

1 COLLECTOR ASSEMBLY

1.1 Handling Precautions

The evacuated tubes are made of borosilicate glass (trade name Pyrex) and although they can withstand a reasonable amount of impact it is possible to break them. Ensure that the bottom of the tube is a shiny silver colour when unpacking them. If this colour has changed to white or clear the tube has been damaged and has lost its vacuum.

We recommend that the evacuated tubes are left in the box until the rest of the installation has been completed. **IMPORTANT: If the tubes are left uncovered in the sun the copper heat transfer tips can reach up to 250°C and cause burn wounds.**

The ITS evacuated tube solar collectors are supplied as follows:

1. Boxes containing evacuated tubes.
2. Box containing collector manifold unit.
3. Box containing standard frame, tube mounting clips, thermal paste, rubber end pieces and fastening screws.
4. Optional: Box containing flat roof mounting frame.

1.2 Frame Assembly

Figure 2 shows the unassembled frame parts for an 18 pipe collector. At the top of the picture is the manifold and there are two down-bars to the left and right. The 24 pipe and 30 pipe units have an extra down-bar in the middle of the collector frame. At the bottom is the cross-bar and to the left and right of the cross-bar are the small rubber end piece inserts. Below the cross-bar are the cross-bar tube clips. Both the down-bars and the cross-bar are polarized and can only be fitted one way around.



Figure 2

Each down-bar has a number of holes in it and has two sets of bolt slots. The set of bolt slots that are further apart from each other are used for mounting the manifold to the frame. The other set of bolt slots that are closer together are for the mounting the cross-bar. The outside face of the down-bars contains only one hole, which is used to attach a flat roof stand (optional).

The frame kit is supplied with a bolt and bracket system for the fastening the manifold and the cross-bar to the down-bars. Figure 3 shows the individual parts and Figures 4 & 5 show how they should be assembled.



Figure 3



Figure 4



Figure 5

Bolting of the cross-bar to the down-bar is shown below. Please note the polarization on the cross-bar in Figure 6. The pipe-clips are made to clip into the cross-bar in only one orientation and therefore the top right-hand lip of the cross-bar is longer and shaped differently to the top left-hand lip.



Figure 6

The rubber end pieces are inserted into the cross-bar to prevent the possibility of the end clips sliding out. Figure 7 below shows the rubber end piece inserted into the cross-bar.



Figure 7

Figure 8 demonstrates how the down-bars should be connected to the manifold.



Figure 8

Four roof mounting brackets are supplied to secure the frame to the roof. They are attached to the frame as shown below in Figures 9 & 10.



Figure 9



Figure 10

Figure 11 shows the fully assembled frame with the pipe clips inserted. We recommend that the pipe clips only be inserted at the same time when the evacuated tubes are inserted.



Figure 11

ITS strongly recommends that the evacuated tubes only be inserted after the rest of the installation has been fully completed. The complete system plumbing, pumps etc should be tested and checked for water leaks before inserting the tubes.

1.3 Inserting the Evacuated Tubes

Once the plumbing side of the installation has been completed and fully tested for leaks the evacuated tubes may be inserted. The thermal transfer tips of the evacuated tubes should be covered with a thin layer of thermal paste to improve the thermal coupling with the manifold. This will also prevent the copper tip from self welding to the manifold, which would make it very difficult to extract the tube if required in the future.

Please note that special care should be taken to apply the thermal paste evenly in a thin layer. Too much thermal paste will increase the thermal resistance and limit the system performance.



Figure 18

Before inserting the glass tubes into the manifold first apply some petroleum jelly to the rubber seals, as shown below, to ease the insertion friction.



Figure 19

Also ensure that the manifold heat transfer tip sockets are unobstructed and in the correct position within the manifold. Incorrect handling and fitting of compression sockets onto the manifold during the plumbing part of the installation can cause the copper manifold to rotate slightly inside the manifold casing and will make insertion of the tubes very difficult if not corrected.

Ensure that the heat transfer tip at the top of the tube is properly inserted into the manifold heat transfer tip socket. The tip should fit snugly, but excessive force is not required for correct insertion. **Please note that it is possible to break the copper heatpipe if the glass tube is forcefully twisted during insertion.**

2 CLEANING

2.1 Evacuated Tubes Cleaning

Before leaving the site it is very important to clean the glass evacuated tubes with a suitable glass cleaner to ensure that maximum solar energy will be allowed through to the absorber surface. Failure to carry out this step may result in reduced performance of the system.