



# AFCTN Test Report 94-055

AFCTB-ID  
93-107



## Technical Illustration Transfer

Using:



## Auto-trol Technology's Data

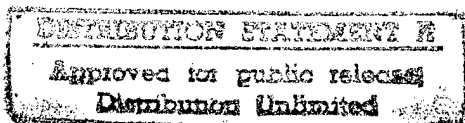


## MIL-D-28000A (IGES)



## Quick Short Test Report

03 December 1993



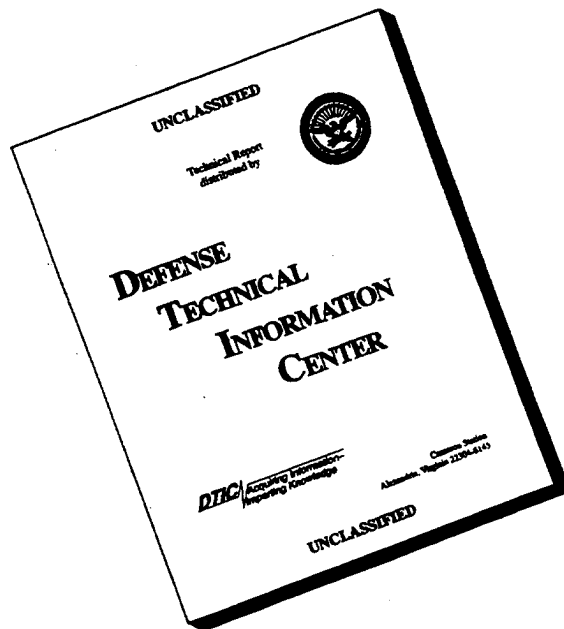
DTIC QUALITY INSPECTED 3



Prepared for  
Electronic Systems Center  
Det 2 HQ ESC/AV-2  
4027 Colonel Glenn Hwy, Suite 300  
Dayton, Ohio 45431-1672

19960822 170

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**Using:**

**Auto-trol Technology's Data**

**MIL-D-28000A (IGES)**

**Quick Short Test Report**

**03 December 1993**

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**Prepared By**

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**DTIC QUALITY INSPECTED 3**

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## 1. Introduction

### 1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALs) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALs standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALs initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

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## 1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Auto-trol Technology's interpretation and use of the CALS standards in transferring technical illustration data. Auto-trol used its CALS Technical Data Interchange System, which consists of Sun Sparcstation/SunOS hardware and Auto-trol Series 5000 v9.1 software, to produce data in accordance with the standards, and delivered it to the AFCTN technical staff using an internet electronic transfer. The stated goal was to evaluate the data and not the MIL-STD-1840A format. No Document Declaration file was delivered with this first test.

## 2. Test Parameters

**Test Plan:** AFCTB 93-107

**Date of Evaluation:** 03 December 1993

**Evaluator:** George Elwood  
Air Force CALS Test Bed  
DET 2 HQ ESC/AV-2P  
4027 Colonel Glenn Hwy  
Suite 300  
Dayton OH 45431-1672

**Data Originator:** Rob Larsen  
Auto-trol Technology  
12500 North Washington Street  
Denver CO 80241  
(313) 252-2248

**Data Description:** Technical Illustration Test  
1 Initial Graphics Exchange Specification  
(IGES) file

**Data Source System:**

IGES

**HARDWARE**

SUN Sparstation/SunOS

**SOFTWARE**

Auto-trol S5000 v9.1

**Evaluation Tools Used:**

**MIL-D-28000 (IGES)**

Sun SparcStation 2

AUTODESK AutoCAD R12

Carberry CADLeaf Plus v3.1

IGES Data Analysis (IDA) Parser/Verifier v92

IDA IGESView v3.05

International TechneGroup Incorporated

(ITI) IGES/Works v1.3

SGI Indigo2

---

AUTODESK AutoCAD R12  
Cadkey Cadkey v6.0  
PC 486/50  
AUTODESK AutoCAD 386 R12  
AUTODESK AutoCAD 386 R11  
Cadkey Cadkey v6.0  
IDA IGESView Windows

**Standards  
Tested:**

MIL-D-28000A

### **3. 1840A Analysis**

#### **3.1 External Packaging**

The file was submitted to the Air Force CALS Test Bed (AFCTB) via an internet electronic transfer. Packaging was not evaluated.

#### **3.2 Transmission Envelope**

Per agreement between Auto-trol and the AFCTB, the file was submitted via an electronic transfer instead of a full CALS submission. Hence, the file was not named in accordance with the MIL-STD-1840A requirements.

##### **3.2.1 Tape Formats**

Not evaluated.

##### **3.2.2 Declaration and Header Fields**

Because the file was submitted via an electronic transfer, instead of as a full CALS submission, declaration and header fields were not addressed or evaluated as part of this test.

### **4. IGES Analysis**

The transfer contained one IGES file. This file was evaluated using IDA's *parser/verifier* set for CALS Class I. This utility reported that the file meets the specification defined in CALS MIL-D-28000A.

The file was inspected for the CALS conformance statement. The correct statement was found.

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many

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of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The file was converted using a utility available within the AFCTB, with no reported errors. The resulting file was read into Island Graphics' *IslandDraw*, displayed and printed without a reported error. The hard copy image was the same as the original provided by Auto-trol, with the exception of horizontal line in the fractions. All of these horizontal lines were shown as vertical lines located to the left of the correct location.

The file was read using AUTODESK's *AutoCAD R12* with translator version 5.1. Compared with the provided original, the hard copy output had no discrepancies.

The file was converted using another software available within the AFCTB, without a reported error. The resulting file read into yet another software without a reported error. When the hard copy was checked, discrepancies were noted in the "General Note" where the vertical letters touched and were not slanted. The word does have a slant value. In the imbedded font block change the "delta" was not displayed. The horizontal lines in the fraction block were not displayed.

The file was converted using Cadkey's *ig2c* utility. The resulting file was read into Cadkey's *Cadkey*, displayed and printed. Variations were noted in the imbedded font block which did not display any characters except the text.

The file was read into Carberry's *CADLeaf* software without a reported error. Variations were noted in the "General Note" where the vertical text was not slanted, and the word does have a slant value. In the imbedded font block, text was shown throughout, without the special characters.

The file was read using IDA's *IGESView* and *IGESView for Windows*. No discrepancies were noted.

The file was read using ITI's *IGESWorks* without a reported error. The file was displayed and printed. No discrepancies were noted.

---

The IGES file was converted using a utility available within the AFCTB, without a reported error. The resulting file was read into a software, displayed and printed. The only noted discrepancy was in the "General Note" block where the letter "I" in the vertical text was slanted at a different angle. The word "SIMPLE" is one word and has a slant value.

The IGES file submitted by Auto-trol meets the specification defined in CALS MIL-D-28000A.

## **5. SGML Analysis**

No Standard Generalized Markup Language (SGML) files were included in this test.

## **6. Raster Analysis**

No Raster files were included in this test.

## **7. CGM Analysis**

No Computer Graphics Metafile (CGM) files were included in this test.

## **8. Conclusions and Recommendations**

The stated goal of this evaluation was the IGES file. The submitted file did not have a Document Declaration file nor CALS header on the data file. The file set was not a complete CALS submission.

The IGES file meets the CALS MIL-D-28000A specification.

## 9. Appendix A - Detailed IGES Analysis

### 9.1 File IENTITY2

#### 9.1.1 IDA Parser/Verifier Log

```
*****  
***** IGES PARSER/VERIFIER *****  
***** MARCH 1993 *****  
***** IGES Data Analysis *****  
***** (708) 344-1815 *****  
*****
```

Input file is identity3.igs

Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

Today is December 3, 1993 12:31 AM

```
*****  
***** CHECK FILE SYNTAX *****  
*****
```

Section	Records
Start	7
Global	3
Directory	500 ( 250 Entities)
Parameter	487
Terminate	1

No syntax errors detected.

```
*****  
***** SUMMARY AND STATISTICS ****  
*****
```

\*\*\* File and Product Name Information \*\*\*

```
File name from sender = 'identity'  
File creation Date.Time = '931203.090822'  
Model change Date.Time = ''  
Author = ''  
Department = 'AUTO-TROL TECHNOLOGY'  
Product name from sender = 'S5000'
```

Destination product name = ''

\*\*\* Parameter Delimiters \*\*\*

Delimiter = ','  
Terminator = ';'

\*\*\* Originating System Data \*\*\*

System ID = 'AUTO-TROL S5000 V 9.1'  
Preprocessor version = 'VERSION 8.0'  
Specification version = 6 (IGES 4.0)

\*\*\* Precision levels \*\*\*

Integer bits = 32  
Floating point - Exponent = 23 Mantissa = 8  
Double precision - Exponent = 52 Mantissa = 11

\*\*\* Global Model Data \*\*\*

Model scale = 1.0000E+00  
Unit flag = 1  
Units = 'INCH'  
Line weights = 27  
Maximum line thickness = 1.000000E+00  
Minimum line thickness = 3.703704E-02  
Granularity = 1.000000E-06  
Maximum coordinate = 1.650000E+01

Drafting standard applicable to original data is not specified.

\*\*\* Status Flag Summary \*\*\*

Blank status:	Visible	250
	Blanked	0
Independence:	Independent	248
	Physically Subordinate	1
	Logically Subordinate	1
	Totally Subordinate	0
Entity use:	Geometry	152
	Annotation	97
	Definition	1
	Other	0
	Logical/Positional	0
	2D parametric	0
	Construction geometry	0

```

                Not Specified                0
Hierarchy:      Structure DE applies          0
                Subordinate DE applies       250
                Hierarchy property applies    0
                Not Specified                0
    
```

\*\*\* Entity Occurrence Counts \*\*\*

Entity	Form	Level	Count	Type
-----	----	-----	-----	-----
106	11	0	67	Copious data - Piecewise planar, linear string(2D linear path)
110	0	0	85	Line
212	0	0	83	General note
212	2	0	1	General note - imbedded font change dimension
212	3	0	1	General note - superscripted dimension
212	4	0	1	General note - subscripted dimension
212	5	0	1	General note - super-/sub-scripted dimension
212	7	0	1	General note - multiple stack/center justified
212	100	0	6	General note - simple fractional dimension
212	102	0	1	General note - imbedded font change/double fractional dimension
404	0	0	1	Drawing
406	16	0	1	Property - Drawing size
410	0	0	1	View - Orthographic parallel

\*\*\* Entity Count by Level \*\*\*

```

Level  Count
  0     250
    
```

\*\*\* Labeling Information \*\*\*

100% of the entities are labeled.

```

Unlabeled      0
    
```

Label	Count	Label	Count	Label	Count
VIEW	1	PROPERTY	1	DRAWING	1
LINE	85	LNR PATH	67	NOTE	95

\*\*\* Line Fonts Used in Data \*\*\*

---

100	102	104	106	108	110	112	114	
-	-	-	-	-	-	-	-	Undefined
-	-	-	67	-	85	-	-	Solid
-	-	-	-	-	-	-	-	Dashed

<<<< PART OF LOG FILE REMOVED HERE >>>>

\*\*\* Line Widths Used in Data \*\*\*

Weight	Count	Width
Defaulted	250	(0.0370)

\*\*\* Colors Used in Data \*\*\*

Defaulted 250

\*\*\*\*\*  
\*\*\*\*\* ENTITY ANALYSIS \*\*\*\*\*  
\*\*\*\*\*

\*\*\* Entity type: 106

\*\*\* Entity type: 110

-- 85 lines averaging 2.424544E+00 units --

\*\*\* Entity type: 212

132 text strings in data file.  
Average text aspect ratio in file is 7.3620707.  
Minimum text aspect ratio in file is 0.9373333.  
Maximum text aspect ratio in file is 160.0000000.

FONTS USED IN FILE

FONT	COUNT	NAME
1	130	Default ASCII Style
1002	2	Symbol Font 2

\*\*\* Entity type: 404

Drawing at D 5 contains 1 views.  
Drawing at D 5 contains 0 annotation entities.

\*\*\* Entity type: 406

\*\*\* Entity type: 410

Scale of view at D 1 is 1.000000E+00.

Orthographic View entity at D 1 has 0 clipping planes specified.

XMIN = Not Set XMAX = Not Set

YMIN = Not Set YMAX = Not Set

ZMIN = Not Set ZMAX = Not Set

\*\*\* Message Summary \*\*\*

\*\*\* Error Summary \*\*\*

0 fatal errors 0 severe errors 0 errors 0 warnings 0 cautions 0 nitpicks  
0 notes

\*\*\* End of Analysis of ientity3.igs \*\*\*

---

## 9.1.2 AutoCAD R12 Parser Log

Title: IGESIN Journal (v5.1 Nov 05 1992)

=====  
File: C:/TMP/IENTITY3.xli  
Date: Thu, Dec 02, 1993  
Time: 17:31:04  
=====

EVALUATION VERSION -- NOT FOR RESALE

Translator S/N: 117-10075750  
Translating from IGES file: C:/TMP/IENTITY3.IGS  
to AutoCAD Drawing: C:\TMP\IENTITY3.dwg

=====  
Options obtained from: C:\ACAD\SUPPORT\CALS1.OPT

Options Description: Configuration file for CALS Class I

Curves Approximated to Tolerance of 0.01

Surfaces Approximated to Tolerance of 0.01

Text Font/Style mapping:

IGES Text font	Style Name	ACAD Font
0	SYMBOL0	iges0
1	STANDARD	txt
2	LEROY	txt
3	FUTURA	txt
6	COMP80	txt
12	GOTHICE	gothice
13	GOTHICI	gothici
14	ROMANS	romans
17	ROMANT	romant
18	ROMAND	romand
19	OCR	txt
1001	SYMBOL1	iges1001
1002	SYMBOL2	iges1002
1003	SYMBOL3	iges1003
2001	KANJI	bigfont

IGES Linefont/AutoCAD Linetype mapping

IGES Line Font	AutoCAD linetype	Shape file
0	BYLAYER	

---

1	CONTINUOUS	
2	DASHED	acad.lin
3	PHANTOM	acad.lin
4	CENTER	acad.lin
5	DOT	acad.lin

---

Parse phase

\*\*\* Warning (IAFP\_LARGER\_SGL\_SIG) \*\*\*

TMP/IENTITY3.IGS, line 11: IGES file has greater number of significant digits in single precision numbers than this system.

---

Start Section:

CONFORMANCE: This IGES file conforms to the MIL-D-28000A, 10 Feb 1992  
Class I subset (Technical Illustrations).

ILLUSTRATION IDENTIFIER:

A

Global Section:

Parameter Delimiter: ,  
Record Delimiter: ;  
Sending Product ID: S5000  
File Name: ientity  
System ID: AUTO-TROL S5000 V 9.1  
Preprocessor Version: VERSION 8.0  
Size of Integer: 32  
Sgl. Precision Mag: 23  
Sgl. Precision Sig: 8  
Dbl. Precision Mag: 52  
Dbl. Precision Sig: 11  
Receiving Product ID:  
Model Space Scale: 1.000000  
Unit Flag: 1  
Unit String: INCH  
# of Line Weights: 27  
Maximum Line Width: 1.000000  
Creation Date: 12/02/93 08:19:56  
Minimum Resolution: 0.000001  
Maximum Coordinate: 16.500000  
Author:  
Organization: AUTO-TROL TECHNOLOGY  
IGES Version Number: 6  
Drafting Standard: 0

Entity Summary:

Type Count	Form	Description
106 67	11	Planar Piecewise Linear Curve
110 85	0	Line
212 83	0	General Note (Simple)
212 1	2	General Note (Font change)
212 1	3	General Note (Superscript)
212 1	4	General Note (Subscript)
212 1	5	General Note (Super/subscript)
212 1	7	General Note (Center justified)
212 6	100	General Note (Simple fraction)
212 1	102	General Note (Fnt chg/dbl fract.)
404 1	0	Drawing (form 0)
406 1	16	Property (Drawing Size)
410 1	0	View
-----		
Total	250	
=====		

Translation phase

Drawing Entity (404 Form 0) at DE 5, with  
 name = ,  
 size = 16.500000, 10.500000,  
 units = IN,  
 was processed in the AutoCAD drawing file: C:\TMP\IENTITY3.dwg

\*\*\* Warning (ACAD\_NEW\_VIEW\_VOLUME\_GENERATED) \*\*\*  
 ( DE: 1 TF: 410:0 )  
 A new view volume has been generated for the view with:  
 XMIN (-1.386796), XMAX (18.386796),

YMIN (-1.386796), YMAX (12.386796),  
ZMIN (-1.886796), ZMAX (1.886796).

IGES Entity Summary

Type	Form	Description	Count	Processed	Errors
106	11	Planar Piecewise Linear Curve	67	67	0
110	0	Line	85	85	0
212	0	General Note (Simple)	83	83	0
212	2	General Note (Font change)	1	1	0
212	3	General Note (Superscript)	1	1	0
212	4	General Note (Subscript)	1	1	0
212	5	General Note (Super/subscript)	1	1	0
212	7	General Note (Center justified)	1	1	0
212	100	General Note (Simple fraction)	6	6	0
212	102	General Note (Fmt chg/dbl fract.)	1	1	0
404	0	Drawing (form 0)	1	1	0
406	16	Property (Drawing Size)	1	1	0
410	0	View	1	1	0
Totals			250	250	0

AutoCAD Entity Summary

Entity	Created	Errors
LINE	85	0
TEXT	132	0
INSERT	12	0
POLYLINE	67	0
BLOCK	12	0
Totals	308	0

Error Summary:

The following message was issued 1 time(s)  
IGES file has greater number of significant digits in single precision numbers than this system.

The following message was issued 1 time(s)  
A new view volume has been generated for the view with:  
XMIN (%lf), XMAX (%lf),  
YMIN (%lf), YMAX (%lf),  
ZMIN (%lf), ZMAX (%lf).

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Status: 0  
Warning: 2  
Error: 0  
Fatal: 0

Elapsed Time:

Processor: 00:00:17  
Clock: 00:00:17

### 9.1.3 IGES/Works Parser Log

IGES/Works v1.4.1  
International TechneGroup Incorporated  
Validation Logfile

Date: December 03, 1993  
Model: ientity3\_mvd

\*\*\*\*\* Validation Parameters \*\*\*\*\*

#### TOLERANCE CONFIGURATION VALUES

-----  
ZERO\_TOL = 1.000000e-13  
MODEL\_SPACE\_PNT\_COIN\_TOL = 1.000000e-03  
PARM\_SPACE\_PNT\_COIN\_TOL = 1.000000e-08  
ISO\_PARM\_CURVE\_TOL = 1.000000e-08  
NON\_CONV\_TOL = 1.000000e-12  
KNOT\_COIN\_TOL = 1.000000e-10  
SAME\_INTER\_TOL = 1.000000e-12  
PARALLEL\_LINES\_TOL = 1.000000e-07  
ANGLE\_COIN\_TOL = 1.000000e-05  
PNT\_PROJ\_TOL = 1.000000e-07  
COLIN\_TOL = 1.000000e-07  
COPLANAR\_TOL = 1.000000e-08  
ZERO\_NORMAL\_TOL = 1.000000e-06  
SAME\_TANGENT\_TOL = 1.000000e-04  
SAME\_CURVATURE\_TOL = 1.000000e-04  
SAME\_DERIVATIVE\_TOL = 1.000000e-03  
MODEL\_LINEAR\_APPROX\_TOL = 2.220446e-16

\*\*\*\*\* Entity Listing Before Validation \*\*\*\*\*

Count	Type	Form	Description
-----	-----	-----	-----
67	106	11	Planar Piecewise Linear Curve
85	110	0	Line
95	212	0	General Note (Simple)

247 - Number of entities in selection list

\*\*\*\*\* Entity Validation \*\*\*\*\*

Entity Validation Summary:

Number of                      Number of

---

Type	Form	Entity Count	Number Valid	Corrected		Uncorrected	
				Warnings	Errors	Warnings	Errors
Global	Section	1	1	0	0	0	0
106	11	67	67	0	0	0	0
110	0	85	85	0	0	0	0
212	0	95	95	0	0	0	0
Totals:		248	248	0	0	0	0

\*\*\*\*\*


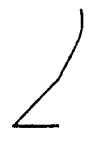

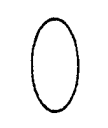


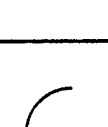



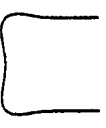

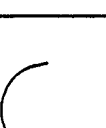
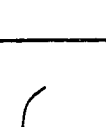

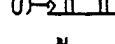
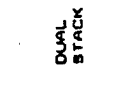

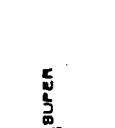

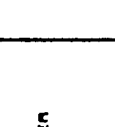

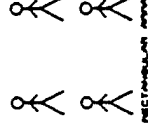
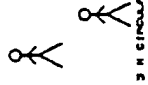
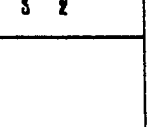




9.1.6 Output Cadkey v6.0 - Detail

NOTE >	IMBEDDED FONT -NOTE CHANGE (212 F2)	SUPERSCRIPT-NOTE (212 F3)	SUBSCRIPT-NOTE (212 F4)	SUPER (
IM DED	DUAL $\frac{TO}{P}$ STACK $\frac{BOT}{TOM}$	IM $\frac{BED}{DED}$	FR $\frac{SUP}{SUB}$ BO $\frac{TT}{OM}$	SECTI (
100 >	NOTE- DUAL STACK FRACTION (212 F101)	NOTE - FONT/DOUBLE FRACTION (212 F102)	NOTE - SUPER/SUB FRACTION (212 F105)	








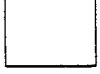









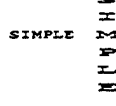





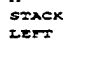





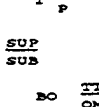



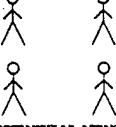
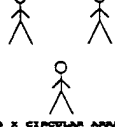
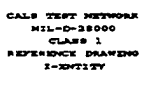
9.1.7 Output Generic

						
CIRCULAR ARC (1188)	COMPOSITE CURVE (1188)	CONIC ARC (ELLIPTICAL) (1184 P1)	CONIC ARC (HYPERBOLA) (1184 P2)	CONIC ARC (PARABOLA) (1184 P3)	LINEAR PLANE CURVE (1188 P11)	SIMPLE CLOSED AREA (1188 P21)
						
LINE (1189)	PARABOLIC ARC (LINE CURVE) (1189)	TRANSFORMATION MATRIX (1184 P4)	IMAGINED POINT (NOTE CHANGES 1818 P1)	SUPER (1818 P3)	SUPER SUB (1818 P4)	MULTI-STACK LEFT (NOTE: MULTI-STACK LEFT MUST 1818 P1)
						
MULTI-STACK CENTER (NOTE: MULTI-STACK CENTER MUST 1818 P1)	SIMPLE (SEMI-CIRCLE NOTE 1818 P1)	DUAL STACK (DUAL STACK - NOTE 1818 P1)	DUAL TO STACK TOP (DUAL TO STACK TOP BOT TON)	IM BED FOR ION (IM BED FOR ACTION)	SECTIONED AREA (NOTE: SECTIONED AREA MUST 1818 P1)	SPACING (CHARACTER SPACING 1458 P1)
						
MULTI-STACK RECTANGULAR ARRAY (NOTE: MULTI-STACK RECTANGULAR ARRAY MUST 1818 P1)	RECTANGULAR ARRAY (RECTANGULAR ARRAY)	3 X 3 CIRCULAR ARRAY (3 X 3 CIRCULAR ARRAY)				CALL TEST METHOD (MIL-D-38510 CLASS 1) REFERENCE DRAWING IDENTIFY

9.1.8 Output Generic - Detail

	<p>IM+ &gt;DED</p>	<p>S SUPER</p>	<p>S SUB</p>
	<p>IMBEDDED FONT -NOTE CHANGE (212 F2)</p>	<p>SUPERSCRIPT-NOTE (212 F3)</p>	<p>SUBSCRIPT-NOTE (212 F4)</p>
	<p>DUAL TO P</p> <p>STACK BOT TOM</p>	<p>IM BED FR ACT DED DED ION</p>	<p>TOP</p> <p>SUP FR SUP SUB BO TT OM</p>
	<p>NOTE- DUAL STACK FRACTION (212 F101)</p>	<p>NOTE - FONT/DOUBLE FRACTION (212 F102)</p>	<p>NOTE - SUPER/SUB FRACTION (212 F105)</p>
<p>4*</p>			










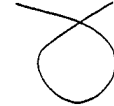


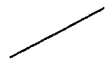





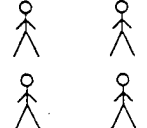
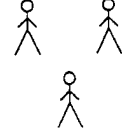
### 9.1.9 Output Cadleaf

 CIRCULAR ARC (100)	 COMPOSITE CURVE (102)	 CONIC ARC (GENERAL) (104 P0)	 CONIC ARC ELLIPSE (104 P1)	 CONIC ARC HYPERBOLA (104 P2)	 CONIC ARC PARABOLA (104 P3)	 LINEAR PLANAR CURVE (100 P11)	 SIMPLE CLOSED AREA (100 P02)
 LINE (110)	 PARAMETRIC SPLINE CURVE (112)	 TRANSFORMATION MATRIX (114 P1)	 RATIONAL B-SPLINE CURVE (116 P0)	 RATIONAL B-SPLINE CURVE (116 P1)	 RATIONAL B-SPLINE CURVE CIRCULAR ARC (116 P2)	 RATIONAL B-SPLINE CURVE ELLIPTICAL ARC (116 P3)	 PARABOLIC ARC (116 P4)
 RATIONAL B-SPLINE CURVE HYPERBOLIC ARC (116 P5)	 SIMPLE NOTE (118 P0)	 DUAL STACK NOTE (118 P1)	 IMBEDDED NOTE (118 P2)	 SUPER SCRIPT-NOTE (118 P3)	 SUB SCRIPT-NOTE (118 P4)	 SUPER SUB SCRIPT-NOTE (118 P5)	 NOTE-MULTI STACK LEFT JUST (118 P6)
 NOTE-MULTI STACK CENTER JUST (118 P7)	 NOTE-MULTI STACK RIGHT JUST (118 P8)	 NOTE -SIMPLE FRACTION (118 P100)	 NOTE - DUAL STACK FRACTION (118 P101)	 NOTE - FONT/DOUBLE FRACTION (118 P102)	 NOTE - SUPER/SUB FRACTION (118 P103)	 SECTIONED AREA ENTITY (120)	 CHARACTER SPACING (120 P1)
 SCRIBBLE - "PERSON"	 RECTANGULAR ARRAY	 2 X CIRCULAR ARRAY					 CALC TEST NETWORK MIL-D-28000 CLASS 1 REFERENCE DRAWING 2-DWT12V




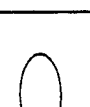
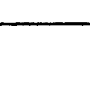
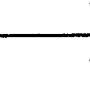
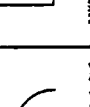
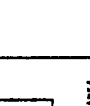









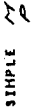





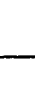
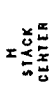
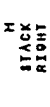
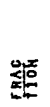
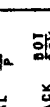
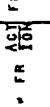
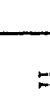
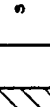
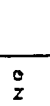
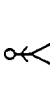

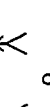



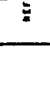

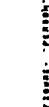

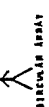
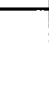
### 9.1.10 Output Cadleaf - Detail

<p>IMbedDED</p> <p>IMBEDDED FONT -NOTE CHANGE (212 F2)</p>	<p>S<sup>SUPER</sup></p> <p>SUPERSCRIPT-NOTE (212 F3)</p>	<p>S<sub>SUB</sub></p> <p>SUBSCRIPT-NOTE (212 F4)</p>	<p>S</p>
<p>DUAL <math>\frac{TO}{P}</math></p> <p>STACK <math>\frac{BOT}{TOM}</math></p> <p>NOTE- DUAL STACK FRACTION (212 F101)</p>	<p>IM <math>\frac{BED}{DED}</math> i FR <math>\frac{ACT}{ION}</math></p> <p>NOTE - FONT/DOUBLE FRACTION (212 F102)</p>	<p>T <math>\frac{O}{P}</math></p> <p>FR <math>\frac{SUP}{SUB}</math></p> <p>BO <math>\frac{TT}{OM}</math></p> <p>NOTE - SUPER/SUB FRACTION (212 F105)</p>	<p>SI</p>



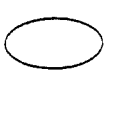
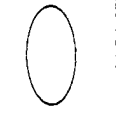






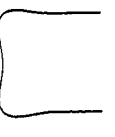





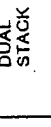



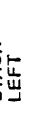



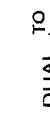

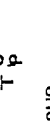



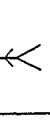



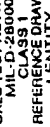
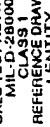



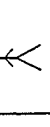


### 9.1.11 Output IGESView

 CIRCULAR ARC (100)	 COMPOSITE CURVE (102)	 CONIC ARC (GENERAL) (104 F0)	 CONIC ARC ELLIPSE (104 F1)	 CONIC ARC HYPERBOLA (104 F2)	 CONIC ARC PARABOLA (104 F3)	 LINEAR PLANAR CURVE (106 FT1)	 SIMPLE CLOSED AREA (106 F63)
 LINE (110)	 PARAMETRIC SPLINE CURVE (112)	 TRANSFORMATION MATRIX (124 F0)	 RATIONAL B-SPLINE CURVE (126 F0)	 RATIONAL B-SPLINE CURVE (126 F1)	 RATIONAL B-SPLINE CURVE CIRCULAR ARC (126 F2)	 RATIONAL B-SPLINE CURVE ELLIPTICAL ARC (126 F3)	 RATIONAL B-SPLINE CURVE PARABOLIC ARC (126 F4)
 RATIONAL B-SPLINE CURVE HYPERBOLIC ARC (126 F5)	SIMPLE GENERAL NOTE (212 F0)	DUAL STACK DUAL STACK - NOTE (212 F1)	IMBEDDED IMBEDDED FONT -NOTE CHANGE (212 F2)	SUPER SUPERSCRIPT-NOTE (212 F3)	SUB SUBSCRIPT-NOTE (212 F4)	SUPER SUB SUPER/SUB SCRIPT-NOTE (212 F5)	M STACK LEFT NOTE-MULTI STACK LEFT JUST (212 F6)
M STACK CENTER NOTE-MULTI STACK CENT JUST (212 F7)	M STACK RIGHT NOTE-MULTI STACK RIGHT JUST (212 F8)	S FRAC TION NOTE -SIMPLE FRACTION (212 F100)	DUAL TO P STACK BOT TOM NOTE-DUAL STACK FRACTION (212 F101)	IMBEDDED = FR ACTION NOTE - FONT/DOUBLE FRACTION (212 F102)	FR SUP SUB BOTTOM NOTE - SUPER/SUB FRACTION (212 F105)	SECTIONED AREA ENTITY (230)	SPACING CHARACTER SPACING (406 F8)
SUBFIGURE - "PERSON" 	RECTANGULAR ARRAY 	3 X CIRCULAR ARRAY 					CALS TEST NETWORK ML-D-28000 CLASS 1 REFERENCE DRAWING I-ENTITY

9.1.12 Output IGFSWorks

	CIRCULAR ARC (110)		OPPOSITE CURVE (109)		CORRE ARC COUNTERAL (108)		CORRE ARC HETERODIA (107)		CORRE ARC PARABOLA (106)				SIMPLE BLUNDED AREA (105)
	LINE (115)		PARABOLIC SPLINE CURVE (114)		TRANSFORMATION MATRIX (113)		NATIONAL B-SPLINE CURVE (112)		NATIONAL B-SPLINE CURVE CENTERED AND TILT (111)				NATIONAL B-SPLINE CURVE PARABOLIC AND TILT (110)
	SIMPLE (116)		SIMPLE NOTE (117)		DUAL STACK (118)		THIRDED (119)		SUPER (120)				H STACK LEFT (121)
	H STACK CENTER (122)		H STACK RIGHT (123)		S FRAC TION (124)		DUAL TO P STACK FOR (125)		IM BED + FR ACT ION (126)				SPACING (127)
	NOTE: MUST STACK AND JUMP (128)		NOTE: MUST STACK AND JUMP (129)		NOTE: - JUMP FRACTION (130)		NOTE: DUAL STACK FRACTION (131)		NOTE: - JUMP FRACTION (132)				NOTE: MUST STACK AND JUMP (133)
	NONUNIFORM ARRAY (134)		NONUNIFORM ARRAY (135)		3 X CIRCULAR ARRAY (136)								ONLY TEST NETWORK MIL-9-7000 CLEAR MARKING BEFORE USING IN SIMULITY (137)

9.1.13 Output IslandDraw

						
CIRCULAR ARC (100)	COMPOSITE CURVE (102)	CONIC ARC (GENERAL) (104 F0)	CONIC ARC HYPERBOLA (104 F2)	CONIC ARC PARABOLA (104 F3)	LINEAR PLANAR CURVE (108 F1)	SIMPLE CLOSED AREA (108 F5)
						
LINE (110)	PARAMETRIC SPLINE CURVE (112)	TRANSFORMATION MATRIX (124 F0)	RATIONAL B-SPLINE CURVE (126 F0)	RATIONAL B-SPLINE CURVE (126 F1)	RATIONAL B-SPLINE CURVE (126 F2)	RATIONAL B-SPLINE CURVE PARABOLIC ARC (128 F1)
						
RATIONAL B-SPLINE CURVE HYPERBOLIC ARC (126 F5)	GENERAL NOTE (212 F0)	DUAL STACK (212 F1)	IMPLIED FONT-NOTE CHANGE (212 F2)	SUPER (212 F3)	SUPER (212 F4)	M STACK LEFT
						
M STACK CENTER (212 F7)	M STACK RIGHT (212 F8)	FRAC S TION (212 F100)	DUAL TOP BOT STACK (212 F101)	IM BED FRACTION (212 F102)	SUPER SUB (212 F5)	SPACING
						
SUBFIGURE "PERSON" (212 F7)	RECTANGULAR ARRAY (212 F8)	NOTE - SIMPLE FRACTION (212 F100)	NOTE - DUAL STACK FRACTION (212 F101)	NOTE - FRACTION (212 F102)	SECTIONED AREA ENTITY (230)	CHARACTER SPACING (408 F16)
						
CALS TEST NETWORK MIL-D-28000 CLASS 1 REFERENCE DRAWING ENTITY						

9.1.14 Output Generic

	CIRCULAR ARC (100)		CONIC ARC (GENERAL) (104 F0)		CONIC ARC ELLIPSE (104 F1)		CONIC ARC HYPERBOLA (104 F2)		CONIC ARC PARABOLA (104 F3)		LINEAR PLANAR CURVE (106 F1)		SIMPLE CLOSED AREA (106 F6)
	LINE (110)		TRANSFORMATION MATRIX (124 F0)		RATIONAL B-SPLINE CURVE (126 F0)		RATIONAL B-SPLINE CURVE (126 F1)		RATIONAL B-SPLINE CURVE (126 F2)		RATIONAL B-SPLINE CURVE (126 F3)		RATIONAL B-SPLINE CURVE (126 F4)
	RATIONAL B-SPLINE CURVE (126 F5)		PARAMETRIC SPLINE CURVE (112)		IMAGINED FORM - NOTE CHANGE (212 F2)		SUPER (212 F3)		SUPER (212 F4)		SUPER/SUB SCRIPT-NOTE (212 F5)		MULTI-STACK LEFT (212 F6)
	MULTI-STACK CENTER (212 F7)		FRACTION (212 F10)		DUAL TO POINT STACK JOIN (212 F10.1)		IMAGINED FORM - NOTE CHANGE (212 F10.2)		IMAGINED FORM - NOTE CHANGE (212 F10.3)		SECTIONED AREA ENTITY (230)		CHARACTER SPACING (406 F18)
	SUBFIGURE - "PERSON"		RECTANGULAR ARRAY		DUAL STACK FRACTION (212 F10.1)		IMAGINED FORM - NOTE CHANGE (212 F10.2)		IMAGINED FORM - NOTE CHANGE (212 F10.3)		CALL TEST NETWORK (4100-2100)		REFERENCE DRAWING 1-ENTITY

9.1.15 Output Generic - Detail

<p>PARAMETRIC SPLINE CURVE (112)</p>	<p>TRANSFORMATION MATRIX (124 F0)</p>	
<p>SIMPLE</p>	<p>DUAL STACK</p>	<p>DUAL STACK - NOTE (212 F1)</p>
<p>VE CURVE (126 F5)</p>	<p>GENERAL NOTE (212 F0)</p>	

S / M P V E