ICC-SRCC
3060 Saturn Street, Suite 100
Brea, CA 92821
t: 888.ICC.SAFE (422.7233)
t: 562.699.0543
f: 562.695.4694
www.solar-rating.org

August 8, 2022

Aqua Solanor Inc.
Roger Abdo
roger.abdo@hydrosolar.ca

RE: Certifications: OG-100 Collectors
Renewal Expiration Date: 9/1/2023

Dear Roger,

Thank you for allowing the Solar Rating and Certification Corporation (ICC-SRCC™) to provide your company with product testing and evaluation services. ICC-SRCC is a program of the ICC Evaluation Services, LLC (ICC-ES).

This letter constitutes final approval of the renewal of Aqua Solanor OG-100 Solar Thermal Collector certifications and authorizes the continued use of the certificates in accordance with the requirements of the OG-100 ICC-SRCC Program Agreements. These OG-100 certificates will be eligible for renewal upon the Renewal Expiration Date listed above and may not be used or referenced beyond that date except with the permission of ICC-SRCC. Unless otherwise noted, your renewed certificate is available on our website at www.solar-rating.org.

Enclosed with this letter is a package of the applicable current ICC-SRCC certification marks for use in product labeling and marketing material. The certification marks are provided in various graphic file formats. Use of the certification document, the certification number and the mark must be in accordance with the *ICC-SRCC Rules for Mark and Certificate Use*, which is attached and also available on the ICC-SRCC website.

We truly appreciate this opportunity to serve you, and we ask that you feel free to contact me, Grace Aduve (gaduve@icc-es.org) or Terri Aguirre (taguirre@icc-es.org) when we can be of assistance.

Respectfully,

Shawn Martin
Vice President, Technical Services
smartin@solar-rating.org
888-422-7233, ext. 7736

Cc: Grace Aduve, Terri Aguirre

Enclosures via e-mail:

ICC-SRCC OG-100 Certification Mark Package
ICC-SRCC Rules for Mark and Certificate Use

SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

OG-100 Solar Thermal Collector Certification

No./10002105

Issued: September 04, 2020
Expiration Date: September 01, 2023

www.solar-rating.org | (800) 423-6587 | (562) 699-0543

CERTIFICATION HOLDER:	EVALUATION SUBJECT	
AQUA SOLANOR INC 2459 46th Avenue Lachine, QUEBEC H8T3C9 Canada	**BRAND:**	HYDROSOL
	MODEL:	VT5815
	TYPE:	Tubular

PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-100 certification program includes evaluation and performance ratings for solar thermal collectors as established in the *ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports* The program also includes periodic factory inspections and surveillance of the manufacturer's quality management system.

COMPLIANCE WITH THE FOLLOWING STANDARD(S): *ICC 901/SRCC 100-2015*

OG-100 THERMAL PERFORMANCE RATINGS:

ICC-SRCC OG-100 thermal performance ratings provided for the collector are calculated for a 24-hour period using OG-100 standard conditions using collector parameters measured through laboratory testing. Actual performance will vary with local conditions, installation details and hot water usage.

OG-100 STANDARD DAILY PRODUCTION							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate -> Category (Ti-Ta)	High Radiation (6.3 kWh/m².day)	Medium Radiation (4.7 kWh/m².day)	Low Radiation (3.1 kWh/m².day)	Climate -> Category (Ti-Ta)	High Radiation (2 kBtu/ft².day)	Medium Radiation (1.5 kBtu/ft².day)	Low Radiation (1 kBtu/ft².day)
A (-5 °C)	6.8	5.1	3.5	A (-9 °F)	23.3	17.5	11.8
B (5 °C)	6.6	5.0	3.3	B (9 °F)	22.7	17.0	11.2
C (20 °C)	6.4	4.7	3.0	C (36 °F)	21.7	16.0	10.3
D (50 °C)	5.7	4.0	2.4	D (90 °F)	19.4	13.7	8.1
E (80 °C)	5.0	3.4	1.7	E (144 °F)	17.0	11.5	5.9
A- Pool Heating (Warm Climate) **B**- Pool Heating (Cool Climate) **C**- Water Heating (Warm Climate) **D**- Space & Water Heating (Cool Climate) **E**- Commercial Hot Water & Cooling							

THERMAL EFFICIENCY:

The efficiency of solar thermal collectors is determined using test methods set in ICC 901/SRCC 100, based on ISO 9806 procedures. Results are processed to provide unique coefficients ($\eta_{0,hem}$, a1, a2…) for collection efficiency equations, provided in several forms below. For the simplified equations, instantaneous power is given by $\dot{Q} = \eta_{hem} A_G G$. Incident Angle Modifiers (IAMs) are provided to indicate the change in output as the angle of solar irradiance changes in the transverse and longitudinal planes of the collector. The inputs to the equations are defined as:

T_i: Temperature of the fluid entering the collector

T_a: Temperature of the ambient air around the collector

G: Hemispherical solar irradiance. Sub-types include beam (b) and diffuse (d) irradiance.

A_G: Gross collector area

SIMPLIFIED THERMAL PERFORMANCE COEFFICIENTS (ISO 9806-2013, Ti, AG)					
Second Order Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-(a_1 (T_i-T_a)/G)-a_2 G((T_i-T_a)/G)^2$				Linearized Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-a_1 (T_i-T_a)/G$	
UNITS:	$\eta_{,hem}$	a_1	a_2	$\eta_{,hem}$("Intercept")	a_1("Slope")
SI	0.420	0.654 (W/m².°C)	0.003(W/m².°C)	0.420	-0.786 (W/m².°C)
IP	0.420	0.115 (Btu/hr.ft².°F)	0.001 (Btu/hr.ft².°F)	0.420	-0.139 (Btu/hr.ft².°F)

* Thermal efficiency equations per ISO 9806-2013 using inlet (Ti) fluid temperature, provided in second and first order (linearized) forms. The second order efficiency equation is a more accurate representation of the collector performance. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the simplified "slope" and "intercept" coefficients to describe collector performance.

DIRECT INCIDENT ANGLE MODIFIERS (IAM)											
Angle (θ)	θ	0^0	10^0	20^0	30^0	40^0	50^0	60^0	70^0	80^0	90^0
Longitudinal IAM:	Klα	-	1.00	0.99	0.97	0.95	0.90	0.82	0.65	-	-
Transverse IAM:	Krα	-	1.02	1.06	1.14	1.25	1.40	1.55	1.35	-	-

TEST SAMPLE SPECIFICATIONS:

The specifications of the collector sample submitted for testing are provided below.

TEST & SAMPLE SPECIFICATIONS					
Gross Area:	2.340 m²	25.19 ft²	Maximum Design Operating Temperature:		
Gross Length:	1.976 m	77.80 in	Maximum Design Operating Pressure:		
Gross Width:	1.185 m	46.65 in	Gross Depth:		
Test Fluid:	Water		Dry Weight:	48.1 kg	106.0 lb
Ave. Flowrate - Thermal Performance Testing:	0.012 Kg/sm^2	0.002 lb/sft^2	Fluid Capacity:	0.9 liter	0.2 gal
Test Standard(s):	Standard 100, ISO 9806:1994				
Notes:					

IDENTIFICATION:

Certified systems must be identified in accordance with the *Rules for Certification Mark and Certificate Use.*

CONDITIONS:

The certified solar water heating system must comply with the following conditions:

1. Collector must be installed and operated in accordance with the manufacturer's published instructions and local codes and regulations.
2. OG-100 Standard Performance Ratings have been calculated for the tested components using standardized conditions established by the OG-100 program and associated test standards. Actual performance will vary based on the specific usage, installation and local environmental conditions.
3. The collector in this ICC-SRCC OG-100 certification must be labeled in accordance with the *ICC-SRCC Rules for Mark and Certificate Use.*
4. OG-100 certifications do not include mounting hardware and fixtures.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all applicable local requirements for fire resistance. Solar thermal collectors must be mounted in accordance with the requirements of the collector and mounting hardware manufacturers to comply with local codes for structural loading for wind, seismic, snow and other loads.
6. Solar thermal collectors must be used with the heat transfer fluids listed in this document.
7. Solar thermal collector manufactured under a quality control program subject to periodic evaluation in accordance with the requirements of ICC-SRCC.
8. This document must be reproduced in its entirety.
9. Certification status should be confirmed on the ICC-SRCC Directory at www.solar-rating.org

Shawn Martin

Vice President of Technical Services, ICC-SRCC

A2LA ACCREDITED
CERTIFICATE # 3299.01, 3299.03

SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

OG-100 Solar Thermal Collector Certification

No./10002106

Issued: September 04, 2020
Expiration Date: September 01, 2023

www.solar-rating.org | (800) 423-6587 | (562) 699-0543

CERTIFICATION HOLDER:	EVALUATION SUBJECT	
AQUA SOLANOR INC 2459 46th Avenue Lachine, QUEBEC H8T3C9 Canada	**BRAND:**	HYDROSOL
	MODEL:	VT5820
	TYPE:	Tubular

PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-100 certification program includes evaluation and performance ratings for solar thermal collectors as established in the *ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports* The program also includes periodic factory inspections and surveillance of the manufacturer's quality management system.

COMPLIANCE WITH THE FOLLOWING STANDARD(S): *ICC 901/SRCC 100-2015*

OG-100 THERMAL PERFORMANCE RATINGS:

ICC-SRCC OG-100 thermal performance ratings provided for the collector are calculated for a 24-hour period using OG-100 standard conditions using collector parameters measured through laboratory testing. Actual performance will vary with local conditions, installation details and hot water usage.

OG-100 STANDARD DAILY PRODUCTION							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate -> Category (Ti-Ta)	High Radiation (6.3 kWh/m².day)	Medium Radiation (4.7 kWh/m².day)	Low Radiation (3.1 kWh/m².day)	Climate -> Category (Ti-Ta)	High Radiation (2 kBtu/ft².day)	Medium Radiation (1.5 kBtu/ft².day)	Low Radiation (1 kBtu/ft².day)
A (-5 °C)	9.0	6.8	4.6	A (-9 °F)	30.6	23.1	15.5
B (5 °C)	8.7	6.5	4.3	B (9 °F)	29.8	22.3	14.8
C (20 °C)	8.4	6.2	4.0	C (36 °F)	28.6	21.1	13.5
D (50 °C)	7.5	5.3	3.1	D (90 °F)	25.5	18.1	10.7
E (80 °C)	6.6	4.4	2.3	E (144 °F)	22.4	15.1	7.7
A- Pool Heating (Warm Climate) **B**- Pool Heating (Cool Climate) **C**- Water Heating (Warm Climate) **D**- Space & Water Heating (Cool Climate) **E**- Commercial Hot Water & Cooling							

THERMAL EFFICIENCY:

The efficiency of solar thermal collectors is determined using test methods set in ICC 901/SRCC 100, based on ISO 9806 procedures. Results are processed to provide unique coefficients ($\eta_{0,hem}$, a1, a2…) for collection efficiency equations, provided in several forms below. For the simplified equations, instantaneous power is given by $\dot{Q} = \eta_{hem} A_G G$. Incident Angle Modifiers (IAMs) are provided to indicate the change in output as the angle of solar irradiance changes in the transverse and longitudinal planes of the collector. The inputs to the equations are defined as:

T_i: Temperature of the fluid entering the collector

T_a: Temperature of the ambient air around the collector

G: Hemispherical solar irradiance. Sub-types include beam (b) and diffuse (d) irradiance.

A_G: Gross collector area

SIMPLIFIED THERMAL PERFORMANCE COEFFICIENTS (ISO 9806-2013, Ti, AG)					
Second Order Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-(a_1 (T_i-T_a)/G)-a_2 G((T_i-T_a)/G)^2$				Linearized Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-a_1 (T_i-T_a)/G$	
UNITS:	$\eta_{,hem}$	a_1	a_2	$\eta_{,hem}$("Intercept")	a_1("Slope")
SI	0.420	0.654 (W/m².°C)	0.003(W/m².°C)	0.420	-0.786 (W/m².°C)
IP	0.420	0.115 (Btu/hr.ft².°F)	0.001 (Btu/hr.ft².°F)	0.420	-0.139 (Btu/hr.ft².°F)

* Thermal efficiency equations per ISO 9806-2013 using inlet (Ti) fluid temperature, provided in second and first order (linearized) forms. The second order efficiency equation is a more accurate representation of the collector performance. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the simplified "slope" and "intercept" coefficients to describe collector performance.

DIRECT INCIDENT ANGLE MODIFIERS (IAM)											
Angle (θ)	θ	0^0	10^0	20^0	30^0	40^0	50^0	60^0	70^0	80^0	90^0
Longitudinal IAM:	Klα	-	1.00	0.99	0.97	0.95	0.90	0.82	0.65	-	-
Transverse IAM:	Krα	-	1.02	1.06	1.14	1.25	1.40	1.55	1.35	-	-

TEST SAMPLE SPECIFICATIONS:

The specifications of the collector sample submitted for testing are provided below.

TEST & SAMPLE SPECIFICATIONS					
Gross Area:	3.080 m²	33.15 ft²	Maximum Design Operating Temperature:		
Gross Length:	1.976 m	77.80 in	Maximum Design Operating Pressure:		
Gross Width:	1.560 m	61.42 in	Gross Depth:		
Test Fluid:	Water		Dry Weight:	64.1 kg	141.4 lb
Ave. Flowrate - Thermal Performance Testing:	0.012 Kg/sm^2	0.002 lb/sft^2	Fluid Capacity:	1.2 liter	0.3 gal
Test Standard(s):	Standard 100, ISO 9806:1994				
Notes:					

IDENTIFICATION:

Certified systems must be identified in accordance with the *Rules for Certification Mark and Certificate Use.*

CONDITIONS:

The certified solar water heating system must comply with the following conditions:

1. Collector must be installed and operated in accordance with the manufacturer's published instructions and local codes and regulations.
2. OG-100 Standard Performance Ratings have been calculated for the tested components using standardized conditions established by the OG-100 program and associated test standards. Actual performance will vary based on the specific usage, installation and local environmental conditions.
3. The collector in this ICC-SRCC OG-100 certification must be labeled in accordance with the *ICC-SRCC Rules for Mark and Certificate Use.*
4. OG-100 certifications do not include mounting hardware and fixtures.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all applicable local requirements for fire resistance. Solar thermal collectors must be mounted in accordance with the requirements of the collector and mounting hardware manufacturers to comply with local codes for structural loading for wind, seismic, snow and other loads.
6. Solar thermal collectors must be used with the heat transfer fluids listed in this document.
7. Solar thermal collector manufactured under a quality control program subject to periodic evaluation in accordance with the requirements of ICC-SRCC.
8. This document must be reproduced in its entirety.
9. Certification status should be confirmed on the ICC-SRCC Directory at www.solar-rating.org

Shawn Martin

Vice President of Technical Services, ICC-SRCC

A2LA ACCREDITED
CERTIFICATE # 3299.01, 3299.03

SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

OG-100 Solar Thermal Collector Certification

No./10002107

Issued: September 04, 2020
Expiration Date: September 01, 2023

www.solar-rating.org | (800) 423-6587 | (562) 699-0543

CERTIFICATION HOLDER:	EVALUATION SUBJECT	
AQUA SOLANOR INC 2459 46th Avenue Lachine, QUEBEC H8T3C9 Canada	**BRAND:**	HYDROSOL
	MODEL:	VT5825
	TYPE:	Tubular

PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-100 certification program includes evaluation and performance ratings for solar thermal collectors as established in the *ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports* The program also includes periodic factory inspections and surveillance of the manufacturer's quality management system.

COMPLIANCE WITH THE FOLLOWING STANDARD(S): *ICC 901/SRCC 100-2015*

OG-100 THERMAL PERFORMANCE RATINGS:

ICC-SRCC OG-100 thermal performance ratings provided for the collector are calculated for a 24-hour period using OG-100 standard conditions using collector parameters measured through laboratory testing. Actual performance will vary with local conditions, installation details and hot water usage.

OG-100 STANDARD DAILY PRODUCTION							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate -> Category (Ti-Ta)	High Radiation (6.3 kWh/m².day)	Medium Radiation (4.7 kWh/m².day)	Low Radiation (3.1 kWh/m².day)	Climate -> Category (Ti-Ta)	High Radiation (2 kBtu/ft².day)	Medium Radiation (1.5 kBtu/ft².day)	Low Radiation (1 kBtu/ft².day)
A (-5 °C)	11.1	8.4	5.6	A (-9 °F)	38.0	28.6	19.3
B (5 °C)	10.8	8.1	5.4	B (9 °F)	37.0	27.7	18.3
C (20 °C)	10.4	7.7	4.9	C (36 °F)	35.4	26.1	16.8
D (50 °C)	9.3	6.6	3.9	D (90 °F)	31.7	22.4	13.3
E (80 °C)	8.2	5.5	2.8	E (144 °F)	27.8	18.7	9.6
A- Pool Heating (Warm Climate) **B**- Pool Heating (Cool Climate) **C**- Water Heating (Warm Climate) **D**- Space & Water Heating (Cool Climate) **E**- Commercial Hot Water & Cooling							

THERMAL EFFICIENCY:

The efficiency of solar thermal collectors is determined using test methods set in ICC 901/SRCC 100, based on ISO 9806 procedures. Results are processed to provide unique coefficients ($\eta_{0,hem}$, a1, a2…) for collection efficiency equations, provided in several forms below. For the simplified equations, instantaneous power is given by $\dot{Q} = \eta_{hem} A_G G$. Incident Angle Modifiers (IAMs) are provided to indicate the change in output as the angle of solar irradiance changes in the transverse and longitudinal planes of the collector. The inputs to the equations are defined as:

T_i: Temperature of the fluid entering the collector

T_a: Temperature of the ambient air around the collector

G: Hemispherical solar irradiance. Sub-types include beam (b) and diffuse (d) irradiance.

A_G: Gross collector area

SIMPLIFIED THERMAL PERFORMANCE COEFFICIENTS (ISO 9806-2013, Ti, AG)					
Second Order Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-(a_1 (T_i-T_a)/G)-a_2 G((T_i-T_a)/G)^2$				Linearized Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-a_1 (T_i-T_a)/G$	
UNITS:	$\eta_{,hem}$	a_1	a_2	$\eta_{,hem}$("Intercept")	a_1("Slope")
SI	0.420	0.654 (W/m².°C)	0.003(W/m².°C)	0.420	-0.786 (W/m².°C)
IP	0.420	0.115 (Btu/hr.ft².°F)	0.001 (Btu/hr.ft².°F)	0.420	-0.139 (Btu/hr.ft².°F)

* Thermal efficiency equations per ISO 9806-2013 using inlet (Ti) fluid temperature, provided in second and first order (linearized) forms. The second order efficiency equation is a more accurate representation of the collector performance. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the simplified "slope" and "intercept" coefficients to describe collector performance.

DIRECT INCIDENT ANGLE MODIFIERS (IAM)											
Angle (θ)	θ	0^0	10^0	20^0	30^0	40^0	50^0	60^0	70^0	80^0	90^0
Longitudinal IAM:	Klα	-	1.00	0.99	0.97	0.95	0.90	0.82	0.65	-	-
Transverse IAM:	Krα	-	1.02	1.06	1.14	1.25	1.40	1.55	1.35	-	-

TEST SAMPLE SPECIFICATIONS:

The specifications of the collector sample submitted for testing are provided below.

TEST & SAMPLE SPECIFICATIONS					
Gross Area:	3.820 m²	41.12 ft²	Maximum Design Operating Temperature:		
Gross Length:	1.976 m	77.80 in	Maximum Design Operating Pressure:		
Gross Width:	1.935 m	76.18 in	Gross Depth:		
Test Fluid:	Water		Dry Weight:	80.0 kg	176.4 lb
Ave. Flowrate - Thermal Performance Testing:	0.012 Kg/sm^2	0.002 lb/sft^2	Fluid Capacity:	1.5 liter	0.4 gal
Test Standard(s):	Standard 100, ISO 9806:1994				
Notes:					

IDENTIFICATION:

Certified systems must be identified in accordance with the *Rules for Certification Mark and Certificate Use.*

CONDITIONS:

The certified solar water heating system must comply with the following conditions:

1. Collector must be installed and operated in accordance with the manufacturer's published instructions and local codes and regulations.
2. OG-100 Standard Performance Ratings have been calculated for the tested components using standardized conditions established by the OG-100 program and associated test standards. Actual performance will vary based on the specific usage, installation and local environmental conditions.
3. The collector in this ICC-SRCC OG-100 certification must be labeled in accordance with the *ICC-SRCC Rules for Mark and Certificate Use.*
4. OG-100 certifications do not include mounting hardware and fixtures.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all applicable local requirements for fire resistance. Solar thermal collectors must be mounted in accordance with the requirements of the collector and mounting hardware manufacturers to comply with local codes for structural loading for wind, seismic, snow and other loads.
6. Solar thermal collectors must be used with the heat transfer fluids listed in this document.
7. Solar thermal collector manufactured under a quality control program subject to periodic evaluation in accordance with the requirements of ICC-SRCC.
8. This document must be reproduced in its entirety.
9. Certification status should be confirmed on the ICC-SRCC Directory at www.solar-rating.org

Shawn Martin

Vice President of Technical Services, ICC-SRCC

A2LA ACCREDITED
CERTIFICATE # 3299.01, 3299.03

SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

OG-100 Solar Thermal Collector Certification

No./10002108

Issued: September 04, 2020
Expiration Date: September 01, 2023

www.solar-rating.org | (800) 423-6587 | (562) 699-0543

CERTIFICATION HOLDER:	EVALUATION SUBJECT	
AQUA SOLANOR INC 2459 46th Avenue Lachine, QUEBEC H8T3C9 Canada	**BRAND:**	HYDROSOL
	MODEL:	VT5830
	TYPE:	Tubular

PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-100 certification program includes evaluation and performance ratings for solar thermal collectors as established in the *ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports* The program also includes periodic factory inspections and surveillance of the manufacturer's quality management system.

COMPLIANCE WITH THE FOLLOWING STANDARD(S): *ICC 901/SRCC 100-2015*

OG-100 THERMAL PERFORMANCE RATINGS:

ICC-SRCC OG-100 thermal performance ratings provided for the collector are calculated for a 24-hour period using OG-100 standard conditions using collector parameters measured through laboratory testing. Actual performance will vary with local conditions, installation details and hot water usage.

OG-100 STANDARD DAILY PRODUCTION							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate -> Category (Ti-Ta)	High Radiation (6.3 kWh/m².day)	Medium Radiation (4.7 kWh/m².day)	Low Radiation (3.1 kWh/m².day)	Climate -> Category (Ti-Ta)	High Radiation (2 kBtu/ft².day)	Medium Radiation (1.5 kBtu/ft².day)	Low Radiation (1 kBtu/ft².day)
A (-5 °C)	13.3	10.0	6.7	A (-9 °F)	45.3	34.2	23.0
B (5 °C)	13.0	9.7	6.4	B (9 °F)	44.2	33.1	21.9
C (20 °C)	12.4	9.1	5.9	C (36 °F)	42.3	31.2	20.0
D (50 °C)	11.1	7.9	4.7	D (90 °F)	37.8	26.8	15.9
E (80 °C)	9.7	6.5	3.3	E (144 °F)	33.2	22.3	11.4
A- Pool Heating (Warm Climate) **B**- Pool Heating (Cool Climate) **C**- Water Heating (Warm Climate) **D**- Space & Water Heating (Cool Climate) **E**- Commercial Hot Water & Cooling							

THERMAL EFFICIENCY:

The efficiency of solar thermal collectors is determined using test methods set in ICC 901/SRCC 100, based on ISO 9806 procedures. Results are processed to provide unique coefficients ($\eta_{0,hem}$, a1, a2…) for collection efficiency equations, provided in several forms below. For the simplified equations, instantaneous power is given by $\dot{Q} = \eta_{hem} A_G G$. Incident Angle Modifiers (IAMs) are provided to indicate the change in output as the angle of solar irradiance changes in the transverse and longitudinal planes of the collector. The inputs to the equations are defined as:

T_i: Temperature of the fluid entering the collector

T_a: Temperature of the ambient air around the collector

G: Hemispherical solar irradiance. Sub-types include beam (b) and diffuse (d) irradiance.

A_G: Gross collector area

SIMPLIFIED THERMAL PERFORMANCE COEFFICIENTS (ISO 9806-2013, Ti, AG)					
Second Order Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-(a_1 (T_i-T_a)/G)-a_2 G((T_i-T_a)/G)^2$				Linearized Thermal Efficiency Equation* $\eta_{,hem}=\eta_{(0,hem)}-a_1 (T_i-T_a)/G$	
UNITS:	**$\eta_{,hem}$**	**a_1**	**a_2**	**$\eta_{,hem}$("Intercept")**	**a_1("Slope")**
SI	0.420	0.654 (W/m².°C)	0.003(W/m².°C)	0.420	-0.786 (W/m².°C)
IP	0.420	0.115 (Btu/hr.ft².°F)	0.001 (Btu/hr.ft².°F)	0.420	-0.139 (Btu/hr.ft².°F)

* Thermal efficiency equations per ISO 9806-2013 using inlet (Ti) fluid temperature, provided in second and first order (linearized) forms. The second order efficiency equation is a more accurate representation of the collector performance. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the simplified "slope" and "intercept" coefficients to describe collector performance.

DIRECT INCIDENT ANGLE MODIFIERS (IAM)											
Angle (θ)	θ	0^0	10^0	20^0	30^0	40^0	50^0	60^0	70^0	80^0	90^0
Longitudinal IAM:	**Klα**	-	1.00	0.99	0.97	0.95	0.90	0.82	0.65	-	-
Transverse IAM:	**Krα**	-	1.02	1.06	1.14	1.25	1.40	1.55	1.35	-	-

TEST SAMPLE SPECIFICATIONS:

The specifications of the collector sample submitted for testing are provided below.

TEST & SAMPLE SPECIFICATIONS					
Gross Area:	4.560 m²	49.08 ft²	**Maximum Design Operating Temperature:**		
Gross Length:	1.976 m	77.80 in	**Maximum Design Operating Pressure:**		
Gross Width:	2.310 m	90.94 in	**Gross Depth:**		
Test Fluid:	Water		**Dry Weight:**	96.0 kg	211.6 lb
Ave. Flowrate - Thermal Performance Testing:	0.012 Kg/sm^2	0.002 lb/sft^2	**Fluid Capacity:**	1.7 liter	0.5 gal
Test Standard(s):	Standard 100, ISO 9806:1994				
Notes:					

IDENTIFICATION:

Certified systems must be identified in accordance with the *Rules for Certification Mark and Certificate Use.*

CONDITIONS:

The certified solar water heating system must comply with the following conditions:

1. Collector must be installed and operated in accordance with the manufacturer's published instructions and local codes and regulations.
2. OG-100 Standard Performance Ratings have been calculated for the tested components using standardized conditions established by the OG-100 program and associated test standards. Actual performance will vary based on the specific usage, installation and local environmental conditions.
3. The collector in this ICC-SRCC OG-100 certification must be labeled in accordance with the *ICC-SRCC Rules for Mark and Certificate Use.*
4. OG-100 certifications do not include mounting hardware and fixtures.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all applicable local requirements for fire resistance. Solar thermal collectors must be mounted in accordance with the requirements of the collector and mounting hardware manufacturers to comply with local codes for structural loading for wind, seismic, snow and other loads.
6. Solar thermal collectors must be used with the heat transfer fluids listed in this document.
7. Solar thermal collector manufactured under a quality control program subject to periodic evaluation in accordance with the requirements of ICC-SRCC.
8. This document must be reproduced in its entirety.
9. Certification status should be confirmed on the ICC-SRCC Directory at www.solar-rating.org

Shawn Martin

Vice President of Technical Services, ICC-SRCC

A2LA ACCREDITED
CERTIFICATE # 3299.01, 3299.03