

Key Features	CADIQ compares CAD models of various formats to identify geometric shape, quality, annotation and PMI saved view differences introduced by engineering changes, translation or manual remodeling. It highlights shape differences in form, mass properties, surface geometry and topology. Quality defects that impede analysis, manufacturing or data exchange processes are clearly identified with no extraneous information. CADIQ analysis uses the native programming interface of each CAD system to maximize accuracy and robustness. Excel statistics are automatically generated to support process quality control. All functionality is available in a command line interface for integration into PLM systems.
New Features in CADIQ 8.3.0	Improved diagnostic results and performance for complex models Improved PMI quality checking Improved NX annotation presentation Improved controller performance Enhanced STEP geometric and assembly validation property support (pre-production testing) Enhanced JT interface to support CAD Session and Model Reuse to improve performance Renamed "Different" diagnostics to "Change" diagnostics (more intuitive) New STEP number of composite tolerances validation property support New STEP Tessellated BREP and Tessellated MESH support New NX option to convert Lightweight Sections to Heavyweight Sections (pre-production testing) New Surface Length Change diagnostic Updated CAD interfaces (see the Support Matrix)
Module	Description
Embedded Launcher	An application that adds CADIQ menus to the CAD system's user interface to make it convenient for a user to set up a Controller job to qualify the working model or to compare it to a model stored in a file on disk. Automates the process of displaying the CAD system model with the same orientation and zoom as in the CADIQ Viewer.
Controller	User interface for creating batch analysis jobs, monitoring their progress in real-time, generating statistics, and loading model diagnostic results into the Viewer. Enables parallel, distributed processing and CAD session sharing to dramatically reduce the time required to analyze a batch of models. Can be executed in batch mode with a command line interface.
Analyzer	Batch CAD application that analyzes a model through a CAD System Interface using diagnostic algorithms and configuration parameters that are consistent across all CAD systems. When comparing two models, this application analyzes the first model (with the appropriate CAD System Interface) and creates a CADIQ results file that becomes an input for a second Analyzer process on the second model (with the appropriate CAD System Interface). Can be invoked through a command line interface if use of the Controller GUI is not desired.
Assembly Analysis Module	Add diagnostics to the Analyzer which enable assembly model quality checking and comparison without flattening.
STEP Validation Properties Module	During validation of a STEP file export, evaluate the mass properties and face sampling points on the native model and append these to the STEP file.
CAD System Interface	Dynamic interface between the Analyzer and a batch CAD session through its application programming interface (API). No data translation or conversion occurs while the model is analyzed. Prerequisites are documented in the Support Matrix.
CAD File Interface	Dynamic interface between the Analyzer and a batch CAD data access process. No prerequisites required for CAD installation/license.
Viewer	Standalone diagnostic user interface for quickly identifying the location and properties of each quality defect or comparison problem. Simultaneously visualizes the analysis results for 1, 2, 3 or 4 related models (same scale and coordinate system). The 3D graphics can be dynamically configured to behave like any supported CAD system. Supports user-defined documentation of diagnostic issues with automated animation between them.
3D PDF Viewer Report Module	Save diagnostic results or user-defined documentation of diagnostic issues (saved views with comments and animations) to 3D PDF viewable with the Adobe Reader X and newer.

CAD Format			Operating System (64-bit)			
Name	System API	Version	Windows			
			7 SP1	8.1	Server 2008 R2	Server 2012
CATIA V4 (7) (8)	CADfix CSDK	4.x.x	8.3.0	8.3.0	8.3.0	8.3.0
CATIA V5 (1) (2) (4)	ABC-CAA	v5r19	*	n/a	*	n/a
		v5r20	*	n/a	*	n/a
		v5r21	8.3.0	n/a	8.3.0	n/a
		v5-6r2012	8.3.0	n/a	8.3.0	n/a
		v5-6r2013	8.3.0	n/a	8.3.0	n/a
		v5-6r2014	8.3.0		8.3.0	
		v5-6r2015 SP1+	8.3.0	8.3.0	8.3.0	8.3.0
NX (1) (3)	NX Open	NX 7	*	n/a	*	n/a
		NX 7.5	*	n/a	*	n/a
		NX 8	8.3.0	n/a	8.3.0	n/a
		NX 8.5	8.3.0		8.3.0	
		NX 9	8.3.0	8.3.0	8.3.0	
		NX 10	8.3.0	8.3.0	8.3.0	8.3.0
Pro/E Wildfire (1)	Pro/TOOLKIT	WF 5 M010+	8.3.0	n/a	8.3.0	n/a
Creo Parametric (1)	Creo Toolkit	2.0	8.3.0		8.3.0	
		3.0	8.3.0	8.3.0	8.3.0	8.3.0
Inventor (1)	Inventor API	2013	*	n/a	*	n/a
		2014	8.3.0	8.3.0	8.3.0	
		2015	8.3.0	8.3.0	8.3.0	8.3.0
		2016	8.3.0	8.3.0	8.3.0	8.3.0
Solid Edge (1)	Parasolid	ST8	8.3.0	8.3.0	8.3.0	8.3.0
SOLIDWORKS (1)	SOLIDWORKS API	2013	*	n/a	*	n/a
		2014	8.3.0		8.3.0	
		2015	8.3.0	8.3.0	8.3.0	8.3.0
		2016	8.3.0	8.3.0	8.3.0	8.3.0
Parasolid (8)	Parasolid	28	8.3.0	8.3.0	8.3.0	8.3.0
ACIS (8)	InterOp	R26	8.3.0	8.3.0	8.3.0	8.3.0
IGES (7)	PDElib	5.3	8.3.0	8.3.0	8.3.0	8.3.0
STEP (7) (8)	CADfix/PDElib	Any AP	8.3.0	8.3.0	8.3.0	8.3.0
JT (8)	JT Toolkit (Format)	v8.0.0 (v10.0)	8.3.0	8.3.0	8.3.0	8.3.0
3D PDF (PRC) (9)	HOOPS Publish	2016	8.3.0	8.3.0	8.3.0	8.3.0
3D PDF (U3D) (5) (7)	RH SDK	5.5	8.3.0	8.3.0	8.3.0	8.3.0

Prerequisites

- (1) Each CAD System Interface requires 64-bit CAD system installation and one CAD system runtime license per concurrent CADIQ Analyzer session.
- (2) CATIA V5 System Interface also requires one 5691-ABC-CAA Multi-Workspace Appl Builder (API) license per CADIQ installation (for any number of concurrent CADIQ Analyzer sessions). CATIA V5 Sheet Metal model analysis requires one SMD license per concurrent CADIQ Analyzer session. CATIA V5 Piping and Tubing model analysis requires one PIP license per concurrent CADIQ Analyzer session.
- (3) NX interface also requires one NX Open Toolkits Author (C/C++ API) license per CADIQ installation (any number of concurrent CADIQ Analyzer sessions).
- (4) CATIA V5r19 **SP6** is recommended to avoid an issue which causes inconsistent area results when compared to newer versions of CATIA
- (5) Microsoft Visual C++ 2005 Redistributable Package
- (6) Microsoft Visual C++ 2008 Redistributable Package
- (7) Microsoft Visual C++ 2010 Redistributable Package
- (8) Microsoft Visual C++ 2012 Redistributable Package
- (9) Microsoft Visual C++ 2013 Redistributable Package

Legend

- Bold font** New functionality or configuration developed and tested for this release
- Regular font Previous configuration upgraded and tested for this release
- *
- Blank Configuration is technically feasible but not yet developed (but could be added as needed)
- n/a Configuration is not supported by the CAD vendor

Released Configurations:

CAD Format			Diagnostic Functionality						
Name	System API	Version	Assembly						
			Structure	Properties	Model Tree	Component Family Table Instances	PMI		
							Annotations	Views	Sections
CATIA V4 (7) (8)	CADfix CSDK	4.x.x	Yes	No	No	n/a	n/a	n/a	n/a
CATIA V5 (1) (2) (4)	ABC-CAA	v5r19	Yes	Yes	Yes	n/a	No	No	No
		v5r20	Yes	Yes	Yes	n/a	No	No	No
		v5r21	Yes	Yes	Yes	n/a	No	No	No
		v5-6r2012	Yes	Yes	Yes	n/a	No	No	No
		v5-6r2013	Yes	Yes	Yes	n/a	No	No	No
		v5-6r2014	Yes	Yes	Yes	n/a	No	No	No
		v5-6r2015 SP1+	Yes	Yes	Yes	n/a	No	No	No
NX (1) (3)	NX Open	NX 7	Yes	Yes	No	Yes	Yes	Yes	Yes
		NX 7.5	Yes	Yes	No	Yes	Yes	Yes	Yes
		NX 8	Yes	Yes	No	Yes	Yes	Yes	Yes
		NX 8.5	Yes	Yes	No	Yes	Yes	Yes	Yes
		NX 9	Yes	Yes	No	Yes	Yes	Yes	Yes
		NX 10	Yes	Yes	No	Yes	Yes	Yes	Yes
Pro/E Wildfire (1)	Pro/TOOLKIT	WF 5 M010+	Yes	Yes	Yes	Yes	No	n/a	n/a
Creo Parametric (1)	Creo Toolkit	2.0	Yes	Yes	Yes	Yes	No	No	No
		3.0	Yes	Yes	Yes	Yes	No	No	No
Inventor (1)	Inventor API	2013	Yes	No	No	No	No	No	No
		2014	Yes	No	No	No	No	No	No
		2015	Yes	No	No	No	No	No	No
		2016	Yes	No	No	No	No	No	No
Solid Edge (1)	Parasolid	ST8	Yes	No	No	n/a	No	No	No
SOLIDWORKS (1)	SOLIDWORKS API	2013	Yes	No	No	n/a	No	n/a	n/a
		2014	Yes	No	No	n/a	No	n/a	n/a
		2015	Yes	No	No	n/a	No	n/a	n/a
		2016	Yes	No	No	n/a	No	n/a	n/a
Parasolid (8)	Parasolid	28	Yes	No	n/a	n/a	n/a	n/a	n/a
ACIS (8)	InterOp	R26	No	No	n/a	n/a	No	No	n/a
IGES (7)	PDElib	5.3	No	No	n/a	n/a	n/a	n/a	n/a
STEP (7) (8)	CADfix/PDElib	Any AP	Yes	No	n/a	n/a	No	No	No
JT (8)	JT Toolkit (Format)	v8.0.0 (v10.0)	Yes	No	No	n/a	No	No	No
3D PDF (PRC) (9)	HOOPS Publish	2016	Yes	Yes	Yes	n/a	Yes	Yes	Yes
3D PDF (U3D) (5) (7)	RH SDK	5.5	Yes	Yes	Yes	n/a	n/a	n/a	n/a

CAD Format			Diagnostic Functionality (continued)											Embedded Launcher	
Name	System API	Version	Part				Geometry			PMI		Presentation	Representation		
			Properties	Model Tree	Features	All Family Table Members	Annotations	Views	Sections	Precise BREP	Tessellated BREP				Mesh
CATIA V4 (7) (8)	CADfix CSDK	4.x.x	No	No	n/a	n/a	n/a	n/a	n/a	Yes	n/a	n/a	No	No	n/a
CATIA V5 (1) (2) (4)	ABC-CAA	v5r19	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	*
		v5r20	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	*
		v5r21	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		v5-6r2012	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		v5-6r2013	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		v5-6r2014	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		v5-6r2015 SP1+	Yes	Yes	Yes	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
NX (1) (3)	NX Open	NX 7	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	*
		NX 7.5	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	*
		NX 8	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		NX 8.5	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		NX 9	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		NX 10	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
Pro/E Wildfire (1)	Pro/TOOLKIT	WF 5 M010+	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	n/a	n/a	Yes	Yes	Yes
Creo Parametric (1)	Creo Toolkit	2.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
		3.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	Yes
Inventor (1)	Inventor API	2013	No	No	No	No	No	No	No	Yes	n/a	n/a	No	No	No
		2014	No	No	No	No	No	No	No	Yes	n/a	n/a	No	No	No
		2015	No	No	No	No	No	No	No	Yes	n/a	n/a	No	No	No
		2016	No	No	No	No	No	No	No	Yes	n/a	n/a	No	No	No
Solid Edge (1)	Parasolid	ST8	No	No	No	n/a	No	No	No	Yes	n/a	n/a	No	No	No
SOLIDWORKS (1)	SOLIDWORKS API	2013	No	No	No	n/a	Yes	n/a	n/a	Yes	n/a	n/a	Yes	Yes	No
		2014	No	No	No	n/a	Yes	n/a	n/a	Yes	n/a	n/a	Yes	Yes	No
		2015	No	No	No	n/a	Yes	n/a	n/a	Yes	n/a	n/a	Yes	Yes	No
		2016	No	No	No	n/a	Yes	Yes	Yes	Yes	n/a	n/a	Yes	Yes	No
Parasolid (8)	Parasolid	28	No	n/a	n/a	n/a	n/a	n/a	n/a	Yes	n/a	n/a	n/a	n/a	n/a
ACIS (8)	InterOp	R26	No	n/a	n/a	n/a	Yes	Yes	n/a	Yes	n/a	n/a	n/a	Yes	n/a
IGES (7)	PDElib	5.3	No	n/a	No	n/a	n/a	n/a	n/a	Yes	n/a	n/a	No	No	n/a
STEP (7) (8)	CADfix/PDElib	Any AP	Yes	n/a	No	n/a	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	n/a
JT (8)	JT Toolkit (Format)	v8.0.0 (v10.0)	Yes	No	n/a	n/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	n/a
3D PDF (PRC) (9)	HOOPS Publish	2016	Yes	Yes	n/a	n/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	n/a	No
3D PDF (U3D) (5) (7)	RH SDK	5.5	Yes	Yes	n/a	n/a	Yes	n/a	n/a	n/a	n/a	Yes	Yes	n/a	No

Level	Diagnostic	Brief Description
Assembly Integrity Defects	Missing Component	Assembly or part component is missing
	Duplicate Assemblies	Two or more assemblies with parent/child relationship have identical parts
	Embedded Assemblies	Two or more assemblies are embedded on top of each other
	Embedded Parts	Two or more parts are embedded on top of each other
	Empty Assembly	Assembly contains no part geometry
	Empty Part	Part contains no geometry
Assembly Design Information	Assembly Name	Identifies the assembly name
	Part Name	Identifies the part name
	Multi-Use Assembly	Assembly is used multiple times in top-level assembly
	Multi-Use Part	Part is used multiple times in top-level assembly
	Single-Use Assembly	Assembly is used only one time in top-level assembly
	Single-Use Part	Part is used only one time in top-level assembly
Assembly STEP Validation Property Defects	Inconsistent Assembly ValProp Child Count	STEP assembly number of children property and entity count are inconsistent
	Inconsistent Assembly ValProp Notional Location	STEP assembly notional solid centroid property and measured value are inconsistent
	Non-Existent Assembly ValProp Child Count	STEP assembly number of children property is missing
	Non-Existent Assembly ValProp Notional Location	STEP assembly notional solid centroid property is missing
Integrity Defects	Degenerate Edge	Edge length is invalid
	Degenerate Face	Face area is invalid
	Degenerate Solid	Solid volume is invalid
	Empty Model	Model contains no entities which satisfy the configuration filters
	Free Edge	Edge is used by only one face
	Inconsistent Edge in Loop	Parametric direction of edge is inconsistent within its loop
	Inconsistent Edge on Curve	Parametric direction of edge is inconsistent with its curve
	Over-Used Edge	Edge is used by more than two faces
	Over-Used Face	Face is used more than once in a solid
	Untessellated Face	Face is not tessellated

Level	Diagnostic	Brief Description
Annotation Semantic Defects	Non-Existent Annotation	Model contains no annotations
	Unassociated Annotation	Annotation has leader line(s) but no associated geometry
	Orphan Annotation	Annotation has no leader line(s) and associated geometry and is not part of a composite annotation
	Fake Dimension	Dimension nominal value is not equal to distance between leader line end points
	Undefined Datum Feature	Datum feature is referenced by an annotation but is not defined
	Duplicate Datum Feature Symbols	Datum feature identifier is used more than once in the model
	Duplicate Datum References	Feature control frame references the same datum feature more than once
	Duplicate Datum Targets	Datum target identifier is used more than once in the model
	Extraneous Datum Feature	Datum feature is defined but not referenced by another annotation
	Unacceptable Datum Label	Datum label uses unacceptable character, number or symbol
	Unacceptable Datum Target Label	Datum target label has unacceptable format or character
	Inappropriate Datum Reference Frame	Form tolerance references a datum reference frame when it should reference none
	Missing Datum Reference Frame	Non-form tolerance requires a datum reference frame which is not referenced
	Indistinct Datum Reference Frame	Geometric tolerance references a datum reference frame which is defined by its associated geometry
	Zero Tolerance Value	Geometric tolerance display value is zero without maximum material condition
	Inconsistent Dimension Tolerance Limits	Dimension tolerance has upper limit less than or equal to lower limit
	Incorrect Orientation Tolerance Type	Orientation tolerance applied to a surface which has incorrect orientation relative to specified datum
	Conflicting Tolerances	A face has more than one geometric tolerance which references it
	Invalid Datum Target Area	Datum target area is not valid (It is blank or contains invalid text)
	Invalid Dimension Tolerance	Limits applied to nominal value causes nominal value to be unrealistic (i.e. negative)
	Unrealistic Dimension Tolerance	Dimension tolerance zone is greater than nominal value
	Tiny Linear Dimension Tolerance Zone	Linear Dimension tolerance zone is too small
	Tiny Angular Dimension Tolerance Zone	Angular Dimension tolerance zone is too small
	Large Linear Dimension Tolerance Zone	Linear dimension tolerance zone is too large
	Large Angular Dimension Tolerance Zone	Angular dimension tolerance zone is too large
	Discontinuous All Around Geometry	All-around condition is specified but the associated geometry does not form a single, continuous set
	Incorrect Geometry Type	Geometry referred by the annotation is not of correct type
	Incomplete Dimension Tolerance	Dimension (not basic or reference) does not have a tolerance defined
	Toleranced Basic Dimension	Basic dimension has a tolerance specified
	Inconsistent Annotation Units	Annotation units are not consistent across all the annotations in the model
	Incorrect Geometric Tolerance	Form Tolerance shown greater than location or orientation tolerance
	Unviewed Annotation	Annotation is not used by any saved view
Annotation Graphic Defects	Non-Existent Saved View	Model contains no saved views
	Undisplayed Annotation	Annotation has no presentation graphics
	Unconnected Annotation	Annotation has no leader line to its associated geometry
	Flattened Datum Feature Symbol	Datum feature symbol is not displayed in a plane perpendicular to its geometry
	Inappropriate Leader Line Type	Form tolerance references a datum reference frame when it should reference none
	Implicit Annotation Pattern	Annotation text does not specify a repeating pattern
	Implicit All Around Specification	Associated geometry forms a single, continuous set but the all-around condition is not specified

Level	Diagnostic	Brief Description
Tooling Defects	Tiny Solid	Solid is too small
	Narrow Step	Narrow face or region that does not blend smoothly with adjacent faces
	Sharp Free Edge Angle	Sharp angle between free edges connected at a vertex
	Sharp Inside Edge	Edge forms a sharp interior angle between two faces
	Sharp Outside Edge	Edge forms a sharp exterior angle between two faces
	Solid Void	Solid has an internal shell surrounding a void space
	High-Curvature Surface	Surface radius of curvature is too small
	Tiny Hole Faces	Connected faces form a hole with a small diameter
	Non-Standard Hole Faces	Connected faces form a hole with a non-standard diameter
	Large Round Faces	Connected faces have a large round radius
	Tiny Round Faces	Connected faces have a small round radius
	Thin Solid Volume	Minimum thickness of a solid is too thin
	Thick Solid Volume	Minimum thickness of a solid is too thick
	Narrow Solid Space	Width of the space between solid features is too small
	Narrow Space Between Solids	Narrow space between adjacent solids in a part
	Narrow Space	Narrow space around a solid formed near a sharp edge between two faces
	Narrow Volume	Narrow portion of a solid formed near a sharp edge between two faces
	Non-Tangent Faces	Non-tangent angle between faces connected along an edge
Structure Defects	Embedded Solids	Two or more solids are duplicated on top of each other
	Embedded Shells	Two or more open shells are duplicated on top of each other
	Embedded Faces	Two or more faces are duplicated on top of each other
	Hidden Entity	Independent geometric entity is hidden (not visible, blanked)
	Non-Parametric Model	Most faces in the model are defined by non-parametric features
	Incorrect Root Node Model Tree Property	Model Tree Property has incorrect value
	Undefined Root Node Model Tree Property	Model Tree Property is not defined in Model Tree Node
Exchange Defects	High-Curvature Curve	Curve radius of curvature is too small
	Large Edge Gap	Large distance between the endpoints of edges connected at a vertex
	Large Edge Face Gap	Large distance between an edge and its underlying face
	High-Degree Curve	Degree of a spline or polynomial curve is too high
	High-Degree Surface	Degree of a spline or polynomial surface is too high
	Large Face Gap	Large distance between faces connected along an edge
	Large Patch Gap	Large distance between connected surface patches
	Large Segment Gap	Large distance between connected curve segments
	Large Vertex Edge Gap	Large distance between a vertex and its underlying edge
	Large Vertex Face Gap	Large distance between a vertex and its underlying face
	Non-Tangent Segments	Non-tangent angle between connected curve segments
	Sharp Face Angle	Sharp angle between faces connected along an edge
	Tiny Patch	Surface patch is too small
Tiny Segment	Curve segment is too short	

Level	Diagnostic	Brief Description
Simulation Defects	Tiny Edge	Edge is too short
	Tiny Face	Face is too small
	Intersecting Loops	Two loops on a face have a close proximity where they are not connected
	Self-Intersecting Loop	A loops has a close proximity to itself where it is not connected
	Narrow Face	Face is consistently narrow in one direction
	Narrow Region	Narrow portion or extension of a face
	Closed Edge	Edge endpoints are coincident
	Closed Face	Face edges on opposite sides are coincident
	Fragmented Edge	Portion of spline/polynomial curve used by edge has too many segments
	Fragmented Surface	Spline or polynomial surface has too many patches
	Non-Tangent Edges	Non-tangent angle between edges connected at a vertex
	Over-Used Vertex	Vertex used by too many edges
	Sharp Edge Angle	Sharp angle between edges connected at a vertex
	Tiny Curve	Curve is too short
	Tiny Surface	Surface is too small
Design Information	Multi-Solid Model	Model contains more than one solid
	Feature Faces	Set of faces created by a parametric design feature
	Feature Edges	Set of edges created by a parametric design feature
	Non-Solid Entity	Independent geometric entity is not part of a solid
	Annotation Set	Annotations share the same associated geometry
	Annotation Attributes	Set of faces and edges associated to a PMI annotation
	Saved View Attributes	PMI annotations and associated geometry referenced by a saved view
	Planar Solid	Solid is defined by only planar faces
	Smooth Edge	Smooth angle between faces connected along an edge
	Analytical Edge	Edge is defined on an analytical curve
	Non-Analytical Edge	Edge is not defined on an analytical curve
	Analytical Face	Face is defined on an analytical surface
	Non-Analytical Face	Face is not defined on an analytical surface

Level	Diagnostic	Brief Description
STEP Validation Property Defects	Deviant Face ValProp Points	STEP face smooth points property and surface have deviations
	Inconsistent Annotation ValProp Affected Area	STEP annotation affected area property and measured value are inconsistent
	Inconsistent Annotation ValProp Affected Curve Length	STEP annotation affected curve length property and measured value are inconsistent
	Inconsistent Curve ValProp Length	STEP curve length property and measured value are inconsistent
	Inconsistent Curve ValProp Location	STEP curve center property and measured value are inconsistent
	Inconsistent Model ValProp Annotations	STEP model number of annotations property and entity count are inconsistent
	Inconsistent Model ValProp Extent	STEP model bounding box extent property and measured value are inconsistent
	Inconsistent Model ValProp Center	STEP model bounding box center property and measured value are inconsistent
	Inconsistent Model ValProp Composite Tolerances	STEP model number of composite tolerances and entity count are inconsistent
	Inconsistent Model ValProp Curve Length	STEP model curve length property and measured value are inconsistent
	Inconsistent Model ValProp Curve Location	STEP model curve center property and measured value are inconsistent
	Inconsistent Model ValProp Datum Features	STEP model number of datum features property and entity count are inconsistent
	Inconsistent Model ValProp Datum Targets	STEP model number of datum targets property and entity count are inconsistent
	Inconsistent Model ValProp Dimensional	STEP model number of dimensional locations property and entity count are
	Inconsistent Model ValProp Dimensional Sizes	STEP model number of dimensional sizes property and entity count are
	Inconsistent Model ValProp Geometric	STEP model number of geometric tolerances property and entity count are
	Inconsistent Model ValProp Saved Views	STEP model number of saved views property and entity count are inconsistent
	Inconsistent Model ValProp Semantic PMIs	STEP model number of semantic PMIs property and entity count are inconsistent
	Inconsistent Model ValProp Solid Area	STEP model solid area property and measured value are inconsistent
	Inconsistent Model ValProp Solid Location	STEP model solid center property and measured value are inconsistent
	Inconsistent Model ValProp Solid Volume	STEP model solid volume property and measured value are inconsistent
	Inconsistent Model ValProp Solid Wetted Area	STEP model solid wetted area property and measured value are inconsistent
	Inconsistent Model ValProp Surface Area	STEP model indep surface area property and measured value are inconsistent
	Inconsistent Model ValProp Surface Location	STEP model indep surface center property and measured value are inconsistent
	Inconsistent Solid ValProp Area	STEP solid area property and measured value are inconsistent
	Inconsistent Solid ValProp Location	STEP solid center property and measured value are inconsistent
	Inconsistent Solid ValProp Volume	STEP solid volume property and measured value are inconsistent
	Inconsistent Solid ValProp Wetted Area	STEP solid wetted area property and measured value are inconsistent
	Inconsistent Surface ValProp Area	STEP indep surface area property and measured value are inconsistent
	Inconsistent Surface ValProp Location	STEP indep surface center property and measured value are inconsistent

Level	Diagnostic	Brief Description
STEP Validation Property Defects (Continued)	Non-Existent Annotation ValProp Affected Area	STEP annotation affected area property is missing
	Non-Existent Annotation ValProp Affected Curve Length	STEP annotation affected curve length property is missing
	Non-Existent Curve ValProp Length	STEP curve length property is missing
	Non-Existent Curve ValProp Location	STEP curve center property is missing
	Non-Existent Face ValProp Sharp Points	STEP face sharp points property is missing
	Non-Existent Face ValProp Smooth Points	STEP face smooth points property is missing
	Non-Existent Model ValProp Annotations	STEP model number of annotations property is missing
	Non-Existent Model ValProp BoundingBox	STEP model bounding box property is missing
	Non-Existent Model ValProp Composite Tolerances	STEP model number of composite tolerances property is missing
	Non-Existent Model ValProp Curve Length	STEP model curve length property is missing
	Non-Existent Model ValProp Curve Location	STEP model curve center property is missing
	Non-Existent Model ValProp Datum Features	STEP model number of datum features property is missing
	Non-Existent Model ValProp Datum Targets	STEP model number of datum targets property is missing
	Non-Existent Model ValProp Dimensional Locations	STEP model number of dimensional locations property is missing
	Non-Existent Model ValProp Dimensional Sizes	STEP model number of dimensional sizes property is missing
	Non-Existent Model ValProp Geometric Tolerances	STEP model number of geometric tolerances property is missing
	Non-Existent Model ValProp Saved Views	STEP model number of saved views property is missing
	Non-Existent Model ValProp Semantic PMIs	STEP model number of semantic PMIs property is missing
	Non-Existent Model ValProp Solid Area	STEP model solid area property is missing
	Non-Existent Model ValProp Solid Location	STEP model solid center property is missing
	Non-Existent Model ValProp Solid Volume	STEP model solid volume property is missing
	Non-Existent Model ValProp Solid Wetted Area	STEP model solid wetted area property is missing
	Non-Existent Model ValProp Surface Area	STEP model indep surface area property is missing
	Non-Existent Model ValProp Surface Location	STEP model indep surface center property is missing
	Non-Existent Solid ValProp Area	STEP solid area property is missing
	Non-Existent Solid ValProp Location	STEP solid center property is missing
	Non-Existent Solid ValProp Volume	STEP solid volume property is missing
	Non-Existent Solid ValProp Wetted Area	STEP solid wetted area property is missing
Non-Existent Surface ValProp Area	STEP indep surface area property is missing	
Non-Existent Surface ValProp Location	STEP indep surface center property is missing	

Level	Diagnostic	Brief Description
Major Assembly Shape Add/Remove	Unmatched Left Part	Part component in the left model does not have a matching part component in the right model
	Unmatched Right Part	Part component in the right model does not have a matching part component in the left model
Major Assembly Shape Changes	Assembly Center Change	Matching assemblies have a significant bounding box center difference
	Part Center Change	Matching parts have a significant bounding box center difference
Minor Assembly Shape Changes	Unmatched Left Assembly	Assembly component in the left model does not have a matching assembly component in the right model
	Unmatched Right Assembly	Assembly component in the right model does not have a matching assembly component in the left model
	Unmatched Left Empty Assembly	Empty assembly component in the left model does not have a matching assembly component in the right model
	Unmatched Right Empty Assembly	Empty assembly component in the right model does not have a matching assembly component in the left model
	Unmatched Left Empty Part	Empty part component in the left model does not have a matching part component in the right model
	Unmatched Right Empty Part	Empty part component in the right model does not have a matching part component in the left model
	Complex Assembly Match	Two or more assembly components in the left-hand model match two or more assembly components in the right-hand model
	Complex Part Match	Two or more part components in the left-hand model match two or more part components in the right-hand model
	Hybrid Part Match	A part or hybrid part in the left-hand model matches a part or hybrid part in the right-hand model
Assembly Property Changes	Assembly Location Change	Matching assembly components have a significant centroid location difference
	Part Location Change	Matching part components have a significant centroid location difference
	Assembly Area Change	Matching assembly components have a significant area difference
	Part Area Change	Matching part components have a significant area difference
	Assembly Volume Change	Matching assembly components have a significant volume difference
	Part Volume Change	Matching part components have a significant volume difference
	Assembly Name Change	Matching assembly components have different names
	Part Name Change	Matching part components have different names
	Assembly Child Count Change	Matching assembly components have a different number of children
Assembly Notional Location Change	Matching assembly components have a significant notional solid location difference	
Assembly Design Information	Simple Assembly Match	One assembly component in the left-hand model matches one assembly component in the right-hand model
	Simple Part Match	One part component in the left-hand model matches one part component in the right-hand model
Assembly STEP Validation Properties	Transcribe Assembly ValProp Child Count	Writes native assembly number of children entity count to STEP assembly number of children property
	Transcribe Assembly ValProp Notional Location	Writes native assembly notional solid centroid measured value to STEP assembly notional solid centroid property
Surface Add/Remove	Indep Surface Entity Added	Solid or independent surface entity added to right model
	Indep Surface Entity Removed	Solid or independent surface entity removed from left model
	Hole Added	Hole feature added to right model
	Hole Removed	Hole feature removed from left model
	Curved Surface Added	Curved surface feature added to right model
	Curved Surface Removed	Curved surface feature removed from left model
	Flat Surface Added	Flat surface feature added to right model
	Flat Surface Removed	Flat surface feature removed from left model
	Complex Surface Added	Complex surface feature added to right model
	Complex Surface Removed	Complex surface feature removed from left model
	Surface Added	General surface feature added to right model
Surface Removed	General surface feature removed from left model	

Level	Diagnostic	Brief Description
Surface Shape Changes	Hole Location Change	Hole axis location changed
	Curved Surface Location Change	Curved surface axis location changed
	Flat Surface Location Change	Flat surface location along its axis changed
	Complex Surface Location Change	Complex surface location changed
	Surface Location Change	General surface location changed
	Hole Position Change	Hole position along its axis changed
	Curved Surface Position Change	Curved surface position along its axis changed
	Flat Surface Position Change	Flat surface position normal to its axis changed
	Hole Angle Change	Hole conical angle changed
	Curved Surface Angle Change	Curved surface conical angle changed
	Surface Angle Change	General surface conical angle changed
	Hole Orientation Change	Hole axis orientation changed
	Curved Surface Orientation Change	Curved surface axis orientation changed
	Flat Surface Orientation Change	Flat surface normal orientation changed
	Surface Orientation Change	General surface axis orientation changed
	Hole Diameter Change	Hole diameter changed
	Curved Surface Radius Change	Curved surface radius changed (formerly Curved Surface Diameter Change)
	Surface Radius Change	General surface radius changed
	Surface Length Change	General surface length changed
	Hole Length Change	Hole length changed
	Curved Surface Length Change	Curved surface length changed
	Flat Surface Length Change	Flat surface length changed
	Complex Surface Length Change	Complex surface length changed
	Complex Surface Deviation	Complex surface has a deviation
	Surface Deviation	General surface has a deviation
	Surface Area Change	General surface area changed
	Surface Perimeter Change	General surface perimeter changed
	Surface Direction Change	General surface direction changed
	Surface Topology Change	General surface face topology changed
	Surface Type Change	General surface geometry type changed
	Flat Graphical Approximation Deviation	Graphical entity tessellation approximation points in the left-hand model differ in shape from flat face in the right-hand model
	Flat Graphical Deviation	Graphical entity tessellation vertices in the left-hand model differ in shape from flat face in the right-hand model
Curved Graphical Approximation Deviation	Graphical entity tessellation approximation points in the left-hand model differ in shape from curved face in the right-hand model	
Curved Graphical Deviation	Graphical entity tessellation vertices in the left-hand model differ in shape from curved face in the right-hand model	
Wireframe Add/Remove	Circular Curve Added	Circular curve feature added to right model
	Circular Curve Removed	Circular curve feature removed from left model
	Linear Curve Added	Linear curve feature added to right model
	Linear Curve Removed	Linear curve feature removed from left model
	Complex Curve Added	Complex curve feature added to right model
	Complex Curve Removed	Complex curve feature removed from left model
	Curve Added	General curve feature added to right model
	Curve Removed	General curve feature removed from left model
	Point Added	Point feature added to right model
	Point Removed	Point feature removed from left model

Level	Diagnostic	Brief Description
Wireframe Shape Changes	Circular Curve Location Change	Circular curve axis location changed
	Linear Curve Location Change	Linear curve axis location changed
	Complex Curve Location Change	Complex curve location changed
	Curve Location Change	General curve location changed
	Circular Curve Position Change	Circular curve position along axis changed
	Linear Curve Position Change	Linear curve position along axis changed
	Circular Curve Orientation Change	Circular curve axis orientation changed
	Linear Curve Orientation Change	Linear curve axis orientation changed
	Curve Orientation Change	General curve axis orientation changed
	Circular Curve Length Change	Circular curve length changed
	Linear Curve Length Change	Linear curve length changed
	Complex Curve Length Change	Complex curve length changed
	Curve Length Change	General curve length changed
	Circular Curve Radius Change	Circular curve radius changed (formerly Circular Curve Diameter Change)
	Curve Diameter Change	General curve diameter changed
	Complex Curve Deviation	Complex curve has a deviation
	Curve Deviation	General curve has a deviation
	Curve Topology Change	General curve edge topology changed
	Curve Type Change	General curve geometry type changed
Point Location Change	Point location changed	
Annotation Semantic Changes	Unmatched Left Annotation	Left-side annotation does not have a matching right-side annotation
	Unmatched Right Annotation	Right-side annotation does not have a matching left-side annotation
	Annotation Edge Length Change	Matching annotations have a significant associated edge length difference
	Annotation Face Area Change	Matching annotations have a significant associated face area difference
	Annotation Parameter Change	Matching annotations have a different parameter value
	Complex Annotation Match	Two or more annotations in the left-hand model match two or more annotations in the right-hand model
	Split Annotations	One annotation in the left-hand model matches two or more annotations in the right-hand model
	Merged Annotation	Two or more annotations in the left-hand model match one annotation in the right-hand model
Annotation Graphic Changes	Unmatched Left Saved View	Left-side saved view does not have a matching right-side saved view
	Unmatched Right Saved View	Right-side saved view does not have a matching left-side saved view
	Annotation Curve Length Change	Matching PMI annotations have a significant curve length difference
	Annotation Location Change	Matching annotations have a significant location difference
	Annotation Up Direction Change	Matching annotations have a significant up direction difference
	Annotation View Direction Change	Matching annotations have a significant view direction difference
	Annotation Color Change	Matching annotations have a different color
	Annotation Identifier Change	Matching annotations have a different identifier
	Annotation Name Change	Matching annotations have a different name
Attribute Changes	Unmatched Left Model Tree Node	Model tree node in left model has no matching node in right model
	Unmatched Right Model Tree Node	Model tree node in right model has no matching node in left model
	Unmatched Left Model Tree Property	Model tree property in left model has no matching property in right model
	Unmatched Right Model Tree Property	Model tree property in right model has no matching property in left model
	Model Tree Property Value Change	Model tree node properties are matched with different values
	Model Tree Node Order Change	Model tree node pairs are matched and occur in a different order
	Unmatched Left Feature	Feature in the left model does not have a matching feature in the right model
	Unmatched Right Feature	Feature in the right model does not have a matching feature in the left model
Feature Parameter Change	Matching features have a different parameter value	

Level	Diagnostic	Brief Description
Property Changes	Entity Count Change	The top-level entity counts (solids, open shells, unsewn faces, etc) are different between the two models
	Model Center Change	Bounding box center of the models is significantly different
	Model Extent Change	Bounding box extent of the models is significantly different
	Model Location Change	Centroid location of the models is significantly different
	Model Area Change	Total area of the models is significantly different
	Model Volume Change	Total solid volume of the models is significantly different
	Model Solid Area Change	Total solid area of the models is significantly different
	Model Solid Wetted Area Change	Total solid wetted area of the models is significantly different
	Model Solid Location Change	Total solid location of the models is significantly different
	Model Surface Area Change	Total non-solid surface area of the models is significantly different
	Model Surface Location Change	Total non-solid surface location of the models is significantly different
	Model Curve Length Change	Total wireframe curve length of the models is significantly different
	Model Curve Location Change	Total wireframe curve location is significantly different
	Solid Volume Change	Solid volume is significantly different
	Solid Area Change	Solid area is significantly different
	Solid Wetted Area Change	Solid wetted area is significantly different
	Solid Location Change	Solid location is significantly different
	Indep Surface Area Change	Independent non-solid surface entity area is significantly different
	Indep Surface Location Change	Independent non-solid surface entity location is significantly different
	Surface Color Change	Surface face color changed
Curve Color Change	Curve edge color changed	
Structure Defects	Unremoved Left Model Tree Node	Left model tree node is identified as removed by configuration option but unexpectedly matches a right model tree node
	Unremoved Right Model Tree Node	Right model tree node is identified as removed by configuration option but unexpectedly matches a left model tree node
	Unremoved Left Model Tree Property	Left model tree property is identified as removed by configuration option but unexpectedly matches a right model tree property
	Unremoved Right Model Tree Property	Right model tree property is identified as removed by configuration option but unexpectedly matches a left model tree property
	Unmodified Model Tree Node Position	Model tree node matches without expected position change based on configuration option
	Unrenamed Model Tree Node	Model tree node matches without expected name change based on configuration option
Equivalent Analytic Features	Equiv Indep Surface Entities	Corresponding solids/surface entities match between left and right models
	Equivalent Holes	Corresponding holes match between left and right models
	Equivalent Curved Surfaces	Corresponding curved surfaces match between left and right models
	Equivalent Flat Surfaces	Corresponding flat surfaces match between left and right models
	Equivalent Complex Surfaces	Corresponding complex surfaces match between left and right models
	Equivalent Surfaces	Corresponding general surfaces match between left and right models
	Equivalent Circular Curves	Corresponding circular curves match between left and right models
	Equivalent Linear Curves	Corresponding linear curves match between left and right models
	Equivalent Complex Curves	Corresponding complex curves match between left and right models
	Equivalent Curves	Corresponding general curves match between left and right models
Equivalent Points	Corresponding points match between left and right models	
Analytic Feature	Indep Surface Entity	Solid or independent surface entity feature
	Hole	Hole feature
	Curved Surface	Curved surface feature
	Flat Surface	Flat Surface feature
	Complex Surface	Complex surface feature
	Surface	General surface feature
	Circular Curve	Circular curve feature
	Linear Curve	Linear curve feature
	Complex Curve	Complex curve feature
	Curve	General curve feature
Point	Point feature	

Level	Diagnostic	Brief Description
Analytic Entity	Planar Face	Face has planar properties
	Cylindrical Face	Face has cylindrical properties
	Conical Face	Face has conical properties
	Spherical Face	Face has spherical properties
	Toroidal Face	Face has toroidal properties
	Complex Face	Face is not a basic analytic type
	Graphical Face	Graphical Face (F) is not a basic analytic type
	Linear Edge	Edge has linear properties
	Circular Edge	Edge has circular properties
	Complex Edge	Edge is not a basic analytic type
	Extruded Face	Face has extruded curve properties
	Offset Face	Face has offset surface type
	Revolved Face	Face has revolved curve properties
	Ruled Face	Face has ruled surface properties
	Polynomial Face	Face has polynomial surface
	Spline Face	Face has spline surface
	Unknown Face	Face has unknown surface type
Design Information	Simple Annotation Match	One annotation in the left-hand model matches a single annotation in the right-hand model
	Simple Saved View Match	One saved view in the left-hand model matches a single saved view in the right-hand model
	Excluded Left Model Tree Node	Model tree node is excluded from matching by configuration option
	Excluded Right Model Tree Node	Model tree node is excluded from matching by configuration option
	Removed Left Model Tree Node	Model tree node is identified as removed based on configuration option
	Removed Right Model Tree Node	Model tree node is identified as removed based on configuration option
	Removed Left Model Tree Property	Model tree property is identified as removed based on configuration option
	Removed Right Model Tree Property	Model tree property is identified as removed based on configuration option
	Modified Model Tree Node Position	Model tree node is matched with an expected position difference
	Renamed Model Tree Node	Model tree node is matched with an expected name difference
	Simple Model Tree Node Match	Model tree node is matched one-to-one
	Complex Model Tree Node Match	Model tree nodes match one-to-many, many-to-one or many-to-many
	Special Model Tree Node Match	Model tree node is matched as special based on configuration option
	Simple Model Tree Property Match	Model tree property is matched one-to-one
	Complex Model Tree Property Match	Model tree properties match one-to-many, many-to-one or many-to-many
Same Model Tree Property Value	Model tree property is matched with same value	

Level	Diagnostic	Brief Description
STEP Validation Properties	Transcribe Curve ValProp Length	Writes native curve length measured value to STEP curve length property
	Transcribe Curve ValProp Location	Writes native curve center measured value to STEP curve center property
	Transcribe Face ValProp Points	Writes native face sampling points to STEP sampling points property
	Transcribe Model ValProp BoundingBox	Writes native model bounding box measured value to STEP model bounding box property
	Transcribe Model ValProp Curve Length	Writes native model curve length measured value to STEP model curve length property
	Transcribe Model ValProp Curve Location	Writes native model curve center measured value to STEP model curve center property
	Transcribe Model ValProp Solid Area	Writes native model solid area measured value to STEP model solid area property
	Transcribe Model ValProp Solid Location	Writes native model solid center property measured value to STEP model solid center property
	Transcribe Model ValProp Solid Volume	Writes native model solid volume property measured value to STEP model solid volume property
	Transcribe Model ValProp Solid Wetted Area	Writes native model solid wetted area measured value to STEP model solid wetted area property
	Transcribe Model ValProp Surface Area	Writes native model indep surface area measured value to STEP model indep surface area property
	Transcribe Model ValProp Surface Location	Writes native model indep surface center measured value to STEP model indep surface center property
	Transcribe Solid ValProp Area	Writes native solid area measured value to STEP solid area property
	Transcribe Solid ValProp Location	Writes native solid center property measured value to STEP solid center property
	Transcribe Solid ValProp Volume	Writes native solid volume property measured value to STEP solid volume property
	Transcribe Solid ValProp Wetted Area	Writes native solid wetted area measured value to STEP solid wetted area property
	Transcribe Surface ValProp Area	Writes native indep surface area measured value to STEP indep surface area property
Transcribe Surface ValProp Location	Writes native indep surface center measured value to STEP indep surface center property	