virtu HOT

More energy, less space

Virtu[HOT] Specification Sheet 2022_1.2

US Customary Units

A product by

Naked Energy.

ELMSOLAR

OG–100 numbers:

Virtu[HOT]: 10002115

Virtu[HOT HD]: 10002116

Unrivaled performance in any environment

> Reduce **scope 1** emissions using 100% renewable **solar heat**
> 3 x **CO_2 savings** per ft^2 compared to PV panels
> Higher **energy–density** compared to market–leading solar thermal panels

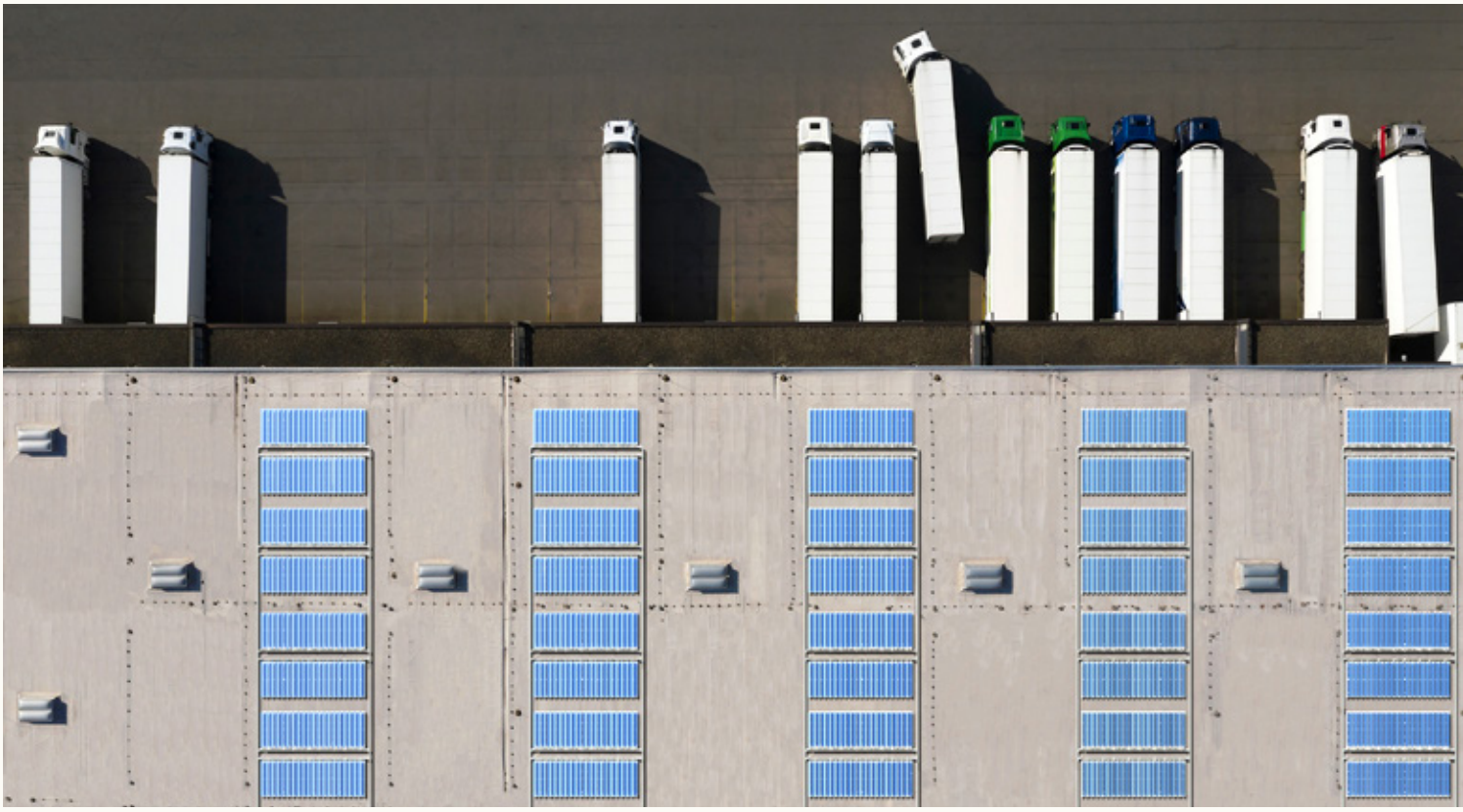
Versatile and easy to install

> Simple **modular** assembly
> Integrated mounting with **self ballasting:** no need for roof penetration
> **Compatible** with any roof type
> **Low profile:** 10" installed height

Designed for Commercial Scale

Ideal for:

- ✓ Multi–dwelling residential
- ✓ Manufacturing
- ✓ Food & beverage
- ✓ Hospitality & leisure

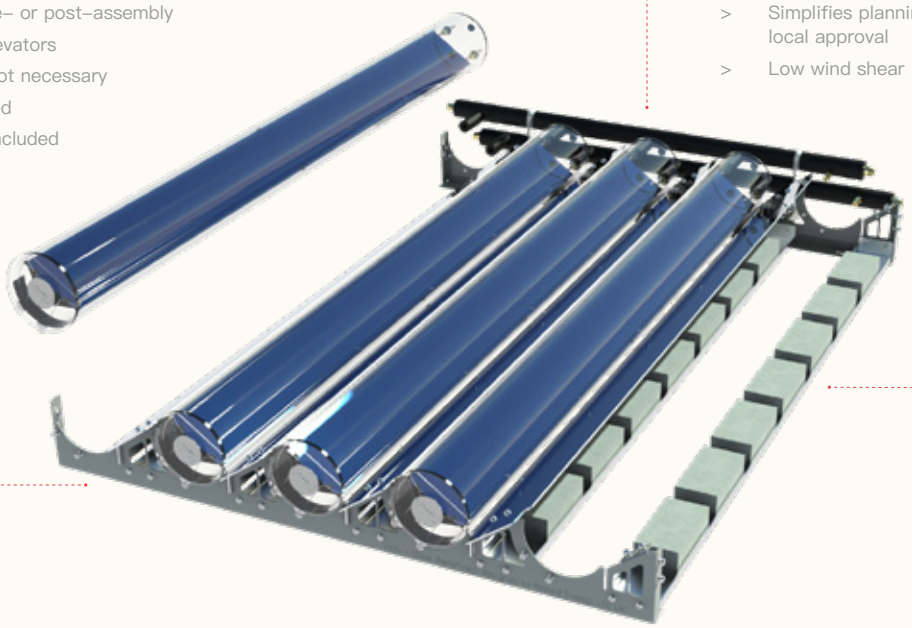


Low install cost

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



Compatible with any roof type

6 X 5/16" mounting slots provide compatibility with, for example, clamp and rail systems

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

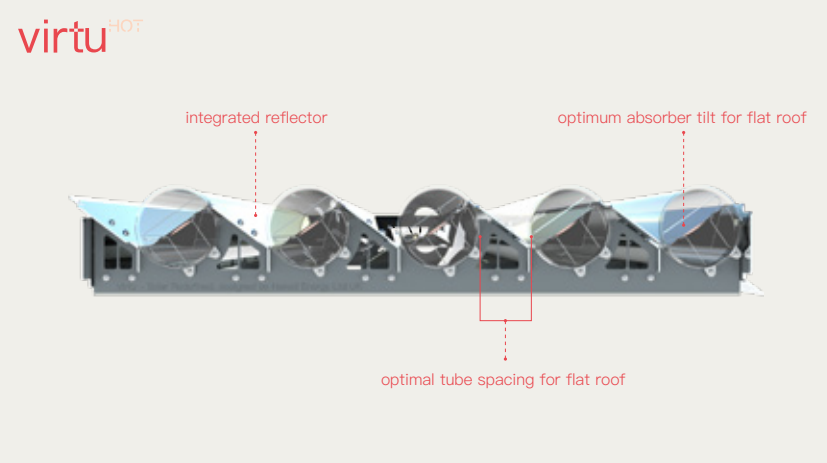
Self ballasting

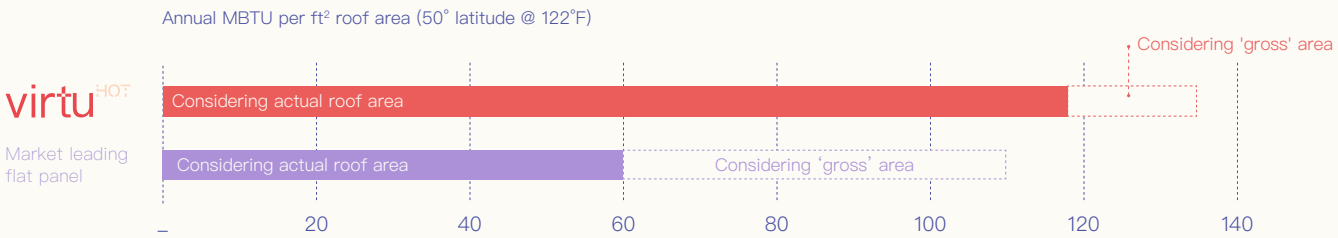
In–built ballast trays can be loaded with concrete blocks.

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

Flat roof performance

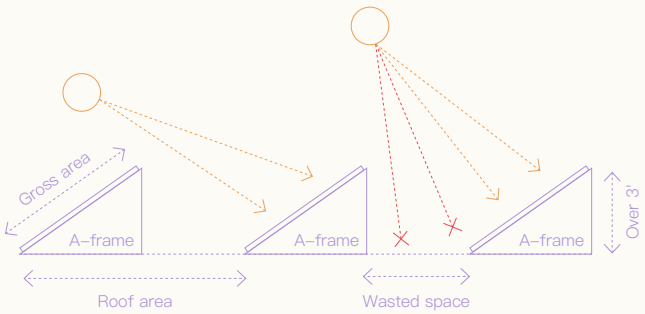
Virtu HOT maximises energy density on a flat roof





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 HOT

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

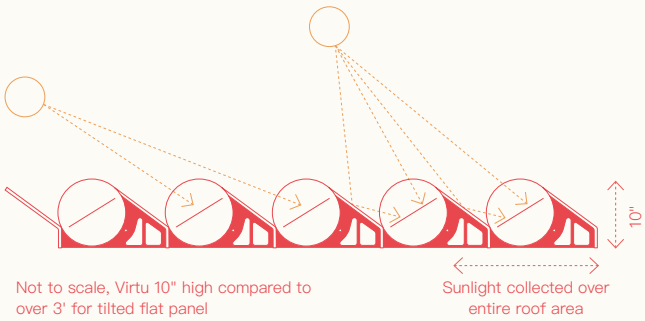


*Chart notes

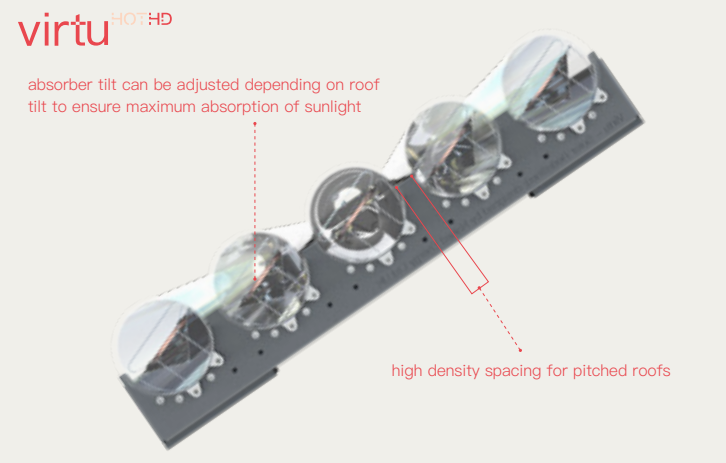
> All annual kWh values are calculated using industry–standard Scenocalc tool, taking Würzburg as location, 122°F fluid temperature and 180° azimuth.

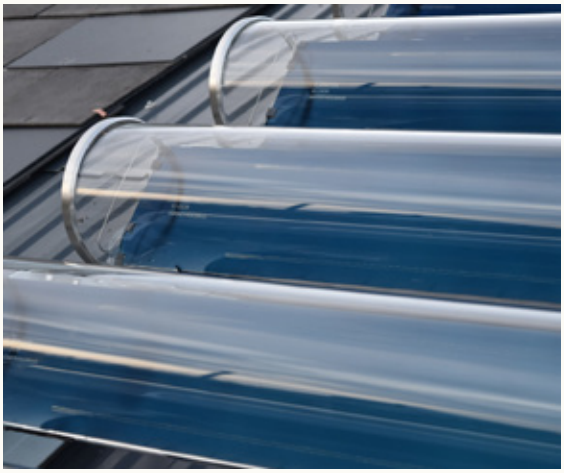
> Virtu HOT kWh calculation takes parameters from the **Virtu HOT Solar Keymark certificate**. Calculation is made at 0° inclination. Service corridor allowance is considered in roof area calculation (see layout on page 6).

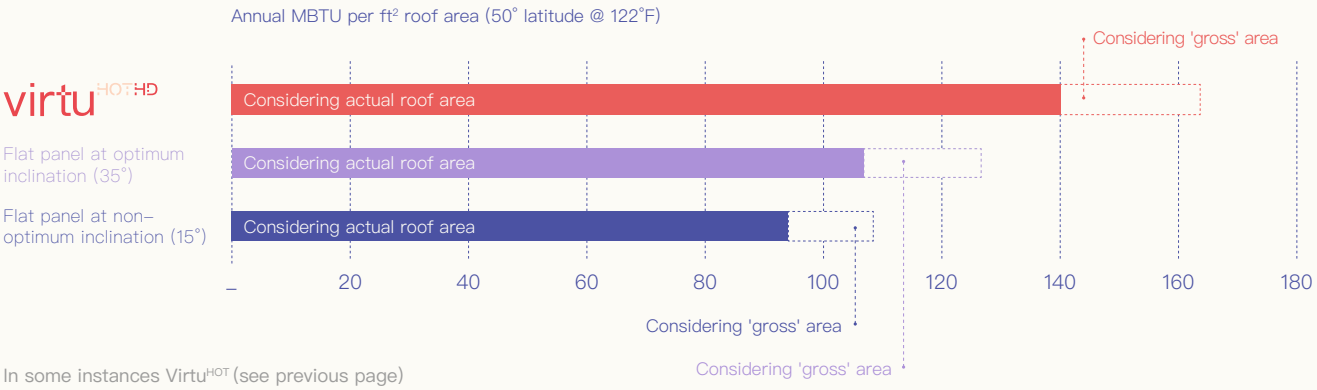
> Flat panel kWh calculation takes parameters from **Viessmann Vitosol 200 FM Solar Keymark certificate**. Similar results are achieved by other best–in–class panels. Calculation is made at 15° inclination, by interpolating between 0° and 25° inclination. Space between panels is calculated using **Viessman Technical Guide – Solar Thermal Systems.** The 15° inclination has been chosen to produce best trade off between gross area and roof area performance.

Pitched roof performance

Sister product Virtu HOT HD is designed for pitched roofs. Very few roofs are optimally angled for solar collectors. Virtu HOT HD has the flexibility to tilt absorbers towards the sun, giving **optimum performance on any roof inclination.**

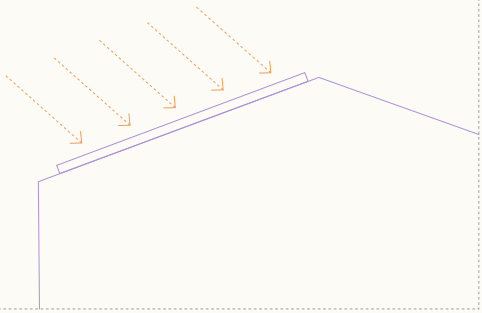






In some instances Virtu HOT (see previous page) may also be used on pitched roofs.

Flat panel: non–optimum inclination



Virtu: always optimum

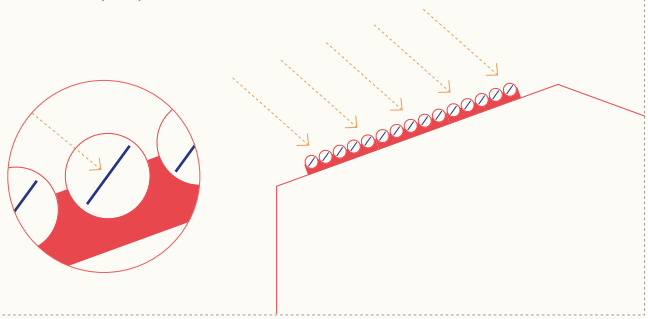


*Chart notes

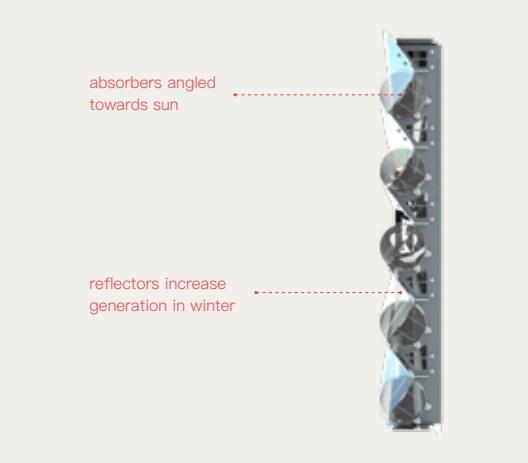
> All annual kWh values are either taken directly from Solar Keymark datasheets, or calculated using the industry–standard Scenocalc tool, taking Würzburg as location, 122°F fluid temperature and 180° azimuth.

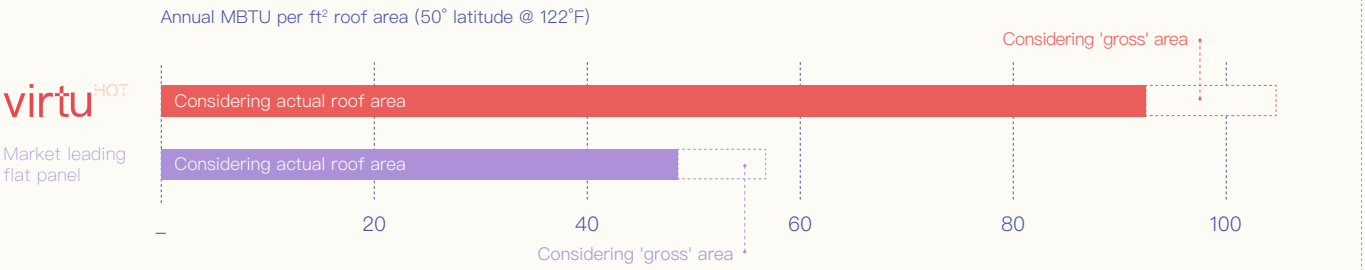
> Virtu HOT HD kWh numbers are taken directly from **Virtu HOT HD Solar Keymark certificate**, since absorbers can be adjusted to produce optimal result on any roof inclination between 15° and 45°. Service corridor allowance is considered in roof area calculation (see layout on page 6).

> Flat panel kWh calculation takes parameters from Viessmann **Vitosol 200 FM Solar Keymark certificate**. Similar results are achieved by other best–in–class panels. Values for 35° inclination are taken directly from Solar Keymark certificate. Values at 15° inclination are calculated using Scenocalc, interpolating between 0° and 25° inclination. For roof area calculation, similar clearance to Virtu HOT HD is assumed.

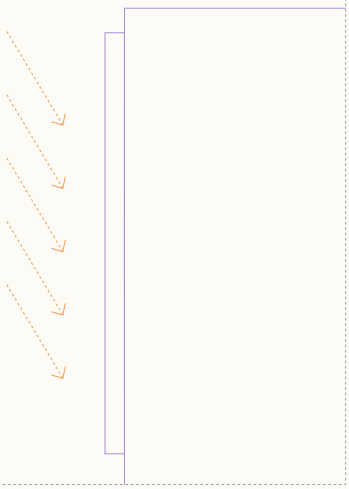
Vertical façade performance

Ever think of using your façade to produce solar energy while introducing a unique architectural feature and broadcasting your green credentials? Virtu[HOT]'s unique design means it generates nearly as much energy on a south–facing façade as it does on a rooftop.





Flat panels are non–optimum in both summer and winter



Virtu: Absorbers tilted upwards for optimal summer performance

Virtu: Reflectors provide boost to winter output

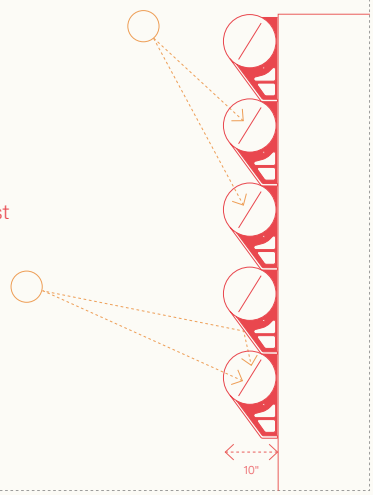


*Chart notes

> All annual kWh values are calculated using industry–standard Scenocalc tool, taking Würzburg as location, 122 °F fluid temperature and 180° azimuth.

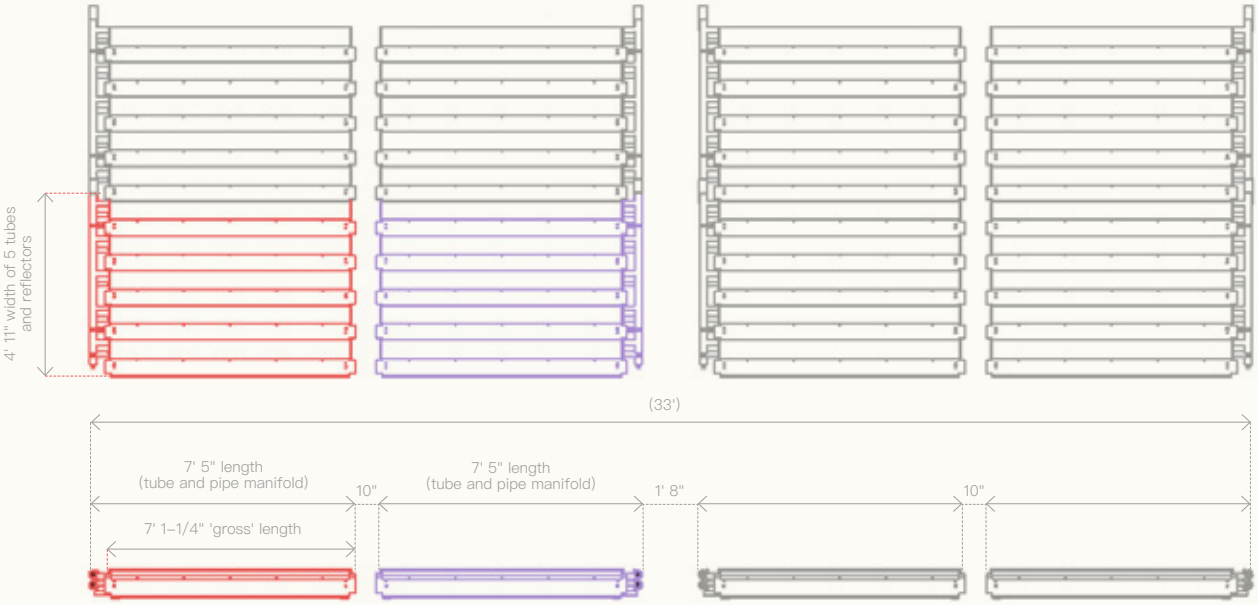
> Virtu[HOT] kWh calculation takes parameters from the Virtu[HOT] Solar Keymark certificate. Calculation is made at 90° tilt. The IAMs have been inverted to account for the orientation of the collector on the façade. Service corridor allowance is considered in façade area calculation (see layout on page 6).

> Flat panel kWh calculation takes parameters from Viessmann Vitosol 200 FM Solar Keymark certificate. Similar results are achieved by other best–in–class panels. Calculation is made at 90° tilt. For roof area calculation, similar clearance to Virtu[HOT] is assumed.

virtu HOT

Includes integrated reflector. Suitable for:

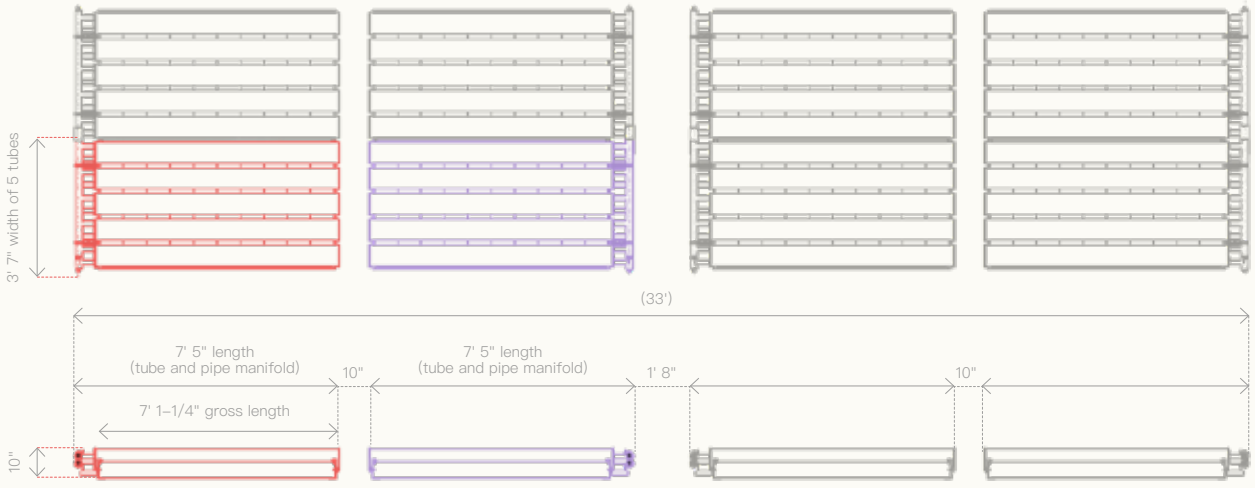
> Flat roofs
> Vertical façades
> Low pitch roofs (< 15° tilt)
> Installed in sets of 5 tubes
> Sets connected together to form an array of any size
> Can be configured with manifolds on **left** or **right** side



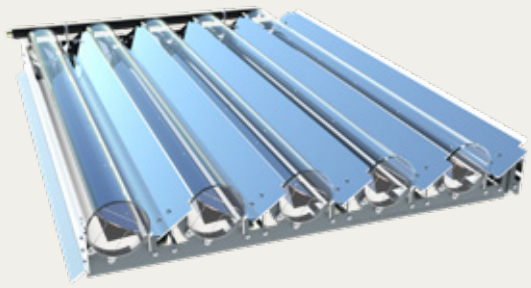
virtu HOT HD

Higher density tubes without reflector. Suitable for:

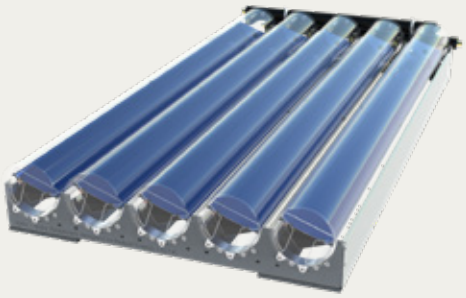
> Pitched roofs
> Flat roofs in very low latitudes (< 30 ° from equator)
> Installed in sets of 5 tubes
> Sets connected together to form an array of any size
> Can be configured with manifolds on **left** or **right** side



virtuHOT



virtuHOT HD



Model	VirtuHOT	VirtuHOT HD
SINGLE TUBE DIMENSIONS (refer to drawing on previous page)		
Gross length	85.24 ± 0.02 in	85.24 ± 0.02 in
Gross width (single tube)	11.81 ± 0.02 in	8.66 ± 0.02 in
Gross height	10.43 ± 0.06 in	10.43 ± 0.06 in
Absorber area	3.49 ± 0.01 ft²	3.49 ± 0.01 ft²
Aperture area	6.89 ± 0.01 ft²	3.88 ± 0.01 ft²
Gross area	7.00 ± 0.01 ft²	5.06 ± 0.01 ft²
Roof area occupied (incl. pipe manifold and service corridor)	8.11 ± 0.01 ft²	5.91 ± 0.01 ft²
Total wet weight (unballasted)	42.549 lb	32.188 lb
Average roof loading (unballasted)	5.24 lb/ft²	5.44 lb/ft²
Additional ballast	up to 34.5 lb (7 x 4.93 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	59.05 ± 0.08 in	43.31 ± 0.08 in

MATERIALS & MOUNTING (SAME FOR VIRTUHOT AND VIRTUHOT HD)	
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

SINGLE TUBE HEAT OUTPUT (see thermal parameters on next page)		
Peak thermal output	400 ± (1365 ± 3) W (BTU/h)	290 ± 1 (990 ± 3) W (BTU/h)
Stagnation temperature	500 °F	500 °F

HYDRONIC OPERATION AND CONNECTIONS (same for VirtuHOT and VirtuHOT HD)	
Flow rate range	1.585–15.850 GPH
Maximum pressure	6 mbar or 87.02 PSI
Fluid outlet temperature range	50 °F to 194 °F
Heat transfer fluid	Water–Glycol Solution
Fluid volume (single tube)	150 ml or 0.040 Gal
Fluid volume (set of 5 tubes with manifolds)	1.7 l or 0.449 Gal
Manifold diameter (external)	0.87 in
Manifold connections	DN16 male (3/4" flat face threaded)

PRESSURE DROP PER TUBE (same for VirtuHOT and VirtuHOT HD)			
Flow rate l/min (GPH)		Pressure drop mbar (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)
1.0	(15.850)	31	(0.45)

These figures throughout this document have been converted from SI to US Customary units for ease of comprehension, however the English–language SI specsheet should be taken as correct in the case of any discrepancy.

Both Virtu[HOT] and Virtu[HOT HD] evaluated, rated and certified by the Solar Rating & Certification Corporation (ICC–SRCCTM), an ISO/IEC 17065 accredited Certification Body, in accordance with the latest version of the ICC–SRCC Rules for Solar Heating & Cooling Product Listing Reports.

Full certificates are available online, showing detailed performance parameters:

Virtu[HOT]

Virtu[HOT HD]

Annual performance in SRC OG–100 standard locations

virtu[HOT]

OG–100 STANDARD DAILY PRODUCTION							
Kilowatt–hours (thermal) per Collector per Day				Thousands of BTU per Collector per Day			
Climate →				Climate →			
Category ($T_i - T_a$)	High Radiation (6.3 kWh/m² •day)	Medium Radiation (4.7 kWh/m² •day)	Low Radiation (3.1 kWh/m² •day)	Category ($T_i - T_a$)	High Radiation (2 MBTU/ft² •day)	Medium Radiation (1.5 MBTU/ft² •day)	Low Radiation (1 MBTU/ft² •day)
A (–5°C)	2.07	1.58	1.10	A (–9°F)	7.05	5.40	3.74
B (5°C)	1.97	1.49	1.00	B (9°F)	6.73	5.09	3.42
C (20°C)	1.82	1.34	0.85	C (36°F)	6.21	4.56	2.89
D (60°C)	1.50	1.02	0.55	D (90°F)	5.13	3.49	1.89
E (80°C)	1.17	0.71	0.27	E (144°F)	3.98	2.42	0.93

virtu[HOT HD]

OG–100 STANDARD DAILY PRODUCTION							
Kilowatt–hours (thermal) per Collector per Day				Thousands of BTU per Collector per Day			
Climate →				Climate →			
Category ($T_i - T_a$)	High Radiation (6.3 kWh/m² •day)	Medium Radiation (4.7 kWh/m² •day)	Low Radiation (3.1 kWh/m² •day)	Category ($T_i - T_a$)	High Radiation (2 MBTU/ft² •day)	Medium Radiation (1.5 MBTU/ft² •day)	Low Radiation (1 MBTU/ft² •day)
A (–5°C)	2.02	1.54	1.06	A (–9°F)	6.90	5.27	3.62
B (5°C)	1.91	1.44	0.95	B (9°F)	6.53	4.90	3.26
C (20°C)	1.75	1.27	0.79	C (36°F)	5.96	4.33	2.68
D (60°C)	1.39	0.92	0.46	D (90°F)	4.75	3.14	1.58
E (80°C)	1.02	0.58	0.19	E (144°F)	3.47	1.97	0.64

Guide to inputting Virtu[HOT] into simulation software, e.g. Polysun, Tsol, EnergyPro, Scencalc

When using more sophisticated simulation software, be sure to use the full parameter set from the SRC OG–100 datasheets Virtu[HOT] or Virtu[HOT HD], and take the full IAM into account. **The collector tilt should be set to the roof inclination.** For vertical façades, the collector is rotated through 180 degrees.

ELM SOLAR

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