IGES Export Entities

There are three different ways to export IGES files from CADfix: through the B-REP option, through the TRIMMED surface option, or through the BOUNDED surface option. Note that only one of these options can be used at a time. The entities exported will depend on this option.

The first table (Table 2) below indicates the entities exported for the B-REP option. The B-REP option uses CADfix parts to generate IGES entities. There is not a direct match between the two systems and IGES definitions have to be determined (in some cases) from more than one part. The BREP option can only be used if bodies exist. There are corresponding tables for the TRIMMED (see Table 3) and BOUND (see Table 4) options.

Table 1: IGES export Supported Entities for export via BREP

CADfix Part (*CAD terminology*)	Entity No.	Entity Description	Notes
Arc Lines	100	Circular arcs	
Straight Lines	110	Straight lines	
Shapes *(surface)*	120	Surface of Revolution	NURBS surfaces can be converted to surfaces-of-revolution on export controlled by auto-detection or by original form attribute of NURBS surface
Shapes (*surface*)	128	Rational B-Spline Surface	All shapes (*surfaces*) within CADfix need to be converted to NURBS for IGES export.
NURBS Lines	126	Rational B-Spline Curve	
XASsiGnment	406	Property	Supports the export of labels. Also Form 15 - colour
Points	502	Vertex List	The Vertex List Entity builds a listing of all vertices within the CADfix model. One entity will exist for each body in the database.
End Points/Lines	504	Edge List	The Edge List Entity builds a listing of all edges and their end points (with reference to the Vertex List entity).
Lines/Surface (*face*)	508	Loop	The Loop Entity determines the lines (with reference to the Edge List Entity) that make inner and outer boundaries of the surfaces (*faces*). These do not exist directly in CADfix and are generated on the fly as the IGES export runs. The CADfix surfaces (*faces*) are used to determine order and orientation of the line in the loop.
Shapes (*surface*) /Surface (*face*)	510	Face	The Face Entity defines the surface (*face*) of the part through pointers to the underlying shape (*surface*) (with reference to the Rational B-Spline Surface Entity) and the loops that make up the inner and outer boundaries (with reference to the Loop Entity).
Surfaces (*face*)/Body	514	Shell	The Shell Entity determines the surfaces (*faces*) (with reference to the Face Entity) that make up the inner and outer boundaries of the body. These do not exist directly in CADfix and are generated on the fly as the IGES export runs. The CADfix body is used to determine order and orientation of the surfaces (*faces*) in the Shell.
Body	186	Solid Manifold B-REP	The Solid Manifold B-Rep Entity determines the shells (with reference to the Shell Entity) that make up the body definition.

The TRIMMED option does not support Bodies through export, however all surfaces within bodies will be exported. The table below describes the entities used. An option exists, only available to TRIMMED export, whether or not to output 2D parametric curves. CADfix generates better model space curves than parametric curves, and by leaving these out, various packages can gain a better definition of the curve. In this description, however, both have been included. This option has the overhead of creating a line for every surface reference, due to ensuring that lines flow correctly round a loop as orientations are not supported in IGES form.

Table 2: IGES export Supported Entities for export via TRIMMED

CADfix Part (*CAD terminology*)	**Entity No.**	**Entity Description**	**Notes**
Arc Lines	100	Circular arcs	
Straight Lines	110	Straight lines	
Shapes *(surface)*	120	Surface of Revolution	NURBS surfaces can be converted to surfaces-of-revolution on export controlled by auto-detection or by original form attribute of NURBS surface
Shapes (*surfaces*)	128	Rational B-Spline Surface	All shapes (*surfaces*) within CADfix need to be converted to NURBS for IGES export.
NURBS Lines	126	Parametric Spline Curve (3D)	Referred to as Model Space curves, these are the most accurate CADfix representation for lines.
NURBS Lines	126	Parametric Spline Curve (2D)	Referred to as 2D Parametric Curves, these are a representation of the Model space curve (see above) in the parameter space of a shape (*surface*). As redefining the line in parameter space has the effect of pulling the line away from the real space it was defined in these are considered less accurate than the Model Space curves. These are only exported if the PCURVE option is enabled.
Surfaces (*faces*)	102	Composite Curve	This entity defines the inner and outer boundaries for a surface (*face*) definition. These do not exist directly in CADfix and are generated on the fly as the IGES export runs. The surface (*faces*) definition is used to determine loop order and ensure a flowing loop by flipping reverse lines. If the 2D parametric curves are enabled then two of these will be created, one for the model space definition, and one for the 2D parametric curve definition, otherwise just the model space curve definition will be exported. One of these will exist for each boundary of a surface (*face*).
	142	Curve on Parametric Surface	This entity does not exist in CADfix, but is used to associate a line with a shape (*surface*). Although this is not required for Model Space curves (see above) it indicates the shape that a 2D parametric curve (see above) has been defined. This entity will point to a Composite Curve (102) containing the model space curves, and another pointing to 2D parametric curves (if enabled). One of these entities should exist for each boundary of a surface (*face*).
Surface (*face*)	144	Trimmed Parametric Surface	This entity defines the surface (*face*) and contains a pointer to the Curve on Parametric Surface Entity for each boundary in the surface (*face*) and a pointer to the underlying shape (*surface*).
XASsiGnment	406	Property	Supports the export of labels. Also Form 15 - colour

With the BOUND option, CADfix surfaces (*faces*) and their loops are exported as Bounded Surfaces (Type 143) and Bounded Entities (Type 141) respectively. This behaviour is in contrast to that of the TRIMMED option, in which surfaces (*faces*) and loops are exported as Trimmed (Parametric) Surface Entities (Type 144), Composite Curve Entities (Type 102), and Curve on a Parametric Surface Entities (Type 142).

Table 3: IGES export Supported Entities for export via BOUND

CADfix Part	Entity No.	Entity Description	Notes
Arc Lines	100	Circular arcs	
Straight Lines	110	Straight lines	
Shapes *(surface)*	120	Surface of Revolution	NURBS surfaces can be converted to surfaces-of-revolution on export controlled by auto-detection or by original form attribute of NURBS surface
Shapes (*surfaces*)	128	Rational B-Spline Surface	All shapes (*surfaces*) within CADfix need to be converted to NURBS for IGES export.
NURBS Lines	126	Parametric Spline Curve (3D)	Referred to as Model Space curves, these are the most accurate CADfix representation for lines.
NURBS Lines	126	Parametric Spline Curve (2D)	Referred to as 2D Parametric Curves, these are a representation of the Model space curve (see above) in the parameter space of a shape (*surface*). As redefining the line in parameter space has the effect of pulling the line away from the real space it was defined in these are considered less accurate than the Model Space curves. These are only exported if the PCURVE option is enabled.
Surfaces (*faces*)	102	Composite Curve	This entity defines the inner and outer boundaries for a surface (*face*) definition. These do not exist directly in CADfix and are generated on the fly as the IGES export runs. The surface (*face*) definition is used to determine loop order and ensure a flowing loop by flipping reverse lines. If the 2D parametric curves are enabled then two of these will be created, one for the model space definition, and one for the 2D parametric curve definition, otherwise just the model space curve definition will be exported. One of these will exist for each boundary of a surface (*face*).
Surfaces (*faces*)	141	Bounded Entity	This entity defines the boundaries for a surface (*face*) definition. These do not exist in CADfix, and are generated on the fly as the IGES export runs. The surface (*face*) is used to determine the loop order. Lines are not flipped, as a sense flag is included in the IGES definition. If the 2-dimensional parametric curves are enabled then two of these will be created, one for the model space definition, and one for the 2-dimensional parametric curve definition; otherwise, just the model space curve definition will be exported. One of these entities will exist for each boundary of a surface (*face*).
Surface (*face*)	143	Bounded Surface	This entity defines the surface (*face*) and contains pointers to the appropriate model-space and parametric curves, and a pointer to the underlying shape (*surface*).
XASsiGnment	406	Property	Supports the export of labels. Also Form 15 - colour