

Quality Management System (QMS)



**Products and Operations**

## **AutoCad Exchange Best Practices**

Business Entity:  
Author / Initiator:  
Document Number:  
Version:  
Date:  
Status:

Open Tools  
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AutoCad  
1.0  
July 11, 2002  
Draft

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# Introduction

This document is meant to serve as an aid to users who need to exchange drawing data with AutoCad. This is very much an in progress document and currently consists of notes from various documents that have been collected over the years. This is only the start point to make it a good document we strongly suggest the readers submit their own valuable experiences and feedback to make this a more robust and useful tool.

## 1 AutoCad to Unigraphics

### 1.1 Dimension Associativity

AutoCAD dimensions are associated to points and not to objects as in Unigraphics. When dimensions are translated from AutoCAD they will be made associative relative to the definition points. These definition points will reside on layer 255 so that they can easily be blanked and unblanked by changing the blank status of all points on layer 255.

### 1.2 AutoCAD Viewport Entity Translation

Viewports are the main building blocks used in creating Tilemode Off drawings within AutoCAD. They have the versatility of being an object (which can be affected by several commands) as well as the unique ability to maintain a *Frozen Layer List*, which controls visibility by layer.

The viewport object is essentially equivalent to a UG view on a drawing. Therefore, when DXFDWG encounters viewports in the AutoCad file, they are used to generate a UG drawing and then the views on that drawing.

The name of the drawing which is created when a viewport is encountered by DXFDWG will be the same as the name of the layer which the viewport resides on in AutoCAD, with the following being the only exception:

If the AutoCAD part being translated with DXFDWG was previously translated from UG to AutoCAD with UGTODXF, then the layer names on which viewports reside may have a prefix of "digit(s)\$". For example, a layer name of 1\$top\$5 would have a prefix of "1\$" which is used to associate that viewport with other viewports that belong to the same drawing. When DXFDWG translates these viewports into one or more drawings with member views, the prefix is removed and will not be part of the drawing or view names in UG.

As soon as a user enters Tilemode OFF in AutoCAD, a viewport to represent the paper space is created in the database. This viewport is used by the DXFDWG translator to initiate the creation of a drawing in the UG database.

Each of the subsequently created viewports in AutoCAD will be used by the DXFDWG translator to initiate the creation of a view on the UG drawing.

AutoCAD parts may contain viewports for multiple drawings if the part originated on UG and is being "Round Tripped" through AutoCAD and back to UG. The DXFDWG translator will group viewports into UG drawings on the basis of the prefix value of the layer that the viewport resides on. This is because prefixes are common among all the layer names that were created by UGTODXF for member views of a given UG drawing.

|

All the views on a drawing that are created by DXFDWG will have a View Layer Mask. All layers will be visible except for those, which are frozen in the viewport's Frozen Layer List.

## 1.3 Vport Configurations vs. Viewports

It is important to note that the use of AutoCAD's *Vport Configurations* in Tilemode ON is completely different from the use of *Viewports* in Tilemode OFF. Since they are different, the DXFDWG translator handles them differently.

*Vport Configurations* in Tilemode On essentially correspond to Modeling Application Layouts in UG. Each AutoCAD Vport Configuration is translated into a corresponding layout in UG. AutoCAD always keeps a duplicate of the currently displayed Vport Configuration in a separate Vport Configuration named \*ACTIVE. A layout in UG which corresponds with the AutoCAD \*ACTIVE Vport Configuration will be the one displayed in UG by the Modeling Application. Suggestion: Use the "VPORTS RESTORE ?" command in Tilemode ON, or the "MVIEW RESTORE ?" command in Tilemode Off to see the AutoCAD Vport Configurations including \*ACTIVE.

*Viewports* in Tilemode OFF, on the other hand, essentially correspond to Drafting Application drawings with member views in UG. They are, therefore, translated accordingly.

## 1.4 Entity Visibility

AutoCAD controls visibility using global ON/OFF (blanking) and THAW/FREEZE (regeneration) layer settings, as well as viewport specific THAW/FREEZE layer settings.

The UG default in the Drafting Application is to control layer visibility using view layer lists, which are found in UG under Layers/Visible In View. The DXFDWG translator will cause the global layer list, as found in UG under Layers/Settings, to reflect the layer visibility in AutoCAD and the null part file.

Entity specific blanking was first added to ACAD in R13 and supported by DXFDWG in V13. Prior to ACAD R13, however, entity specific blanking was not supported and a DXFDWG translation resulted in all entities in UG having an unblanked status.

## 1.5 Layer Handling

The current LAYER retention implementation is as follows:

Numbered ACAD layers between 1-256 are mapped to UG layers 1-256.

All other ACAD layers are treated as named layers and are mapped to vacant layers. A category is created for each named layer with same name.

If there are more named layers than vacant layers, then:

No 1	All remaining visible ACAD layers are mapped to last visible UG layer.
No. 2	All the remaining invisible ACAD layers are mapped to last invisible UG layer.
No. 3	If there are no invisible layers in case (2) then the layer is mapped to the last visible layer and entities on it are blanked.

It is recommended that standard AutoCAD dimensions be used in AutoCad.

Potentially large increases in UG file size may result from certain DXF to UG translations depending on the file contents. One potential contributor is that ACAD's surfaces (polyline meshes) are translated into [greater size but higher usefulness] UG sheet bodies. There is some correlation between the number of 3DFACE & POLYLINE entities and increased size. The major contributor to file size increase, however, comes from expanding blocks by multiple inserts instead of translating them into UG components and instances.

## **1.6 Line Weight Mappings: Only for DXF(DWG) R2000**

- Line weights are dealt with using parameters in the Settings file (if not available, add them).
- Import: The parameters are:
  - AutoCAD line weights equal to or less than the value associated with LWEIGHT\_THIN\_MAX are mapped to UG Thin line weight.
  - AutoCAD line weights equal to or greater than value associated with LWEIGHT\_THICK\_MIN are mapped to the UG Thick line weight.

- AutoCAD line weights equal to or between the two values are mapped to the UG Medium line weight.

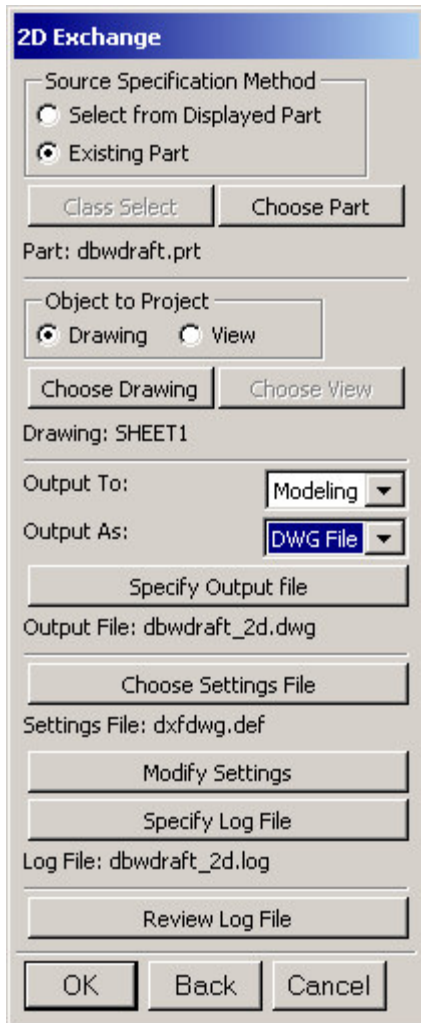
## **2 Unigraphics to AutoCad**

For most users that want to take a Unigraphics drawing to AutoCad we recommend that the you first flatten the UG drawing using 2d Exchange. Unigraphics drafting is a 3d drafting system and all drawing data is associated to the 3d geometry. This can cause some problems for Autocad and other 2d systems. Creating a 2d part out of the UG data provides better results. AutoCad as well as many other 2d drawing systems accept a UG drawing better when it has been flattened.

The following is a general guide on when to use 2d Exchange or just DXFDWG

- 1) If you want 2d data and 3d geometry in the AutoCad file use the standard DXFDWG translation
- 2) If you are going to AutoCad 14+, do a 2d exchange to model on the UG part first and specify DWG as the output. This will allow you to edit the geometry and drafting in model space in Autocad
- 3) If you have scaled views on the drawing and you want to maintain the relationship with the geometry, then you do a 2d exchange to drafting and specify DWG as the output.
- 4) For assembly drawings 2d exchange and specify DWG as the ouput.

### **2D Exchange**



## 2.1 Dimensions and Text

### 2.1.1 Dimension Associativity

AutoCAD dimensions are associated to points and not to objects as in Unigraphics. When dimensions are translated to AutoCAD they will be made associative relative to the definition points.

## 2.2 GD&T Symbols

Some GD&T symbols, which appear to be circular in the UG part, may come up in AutoCAD with a hexagon-like appearance. This is the result of an AutoCAD zoom limitation. This can be fixed by entering the command REGEN at the AutoCAD command line. After REGEN, the symbols will return to their original circular appearance.

## 2.3 Curves and Surfaces

## 2.4 Solids to Wireframe Only Translation

Solids to Wireframe Only translations can be accomplished by setting appropriate User Interface fields. Specifically, under Translation Options, Selected Curves, *deselect Solid Edges on Drawings* and *select All Solid Edges*. Under **Translation Options**, *deselect* everything under **Selected Solid Sheet Bodies** and **Selected Solids**.

In order to optimize your chances of getting a complete but simple part representation in AutoCAD, you can cause "wireframe only" to be translated by using the following UI settings: Turn Solid Edges are "on", and Solid Bodies and Sheet Bodies are "off".

If desired, the solid edges can be limited further by using "Solid Edge in Drawings" rather than "All solid edges". Visually, this will look the same as when "All Solid Edges" is selected. If both are on, the results are similar to "All solid edges".

## 2.5 CHARACTER FONT MAPPING FOR DXFDWG

In V18, fonts can be mapped when converting UG to DXF or DWG and DWG or DXF to UG. The default font mappings are listed in the file below. This file can be edited to map the fonts, or a new file can be created using the format of this file and only listing the fonts to be mapped.

```
! This file contains the character font mappings used by DXFDWG product
!
! The mappings for import and export direction are explicitly specified.
!
! All mapping statements must follow the specified syntax i.e. direction_keyword :
! source_setting = destination_setting
!
! Comments are allowed inline & are marked by a '!' to end-of-line
!
! If the user wishes to alter these settings, it is suggested that this file be copied and the
! required mappings changed; or a new file be created with just the required settings
! - the new settings be added at the end of this file
!
!
! If the user creates a new file, the same should be specified using the keyword in the
! main defaults file as ( w/o quotes ) "CHARACTERFONT_MAPPING_FILENAME =
! <location_of_user_font_mapping_file>"
!
! It should be noted that for a given direction, the last font mapping specified shall take
! effect when duplicates exist
!
! The user can optionally specify a fixed aspect ratio to be used with the specified
! mapping.
!
! The aspect ratio to be used for a particular mapping is added at the end of the mapping
! statement as in :- import : "txt.shx" = "blockfont" , 0.8
! The above shall cause all DXF/DWG text in txt.shx font to be mapped to UG
! "blockfont" font with a fixed aspect ratio of 0.8
!
```



! For mappings that do not have the aspect ratio specified, the translator shall evaluate  
! the same for each text

!

! Default Character font mapping from ACAD to UG follows :-

!

```
import : "txt.shx" = "blockfont"  
import : "swisscbo.ttf" = "aurora"  
import : "swissbo.ttf" = "lubalin"  
import : "swissbo.ttf" = "lubalins"  
import : "bgothm.ttf" = "ballfont"  
import : "bgothl.ttf" = "ballfont"  
import : "arial.ttf" = "iso-1"  
import : "dutchi.ttf" = "cyrillic"  
import : "cour.ttf" = "cyrillicf"  
import : "romans.shx" = "ge_font5"  
import : "greekc.shx" = "greekfont"  
import : "isocp.shx" = "iso_font"  
import : "tt0596m_.ttf" = "helios"  
import : "gothice.shx" = "oldenglish"  
import : "simplex.shx" = "pwfont"  
import : "scriptc.shx" = "script"  
import : "impact.ttf" = "helvet"
```

!

! Set the default font - to be used when a mapping is not found for a ACAD font while  
! importing

!

```
import : "DEFAULT" = "blockfont"
```

!

!

! Character font mapping from UG to ACAD follows :-

!

```
export : "blockfont" = "txt.shx"  
export : "aurora" = "swisscbo.ttf"  
export : "lubalin" = "swissbo.ttf"  
export : "lubalins" = "swissbo.ttf"  
export : "ballfont" = "bgothm.ttf"  
export : "iso-1" = "arial.ttf"  
export : "chinese" = "arial.ttf"  
export : "cyrillic" = "dutchi.ttf"  
export : "cyrillicf" = "cour.ttf"  
export : "full_leroy" = "arial.ttf"  
export : "futura" = "swisscbo.ttf"  
export : "ge_font5" = "romans.shx"  
export : "greekfont" = "greekc.shx"  
export : "iso_font" = "isocp.shx"  
export : "helios" = "tt0596m_.ttf"  
export : "helios_con_it" = "tt0596m_.ttf"  
export : "helvet" = "tt0596m_.ttf"  
export : "leroy" = "arial.ttf"  
export : "oldenglish" = "gothice.shx"  
export : "pwfont" = "simplex.shx"  
export : "script" = "scriptc.shx"  
export : "helvet" = "impact.ttf"  
export : "cadds4" = "arial.ttf"
```

!

! Set the default font - to be used when a mapping is not found for a UG font

!  
export : "DEFAULT" = "simplex.shx"  
!  
! User settings to override one or all of the above mappings may be entered after this line

## **2.6 Line Width**

For EXPORT, the UG line width of thin, normal and thick map to the values specified for the parameters LWEIGHT\_THIN\_MAX, LWEIGHT\_NORMAL and LWEIGHT\_THICK\_MIN.

If any of the above parameters are set to “-1” then line weight display processing is not set.