

# Errata

February 28, 2002

This posting of *The International Technology Roadmap for Semiconductors, 2001 edition*, contains the following corrections:

## Executive Summary

Figures 2 and 3 were updated for consistency with Glossary definitions, and clarification. Text was updated to reflect updated figures. In Figure 2, an arrow mark for 'a second follower within three months' was added.

Corrected the text for the figure as follows:

Was—The "Production" time in ITRS refers to the time when the first two companies bring a technology to production and the succeeding companies follow production within three months.

Correction—The "Production" time in ITRS refers to the time when the first company brings a technology to production and a second company follows within three months.

In Figure 3, the legends showing the (vertical) feature size range of each of the squares for production capacity was added. The squares were colored to reflect this. Corrected the text for the figure as follows:

Was—Figure 3 shows, in green horizontal bar-graph, the actual, annual worldwide wafer production capacity distributions over different process feature sizes.

Correction—Figure 3 shows, in horizontal bar-graph, the actual, annual worldwide wafer production capacity distributions over different process feature sizes.

## Process Integration, Devices, and Structures

Correction—in "Architectures—Definition and Discussion of Table Entries" section, numbered list items refreshed to start at 1.

## Lithography

Figure 24 font was raised 1 point

## Factory Integration

All Tables' and Figures' numbers were corrected for continuous numbering as follows:

|                                  |  |                              |
|----------------------------------|--|------------------------------|
| Figure 36 corrected to Figure 44 | Table 51 <i>Factory Integration Difficult Challenges</i>                               | corrected to Table 65        |
| Figure 37 corrected to Figure 45 | Table 52a and b <i>Factory Operations Technology Requirements</i>                      | corrected to Table 66a and b |
| Figure 38 corrected to Figure 46 | Table 53a and b <i>Production Equipment Technology Requirements</i>                    | corrected to Table 67a and b |
| Figure 39 corrected to Figure 47 | Table 54a and b <i>Material Handling Systems Technology Requirements</i>               | corrected to Table 68a and b |
| Figure 40 corrected to Figure 48 | Table 55a and b <i>Factory Information and Control Systems Technology Requirements</i> | corrected to Table 69a and b |
| Figure 41 corrected to Figure 49 | Table 56a and b <i>Facilities Technology Requirements</i>                              | corrected to Table 70a and b |
| Figure 42 corrected to Figure 50 | Table 57a and b <i>Probe/Test Manufacturing Technology Requirements</i>                | corrected to Table 71a and b |
| Figure 43 corrected to Figure 51 | Table 58 <i>Assembly and Packaging Potential Solutions</i>                             | corrected to Table 72        |
|                                  | Table 59 <i>Yield Management Potential Solutions</i>                                   | corrected to Table 73        |

## ESH

All Tables' numbers were corrected for continuous numbering as follows:

|   |                              |
|---|------------------------------|
| Table 67 <i>ESH Difficult Challenges</i>  | corrected to Table 82        |
| Table 68a and b <i>ESH Intrinsic Requirements</i>   | corrected to Table 83a and b |
| Table 69a and b <i>Chemicals, Materials, and Equipment Management Technology Requirements</i> | corrected to Table 84a and b |
| Table 70a and b <i>Climate Change Mitigation Technology Requirements</i>                      | corrected to Table 85a and b |
| Table 71a and b <i>Resource Conservation Technology Requirements</i>                          | corrected to Table 86a and b |
| Table 72 <i>Design for Environmental, Safety, and Health Technology Requirements</i>          | corrected to Table 87        |

Table 83a and b

Correction—"Resource Conservation" was added just before "Energy Consumption."

Correction—"ESH Design & Measurement Method Technology Requirements" corrected with "Design for ESH (DFESH)"

Left-most column organized in terms of alignment to reflect changes

Correction:—83a: Near-term "Tool UPW Use (Liters/cm<sup>2</sup>, per wafer pass)," corrected 0.49 with 0.15, 0.25 with 0.075, 0.20 with 0.06.

Correction—83b: Long-term "Tool UPW Use (Liters/cm<sup>2</sup>, per wafer pass)," corrected 0.15 with 0.05.

Correction—83b: Long-term "Energy Consumption, Fab facility (kWh/cm<sup>2</sup>)," corrected 0.3-0.3 with 0.3-0.4

Correction—83b: Long-term Added "New chemicals (include by-product materials)" after "Existing Chemicals (include by-product materials)" and for years 2010-2016, shaded red background, and fill cells with "100% after 2 years of market introduction."

Correction—Table 85a: Added "Definition: Utilization = (PFCin - PFCout)/PFCin \*100" below table

Correction—Table 86a: "Tool UPW Use (Liters/cm<sup>2</sup>, per wafer pass)," corrected 0.75 with 0.075

Reformat—Table 86b: Driver column placed at the right side of table

## Metrology

Correction—Table 100a: *Front End Processes Metrology Technology Requirements—Near-term*

"DRAM capacitor dielectric physical thickness (nm)  $\pm 3 \sigma$  process range," cell values were corrected to indicate  $\pm$  percentage in all cells