



ETC SOLAR COLLECTOR

PRODUCT OVERVIEW



Product Highlights

- High Efficiency Evacuated Tube Solar Thermal Collector
- Suitable for Residential and Commercial Projects
- Steam-back and Drain-back Compatible Header Design
- Cyclone Rated, Marine Grade Mounting Frame and Fasteners
- Comprehensive 15 Year Limited Warranty*

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BASIC SPECIFICATIONS

Apricus ETC range of evacuated tube solar thermal collectors are suitable for both residential and commercial applications. 4 sizes are available ranging from 10 to 30 tubes.



ETC-10

Dimensions (LxWxH) *	2005 x 796 x 136 mm
Peak Output **	671 W
Aperture Area	0.947 m ²
Gross Area	1.59 m ²
Gross Dry Weight	35 kg
Fluid Capacity	310 ml
Flow Rate	0.7 L/min (max 15L/min)
Max Operating Pressure	800 kPa / 8 bar



ETC-20

Dimensions (LxWxH) *	2005 x 1496 x 136 mm
Peak Output **	1342 W
Aperture Area	1.89 m ²
Gross Area	3 m ²
Gross Dry Weight	63.5 kg
Fluid Capacity	550 ml
Flow Rate	1.4 L/min (max 15L/min)
Max Operating Pressure	800 kPa / 8 bar



ETC-22

Dimensions (LxWxH) *	2005 x 1636 x 136 mm
Peak Output **	1477 W
Aperture Area	2.07 m ²
Gross Area	3.28 m ²
Gross Dry Weight	71.3 kg
Fluid Capacity	600 ml
Flow Rate	1.5 L/min (max 15 L/min)
Max Operating Pressure	800 kPa / 8 bar



ETC-30

Dimensions (LxWxH) *	2005 x 2196 x 136 mm
Peak Output **	2014 W
Aperture Area	2.84 m ²
Gross Area	4.4 m ²
Gross Dry Weight	95 kg
Fluid Capacity	790 ml
Flow Rate	2 L/min (max 15 L/min)
Max Operating Pressure	800 kPa / 8 bar

* Height does not include mounting frame.

** Data from TUV report 154035663_EN. Calculated at midday (trans IAM = 1), G=1000W/m², ΔT (tm-ta)=0

COMPONENT MATERIALS

Component	Material Specifications
Evacuated Tubes	<p>Material: Borosilicate 3.3</p> <p>Tube style: Twin wall all glass</p> <p>Dimensions: \varnothing58mm outer tube; \varnothing47mm inner tube; 1.8m length, 1.8mm outer tube wall thickness</p> <p>Absorber Material: Selective coating</p> <p>Absorptance: >93% (AM1.5); Emittance: <8% (80°C)</p> <p>Vacuum: $P < 5 \times 10^{-3}$ Pa; Heat loss: <0.8W/(m² °C)</p>
Heat Pipes	<p>Material: High purity “oxygen free” copper (ASTM: C10200; DIN: OF-Cu)</p> <p>Working fluid: non-toxic liquid (Apricus’ proprietary mixture)</p> <p>Maximum heat transfer capacity: 220W</p> <p>Operating angle: 20-80° Startup temperature: ~30°C</p>
Copper Header Pipe	<p>Material: Copper (ASTM: C1100, DIN: ECu-58);</p> <p>Brazing rod material: BAg45CuZn (Potable water certified)</p> <p>Maximum pressure: 800kPa / 116psi</p> <p>Connection options: 3/4”M NPT; 3/4” SWEAT; 3/4”M BSP; 1/2”M BSP ELBOW</p>
Heat Transfer Fins	Material: High purity aluminium
Rubber Components	Material: HTV Silicone Rubber (UV stabilized)
Mounting Frame	Material: 6005-T5 Aluminium Alloy with Anodized Finish (Stainless Steel frame available upon special request)
Tube Clips	Material: 316 Stainless Steel
Fasteners	Material: 316 Stainless Steel
Manifold Casing	Material: 3003 Aluminium with PVDF coating.
Manifold Insulation	Material: Glass Wool (<0.043W/mK) Thickness: Average >50mm

CERTIFICATIONS

Standard	Report Number	Region
AS/NZS 2712:2007	100633	Australia and New Zealand
AS 3688:2005 Watermark	100633	Australia and New Zealand
ISO9001:2008	100633	Global
Solarkeymark	011-7S2323R	Europe
SRCC OG-100	10001909	USA



SOLAR COLLECTOR COMPONENTS

Manifold & Header Pipe

Insulated box housing the copper header pipe (heat exchanger) that the system fluid circulates through.

The header pipe is designed for both efficient heat transfer and reliability with only 4 brazing points. Brazing is 45% silver material for optimal strength and corrosion resistance.

The header pipe drains effectively making it compatible with steam-back and drain-back systems.

A thick layer of glass wool made from recycled glass insulates the header pipe to reduce heat loss and is able to withstand high temperatures.

Evacuated Tube (ET)

Evacuated tubes are made from two glass tubes that are fused at the top and the bottom. The space between the tubes is evacuated to form an insulating vacuum. The inner tube is coated with a special absorber material which absorbs 95% of sunlight, converting it into usable heat.

The contoured aluminium heat transfer fin holds the heat pipe close to the inner glass wall enhancing heat transfer.

Heat Pipe (HP)

The copper heat pipe absorbs heat from the glass wall and the heat transfer fin.

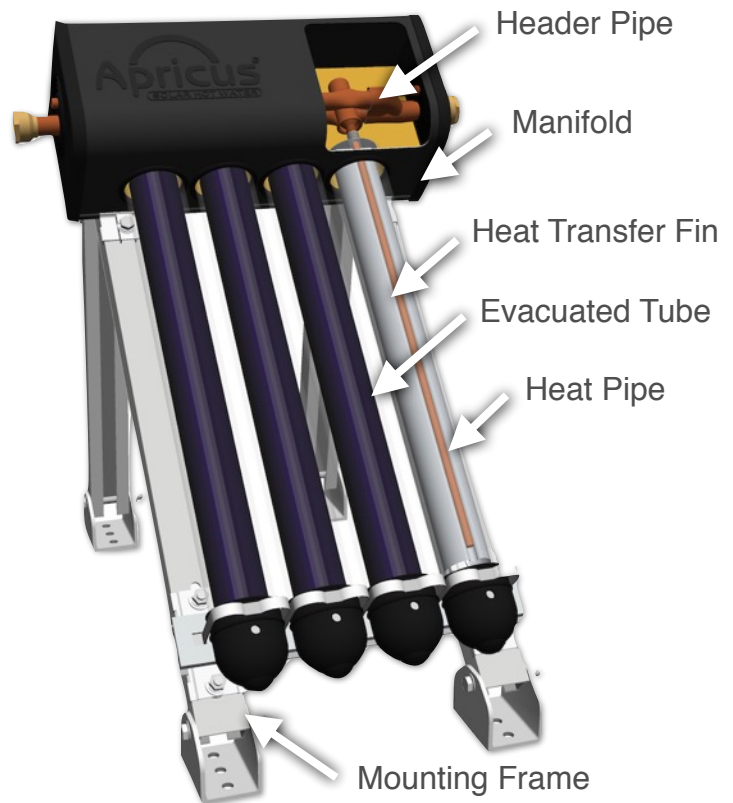
A small amount of water inside the heat pipe turns to steam at only 30°C rapidly transferring heat up to the header pipe. Liquid circulates through the header pipe carrying away the heat.

Mounting Frame

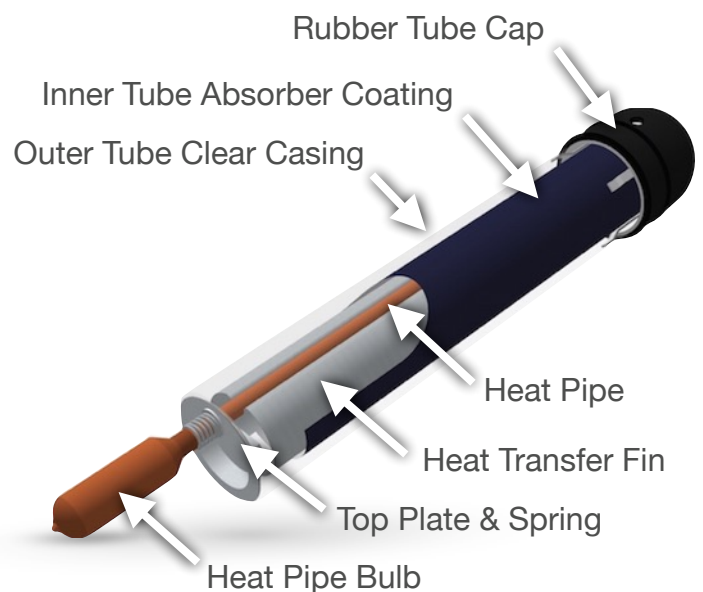
Frame components are made from high tensile and corrosion resistant anodized aluminium, with marine grade 316 stainless steel fasteners. The aluminium frame extrusions are designed to withstand extreme wind and snow loading with only 2 mounting rails, greatly speeding up the installation process.

A range of components are available to mount on almost any roof type and at various angles.

Complete ETC Collector



Evacuated Tube & Heat Pipe



EVOLUTIONARY DESIGN

The ETC solar collector is the successor to Apricus' flagship product, the AP evacuated tube solar collector. Tens of thousands of AP collectors have been installed worldwide over the past 8 years.

Internal R&D, 3rd party lab testing and feedback from installers have resulted in a range of incremental improvements. The same overall dimensions have been maintained, so most ETC components maintain backward compatibility with AP collectors. Below are just some of the key improvements.

Manifold Casing

The manifold casing has been upgraded from an electroplated finish after folding, to PVDF coated aluminium sheets.

The 500m long rolls of the coated metal are produced in a fully automated state of the art production line. The rolls are cut into sheets, stamped and folded into manifold case shape.

PVDF is widely used for roofing and wall panels due to its excellent performance in harsh outdoor environments.



Freeze Resistant Heat Pipes

Many Apricus' collectors are installed in cold regions and so freeze resilience is vital.

Apricus has developed a new generation of freeze protected heat pipes that have passed European (solarkeymark) testing as well as Apricus internal, more stringent, freeze cycle tests.

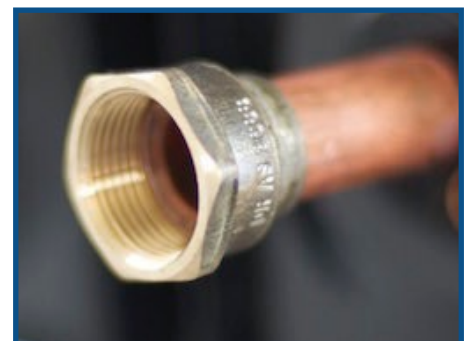
Cycles simulating over 10 years of harsh winters have been completed without freeze related damage.



Header Pipe Connections

Apricus has supplied collectors to Australia for more than seven years with DRZ brass flared compression fittings that provide an extremely reliable, leak free metal to metal seal.

This reliable fitting is now being implemented to all regions with the new ETC design. Adaptors are offered by Apricus that provide standard 3/4" M BSP/NPT thread or brazed/soldered connections to ensure worldwide compatibility. This format also provides a union connection between collectors connected in series.



Mounting Frame

The new mounting frame is made from high tensile 6005-T5 grade anodised aluminium alloy. The frame strength and mounting format has been certified as meeting Australian region D (316km/h) cyclonic wind loading requirements.

The anodised frame treatment combined with marine grade 316SS attachment plates, tube clips, nuts, bolts and washers make the collector extremely durable even in coastal installations.



CHOICE OF MATERIALS

Materials used in the Apricus ETC solar collector have been chosen to provide optimum efficiency while ensuring reliability, longevity and excellent end of life recyclability.

Silicone Rubber

HTV Silicone rubber is used for the manifold seals and tube caps due to its excellent stability through a wide temperature range and excellent UV stability.

Tube Attachment

Plastic tube caps that clip into the frame are widely used by many other brands, but they become brittle and degrade in UV radiation.

In contrast, Apricus ETC solar collectors use a high tensile 316 grade stainless steel clip that ensures the tubes are held firm long term even during extreme wind loads.



High Purity Copper

Apricus manufactures heat pipes in house using high purity C10200 grade copper combined with an ageing process that ensure long term vacuum stability and optimum heat transfer.

Using a lower purity grade copper such as C12200 reduces the cost of the heat pipes considerably but can reduce the longevity as impurities in the copper leach out over time (3-5 years) to form an air pocket in the bulb, compromising heat transfer.



Folded Aluminium Manifold Casing

Rather than using thick extruded aluminium for the manifold casing, the ETC collector uses folded 0.8mm thin high tensile PVDF coated aluminium alloy sheet. This provides a very strong, rigid casing that provides a total assembled manifold weight of only 9.2kg for ETC-30, half that of most competitors' designs.

That extra weight makes life a lot harder for installers carrying the manifold up a ladder! Prototypes of an extruded manifold casing design were developed by Apricus in 2008, but rejected by installers in field trials simply due to the extra weight it added.

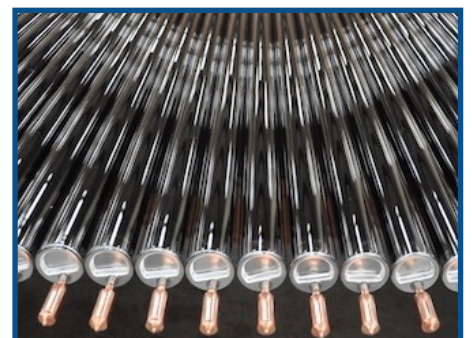


Evacuated Tubes

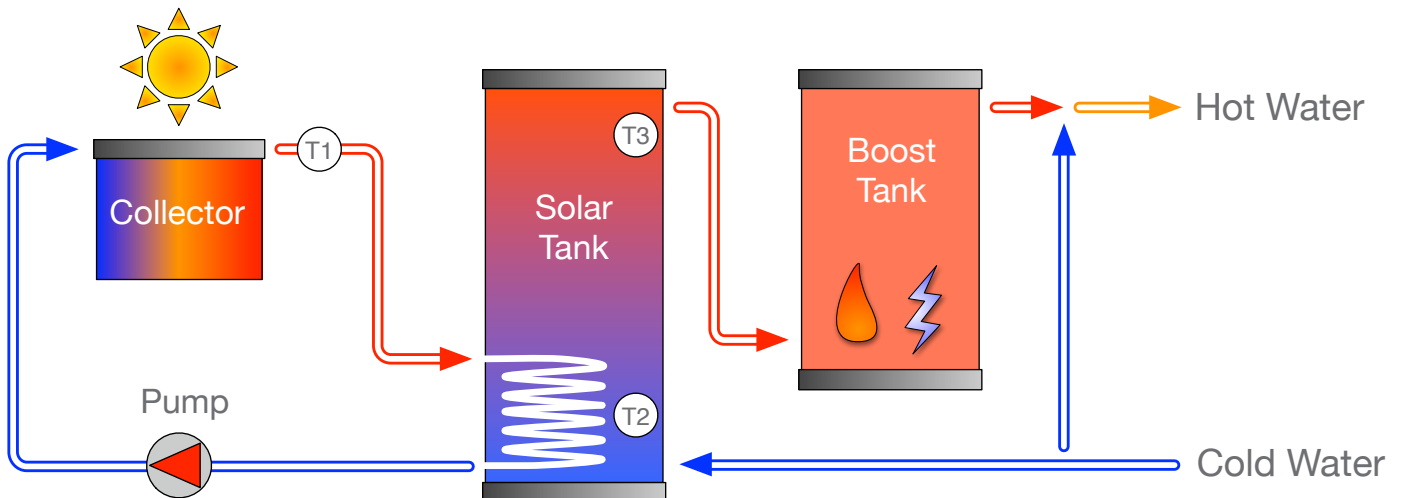
Apricus uses extremely durable twin-glass tubes with a high efficiency selective coating. Each batch of tubes undergoes random selection steel ball impact testing and 100% visual inspection. In addition Apricus tubes have passed Australian, European (Solarkeymark) and Swiss hail stone impact testing.

End of Life Recyclability

Ease of recycling was a key consideration when selecting the materials for the ETC solar collector, so ensuring minimal end of life environmental impact.



SOLAR SYSTEM OPERATION



System Operation Overview

1. The ETC solar collector converts sunlight into usable heat, heating the liquid in the header pipe.
2. Once the temperature in the header pipe is measured to be hotter than the water in the bottom of the storage tank (T2), the pump turns on. The liquid is slowly circulated through the header pipe in the collector, heating by $\sim 7^{\circ}\text{C}$ during each pass.
3. Depending on the location, the climate, and local requirements, water may be circulated directly from the storage tank, or through an internal coil (as shown) or external heat exchanger. Gradually throughout the day, the water in the storage tank is heated up.
4. The temperature in the top of the solar tank (T3) is monitored and the solar system is shut down (or excess heat is dissipated) once a maximum temperature ($\sim 75^{\circ}\text{C}$) has been reached.
5. If the water is not already hot enough from solar input, the traditional heating system boosts the solar pre-heated water up to the required temperature. The boosting may be an electrical element inside the main storage tank (solar tank), or a secondary tank (gas or electric). Since the water has already been heated by solar energy, less energy is consumed.
6. In hot climates up to 80% of domestic hot water can be provided by solar energy, with 55-60% provided in cold climates.

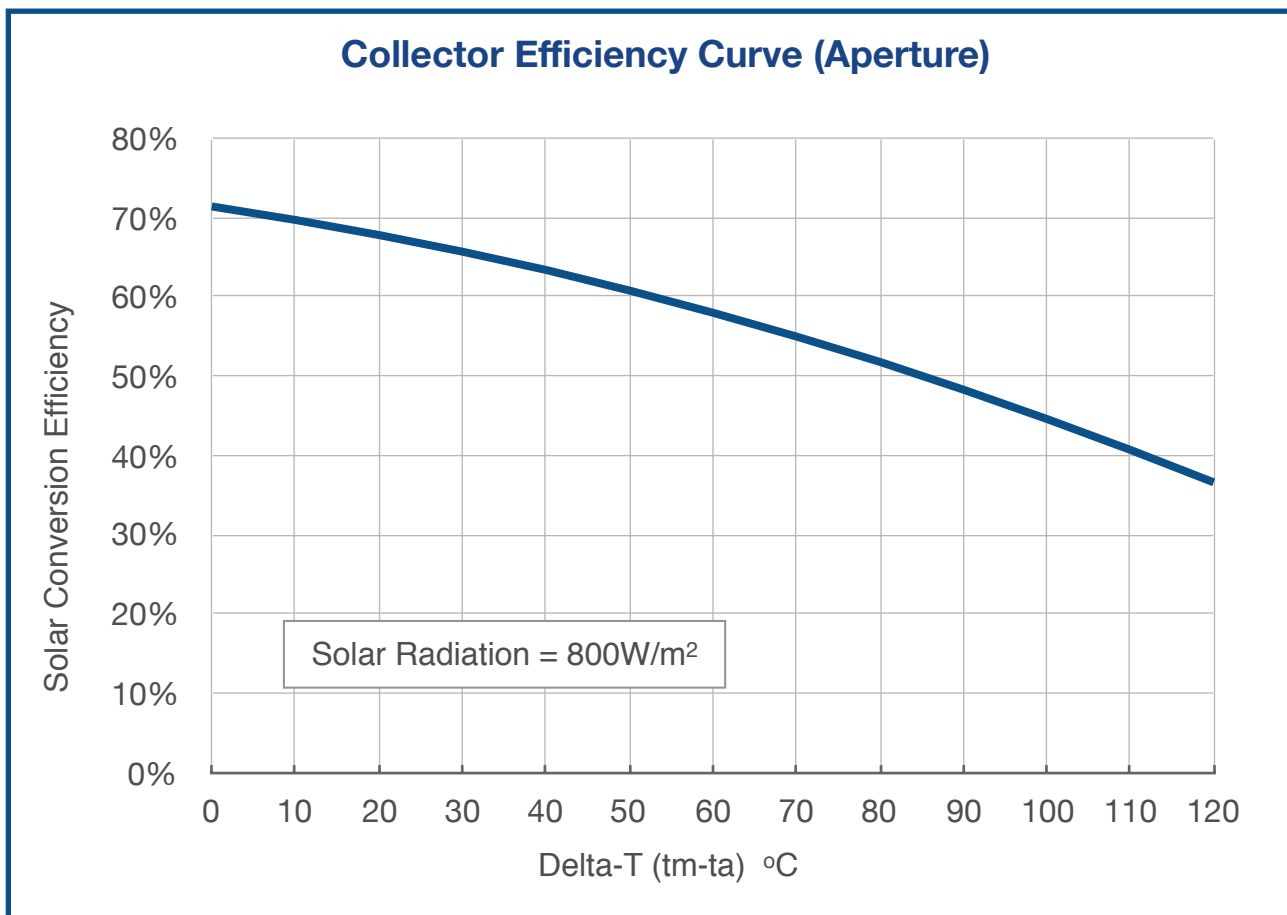


COLLECTOR EFFICIENCY

The instantaneous efficiency of the collector depends on the surface area used for the calculation. It is important to use the same area (absorber, aperture or gross) when comparing collectors. Aperture is the standard area measurement for presenting efficiency values.

Below are the performance variable for the Apricus ETC-30 solar collector based on TUV test results for Solarkeymark certification.

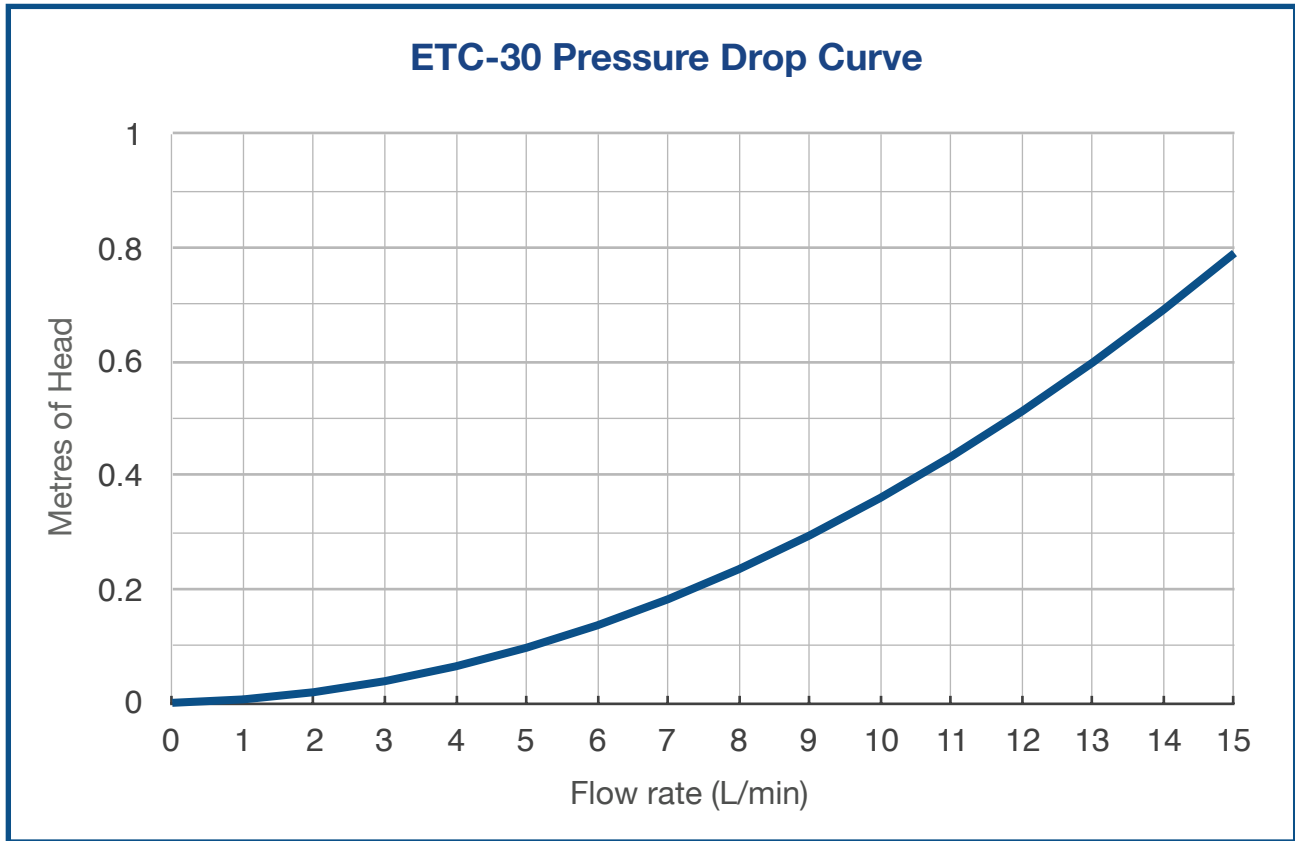
Variable	Absorber	Aperture	Gross Area
ETC-30 Area	2.4 m ²	2.84 m ²	4.4 m ²
Eta0 (η0)	0.845	0.714	0.46
a1	1.47	1.243	0.802
a2	0.01	0.009	0.005



It is important to consider BOTH efficiency conversion and IAM to evaluate a collector's true daily or annual heat output.

PRESSURE DROP

The following curves provides the pressure drop values for an ETC-30 collectors. This can be used to help determine pump sizing when installing a number of collectors in series.

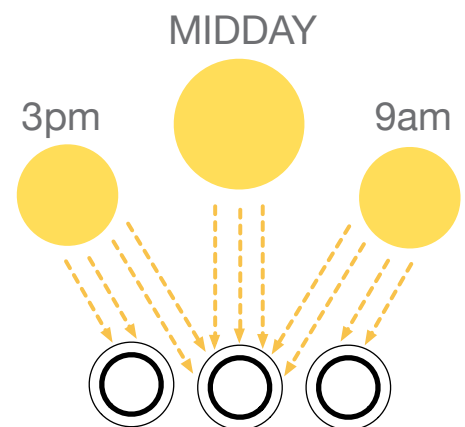


INCIDENCE ANGLE MODIFIER (IAM)

IAM is a measure of the change in collector output as the sun angle changes. Longitudinal IAM is the path of the sun in the sky throughout the year. Transversal IAM represents the sun’s path over the collector each day from morning to afternoon and is very different for Apricus evacuated tubes compared to flat absorbers due to the round shape.

The round shaped evacuated tube absorber passively tracks the sun throughout the day. The transversal IAM values are also referred to as “angle modifiers” and are multiplied by efficiency calculations to get the actual total output of the solar collector.

The values in the table are required if using Polysun, TRNSYS or other solar thermal output modelling calculators.



Angle	0°	10°	20°	30°	40°	50°	60°	70°
Longitudinal	1	1	1	0.99	0.98	0.97	0.94	0.88
Transversal	1	1.03	1.07	1.16	1.31	1.4	1.44	1.3

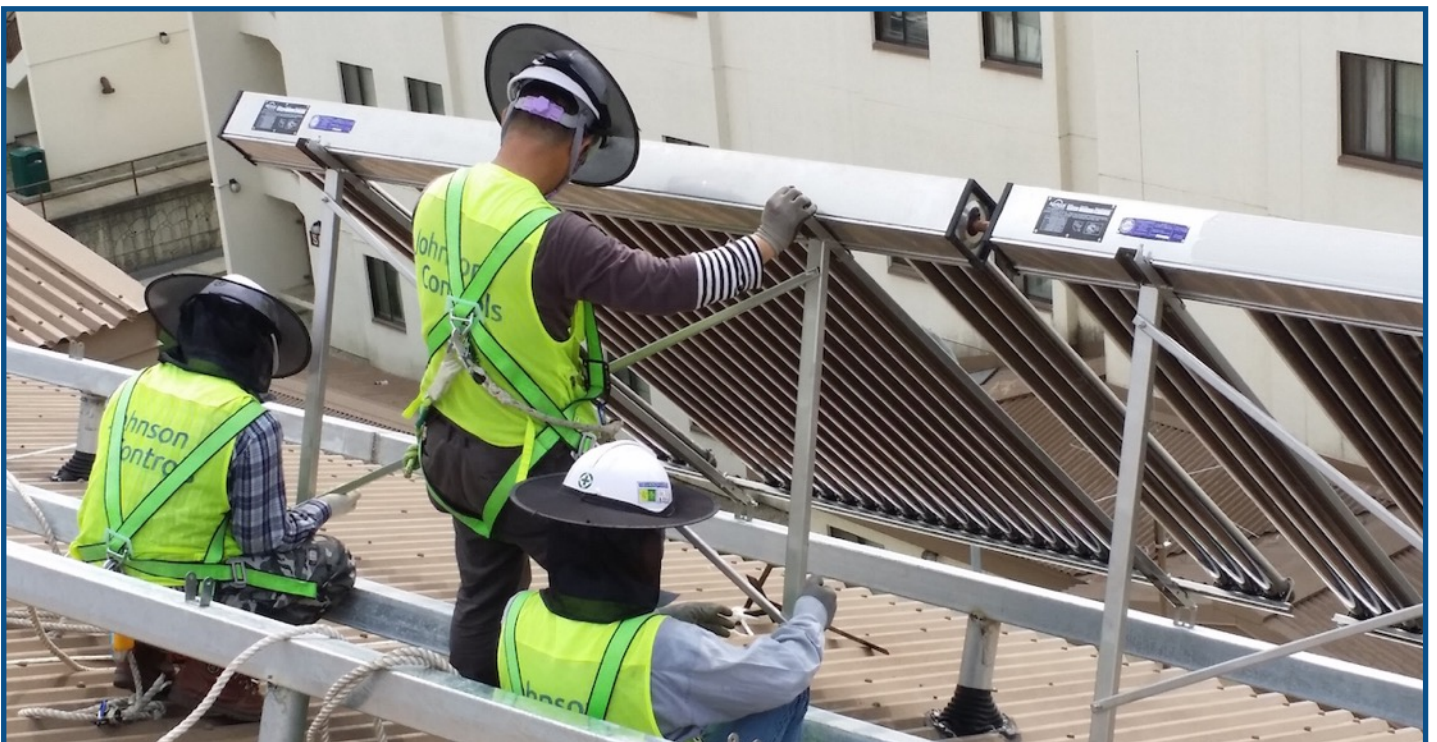
SNOW LOADING

ETC solar collectors are rated for up to 295kg/m² snow loading. The roof and attachment points must also be suitably rated. In snow prone regions the installation angle should be 45° or higher and the collector raised off the roof by a suitable amount to prevent snow build-up on the tubes.



WIND LOADING

Apricus ETC aluminium solar collector mounting frames have been independently reviewed by structural engineers and confirmed to be strong enough for wind gusts up to 316km/h. Conditions apply, so always consult with a local structural engineer to review the roof structure to ensure a suitable strength attachment method is implemented. Refer to the full ETC solar collector installation manual for more information on frame design and mounting.



STANDARD PACKAGE CONTENTS

The following diagrams shows the standard parts that are packed together. Refer to the following page for more detailed product listing, packing dimensions and weights.

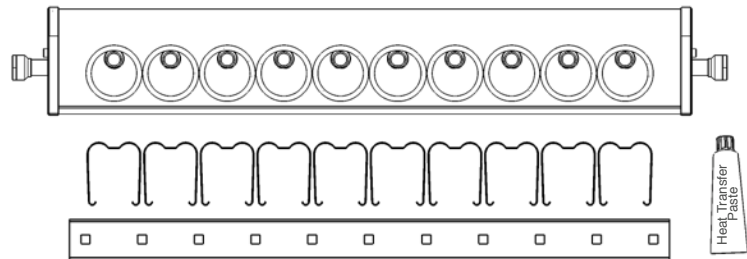
Box/Package

Package Contents

Manifold Box

Contents:

- 1 x ETC manifold
- 1 x Bottom Track
- Tube Clips
- Heat Transfer Paste



Front Tracks

Contents:

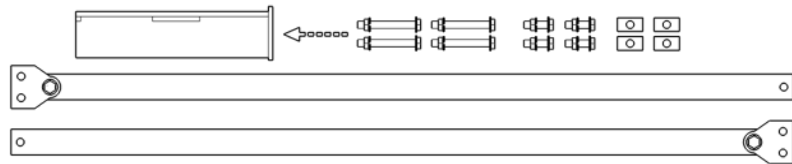
- 2 x Front Tracks
- 8 x Attachment Plates (on tracks)



Rear Legs

Contents:

- 2 x Rear Legs
- 4 x Tri-plates (attached)
- 1 x Box of nuts, bolts etc.



X Braces

Contents:

- 1 x X-brace
- Bolts packed with rear legs



U Feet

Contents:

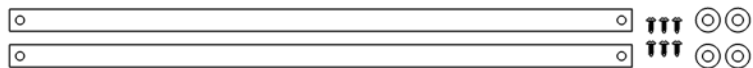
- 4 x U Feet
- 4 x Bolts (in plastic bag)



Leg Extensions

Contents:

- 2 x Leg Extensions
- 6 x Screws
- 4 x Washers



Roof Rails

Contents:

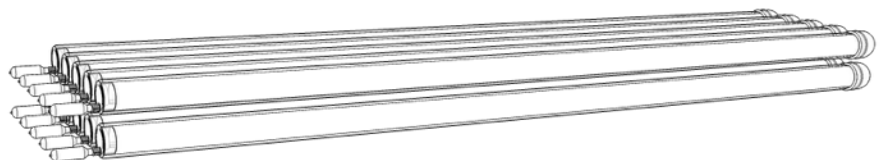
- 2 x Roof Rails
- 8 x L Brackets (on rails)
- 4 x Bolts (attached to L brackets)



ET & HP Box

Contents:

- Evacuated Tubes & Heat Pipes
- 3 packing formats:
(10/10-ET/HP, 12/12-ET/HP or 10 ET)

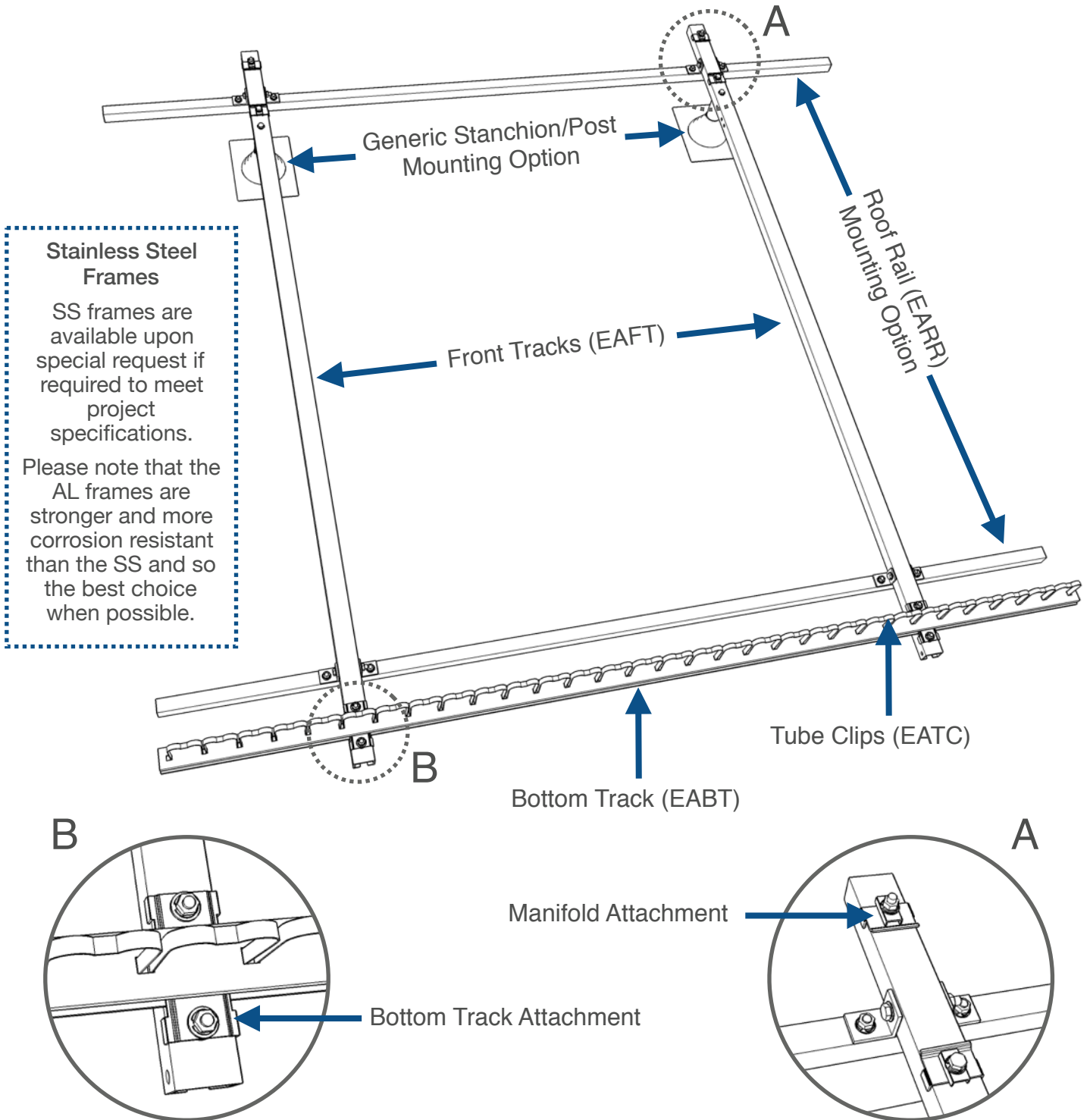


PACKING DIMENSIONS & WEIGHTS

Product Type	Packing List (1 Set)	Sets/Box	Dimensions LxWxH	Set G. Wt Box G. Wt
10T Manifold Box	<ul style="list-style-type: none"> • 1 x ETC-10T (Manifold) • 1 x EABT-10T (Bottom Track) • 10 x ETC-FR-TC (Tube Clips) • 1 x HTP-25G (Heat Transfer Paste) 	1	900*185*160mm	5kg
20T Manifold Box	<ul style="list-style-type: none"> • 1 x ETC-20T (Manifold) • 1 x EABT-20T (Bottom Track) • 20 x ETC-FR-TC (Tube Clips) • 1 x HTP-25G (Heat Transfer Paste) 	1	1660*180*160mm	10kg
22T Manifold Box	<ul style="list-style-type: none"> • 1 x ETC-22T (Manifold) • 1 x EABT-22T (Bottom Track) • 22 x ETC-FR-TC (Tube Clips) • 1 x HTP-25G (Heat Transfer Paste) 	1	1800*180*160mm	11.7kg
30T Manifold Box	<ul style="list-style-type: none"> • 1 x ETC-30T (Manifold) • 1 x EABT-30T (Bottom Track) • 30 x ETC-FR-TC (Tube Clips) • 1 x HTP-25G (Heat Transfer Paste) 	1	2330*180*160mm	14.1kg
Box of 10*ET & HP	• 10 x Evacuated Tubes & Heat Pipes	1	1965*370*190	28kg
Box of 12*ET & HP	• 12 x Evacuated Tubes & Heat Pipes	1	1965*370*260	33.6kg
Front Tracks	• 2 x EAFT (Front Tracks)	4	2080*255*150mm	4.9kg 21kg
20D Rear Legs	<ul style="list-style-type: none"> • 2 x EARL-20D (20° Rear Legs) • 1 x 316SS Bolt Set in Plastic Box 	8	700*325*175mm	1.45kg 12.5kg
30D Rear Legs	<ul style="list-style-type: none"> • 2 x EARL-30D (30° Rear Legs) • 1 x 316SS Bolt Set in Plastic Box 	8	940*325*175mm	1.9kg 16.4kg
45D Rear Legs	<ul style="list-style-type: none"> • 2 x EARL-45D (45° Rear Legs) • 1 x 316SS Bolt Set in Plastic Box 	8	1230*325*175mm	2.5kg 21.7kg
60D Rear Legs	<ul style="list-style-type: none"> • 2 x EARL-60D (60° Rear Legs) • 1 x 316SS Bolt Set in Plastic Box 	8	1750*325*175mm	3kg 25.8kg
10T X Brace	• 1 x EAXB-10T (X Braces)	8	765*254*45mm	0.2kg 2.1kg
20/22T X Brace	• 1 x EAXB-20/22T (X Braces)	8	1270*254*45mm	0.3kg 3kg
30T X Brace	• 1 x EAXB-30T (X Braces)	8	1515*254*45mm	0.35kg 3.9kg
U Feet	<ul style="list-style-type: none"> • 4 x EAUF-45 (U Feet) • 4 x 316SS Bolt Set 	1	130*80*90mm	0.7kg
10T Roof Rails	• 2 x EARR-10T (Roof Rails)	8	775*295*190mm	1.6kg 13.6kg
20/22T Roof Rails	• 2 x EARR-20/22T (Roof Rails)	8	1615*295*190mm	2.9kg 25kg
30T Roof Rails	• 2 x EARR-30T (Roof Rails)	4	2175*295*100mm	3.8kg 17kg
Leg Extension	<ul style="list-style-type: none"> • 2 x EARL-EXT (Leg Extensions) • 6 x Screws • 4 x Washers (use with EAUF or EARR) 	4	695*280*150mm	1.3kg 11.2kg

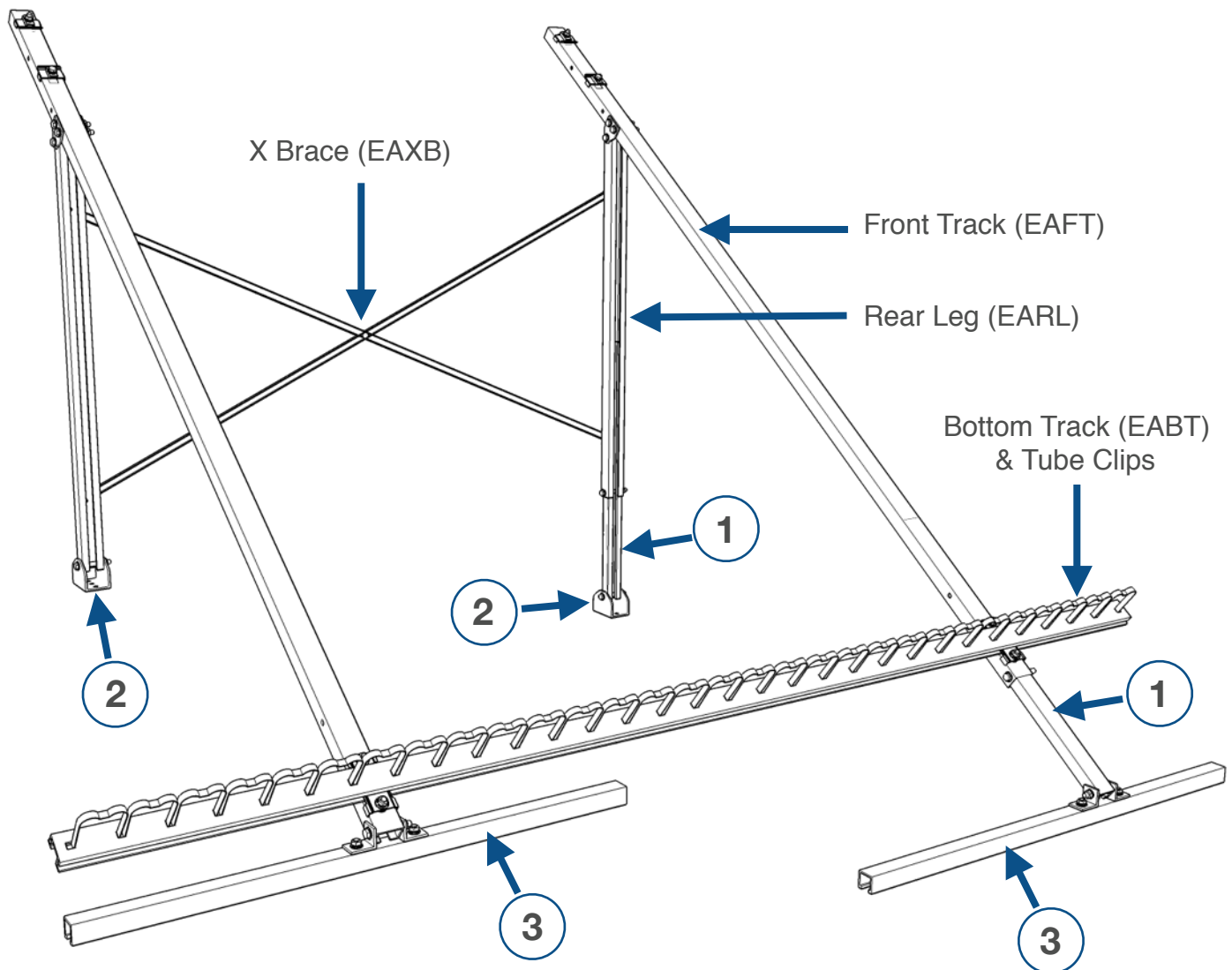
STANDARD MOUNTING FRAME

- ETC collectors are supplied with a Standard Frame for flush mounting on a $>20^\circ$ pitched roof.
- Depending on the roof type, there are many methods of attachments formats that can be used, bolted through the sides or top of the Front Tracks. Additional holes may be drilled as required.
- Apricus Roof Rails are an excellent method for attaching to the roof.
- 3rd party mounting hardware such as stanchions/posts may also be used.



ANGLED MOUNTING FRAME

- Two Rear Legs and an X Brace are added to the Standard Frame to raise the rear of the collector.
- A range of leg lengths are available to achieve angles from ~20° up to ~60°.
- Leg Extensions can also be used to extend the Front Track to raise the collector in snowy regions.
- Diagram below shows various different mounting and adjustment hardware offered by Apricus.



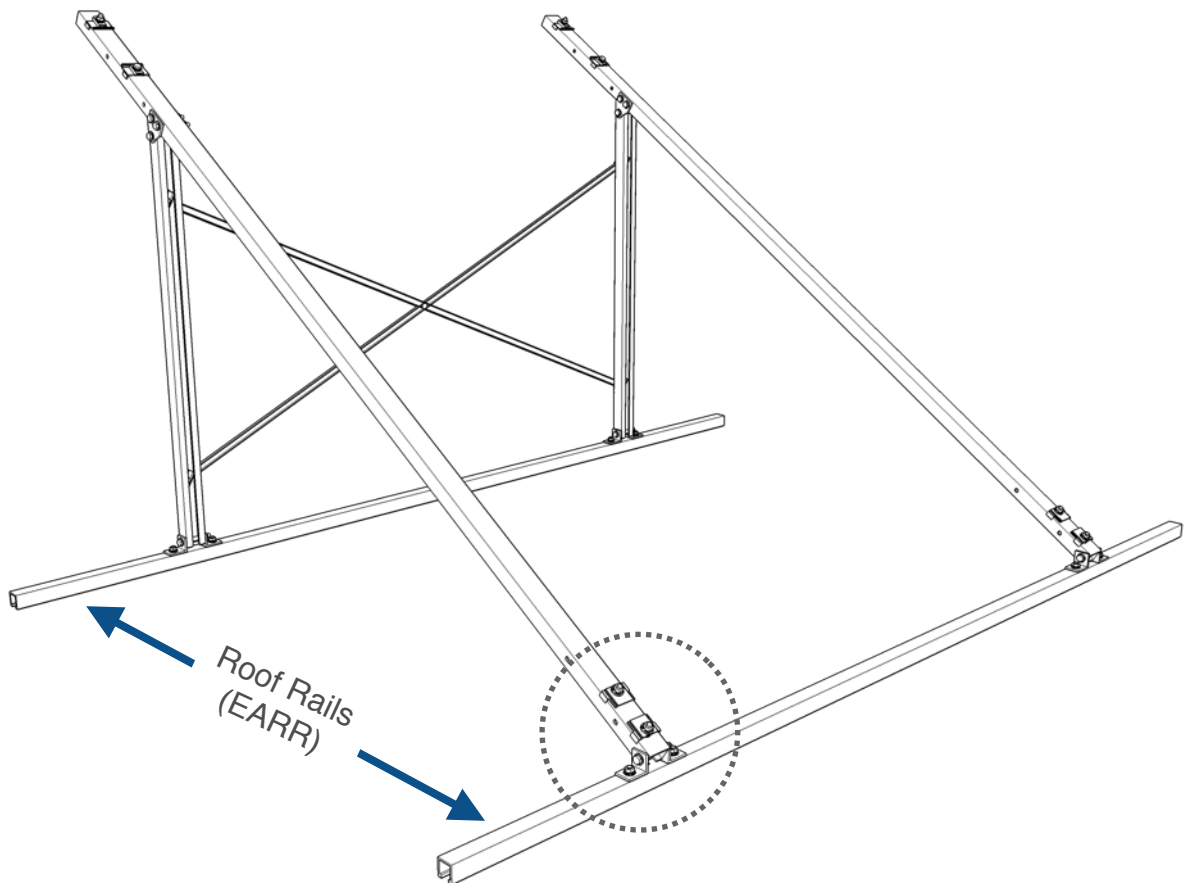
1. Leg Extension (EARL-EXT) *
2. U Foot (EAUF-45)
3. Roof Rail (EARR) **

* Leg Extensions ordered separately from Angled Frames.

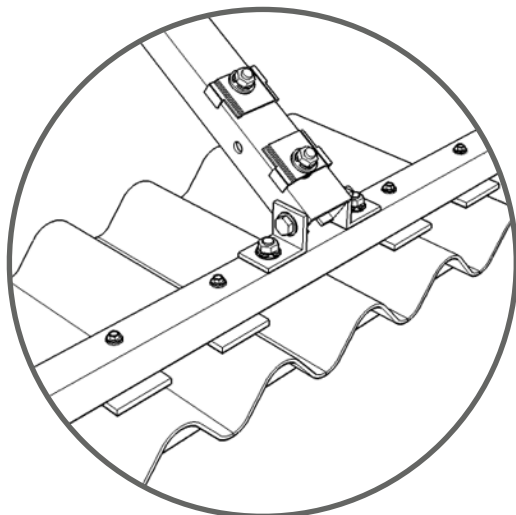
** Roof rails always run the full width of the collector, not half as shown.

ROOF RAILS

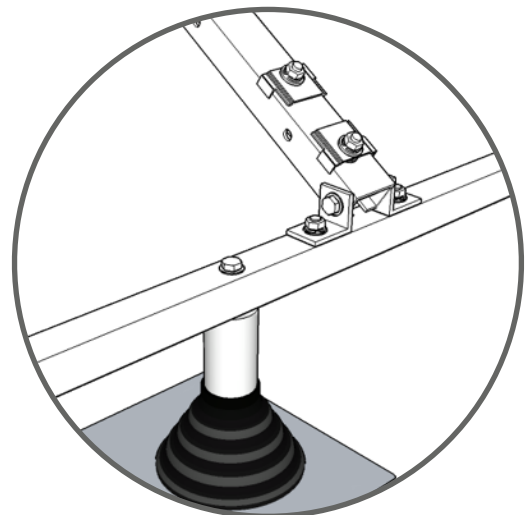
- Designed for use where Front Tracks cannot be aligned neatly with roof mounting points or where many attachment points are required to ensure suitable strength.
- Can be used on the standard frame in a flush mounting format, or on high angle frames (shown below)
- Attached to the Rear Legs or Front tracks using L brackets (supplied) for optimal strength and stability.
- Holes can be drilled in the top or sides of the Roof Rails as required for mounting.



Sheet Metal Roofing

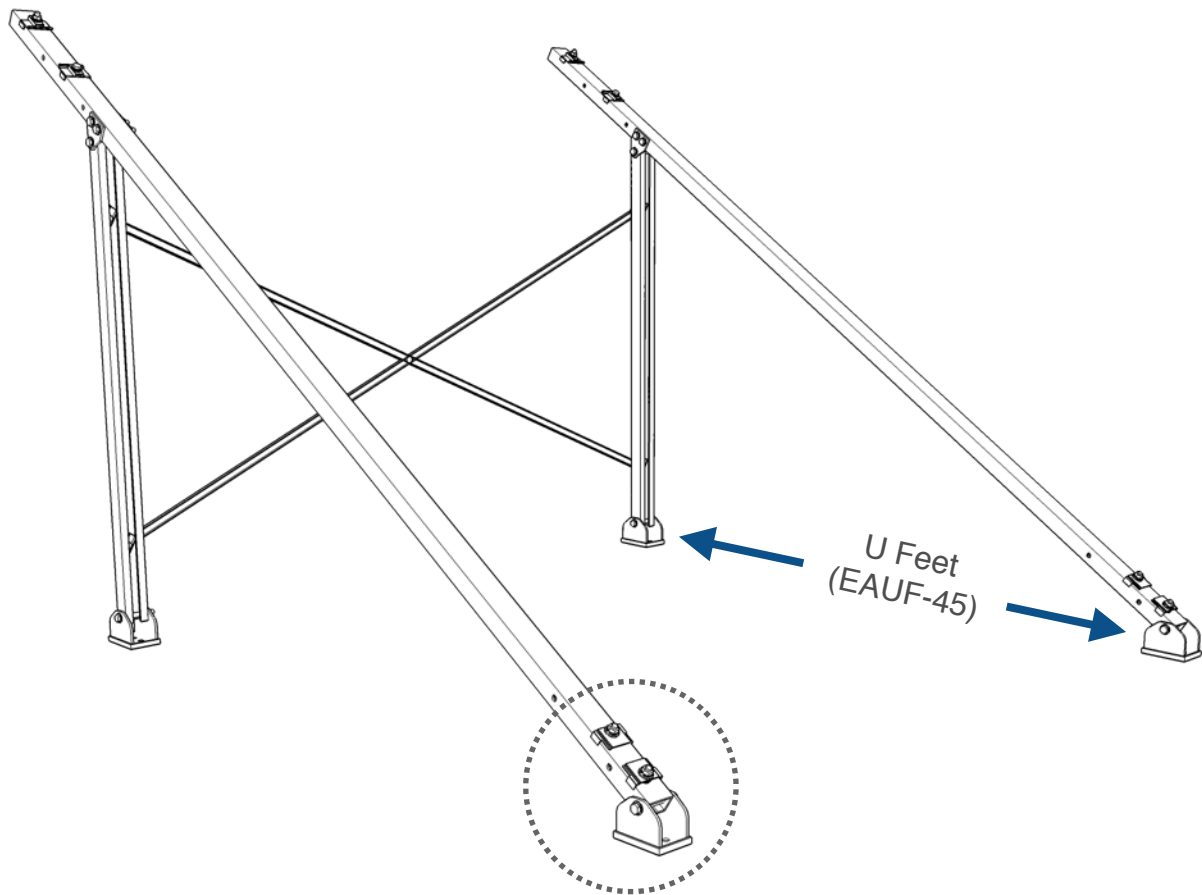


Stanchions / Posts

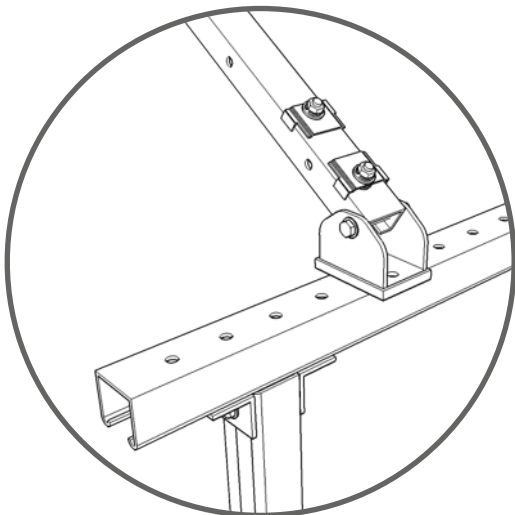


U FEET

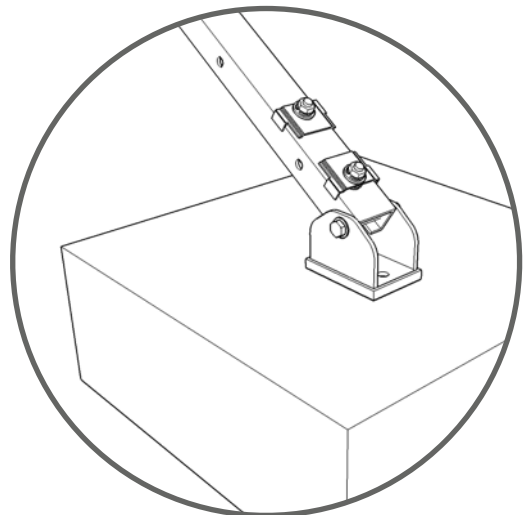
- Ideal for flat roof mounting on concrete blocks or metal framework.
- Primarily used with angled frames.
- Attached to the end of Rear Legs, Front tracks or Leg Extensions.
- Include a silicone rubber pad to protect other metal surfaces, provide basic sealing.



Metal Frame

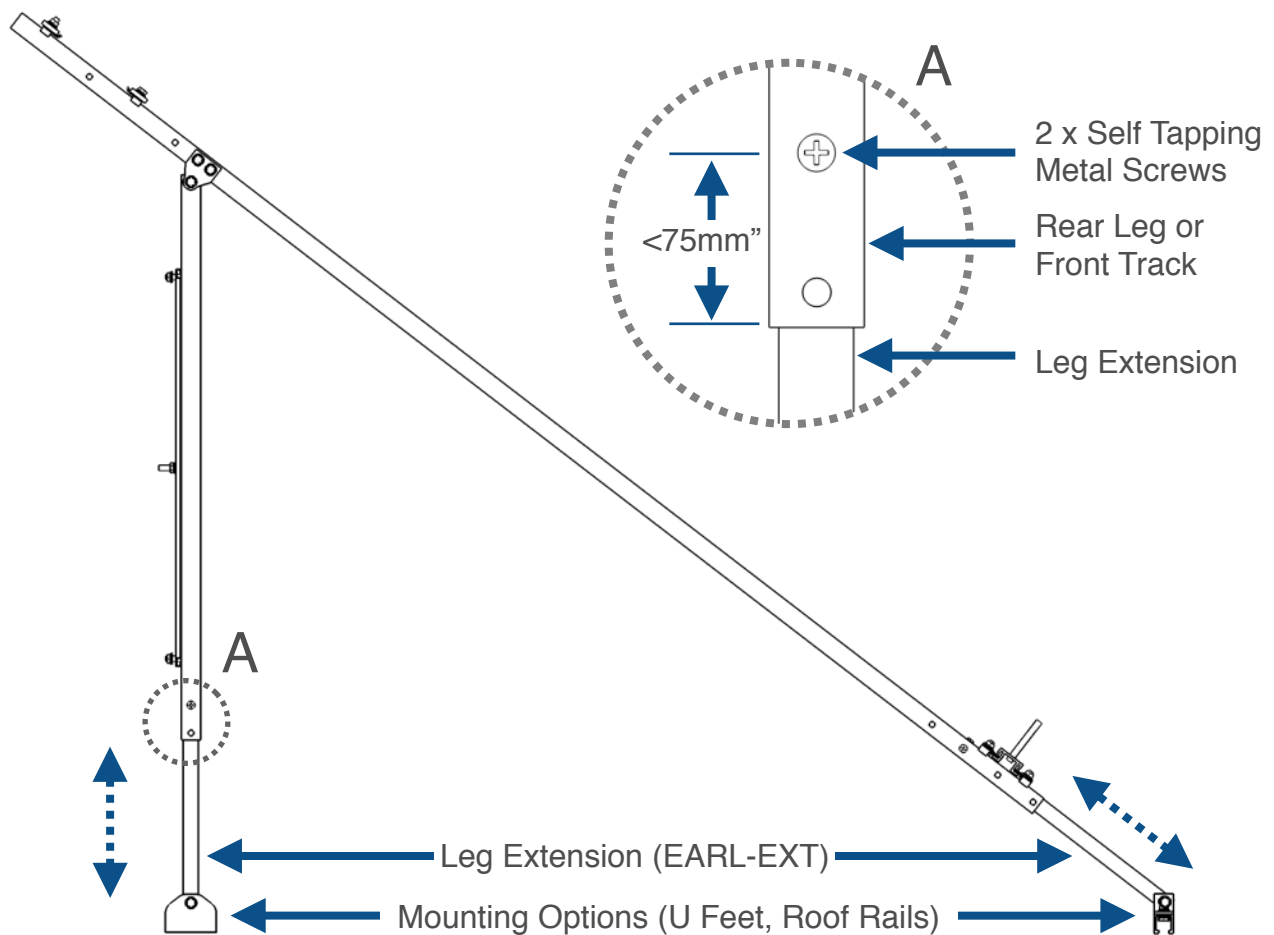


Concrete Block

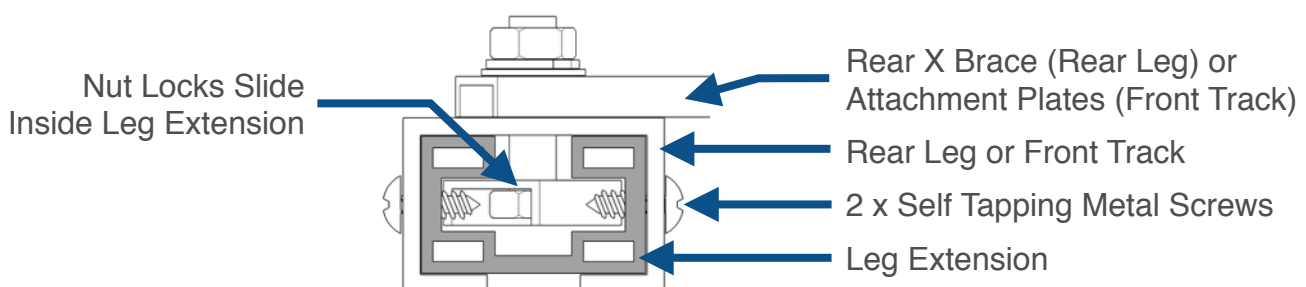


LEG EXTENSIONS

- Extend rear legs (RL) to achieve larger installation angle or extend front tracks (FT) to lift front of collector off roof in high snowfall regions.
- Leg Extensions are NOT supplied as standard with Rear Legs and must be ordered separately.
- Leg Extension slide inside RL or FT for fully adjustable position.
- Must insert minimum of 100mm into RL or FT to ensure sufficient strength.
- Secured using 2 supplied stainless steel screws (drill 3.5mm pilot holes) plus existing RL or FT bolt(s).
- Screws should be located within 75mm of the end of the RL or FT.

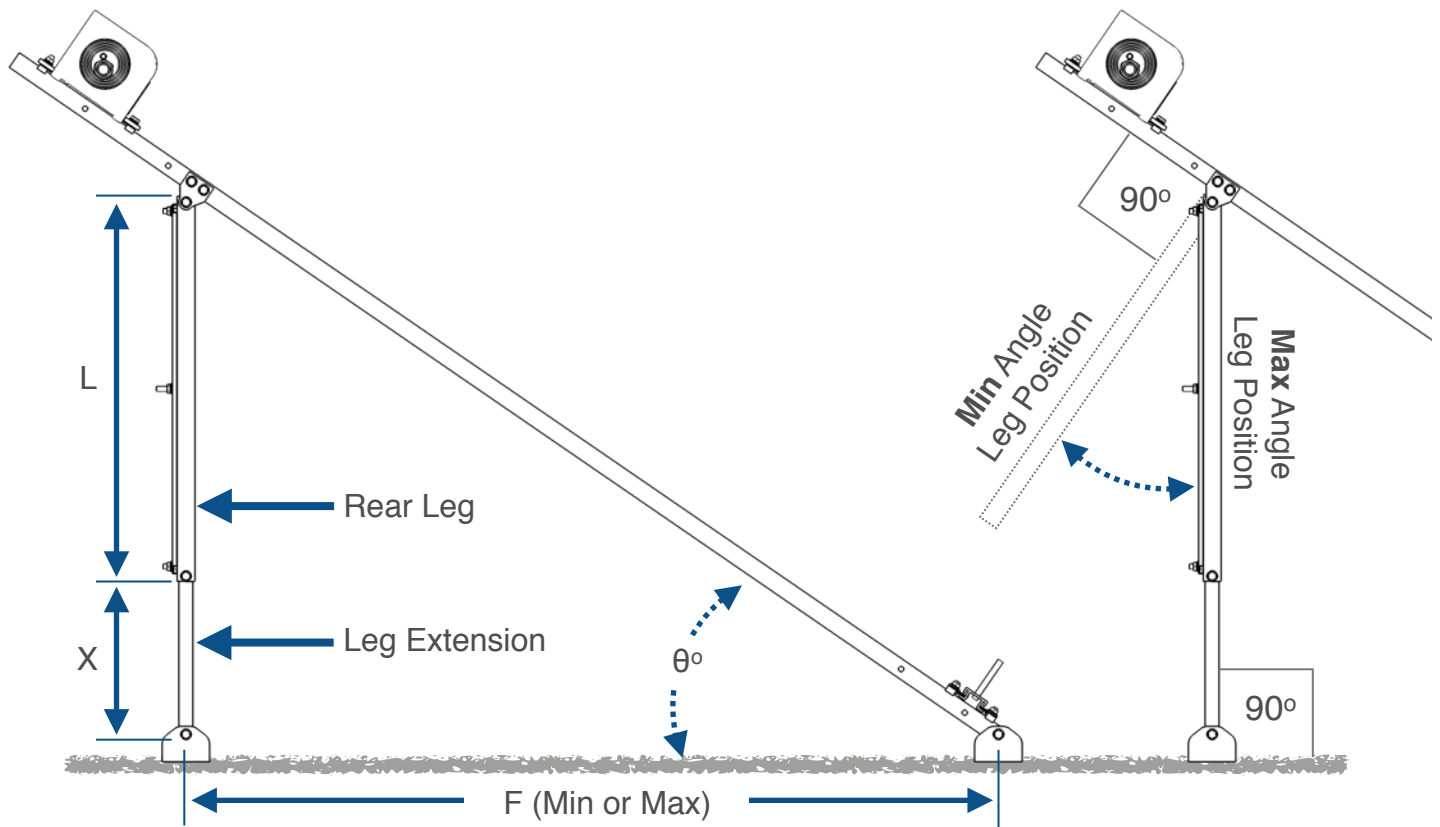


Cross Sectional View



MOUNTING ANGLE & DIMENSIONS

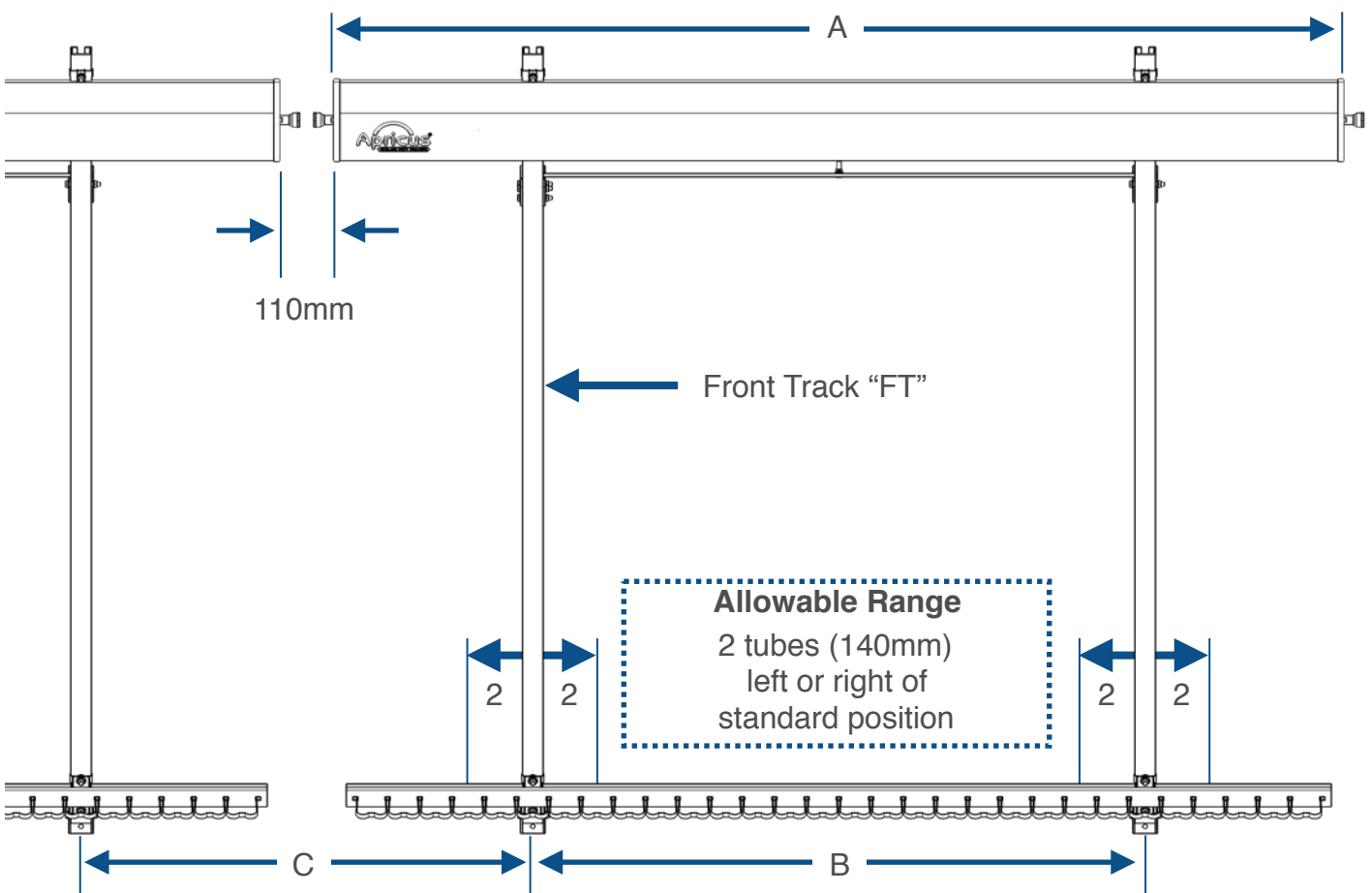
- Rear Legs can be adjusted between Min & Max positions to make small adjustments to the angle.
- Leg positions outside this range are not structurally sound and must not be used.



L (Leg Length)	X (Extension)	F (Min)	F (Max)	θ° (Min)	θ° (Max)
EARL-20D (650mm)	No Extension	1771mm	1515mm	22°	23°
	50mm	1792mm	1494mm	23°	26°
	150mm	1834mm	1444mm	26°	30°
	250mm	1881mm	1385mm	29°	34°
	350mm	1931mm	1317mm	32°	38°
	450mm	1986mm	1236mm	34°	42°
	550mm	2044mm	1141mm	36°	47°
EARL-30D (888mm)	No Extension	1871mm	1393mm	29°	33°
	50mm	1895mm	1361mm	30°	35°
	150mm	1948mm	1288mm	33°	39°
	250mm	2004mm	1202mm	35°	44°
	350mm	2063mm	1101mm	37°	49°
	450mm	2126mm	979mm	39°	55°
EARL-45D (1179mm)	No Extension	2027mm	1163mm	36°	46°
	50mm	2056mm	1111mm	37°	49°
	150mm	2118mm	991mm	39°	54°
EARL-60D (1425mm)	No Extension	2179mm	849mm	50°	60°

MOUNTING ANGLE & DIMENSIONS

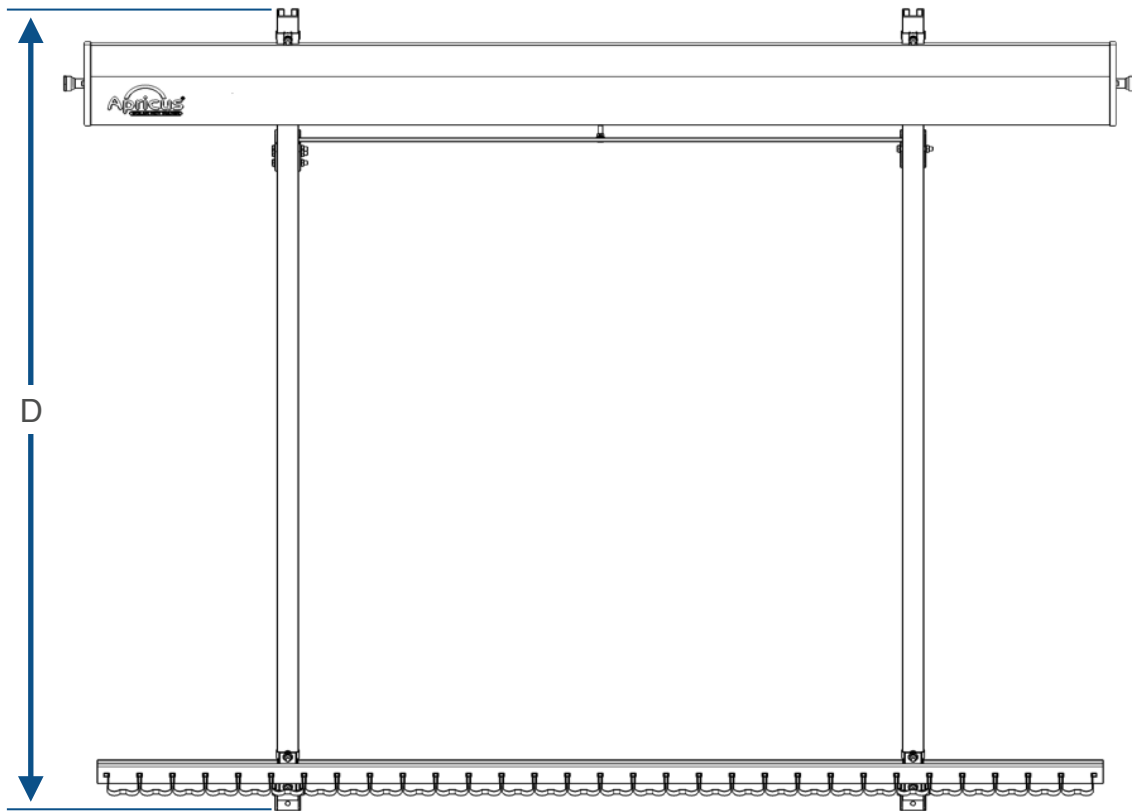
- The following diagram and table provides the Front Track spacing (and Rear Leg for angled frames) for each collector size (10, 20, 22 & 30 tube).
- Front Tracks can be positioned up to 2 tubes left or right of standard position as required for mounting.
- The standard frame spacing (B) positions the Front Tracks underneath the evacuated tubes:
 - 10T: 2nd & 9th tubes
 - 20T: 3rd & 18th tubes
 - 22T: 4th & 19th tubes
 - 30T: 6th & 25th tubes



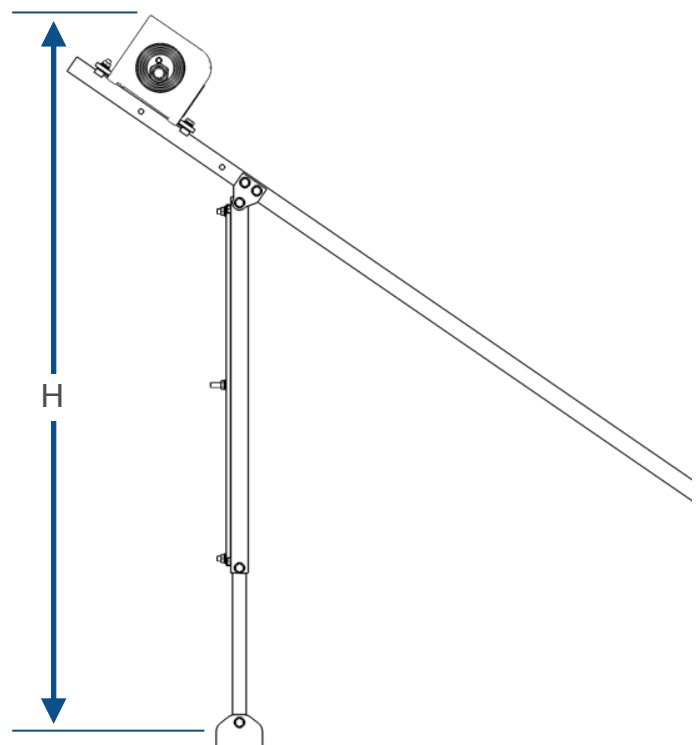
# Tubes	A (Manifold Width)	B (FT Spacing)	C (Next FT Spacing)
10	796mm	490mm	416mm
20	1496mm	1055mm	556mm
22	1636mm	1055mm	696mm
30	2196mm	1330mm	976mm

MOUNTING ANGLE & DIMENSIONS

- The following diagram and table provides the overhead depth (D) and height (H) of the collector at each 5° incremental angle between the allowable 20-80° range.

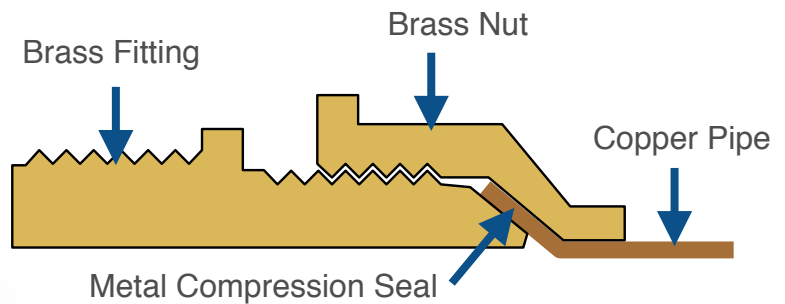
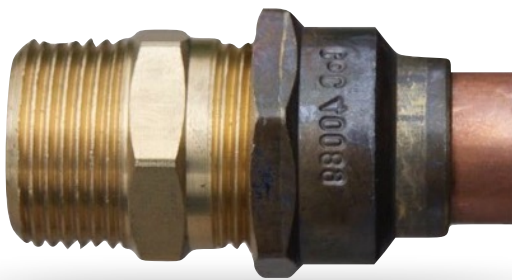


Angle	D (Depth)	H (Height)
20°	1938mm	802mm
25°	1872mm	954mm
30°	1792mm	1099mm
35°	1699mm	1236mm
40°	1593mm	1363mm
45°	1475mm	1480mm
50°	1346mm	1585mm
55°	1208mm	1679mm
60°	1060mm	1760mm
65°	905mm	1833mm
70°	743mm	1898mm
75°	575mm	1950mm
80°	404mm	1987mm



BRASS FITTINGS

- The inlet and outlet of the ETC collector header pipe are factory fitted with a brass flared pipe nut. This connection forms a metal-metal-metal seal which is far more reliable than o-rings or washers when considering the high temperatures that the solar collectors experience during operation.
- This method is the standard copper pipe connection used in Australia. Apricus adopted this format for the Australian market nearly 7 years ago and is now implementing globally.

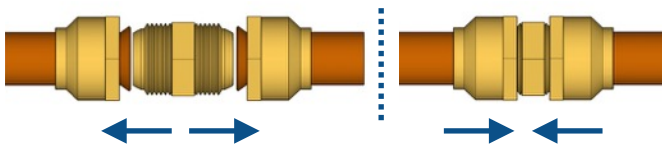


Brass Fitting Options

Collector-Collector Fitting

Part: BF-ST-FL19xFL19

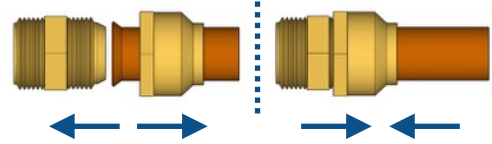
Description: This brass fitting is used between two collectors when connected in series.



Male BSP Thread Fitting

Part: BF-ST-FL19x3/4"MBSP

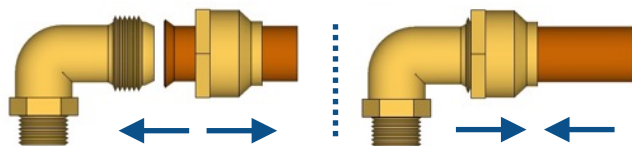
Description: Provides a 3/4" male BSP thread (Metric standard).



Elbow Male Thread Fitting

Part: BF-L-FL19x1/2"MBSP

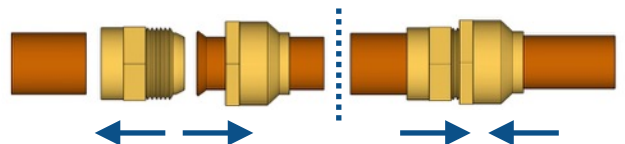
Description: Elbow fitting provides a 1/2" male BSP thread (Metric standard). Suitable for 1-2 collector systems only.



22mm Copper Pipe Sweat Fitting

Part: BF-ST-FL19x22S

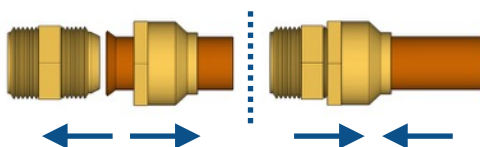
Description: Solder/brazing connection for European standard 22mm OD copper pipe.



Male NPT Thread Fitting

Part: BF-ST-FL19x3/4"MNPT

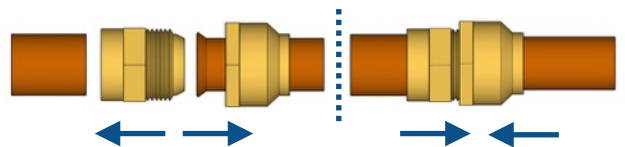
Description: Provides 3/4" male NPT thread (US standard).



7/8" Copper Pipe Sweat Fitting

Part: BF-ST-FL19x7/8"S

Description: Solder/brazing US standard 3/4" copper pipe (actually 7/8" OD).



LIMIT OF LIABILITY

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Apricus assumes no responsibility under this Limited Warranty for any damage to the Products caused after they have left the control of Apricus, including but not limited to damages caused by any trades people or visitors on the job site, or damage caused as a result of post-installation work. This Limited Warranty shall be invalidated by any abuse, misuse, misapplication or improper installation of the Products.

GENERAL

Apricus warrants its Solar Collectors and Accessories (the "Products") to be free from defects in workmanship under normal usage for the applicable Warranty Period from the date of installation. This Limited Warranty extends to the End-User of the product at the original installation location, and is not transferable.

In the event of a defect, malfunction or other failure of the Products occurring within the applicable Warranty Period which is not caused by any misuse or damage to the Product while in the possession of the End-User, Apricus will remedy the failure or defect within a reasonable amount of time. The remedy will consist of repair or replacement of the Products, or refund of the purchase price, in Apricus's sole discretion. However, Apricus will not elect to refund the purchase price unless it is unable to provide a replacement, and repair is not commercially practical and cannot be made within a reasonable timeframe. After a reasonable number of attempts by Apricus to remedy any defects or malfunction, the End-User will be entitled to either a refund or replacement of the product or its component parts. The remedies stated herein are the sole remedies for defects within the applicable warranty period.

WARRANTY PERIOD

The "Effective Date" of warranty coverage is the installation date as recorded on the installation record form, purchase invoice date, or, if neither are available, the date of manufacture plus sixty (60) days.

Components	Failure Type	Coverage
Manifold Box	Manifold Box Leaking Rubber Seal Cracking	Ten years parts
	Manifold Case Colour Fading	One year parts
	Manifold Case Coating Pitting or Peeling	Three year parts
Header Pipe	Leaking	Fifteen years parts
	Brass Fittings	Ten years parts
Evacuated Tube	Complete Loss of Vacuum	Ten years parts
Heat Pipe	Not Transferring Heat	Ten years parts
Mounting Frame	Structural Failure Dimensional Errors Effecting Operation	Fifteen years parts
Tube Clips	Structural Failure	Ten years parts
Tube Caps	Cracking	Ten years parts

WARRANTY EXCLUSIONS

This warranty shall be void and shall have no effect if:

General

- The design or structure of the Products are attempted to be modified or altered in any way, including but not limited to attaching non-Apricus approved appliances or equipment;
- The Products are not installed or repaired in accordance with applicable local codes;
- The Products are not installed by qualified, suitably licensed persons;
- The installer had not received Product installation training by an authorized Apricus distribution partner;
- The installation was not completed in line with the guidelines of the then current Apricus installation manual;
- Failure due to vibrations or movement of the piping connected to the collector, such as when valve or faucet/tap is closed.
- Failure is due to wind, hail, storms or other acts of God;
- Failure or loss of efficiency is due to lime-scale formation;
- Product serial tag or other identification is defaced or removed;

- Product is relocated from its original point of installation;
- Collector is not commissioned and is left to dry stagnate for a period exceeding 14 consecutive days;
- Any operation or environmental conditions that exceed documented design limits of the system components or materials.

Manifold Casing

- Damage to the manifold casing during or after installation;
- Failure to seal insulation up to manifold casing for rear port manifolds;
- Piping connected to the inlet/outlet is not properly supported causing rubber seal to be pulled out of shape;
- Gradual colour fade
- Damage due to attacks by insects or animals
- Piping connected to the inlet/outlet is "hung" off the collector.

Header Pipe

- Leakage from any connection to header inlet or outlet;
- Exposure of the manifold header pipe to pressure exceeding 0.8Mpa/8bar/116psi;
- Exposure to flow rates exceeding 15 L/min or 4gpm;
- Freezing of the liquid contained in the manifold header pipe;
- Leakage of the manifold header pipe as a clear result of metallic corrosion and not structural braze failure;
- Poor heat transfer, excessive pressure drop, or blockage of header as a result of scale formation;
- Installation of more than five end port manifolds in series without at least one suitably flexible connection that allows longitudinal expansion and contraction of the header pipe(s);
- Piping connection on the inlet/outlet of the collector that restricts longitudinal expansion and contraction of the header pipe(s).
- Piping connected to the inlet/outlet is "hung" off the collector.
- Brass fitting has been over torqued, indicated by deformation marks on corners of the HEX of the nut, crossed thread or other clear evidence of incorrect use;
- Spanner/wrench with teeth (rather than flats) has been used to tighten the fitting;
- Non Apricus supplied nipple has been used with the flared nut;
- Copper flare has been deformed from original manufacturer shape.

Evacuated Tubes

- Heat pipes are not correctly installed full depth into header ports, indicated by deformation of the evacuated tube top plate;
- Heat pipes are not running straight up and down the top side of the evacuate tube due to excessive rotation of the evacuated tube during installation;
- Collector mounting frame is installed in twisted (not squared or even) position putting stress on evacuated tubes;

Heat Pipes

- Heat pipes are installed outside of the required 20-80deg installation angle;
- Heat pipes have been bent or damaged causing rupture to the copper pipe.

Mounting Frame & Tube Clips

- Failure attributable to any modification to the mounting frame components;
- Failure when not installed in accordance with Apricus installation guidelines;
- Failure of non-Apricus fastening components or the structure to which mounting frame is attached;
- Failure due to wind loading when the mounting frame has not been installed in line with installation guidelines and local structural codes for high wind regions.
- Failure due to wind loading in areas that experience >205km/h / 127mph where local structural engineering approval has not been obtained;
- Failure due to excessive snow loading;

Tube Caps

- Damage is due to attacks by insects or animals.

END USER OBLIGATIONS

In order to obtain performance of any obligation under this warranty, the End-User must:

- Firstly determine if the Product is within the applicable Warranty Periods. This can be determined by referring to the installation record form, or alternatively the original purchase invoice. If neither documents are available, the serial number and manufacturing date will need to be read off the Product serial tag. Some Products may be installed in a location that is not accessible to the End-User and so the information may only be obtained by a qualified service technician.
- Contact the company who installed the original Product, or, if unknown or unable to be contacted, contact Apricus directly.

The following information may be required to determine if the Product issue is eligible for coverage under the terms of this Limited Warranty.

- Information related to the manner in which the Product(s) were installed.
- The history of operation.
- Any repairs that may have been made.
- Evidence that the Product(s) were installed by a qualified, licensed contractor.
- Evidence that the Product(s) were installed in accordance with the applicable Products Installation Manuals and any special written design or installation guidelines by Apricus for this project.
- Evidence that the Product(s) were installed in accordance with all applicable local building, plumbing and electrical codes.

CUSTOMER SATISFACTION

We believe you will be fully satisfied by the service you receive from the local Apricus representatives and from Apricus. However, because our aim is your complete and lasting satisfaction, Apricus adds another feature to your warranty's protection. In the unlikely event that you feel our response to a warranty service request is not satisfactory, Apricus offers you an opportunity to air your complaint in an impartial Mediation process.

The opportunity to mediate any complaint made by an End-User is hereby extended to all End-Users. If you are a Consumer End-User, the provisions of the federal Magnuson-Moss Warranty Act provide that you may not file suit against Apricus until your claim has been submitted to Mediation for an informal dispute settlement and a decision has been reached.