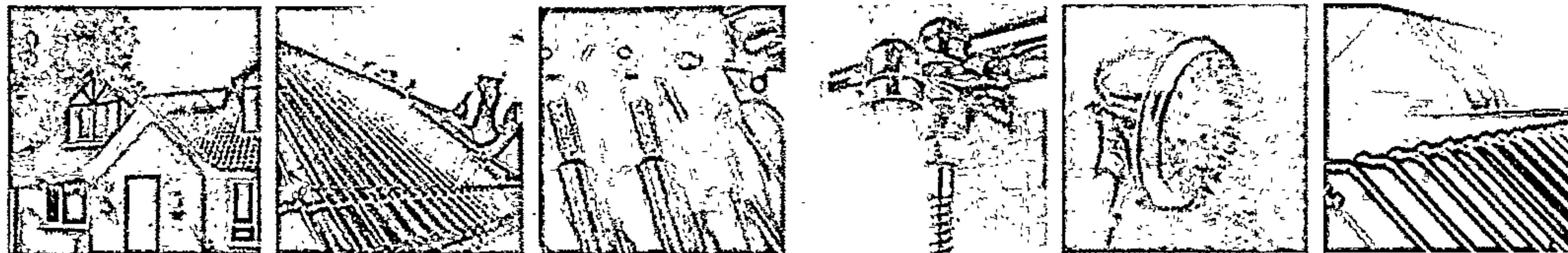
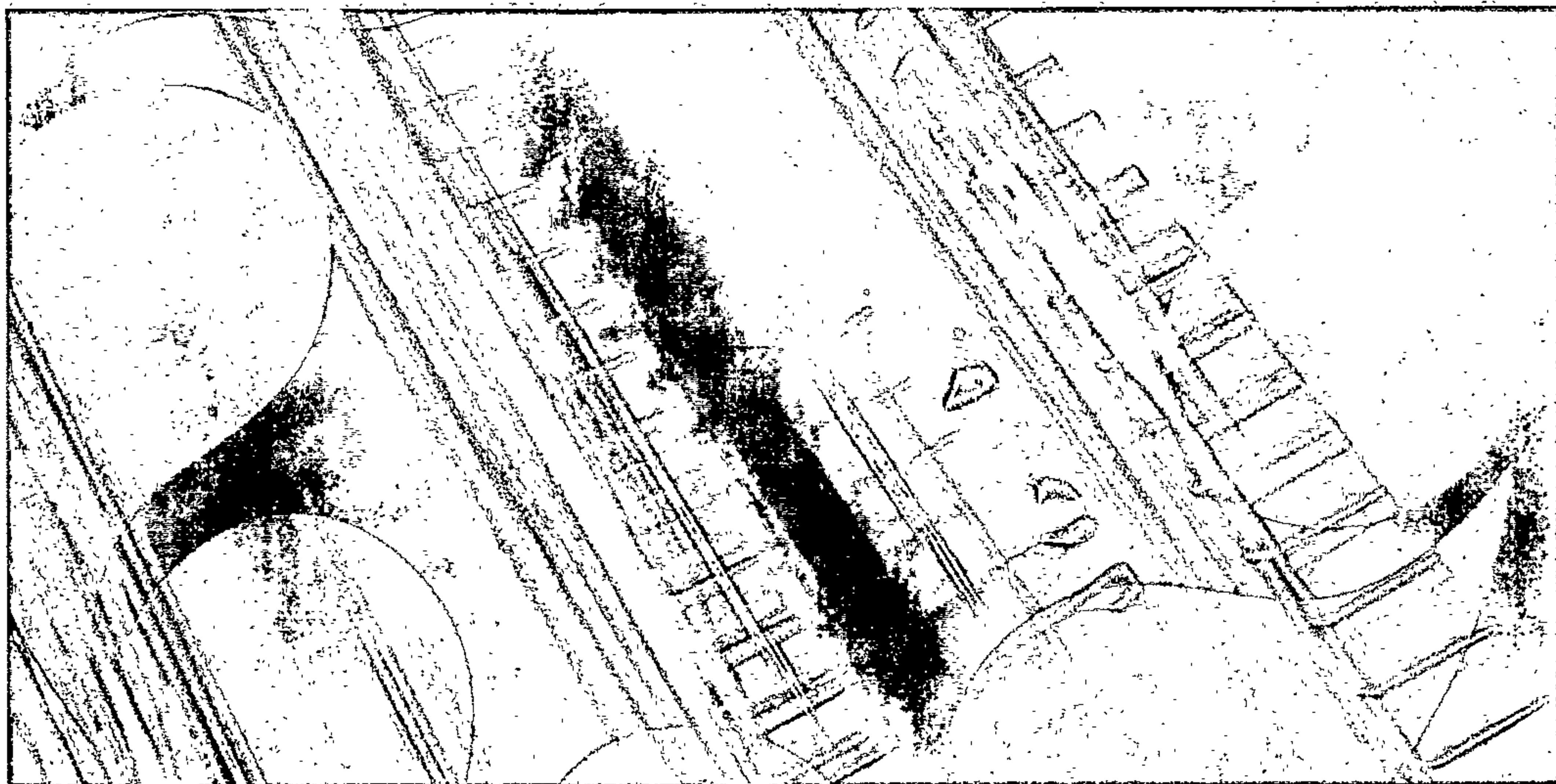


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THERMOMAX

World Leader in Solar Thermal Systems



HEALTH, SAFETY COUNCIL
PLANNING SERVICES
DEVELOPMENT CONTROL

8 - MAR 2011

To:

Ack'd: File:


Kingspan®

Kingspan SOLAR

Renew your way of thinking with Kingspan Solar

Thermomax - the original and still the best

The Kingspan Solar range, from Kingspan Renewables, reflects our on-going commitment to a zero carbon lifestyle and a brighter future for us all. When it comes to creating efficient and cost-effective energy solutions that address today's growing environmental concerns, the Kingspan Solar range of products leads the way. Thermomax is the original and still the best vacuum tube collector in the world.

This premium product performs more efficiently than flat plate collectors and in particular, Thermomax systems out-perform competitors in Northern Europe and other less sunny climates.

Solar Energy for a Brighter Future

Solar energy is free, clean and safe. It is environmentally friendly and produces no waste or pollution. Using solar energy enables you to reduce your carbon footprint as well as your energy bills. Grants are available through many Government schemes.

The sun radiates enormous amounts of energy to the earth. In the UK and Ireland we receive, on average per year, as much as 60% of that received on the equator.

This radiation is similar to the output of 1,000 power stations.

Solar Thermal Vacuum Tube Systems

Solar thermal technology transforms direct and diffuse solar radiation into useful heat using a solar collector.

Each Thermomax collector consists of a highly insulated water manifold and a row of tubes. The vacuum inside each tube provides perfect insulation and therefore, protects the system from outside influences, such as cold and windy weather or high humidity. This vacuum insulation also ensures that the energy collected from the sun is very efficiently and effectively transferred into usable heat as there is minimal heat loss.

Why Thermomax?

With over 25 years of experience, the Thermomax brand is firmly established as a world leader in solar thermal products. Thermomax collectors are the premium product in the market, designed specifically for a Northern European climate. They provide a superior performance whatever the weather.

Manufactured in the UK

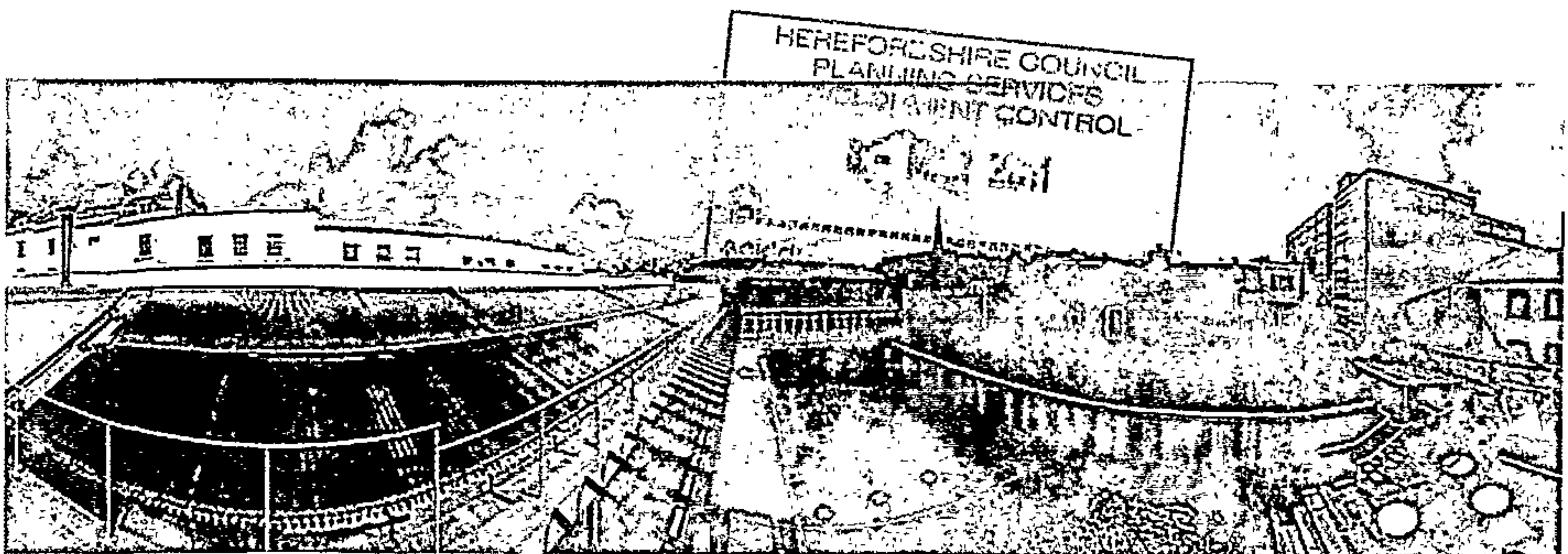
Thermomax products are manufactured to the highest standards in the UK. A full service package is offered including bespoke design, technical advice, training and sales support. The quality of our product is paramount to Kingspan's success. This differentiates us from the influx of inferior products being imported from the Far East.



Thermomax products were the first to receive the European quality mark for solar collectors – The Solar Keymark.



In 2005, Thermomax collectors were awarded the International Forum Design award for excellence in product design.



Kingspan SOLAR

Easy Installation

The unique 'plug and play' design of Thermomax HP200 and DF100 solar thermal collectors makes installation quick and easy. There is no need for heavy lifting equipment as tubes can be carried onto the roof individually. The collector is fixed to the roof by easy-fit roof brackets, which are simply fixed to the rafter.

The design of the Varisol product offers significant benefits to the installer. Quick and easy to install, Varisol allows individual tubes to be simply 'clicked' together to create solar collectors of varying sizes and cover area that couldn't normally be covered using standard manifolds, e.g. around windows or sky lights.

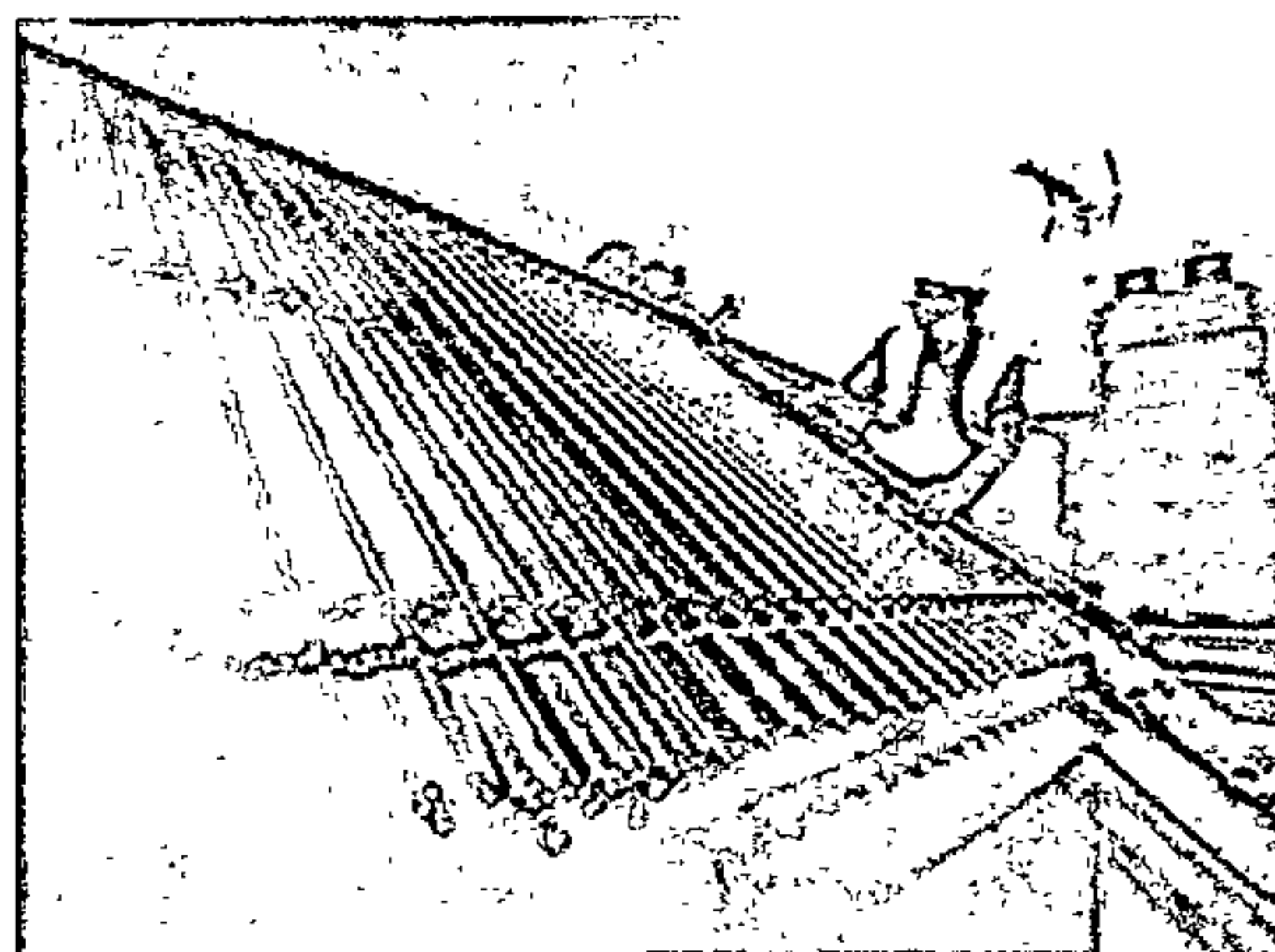
Network of Kingspan Solar Accredited Installers

With a nationwide network of Kingspan Solar Accredited Installers on-hand to advise you on design, installation and grants, you can be confident that your investment in a Thermomax solar thermal system will be an informed one. Only installers who have met the Scheme's strict requirements of knowledge and skills are awarded Kingspan Solar Accredited Installer status. Each member is given expert product training and kept up-to-date with the latest regulations, environmental standards and health and safety guidelines, giving you the confidence that your system is installed and maintained to the highest standards achievable.

A Positive Environmental Impact

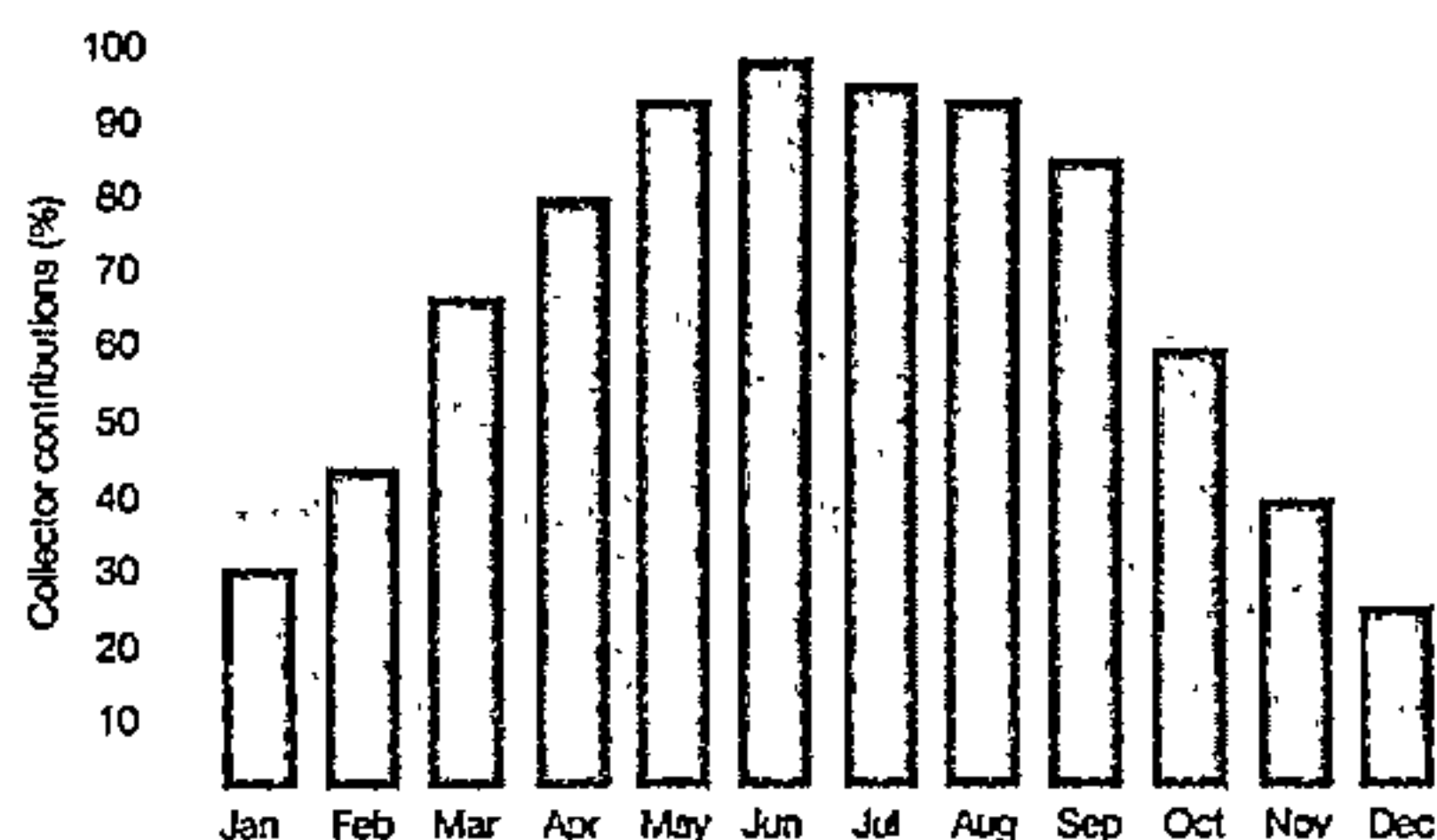
Burning fossil fuels produces vast quantities of carbon dioxide, a major contributor to global warming. The average household with a Thermomax system installed can expect to generate approximately 1,836 kWh/year with zero emissions.

The diagram below illustrates the amount of CO₂ produced by oil, gas and electricity to generate the equivalent 1,836 kWh.



Solar Energy Contribution

The table below shows the typical annual percentage of hot water achieved using our solar collectors, based on figures for London.



Performance and Savings

Thermomax products have been designed specifically for Northern European climates

Supplies up to 70% of your annual hot water needs—reducing dependence on increasingly expensive fossil fuels

5-year standard guarantee. 20-year guarantee when installed by a Kingspan Solar Accredited Installer

Works from dawn until dusk and throughout the year

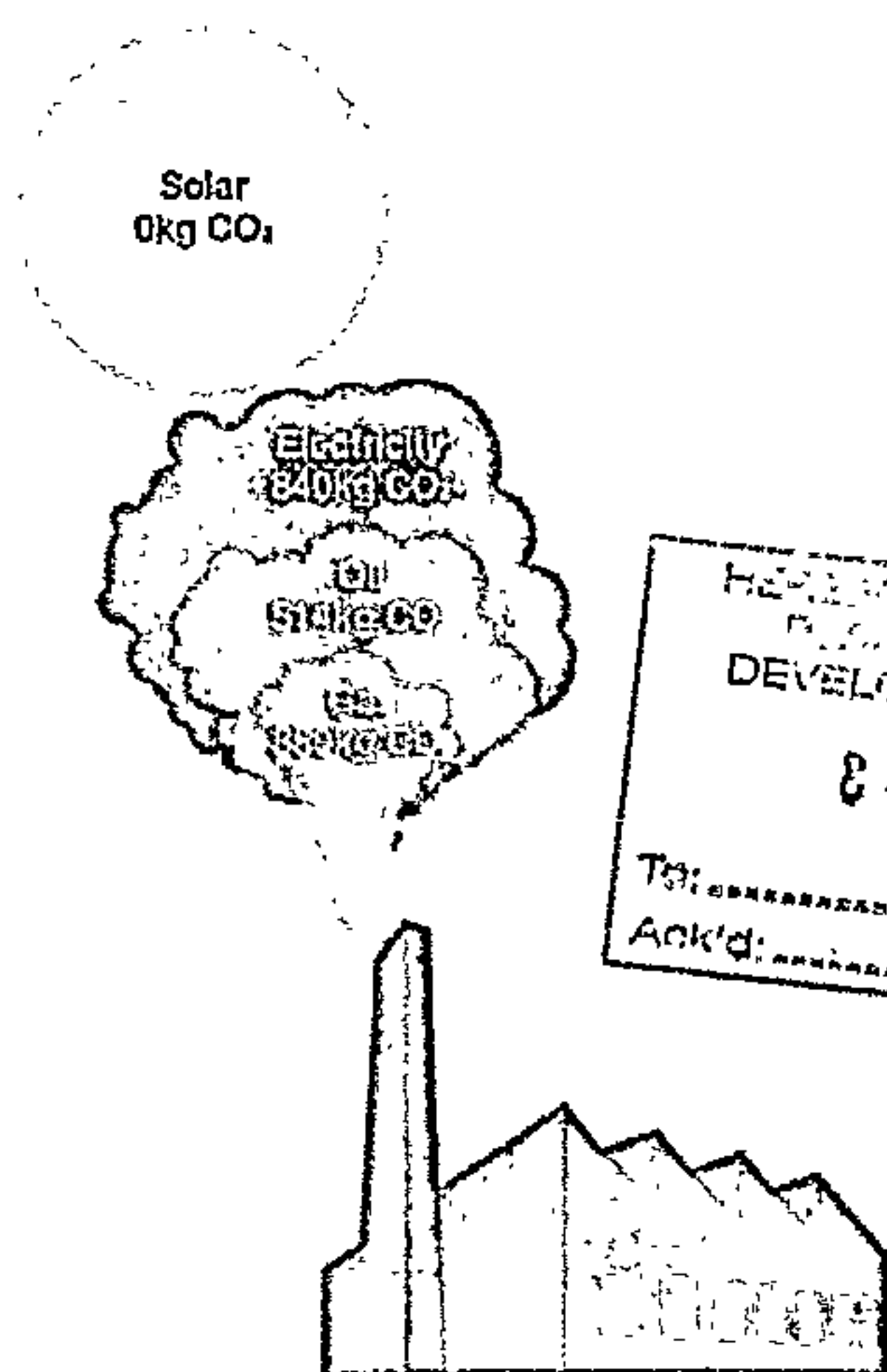
Provides heat even in cold, windy or humid conditions

Rapid conductivity and transfer of energy into heat

Up to 30% more effective than flat plate collectors

Average 25-year lifespan

Unique temperature limitation safety device provides significant protection against stagnation

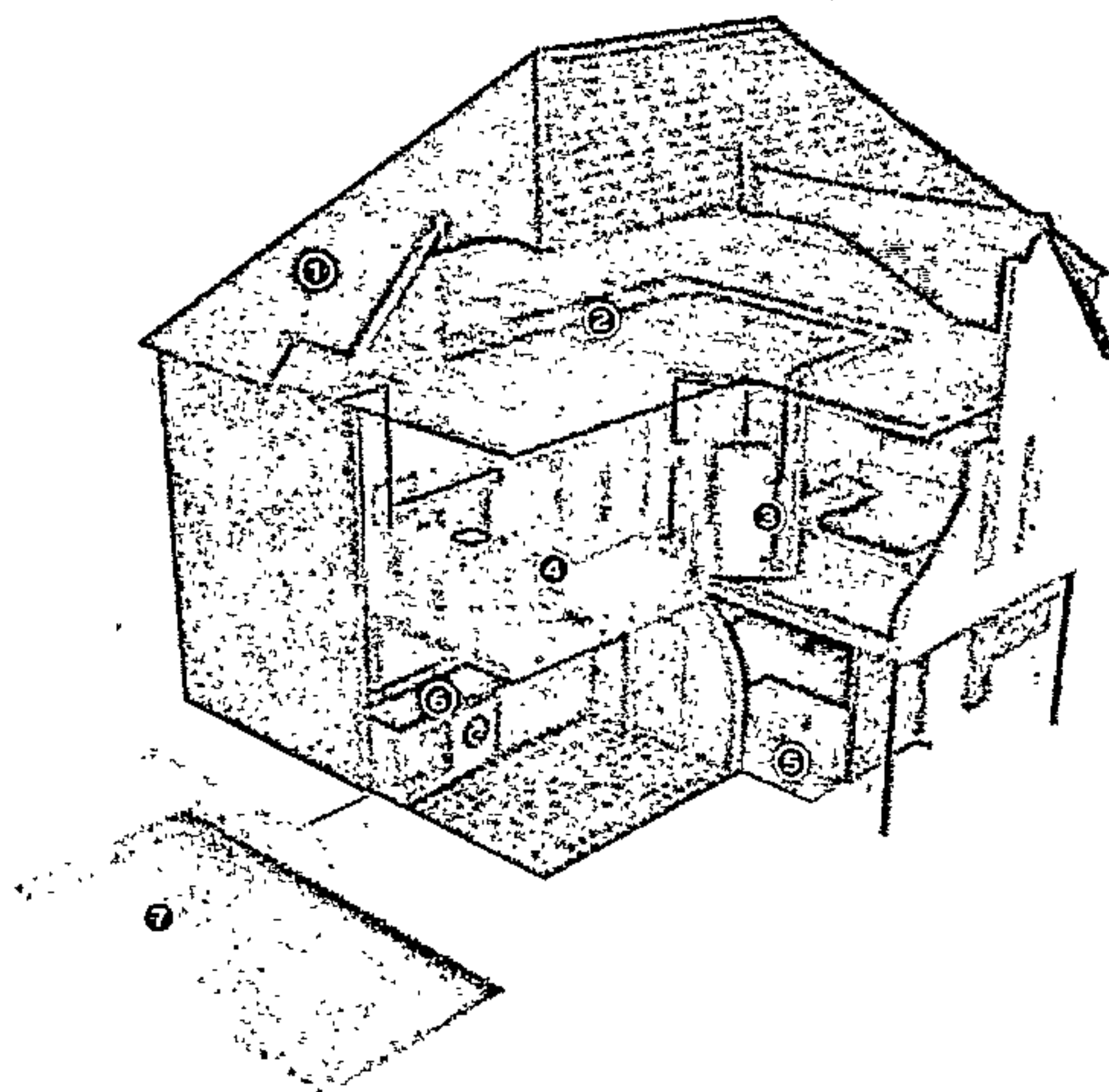


Key

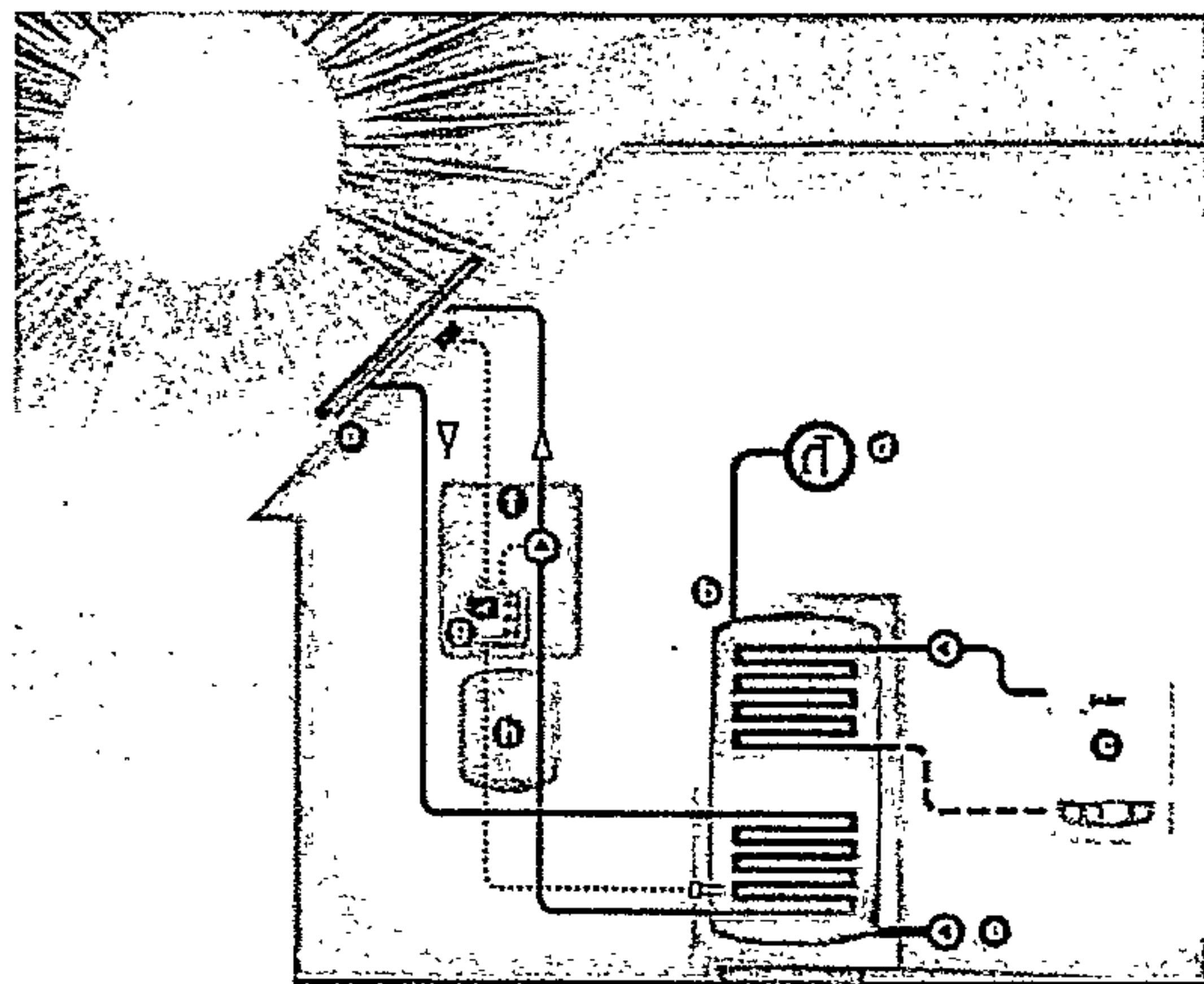
- 1 Thermomax collector
- 2 Hot water
- 3 Cylinder

Applications

- 4 Bath/Shower/Tap
5 Underfloor heating/Space heating
6 Washing machine/Dishwasher
7 Swimming pool



The diagram below shows a typical solar installation for domestic hot water with a twin coil hot water storage tank. This enables energy input from the central heating system to the top half of the tank and energy input from the solar system to the bottom half of the tank.



- a Solar collector on sloping roof kit. The connection kit connects the pipe work to the collector
- b Cylinder with solar coil at the bottom and coil for boiler at the top
- c Boiler or other traditional heating source
- d Hot water out
- e Cold water mains in
- f Pump station used to circulate water from the collector to the heat exchanger within the cylinder
- g Controller uses temperature sensors to monitor heat differences between the collector and the water in the tank and switches the pump on or off accordingly
- h Expansion vessel to contain increased water volume in the system due to rise in temperature, and hence increased pressure, of water

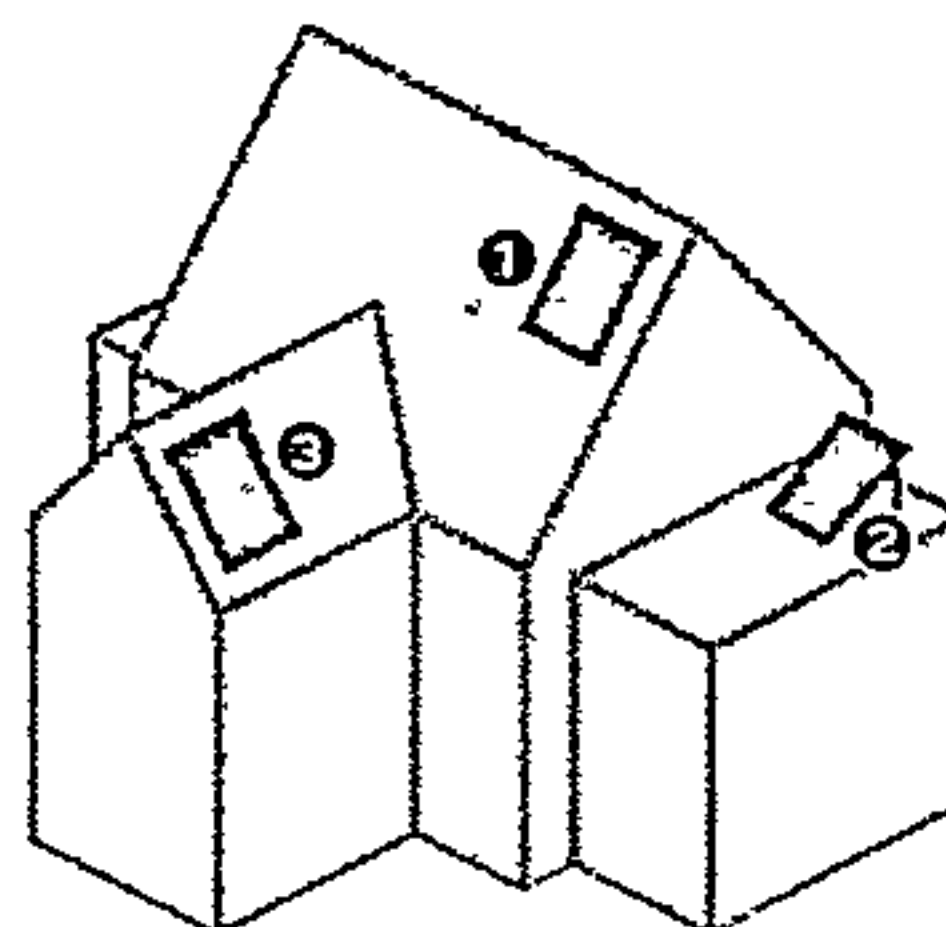
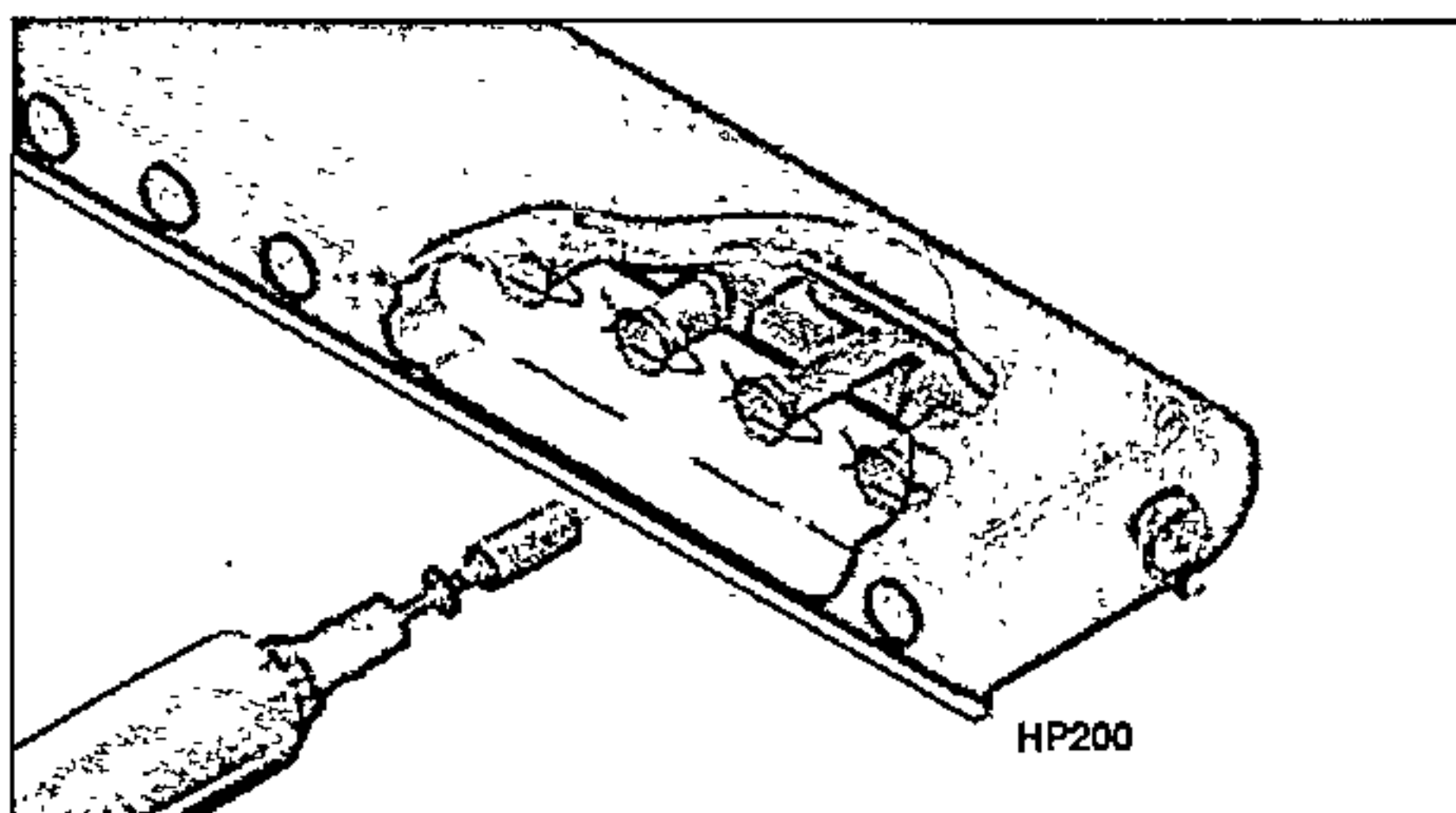
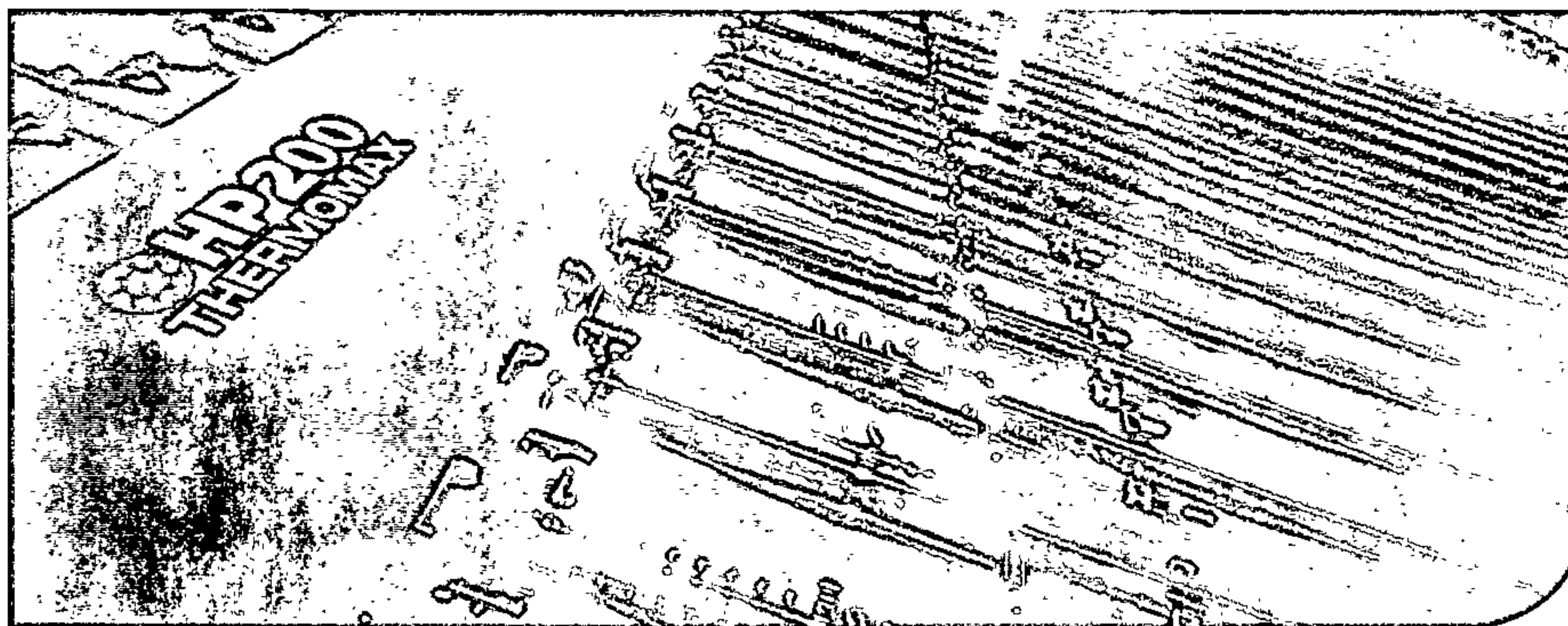
PLANNING SERVICES
DEVELOPMENT CONTROL

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Kingspan SOLAR

THERMOMAX HP200 vacuum tube solar collectors



HP200

Collector Positions

- 1 Ideal slope 40°
- 2 Roof tilt angled 40°
- 3 Elevated 20°

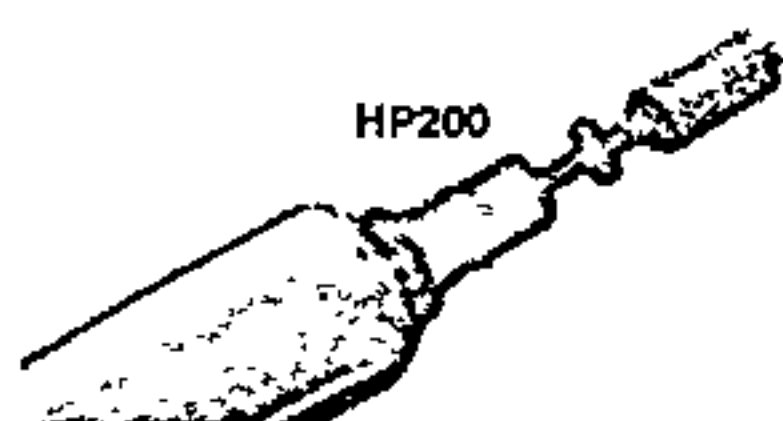
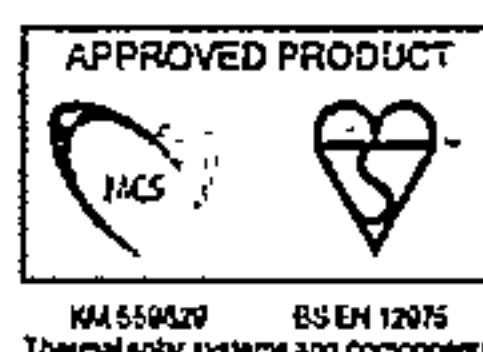
Heat Pipe Collectors HP200

Unique Feature - Temperature Limitation Device

This premium product is suitable for when the ideal installation position on the building is achievable.

HP200 is a 'Dry System' recommended for domestic use, ideal for Northern European climates. The dry connection between manifold and tube means tubes can be easily fitted and replaced, without the need to drain down the system.

- Highly efficient – super fast heat transfer
- Temperature limitation safety device
- Ease of installation and maintenance
- The system consists of two separate circuits: one in each individual tube inside the heat pipe and one through the manifold into the hot water tank
- 'Plug and play' design
- MCS certified



Temperature limitation device is fitted in the condenser bulb

Temperature Limitation Devices

All HP200 series collectors contain a unique temperature limitation safety device for system protection; there are 2 types:

HP200

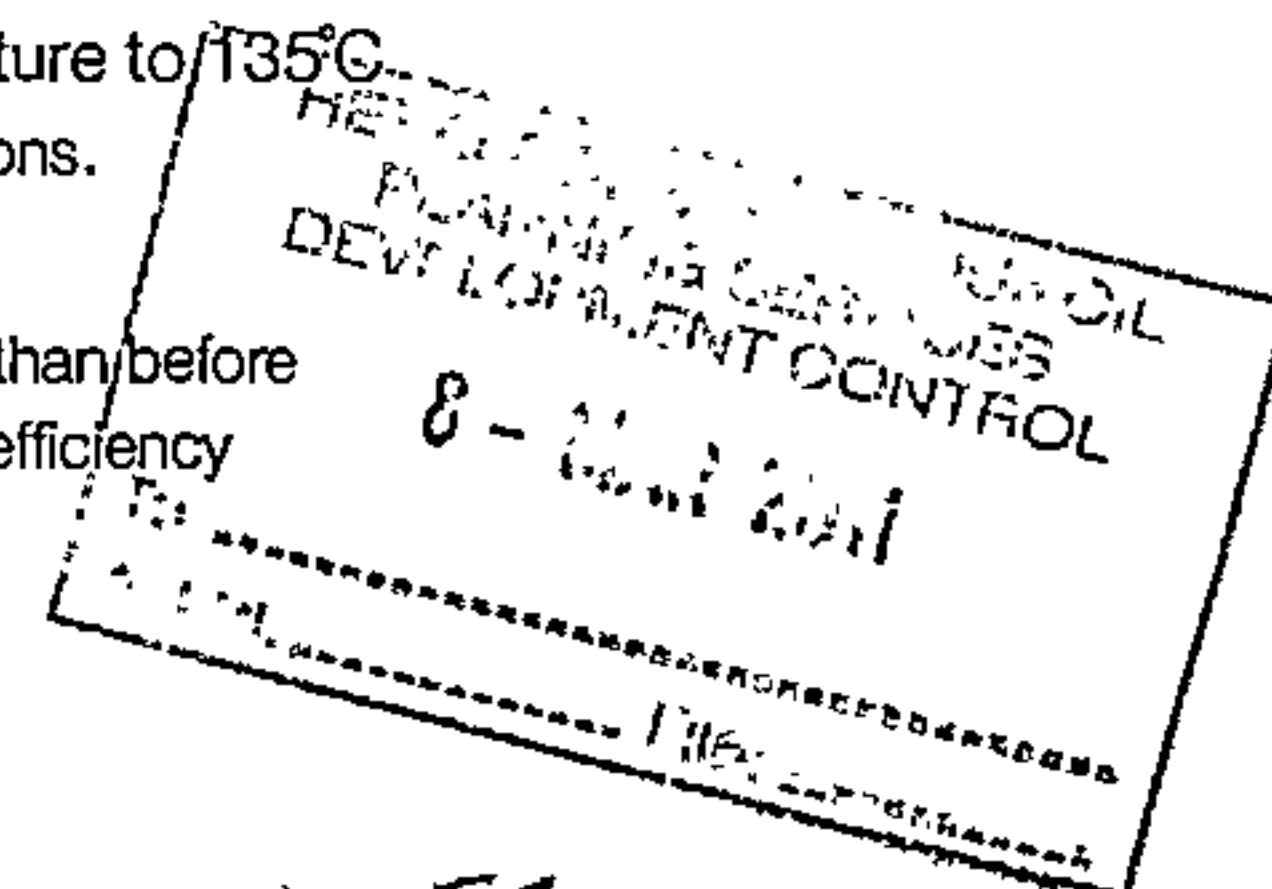
Memory spring to limit temperature to 95°C
Ideal for domestic installations.

HP250

Snap disk to limit temperature to 135°C
Ideal for commercial installations.

New improved snap disk

- Over 3.5% more efficient than before – now up to 81% optical efficiency
- More robust
- More reliable



Snap Disk Operation

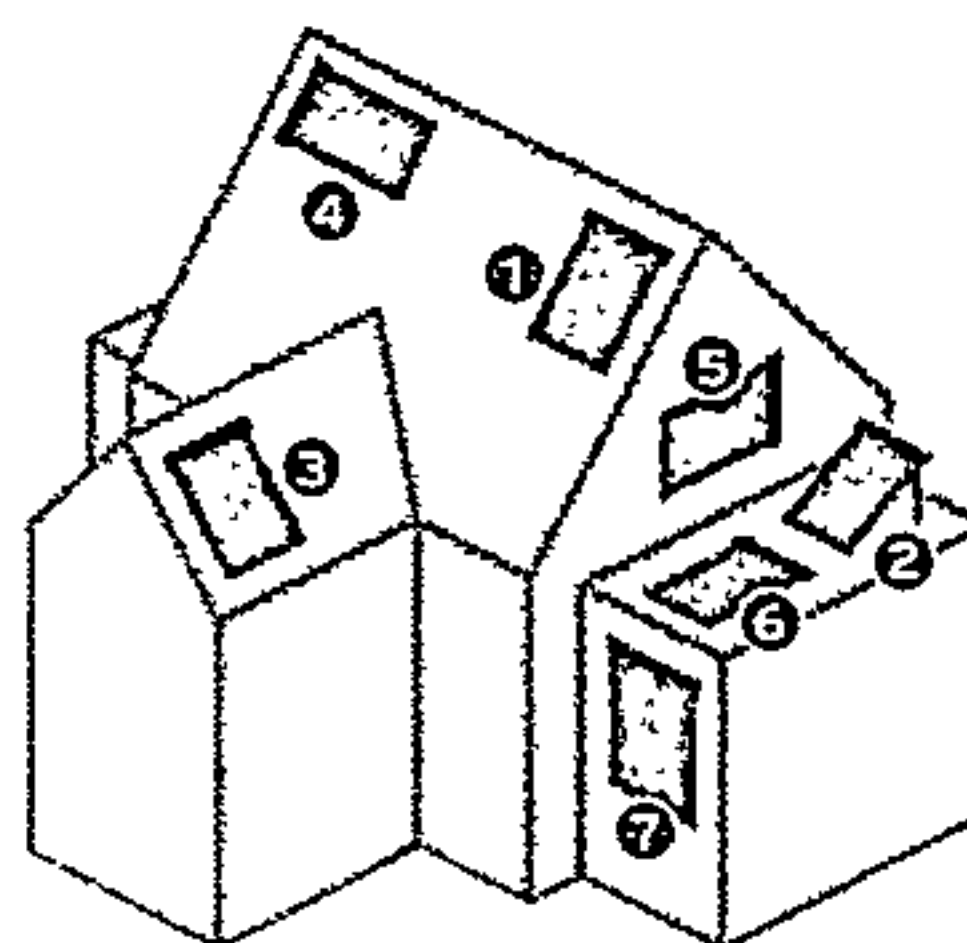
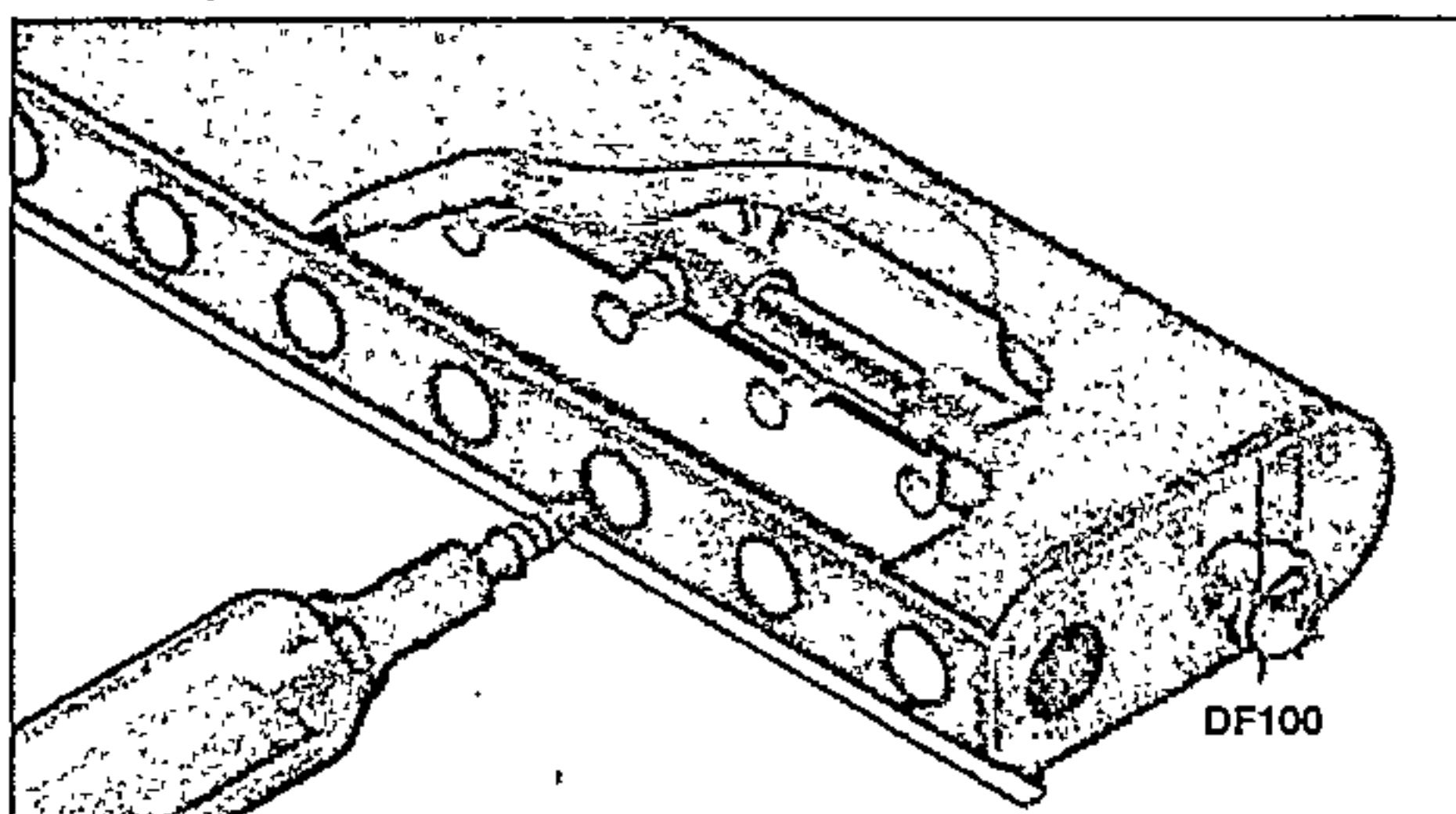
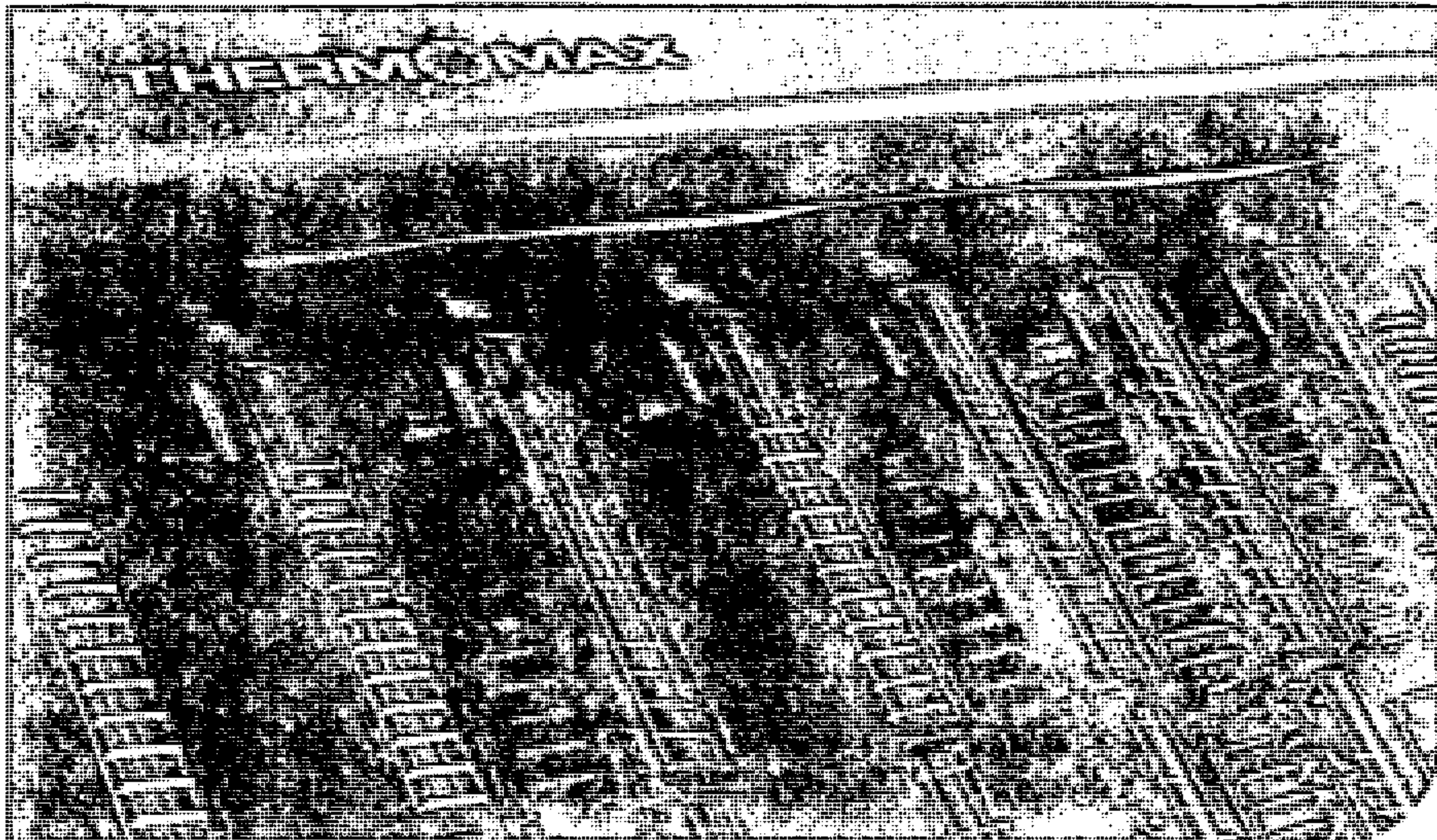
The device is open and heat transfer occurs until the condenser reaches 135°C

Snap disks operate and close the device, stopping heat transfer into condenser

Device re-opens as temperature falls below 135°C, reactivating heat transfer

Kingspan SOLAR

THERMOMAX DF100 vacuum tube solar collectors



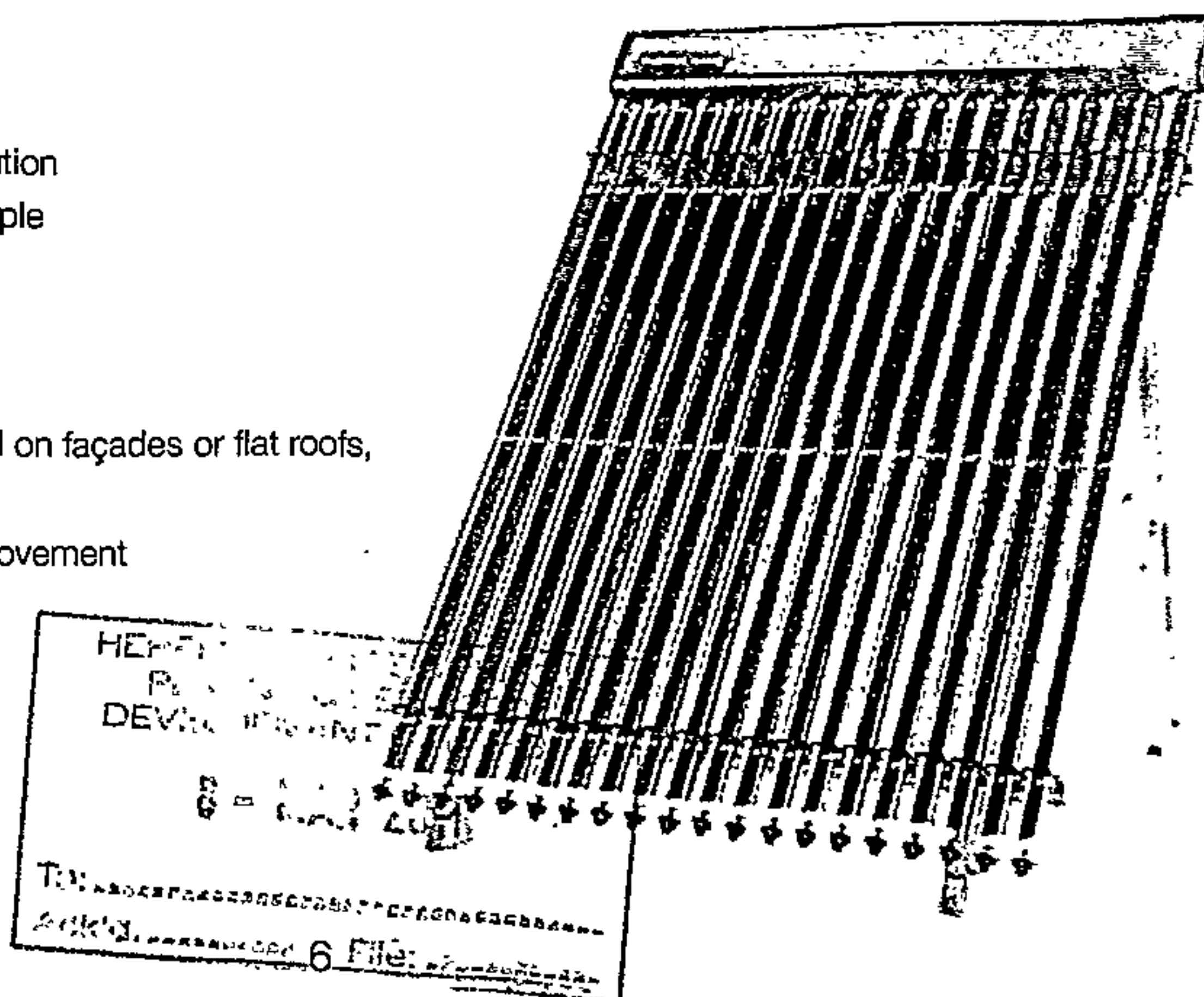
- DF100 Collector Positions
- 1 Ideal slope 45°
 - 2 Roof kit angled 45°
 - 3 Elevated 20°
 - 4 Horizontal ideal slope
 - 5 Horizontal façade
 - 6 Flat
 - 7 Vertical façade

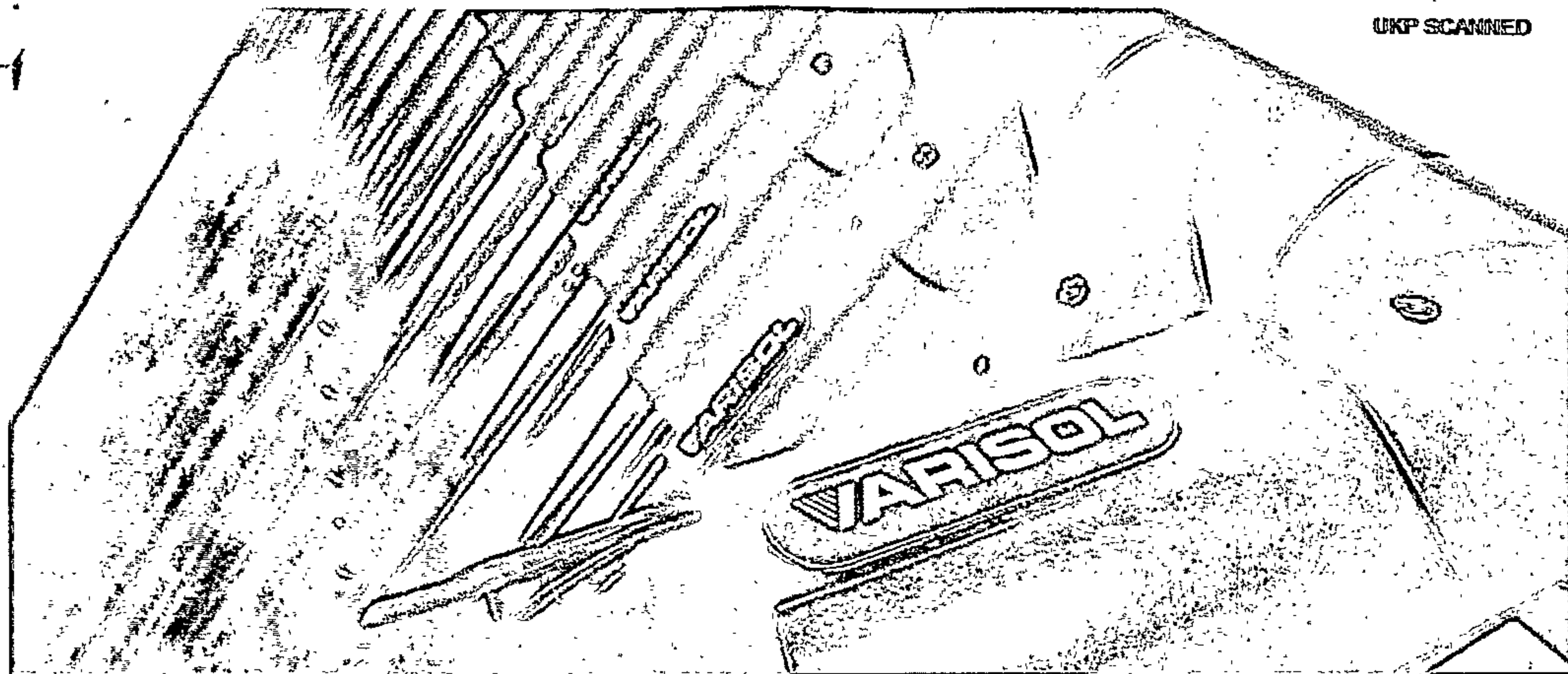
Direct Flow Collectors DF100

Unique Feature - Versatility

This versatile product provides the perfect solution when the ideal position is not available. It's simple and easy to install.

- Cost-effective choice
- Highly variable installation methods
- Flexible building integration – can be installed on façades or flat roofs, as seen in the diagram above
- Heat transfer fluid is circulated in a coaxial movement
- 'Plug and play' design
- MCS certified





VARISOL

Next Generation Thermomax Direct Flow Technology

The new Varisol combines Thermomax DF vacuum tubes with a unique modular manifold for increased flexibility in system design and installation, whilst retaining their top quality performance.

The design of the Varisol product offers a modern and flexible alternative wherever a rigid manifold system cannot be installed due to space limitations. Quick and easy to install, Varisol allows individual tubes to be simply 'clicked' together to create solar panels of varying sizes. This means collectors can be sized to the exact needs of the end user.

Benefits for everyone

Total flexibility and high performance are not the only benefits of this unique new design. The combination of high performance polymer materials and 'click-fit' technology creates a product that is easier to order, store and install and is also more environmentally friendly.

Installer

- Rapid installation.
- No heavy manifold.
- Can size collectors to fit available space e.g. in between windows

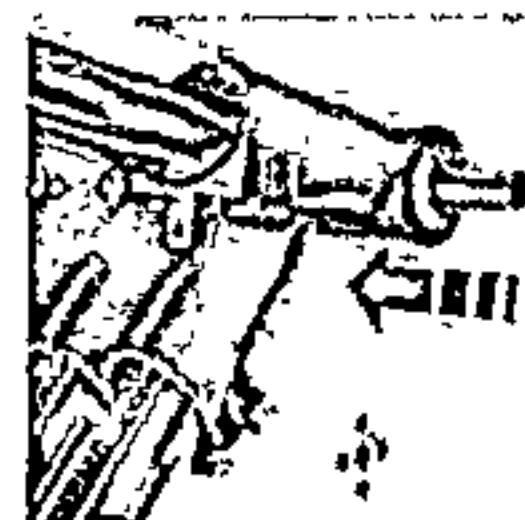
End user

- Sized exactly to meet your needs.
- Only pay for what you need e.g. 24 tube collector - exactly sized.
- Expandable as needs change - the system can grow with your family.
- No gaps in larger systems improving overall appearance.

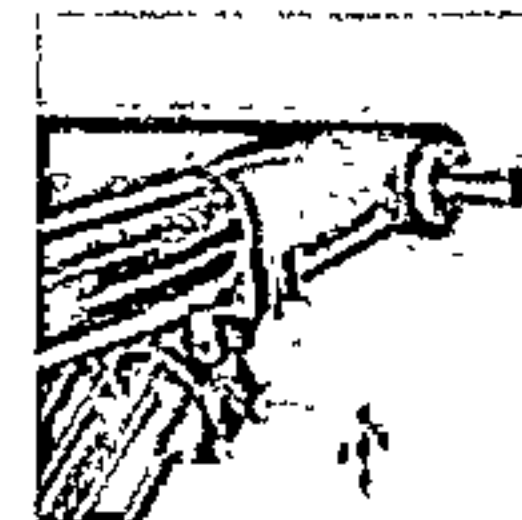
Environment

- Less use of energy intensive metals.
- No brazing or welding, reducing energy usage in manufacturing.
- Polymer materials are 100% recyclable.
- Lighter weight and reduced packaging minimise the impact of transport.

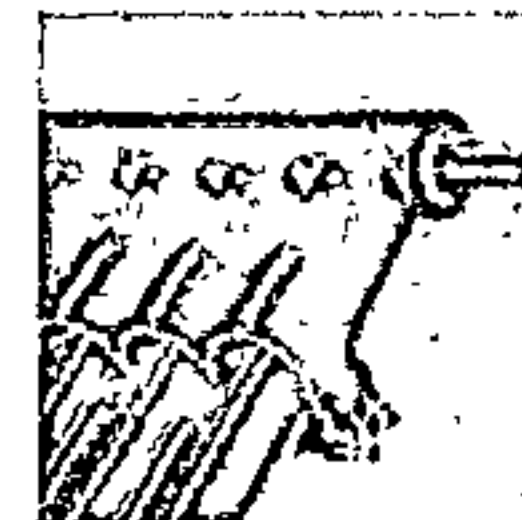
1 Insert Varisol tube



2 Rotate down

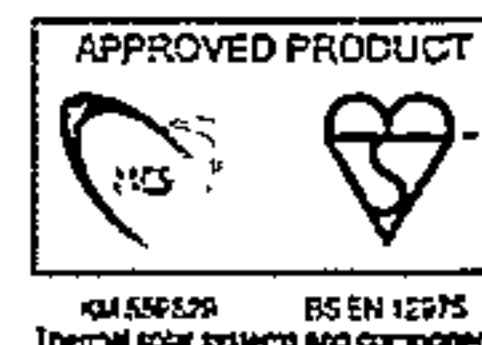


3 Click into position



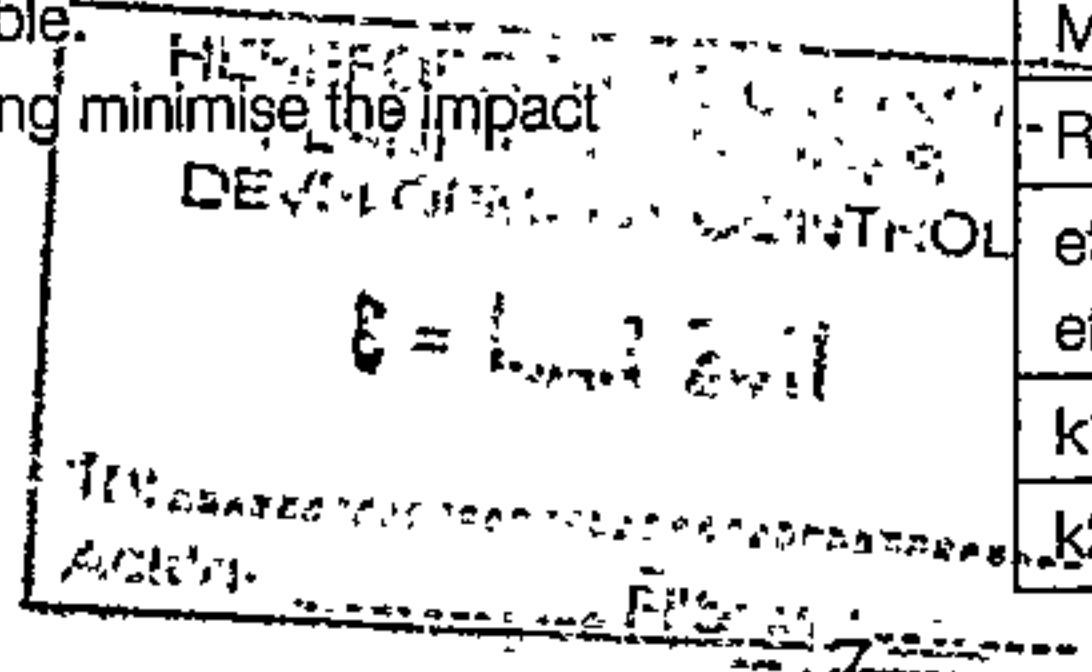
Features

- Total flexibility
- Precision sizing - 100% accurate
- High performance of Thermomax Direct Flow technology
- High performance polymer material
- Manifold component and tube pre-assembled
- Box sizes of 1, 5 and 10
- Suitable for domestic and commercial applications
- 20-year guarantee on vacuum tubes when installed by a Kingspan Solar Accredited Installer
- Collector size up to 150 tubes
- 100% European design and manufacture
- 5-year guarantee against hail damage
- MCS Certified

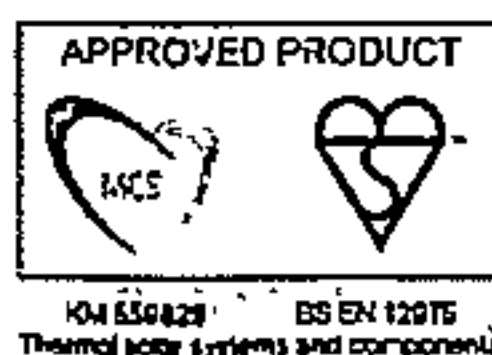


Specification

Dimensions (Each Tube)	1950 x 70.9 x 70.9mm
Weight (Each Tube)	2.2kg
Volume (Each Tube)	0.19 litres
Pipe Connections	22mm compression
Max Operating Pressure	6 bar
Recommended Inclination	0-90°
η_{00} - Zero loss collector efficiency (η_0)	0.783
k1 - Heat loss coefficient (a_1)	1.061
k2 - Heat loss coefficient (a_2)	0.023



	HP200		DF100	
	2m ²	3m ²	2m ²	3m ²
Dimensions				
Absorber Area (m ²):	2.010	3.021	2.004	3.020
Overall Dimensions (l x w x d):	2005 x 1418 x 97	2005 x 2127 x 97	1996 x 1418 x 97	1996 x 2127 x 97
Aperture Area (m ²)	2.16	3.23	2.15	3.23
Fluid Volume (ltr)	1.1	1.7	3.6	5.6
Weight - Empty (kg)	50	76	55	81
Efficiency (based on aperture)				
Eta 0	0.726	0.726	0.773	0.773
K1 (W/m ² K)	1.55	1.55	1.43	1.43
K2 (W/m ² K ²)	0.006	0.006	0.006	0.006
Operating Data				
Max Operating Pressure	8 Bar	8 Bar	8 Bar	8 Bar
Stagnation Temperature (°C)	184	184	286	286
Temperature Limitation (°C)	90-95	90-95	-	-



Thermomax Performance

- High quality glass – unique properties give good transmissibility with low reflection losses and increased durability.
- Superior vacuum – by creating a vacuum of 10⁻⁶ bar within the tube, thermal losses caused by conduction and convection are eliminated.
- Glass to metal seal – unique fusing process for durability.
- Larger 'getter' area – maintains a vacuum in the tubes throughout their operational lifetime.
- Impact Resistance – certified to withstand the Impact Resistance Test of DIN EN12975 using ice-balls.

Kingspan Renewables have a policy of continuous product development and may introduce product modifications from time to time. As a consequence details given in this brochure are subject to alteration without notice.



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