virtu PVT

More energy, less space

Virtu PVT Specification Sheet 2022_v1.2
US Customary Units

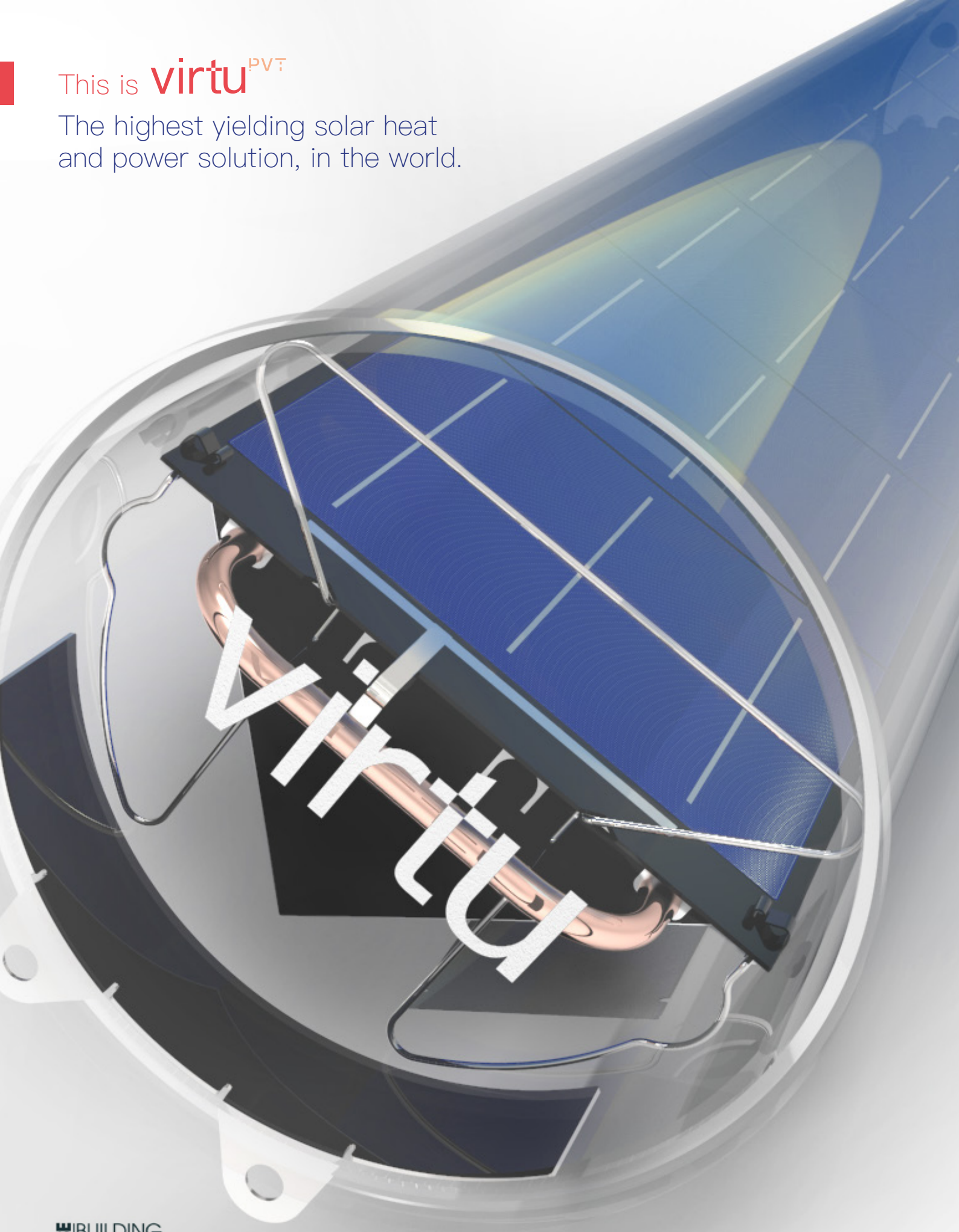
A product by
Naked Energy.

ELM SOLAR

CE DIN Geprüft TÜVRheinland PENDING

This is virtu PVT

The highest yielding solar heat
and power solution, in the world.



CIBSE BUILDING PERFORMANCE AWARDS 2021
Winner

Why Virtu PVT is preferred by our customers

Up to 3 x CO2 savings per ft²

Virtu PVT decarbonises both heat and power

> Combining heat and power, delivers 3 times the savings compared to PV

> Decarbonises both scope 1 (heat) and scope 2 (power) emissions, mitigating need for additional measures, e.g. carbon offset payments

> Utilising renewable energy improves building ratings and supports the transition to a zero carbon economy

More versatile

Virtu PVT has exceptional performance on flat or pitched roofs and vertical façades

> Low profile, tubular design avoids wasted space and shading

> Integrated reflectors enable Virtu to capture 40% more energy compared to conventional PV

> Collectors can be rotated, optimising performance on pitched roofs, flat roofs and vertical facades

> The vacuum tube minimises thermal losses to the atmosphere, resulting in high efficiency even in cold weather

> Can handle high temperatures and withstand stagnation if it occurs

Up to 50% greater financial returns per ft²

Virtu PVT is designed to maximise the solar potential of your roof

> Requires significantly less space than separate thermal and PV systems

> Reduces energy bills and provides security against energy price inflation

> Eligble for many Government backed subsidies

> Fully funded option available. Just pay for the energy you use

Lower install and maintenance costs

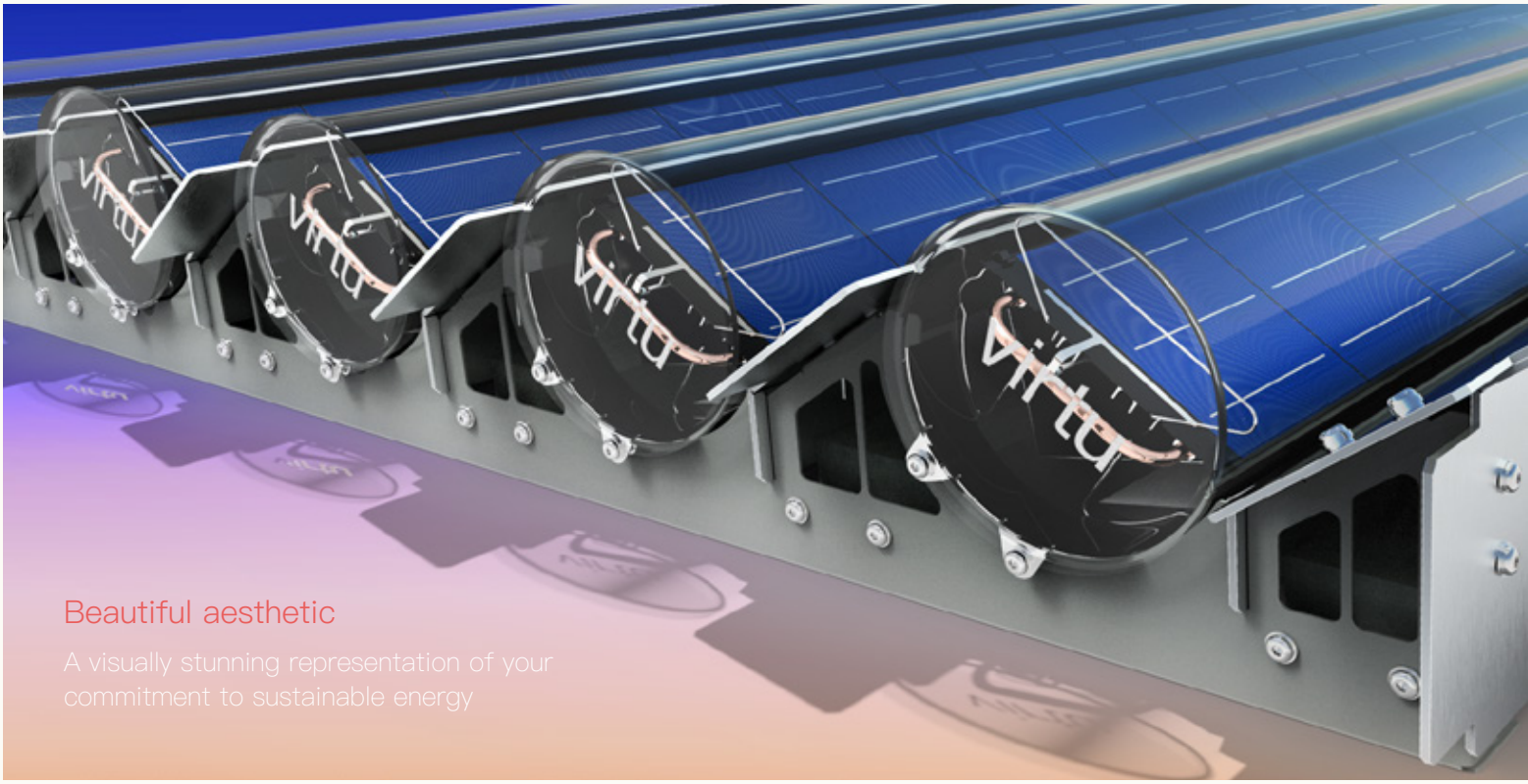
A design–led architecture and turnkey solution makes Virtu PVT easy to install

> Low profile design reduces wind shear and the need for ballast or piercing roof membranes

> Modular design enables quicker, cheaper installation requiring only one installer and maintenance contract, unlike separate PV + thermal systems that require two designs, two installers and two trips to the roof

> Remote monitoring platform for performance data and alerts

> Low maintenance and backed by a warranty of up to 10 years



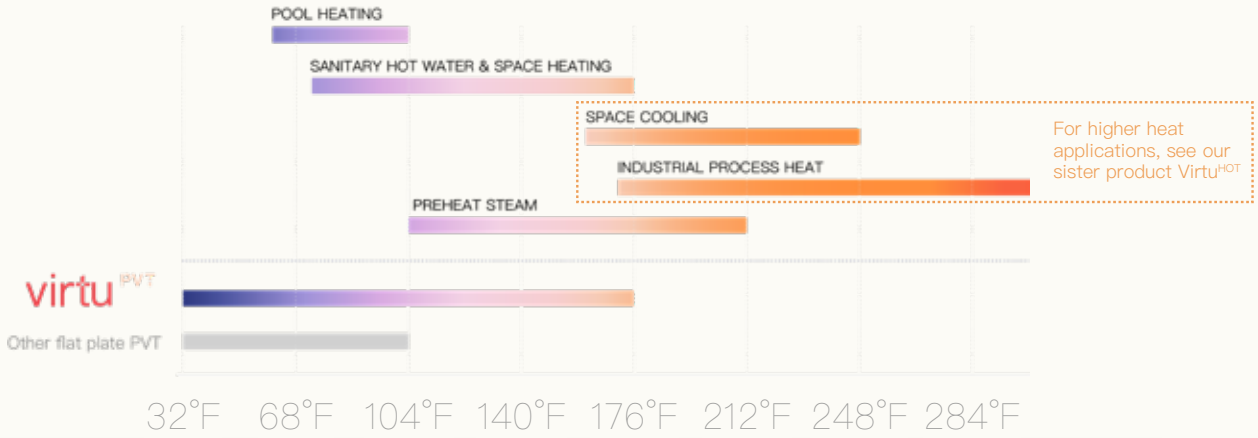
Beautiful aesthetic

A visually stunning representation of your commitment to sustainable energy

Suitable for buildings with high heat demand such as:

- ✓ Multi–dwelling residential
- ✓ Public buildings e.g. hospitals
- ✓ Manufacturing
- ✓ Food & beverage
- ✓ New residential developments
- ✓ Hospitality & leisure

Virtu PVT provides the ideal temperature to support many commercial and industrial processes:

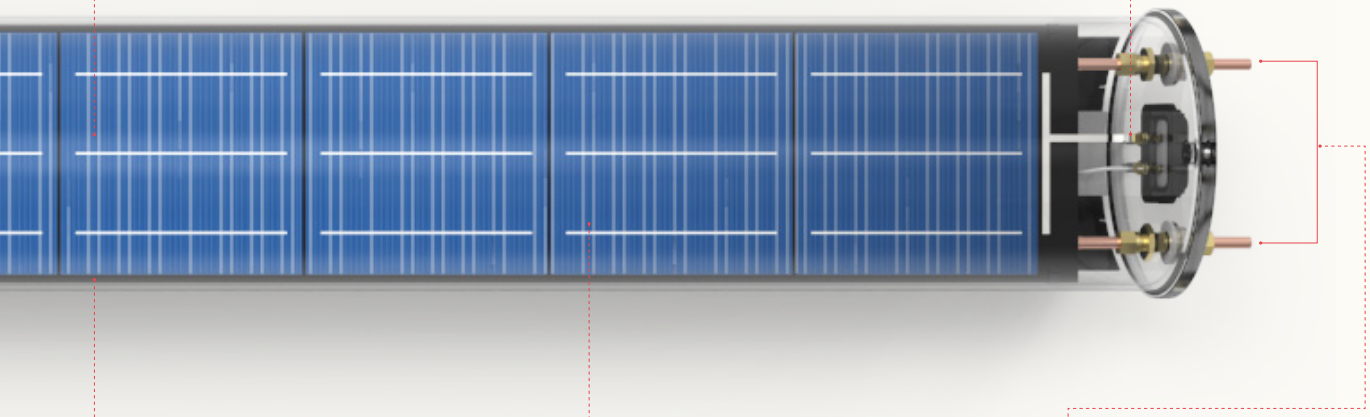


Photovoltaic cells

High–efficiency monocrystalline PERC cells convert more than 20% of the sun's energy into electricity.

Electrical connection

Electrical connection is via standard MC4 connectors, making Virtu as easy to connect as a PV array.



Novel aluminium absorber plate

Another 60% of the sun's energy is extracted from the cells as heat, and is transferred to fluid channels behind the absorber plate.

Glass vacuum tube

A borosilicate vacuum tube prevents heat loss to the surroundings, allowing Virtu to provide useful heat over a wide temperature range, and in cold climates.

Copper water connection

8mm pipes connect to a 21mm manifold with DN16 (3/4") connectors, which can be plumbed into the building using standard solar thermal pipework.

Low install cost

> Simple modular assembly
> Lifted to roof pre or post assembly
> Fits in service elevators
> Use of a crane not necessary
> Mounting included
> Pipe manifolds included

Low Profile

> 10.5" height from roof/façade
> Simplifies planning permission/ local approval
> Low wind shear

Compatible with any roof type

6 X M8 mounting slots provide compatibility with, for example, clamp and rail systems

> Suitable for:
- ✓ Raised seamed roofs
- ✓ Trapezoidal roofs
- ✓ PVC roofs
- ✓ Nicholson fittings
- ✓ Pitched roofs
- ✓ Façade mounting

Self ballasting

In–built ballast trays can be loaded with concrete blocks

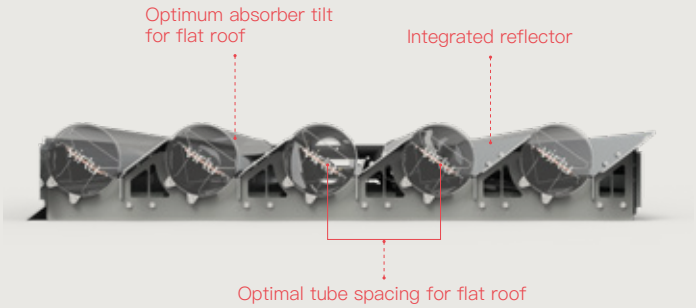
> No need for roof penetration
> No need for additional mounting
> Suitable for:
- ✓ Felt roofs
- ✓ EPDM roofs
- ✓ Rubber roofs
- ✓ PVC roofs
- ✓ TPO roofs

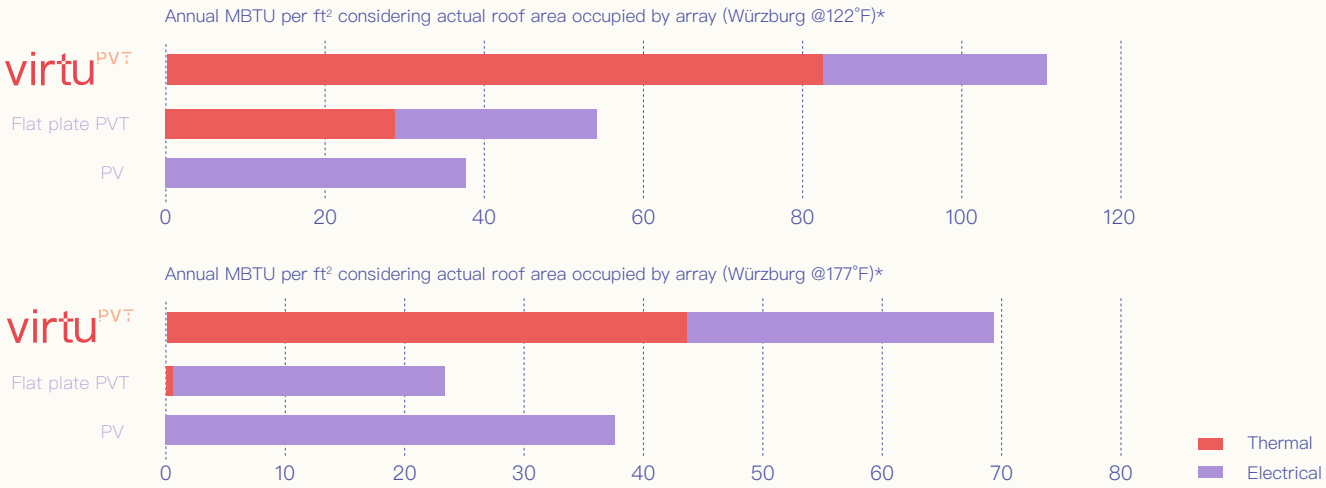
Solar Redefined

virtu

Flat roof performance

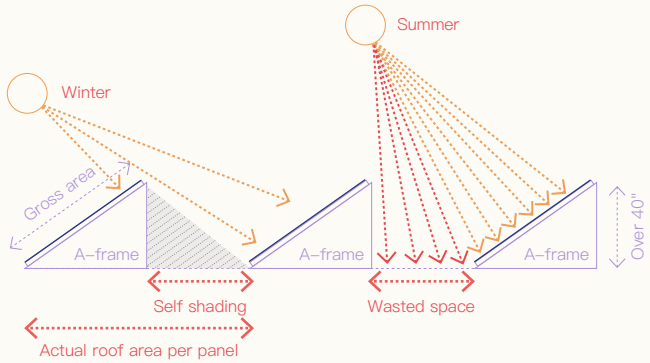
Virtu PVT maximises energy density on a flat roof





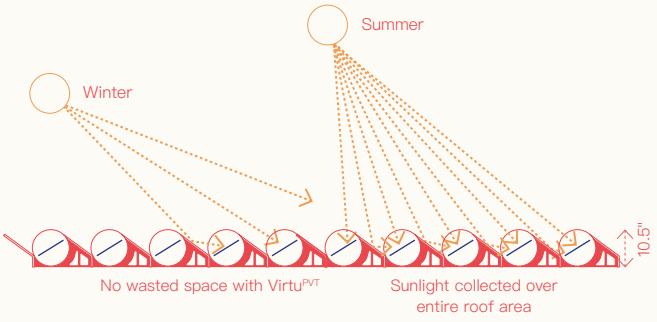
Standard panels waste space

> Panels/collectors tilted towards the sun on A–frames
> Spaced to avoid self shading in winter
> Roof area required is larger than panel gross area



No wasted space with Virtu PVT

> Absorber plates are tilted to optimum angle within tubes
> Integrated reflector captures sunlight in space between tubes
> More energy, less space



Not to scale. Virtu stands at 10.5" high, compared to over 40" for tilted flat panel

*Chart notes

> All annual kWh values are calculated using industry–standard Scenocalc and PVGIS tools, taking Würzburg as location and 180° azimuth.

> Virtu PVT kWh calculation takes parameters derived from certification pre–testing at TUV Rheinland. Calculation is made at 0° inclination. Service corridor allowance is considered in roof area calculation (see layout on page 6).

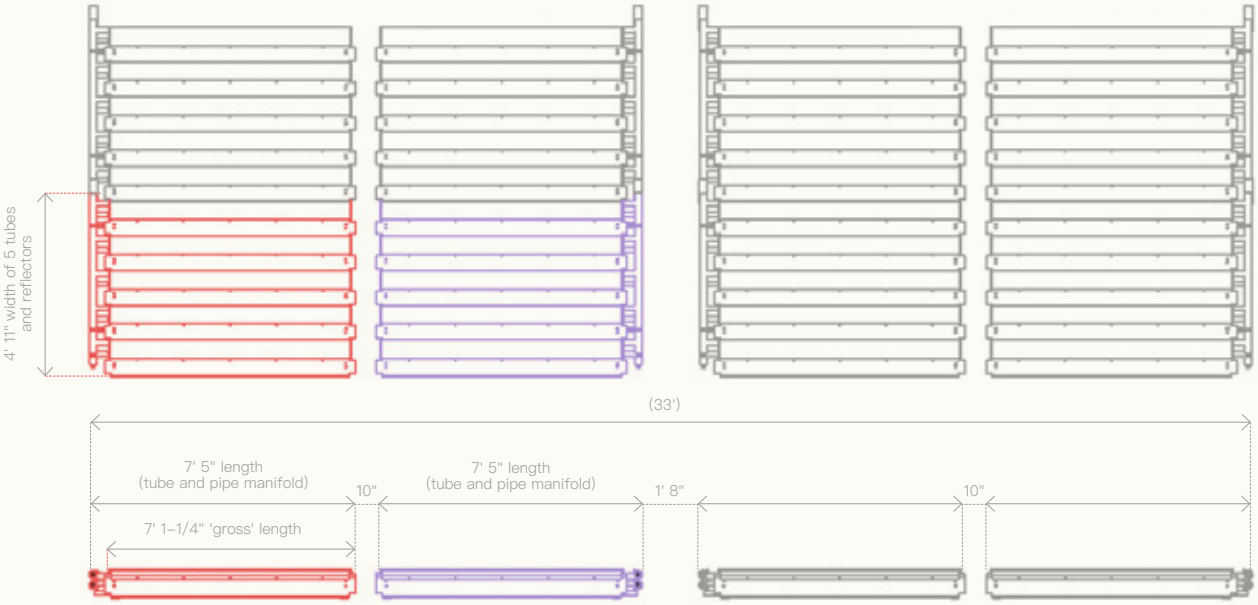
> Flat plate PVT kWh are taken from the Solar Keymark datasheet of a market leading PVT product. Similar results are achieved by other best–in–class panels. The flat plate PVT panel is at 35° inclination as per the datasheet. kWh / m² gross area is converted to kWh / m² roof area by considering the space between panels, which is calculated using the Technical Guide – Solar Thermal Systems (page 47) at 35° inclination.

> PV kWh are taken from PVGIS, using Würzburg as location. Panel slope is 15°. System losses are not considered. A panel area of 21.53 ft² and a panel peak power of 390 W (1330 BTU) is assumed. The roof space occupied by a panel is calculated using the Technical Guide – Solar Thermal Systems (page 47) at 15° inclination.

virtu PVT

Includes integrated reflector. Suitable for:

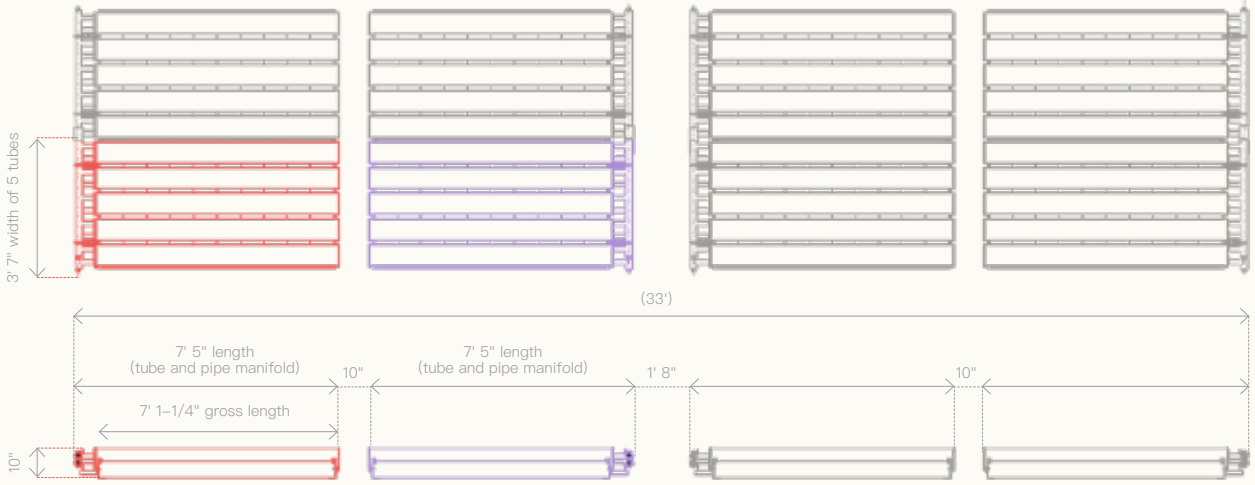
- Flat roofs
- Vertical façades
- Low pitch roofs (< 15° tilt)
- Installed in sets of 5 tubes
- Sets connected together to form an array of any size
- Can be configured with manifolds on **left** or **right** side



virtu PVT HD

Higher density tubes without reflector. Suitable for:

- Pitched roofs
- Flat roofs in very low latitudes (< 30° from equator)
- Installed in sets of 5 tubes
- Sets connected together to form an array of any size
- Can be configured with manifolds on **left** or **right** side



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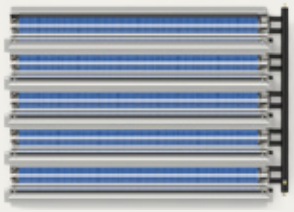

virtu$^{PVT HD}$

Model	Virtu^{PVT}	Virtu$^{PVT\ HD}$
SINGLE TUBE DIMENSIONS (refer to drawing on previous page)		
Gross length	85.24 +/– 0.02"	85.24 +/– 0.02"
Gross width (single tube)	11.81 +/– 0.02"	8.66 +/– 0.02"
Gross height	10.43 +/– 0.06"	10.43 +/– 0.06"
Absorber area	3.56 +/– 0.01 ft²	3.56 +/– 0.01 ft²
Aperture area	6.88 +/– 0.01 ft²	3.87 +/– 0.01 ft²
Gross area	6.99 +/– 0.01 ft²	5.05 +/– 0.01 ft²
Roof area occupied (incl. pipe manifold and service corridor)	8.07 +/– 0.01 ft²	5.92 +/– 0.01 ft²
Total wet weight (unballasted)	46.07 lb	37.69 lb
Average roof loading (unballasted)	5.71 lb ft²	6.37 lb ft²
Additional ballast	up to 47.84 lb (7 x 6.83 lb) of ballast blocks can be added per tube. Choose additional ballast based on wind loading calculations.	
Absorber plate angles	35°	Adjustable 20°, 0° or –20°
SET OF 5 CONNECTED TUBES DIMENSIONS (refer to drawing on previous page)		
Gross width	59.06 +/– 0.08"	43.31 +/– 0.08"

SINGLE TUBE HEAT OUTPUT (see thermal parameters on next page)		
Peak thermal output	275 +/– 1 (938 ± 3) W (BTU/h)	215 +/– 1 (733 ± 3) W (BTU/h)
Stagnation temperature	266 °F	266 °F

SINGLE TUBE ELECTRICAL OUTPUT		
Pmax	74 +/– 2 W	54 +/– 2 W
Voc	8.2 +/– 0.2 V	8.1 +/– 0.2 V
Isc	12.5 +/– 0.3 A	8.9 +/– 0.2 A
Temperature coefficienct of Pmax	0.31 % / °C	0.31 % / °C
Max overcurrent protection	15.6 A	15 A

MATERIALS & MOUNTING (same for Virtu^{PVT} and Virtu$^{PVT\ HD}$)	
PV cells	
Absorber plate	Aluminum/copper
Pipes and manifolds	Copper
Glass	Borosilicate 3.3
Frame	Aluminum
Mounting slots	6 x M8 slots per set of 5 tubes

HYDRONIC OPERATION AND CONNECTIONS (same for Virtu^{PVT} and Virtu$^{PVT\ HD}$)	
Flow rate range	1.585–15.850 GPH
Maximum pressure	6 mbar (87.02 PSI)
Fluid outlet temperature range	50–176 °F
Heat transfer fluid	Water–Glycol Solution
Fluid volume (single tube)	150 ml (0.04 Gal)
Fluid volume (set of 5 tubes with manifolds)	1.7 l (0.45 Gal)
Manifold diameter (external)	21mm/0.87"
Manifold connections	DN16 male (3/4" flat face threaded)

PRESSURE DROP PER TUBE (same for Virtu^{PVT} and Virtu$^{PVT\ HD}$)	
Flow rate l/min (GPH)	Pressure drop (PSI)
0.1 (1.585)	3 (0.04)
0.2 (3.170)	6 (0.09)
0.4 (6.340)	12 (0.18)
0.6 (9.510)	19 (0.27)
0.8 (12.680)	25 (0.36)
1 (15.850)	31 (0.45)

A product by

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