Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultas d'essais selon EN 12976, Annexe au certificat Solar	**Registration No.** Registernummer Num. d'enregistremen	**011-7S752 A**
	Date / Datum / Date	07.04.2009

Company / Firma / Société	Rheem Australia Pty Ltd		**Country**/Land/Pays		Western Australia
Street / Straße / Rue	112 Pilbara Street		**Website**		http://www.rheem.com.au
Postal Code, Place / PLZ, Ort / Code postal, Place	6106	Welshpool Perth	**E-mail**		Rob@solahart-europe.com
			Tel.	+61	89 356 283

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	Horizontal / 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)

Company / Hersteller / Manufactuer: Rheem Australia Pty Ltd

Keymark reg. no. (optional)

Model Bezeichnung Modéle	**Per module** / G / F: **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
	m²	mm	mm	min - max
Vulcan-Optimus	1.86	1936	1022	2 2

Storage(s) / Akkumulator(en) / F

Company / Hersteller / Manufactuer: Rheem Australia Pty Ltd

Model Bezeichnung Modéle	**Total volume** G F	**Gross diameter/width** Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	**Gross length** Länge (Außenmaß) longeur hors tout	**Back-up heated volume** G F	**El. back-up power** G F
	litres	mm	mm	litres	kW
Vulcan	300	510	2310	-	-

Controller / G / F		**Fluid** / G / F		
Company/Hersteller/Manufacteu	-	**Company**/Hersteller/Manufacteu	Propylen-Glycol-Water	
Model / Bezeichnung / Modéle	-	**Model** / Bezeichnung / Modéle	Hartgard®	
Functions G F	-	**Freezing point** G F	-35	°C

System family overview / G / F

Collector G F	**No. collectors** / G / F **Storage** / G / F Vulcan			
Vulcan-Optiums	1			

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number / Prüberichtsnummer / F	08SYS65
Date of test report / Datum G / date F	29.09.2008

Comments of test lab / Kommentare des Laboratoriums / Commentaires du laboratoire

In cases where the tank is installed outside a Tank Anti Freezing Device is installed which is a 500 Watt electrical element with a thermostat that is set to 4 °C. The thermostat is fixed and can not be changed. The element will switch on when the water gets below 4 °C. This device will not work more than 30 days per year.

TZS Stuttgart
Pfaffenwaldring 6
70550 Stuttgart

Version 0.5, 04-02-2008

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Postal Code, Place / PLZ, Ort / Code postal, Place	6106	Welshpool Perth	**E-mail**		
			Tel. / **Fax**	+61	89 356 283

System family overview / G / F

Collector type G F	**Number of collectors** / G / F																							
	Storage type / G / F																							
	Vulcan																							
Vulcan-Optiums	1																							

Name of system konfiguration / G / F

Collector type G F	Vulcan-Optimus	**No. collectors** G F	2	**Storage type** G F	Vulcan

Calculated annual results / G / F

Location G F	**Daily draw-off litres/day** / G / F /											
	250 l/d	300 l/d	400 l/d	250 l/d	300 l/d	400 l/d	250 l/d	300 l/d	400 l/d	250 l/d	300 l/d	400 l/d
	Q_d MJ/a			Q_L MJ/a			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	13 939	16 746	22 327	6 307	6 812	7 253	45.3	40.7	32.5	0	0	0
Würzburg, DE	13 277	15 926	21 224	6 843	7 506	8 136	51.5	47.1	38.3	0	0	0
Davos, CH	15 137	18 165	24 220	9 871	10 565	11 069	65.2	58.2	45.7	0	0	0
Athens, GR	10 407	12 488	16 651	7 159	7 979	9 114	68.8	63.9	54.7	0	0	0

Perf. indicators G F		
	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

Ref. conditions G F		Stockholm	Würzburg DE	Davos CH	Athens GR
	G	1 113	1 230	1 684	1 359
	Ta	6.9	9.0	3.2	18.2
	Tc	8.5	10.0	5.4	17.8
	ΔTc	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2

G	kWh/m²	**Annual irradiation South, 45°** / G / F
Ta	°C	**Annual mean air temp.** / G / F
Tc	°C	**Annual mean cold water temp.** / G / F
ΔTc	°C	**Seasonal variation of Tc** / G / F
Th	45°C	**Desired (mix. valve) temp.** / G F

Max. operating press. - collector side G F	0.8	bar	**Max. operating press. - tank side** G F	8	bar

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number / Prüberichtsnummer / F	08SYS65
Date of test report / G / F	29.09.2008
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire

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