

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS A5A

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1 INTRODUCTION. This version of the standard will utilize and encompass the new technology and functionality that is part of Unigraphics V11.X.

An attribute for dataset context is introduced in this release of the standards for both UG native and UG with GM/PDM. The dataset context is a GM/PDM requirement and defines the content of a file similar to the way in which a file classification defines content. The attribute will be added to the files in native UG in order to facilitate importing data into GM/PDM at the time GM/PDM is implemented at a site or when sharing data between GM/PDM sites and non GM/PDM sites. The file log program is used to enter this attribute in the file. For an explanation of dataset contexts see Section E.

The introduction of alpha-numeric numbering for file identity is referred to in this section and defined in 2.5. Those sites that do not implement alpha-numeric numbers, prior to the implementation of GM/PDM (Product Data Manager), will follow the Unigraphics V10 standard for file naming (Section A4, 2.5.2.2) as revised.

Other changes to this version of A5A are in 6.1.2 and 6.2.3.

A Unigraphics DCS Users Guide is supplied in the GM Program Development Library.

2 FILE MANAGEMENT.

2.1 MASTER DATA. It is intended that all part data exist electronically only once. If the data exists more than once, then one of them must be designated as the MASTER.

2.2 COPIED DATA. Copied data is a duplication of the master data. This will occur when a user, nonowner of the data, cannot directly access the database of the design group responsible for the data.

2.3 FILE APPLICATION. A file contains the 3D mathematical definition of a single part. Purchased assemblies may be managed in a single file when the parts of assembly do not have GM part numbers.

No more than one part description may be in any Unigraphics part file, however, less than a complete part description may be in a file when more than one file is necessary to define a part.

2.4 FILE TYPES.

2.4.1 Single Part Files. The data must correspond with the required DCS category names that are automatically created by the **required categories** program when the file is created. Required reference sets will be created by using the **organize file** program.

2.4.2 Assembly Files. These files will consist of component entities which access the single part files and/or other assembly files. All data must be assigned to properly named reference sets created by the **organize file** program. These files may also contain certain 3-D geometry for promoted bodies, i.e., assembly level features and mechanisms.

2.4.3 Drawing Files. These files will consist of a component entity(s) which accesses the part and/or assembly files. This file also contains a drawing format created by the **drawing format program**. Annotation and geometry required to support an engineering drawing may also reside in these files.

2.5 ALPHA-NUMERIC NUMBERS. Alpha-numeric numbers will be used as a unique file identifier to facilitate the migration to GM/PDM. The alpha-numeric numbers will not replace GM part numbers and will not be assigned or tracked by PDS (Product Description System). The use of alpha-numeric numbers will replace the MFI and ITEM file naming applications. Tracking the usage of these files will be done with a DOCMNT file as described throughout this standard. When a complete part description is in a file the relationship between the alpha-numeric file identifier and the GM part number will be maintained with an attribute. The GM part number will be entered into the Part No. field of the file log.

Blocks of alpha-numeric numbers will be assigned by CIM (Corporate Information Management Infrastructure Group).

2.6 FILE NAMING.

2.6.1 Nondrawing Files. The file name for all nondrawing classifications will consist of 4 fields separated by periods.

2.6.1.1 Field One. The **first** field (8 characters maximum) is the GM part number or alpha-numeric number.

2.6.1.2 Field Two. The **second** field is the file classification. The classification defines the general content of the file. See Section 3 for valid classifications.

2.6.1.3 Field Three. The **third** field (4 numeric characters) is the sequence number as defined by the TDMF Standard. See Section E for details.

2.6.1.4 Field Four. The **fourth** field is the file type. Unigraphics automatically appends a '.PRT' extension to part files.

2.6.2 Drawing Files. The file name for drawing classifications will consist of 4 or 5 fields separated by periods. The second field identifies the sheet number and is used only when multiple sheet drawings are stored with one drawing sheet per file.

2.6.2.1 Field One. The **first** field (8 characters maximum) is the drawing number.

2.6.2.2 Field Two. The **second** field is the drawing sheet number. This field is required with multiple sheet drawings that are stored in an individual file. Sheet number will be a 4 character field, numbered sequentially, as follows: S001, S002, etc.

2.6.2.3 Field Three. The **third** field is the file classification. The classification defines the general content of the file. See Section 3 for valid classifications.

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2.6.2.4 Field Four. The **fourth** field (4 numeric characters) is the sequence number as defined by the TDMF standard. See Section E for details.

2.6.2.5 Field Five. The **fifth** field is the file type. Unigraphics automatically appends a '.PRT' extension to part files.

2.6.3 Example File Names.

```
34567890.MLDES.0005.PRT
34567890.MLASM.0000.PRT
12345678.PKG.0011.PRT
AAA56432.MLDES.0000.PRT
ABC23456.MLASM.0001.PRT
34567899.DWGFM.T.0000.PRT
3L887790.S001.LYTFMT.0000.PRT
3L887790.S002.LYTFMT.0020.PRT
TL234567.LYTFMT.0010.PRT
```

3 VALID CLASSIFICATIONS.

CRITIA (Criteria)
 DOCMNT (Document)
 DWGFM.T (Drawing Format)
 LYTFMT (Layout Format)
 MDATA (Bulk Master Data) for legacy files only*
 MLDES (Master Layout Design)
 MLASM (Master Layout Assembly)
 MLELEC (Master Layout Electrical)
 MLREF (Master Layout Reference) for sites using TDMF/
 UNIX
 PKG (Package)
 STDPRT (Standard Part) for legacy files only*

*File classifications for legacy files will be validated by the file checker that they existed in a version of UG prior to version 11.

4 DATA ORGANIZATION. In order to organize geometry into logical collections of data, program created Attributes, Categories and Reference Sets will be used. These program created categories and reference sets will be referred to as required categories or reference sets throughout the rest of this standard.

4.1 ATTRIBUTE USAGE.

4.1.1 Part Administrative Data. Part administrative data, will be assigned as UG part attributes. See Section D for a list of the attribute names to be assigned.

The **file log** program will be used to define the File Information Log and part attributes that are necessary to convey administrative information about the file.

4.2 CATEGORY USAGE.

4.2.1 Required Categories. Required categories will be used to label and collect layers. Each of these layers must be

assigned an appropriate category name. These categories are generated by the **required categories** program. The order of category assignment is not important, however, the user will be prompted to enter a start layer. The category must be assigned to a layer that the corresponding data type reside on.

The required categories generated by the program are as listed below:

Layer	Categories
1	Part, Solid
2	Part, Wireframe
3	Part, Centerline
4	Theoretical
5	Section
6	Developmental
7	Mate

4.2.1.1 Category Definitions.

Solid - Solids and sheet bodies required to define the part.

Wireframe - Lines and curves required to define the part that is not defined by the solid(s). Drop off wireframe is no longer required.

Centerline - Lines and curves used as centerlines as required for sweeps and extruded solids, such as pipes, etc. The **organize file** program will change the line font to centerline.

Theoretical - Lines and curves used as theoretical intersections as required for drawing purposes. The **organize file** program will change the line font to phantom.

Section - Sections shown to define material thickness and part development when used in a nondrawing file.

Developmental - All geometry types used to develop the part, i.e., sketches, smart curves, trimmed sheet bodies, swept curves, datum planes, etc.

Mate - Datum planes, datum axes and saved coordinate systems used for mating conditions.

4.2.2 Optional Categories.

4.2.2.1 Section Naming. Optional section categories are used when in-depth information pertaining to the section may be needed. Any optional section category must also be accompanied by the category name 'SECTION'.

Some examples are below:

```
SECTION, X500.0
SECTION, SA
SECTION, X-150.275
SECTION, Y50
SECTION, Y-100
```

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SECTION, Z1000.5
SECTION, Z-1000.5
SECTION, R98.5

4.2.2.1.1 A planar cross section is one cut along the X, Y or Z axis and is identified as such. For example:

X500
X2302.25

Rules for planar section naming are as follows:

- Must have an X, Y, Z, character in the first position of its name.
- Name must be at least 2 and no more than 12 characters in length.
- Name cannot contain more than 3 digits after a decimal point.
- Name may contain a minus (-) sign in the second position.
- All characters of the name except the first character, decimal point and the minus sign must be numeric.

4.2.2.1.2 When section data for skewed sections is required the additional naming convention is used.

Saa - Skewed sections. (aa = A through Z for the first 26, then AA through ZZ)

Rules for skewed section naming are as follows:

- Must have an S character in the first position of the name.
- Must be at least 2 characters in length.
- May be a maximum of 3 characters.
- All characters must be alphabetic.

4.2.2.1.3 When radial sections are required (i.e., tire envelope) the additional naming convention is used:

Rnnn.nn - Radial section (use positive angles)

Rules for radial sections naming are as follows:

- Must have an R in the first position of the name.
- Must be at least 2 characters in length.
- May be a maximum of 8 characters.
- Name cannot contain more than 3 digits before a decimal point.
- All characters except the first character and the decimal point must be numeric.

4.2.2.2 User Defined Categories. User defined category names may be assigned in addition to the required category names but they must be preceded by an underscore thus sketch.

4.3 REFERENCE SET USAGE. Reference Sets will be used in single part files and intermediate assemblies to collect specific sets of component part data. The **organize file** program automatically builds reference sets depending on the data that exists within the categories as defined in Table 3.

All nondrawing part files will always contain at least 2 required reference sets **PART** and **REP**. A nondrawing part file may contain a **DRAW** and/or a **MATE** reference set.

PART - Geometry required to define the part.

REP - A representation of the part for quick display.

DRAW - All part geometry and theoretical intersection lines for drawing purposes.

MATE - All part geometry as well as datum planes, datum axes and saved coordinate systems used for mating conditions.

Assembly files will always contain component entities that collect reference sets of the component parts.

4.3.1 Site Defined Reference Sets. Site defined reference sets can be defined at each site in addition to the 4 reference sets listed above. To be valid these reference sets must be listed in a special text file: **site_optional_refsets**. Details of where to get this file and how to set it up are in Appendix B in this section.

4.4 COMPONENT ENTITY USAGE. In Unigraphics virtual assembly files, component entities, are used to access reference sets from single part files or subassemblies. The **organize file** program will change the component entity name to that of the part name.

4.5 REVISED DATA. Revised Data to be addressed at a future date.

4.6 LAYER RANGES. The layering convention, shown below will be used in all part files. Where a range of layers is indicated, local/site preference for detailed delineation of data within the range is allowed.

TABLE 1

Layer Number	Layer Content
1 - 252	Model Geometry
253	Drawing Format & Annotation
254	Drawing Format & Annotation
255	Data Received via C4 Translator
256	Saved Coordinate System Entities for In-vehicle Position

The **required categories** program places the required categories on layers 1 through 7 unless another start layer is entered.