

Operation

Page 2

Sizing

Page 4

System Components

Pages 6

Techno-Solis Advantages

Pages 8

Specs

Pages 11



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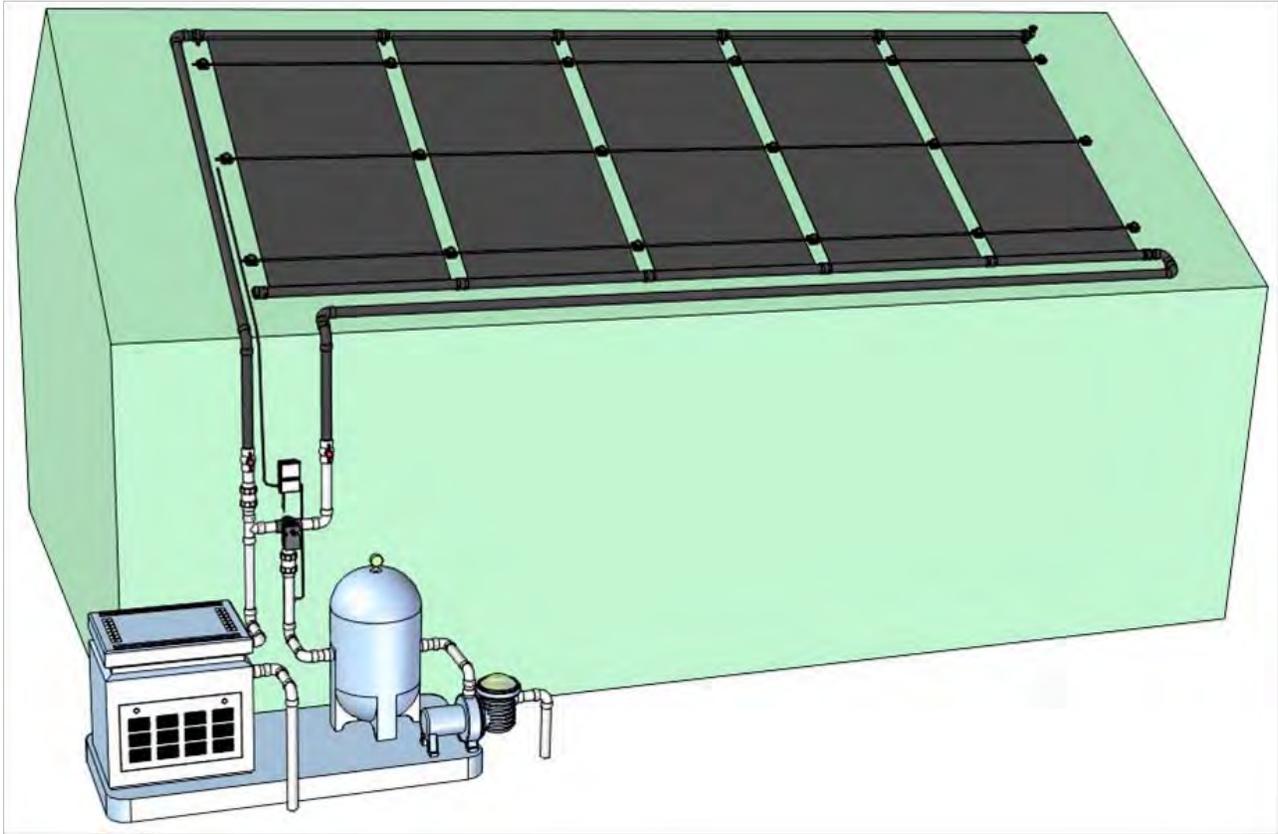
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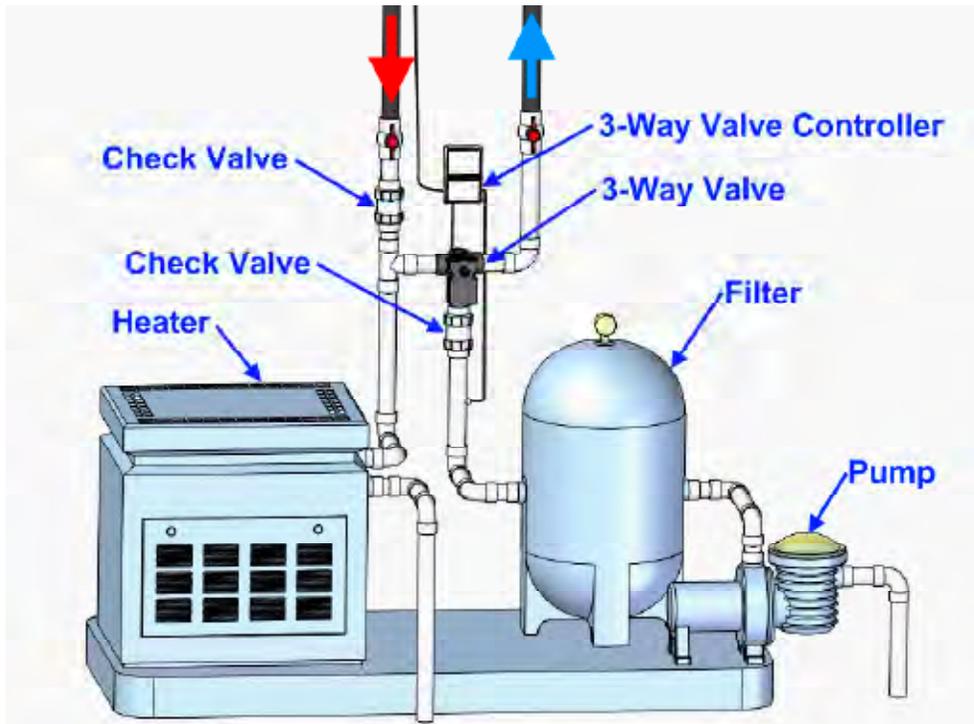
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Operation



1. Pump moves the water to the solar collectors
2. Water enters solar collector from the bottom.
3. Water is heated as it flows through collectors.
4. Warm water is then returned to the pool.

Operation



- Ball Valves (2) can be used to ensure system isolation when not in use.
- Check Valves (2) allow water to flow in only one direction.
- 3-Way Valve (1) is used to divert flow to or from the collectors
- Controller Valve (1) Operates the 3-way valve

3 Things You must know to size a pool:

1. Swimming Pool Ft²

Heat loss occurs at the surface, so you must know the Pool's Area (L x W) when sizing a system.

2. Solar Panel Ft²

Standard Techno-Solis Panel Sizes:

- 4 x 12 = 48 Ft²
- 4 x 10 = 40 Ft²
- 4 x 08 = 32 Ft²

3. Solar Panel Direction:

The direction that the solar panels face affects the amount of daily radiation that they receive from the sun.

Use the following *Direction Percentages* when sizing a system:

- Panels facing **South: 75%**
- Panels facing **West: 85%**
- Panels facing **East: 95%**

Sizing Formula:

$$\underline{\text{Swimming Pool Ft}^2} \times \underline{\text{Direction \%}} = \underline{\text{Solar Ft}^2}$$

$$\underline{\text{Solar Ft}^2} \div \underline{\text{Panel Ft}^2} = \underline{\text{Required Number of Panels}}$$

Example:

- Swimming Pool Size = 16' x 32' (512 Ft²)
- Solar Panel Size = 4 x 12 (48 Ft²)
- Solar Panel Direction = South

$$512 \text{ Ft}^2 \times 75 \% = 384 \text{ Ft}^2$$

$$384 \text{ Ft}^2 \div 48 \text{ Ft}^2 = \underline{8 \text{ Panels}}$$

Sizing

Sizing Work Sheet

A.	Pool Surface Area	
-----------	--------------------------	--

(width x length)

B.*	Shading Factor	
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Enter the following values for:

Open Pool - 1.0

Screened Pool - 1.1

Shaded Pool - 1.15

Screened & Shaded Pool - 1.25

C.	Roof Faces:	
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Enter the following values for:

South - .75

West - .85

East - .95

D.	Panel Surface Area:	
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Panel Size - 4'x8' = 32 sq ft

Panel Size - 4'x10' = 40 sq ft

Panel Size - 4'x12' = 48 sq ft

E.	Required # of Panels:	
-----------	------------------------------	--

$$\begin{array}{ccccccc} \text{A:} & & \text{B:} & & \text{C:} & & \text{D:} \\ \boxed{} & \times & \boxed{} & \times & \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$

*A swimming pool that is shaded and or screened will need approximately 15-25% more solar heating than a completely open pool.

System Components

All Pre-packaged Systems Include The Following Materials:

<p>Panels</p> <p><u>1.5" Header</u> 4 x 08 - c15ts08 4 x 10 - c15ts10 4 x 12 - c15ts12</p> <p><u>2" Header</u> 4 x 08 - c20ts08 4 x 10 - c20ts10 4 x 12 - c20ts12</p>		
<p>Panel Kit (1 per panel)</p> <p>1.5" - k15pan-super 2.0" - k20pan-super</p>		
<p>System Kit (1 per System)</p> <p>1.5" - k15sys-super 2.0" - k20sys-super</p>		
<p>Vacuum Breaker (1 per System)</p> <p>1.5" - k15vac-super 2.0" - k20vac-super</p>		
<p>Strap (2 rolls per system)</p> <p>100 ft - astr100p</p>		
<p>Auto Temp Controller (1 per System)</p> <p>Hayward Goldline G235 - G-glc-2p-a Pentair Suntime Solar - Pen-520856</p>		

Panel Kit



Includes:

- Rubber Hose 2
- Hose Clamp 4
- LAG Screw 5
- Strap Clip 3
- Pipe Strap 1

System Kit



Includes:

- Rubber Hose 2
- Hose Clamp 4
- LAG Screw 5
- Strap Clip 3
- Pipe Strap 1
- Adapter 2
- Plug 2

Auto Controller



Includes:

- Control Box 1
- 3-Way Valve 1
- Actuator 1
- Sensors 2

Vacuum Breaker



System Components

Reference when ordering Systems:

Part Numbers

4 x 8 Systems

	Panel	Panel Kit	System Kit	Vacuum Breaker	Strap	Auto Temperature Controller
1.2" Header:	C15TS08	K15Pan-S	K15Sys-S	K15Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)
2.0" Header	C20TS08	K20Pan-S	K20Sys-S	K20Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)

4 x 10 Systems

	Panel	Panel Kit	System Kit	Vacuum Breaker	Strap	Auto Temperature Controller
1.2" Header	C15TS10	K15Pan-S	K15Sys-S	K15Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)
2.0" Header	C20TS10	K20Pan-S	K20Sys-S	K20Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)

4 x 12 Systems

	Panel	Panel Kit	System Kit	Vacuum Breaker	Strap	Auto Temperature Controller
1.2" Header	C15TS12	K15Pan-S	K15Sys-S	K15Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)
2.0" Header	C20TS12	K20Pan-S	K20Sys-S	K20Vac	astr100p	G-glc-2p-a (Hayward) -or- Pen-520856 (Pentair)

Item Quantities

Pre-Packaged - 4 x 8 Systems

5	4 x 8 Panels,	5 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
6	4 x 8 Panels,	6 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
7	4 x 8 Panels,	7 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
8	4 x 8 Panels,	8 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
9	4 x 8 Panels,	9 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
10	4 x 8 Panels,	10 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
11	4 x 8 Panels,	11 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
12	4 x 8 Panels,	12 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller

Pre-Packaged - 4 x 10 Systems

5	4 x 10 Panels,	5 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
6	4 x 10 Panels,	6 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
7	4 x 10 Panels,	7 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
8	4 x 10 Panels,	8 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
9	4 x 10 Panels,	9 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
10	4 x 10 Panels,	10 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
11	4 x 10 Panels,	11 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
12	4 x 10 Panels,	12 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller

Pre-Packaged - 4 x 12 Systems

5	4 x 12 Panels,	5 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
6	4 x 12 Panels,	6 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
7	4 x 12 Panels,	7 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
8	4 x 12 Panels,	8 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
9	4 x 12 Panels,	9 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
10	4 x 12 Panels,	10 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
11	4 x 12 Panels,	11 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller
12	4 x 12 Panels,	12 Panel Kits,	1 System Kit,	1 VB Kit,	200' Strap,	1 Auto Controller

Techno-Solis Advantages

Techno-Solis Panel

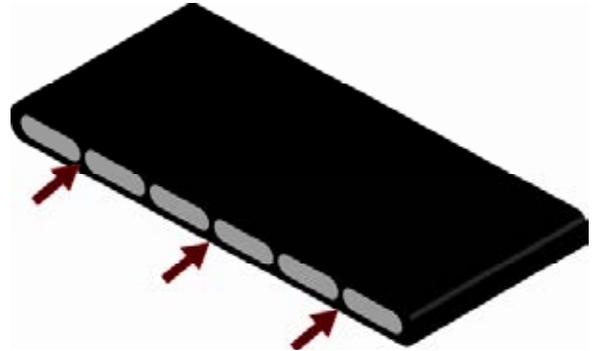
1006 BTU Ft² per day

Thick Material
Requires NO Repair Kit



Reinforced Pipe Weld
Increases Durability

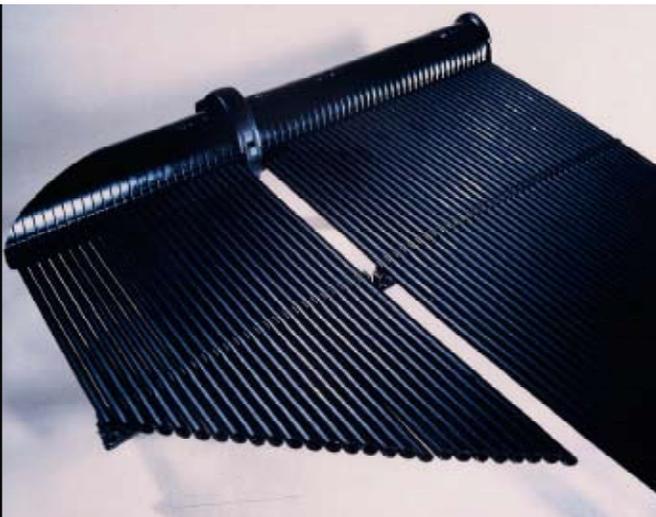
Connected Flow Tubes
PREVENT Heat Loss



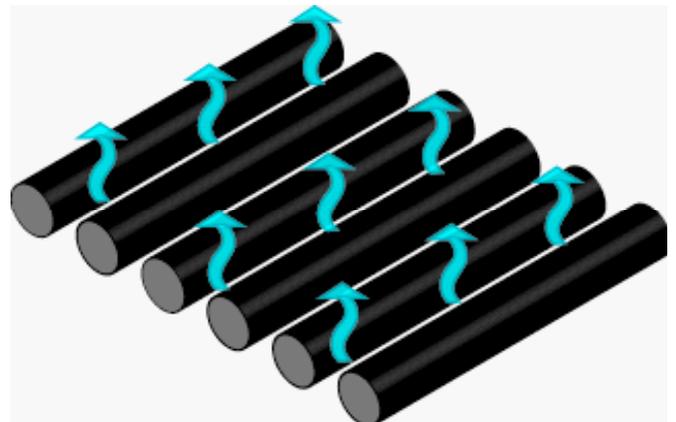
Typical Solar Panel

956 BTU Ft² per day (Avg)

Light Material
Requires Repair Kit



Individual Flow Tubes
Allow Heat Loss



Techno-Solis Advantages

Certifications & Performance Ratings

Techno-Solis vs. Heliocol Summary

Manufacturer	Panel Size	FSEC BTU/ft ² /day	SRCC 2kBTU/ft ² -d	NSTF Annual Energy (GJ/m ²)
Techno-Solis	2.9 m ²	1006	1.8	not tested
Techno-Solis	3.7 m ²	1006	1.8	1.3
Techno-Solis	4.4 m ²	1006	1.8	not tested
Heliocol	2.77 m ²	956	1.7	not tested
Heliocol	3.88 m ²	956	1.7	1.1
Heliocol	4.65 m ²	956	1.7	not tested

Florida Solar Energy Center (FSEC)

Manufacturer	Model	FSEC #	Material	Coating	Gross Area (sq ft)	BTU/Day	BTU/Sq Ft
Techno-Solis	TS-32-FS	97007C	UV Stabilized Plastic Polymer	None	31.71	32320	1006
Techno-Solis	TS-40-FS	97008C	UV Stabilized Plastic Polymer	None	39.78	40400	1006
Techno-Solis	TS-48-FS	97009C	UV Stabilized Plastic Polymer	None	47.64	48480	1006
Heliocol	Heliocol 30	00011C	UV Stabilized Plastic Polymer	None	29.15	27900	956
Heliocol	Heliocol 40	00013C	UV Stabilized Plastic Polymer	None	40.68	38900	956
Heliocol	Heliocol 50	98002	UV Stabilized Plastic Polymer	None	48.23	46100	956

*FSEC ratings measured in BTU/ft²/day

National Solar Test Facility

Collector			Rated Annual Energy (GJ/m sq)		
Manufacturer	Model	Area (m sq)	Vancouver	Toronto	Montreal
Techno-Solis	TS-40- FS	3.672	1.3	1.3	1.2
Heliocol	Heliocol 40	3.768	1.0	1.1	1.0

*NSTF ratings based on Rated Annual Energy (GJ/m²)

Solar Rating & Certification Corp (SRCC)

Manufacturer	Gross Area	Test Climate	Heat Output 2kBTU/ft ² -d
Techno-Solis	2.703 m ²	Mildly Cloudy 20° C	1.8
Heliocol	2.703 m ²	Mildly Cloudy 20° C	1.7

*Techno-Solis test conducted in a real world outdoor environment. Heliocol test conducted in a controlled lab.

Techno-Solis Advantages

Industry's Best Warranty

- 10 Year Full Replacement
-
- Limited Lifetime Warranty After 10 Years
-
- No Repair or Replace Clause
-
- Freeze Damage Included

TECHNO-SOLIS, INC

10 Year Limited Lifetime Warranty

Including Internal Freeze Protection

Techno-Solis the "Warrantor" warrants the solar pool panels manufactured by it the "Panel", to be free from defects in material and workmanship from the date of purchase by owner the "Consumer", subject to the following limitations, terms, and conditions.

1. Duration of the Warranty

1.1 First Period: Ten (10) Years Warranty.

1.2 Second Period: Lifetime Limited Warranty.

2. Warrantors Obligations

2.1 During the First Period (10 Years), the Warrantor shall be required to exchange a defective Panel due solely to faulty materials or workmanship.

2.2 During the Second Period, the Warrantor shall be required, under this Limited Lifetime Warranty, to replace a defective Panel due solely to faulty materials or workmanship, the cost of such replacement will be 50% of the published Panel List Price, in effect at the time of discovery, to be assumed by the Consumer.

3. Installation Conditions

3.1 The Panel must be installed in accordance with The Techno-Solis Installation Manual. Local installation regulation shall provide the base standards by which the installation is performed.

Installation standards include but are not limited to:

3.1.1.1 The Panel must be fully drained when they are not in use.

3.1.1.2 The Panel must not rest on any sharp objects.

3.1.1.3 The Panel must not be anchored at both the top and bottom header.

3.1.1.4 The Panel must be supplied with filtered water.

3.2 The Panel has to be installed and serviced exclusively by a Techno-Solis Authorized Dealer.

4. Transferability of Warranty

4.1 This Warranty is solely for the benefit of the original Consumer and is therefore not transferable. If at any time, the Panel is resold or has changed ownership; this Warranty shall become null and void.

4.2 You have the option to apply directly with Techno-Solis for a Transferability Addendum to this warranty. The cost of this Transferability Addendum is 50% of the current list price of a Panel per Panel sold and installed (as per the original sales contract and Warranty Card). This application and payment must be turned in to Techno-Solis within 90 days of the change in original ownership. We reserve the right to refuse any application. (see reverse)

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Techno-Solis Advantages

Freeze Resistant

Thick Channel Walls

+

Elliptical Flow Tubes

=

Ability to Withstand Freezing Conditions



Although we advise draining a system before temperatures drop below freezing, we know that weather conditions can often change rapidly and this is not always possible. Because water expands by approximately 9 % when turning to ice, the strain put on a solar pool heating system can be devastating. Techno-Solis collectors are designed to withstand internal freezing because of their extra thick channel walls and elliptical shaped flow tubes that can expand and change shape.

Techno-Solis Advantages

Techno-Solis Advantages Summary

- ⚙️ High BTU Rating
- ⚙️ Efficient Design Reduces Heat Loss
- ⚙️ Most Durable Solar Panel Available
- ⚙️ Freeze Resistant
- ⚙️ Industry's Best Warranty

Technical Specs

US

		2" Header			1.5" Header		
Dims		4 x 12	4 x 10	4 x 8	4 x 12	4 x 10	4 x 8
Overall Length	In	144.12	120.37	96.00	143.3	119.55	95.18
Absorber Width	In	47.50	47.50	47.50	47.63	47.63	47.63
Header Length	In	50.75	50.75	50.75	50.75	50.75	50.75
Gross Area	ft ²	47.62	39.79	31.65	47.31	39.46	31.40
# Flow Channels		104	104	104	104	104	104
Flow Rates							
Max	Gpm	10	10	10	10	10	10
Min	Gpm	3	2.5	2.5	3	2.5	2.5
Rec.	Gpm	4.9	4.9	4.9	4.9	4.9	4.9
Perf.							
FSEC rating /ft ²	BTU	1006	1006	1006	1006	1006	1006
Wind Load	mph	150	150	150	150	150	150
Weight							
Dry	lbs	30	25	20	29	24	19
Wet	lbs	62.5	53.6	44.7	62.5	53.6	44.7

Metric

		50.8 mm Header			38.1 mm Header		
Part #		c20ts12	c20ts10	c20ts08	c15ts12	c15ts10	c15ts08
Dims							
Overall Length	m	3.66	3.06	2.44	3.64	3.04	2.42
Absorber Width	m	1.21	1.21	1.21	1.21	1.21	1.21
Header Length	m	1.29	1.29	1.29	1.29	1.29	1.29
Gross Area	m ²	4.42	3.70	2.94	4.395	3.666	2.917
# Flow Channels		104	104	104	104	104	104
Flow Rates							
Max	l/min	37.86	37.86	37.86	37.86	37.86	37.86
Min	l/min	11.36	9.47	9.47	11.36	9.47	9.47
Rec.	l/min	18.55	18.55	18.55	18.55	18.55	18.55
Perf.							
FSEC rating /ft ²	BTU	1006	1006	1006	1006	1006	1006
Wind Load	KM/H	241.4	241.4	241.4	241.4	241.4	241.4
Weight							
Dry	kg	13.61	11.34	9.07	13.15	10.89	8.62
Wet	kg	29.17	25.13	20.59	28.35	24.31	20.28