Comments of test lab / Kommentare des Laboratoriums / Commentaires du laboratoire	
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System family overview / G / F

Collector type G F C	Number of collectors / G / F											
	Storage type / G / F											
	180C				300C							
			1	2							2	3

Name of system configuration / G / F

Collector type	C	No. collectors	1	Storage type	180C
G		G		G	
F		F		F	

Calculated annual results / G / F

Location G F	Daily draw-off litres/day / G / F /											
	110	140	200	110	140	200	110	140	200	110	140	200
	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 _d MJ/a			Q _L MJ/a			f _{sol} %			Q _{par} MJ/a		
Stockholm, SE	6 107	7 772	11 103	2 614	3 023	3 486	42.8	38.9	31.4	0.0	0.0	0.0
Würzburg, DE	5 854	7 450	10 643	2 868	3 353	3 959	49.0	45.0	37.2	0.0	0.0	0.0
Davos, CH	6 628	8 435	12 050	4 049	4 648	5 314	61.1	55.1	44.1	0.0	0.0	0.0
Athens, GR	4 545	5 784	8 263	3 581	4 292	5 354	78.8	74.2	64.8	0.0	0.0	0.0

Perf. indicators G F	Q _d	Heat demand / G / F
	Q _L	System output / G / F
	f _{sol}	QL/Q_d; solar fraction / G / F
	Q _{par}	Elec. for pumps/controllers / G / F

Ref. conditions G F		Stockholm	Würzburg DE	Davos CH	Athens GR
	G	1 157	1 230	1 684	1 718
	T _a	7.5	9.0	3.2	18.5
	T _c	8.5	10.0	5.4	17.8
	ΔT _c	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2

G	kWh/m ²	Annual irradiation South, 45° / G / F
T _a	°C	Annual mean air temp. / G / F
T _c	°C	Annual mean cold water temp. / G / F
ΔT _c	°C	Seasonal variation of T_c / G / F
T _h	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	1 000	kPa
G			G		
F			F		

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number / Prüberichtnummer / F	10SYS82/1OEM01
Date of test report / G / F	01.02.2012
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire	TZS Stuttgart Pfaffenwaldring 6 70550 Stuttgart
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System family overview / G / F

Collector type	Number of collectors / G / F											
	Storage type / G / F											
G												
F												
C												

Name of system configuration / G / F

Collector type	C	No. collectors	2	Storage type	180C
G		G		G	
F		F		F	

Calculated annual results / G / F

Location	Daily draw-off litres/day / G / F /											
	110	140	200	110	140	200	110	140	200	110	140	200
G	l/d											
F	l/d											
	Q _d MJ/a			Q _L MJ/a			f _{sol} %			Q _{par} MJ/a		
Stockholm, SE	6 107	7 772	11 103	3 127	3 808	4 808	51.2	49.0	43.3	0.0	0.0	0.0
Würzburg, DE	5 854	7 450	10 643	3 331	4 075	5 279	56.9	54.7	49.6	0.0	0.0	0.0
Davos, CH	6 628	8 435	12 050	4 957	6 039	7 616	74.7	71.6	63.2	0.0	0.0	0.0
Athens, GR	4 545	5 784	8 263	4 017	4 992	6 627	88.4	86.3	80.2	0.0	0.0	0.0

Perf. indicators	Q _d	Heat demand / G / F
	Q _L	System output / G / F
	f _{sol}	QL/Q_d; solar fraction / G / F
	Q _{par}	Elec. for pumps/controllers / G / F
G		
F		

Ref. conditions		Stockholm	Würzburg DE	Davos CH	Athens GR			
	G	1 157	1 230	1 684	1 718			
	G	T _a	7.5	9.0	3.2	18.5		
	F	T _c	8.5	10.0	5.4	17.8		
		ΔT _c	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2		

G	kWh/m ²	Annual irradiation South, 45° / G / F
T _a	°C	Annual mean air temp. / G / F
T _c	°C	Annual mean cold water temp. / G / F
ΔT _c	°C	Seasonal variation of T_c / G / F
T _h	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	1 000	kPa
G			G		
F			F		

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System family overview / G / F												
Collector type	Number of collectors / G / F											
	Storage type / G / F											
G												
F												
C												

Name of system configuration / G / F			
Collector type	C	No. collectors	2
G		G	
F		F	
Storage type			300C
G			
F			

Calculated annual results / G / F												
Location	Daily draw-off litres/day / G / F /											
	200	250	300	200	250	300	200	250	300	200	250	300
G	I/d	I/d	I/d	I/d	I/d	I/d	I/d	I/d	I/d	I/d	I/d	I/d
F	Q _d MJ/a			Q _L MJ/a			f _{sol} %			Q _{par} MJ/a		
Stockholm, SE	11 103	13 879	16 655	5 030	5 976	6 096	45.3	40.9	36.6	0.0	0.0	0.0
Würzburg, DE	10 643	13 304	15 965	5 481	6 279	6 865	51.5	47.2	43.0	0.0	0.0	0.0
Davos, CH	12 050	15 063	18 075	7 833	8 751	9 345	65.0	58.1	51.7	0.0	0.0	0.0
Athens, GR	8 263	10 329	12 395	6 726	7 871	8 825	81.4	76.2	71.2	0.0	0.0	0.0

Perf. indicators	Q _d	Heat demand / G / F
	Q _L	System output / G / F
	f _{sol}	Q _L /Q _d ; solar fraction / G / F
	Q _{par}	Elec. for pumps/controllers / G / F
G		
F		

Ref. conditions		Stockholm	Würzburg DE	Davos CH	Athens GR	
	G	1 157	1 230	1 684	1 718	
	G	T _a	7.5	9.0	3.2	18.5
	F	T _c	8.5	10.0	5.4	17.8
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G	kWh/m ²	Annual irradiation South, 45° / G / F
T _a	°C	Annual mean air temp. / G / F
T _c	°C	Annual mean cold water temp. / G / F
ΔT _c	°C	Seasonal variation of T _c / G / F
T _h	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	1 000	kPa
G			G		
F			F		

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System family overview / G / F

Collector type G F C	Number of collectors / G / F												
	Storage type / G / F												

Name of system configuration / G / F

Collector type	C	No. collectors	3	Storage type	300C
G		G		G	
F		F		F	

Calculated annual results / G / F

Location G F	Daily draw-off litres/day / G / F /											
	200	250	300	200	250	300	200	250	300	200	250	300
	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 _d MJ/a			Q _L MJ/a			f _{sol} %			Q _{par} MJ/a		
Stockholm, SE	11 103	13 879	16 655	5 507	6 537	7 361	49.6	47.1	44.2	0.0	0.0	0.0
Würzburg, DE	10 643	13 304	15 965	5 886	7 051	8 046	55.3	53.0	50.4	0.0	0.0	0.0
Davos, CH	12 050	15 063	18 075	8 724	10 333	11 622	72.4	68.6	64.3	0.0	0.0	0.0
Athens, GR	8 263	10 329	12 395	7 181	8 697	10 040	86.9	84.2	81.0	0.0	0.0	0.0

Perf. indicators G F	Q _d	Heat demand / G / F
	Q _L	System output / G / F
	f _{sol}	QL/Q_d; solar fraction / G / F
	Q _{par}	Elec. for pumps/controllers / G / F

Ref. conditions G F		Stockholm	Würzburg DE	Davos CH	Athens GR		
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T _a	°C	Annual mean air temp. / G / F
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ΔT _c	°C	Seasonal variation of T_c / G / F
T _h	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side	200 kPa	Max. operating press. - tank side	1 000 kPa
G		G	
F		F	

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