

Roll-to-Roll Deposition

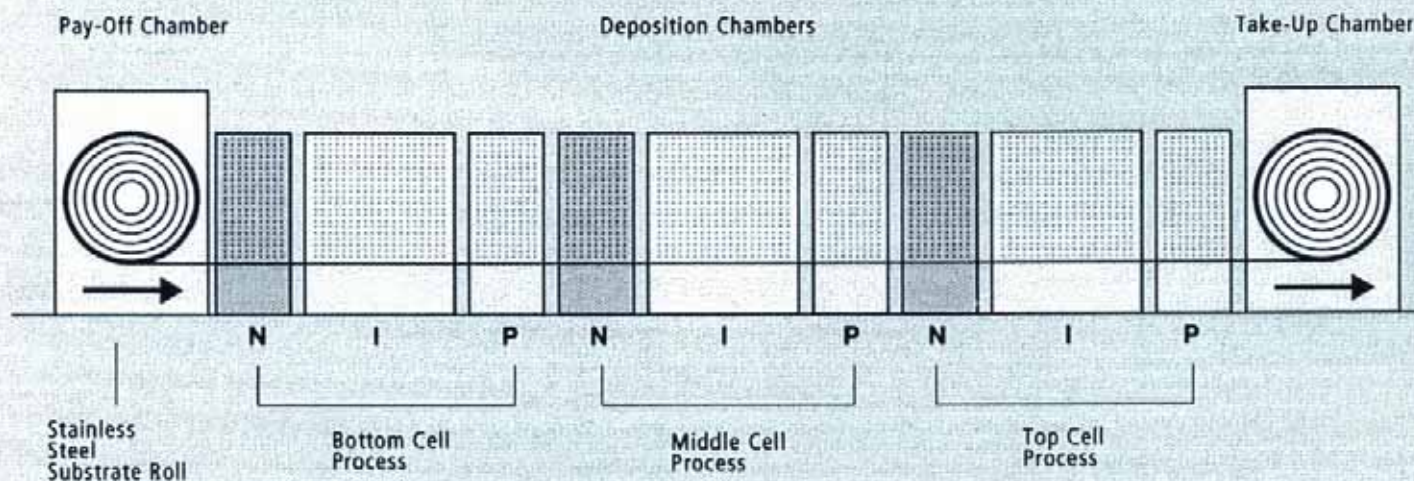


Fig 2.10 Roll to roll , microwave , plasma, chemical deposition process.

Invented by Uni-Solar Inc in conjunction with Canon Corporation. This high speed process has revolutionised solar cell production and is the key to the wide spread, cost effective application of solar power technology.

There are no soldered connections between individual cells. Entire sections of cells are formed as one, at the rated output voltage of the solar panel. This greatly increases reliability and shock resistance compared to crystalline units. These cell sections are then arranged in parallel to obtain the specified amperage rating of the panel. This *parallel architecture* renders the panels extremely shadow tolerant, as significant amounts of their surface area can be shaded without switching off the entire panel, again in direct contrast to crystalline units. Yet another advantage is their high temperature performance, it actually increases slightly, unlike crystal panels that can lose over 15% of their output. There is no question about it; in hot arid climates for use in water pumping and home power systems, amorphous silicon is the only way to go.

Finished panels are encapsulated within a tough, U.V stabilised polymer cladding to resist abrasion, dust and moisture. They are available in rigid framed, flexible or roof integrated modules to suit a wide range of markets and applications. The rigid framed units are the traditional form that most people would be familiar with. A good general purpose panel, they are ideal for free standing use and for mounting on poles and trackers. The flexible versions are very thin and lightweight and great for mounting onto curved surfaces such as boats, motor vehicles and caravans. The roof integrated panels are a recent

concept that allow the roof itself to become the solar collector. This reduces cost and delivers a more aesthetically pleasing result, and in the fullness of time will be seen to be the answer for the widespread application of solar power throughout cities and towns.

Finally, the original energy and materials input to manufacture the product must be considered. Amorphous cells are made in a low temperature process using minute amounts of silicon. This is in direct contrast to the wasteful, high temperature smelting operations required in the fabrication of mono and poly-crystalline solar cells. As you can see from the figure below there is absolutely no comparison. This is the overwhelming reason why crystalline technology is very close to becoming obsolete!

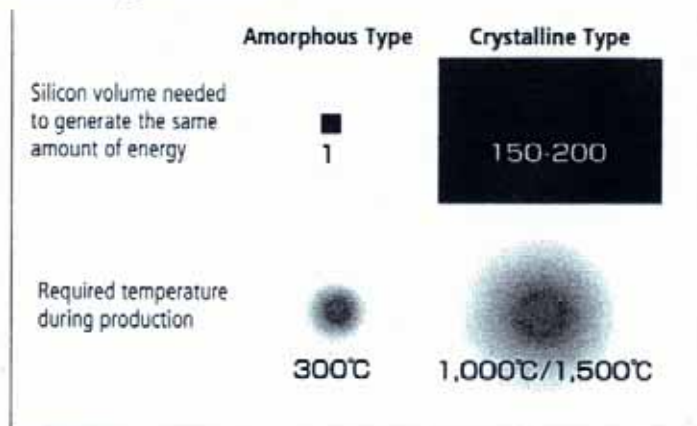


Fig 2.11 Manufacturing inputs

Comparison of resource and energy inputs in the production of amorphous and crystalline solar cells