JEITA

300mm Prime Guidelines

Phase 1

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1. Next Generation Fab Image Intended by J300P Guidelines

1.1. Introduction

This guideline booklet was developed by 300mm Prime Task Force affiliated with JEITA-JSIA (Japan Electronics Information Technology Association Japan-Japan Semiconductor Industry Association) Technology Committee, hereafter *J300P Task Force*. The area of the guideline requirements is limited to production equipment and related peripheral capabilities per the agreement made among the JEITA-JSIA member companies. This set of guidelines is expansion of the existing global guidelines (GJG300: Global Joint Guidance for 300mm Semiconductor Factory CIM and EEC: Equipment Engineering Capabilities Guidelines) to capture the requirements in the next generation semiconductor fabs as reduction in production cycle time, more stable and elaborate process outcome controllability, and, reinforced productivity in the production equipment. J300P Task Force reviewed the existing guidelines of both GJG300 and EEC. J300Ptask Force found they are all reusable except for new additional requirements.
Phase 1 guidelines focus on wafer point of view visualization of factory and equipment activities, and phase 2 guidelines will focus on equipment controllability.

1.2. Background

300mm factories have been designed for factory automation and build worldwide basis. There are following problems in terms of productivity and a paradigm shift in the manufacturing methodology now being sought.

(1) Wafer level process outcome control capability in response to process node advancement
(2) Productivity and cycle time improvement in response to rapidly changing business requirement

Figure 1 shows the image of above mentioned paradigm shift in semiconductor factory and its manufacturing methodology. This figure was created by STRJ and presented in 2005 winter ITRS meeting.

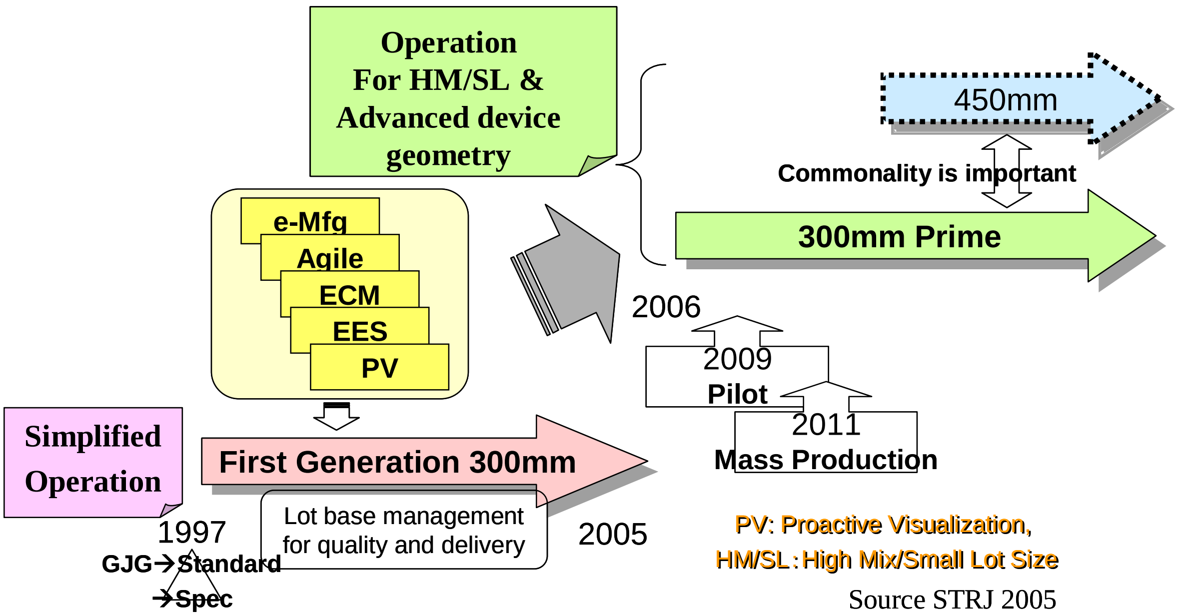

Figure 1: Paradigm shift for the next generation semiconductor factory

STRJ disclosed following manufacturing concepts in the past 5 years; e-Manufacturing, Agile-Manufacturing, Engineering Chain management, Equipment Engineering System, Proactive Visualization, Hierarchical Strategic Quality Assurance. J300P Task Force formulated requirements as guidelines out of these manufacturing concepts with a focus on productivity and cycle time improvement.

1.3. Implementation Timings

Followings are implementation timings of the capabilities required in this guidelines.

2008

Completion of equipment engineering data contents and data provision readiness that are asked in the base guidelines

2009

Implementation of wafer traceability information from wafer point of view that is asked in the base guidelines

Completion of standardization for equipment capability and relevant data models

Standardization of information definition for Dandori visualization

Implementation of graceful shut down of equipment that are asked in the individual wafer equipment control guideline

Standardization of wafer management information at the interface between production equipment and factory for wafer

2010
Standardization and implementation of those wafer level control capabilities required in Phase 2

2. Basic Guidelines

Manufacturing Management and Control in Wafer Point of View (Explanation)

Wafer processing operations are graphically represented in Figure 2. A lot has been defined as a carrier containing 25 wafers and most of the production information has been defined based on this lot definition, and manufacturing is controlled and executed based on this lot basis and the information has been gathered.
For the further improvement of the cycle time and productivity it will become important to utilize individual wafer's movement information that describe all experienced states in the course of fabrication at individual wafers internal and external to the equipment together with equipment operation log data. The scope of the basic guidelines is that equipment productivity and equipment process control activities are to be analyzed at individual wafer level so as to visualize individual wafer activities as well as productivity losses that have not been explored before and the process outcome control and related peripheral activity control are to be done at the wafer level as well to improve the productivity in a comprehensive manner.
Phase 1 basic guidelines present the requirements for factory activity visualization from the viewpoint of individual wafers and from the other viewpoints as well. Phase 2 basic guidelines are scheduled to present requirements for the process outcome control and related activities at individual wafer-level.

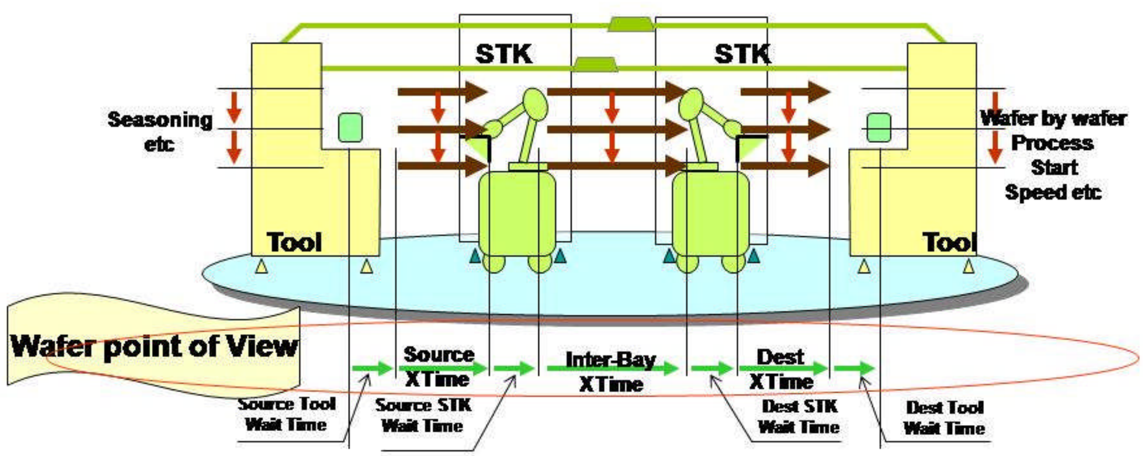

Figure 2: Cycle time visualization concept from wafer point of view

2.1. Manufacturing Management and Control in Wafer Point of View

Manufacturing management and control information shall be designed to allow elaborated wafer view utilization both in the factory and equipment systems.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
For the consistent improvement both in the cycle time and productivity it will become important to utilize factory information comprising of individual wafer's movement information that describe all experienced states in the course of fabrication internal and external to the equipment in conjunction with hierarchically structurised relevant equipment activity log data. Wafer view factory information such as cycle time and waiting time information has been defined by individual device makers. The equipment activity information from the wafer viewpoint such as wafer movement upon load; port transfer and equipment internal transfer events are provided by equipment suppliers in their specific manner. Wafer view information utilization will play an even more important role in the context of more complex and finer geometry fabrication.

Standards:
1. Wafer view cycle time related data such as individual wafers' waiting time, process time need clear definitions. Wafer view cycle time related data are to be defined to have a hierarchical structure in the standard.
2. The wafer level traceability data shall be defined to have finer granularity in comparison to the lot based traceability data. Particularly event data upon equipment's state changes shall be defined with high granularity for standardization.
Examples of data definitions that require standardization:

- Time duration of equipment internal fabrication or fabrication related operations from the viewpoint of individual wafers
- Graphical representation methods of equipment internal paralleled operations on multiple wafers,
- Discrete waiting time segments for individual wafer that comprise overhead time of individual wafers (know as B values):
  - Across the factory-equipment boundary;
    - Time of "paper work" of wafer carrier acceptance
    - Physical transfer time and some wait time
  - External to equipment;
    - Wait time for a carrier to be transported
    - Wait time in a queue

• Internal to equipment;

Time segments that can not be hidden by parallelism of equipment internal processes that add up to the total lot cycle time

Production time discontinuity between consecutive 2 lots with different recipes

Time needed for batch formation

Cleaning and seasoning time, time used for particle check

Wait to time for manual operation, wait time for quality judgment, etc.

Wafer traceability information element examples:

Process sequences log data for individual wafers, Wafer rotation at relevant wafer positions, equipment group, equipment, equipment modules that individual wafers went through, carriers in which that wafer was contained

Examples of event data that support above mentioned wafer view data utilization;

Event of equipment status changes, its contents, and, event data definition in terms of engineering specifications and structural definition that contains relevant context information.

Remarks:

None

2.2. Quality Assurance Across Business Boundary

Production equipment quality shall be visualized, traced, and maintained across the equipment supplier-device maker business boundary.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and Purposes:

Production equipment quality is built into the equipment in the manufacturing process. This equipment quality will be succeeded and used at device maker's production line. It is important that quality maintenance and improvement activities at the equipment supplier and those at the device maker are mutually interrelated so as to improve the quality and efficiency of equipment engineering operations at both parties.

Standards:

Standard requirements will be described in the dependent lower level guidelines. For the implementation of this guideline following standardization efforts are required in plural industry domains.

Consortia campaign:

Business model study of Enhanced Equipment Quality Assurance
For EEQA see *http://jeita-smtc.elisasp.net/*

Implementation encouragement by consortia: Following publications

Establishment of EEQA's technical procedure as a common knowledge
Format of EEQA contents sheet
EEQA contents standardization of well-known equipment capabilities
Standardization of EEQA equipment engineering data and data specifications
EEQA equipment engineering data reutilization

Remarks:

Business model study as an industry is required for implementation of this guideline. Industry organizations from both equipment suppliers and device makers should conduct mutual and open investigation. For effective and proactive visualization of equipment quality each party should prepare to propose the equipment quality visualization contents. Device makers' active support of equipment suppliers' reutilizing the EEQA data for the further equipment quality improvement should become a common practice.

2.3. Hierarchical Assurance of equipment's process execution performance

Equipment's process execution performance quality (such as low failure rate, short equipment state validation time, low process outcome quality fluctuation, reduced machine-to-machine or chamber-to-chamber difference, shall be assured in accordance to equipment's hierarchical logical structure model. This quality validation shall be performed prior to equipment's acceptance to the production line by the equipment supplier. This quality assurance should be performed at needed frequency after the acceptance. The EEQA data shall be able to be shared between the equipment supplier and the device maker.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers, device makers, and third parties

Background and purposes:
Selected equipment engineering data sharing is required between the equipment supplier and the device maker for sufficient information support to maintain the equipment at the specified performance. Data selection shall be decided by collaboration between the equipment maker and the device maker.

Standard:
Hierarchical equipment logical structure (equipment level capability layer, equipment module level capability layer, part level capability layer) should be standardized.

Remarks:
Equipment reliability improvement is important to semiconductor manufacturing where inherent feature shrinkage continues. Scientific approach to the more stable equipment performance is eagerly expected with hierarchical quality traceability being in place from low component level to the whole equipment level.

3. Equipment Engineering Data/Model Definition

Proactive visualization of production equipment quality

3.1. Proactive visualization of production equipment quality

Production equipment quality shall be visualized with sharable healthiness and productivity evaluation methods and evidence data, and that visualized information shall be able to be reutilized.

Who to implement this guideline: equipment suppliers, device makers
Who to use this guideline: Equipment suppliers, device makers

Background and purposes
Production equipment is the most important factory resource and its quality influences semiconductor product quality, cost, delivery time. Therefore the equipment quality validation at the time of acceptance to the production line and the equipment quality maintenance and tracking are very important equipment engineering operations. They needs to be consequentially reinforced with scientific equipment engineering data.

Standard:

Equipment quality validation procedure shall be standardized.
Equipment engineering data for equipment quality description and evidence shall be standardized.

Remarks:

3.2. Reinforcement of production equipment quality assurance

Production equipment quality visualization, assurance, validation, and, trace shall be reinforced with using steadily available equipment engineering data from the production equipment.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers, device makers

Background and purposes:
Currently available on-line equipment data is not utilized in a positive manner for production equipment quality assurance. Equipment capabilities shall be tuned, validated for performance with using steadily available equipment engineering data for the purpose of enhancing equipment quality assurance. Production equipment performance visualization and maintenance should use this steadily available equipment engineering data so as to succeed the initial equipment performance validation by using the same data.

Standard:
None

Remarks;
See guideline 2.6 for production equipment quality reinforcement.

3.3. Focus on basic equipment capability visualization

Visualization of individual equipment capabilities and equipment control capability shall be prioritized in conducting production equipment quality validation, trace, and maintenance operations.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
An process tool is, for example, consist of process generation means such as reaction condition generation (pressure and reactant concentrations, etc..), wafer temperature adjustment means, wafer transportation means, and such. It is a basic and very first step to examine if individual equipment capabilities are functioning in accordance to their specifications or to what design intended.

Standard:
Validation procedures and the relevant data shall be standardized at least for the principal equipment capabilities.

Remarks;
There are several well-known equipment capabilities in production equipment. These capability performances shall be expressed as logical capability components and to be validated for their performances per these logical definitions. Accumulation of these logical components should validate the whole equipment performance so that that equipment quality is described.
Examples of equipment capability performance focus;
(1) Famous capabilities with well-known high trouble potential such as mass flow controllers, automatic pressure controllers, …
(2) Machine-to-machine and/or chamber-to-chamber difference
(3) Repeatability of in-equipment process execution sequence

3.4. Critical values provision of equipment performance healthiness determination

Equipment supplier shall provide both sets of critical value sets to determine the healthiness of equipment capability performances and/or behaviors for the initial validation at the time of production line acceptance and for the continuous operation in production.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Back ground/purposes:

Currently the critical values to determine the healthiness of an equipment capability performance for the initial validation at the time of production line acceptance and the critical value for the continuous operation in production that is the expectation of the performance stability are not well distinguished, and, hence, equipment suppliers have very often no such pairing design values. This ends up with poor traceability of equipment quality, and examination of particular equipment capability's healthiness is difficult without the provision of critical values for performance stability.
It is expected that the equipment supplier is most knowledgeable about the healthiness definition or designed criteria. Device maker engineers are also knowledgeable enough to set reasonable critical values for healthiness determination from his/her experiences, but not necessarily know all the equipment capabilities and because of their large number it is impossible to cover wide good portion of the capabilities.

Standard:

Behavior models and healthy operation models of principal equipment capabilities shall be standardized.

Remarks:

Equipment supplies are expected to continuously collect field data and proactive equipment quality visualization data to accumulate knowledge so as to elaborate visualization contents such as equipment capability healthiness determination criteria. Equipment suppliers are expected to improve their traceability capability with statistical analysis of equipment quality proactive visualization data from a large number of shipped tools, a large number of process chambers, or large number of individual logical equipment capability components

3.5. Collaboration between device makers and equipment suppliers

Device makers and equipment suppliers are to investigate and improve the contents of proactive equipment quality visualization collaboratively.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
Device makers are expected to propose the better contents of proactive equipment quality visualization from their experiences in running the production tool in mass production environment. The equipment quality data obtained for equipment capability validation at the time of production equipment acceptance to the production line shall be used by the equipment suppliers for improvement of equipment quality and services.

Standard:
Typical proactive equipment quality visualization shall be standardized.
Typical measurement methods of productivity and equipment capability performances shall be standardized including important trigger data.
Visualization items of productivity and equipment capability performances shall be distinctly sorted from the viewpoints of factory operation, production equipment, and, product wafers.

Remarks: none

3.6. Improved efficiency in equipment engineering data collection and data utilization

Equipment engineering data collection and data utilization shall be systemized with being embedded in the current workflows.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers, device makers

Background and purposes:
If data gathering and analysis take too long for equipment quality improvement and maintenance, equipment quality visualization with enough coverage and depth can not be achieved. The data gathering shall be done on-line as much as possible. Furthermore the necessary data extraction, information abstraction, data sorting and accumulation per individual equipment capabilities, statistical determination of individual equipment capability healthiness shall be automated and systemized so that data reliability and healthiness determination reliability are to be improved. This also contributes to establish equipment quality improvement cycles.
While equipment data collection systems have been implemented for years at device makers for process condition data retrieval, equipment suppliers shall implement equipment engineering data collection and utilization system at their own manufacturing sites for proactive equipment quality visualization or enhanced equipment quality assurance with equipment capability level granularity.

Standard:
Data utilization for proactive equipment quality visualization shall be standardized in terms of the data and its data retrieval capabilities with individual equipment capability granularity and in order to promote efficient equipment engineering data utilization.

Remarks: None

Equipment engineering data definition

3.7. Equipment engineering data utilization areas of interest

Production equipment shall provide elemental data for the information used in the various equipment engineering operation areas.

Above-mentioned equipment engineering operation areas should include followings;

1. Management and control operations of host view equipment behavior (GEM300)
2. Productivity management and improvement operations in terms of OEE , cycle time from host view, equipment view, and, product wafer view.
3. Energy consumption management and reduction and consumables management and reduction operations
4. Process condition management, monitor, fault detection, and advanced process control operations where process parametric information is mainly used
5. Equipment engineering operations such as process tool healthiness monitoring, equipment capability performance validation, malfunction identification, maintenance management where equipment capability activity information is mainly used.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers, device makers

Background and purposes:

The history has been that the equipment data is superimposed onto the SECS communication, and that the main data utilization purpose was to monitor the process conditions. Production equipment is the most precious resource in the factory, and consequently it is involved in many aspects of equipment engineering operations. The equipment engineering data shall be reexamined from above mentioned many aspects of relevant data usage.

Standards:
Equipment engineering data items, data types, and, relevant context data shall be standardized for each of the equipment engineering operations of interest.

Remarks:
It is note worthy to mention that equipment does not necessarily provide readily usable information for 5 operation areas. Since there are many data that are used commonly in the 5 equipment engineering operation areas, information extraction from the equipment

engineering data shall be done external to the equipment in accordance with targeted operation areas of interest.

3.8. Structure of Equipment Engineering Data

The definition of equipment engineering data is designed in accordance with the logical modular structure per equipment's control capability logical structure.

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
Equipment engineering data should be designed so that it is used both by the equipment suppliers and device makers for the purposes of equipment quality maintenance and improvement. Although the process parametric monitoring has been historically the center of interest at device makers, equipment data that more directly describes equipment capability activities is required from the viewpoint of equipment supplier.
The process performance of a production tool is hard to be described in terms of the process results since it is considerably dependent on process parameter settings and the wafer itself. Equipment quality should be visualized by visualizing individual capability performances. It should be understood that a production equipment is described as a logical combination of many individual equipment capabilities, and that some of these capabilities are common to other production equipment; i.e., an rf power application means is used in plasma CVD, PVD, dry etching tools. Design and utilization of equipment engineering data will be made efficient by standardized modeling of these basic capabilities.

Standards:
Equipment capabilities shall be described in a standardized hierarchical logical structure. Basic equipment capabilities should be standardized for their behavior models comprising of data definition and healthiness model.

Remarks:
It is required that equipment engineering data is used per each of data utilization purposes with high efficiency. Information extraction from equipment engineering data should be well defined for automation without much labor. This means that equipment suppliers are able to gather data from the all process chambers delivered to users as needed and to evaluate the necessary part of the data with ease. If these are done by hand or with lots of mouse clicks, systematic and continuous equipment quality improvement will be jeopardized.

3.9. Equipment Engineering Data Quality

Equipment engineering data shall be designed to suffice its data specification in accordance with individual data usage purposes. More concretely following 4 data qualities shall be considered;

(1) Data items and their precisions defined after healthiness models of individual equipment capabilities

(2) Sufficiency of context for equipment internal activity description endorsed with equipment activity event data

(3) Sufficiency in time stamping that allows correct interpretation of series of equipment activity accompanied by control sequential structure information

(4) Provision of context data from the viewpoint of equipment control sequence that helps a cluster of data be allocated in the right timing of equipment's control sequence data where that cluster of data is obtained external to the equipment control. Such "external data" gathering examples are data collection of supplemental equipment such as slurry supply units or fast trace data collection by dedicated data collector hardware such as an etching end point detector.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Background and Purposes:
Although the specification of equipment engineering data can not determined uniformly since there are many different data utilizations and different tool types, equipment engineering data should be provided with the quality that assures correct data interpretation. This data quality corresponds to context data provision. Context data should enable data extraction of particular focused area with the right logical state of equipment and recognition of start and end of a certain control sequence. Some equipment sequence context may be deduced from combination of plural equipment activity event data. Plural data sets with different time stamps with different clocks can be correctly interpreted by provision of adequate sequence context data. In other words very high time stamping accuracy would be required with less adequate context information (equipment activity event data) to read the data in some cases.

Standards:
Data quality standard development is required whose scope includes interpretation of equipment engineering data with using the combination of time stamping and equipment control consequence information from the viewpoint of data utilization procedure.

Remarks: None

4. Individual Wafer Equipment Control

4.1. Graceful Shutdown of Production Equipment (EEC Guidelines)

While production tools are designed to have the maximized effective production time a production equipment shall cease processing wafers safely when malfunctions in safety or base equipment capabilities are detected with the minimum granularity unit such as individual wafers or individual chambers. The consecutive sequence from the decision making of ceasing processing to actual shut down shall be reported.
(Ref.: EEC Guidelines 2002)

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Background and Purposes:
The granularity of production tool's process ceasing action has not been standardized. It is important that the number of scrap wafers is minimized by designing production tools with minimum number of granularity of ceasing action.

Standards: The process ceasing actions are to be standardized with considering the equipment types and variety of process status.

Remarks:
The malfunction of the equipment should be detected within the process time of the relevant chamber in multi-chamber tool. Processed wafers and unprocessed wafers are clearly recognized so. Process ceasing method should be selected per information available from and out of the tool, depending on tool/process configuration such as series or paralleled sequence in multi-chamber tools.

4.2 Equipment capability performance adjustment and control (Phase 2)

4.3 Wafer Level Intermediate Metrology Control (Phase 2)

4.4 Wafer Level Quality Control (Phase 2)

4.5 Productivity of Metrology Tools (Phase2)

4.6 Minimization of Equipment Throughput Variation (Phase 2)

4.7 Continuous Wafer Feed and Pick-Up (Phase 2)

4.8 Manipulation of Wafer Processing Queue (Phase 2)

5 Production Equipment Productivity Improvement

Definition of Dandori

Dandori operations are peripheral operations to the throughput-constraint main thread operations. Dandori operations include preparatory operations before the processing, post process operations, wafer transportation, wafer identification operation.
Dandori operations may be categorized per operation responsibility owners;
Class 1 Dandori operations: where Dandori operations are all delegated to the equipment and designed by equipment suppliers to be executed within that production equipment.
Class 2 Dandori operations: where Dandori operations reside across the boundary of factory and the production equipment, and they are very often related the information transfer.
Class 3 Dandori operations: where Dandori operations are controlled by the factory

5.1 Dandori visualization

Dandori operations shall be categorized for the ease of solutions development by device maker and the equipment supplier. The categorized Dandori operations shall be defined with provision of the state triggers. Dandori data shall be designed so that the device maker and equipment supplier can share.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
Dandori operation elimination or its time reduction, paralleling Dandori operation with the other operations, evaluation of effectiveness and related effects of each Dandori operation are important to plan to improve equipment cycle time and OEE. Relevant Dandori operations are required to be categorized as described in Dandori definition and analyzed in detail.
Dandori operations have not been categorized and defined per logical locations, i.e., equipment side, factory side, and their boundary.

Standards:
Dandori operations should be defined and categorized in standard.

Remarks: it is important to eliminate productivity losses by deploying effective measures of which examples are listed in Figure 3 that are possible with sharing Dandori information between the different control layers

Category	Improvement in Specific Technology	Improvement in Control Technology
Class 1	• Reduce seasoning and/or cleaning time • Reduce WIP identification time	• Optimize tool internal wafer transfer scheduling • Optimize tact balance between equipment side and factory side
Class 2	• Reduce process instruction information time • Reduce WIP identification time • Reduce carrier identification time • Reduce NPW preparation time	• Parallel such operations as seasoning and cleaning with other operations • Preset the process instruction • Optimize the wafer process order
Class 3	• Reduce carrier dispatching time • Reduce time used for equipment process performance stability • Reduce time used for product quality confirmation	• Pre-create of NPW process jobs • Synchronization of job exchange and dispatching • Parallel product quality confirmation operations and other operations

Figure 3: Counter measure examples for productivity losses induced by Dandori operations

5.2 Dandori Loss Reduction (Phase 2)

5.3 Intended Stable Wafer Processing

A single-wafer processing tool shall control execution of identical processing to individual wafers within a lot or across adjacent lots

Who to implement this guideline: Equipment suppliers and device makers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
There are many factors beside what is written in a recipe that determine the process condition in process tools. A good example is the condition between the process steps in a multi-chamber configuration tools. It is important to understand the process conditions between chambers such as time between steps, environment the wafers are immerged, temperature changes, etc..
Process tools are expected to provide identical process execution to all wafers within a lot, or even for wafers in different lots with the same processing conditions in accordance to the equipment design concept.

Standards:
None

Remarks:
Some process tools are designed to use plural process chambers in parallel
Chamber-to-chamber differences are to be sufficiently reduced by proactive equipment quality visualization.
Equipment control for identical wafer processing is to be visualized and can be validate as required.

5.4 Continuous Wafer Processing Across Lot Boundaries

A single wafer processing tool shall be able to process wafers continuously across lot boundaries when that tool is fed with multiple different process lots except for a discontinuity of that the equipment's process resources for the following lot become available

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
There are often observed discontinuity in production time between lots with different recipe contents.
Equipment in some cases needs to wait for a tool internal processing resource will become available to the wafers in the following lot in such cases as bake temperature setting being changed from one value to another across the lot boundary.
This guideline intends to require that the wafer in the subsequent lot will be processed without excessive delay so as to minimize the discontinuity in the production time.

Standards:
Standards for single carrier multi-lot capabilities need to be reinvestigated

Remarks:
Production discontinuity can arise where continuous wafer supply from the load ports is not possible. The requirements for such cases will be deployed in Phase 2 publication.

6 New Factory-Production Equipment Control Interface

6.1 Addition of Wafer Level Management Interface

Following information shall be defined across the interface where individual wafers are transferred to process part of the production equipment. This information shall be shared with the system external to the equipment.
The information handled is as follows
Wafer identification information, wafer traceability information with its elements such as process sequences log data for individual wafers, Wafer rotation at relevant wafer positions, equipment group, equipment, equipment modules that individual wafers went through, carriers in which that wafer was contained, processing instruction information such as the recipe, *Variable Parameters*, target process positions.

Who to implement this guideline: Equipment suppliers
Who to use this guideline: Equipment suppliers and device makers

Background and purposes:
In hi-mix production various process/chamber configuration and operations are possibly used. Therefore process management requires the granularity of individual wafers and individual processes encountered. Although the unicasette operation has been implemented for many years where carrier integrity and slot integrity are well managed at hardware level, such integrities will possibly subjected to change in response to the wafer level control of the next generation fab. Such elaborate management will eventually lead to optimization of wafer feed to individual process parts of the production equipment in terms of stable process and productivity control including cycle time reduction. This guideline is a basic prerequisite requirement to individual wafer level manufacturing control.

6.2 Addition of Wafer Level Control Interface (Phase 2)

7 Guideline Phasing

The guideline items marked as Phase 2 in the contents will be developed after July 2007 and revision 2 J300P guidelines will be published

8 Contacts

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9 Revision Record