



# Application Note 1001

July 22, 2010

## Efficiency Variability in Spectrolab Production Solar Cells

Spectrolab’s multijunction solar cell products exhibit the highest repeatable production efficiency in the industry and also the most consistent performance. Nevertheless, there is variability in the measured efficiency of the cells. The figure below is an illustration of the nature and magnitude of typical variability in production cells. The figure shows actual production efficiency summaries for C3MJ production cells tested between May 25 and July 19, 2010. The notation along the x-axis connotes batch numbers. Each batch comprises 55 wafers, corresponding to 2,750 CDO-100 cells (or more cells for smaller cell sizes with more die per wafer). The crossbar reflects the batch average, and the vertical bars represent  $\pm 1\sigma$  variation in measured efficiency for that batch on Spectrolab’s automated bare cell tester.

It can be readily seen that, while the overall population exceeds the target average efficiency of 38.5% for this product, many individual batches (13 out of 87 in this sample of production history) fall short of the broad population average.

For these reasons, it is Spectrolab’s policy to have no specified minimum average efficiency for small orders. We maintain batch traceability for all cell deliveries for quality control purposes, so deliveries to customers are essentially in the order scheduled. All individual cells are subjected to an acceptance criterion for efficiency of at least 94% of the target population average (36.2% for C3MJ product) and binned by performance for all orders regardless of order size.

