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AMENDMENT 1
1992-09-01

Information processing systems — Computer graphics — Programmer's Hierarchical Interactive Graphics System (PHIGS) —

Part 3 : Clear-text encoding of archive file

AMENDMENT 1

*Systèmes de traitement de l'information — Infographie — Interface de
programmation du système graphique hiérarchisé (PHIGS) —*

Partie 3 : Codage mode texte en clair du fichier d'archive

AMENDEMENT 1



Reference number
ISO/IEC 9592-3 : 1989/Amd.1 : 1992 (E)

Foreword

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Amendment 1 to International Standard ISO/IEC 9592-3 : 1989 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

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Introduction

This amendment specifies the additions and changes to ISO/IEC 9592-3 to support the structure elements specified in ISO/IEC 9592-4. A clear text encoding is specified for each of the structure element types specified in ISO/IEC 9592-4.

Unless otherwise specified, all references in this amendment refer to ISO/IEC 9592-3.

STANDARDSISO.COM: Click to view the full PDF of ISO/IEC 9592-3:1989/Amd1:1992

Withdrawing

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Withdrawn

**Information processing systems—Computer graphics—
Programmer's Hierarchical Interactive Graphics System (PHIGS)—
Part 3: Clear-text encoding of archive file
Amendment 1**

Page 12

4.2.4.5 Derived types

Add the following:

COLRCURVE ::= <LEFT PAREN><OPTSEP>
<I:ORDER> <SEP>
<RLIST:KNOTS> <SEP>
<RATIONAL | NONRATIONAL> <SEP>
<I:COLOUR TYPE> <SEP>
<COLRVLIST:CONTROL_POINTS>
<OPTSEP> <RIGHT PAREN>

COLRSURF ::= <LEFT PAREN><OPTSEP>
<I:U_ORDER> <SEP>
<I:V_ORDER> <SEP>
<RLIST:U_KNOTS> <SEP>
<RLIST:V_KNOTS> <SEP>
<RATIONAL | NONRATIONAL> <SEP>
<I:COLOUR_TYPE> <SEP>
<COLRVLISTS:CONTROL_POINTS>
<OPTSEP> <RIGHT PAREN>

NOTE: Each COLRVLIST contains control points along the u dimension.

COLRV ::= <I:COLOUR_INDEX>
| <COORDLIST:COLOUR_COORDINATES>
>

COLRVLIST ::= <LEFT PAREN> <OPTSEP>
< <COLRV> <<SEP> <COLRV>>* >0
<OPTSEP> <RIGHT PAREN>

COLRVLISTS ::= <LEFT PAREN> <OPTSEP>
< <COLRVLIST> <<SEP> <COLRVLIST>>* >0
<OPTSEP> <RIGHT PAREN>

COLRVROWS ::= COLRVLISTS

COORDLIST ::= <LEFT PAREN> <OPTSEP>
<COORD> << SEP> <COORD>>*<OPTSEP> <RIGHT PAREN>

CURVEAPPROXDAREC ::= <LEFT PAREN> <OPTSEP>
<<I:COUNT>
| <R:APPROXIMATION_VALUE>
| <S:TYPE_DEPENDENT_DATA>>0
<OPTSEP> <RIGHT PAREN>>

DATAMAPPINGDAREC ::= <LEFT PAREN> <OPTSEP>
<
<DATAMAPPINGDAREC1>
| <DATAMAPPINGDAREC2>
| <DATAMAPPINGDAREC3>
| <DATAMAPPINGDAREC4>
| <DATAMAPPINGDAREC5>
| <S:METHOD_DEPENDENT_DATA>
>0
<OPTSEP> <RIGHT PAREN>

DATAMAPPINGDAREC1 ::= <SOURCESELECTORLIST:SELECTOR>

DATAMAPPINGDAREC2 ::= <SOURCESELECTORLIST:SELECTOR> <SEP>
<I:INDEX> <SEP>
<R:LOWER_LIMIT> <SEP>
<R:UPPER_LIMIT> <SEP>
<I:COLOUR_TYPE> <SEP>
<CORLVLIST:COLOUR_LIST>

DATAMAPPINGDAREC3 ::= <SOURCESELECTORLIST:SELECTOR> <SEP>
<I:INDEX> <SEP>
<RLIST:RANGE_BOUNDARIES> <SEP>
<I:COLOUR_TYPE> <SEP>
<CORLVLIST:COLOUR_LIST>

DATAMAPPINGDAREC4 ::= <SOURCESELECTORLIST:SELECTOR> <SEP>
<I:INDEX_1> <SEP>
<I:INDEX_2> <SEP>
<R:Ra_LOWER_LIMIT> <SEP>
<R:Ra_UPPER_LIMIT> <SEP>
<R:Rb_LOWER_LIMIT> <SEP>
<R:Rb_UPPER_LIMIT> <SEP>
<I:COLOUR_TYPE> <SEP>
<CORLVLISTS:COLOUR_LISTS>

DATAMAPPINGDATAEC5 ::= <SOURCESELECTORLIST:SELECTOR> <SEP>
 <I:INDEX_1> <SEP> <I:INDEX_2> <SEP>
 <RLISTS:Ra_RANGE_BOUNDARIES> <SEP>
 <RLISTS:Rb_RANGE_BOUNDARIES> <SEP>
 <I:COLOUR_TYPE> <SEP>
 <CORLVLISTS:COLOUR_LISTS>

DATASURF ::= <LEFT PAREN> <OPTSEP>
 <I:U_ORDER> <SEP>
 <I:V_ORDER> <SEP>
 <RLIST:U_KNOTS> <SEP>
 <RLIST:V_KNOTS> <SEP>
 <RATIONAL | NONRATIONAL> <SEP>
 <RLISTS:CONTROL_POINTS>
 <OPTSEP> <RIGHT PAREN>

NOTE: Each RLIST is a single control point. Each RLISTS contains control points along the *u* dimension.

DATASURFLIST ::= <LEFT PAREN> <OPTSEP>
 <DATASURF> <<SEP> <DATASURF>>*
 <OPTSEP> <RIGHT PAREN>

EDGEDATAFLAG ::= <
 NONE
 | EDGE_VISIBILITY_FLAGS
 >

EDGEFLAG ::= <OFF | ON>

EDGEFLAG2 ::= <LEFT PAREN> <OPTSEP>
 <EDGEFLAG> <SEP> <EDGEFLAG>
 <OPTSEP> <RIGHT PAREN>

EDGEFLAG2ROW ::= <LEFT PAREN> <OPTSEP>
 <<EDGEFLAG2> <<SEP> <EDGEFLAG2>>* >0
 <OPTSEP> <RIGHT PAREN>

EDGEFLAG3 ::= <LEFT PAREN> <OPTSEP>
 <EDGEFLAG> <SEP> <EDGEFLAG> <SEP> <EDGEFLAG>
 <OPTSEP> <RIGHT PAREN>

EDGEFLAG3LIST ::= <LEFT PAREN> <OPTSEP>
 <<EDGEFLAG3> <<SEP> <EDGEFLAG3>>* >0
 <OPTSEP> <RIGHT PAREN>

EDGEFLAGLIST ::= <LEFT PAREN> <OPTSEP>
 <<EDGEFLAG> <<SEP> <EDGEFLAG>>* >0
 <OPTSEP> <RIGHT PAREN>

EDGEFLAGLISTS ::= <LEFT PAREN> <OPTSEP>
 <<EDGEFLAGLIST> <<SEP> <EDGEFLAGLIST>>* >0
 <OPTSEP> <RIGHT PAREN>

EDGEFLAGLISTSLIST ::= <LEFT PAREN> <OPTSEP>
< <EDGEFLAGLISTS> <<SEP> <EDGEFLAGLISTS>>* >0
<OPTSEP> <RIGHT PAREN>

EDGEFLAGROW ::= <EDGEFLAGLIST>

FACETDATA ::= <LEFT PAREN> <OPTSEP>
<COLRV>0
<<SEP> <V3:UNIT_NORMAL>>0
<<SEP> <RLIST:DATA_MAPPING_DATA>>0
<OPTSEP> <RIGHT PAREN>

FACETDATAFLAG ::= <
NONE
| FACET_COLR
| FACET_NORMAL
| FACET_DATA
| FACET_COLR_NORMAL
| FACET_COLR_DATA
| FACET_NORMAL_DATA
| FACET_COLR_NORMAL_DATA
>

FACETDATALIST ::= <LEFT PAREN> <OPTSEP>
< <FACETDATA> <<SEP> <FACETDATA>>* >0
<OPTSEP> <RIGHT PAREN>

FACETDATALISTS ::= <LEFT PAREN> <OPTSEP>
< <FACETDATALIST> <<SEP> <FACETDATALIST>>* >0
<OPTSEP> <RIGHT PAREN>

FACETDAROW ::= <FACETDATALIST>

GCOLOR ::= <I:COLOUR_TYPE> <SEP> <COLRV>

INT3 ::= <LEFT PAREN> <OPTSEP>
<I> <SEP> <I> <SEP> <I>
<OPTSEP> <RIGHT PAREN>

INT3LIST ::= <LEFT PAREN> <OPTSEP>
< <INT3> <<SEP> <INT3>>* >0
<OPTSEP> <RIGHT PAREN>>

INT3LISTS ::= <LEFT PAREN> <OPTSEP>
< <INT3LIST> <<SEP> <INT3LIST>>* >0
<OPTSEP> <RIGHT PAREN>>

INTLIST ::= <LEFT PAREN> <OPTSEP>
< <I> <<SEP> <I>>* >0
<OPTSEP> <RIGHT PAREN>>

INTLISTS ::= <LEFT PAREN> <OPTSEP>
<<INTLIST> <<SEP> <INTLIST>>* >0
<OPTSEP> <RIGHT PAREN>>

INTLISTSLIST ::= <LEFT PAREN> <OPTSEP>
<<INTLISTS> <<SEP> <INTLISTS>>* >0
<OPTSEP> <RIGHT PAREN>>

P4 ::= <
<POINT4>
| <LEFT PAREN> <OPTSEP> <POINT4> <OPTSEP> <RIGHT PAREN>
>

POINT4 ::= <COORD:wX> <SEP>
<COORD:wY> <SEP>
<COORD:wZ> <SEP>
<COORD:w>

POINTLIST4 ::= <<P4:POINT> <<SEP> <P4:POINT>>* >0

PARAMSURFCHARACDATAREC ::= <LEFT PAREN> <OPTSEP>
<
<PARAMSURFCHARACDATAREC3>
| <PARAMSURFCHARACDATAREC4>
| <S:TYPE_DEPENDENT_DATA>
>0
<OPTSEP> <RIGHT PAREN>

PARAMSURFCHARACDATAREC3 ::= <UNIFORM | NONUNIFORM> <SEP>
<I:U_COUNT> <SEP> <I:V_COUNT>
<OPTSEP> <RIGHT PAREN>

PARAMSURFCHARACDATAREC4 ::= <P3:ORIGIN_POINT> <SEP>
<V3:DIRECTION_VECTOR> <SEP>
<RLIST:PARAMETERS>

REFLPROPSDATAREC ::= <LEFT PAREN> <OPTSEP>
<
<REFLDATAREC1>
| <S:METHOD_DEPENDENT_DATA>
>0
<OPTSEP> <RIGHT PAREN>

REFLPROPSDATAREC1 ::= <R:AMBIENT_REFLECTION_COEFFICIENT> <SEP>
<R:DIFFUSE_REFLECTION_COEFFICIENT> <SEP>
<R:SPECULAR_REFLECTION_COEFFICIENT> <SEP>
<GCOLR:SPECULAR_COLOUR> <SEP>
<R:SPECULAR_EXPONENT>

RLIST	::= <LEFT PAREN> <OPTSEP> <<R> <<SEP> <R>>*> <OPTSEP> <RIGHT PAREN>
RLISTS	::= <LEFT PAREN> <OPTSEP> <<RLIST> <<SEP> <RLIST>>*> <OPTSEP> <RIGHT PAREN>
RLISTSLIST	::= <LEFT PAREN> <OPTSEP> <<RLISTS> <<SEP> <RLISTS>>*> <OPTSEP> <RIGHT PAREN>
SOURCESELECTOR	::= < COLOUR_ASPECT VERTEX_COLOUR VERTEX_DATA FACET_COLOUR FACET_DATA >
SOURCESELECTORLIST	::= <LEFT PAREN> <OPTSEP> <<SOURCESELECTOR> <<SEP> <SOURCESELECTOR>>*> <OPTSEP> <RIGHT PAREN>
SURFAPPROXDATAREC	::= <LEFT PAREN> <OPTSEP> <<I:U_COUNT> <SEP> <I:V_COUNT> <R:APPROXIMATION_VALUE> <R:U_APPROXIMATION_VALUE> <SEP> <R:V_APPROXIMATION_VALUE> <S:TYPE_DEPENDENT_DATA>> <OPTSEP> <RIGHT PAREN>
TRIMCURVE	::= <LEFT PAREN> <OPTSEP> <I:APPROXIMATION_TYPE> <SEP> <CURVEAPPROXDATAREC:DATA_RECORD> <OFF ON:EDGE_FLAG> <SEP> <I:ORDER> <SEP> <RLIST:KNOTS> <SEP> <R:TMIN> <SEP> <R:TMAX> <SEP> < <RATIONAL <SEP> <POINTLIST3:CONTROL_POINTS>> <NONRATIONAL <SEP> <POINTLIST2:CONTROL_POINTS>> > <OPTSEP> <RIGHT PAREN>
TRIMLOOP	::= <LEFT PAREN> <OPTSEP> <TRIMCURVE> <<SEP> <TRIMCURVE>>*> <OPTSEP> <RIGHT PAREN>

TRIMLOOPLIST ::= <LEFT PAREN> <OPTSEP>
 <TRIMLOOP> <<SEP> <TRIMLOOP>>*
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA2 ::= <LEFT PAREN> <OPTSEP>
 <P2:POINT>
 <<SEP> <COLRV>>0
 <<SEP> <V3:UNIT_NORMAL>>0
 <<SEP> <RLIST:DATA_MAPPING_DATA>>0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA2LIST ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATA2> <<SEP> <VERTEXDATA2>>* >0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA2LISTS ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATA2LIST> <<SEP> <VERTEXDATA2LIST>>* >0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA3 ::= <LEFT PAREN> <OPTSEP>
 <P3:POINT>
 <<SEP> <COLRV>>0
 <<SEP> <V3:UNIT_NORMAL>>0
 <<SEP> <RLIST:DATA_MAPPING_DATA>>0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA3LIST ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATA3> <<SEP> <VERTEXDATA3>>* >0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATA3LISTS ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATA3LIST> <<SEP> <VERTEXDATA3LIST>>* >0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATAFLAG ::= <
 COORD
 | COORD_COLR
 | COORD_NORMAL
 | COORD_DATA
 | COORD_COLR_NORMAL
 | COORD_COLR_DATA
 | COORD_NORMAL_DATA
 | COORD_COLR_NORMAL_DATA
 >

VERTEXDATA3PL3 ::= <LEFT PAREN> <OPTSEP>
 <P3:POINT>
 <<SEP> <COLRV>>0
 <OPTSEP> <RIGHT PAREN>

VERTEXDATAPL3LIST ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATAPL3> <<SEP> <VERTEXDATAPL3>>* >o
 <OPTSEP> <RIGHT PAREN>

VERTEXDATAPL3LISTS ::= <LEFT PAREN> <OPTSEP>
 < <VERTEXDATAPL3LIST> <<SEP> <VERTEXDATAPL3LIST>>* >o
 <OPTSEP> <RIGHT PAREN>

Page 14

4.2.5.1 Terms deleted

Add the following:

OF, WITH

4.2.5.3 Words used unabbreviated

Add the following:

BACK, CURVE, DATA, FRONT, LIGHT, MAPPING, MODE

4.2.5.4 Abbreviations

Add the following:

APPROXIMATION	→	APPROX
CHARACTERISTICS	→	CHARAC
CRITERIA	→	CRIT
CULLING	→	CULL
DEPTH CUE	→	DEPTHCUE
DISTINGUISHING	→	DIST
METHOD	→	METH
NON_UNIFORM_B_SPLINE	→	NUNIBSP
PARAMETRIC	→	PARAM
PROPERTIES	→	PROPS
QUADRILATERAL	→	QUAD
REFLECTANCE	→	REFL
RENDERING	→	REND
SHADING	→	SHAD
SOURCE	→	SRC
SURFACE	→	SURF
TRIANGLE	→	TRI
TRIMMING CURVE	→	TRIMCURV

4.2.5.7 The derived archive file element names

Add the following:

POLYLINE SET 3 WITH COLOUR	→	ARF_LINESET3COLR
FILL AREA SET 3 WITH DATA	→	ARF_FILLAREASET3DATA
FILL AREA SET WITH DATA	→	ARF_FILLAREASETDATA
CELL ARRAY 3 PLUS	→	ARF_CELLARRAY3PLUS
SET OF FILL AREA SETS 3 WITH DATA	→	ARF_SETFILLAREASETS3DATA
SET OF FILL AREA SETS WITH DATA	→	ARF_SETFILLAREASETSDATA
TRIANGLE SET 3 WITH DATA	→	ARF_TRISET3DATA
TRIANGLE SET WITH DATA	→	ARF_TRISETDATA
TRIANGLE STRIP 3 WITH DATA	→	ARF_TRISTRIP3DATA
TRIANGLE STRIP WITH DATA	→	ARF_TRISTRIPDATA
QUADRILATERAL MESH 3 WITH DATA	→	ARF_QUADMESH3DATA
QUADRILATERAL MESH WITH DATA	→	ARF_QUADMESHDATA
NON-UNIFORM B-SPLINE CURVE	→	ARF_NUNIBSPCURVE
NON-UNIFORM B-SPLINE CURVE WITH COLOUR	→	ARF_NUNIBSPCURVECOLR
NON-UNIFORM B-SPLINE SURFACE	→	ARF_NUNIBSPSURF
NON-UNIFORM B-SPLINE SURFACE WITH DATA	→	ARF_NUNIBSPSURFDATA
SET DATA MAPPING INDEX	→	ARF_DATAMAPPINGINDEX
SET REFLECTANCE INDEX	→	ARF_REFLINDEX
SET BACK INTERIOR INDEX	→	ARF_BACKINTINDEX
SET BACK DATA MAPPING INDEX	→	ARF_BACKDATAMAPPINGINDEX
SET BACK REFLECTANCE INDEX	→	ARF_BACKREFLINDEX
SET PARAMETRIC SURFACE INDEX	→	ARF_PARAMSURFINDEX
SET POLYLINE COLOUR	→	ARF_LINECOLR
SET POLYLINE SHADING METHOD	→	ARF_LINESHADMETH
SET POLYMARKER COLOUR	→	ARF_MARKERCOLR
SET TEXT COLOUR	→	ARF_TEXTCOLR
SET FACET DISTINGUISHING MODE	→	ARF_FACETDISTMODE
SET FACET CULLING MODE	→	ARF_FACETCULLMODE
SET INTERIOR COLOUR	→	ARF_INTCOLR
SET INTERIOR SHADING METHOD	→	ARF_INTSHADMETH
SET DATA MAPPING METHOD	→	ARF_DATAMAPPINGMETH
SET REFLECTANCE PROPERTIES	→	ARF_REFLPROPS
SET REFLECTANCE MODEL	→	ARF_REFLMODEL

SET BACK INTERIOR STYLE	→	ARF_BACKINTSTYLE
SET BACK INTERIOR STYLE INDEX	→	ARF_BACKINTSTYLEINDEX
SET BACK INTERIOR COLOUR	→	ARF_BACKINTCOLR
SET BACK INTERIOR SHADING METHOD	→	ARF_BACKINTSHADMETH
SET BACK DATA MAPPING METHOD	→	ARF_BACKDATAMAPPINGMETH
SET BACK REFLECTANCE PROPERTIES	→	ARF_BACKREFLPROPS
SET BACK REFLECTANCE MODEL	→	ARF_BACKREFLMODEL
SET LIGHT SOURCE STATE	→	ARF_LIGHTSRCSTATE
SET EDGE COLOUR	→	ARF_EDGECOLR
SET CURVE APPROXIMATION CRITERIA	→	ARF_CURVEAPPROXCRT
SET SURFACE APPROXIMATION CRITERIA	→	ARF_SURFAPPROXCRT
SET PARAMETRIC SURFACE CHARACTERISTICS	→	ARF_PARAMSURFCHARAC
SET RENDERING COLOUR MODEL	→	ARF_RENDCOLRMODEL
SET DEPTH CUE INDEX	→	ARF_DEPTHCUEINDEX
SET COLOUR MAPPING INDEX	→	ARF_COLRMAPPINGINDEX

Page 18

4.3.3 The structure element production

Add the following:

|

<POLYLINE SET 3 WITH COLOUR> |

<FILL AREA SET 3 WITH DATA> |

<FILL AREA SET WITH DATA> |

<CELL ARRAY 3 PLUS> |

<SET OF FILL AREA SETS 3 WITH DATA> |

<SET OF FILL AREA SETS WITH DATA> |

<TRIANGLE SET 3 WITH DATA> |

<TRIANGLE SET WITH DATA> |

<TRIANGLE STRIP 3 WITH DATA> |

<TRIANGLE STRIP WITH DATA> |

<QUADRILATERAL MESH 3 WITH DATA> |

<QUADRILATERAL MESH WITH DATA> |

<NON-UNIFORM B-SPLINE CURVE> |

<NON-UNIFORM B-SPLINE CURVE WITH COLOUR> |

<NON-UNIFORM B-SPLINE SURFACE> |

<NON-UNIFORM B-SPLINE SURFACE WITH DATA> |

<SET DATA MAPPING INDEX> |
<SET REFLECTANCE INDEX> |
<SET BACK INTERIOR INDEX> |
<SET BACK DATA MAPPING INDEX> |
<SET BACK REFLECTANCE INDEX> |
<SET PARAMETRIC SURFACE INDEX> |
<SET POLYLINE COLOUR> |
<SET POLYLINE SHADING METHOD> |
<SET POLYMARKER COLOUR> |
<SET TEXT COLOUR> |
<SET FACET DISTINGUISHING MODE> |
<SET FACET CULLING MODE> |
<SET INTERIOR COLOUR> |
<SET INTERIOR SHADING METHOD> |
<SET DATA MAPPING METHOD> |
<SET REFLECTANCE PROPERTIES> |
<SET REFLECTANCE MODEL> |
<SET BACK INTERIOR STYLE> |
<SET BACK INTERIOR STYLE INDEX> |
<SET BACK INTERIOR COLOUR> |
<SET BACK INTERIOR SHADING METHOD> |
<SET BACK DATA MAPPING METHOD> |
<SET BACK REFLECTANCE PROPERTIES> |
<SET BACK REFLECTANCE MODEL> |
<SET LIGHT SOURCE STATE> |
<SET EDGE COLOUR> |
<SET CURVE APPROXIMATION CRITERIA> |
<SET SURFACE APPROXIMATION CRITERIA> |
<SET PARAMETRIC SURFACE CHARACTERISTICS> |
<SET RENDERING COLOUR MODEL> |
<SET DEPTH CUE INDEX> |
<SET COLOUR MAPPING INDEX>

4.3.4 Encoding output primitive elements

Add the following:

POLYLINE SET 3 WITH COLOUR ::= ARF_LINESET3DATA
 <SOFTSEP>
 <VERTEXDATAFLAG> <SEP>
 <I:COLOUR_TYPE> <SEP>
 <VERTEXDATA3LISTS>
 <TERM>

FILL AREA SET 3 WITH DATA ::= ARF_FILLAREASET3DATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATA>>0
 <<SEP> <EDGEFLAGLISTS>>0
 <SEP> <VERTEXDATA3LISTS>
 <TERM>

FILL AREA SET WITH DATA ::= ARF_FILLAREASETDATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATA>>0
 <<SEP> <EDGEFLAGLISTS>>0
 <SEP> <VERTEXDATA2LISTS>
 <TERM>

CELL ARRAY 3 PLUS ::= ARF_CELLARRAY3PLUS
 <SOFTSEP>
 <P3:P_POINT> <SEP>
 <P3:Q_POINT> <SEP>
 <P3:R_POINT> <SEP>
 <I:COLOUR_TYPE> <SEP>
 <I:X_DIM> <SEP>
 <I:Y_DIM> <SEP>
 <COLRVROWS>
 <TERM>

SET OF FILL AREA
SETS 3 WITH DATA

```

::= ARF_SETFILLAREASETS3DATA
    <SOFTSEP>
    <FACETDATAFLAG> <SEP>
    <EDGEDATAFLAG> <SEP>
    <VERTEXDATAFLAG>
    <<SEP> <I:COLOUR_TYPE>>0
    <<SEP> <FACETDATALIST>>0
    <<SEP> <EDGEFLAGLISTSLIST>0
    <SEP> <VERTEXDATA3LIST> <SEP>
    <INTLISTSLIST:VERTEX_INDICES>
    <TERM>

```

SET OF FILL AREA
SETS WITH DATA

```

::= ARF_SETFILLAREASETSDATA
    <SOFTSEP>
    <FACETDATAFLAG> <SEP>
    <EDGEDATAFLAG> <SEP>
    <VERTEXDATAFLAG>
    <<SEP> <I:COLOUR_TYPE>>0
    <<SEP> <FACETDATALIST>>0
    <<SEP> <EDGEFLAGLISTSLIST>>0
    <SEP> <VERTEXDATA2LIST> <SEP>
    <INTLISTSLIST:VERTEX_INDICES>
    <TERM>

```

TRIANGLE SET 3 WITH DATA

```

::= ARF_TRISSET3DATA
    <SOFTSEP>
    <FACETDATAFLAG> <SEP>
    <EDGEDATAFLAG> <SEP>
    <VERTEXDATAFLAG>
    <<SEP> <I:COLOUR_TYPE>>0
    <<SEP> <FACETDATALIST>>0
    <<SEP> <EDGEFLAG3LIST>0
    <SEP> <VERTEXDATA3LIST> <SEP>
    <INT3LISTS:VERTEX_INDICES>
    <TERM>

```

TRIANGLE SET WITH DATA ::= ARF_TRISSETDATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATALIST>>0
 <<SEP> <EDGEFLAG3LIST>>0
 <SEP> <VERTEXDATA2LIST> <SEP>
 <INT3LISTS: VERTEX_INDICES>
 <TERM>

TRIANGLE STRIP 3 WITH DATA ::= ARF_TRISTRIP3DATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATALIST>>0
 <<SEP> <EDGEFLAGLIST>>0
 <SEP> <VERTEXDATA3LIST>
 <TERM>

TRIANGLE STRIP WITH DATA ::= ARF_TRISTRIPDATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATALIST>>0
 <<SEP> <EDGEFLAGLIST>>0
 <SEP> <VERTEXDATA2LIST>>0
 <TERM>

QUADRILATERAL MESH 3 WITH DATA ::= ARF_QUADMESH3DATA
 <SOFTSEP>
 <FACETDATAFLAG> <SEP>
 <EDGEDATAFLAG> <SEP>
 <VERTEXDATAFLAG> <SEP>
 <I:NUM_ROWS> <SEP>
 <I:NUM_COLUMNS>
 <<SEP> <I:COLOUR_TYPE>>0
 <<SEP> <FACETDATA2ROW>>*
 <<SEP> <EDGEFLAG2ROW>>*
 <SEP> <VERTEXDATA3LISTS>
 <TERM>

QUADRILATERAL MESH
WITH DATA

```
::= ARF_QUADMESHDATA
  <SOFTSEP>
  <FACETDATFLAG> <SEP>
  <EDGEDATAFLAG> <SEP>
  <VERTEXDATAFLAG> <SEP>
  <I:NUM_ROWS> <SEP>
  <I:NUM_COLUMNS>
  <<SEP> <I:COLOUR_TYPE>>o
  <<SEP> <FACETDATAROW>>*
  <<SEP> <EDGEFLAG2ROW>>*
  <SEP> <VERTEXDATA2LISTS>
  <TERM>
```

NON-UNIFORM B-SPLINE
CURVE

```
::= ARF_NUNIBSPCURVE
  <SOFTSEP>
  <I:SPLINE_ORDER> <SEP>
  <RLIST:KNOTS> <SEP>
  <R:TMIN> <SEP> <R:TMAX> <SEP>
  < <RATIONAL <SEP>
    <POINTLIST4:CONTROL_POINTS>>
  | <NONRATIONAL <SEP>
    <POINTLIST3:CONTROL_POINTS>>
  >
  <TERM>
```

NON-UNIFORM B-SPLINE
CURVE WITH COLOUR

```
::= ARF_NUNIBSPCURVECOLR
  <SOFTSEP>
  <I:SPLINE_ORDER> <SEP>
  <RLIST:KNOTS> <SEP>
  <R:TMIN> <SEP> <R:TMAX> <SEP>
  < <RATIONAL <SEP>
    <POINTLIST4:CONTROL_POINTS>>
  | <NONRATIONAL <SEP>
    <POINTLIST3:CONTROL_POINTS>>
  >
  <<SEP> <COLRCURVE>>o
  <TERM>
```

NON-UNIFORM B-SPLINE
SURFACE

```
 ::= ARF_NUNIBSPSURF
    <SOFTSEP>
    <I:U_ORDER> <SEP>
    <I:V_ORDER> <SEP>
    <RLIST:U_KNOTS> <SEP>
    <RLIST:V_KNOTS> <SEP>
    <<RATIONAL <SEP>
        <POINTLIST4:U_DIRECTION_CONTROL_POINTS>
        <<SEP> <POINTLIST4:U_DIRECTION_CONTROL_PTS>>*>
    | <NONRATIONAL <SEP>
        <POINTLIST3:U_DIRECTION_CONTROL_PTS>
        <<SEP> <POINTLIST3:U_DIRECTION_CONTROL_PTS>>*>
    >
    <<SEP> TRIMLOOPS <SEP> <TRIMLOOPLIST>>0
    <TERM>
```

NOTE: Each POINTLIST3 or POINTLIST4 contains control points along the u dimension.

NON-UNIFORM B-SPLINE
SURFACE WITH DATA

```
 ::= ARF_NUNIBSPSURFDATA
    <SOFTSEP>
    <I:U_ORDER> <SEP>
    <I:V_ORDER> <SEP>
    <RLIST:U_KNOTS> <SEP>
    <RLIST:V_KNOTS> <SEP>
    <<RATIONAL <SEP>
        <POINTLIST4:U_DIRECTION_CONTROL_POINTS>
        <<SEP> <POINTLIST4:U_DIRECTION_CONTROL_POINTS>>*>
    | <NONRATIONAL <SEP>
        <POINTLIST3:U_DIRECTION_CONTROL_POINTS>
        <<SEP> <POINTLIST3:U_DIRECTION_CONTROL_POINTS>>*>
    >
    <<SEP> TRIMLOOPS <SEP> <TRIMLOOPLIST>>0
    <<SEP> COLRSURF <SEP> <COLRSURF>>0
    <<SEP> DATASURFS <SEP> <DATASURFLIST>>0
    <TERM>
```

NOTE: Each POINTLIST3 or POINTLIST4 contains control points along the u dimension.