

Terms of Reference for Renewable Heating Systems

Absorber

An absorber transfers energy from one source to another. In solar thermal applications it transfers the sun's energy into the glycol. In a heat pump it takes a different form and transfers heat from the air into the transfer medium (refrigerant).

Air-to-water heat pump

Drawing heat from the air outside and providing heating to water (for space heating or hot water cylinder).

Ambient Temperature

The current air temperature for a specific location.

Back Boiler

In solid fuel applications the back boiler is a metal vessel of water, which can be heated by exposure to the fire and contributes that heat to hot water production of heating. Common in cast stoves.

Brine

A general term for the transfer medium in a solar thermal installation. Typically the transfer medium is Glycol.

British Standard (BS)

A document defining the testing methodology and standard of performance for a given item.

BTU

British Thermal Unit. 1 kW = 3411 BTU's. A measure of heat output.

Buffer store / buffer vessel / buffer tank

A store of heated water. Typically not less than 12 litres per Kw output of the heat pump or boiler. Buffer vessels increase heat pump efficiency by increasing run-time and decreasing off time (preventing cycling).

Circulating pump

The electrically powered pump which moves water or other fluids around the heating system. Example hot water around the radiators, Glycol around the solar thermal assembly.

Compressor

The common types of compressor in a heat pump are scroll or rotary. It uses electricity and compresses the refrigerant gas.

Coefficient of Performance

The C.O.P is a simple ratio between the Kw of heat put into the water when 1kw of electricity is consumed by the heat pump. Example: C.O.P 4.2 translates as average of 4.2 Kw of heat output for 1kw/h of electricity consumed on average across the year.

The formula for calculating a C.O.P = $QH / (Pel + Pdv)$

QH: Kw heat output

Pel: electricity in kw/h consumed by the unit

Pdv: energy required to nullify (overcome) the hydraulic resistance of the heat exchanger.

Cycling

The harmful and energy inefficient frequent switching on/off of an item of heating apparatus such as a boiler or heat pump. Cycling reduces efficiency and reduces component life.

Defrost

An automatic process whereby the heat pump melts the coating of ice which may have occurred on the external coil.

DHW

Domestic Hot Water

Differential Temperature

Typically the deltaT (temperature difference) between flow and return.

EN14511

European standard for testing and rating heat pump performance.

Evacuated Tube

A glass vacuum filled tube. Prevents loss of thermal gain by convection from the heat pipe.

Evaporator

The absorber for the heat from the air into the refrigerant.

Expansion valve

Regulates the flow of refrigerant in the heat pump

Feed in tariff

A preferential buy back rate for electricity sold back to the national grid.

Flat-plate collector

Commonly a flat, rectangular insulated panel which absorbs solar radiation into a heat transfer medium (glycol) for heating water.

Flow rate

Typically in cubic m per hour or litres per minute. Example: the amount of water flowing through the heat pump in a minute may be expressed as 25l/m.

Flow setter

A component with a visual aid for indicating a flow rate and the ability to regulate it downwards from the flow provided by the pump.

Flow temperature

The temperature of a heat transfer medium as it leaves the heat source. Example the temperature of the water as it leaves the boiler.

Heat exchanger

Taking various physical forms a heat exchanger typically passes two liquids on either side of a heat conductive barrier to transfer heat from one liquid to the other. Example: the coil in a hot water cylinder.

Heat Loss

The calculated rate at which a given structure or part of a structure loses heat energy in a given period.

Heat output

Typically expressed in Kw or B.T.U this is simply the amount of energy output by a heat pump or boiler in a specified time. Example: A 7kw/h heat pump transfers 7kw of energy in a one hour period into the system water.

Heat pump

The modern replacement for the typical gas or oil boiler. A low carbon heating solution which is based on an ultra efficient refrigerant cycle rather than burning fossil fuels.

Heating System

The entire apparatus of heat production and distribution. Example: A heat pump and the various components with radiators.

Heat Transfer Medium

The substance which is heated in order to transfer heat from one piece of equipment to where it is used. Example: water is the heat transfer medium in a typical domestic heating system.

In Line Boost Heater

A 3kw electric element which increased flow temperature when activated. Can assist the heat pump at times of extreme demand.

Inverter

Apparatus which smoothes and stabilizes the varying electrical current from PV or wind turbine

J

kW or Kilowatt

A measure of energy, 1000watts = 1kW

L

Microgeneration

Small scale or local generation of electricity. Example: Photovoltaic or wind turbine.

N

O

Photovoltaic

See Solar Photovoltaic

Renewable Energy

Energy from a source which will not be exhausted as a result of its use. Examples: The sun, tidal, wind

Scroll Compressor

A more efficient compressor which replaces a valve with a spiral channel which gives more effective and smooth compression.

Solar thermal

Heating water by harnessing solar radiation in a heat transfer medium

Solar Photovoltaic

Exposing PV panels to daylight causes an electric current to be produced.

Stagnation Temperature

The very high temperature that can be reached in solar thermal collectors if the heat is not used. Stagnation temperature should be avoided as high temperatures can be damaging to the equipment.

Stratification

In a water cylinder the water at the top is hotter than the water at the bottom. In thermal stores this stratification can be used to various advantages.

Thermal Store

Typically a combined buffer vessel and hot water store. The hot water is normally produced by an integral or external heat exchanger.

Timed Period

The interval between a set 'on' time and a set 'off time' during which part of the heating assembly is active

Underfloor Heating

Heating pipes are laid in the substrate of the floor. When hot water is pumped through them, the gentle heat permeates the floor and heats the room. Operating at much lower temperatures than radiators it allows heat pumps to operate in the most efficient segment of their operating range.

U-Value

The measure of the rate of heat loss through a material. Typically expressed as watts per meter squared per degree Kelvin. (Kelvin being the scale of temperature difference, numerically equal to °C) W/m^2K

V

Wind turbine

The wind turns a fan type arrangement of blades which turns a generator. Electricity is produced.

X

Y

Z

Eco Airpump