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SOLAR RESEARCH DESIGN SDN. BHD.

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Sole Agent For: **Microsolar**

the world's highest temperature thermosyphon solar water heaters

MICROSOLAR WATER HEATERS PERFORMANCE GUIDELINES AND SCHEDULE OF USE

MODEL ACTUAL STORAGE CAPACITY	SIZE OF HOUSE	OVERCAST RAINY DAYS	NORMAL HALF SUNNY DAYS	VERY HOT CLEAR SUNNY DAYS
Microsolar 10 vacuum tubes **2-3 Pax** **M30VT** 28 gals / 127 litres 1.6 sqm collector **SL25VTHE** 24 gals / 110 litres 1.7 sqm collector	Small terrace house max. 2 storeys, 2000sft built up area, 2 bathrooms less than 20 ft (6m) apart. **No kitchen use**	Hot water (47.5°C) Hot showers For 2 pax : 3.46 kWh per day eqv. 3038 kcal per day 198 lt. x 40°C or 135 lt. x 47.5°C	Steaming hot water (50° - 60°C) Hot showers for 3 pax : 5.38 kWh per day eqv. 4725 kcal per day 307 lt. x 40°C or 184 lt. x 50°C or 135 lt. x 60°C	Steaming hot water (60°C - 85°C) Hot showers for 4 pax : 7.67 kWh per day eqv. 6750 kcal per day 438 lt. x 40°C or 188 lt. x 60°C or 135 lt. x 75°C
Microsolar 20 vacuum tubes **4-5 Pax M60VT** 55 gals / 250 litres. 3.0 sqm collector	Small terrace house max. 2 storeys, 2500sft built up area, 2-3 bathrooms less than 24 ft (8m) apart. **With kitchen use** **3 pax only**	Hot water (47.5°C) Hot showers For 3 pax : 6.54 kWh per day eqv. 5625 kcal per day 375 lt. x 40°C or 250 lt. x 47.5°C	Steaming hot water (50° - 60°C) Hot showers for 4-5 pax : 10.17 kWh per day eqv. 8750 kcal per day 583 lt. x 40°C or 250 lt. x 60°C	Steaming hot water (60°C - 85°C) Hot showers for 6 pax : 14.54 kWh per day eqv. 12500 kcal per day 833 lt. x 40°C or 250 lt. x 75°C
Microsolar 30 vacuum tubes **6-7 Pax M80VT** 75 gals / 340 litres. 4.2 sqm collector	Bungalow max. 2½ storeys, 3000sft to 4000sft built up area, 3-4 bathrooms less than 36 ft (12m) apart. **With kitchen use** **5 pax only**	Hot water (50.0°C) Hot showers for 4 pax: 9.85 kWh per day eqv. 8500 kcal per day 567 lt. x 40°C or 340 lt. x 50°C	Steaming hot water (50°C - 60°C) Hot showers for 5-7 pax: 13.84 kWh per day eqv. 11900 kcal per day 793 lt. x 40°C or 340 lt. x 60°C	Steaming hot water (60° - 85°C) Hot showers for 8 pax: 19.77 kWh per day eqv. 17000 kcal per day 1133 lt. x 40°C or 340 lt. x 75°C

Kitchen use is considered as 3 persons extra (36 UK gals)
Laundry use is considered as 3 persons extra (36 UK gals)
Bathtub use is considered as 2 persons extra (24 UK gals)

Note : 1 UK Gal = 4.546 litres
1 US Gal = 3.785 litres
1000 kcal = 1.163 kwh eqv. = 4.1868 MJ = 3970 Btu
1 kcal of heat energy raises 1 litre of water by 1ºC = 4187 J = 3.97Btu

Nominal Heat Storage Capacities indicate actual total volume of hot water produced at 40°C (maximum shower temperatures) when mixed with cold water at 25°C. Shower water above 40°C is too hot and may be dangerous. Mixers must be used.
Young children must be supervised in the bathroom.
Maximum temperatures indicate undiluted hot water temperatures (before draw off). Performance may vary from house to house depending on distance of solar water heater panel from bathroom and on whether the copper pipes are insulated. The temperatures shown above relate to insulated copper hot water pipes only.
Temperature indications are for Kuala Lumpur Malaysia, Latitude 3°N, 65m above sea level, average daily temperatures 24°C to 32°C throughout the year.
Uninsulated copper pipes may not attain the temperatures shown.
If a hot water pump 2 bar (30psi) is used, the number of persons supported will drop by 25% due to the increased flowrate.
It is recommended that the solar heater panels not face the north, northeast or northwest in Malaysia.

On a sunny day in South Africa 2007 November to 2008 February the South Africa Bureau of Standards (SABS) tested the Microsolar, with total 25 MJ/m^2 per day of solar radiation on plane of collector, the Microsolar M60VTHE 250 litres 3.0 sqm collector is estimated to produce 31 MJ / 29,395 Btu / 8.611 kwh / 7404 kcal per day, with ambient ºC – cold water ºC = 20ºC.

On a cloudy day with total 16 MJ/m^2 per day total solar radiation on plane of collector, the Microsolar M60VTHE 250 litres 3.0 sqm collector produces 19.524 MJ / 18,513 Btu / 5.423 kwh / 4663 kcal per day, with ambient ºC – cold water ºC = 10ºC.

Solar Efficiency Conversion Factor = solar heat energy stored ÷ solar energy received = 40.7%