SEMI P10-0703
SPECIFICATION OF DATA STRUCTURES FOR PHOTOMASK ORDERS

This specification was technically approved by the Global Micropatterning Committee and is the direct responsibility of the North American Microlithography Committee. Current edition approved by the North American Regional Standards Committee on April 11, 2003. Initially available at www.semi.org June 2003; to be published July 2003. Originally published in 1990; previously published March 2001.

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1 Purpose

1.1 These data structure specifications are intended to facilitate the transmittal of mask order data between software systems to allow:

1.1.1 automated order placement by mask customers and to allow the automatic processing of such orders by mask shops, and

1.1.2 automated delivery of actual mask data by mask shops and to allow the automatic processing of such data by mask customers.

1.2 By using these standardized structures, software written independently for either mask customers or mask shops should be able to communicate unambiguously with software written by other parties.

2 Scope

2.1 This structure only defines the data format for the transmitted file. No particular database or programming language is specified by this standard. The data file is to be transmitted as an ASCII file. As such, it is compatible with the SECS-II standard.

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 For a given customer, all pattern file names must be unique. (i.e., Pattern files which are different may not have the same name.)

3.2 For a given customer, all job file names must be unique. (i.e., Job files which are different may not have the same name.)

3.3 For a given customer, each mask set must have a unique identification.

3.4 For a given customer, each magnetic tape or other physical media delivered to the mask shop must have a unique identification.

4 Referenced Standards

4.1 *SEMI Standards*

SEMI P1 — Specification for Hard Surface Photomask Substrates

SEMI P2 — Specification for Chrome Thin Films for Hard Surface Photomasks

4.2 *ISO Standards*[1]

ISO 4217:2001 — Currency and funds code list[2]

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology

5.1 See Section 8.

6 Instructions and Conventions

6.1 Each record in the file will be composed of a specific keyword identifier followed by one or more data values, and will be terminated by a carriage return and/or linefeed.

6.2 Only records which are required to specify the order need to be included in the transmitted <mask_order> file, but each record included must appear in the sequence shown in the syntax specification.

6.3 Subsequent modifications or additions to the mask set require transmittal of all the information for the specific masks involved, including previously transmitted keywords and data fields if they still apply. Masks previously ordered which are not affected by the new order transmission may have their <mask_definition>, <mask_group> or <mask_set> omitted as appropriate.

6.4 Options are specified hierarchically such that those specified at a higher level are the default for all masks below, unless overridden at a lower level. The hierarchy

1 International Organization for Standardization, ISO Central Secretariat, 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland. Telephone: 41.22.749.01.11; Fax: 41.22.733.34.30, Website: www.iso.ch

2 http://www.bsi-global.com/Technical+Information/Publications/_Publications/tig90.xalter

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is such that mask set options are overridden by mask group options, followed by mask definition, cell definition, cell instance, pattern group definition, and pattern definition.

6.5 Mask groups describe sets of masks which are similarly constructed. In simple cases there will be only one mask group per mask set. Multiple mask groups will be needed to describe mix-and-match sets, or for situations within a mask set where different features are required on some masks.

6.6 Pattern group definitions are intended for patterns which are similarly placed on all or most masks within a mask group (e.g., primary pattern files or test pattern files).

6.7 Cell definitions describe the construction of clusters of pattern groups and/or other cells. The PLACEMENT_TOP_CELL under a mask group describes the overall layout of the cells on all masks within the mask group.

6.8 Within a given mask set, each mask must have a unique identification (MASK_ID), independent of any titles on the mask.

6.9 Masks which require multiple writing operations (such as phase shift masks) will find those MASK_ID's identified with the same group number by the MULTIWRITE keyword.

6.10 The MASK_ID's defined under a mask group specify the masks to be built. The MASK_ID's also identify which patterns are to appear on the mask. A pattern is placed on the mask if and only if the MASK_ID matches the LEVEL_ID of a pattern referenced under the mask group's PLACEMENT_TOP_CELL.

6.11 <cell instance> and <pattern group instance> LOCATION's position the center of the patterns relative to the center of the CELL_ID referencing them. The cell referenced by the PLACEMENT_TOP_CELL is positioned at the center of the mask.

6.12 Job file data may be supplied in place of cell and pattern group data. In this case, the MASK_ID is understood to correspond to JOB_LEVEL in JOB_NAME.

6.13 Location of reference marks, mask titles and vendor-supplied barcodes are relative to the center of the mask. The coordinates and directions refer to right-handed, rectangular (Cartesian) coordinates, applied to the substrate being written.

6.14 All data in the structure will be in ASCII. The keyword in each record must include only upper case alphabetic characters and underscore.

6.15 Records (keyword, data value, comment and new line) may not exceed 256 characters. Some records may be repeated (e.g., BUSINESS_ADDRESS) in order to allow for longer field requirements; these are explicitly indicated in the syntax specification.

6.16 Comments may be included in records by preceding them with an exclamation point (!). Any data following an exclamation point and preceding a carriage return and/or linefeed will be ignored. Such comments are included in the 256 character record limit. If a record starts with an exclamation point, the entire record will be ignored. Only printable ASCII characters (plus spaces and tabs) are permitted in comments. Comments are for development and diagnostic purposes only. In commercial use, comments may always be ignored by the recipient without consequence. On the other hand, ADDITIONAL_..._INFO records must be evaluated by the recipient and applied to the masks being ordered, and may justify delay in mask delivery.

6.17 Spaces or tabs preceding the keyword will be ignored. At least one space or tab must precede the data field. Spaces and tabs imbedded in alphanumeric data fields will be preserved. Spaces or tabs may not be imbedded within numeric data values, but may be used to separate data values in multi-value data fields. At least one comma must appear between adjacent data values in multi-value data fields; more than one comma may not appear between adjacent data values. Spaces or tabs trailing the last data value in a data field will be ignored.

6.18 All numeric record values which require units will be in metric unless otherwise specified in Section 8. Units of length or position will be in microns unless otherwise specified.

6.19 Dates will be in the alphanumeric format DD-MMM-YYYY, where MMM will be the first 3 letters of the English spelling of the month. Times will be in the format HH:MM:SS OR HH:MM. Within the transmitted file, times and dates will always be Greenwich mean time.

6.20 Sizing to achieve a CD_TARGET from a CD_DATA must be applied to all pattern files hierarchically affected by the CD_TARGET record.

6.21 Since complex data manipulation operations are composed of simple binary and unary operations, intermediate files will need to be named. These names may be comprised of any printable ASCII characters, and must be unique within all revisions of the <mask_set>.

6.22 Binary data manipulation operations expect operands (input pattern files) to align center-to-center.

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This requires that DATA_PATTERN_WINDOW be defined for patterns which do not contain an explicit record of file extents.

6.23 All references to horizontal (or “x”) and vertical (or “y”) correspond to normal Cartesian coordinates and assume the rotational orientation of the glass when the mask was written.

6.24 All <shippable_data> keywords will be followed by <ship_to> specifying the destination and/or method of transmission for the transmitted data. Whenever applicable, the SEMI <mask_results> file (see Section 7.5) should be sent accordingly if electronic transmission is specified.

6.25 <shippable_data> keywords which require reference to specific mask feature locations will reference CD_SITE_ID and/or REGISTR_MARK_ID which must be unique for each location within all transmissions of <mask_order> for a given MASK_SET_ID.

6.26 When modifications to this standard are required between ballot cycles (e.g. new data field values “on request”), users should contact the N.A. SEMI P10 task force leader directly. After a poll of the active task force members, a tentative recommendation will be posted on the SEMI P10 task force web site at SEMI so that all users can adopt a common interim solution until a formal ballot can officially resolve the issue.

6.27 Every effort should be made to construct a SEMI P10 file without inconsistencies or ambiguities. If a vendor detects such flaws in a file from a customer, the vendor should contact the customer to correct the inconsistencies and/or remove the ambiguities before proceeding with making the mask.

7 Syntax Specification

The following specifies the syntax for the mask order structures. The record order is specific; records must appear in the sequence shown. Terminology for the individual records and their allowed data values are specified in Section 8.

7.1 *Syntax Symbol Definition* — The lower case syntactic names within < > are used to refer to collections of records. The use of { } around records or collections of records means an arbitrary number of repetitions of the records, including none at all. The use of [ ] around a record or collection of records means that the collection is optional.

7.2 *Record Syntax* — A keyword is followed by a data field which is followed by an optional comment. The record is terminated by a carriage return and/or linefeed. Each of these elements may be preceded by any combination of spaces or tabs, which will be ignored. At least one space or tab is required preceding the first data value in the record. An exclamation point (!) is required to initiate a comment. Exclamation points, carriage returns, and linefeeds are not allowed in keywords, data values or comments. Note that a record consisting of a comment only is also allowed. The syntax for individual records is defined as:

<record> = [{<separator>} <keyword>

<separator> {<separator>} <data_field>]

[{<separator>} ! <comment>]

{<separator>} <new_line>

where “separator” is a space or a tab, “comment” is any string of printable ASCII characters (plus spaces and tabs), and “new_line” is a carriage return, linefeed or both.

7.3 *Multi-value Data Field Syntax* — When data_field contains more than one data_value, such as (x,y) pairs or (x1,y1,x2,y2) double pairs (see Section 8), the individual values must be separated by a comma and any combination of spaces or tabs. One comma is required between each data_value, but not more than one comma. Two commas without an intervening data value are not permissible.

(x,y) = data_value {separator} comma {separator} data_value

(x,y,z) = (x,y) {separator} comma {separator} (z)

(x1,y1,x2,y2) = (x1,y1) {separator} comma {separator} (x2,y2)

(x,y,x1,y1,x2,y2) = (x,y) {separator} comma {separator} (x1,y1,x2,y2)

For data manipulation operations only, a semicolon separates layers from its datatype, and a dash indicates a range of layers or a range of datatypes.

layer1;datatype6 , layer3-layer4;datatype1-datatype9

7.4 *Mask Order Structure Syntax* — The following syntax definition uses the upper case keyword to represent the permissible applications of the corresponding data record within the mask order structure.

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```
<mask_order> =      START_ORDER   SEMI_REVISION  CUSTOMER VENDOR
                    FILE_DATE_TIME  [OPERATOR_NAME]
                    <mask_set>  END_ORDER  CHECKSUM
<mask_set> =        MASK_SET_ID  <mask_set_options>  END_MASK_SET_OPTIONS
                    {<mask_group>}  END_MASK_SET
<mask_set_options> = [BUSINESS_CONTACT]  {BUSINESS_ADDRESS}  {BUSINESS_PHONE}
                      {BUSINESS_FAX}  [BUSINESS_EMAIL]
                    [BILLING_CONTACT]  {BILLING_ADDRESS}
                      {BILLING_PHONE}  {BILLING_FAX}  [BILLING_EMAIL]
                    [DESIGN_RULE]
                    [PRICE_UNITS]
                    [SECURITY_CLASS] [QS9000]
                    [ENGINEERING_CONTACT]  {ENGINEERING ADDRESS}  {ENGINEERING_PHONE}
                      {ENGINEERING_FAX}  [ENGINEERING_EMAIL]
                    [SHIPPING_CONTACT]  {SHIPPING_ADDRESS}  {SHIPPING_PHONE}
                      {SHIPPING FAX}  [SHIPPING_EMAIL]
                    {SHIPPING_METHOD}
                     [REPAIRS_AUTHORIZED]
                    [<shippable_data>]
                    {<data>}
                    {<standard_pattern>}
                    [MASK_SET_NAME [MASK_SET_VERSION] ] [ORDER_ID]
                    {ADDITIONAL_MASK_SET_INFO}
<data> =            DATA_MEDIUM  [DATA_LOCATION]  [DATA_ID]
                    [DATA_FORMAT [DXF_ANGLE  DXF_UNIT] ]
                    [DATA_DENSITY]  [DATA_FILE_SIZE]
                    [DATA_COMPRESSION]  [DATA_CONSOLIDATION]  [DATA_ENCRYPTION]
                    [DATA_CHECKSUM  DATA_CHECKSUM_TYPE ]
                    {<pattern_data>} {<job_data>}
                    [FRACTURE_FILE  FRACTURE_FILE_FORMAT]
                    {MEASURE_FILE_NAME  [MEASURE_FILE_FORMAT] }
                    {CD_MATRIX_FILE_NAME  [CD_MATRIX_FILE_FORMAT] }
                    END_DATA_MEDIUM
<pattern_data> =    DATA_PATTERN_NAME   {PATTERN_FORMAT}  [DATA_FILE_NUMBER]
                    [PATTERN_UNITS]  [PATTERN_CHARACTER_SET]
                    [FRACTURE_FILE]
                    {<data_manipulation>}
                    END_ DATA_PATTERN_ NAME
<data_manipulation> = START_DATA_MANIPULATION
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	[BOOLEAN
	[PATTERN_GENERATION_AREA]
	<data_file_parameters> { <data_file_parameters> }]
	{<data_fracture>}
	END_DATA_MANIPULATION
<data_file_parameters > =	DATA_SOURCE_FILE [PATTERN_FORMAT]
	[DATA_TOP_CELL] [DATA_LAYER_ID]
	[DATA_PATTERN_WINDOW]
	{<data_fracture>}
	END_DATA_SOURCE_FILE
<data_fracture> =	START_DATA_FRACTURE
	[SIZING [SIZING_RULE] [SIZING_BORDER_RULE]]
	[FRACTURING_SCALE] [DATA_SCALE_FACTOR]
	[PATTERN_ADDRESS_SIZE]
	[DARK_INTERNAL_WINDOW] [CLEAR_INTERNAL_WINDOW]
	[EXTERNAL_WINDOW] [ROTATION] [MIRROR]
	END_DATA_FRACTURE
<job_data> =	DATA_JOB_NAME JOB_FORMAT
<standard_pattern> =	STD_PATTERN_NAME PATTERN_FORMAT
<mask_group> =	MASK_GROUP_ID [<mask_options>] END_MASK_GROUP_OPTIONS
	PLACEMENT_TOP_CELL {<mask_definition>}
	{<cell_definition>} {<pattern_group>} END_MASK_GROUP
<mask_options> =	[BLANKET_PO_NUMBER] [PO_NUMBER] [SO_NUMBER] [ORDER_ID]
	[RELEASE_NUMBER] [LINE_ITEM_NUMBER] [QUOTE_NUMBER]
	[STATUS]
	[DUE_DATE_TIME_REQUESTED] [DELIVERY_PRIORITY]
	[LAYER_PRIORITY [ELAPSED_TIME]]
	[MILESTONES <ship_to>] [PERIODIC_UPDATES <ship_to>]
	[ESTIMATED_ARRIVALS <ship_to>]
	[BUSINESS_CONTACT] {BUSINESS_ADDRESS} {BUSINESS_PHONE}
	{BUSINESS_FAX} [BUSINESS_EMAIL]
	[BILLING_CONTACT] {BILLING_ADDRESS}
	{BILLING_PHONE} {BILLING_FAX} [BILLING_EMAIL]
	[PRICE]
	[SECURITY_CLASS] [QS9000]
	[SHIPPING_CONTACT] {SHIPPING_ADDRESS} {SHIPPING_PHONE}
	{SHIPPING FAX} [SHIPPING_EMAIL]
	{SHIPPING_METHOD}
	[REPAIRS_AUTHORIZED]

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[<shippable_data>]

{MFG_SITE}

{ [MFG_EQUIP_REQD] { [MFG_MODEL] {MFG_MODE_REQD} } }

{PRODUCT_TYPE [PRODUCT_MAGNIFICATION] [PRODUCT_IMAGING_TYPE]

[QUANTITY] [PRODUCT_AS_CHECKPLATE] }

[MULTIWRITE]

{WAFER_EXPOSURE_TOOL}

[JOB_NAME] [JOB_LEVEL]

[RETROFIT_JOB_NAME] [RETROFIT_JOB_LEVEL]

[RETROFIT_MASK_SET_ID] [RETROFIT_MASK_ID]

[RETROFIT_MASK_SET_NAME [RETROFIT_MASK_SET_VERSION]

[RETROFIT_MASK_NAME]]

{<title_data>}

{<barcode_data>}

{APPROVAL_REQD}{REVIEW_REQD}

[SERIAL_NUMBER]

[MIRROR_MASK]

<substrate>

[<phase_shift>]

[UT1X_UNCUT] [PROCESS] [PROCESS_ETCHING_TYPE]

{TOP_PELLICLE_TYPE [TOP_PELLICLE_CENTRALITY_ERROR] [PRICE] }

{BOTTOM_PELLICLE_TYPE [BOTTOM_PELLICLE_CENTRALITY_ERROR] [PRICE]}

[GUIDES_REQD [PRICE]]

[CENTRALITY]

{<registration>}

[REGISTR_CLOSURE [REGISTR_CLOSURE_BEGIN REGISTR_CLOSURE_END]]

[BUTTING_ERROR [BUTTING_ERROR_METHOD]]

{START_CD [<cd_definition>] [NUMBER_OF_CDS]

{ [CD_SITE_ID] MASK_CD_LOCATION} [CD_MATRIX_FILE_NAME]

[<cd_description>] END_CD}

[MIN_MASK_FEATURE_SIZE] [MIN_CORNER_TO_CORNER_GAP]

[PERCENT_CLEAR]

{<opc_definition>}

{<defect_definition>}

[INSPECTION_REF_LOCATION]

<surface_definition>

[INSPECT_THROUGH_PELLICLE <defect_definition>]

{<sem_photo>}

[QUALITY_GROUP_ID]

[COMPACT_LABEL]

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	{PACKAGE [MAX_MASKS_IN_PACKAGE] }
	{ADDITIONAL_MASK_INFO}
<title_data> =	START_TITLE [TITLE_TEXT] [TITLE_TYPE] [TITLE_FONT] [TITLE_HEIGHT]
	[TITLE_MAG] [TITLE_JUSTIFICATION] [TITLE_LOCATION] [MIRROR_TITLE]
	[ROTATE_TITLE] [ROTATE_TITLE_CHARACTERS] END_TITLE
<barcode_data> =	START_BARCODE [BARCODE_TYPE] [BARCODE_TEXT] [BARCODE_LOCATION]
	[BARCODE_ROTATION] END_BARCODE
<substrate> =	[GLASS_SIZE] [GLASS_TYPE]
	[FLATNESS] [MASK_COATING]
	[RESIST_TYPE] [RESIST_THICKNESS]
	[SUBSTRATE_GRADE] [BIREFRINGENCE]
	[ATTENUATOR] [COATING_GRADE]
<array_plot> =	SHIP_ARRAY_PLOT [QUANTITY]
	[ARRAY_PLOT_SCALE]
	[PRICE] [<ship_to>] END_SHIP_ARRAY_PLOT
<films> =	SHIP_FILM [QUANTITY]
	[FILM_SCALE] [FILM_SIZE] [FILM_COLOR] [FILM_NORMAL_TONE]
	[PRICE] [<ship_to>] END_SHIP_FILM
<phase_shift> =	START_PHASE_SHIFT [PHASE_SHIFT_QUALITY_ID] [WAVELENGTH
	[TRANSMISSION_TARGET [TRANSMISSION_TOLERANCE]
	[TRANSMISSION_RANGE] [TRANSMISSION_ERROR]
	{ [TRANSMISSION_MARK_SITE_ID] TRANSMISSION_MARK_LOCATION }
	[TRANSMISSION_MARK_FEATURE]
	[TRANSMISSION_MARK_LOCATION_DRAWING]
	[TRANSMISSION_MARK_DRAWING]
	[PHASE_ANGLE_TARGET [PHASE_ANGLE_TOLERANCE]
	[PHASE_ANGLE_RANGE] [PHASE_ANGLE_ERROR]
	{ [PHASE_ANGLE_SITE_ID] PHASE_ANGLE_MARK_LOCATION }
	[PHASE_ANGLE_MARK_FEATURE]
	[PHASE_ANGLE_MARK_LOCATION_DRAWING]
	[PHASE_ANGLE_MARK_DRAWING]
	[ETCH_DEPTH_TARGET [ETCH_DEPTH_TOLERANCE]
	[ETCH_DEPTH_RANGE] [ETCH_DEPTH_ERROR]
	{ [ETCH_DEPTH_SITE_ID] ETCH_DEPTH_MARK_LOCATION }
	[ETCH_DEPTH_MARK_FEATURE]
	[ETCH_DEPTH_MARK_LOCATION_DRAWING]
	[ETCH_DEPTH_MARK_DRAWING]
	END_PHASE_SHIFT
<registration> =	START_REGISTR [REGISTR_QUALITY_ID]
	[REGISTR_ERROR] [REGISTR_SCALE] [REGISTR_RESIDUAL]

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[REGISTR_RESIDUAL_THREE_SIGMA] [REGISTR_ORTHO] [REGISTR_RELATIVE]
[MULTIWRITE_OVERLAY_ERROR MULTIWRITE_REF_MASK_ID]
{REGISTR_REF_MASK_ID REGISTR_REF_MASK_SET_ID}
{REGISTR_REF_MASK_NAME REGISTR_REF_MASK_SET_NAME
[REGISTR_REF_MASK_SET_VERSION] }
{REGISTR_EQUIP_REQD} [REGISTR_STD_GRID] {REGISTR_REF_METHOD}
[REGISTR_ALGORITHM] [REGISTR_COLLECTION_TEMPERATURE]
{ [REGISTR_MARK_ID] MASK_REGISTR_MARK [MEASURE_FILE_NAME]
[REGISTR_MARK_FEATURE]
[REGISTR_MARK_LOCATION_DRAWING] [REGISTR_MARK_DRAWING]
[REGISTR_MARK_SEPARATION REGISTR_MARK_COUNT] }
END_REGISTR

<cd_definition> = [CD_QUALITY_ID] [CD_DATA] [CD_DIGITIZED] [CD_TONE_CLEAR]
[CD_ISOLATED] [CD_DENSE]
[CD_PERCENT_CLEAR] [CD_PERCENT_CLEAR_WINDOW]
[CD_TARGET] [CD_ORIENTATION]
[CD_REFERENCE_ONLY]
[CD_TOLERANCE] [CD_XY_TOLERANCE] [CD_XY_DEVIATION]
[CD_RANGE] [CD_THREE_SIGMA]
[CD_DEVIATION_FROM_TARGET] [CD_DEVIATION_FROM_MEAN]
[CD_ISO_DENSE_TOLERANCE]
[CD_STD] [CD_CORRELATION_ID]
{CD_EQUIP_REQD}

<cd_description> = [CD_FEATURE] [CD_LOCATION_DRAWING] [CD_DRAWING]

<opc_definition> = START_OPC
[OPC_TYPE [OPC_MINIMUM_FEATURE_SIZE] [OPC_MINIMUM_GAP]
[OPC_PATTERN_SEPARATE] [OPC_PATTERN_MODIFIABLE]]
END_OPC

<defect_definition> = START_DEFECT_DEFINITION [DEFECT_QUALITY_ID]
[VISUAL_INSPECTION_OK] [VISUAL_INSPECTION_REQD]
[AUTO_INSPECTION_REQD] [DIE_TO_DIE_INSPECTION]
[DEFECT_SIZE] [DEFECT_SIZE_CL] [DEFECT_SIZE_DK]
[DEFECT_SIZE_CL_ADJ] [DEFECT_SIZE_CL_ADJ_REP]
[DEFECT_SIZE_DK_ADJ] [DEFECT_SIZE_DK_ADJ_REP]
[DEFECT_SIZE_CL_ISO] [DEFECT_SIZE_CL_ISO_REP]
[DEFECT_SIZE_DK_ISO] [DEFECT_SIZE_DK_ISO_REP]
[DEFECT_DENSITY] [DEFECT_COUNT] [DEFECT_COUNT_REP]
[DEFECTIVE_DIE_DENSITY] [DEFECTIVE_DIE_COUNT]
[DEFECTIVE_DIE_COUNT_REP]
[PERCENT_DEFECTIVE_DIE]

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[EDGE_ROUGHNESS]
[SCRATCH_SIZE_FRONT] [SCRATCH_SIZE_BACK]
{INSPECTION_AREA} {INSPECTION_AREA_EXCLUDE}
[GOOD_FIELDS]
{DEFECT_EQUIP_REQD [DEFECT_INSP_MODE_REQD]
[DEFECT_SETUP_FILE_NAME] }
[<database_inspection>]
END_DEFECT_DEFINITION

<database_inspection> = DATABASE_INSPECTION [PRICE]
[DATABASE_SOURCE]
[DATABASE_TOP_CELL DATABASE_LAYER]
[DATABASE_FILE_NAME]
[DATABASE_UNIT] [USER_UNIT]
[DATABASE_WITH_JOB [DATABASE_JOB_NAME DATABASE_JOB_LEVEL]]
{DATABASE_AREA}

<surface_definition> = [SURFACE_INSPECTION] [SURFACE_QUALITY_ID]
[SURF_INSP_EQUIP_REQD] [SURF_INSP_MODE_REQD]
[SURF_INSP_SETUP_FILE_NAME]
[SURF_INSP_METHOD] [SURF_INSP_AREA]
[SURF_INSP_PELL_TOP_ON_CLEAR_PATTERN]
[SURF_INSP_PELL_TOP_ON_OPAQUE_PATTERN]
[SURF_INSP_PELL_TOP_OUTSIDE_FRAME]
[SURF_INSP_PELL_TOP_OUTSIDE_ON_OPAQUE]
[SURF_INSP_PELL_TOP_OUTSIDE_MEMBRANE]
[SURF_INSP_PELL_TOP_INSIDE_MEMBRANE]
[SURF_INSP_PELL_TOP_OUTSIDE_ON_FRAME]
[SURF_INSP_PELL_TOP_INSIDE_ON_FRAME]
[SURF_INSP_PELL_BOTTOM]
[SURF_INSP_GLASS_SIDE] [SURF_INSP_PATTERN_SIDE]
[TRANSMISSION_DEFECT_CLEAR] [TRANSMISSION_DEFECT_DARK]

<sem_photo> = {START_SEM_PHOTO
{ [SEM_PHOTO_SITE_ID] [SEM_PHOTO_LOCATION] }
[SEM_PHOTO_MATRIX_FILENAME] [<cd_description>]
[SEM_PHOTO_SCALE]
[SEM_PHOTO_TILT] [SEM_PHOTO_ROTATION]
END_SEM_PHOTO }

<mask_definition> = MASK_ID [MASK_NAME] DELIVERABLE_MASK
<mask_options> END_MASK

<cell_definition> = CELL_ID [<pattern_options>] END_CELL_OPTIONS
{<cell_instance>} {<pattern_instance>} END_CELL

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<pattern_group> =	PATTERN_GROUP_ID [<pattern_options>]
	END_PATTERN_GROUP_OPTIONS {<pattern_definitions>}
	END_PATTERN_GROUP
<pattern_definitions> =	LEVEL_ID
	[PATTERN_NAME] [PATTERN_VISUAL_ID] [FIGURE_COUNT]
	[MINIMUM_FEATURE_SIZE {MINIMUM_FEATURE_LOCATION}]
	{<opc_definition>}
	[OPTICAL_MASK_SET_ID [OPTICAL_MASK_ID]]
	[OPTICAL_MASK_TITLE]
	[<pattern_options>]
	END_PATTERN_DEFINITION
<cell_instance> =	CELL_INSTANCE [<pattern_options>]
	END_CELL_INSTANCE_OPTIONS {<placement>}
	END_ CELL_INSTANCE
<pattern_instance> =	PATTERN_GROUP_INSTANCE [<pattern_options>]
	{<placement>}
	END_ PATTERN_GROUP_INSTANCE
<placement> =	START_PLACEMENT { LOCATION [STEPPING_DISTANCE STEPPING_COUNT] }
	[ARRAY_DIAMETER ARRAY_CENTER [ARRAY_DIAMETER_INCLUSIVE]]
	[DATA_OFFSET]
	{DROPOUT [SCRIBE_TONE SCRIBE_INSIDE_CORNERS
	SCRIBE_OUTSIDE_CORNERS] }
	[LOCATION_SPEC] [CD_MEASURE_DIE]
	END_PLACEMENT
<pattern_options> =	START_PATTERN_OPTIONS [PATTERN_FUNCTION]
	[DATA_FILE_SIZE] [DATA_CHECKSUM DATA_CHECKSUM_TYPE]
	[PATTERN_ADDRESS_SIZE] [SCALE_FACTOR]
	[DIGITIZED_DATA_DARK]
	[STRIPE_HEIGHT]
	[UNSCALED_PATTERN_SIZE]
	[MFG_BIAS_PREAPPLIED]
	{MFG_MODE_REQD}
	[SURROUNDING_TONE SURROUNDING_WIDTH SURROUNDING_HEIGHT]
	[MIRROR_PATTERN]
	[SHIP_PATTERN_PLOT [PRICE] [QUANTITY] [<ship_to>]]
	[PATTERN_PLOT_SCALE] [PATTERN_PLOT_NORMAL_TONE]
	[PATTERN_PLOT_APPR_REQD]
	{<films>}
	{ [REGISTR_MARK_ID] CELL_REGISTR_MARK [MEASURE_FILE_NAME]
	[REGISTR_MARK_SEPARATION REGISTR_MARK_COUNT] }

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{START_CD [<cd_definition>] [NUMBER_OF_CDS]
{ [CD_SITE_ID] PATTERN_CD_LOCATION} [CD_MATRIX_FILE_NAME]
[<cd_description>] END_CD }
[PERCENT_CLEAR]
[INSPECT_ALL_SITES]
{<defect_definition>}
[BUTTING_ERROR]
[ADDITIONAL_PATTERN_INFO]
END_PATTERN_OPTIONS

<shippable_data> = START_SHIPPABLE_DATA
[SHIP_CD_DATA [<ship_to>]]
[SHIP_CD_PRINTOUT [<ship_to>]]
[SHIP_CD_UNIFORMITY_MAP [<ship_to>]]
[SHIP_DEFECT_DATA [<ship_to>]]
[SHIP_THRU_PELLICLE_DATA [<ship_to>]]
[SHIP_MANUAL_INSPECTION_FORM [<ship_to>]]
[SHIP_INSP_DATABASE_DATA [INSP_DATABASE_DATA_FORMAT] [<ship_to>]]
[SHIP_FIRST_PREPELL_DIE_DB_MSK_MAP [<ship_to>]]
[SHIP_FIRST_PREPELL_DIE_DB_PTN_MAP [<ship_to>]]
[SHIP_FIRST_PREPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FIRST_ROT_PREPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FINAL_PREPELL_DIE_DB_MSK_MAP [<ship_to>]]
[SHIP_FINAL_PREPELL_DIE_DB_PTN_MAP [<ship_to>]]
[SHIP_FINAL_PREPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FINAL_ROT_PREPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FIRST_POSTPELL_DIE_DB_MSK_MAP [<ship_to>]]
[SHIP_FIRST_POSTPELL_DIE_DB_PTN_MAP [<ship_to>]]
[SHIP_FIRST_POSTPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FIRST_ROT_POSTPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FINAL_POSTPELL_DIE_DB_MSK_MAP [<ship_to>]]
[SHIP_FINAL_POSTPELL_DIE_DB_PTN_MAP [<ship_to>]]
[SHIP_FINAL_POSTPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_FINAL_ROT_POSTPELL_DIE_DIE_MAP [<ship_to>]]
[SHIP_REPAIR_DATA [<ship_to>]]
[SHIP_REGISTR_DATA [<ship_to>]]
[SHIP_ARRAY_REGISTR_MAP [<ship_to>]]
[SHIP_DIE_FIT_MAP [<ship_to>]]
[SHIP_MEASURE_FILE_REGISTR_MAP [<ship_to>]]
[SHIP_PATTERN_PLACEMENT_MAP [<ship_to>]]
[SHIP_FIELD_FIT_MAP [<ship_to>]]

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[SHIP_CENTRALITY_DATA [<ship_to>]]

[SHIP_CENTRALITY_MAP [<ship_to>]]

[SHIP_SURF_INSP_MEASUREMENTS [<ship_to>]]

[SHIP_SURF_INSPECTION_MAP [<ship_to>]]

[SHIP_ SURF_INSP_PELL_TOP_MAP [<ship_to>]]

[SHIP_ SURF_INSP_PELL_BOTTOM_MAP [<ship_to>]]

[SHIP_ SURF_INSP_GLASS_SIDE_MAP [<ship_to>]]

[SHIP_ SURF_INSP_PATTERN_SIDE _MAP [<ship_to>]]

[SHIP_STARLIGHT_MAP [<ship_to>]]

[SHIP_PHASE_SHIFT_MEASUREMENTS [<ship_to>]]

[SHIP_PHASE_SHIFT_REPORT [<ship_to>]]

[SHIP_SEM_PHOTOS [<ship_to>]]

{<array_plot>}

[SHIP_JOB_DATA_PLOT [<ship_to>]]

SHIP_BARCODE_PLOT [<ship_to>]]

{<films>}

[SHIP_CERTIFICATE_OF_CONFORMANCE [<ship_to>]]

{SHIP_CUSTOMER_QUALITY_FORM [<ship_to>] }

[SHIP_TRAVELER [<ship_to>]]

[PERCENT_CLEAR_REQUESTED [<ship_to>]]

{SHIP_SPECIAL_REQUEST [<ship_to>] }

END_ SHIPPABLE_DATA

<ship_to> = START_SHIP_TO

{EMAIL_ADDRESS} [<ftp_address>] [WEB_ADDRESS]

{MAILING_ADDRESS} [SHIP_TO_FAX]

[DUE_DATE_TIME_REQUESTED]

END_SHIP_TO

<ftp_address> = FTP_HOST_NAME [FTP_LOGIN] [FTP_PASSWORD] [FTP_DIRECTORY]

[FTP_MODE] END_FTP_HOST

7.5 *Mask Data Structure Syntax* — The following syntax definition uses the upper case keyword to represent the permissible applications of the corresponding data record within the mask data structure. This structure allows the vendor to deliver to the customer actual data regarding masks being built.

<mask_results> = START_MASK_RESULTS SEMI_REVISION CUSTOMER VENDOR

FILE_DATE_TIME [OPERATOR_NAME]

MASK_SET_ID [<vendor_info>]

{MASK_GROUP_ID [<vendor_info>]

{MASK_ID <mask_results_options> END_MASK}

END_MASK_GROUP}

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END_MASK_SET

END_MASK_RESULTS

CHECKSUM

<mask_results_options> = [<vendor_info>]

[MASK_NAME]

{TITLES [TITLE_TYPE] }

[DUE_DATE_TIME_COMMITTED] [ELAPSED_TIME_COMMITTED]
[MILESTONE [ADDITIONAL_MILESTONE_INFO]]

[PERIODIC_UPDATE [ADDITIONAL_MILESTONE_INFO]]

[ESTIMATED_ARRIVAL [ADDITIONAL_MILESTONE_INFO]]

[CUSTOMER_SPEC_REVISION]
[MEASURED_PERCENT_CLEAR]

[MEASURED_CENTRALITY]

[<phase_shift_measurements>]

[<registration_measurements>]

{<cd_measurements>}

[<defect_measurements>]

[THROUGH_PELLICLE_DEFECTS < defect_measurements>]

[<surface_measurements>]

<vendor_info> = START_VENDOR_INFO

[VENDOR_CONTACT] [VENDOR_PHONE] {VENDOR_ADDRESS}

[VENDOR_FAX] [VENDOR_EMAIL]

[FINAL_QC_AUDITOR]

[PATTERN_INSP_OPERATOR] [STARLIGHT_INSP_OPERATOR]

END_VENDOR_INFO

<phase_shift_measurements> = START_PHASE_SHIFT_MEASUREMENTS

[PHASE_SHIFT_QUALITY_ID]

[START_TRANSMISSION_MEASUREMENTS

[TRANSMISSION_MEASUREMENT_DATE]

[TRANSMISSION_MEASUREMENT_EQUIP_USED]

[TRANSMISSION_MEASUREMENT_MODE_USED]

[TRANSMISSION_MEASUREMENT_FILE_NAME]

TRANSMISSION_TARGET

[TRANSMISSION_TOLERANCE]

[TRANSMISSION_RANGE]

[TRANSMISSION_ERROR]

[MEASURED_TRANSMISSION_AVERAGE]

[MEASURED_TRANSMISSION_TOLERANCE]

[MEASURED_TRANSMISSION_RANGE]

[TRANSMISSION_MARK_FEATURE]

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[TRANSMISSION_MARK_LOCATION_DRAWING]
[TRANSMISSION_MARK_DRAWING]
{MEASURED_TRANSMISSION_MARK_SITE_ID
TRANSMISSION_MARK_LOCATION
MEASURED_TRANSMISSION
[MEASURED_TRANSMISSION_ERROR]
END_MEASURED_TRANSMISSION_SITE }
END_TRANSMISSION_MEASUREMENTS]
[START_PHASE_ANGLE_MEASUREMENTS
[PHASE_ANGLE_MEASUREMENT_DATE]
[PHASE_ANGLE_MEASUREMENT_EQUIP_USED]
[PHASE_ANGLE_MEASUREMENT_MODE_USED]
[PHASE_ANGLE_MEASUREMENT_FILE_NAME]
PHASE_ANGLE_TARGET
[PHASE_ANGLE_TOLERANCE]
[PHASE_ANGLE_RANGE]
[PHASE_ANGLE_ERROR]
[MEASURED_PHASE_ANGLE_AVERAGE]
[MEASURED_PHASE_ANGLE_TOLERANCE]
[MEASURED_PHASE_ANGLE_RANGE]
[PHASE_ANGLE_MARK_FEATURE]
[PHASE_ANGLE_MARK_LOCATION_DRAWING]
[PHASE_ANGLE_MARK_DRAWING]
{MEASURED_PHASE_ANGLE_MARK_SITE_ID
PHASE_ANGLE_MARK_LOCATION
MEASURED_PHASE_ANGLE
[MEASURED_PHASE_ANGLE_ERROR]
END_MEASURED_PHASE_ANGLE_SITE }
END_PHASE_ANGLE_MEASUREMENTS]
[START_ETCH_DEPTH_MEASUREMENTS
[ETCH_DEPTH_MEASUREMENT_DATE]
[ETCH_DEPTH_MEASUREMENT_EQUIP_USED]
[ETCH_DEPTH_MEASUREMENT_MODE_USED]
[ETCH_DEPTH_MEASUREMENT_FILE_NAME]
ETCH_DEPTH_TARGET
[ETCH_DEPTH_TOLERANCE]
[ETCH_DEPTH_RANGE]
[ETCH_DEPTH_ERROR]
[MEASURED_ETCH_DEPTH_AVERAGE]
[MEASURED_ETCH_DEPTH_TOLERANCE]

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[MEASURED_ETCH_DEPTH_RANGE]
[ETCH_DEPTH_MARK_FEATURE]
[ETCH_DEPTH_MARK_LOCATION_DRAWING]
[ETCH_DEPTH_MARK_DRAWING]
{MEASURED_ETCH_DEPTH_MARK_SITE_ID
ETCH_DEPTH_MARK_LOCATION
MEASURED_ETCH_DEPTH
[MEASURED_ETCH_DEPTH_ERROR]
END_MEASURED_ETCH_DEPTH_SITE }
END_ETCH_DEPTH_MEASUREMENTS]
END_PHASE_SHIFT_MEASUREMENTS

<registration_measurements> = START_REGISTR_MEASUREMENTS [REGISTR_QUALITY_ID]
[REGISTR_MEASUREMENT_DATE] [REGISTR_MEASUREMENT_EQUIP_USED]
[REGISTR_REF_MASK_ID]
[REGISTR_ERROR] [REGISTR_SCALE] [REGISTR_RESIDUAL]
[REGISTR_RESIDUAL_THREE_SIGMA] [REGISTR_ORTHO] [REGISTR_RELATIVE]
[MULTIWRITE_OVERLAY_ERROR]
[MEASURED_REGISTR_ERROR] [MEASURED_REGISTR_SCALE]
[MEASURED_REGISTR_RESIDUAL]
[MEASURED_REGISTR_RESIDUAL_THREE_SIGMA]
[MEASURED_REGISTR_ORTHO] [MEASURED_REGISTR_RELATIVE]
[MEASURED_MULTIWRITE_OVERLAY_ERROR]
{MEASURED_REGISTR_MARK_ID
MASK_REGISTR_MARK_LOCATION
MEASURED_REGISTR_MARK_LOCATION
END_MEASURED_REGISTR_MARK}
[MEASURED_REGISTR_FILE_NAME]
[REGISTR_CLOSURE] [MEASURED_REGISTR_CLOSURE]
END_ REGISTR _MEASUREMENTS

<cd_measurements> = START_CD_MEASUREMENTS
[CD_QUALITY_ID]
[CD_MEASUREMENT_DATE] [CD_MEASUREMENT_EQUIP_USED]
[CD_TOLERANCE]
[CD_XY_TOLERANCE] [CD_XY_DEVIATION]
[CD_RANGE] [CD_THREE_SIGMA]
[CD_DEVIATION_FROM_TARGET]
[CD_DEVIATION_FROM_MEAN]
[CD_ISO_DENSE_TOLERANCE]
[CD_STD] [CD_CORRELATION_ID]

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[MEASURED_CD_TOLERANCE]

[MEASURED_CD_XY_TOLERANCE] [MEASURED_CD_XY_DEVIATION]

[MEASURED_CD_RANGE] [MEASURED_CD_THREE_SIGMA]

[MEASURED_CD_DEVIATION_FROM_TARGET]

[MEASURED_CD_DEVIATION_FROM_MEAN]

[MEASURED_CD_ISO_MEAN] [MEASURED_CD_ISO_RANGE]

[MEASURED_CD_DENSE_MEAN] [MEASURED_CD_DENSE_RANGE]

[MEASURED_CD_ISO_DENSE_TOLERANCE]
{MEASURED_CD_SITE_ID

MASK_CD_LOCATION

CD_TARGET

CD_TONE_CLEAR

[CD_ISOLATED] [CD_DENSE]

[CD_PERCENT_CLEAR] [CD_PERCENT_CLEAR_WINDOW]
[CD_ORIENTATION]

[CD_REFERENCE_ONLY]

MEASURED_CD

END_MEASURED_CD_SITE}

[MEASURED_CD_FILE_NAME]

END_ CD_MEASUREMENTS

<defect_measurements> = START_DEFECT_MEASUREMENTS

[DEFECT_QUALITY_ID]
[DEFECT_INSP_DATE]

[DEFECT_INSP_EQUIP_USED] [DEFECT_INSP_MODE_USED]

[DEFECT_INSP_PIXEL_SIZE] [DEFECT_INSP_SENSITIVITY]

[MEASURED_DEFECT_DENSITY]

[MEASURED_DEFECT_COUNT]

[MEASURED_DEFECT_COUNT_REP]

[MEASURED_DEFECT_COUNT_WITHIN_SPEC]

[MEASURED_DEFECTIVE_DIE_DENSITY]

[MEASURED_DEFECTIVE_DIE_COUNT]

[MEASURED_DEFECTIVE_DIE_COUNT_REP]

[MEASURED_PERCENT_DEFECTIVE_DIE]

{MEASURED_DEFECT_FILE_NAME}
END_DEFECT_MEASUREMENTS

<surface_measurements> = START_SURFACE_INSP_MEASUREMENTS

[SURFACE_QUALITY_ID]

[SURF_INSP_EQUIP_USED] [SURF_INSP_MODE_USED]

[SURF_INSP_PIXEL_SIZE] [SURF_INSP_SENSITIVITY]

END_SURFACE_INSP_MEASUREMENTS

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8 Terminology and Usage

8.1 Values in parentheses indicate the only acceptable alternative data values for the record and must be transmitted exactly as shown. (x,y) indicates the acceptable data value must be an ordered pair of dimensions, coordinates, repeat counts, filenames, or other parameters. (x,y,z) indicates an ordered triple. (x1,y1,z1) indicates a window with two ordered pairs, (x1,y1) and (x2,y2), describing the lower left and upper right corners respectively. Records without specified alternative values may have any appropriate data value.

8.1.1 ADDITIONAL_MASK_INFO — Any information necessary to specify the overall mask set which cannot be specified elsewhere in the order structure; must be brought to the attention of mask vendor personnel.

8.1.2 ADDITIONAL_MASK_SET_INFO — Any information necessary to specify the overall mask set which cannot be specified elsewhere in the order structure; must be brought to the attention of mask vendor personnel.

8.1.3 ADDITIONAL_MILESTONE_INFO — Text for the vendor to supply additional information regarding the status of the mask.

8.1.4 ADDITIONAL_PATTERN_INFO — Any information necessary to specify the pattern(s) which cannot be specified elsewhere in the order structure; must be brought to the attention of mask vendor personnel.

8.1.5 APPROVAL_REQD — If present, indicates that no mask(s) are to be written until the approval is explicitly granted by the customer. The alphanumeric data field describes the items to be approved.

8.1.6 ARRAY_CENTER — Center of circular array limit, relative to the center of the mask.

8.1.7 ARRAY_DIAMETER — Diameter of circular array limit to be applied to pattern files.

8.1.8 ARRAY_DIAMETER_INCLUSIVE — (T or F) If T, then die which are at least partially included within the circular array limit must be included in the array. If F, then only die which are wholly included within the circular array limit may be included in the array.

8.1.9 ARRAY_PLOT_SCALE — Numeric scale of array map.

8.1.10 ATTENUATOR — Attenuator Mask_Coating used for Embedded Attenuated Phase Shift Masks. (MoSi, TinSin, ZrSi) or any other material agreed upon between customer/vendor. May be used in conjunction with other Mask_Coatings.

8.1.11 AUTO_INSPECTION_REQD — (T or F) Automated inspection of the mask for defects is required.

8.1.12 BARCODE_LOCATION — (x,y) Location to place the center of the vendor-generated barcode.

8.1.13 BARCODE_ROTATION — (0, 90, 180, or 270) Degrees the barcode is to be rotated counterclockwise (before mirroring).

8.1.14 BARCODE_TEXT — Text to be used by the vendor to build the barcode.

8.1.15 BARCODE_TYPE — (ASM, ASET, CANON, GCA, NIKON_STD or NIKON_CODE39, UT1X_10, UT1X_24 and UT_XLS, and others on request) Encoding system to be used by the vendor to build the required barcode.

8.1.16 BILLING_ADDRESS — Address for billing.

8.1.17 BILLING_CONTACT — Name of person to contact for billing purposes.

8.1.18 BILLING_EMAIL — Internet address for BILLING_CONTACT.

8.1.19 BILLING_FAX — Phone number for facsimile machine of BUSINESS_CONTACT.

8.1.20 BILLING_PHONE — Phone number for BILLING_CONTACT.

8.1.21 BIREFRINGENCE — Birefringence level of the substrate in nanometers.

8.1.22 BLANKET_PO_NUMBER — Alphanumeric blanket purchase order number.

8.1.23 BOOLEAN — Logical operation to be performed on one or more following pattern files. Data value meanings are:

- NONE — no logical operation to be performed; sizing/scaling may still be performed,
- OR — logical union of two files,
- AND — logical intersection of two files,
- NOT — logical inverse of one file,
- XOR — logical union of two files, excluding all areas in which the two intersect, and
- MINUS — logical difference between input file 1 and input file 2; i.e., logically removing from input file 1 the portions of all digitized geometry which overlap with digitized geometry in input file 2.

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8.1.24 BOTTOM_PELLICLE_CENTRALITY_ERRO R — (x,y,rotation) Maximum misplacement in micrometers and microradians of pellicle mounting, relative to the nominal center of the mask. The nominal center is determined using the bottom and left edges (chrome side up) and assumes nominal substrate dimensions. (See SEMI P1.)

8.1.25 BOTTOM_PELLICLE_TYPE — Alphanumeric brand and model of acceptable pellicle for the glass side of the mask. If multiple pellicles are listed, they are listed with the most preferred first and then in declining preference.

8.1.26 BUSINESS_ADDRESS — Address of person placing the order.

8.1.27 BUSINESS_CONTACT — Name of person placing the order.

8.1.28 BUSINESS_EMAIL — Internet address for BUSINESS_CONTACT.

8.1.29 BUSINESS_FAX — Phone number for facsimile machine of BUSINESS_CONTACT.

8.1.30 BUSINESS_PHONE — Phone number for BUSINESS_CONTACT.

8.1.31 BUTTING_ERROR — Maximum misalignment of features due to stitching of adjacent fields in the segmented writing of a mask.

8.1.32 BUTTING_ERROR_METHOD — Alphanumeric description of the method to be used to measure butting error.

8.1.33 CD_CORRELATION_ID — Alphanumeric date or other identification of the vendor/customer correlation test to be used in measuring CDs.

8.1.34 CD_DATA — Size of critical dimension feature in data as supplied in the pattern file.

8.1.35 [CD_DENSE] — (T or F) Region surrounding cd feature is dense geometry.

8.1.36 CD_DEVIATION_FROM_MEAN — Maximum acceptable deviation of any of the customer-required CD measurements from the mean of those measurements.

8.1.37 CD_DEVIATION_FROM_TARGET — Maximum acceptable deviation of any of the customer-required CD measurements from the CD_TARGET. If only one data value (p) appears in the data field, the tolerance is considered +/- symmetrically about CD_TARGET. If two data values (p [,m]) appear, then the first is the maximum amount by which deviation is allowed larger than CD_TARGET, and the second is the maximum amount by which deviation is allowed smaller than CD_TARGET. The comma and second half of the argument are optional in the syntax (p[,m]) where p = the plus and m = the minus value for non-symmetric tolerances; if only p is specified, the plus and minus values are assumed to be symmetric.

8.1.38 CD_DIGITIZED — (T or F) If T, critical dimension in pattern is digitized data.

8.1.39 CD_DRAWING — The uniquely identified (for each customer) document which shows the CD structure itself, and may show the place within the CD which are to be measured.

8.1.40 CD_EQUIP_REQD — Alphanumeric identification of acceptable equip-ment for measuring critical dimensions.

8.1.41 CD_FEATURE — Text describing the feature to be used for CD measurement.

8.1.42 CD_ISO_DENSE_TOLERANCE — Maximum acceptable difference of the mean of all measured customer-defined CD_DENSE patterns from the mean of all measured customer-defined CD_ISOLATED patterns.

8.1.43 CD_ISOLATED — (T or F) CD feature has no other geometry nearby.

8.1.44 CD_LOCATION_DRAWING — The uniquely identified (for each customer) document which shows the location of the CD structure.

8.1.45 CD_MATRIX_FILE_NAME — Alphanumeric name of file to be used for critical dimension measurement locations. It is not to be used in conjunction with MASK_CD_LOCATION or PATTERN_CD_LOCATION within the same START_CD to END_CD set.

8.1.46 CD_MATRIX_FILE_FORMAT — (MF2, MF3, KMS and others on request)

8.1.47 CD_MEASURE_DIE — In combination with the associated <placement> definition, specifies the die to be used for CD measurement.

8.1.48 CD_MEASUREMENT_DATE — CD measurement date.

8.1.49 CD_MEASUREMENT_EQUIP_USED — CD measurement equipment used.

8.1.50 CD_ORIENTATION — (VERTICAL or HORIZONTAL) Direction in which the CD feature is to be scanned for measurement.

8.1.51 CD_PERCENT_CLEAR — Calculated percentage of clear area within CD_PERCENT_CLEAR_WINDOW in the mask data.

8.1.52 CD_PERCENT_CLEAR_WINDOW — (x1,y1,x2,y2) window coordinates over which

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CD_PERCENT_CLEAR is calculated, relative to the nominal center of the mask. The nominal center is determined using the bottom and left edges (chrome side up) and assumes nominal substrate dimensions. (See SEMI P1.)

8.1.53 CD_QUALITY_ID — Alphanumeric customer's label for a collection of CD quality specifications, to be used only in addition to explicit quality requirement keywords. This may not be used in the data structure in place of quality requirement keywords, nor in combination with QUALITY_GROUP_ID. Customer and vendor should document the meaning of this quality grade before using it in SEMI P10.

8.1.54 CD_RANGE — Maximum acceptable variation of all measured critical dimensions of same nominal size, same tone and same orientation, relative to each other.

8.1.55 CD_REFERENCE_ONLY — (T or F) If T, indicates that the CD location is to be measured and the data transmitted to the customer (if requested by SHIP_CD_DATA_), but that deviations in its measured value due to mask processing would NOT be cause for mask rejection. (This does not exempt mishandling of the data in pattern preparation from being a cause for mask rejection.)

8.1.56 CD_SITE_ID — Unique alphanumeric identifier of each critical dimension location within MASK_SET_ID to identify individual cd locations when using <mask_results>. If the same coordinates apply to locations on different masks within the mask set, they may have the same CD_SITE_ID, but it is not mandatory. If CD_SITE_ID is used with a PATTERN_CD_LOCATION, it will be associated with as many mask locations as the cell has instances. (See MEASURED_ CD_SITE _ID for more information.)

8.1.57 CD_STD — (NBS, NIST, ROGER_SHERMAN, CUSTOMER, and others on request) reference standard to be used to correlate critical dimension measurements.

8.1.58 CD_TARGET — Desired final size of critical dimension feature on mask.

8.1.59 CD_THREE_SIGMA — Maximum acceptable 3-sigma deviation of all measured critical dimensions to the the mean of all measured critical dimensions

8.1.60 CD_TOLERANCE — Maximum acceptable deviation of the mean of all measured critical dimensions to the CD_TARGET

8.1.61 CD_TONE_CLEAR — (T or F) If T, critical dimension feature on mask is clear.

8.1.62 CD_XY_DEVIATION — Maximum deviation, on a site-by-site basis, of a horizontal critical dimension to a vertical critical dimension. The two critical dimensions at each site must be the same size in the pattern data.

8.1.63 CD_XY_TOLERANCE — Maximum acceptable deviation of the mean of all measured horizontal critical dimensions to the mean of all measured vertical mask critical dimensions. Critical dimensions at all sites must be the same size in the pattern data.

8.1.64 CELL_ID — Name of the cell which follows; must be used in all references within this MASK_SET_ID to this cell definition.

8.1.65 CELL_INSTANCE — (text) Identifies CELL_ID to be placed by the following location information.

8.1.66 CELL_REGISTR_MARK — (x,y) Location of initial registration reference mark, relative to center of cell (before mirroring or scaling).

8.1.67 CENTRALITY — (x,y,rotation) Maximum misplacement in millimeters and, optionally, microradians of all patterns as a group, relative to the nominal center of the mask. The nominal center is determined using the bottom and left edges (chrome side up) and assumes nominal substrate dimensions. (See SEMI P1.)

8.1.68 CHECKSUM — For <mask_order>, an ASCII 16 bit crc checksum encompassing all records from START_ORDER through END_ORDER, inclusive. For <mask_results>, an ASCII 16 bit crc checksum encompassing all records from START_MASK_RESULTS through END_MASK_RESULTS, inclusive. (See COMPUTING THE CHECKSUM, Section 9.)

8.1.69 CLEAR_INTERNAL_WINDOW — (x1,y1,x2,y2) Area to have all digitized data removed within the window described by (x1,y1,x2,y2). The extents of the output pattern file will be the same as the input data source.

8.1.70 COATING_GRADE — Supplier grade of MASK_COATING applied to the substrate to build the photomask. Text to be agreed by customer/vendor to suit the specific requirement.

8.1.71 COMPACT_LABEL — Identification of customer-supplied label to use on shipping compact.

8.1.72 CUSTOMER — The name of the company placing the order.

8.1.73 CUSTOMER_SPEC_REVISION — Name of customer's specification revision used by vendor.

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8.1.74 DARK_INTERNAL_WINDOW — (x1,y1,x2,y2) Area to completely digitize within the window described by (x1,y1,x2,y2). The extents of the output pattern file will be the same as the input data source.

8.1.75 DATA_CHECKSUM — (integer) To be used to verify integrity of transmitted data.

8.1.76 DATA_CHECKSUM_TYPE — (text) Algorithm used to generate DATA_CHECKSUM.

8.1.77 DATA_COMPRESSION — (ZIP, ZOO, GZIP, Z, NONE, BINHEX) Compression algorithm used for transmitted data.

8.1.78 DATA_CONSOLIDATION — (BACKUP, TAR, GNUTAR, ZIP, NONE Consolidation method used for transmitted data.

8.1.79 DATA_DENSITY — (800BPI, 1600BPI or 6250BPI for 9_TRACK_-TAPE DATA_MEDIUM; HIGH or LOW for 4MM_DAT or 8MM_DAT DATA_MEDIUM) for magnetic tape density.

8.1.80 DATA_ENCRYPTION — (PGP, NETWIZARD, USER, HARDWARE, NONE) Encryption algorithm used for transmitted data.

8.1.81 DATA_FILE_NUMBER — For GDS-II OASIS, Mann or Electromask data, this is the file number on the physical medium.

8.1.82 DATA_FILE_SIZE — Size of the file in bytes.

8.1.83 DATA_FORMAT — (MEBES, RDOS = RDOS dump, VAX = VAX backup, GDS-II = GDS-II stream, OASIS = Specification for Open Artwork System Interchange Standard, CIF = Cal Tech Intermediate Format, DXF = Autocad output, APPLICON, MANN_3000, MANN_3600, ELECTROMASK, DOS, UNIX, APPLE, TAR, and others on request) Physical medium format.

8.1.84 DATA_ID — The required identifying “name” for a physical volume of data. The name must match the label visible on the outside of the volume and must be unique among all physical volume names sent by a customer to a vendor.

8.1.85 DATA_JOB_NAME — For E-beam data, this is the name of the job file to be expected in DATA MEDIUM.

8.1.86 DATA_LAYER_ID — (Layer1;Datatype1[,Layer2;Datatype2,…]) Within DATA_TOP_CELL, a numeric pair of layer number and layer datatype separated by a semicolon and multiple sets of layers/datatypes separated by a comma. If no datatype is specified for a layer number, then all data datatypes are assumed to be included for that layer.

8.1.87 DATA_LOCATION — Alphanumeric site where the data file may be found.

8.1.88 DATA_MEDIUM — (9_TRACK_TAPE, 4MM_DAT, 8MM_DAT, 1/4_INCH_CARTRIDGE, MODEM, FLOPPY, EMAIL, VPN, FTP, RCP, CDR, CDRW, HARDDRIVE ZIPDRIVE, JAZZDRIVE, FLOPPY100MB, DERIVED) Data transfer medium used for delivering pattern files, fracture files, job files and measure files. DERIVED indicates files which are the result of <data_manipulation> operations contained within the <mask_order>.

8.1.89 DATA_OFFSET — For optical masks only, the (x,y) shift to be applied to the data in building the mask.

8.1.90 DATA_PATTERN_NAME — For numbered files in a data volume, this is the pattern name to be applied to the file specified by the succeeding DATA_FILE_NUMBER and/or DATA_TOP_CELL and/or DATA_LAYER_ID. For E-beam, data, this is the name of the pattern file to be expected on the physical volume.

8.1.91 DATA_PATTERN_WINDOW — (x1,y1,x2,y2) Establishes the extents of the pattern file in the coordinate space as received. (x1,y1) identifies the lower-left corner; (x2,y2) identifies the upper-right corner.

8.1.92 DATA_SCALE_FACTOR — (n) (De)Magnifying factor to be used in (de)magnifying both the geometries and the overall pattern file extents of the current data source.

8.1.93 DATA_SOURCE_FILE — A file provided by the customer to be used in a Boolean fracturing operation, or file resulting from a <data_manipulation> operation. It must match either a START_DATA_MANIPULATION or a DATA_PATTERN_NAME defined earlier in the <mask_order>.

8.1.94 DATA_TOP_CELL — Top cell or structure of the design.

8.1.95 DATABASE_AREA — (x1,y1,x2,y2) Unscaled, unmirrored coordinates of window for database inspection, lower left and upper right corners, relative to the center and coordinate system of the pattern or cell or, if a <mask_option>, relative to the center of the mask.

8.1.96 DATABASE_FILE_NAME — Name of database file to use for database inspection.

8.1.97 DATABASE_INSPECTION — (T or F) If T, database inspection is required.

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8.1.98 DATABASE_JOB_LEVEL — Mask level of customer-supplied job file to use for database inspection.

8.1.99 DATABASE_JOB_NAME — Customer-supplied job file to use for database inspection. Should be omitted if customer does not supply job file.

8.1.100 DATABASE_LAYER — (Layer1;Datatype1[,Layer2;Datatype2,…]) Within DATABASE_TOP_CELL, a numeric pair of layer number and layer datatype separated by a semicolon and multiple sets of layers/datatypes separated by a comma. If no datatype is specified for a layer number, then all data datatypes are assumed to be included for that layer. To be used if DATABASE_SOURCE is GDS-II or OASIS.

8.1.101 DATABASE_SOURCE — (MEBES, PG, GDS-II, OASIS, KLARIS, UNDERIVED, and others on request) Data source to be used when database inspection is required. KLARIS indicates that KLARIS data was supplied by the customer. UNDERIVED indicates the customer-supplied data prior to vendor-performed data manipulation is to be used to produce the inspection data. GDS-II or OASIS indicates that the GDS-II or OASIS data is being supplied for database inspection, in addition to the customer-supplied MEBES or PG data to be used to write the mask.

8.1.102 DATABASE_TOP_CELL — Top cell to be used if DATABASE_SOURCE is GDS-II or OASIS.

8.1.103 DATABASE_UNIT — Grid size to be used for fracturing DATABASE_SOURCE into inspection data, as required by some inspection systems.

8.1.104 DATABASE_WITH_JOB — (T OR F) Database inspection must use job file (DATABASE_JOB_NAME and DATABASE_JOB_LEVEL if supplied by customer) to consolidate pattern files.

8.1.105 DEFECT_COUNT — Integer maximum allowable number of defects within the INSPECTION_AREA.

8.1.106 DEFECT_COUNT_REP — Integer maximum number of repeating defects within the INSPECTION_AREA.

8.1.107 DEFECT_DENSITY — Maximum allowable number of defects per square centimeter within the INSPECTION_AREA.

8.1.108 DEFECT_EQUIP_REQD — Alphanumeric identification of acceptable equip-ment for defect inspection.

8.1.109 DEFECT_INSP_DATE — DEFECT inspection date.

8.1.110 DEFECT_INSP_EQUIP_USED — Defect inspection equipment used.

8.1.111 DEFECT_INSP_MODE_REQD — Alphanumeric operating mode for DEFECT_EQUIP_REQD.

8.1.112 DEFECT_INSP_MODE_USED — (text) DEFECT_INSP_EQUIP_USED operating mode.

8.1.113 DEFECT_INSP_PIXEL_SIZE — Pixel size used by DEFECT_INSP_EQUIP_USED.

8.1.114 DEFECT_INSP_SENSITIVITY — Sensitivity used by DEFECT_INSP_EQUIP_USED.

8.1.115 DEFECT_QUALITY_ID — Alphanumeric customer's label for a collection of defect quality specifications, to be used only in addition to explicit quality requirement keywords. This may not be used in the data structure in place of quality requirement keywords, nor in combination with QUALITY_GROUP_ID. Customer and vendor should document the meaning of this quality grade before using it in SEMI P10.

8.1.116 DEFECT_SETUP_FILE_NAME — Alphanumeric name of setup file for DEFECT_EQUIP_REQD.

8.1.117 DEFECT_SIZE — Maximum dimension of smallest unacceptable defect—all types.

8.1.118 DEFECT_SIZE_CL — Maximum dimension of smallest unacceptable clear defect.

8.1.119 DEFECT_SIZE_CL_ADJ — Maximum dimension of smallest unacceptable clear, non-repeating edge defect.

8.1.120 DEFECT_SIZE_CL_ADJ_REP — Maximum dimension of smallest unacceptable clear, repeating edge defect.

8.1.121 DEFECT_SIZE_CL_ISO — Maximum dimension of smallest unacceptable clear, repeating isolated defect.

8.1.122 DEFECT_SIZE_CL_ISO_REP — Maximum dimension of smallest unacceptable clear, non-repeating isolated defect.

8.1.123 DEFECT_SIZE_DK — Maximum dimension of smallest unacceptable dark defect.

8.1.124 DEFECT_SIZE_DK_ADJ — Maximum dimension of smallest unacceptable dark, non-repeating edge defect.

8.1.125 DEFECT_SIZE_DK_ADJ_REP — Maximum dimension of smallest unacceptable dark, repeating edge defect.

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