

STEP standard support in Creo

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Support of AP214 and AP203 are the foundation of our STEP functionality

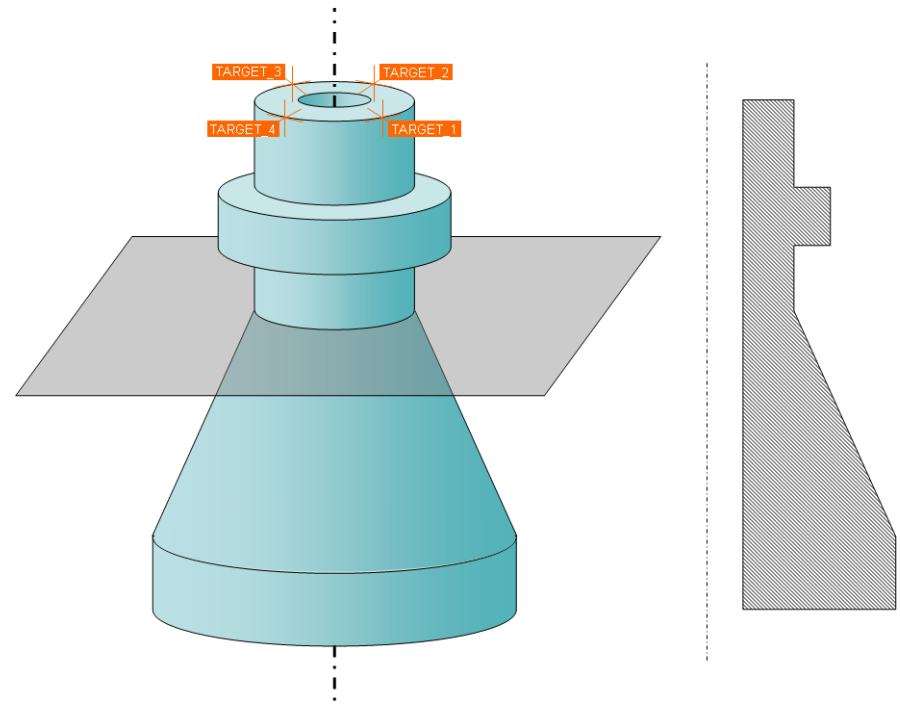
- **Pro/ENGINEER Wildfire 4.0**
 - User Defined Attributes
 - AP214_IS and AP203_E2
 - Material Name and Density
 - Export as general property
 - Export as separate STEP Product
 - Geometric Validation Properties
 - AP214_IS
 - Volume
 - Surface area
 - Center of gravity
 - “As Received” statistics stored in the STEP file
 - “As Computed” are statistics calculated by Pro/ENGINEER after import
- **Creo Elements/Pro 5.0**
 - Supplemental Geometry
 - AP214_IS and AP203_E2
 - Points
 - Axes
 - Planes
 - Csys
 - Assembly Validation Properties
 - AP214_IS and AP203_E2
 - Added number of children attribute
 - Already supported centroid for assemblies
 - Non-Geometric Content
 - AP214_IS and AP203_E2
 - Graphical annotations
 - 3D Notes, GD&T
 - Combined States: Orientations * & Layer States

STEP standard support

Supplemental Geometry via STEP

AP214_IS and AP203_E2

- All geometric elements that serve as a reference element
 - Creo Import/Export of Supplemental Geometry available in Creo Elements/Pro 5.0 F000
- Creo will map
 - STEP center line to Datum Axis
 - Datum Axis to STEP center line (unbounded)
 - STEP reference plane to Datum Plane
 - Datum Plane to STEP reference plane (unbounded)
 - STEP axis placement to Datum CSYS
 - Datum CSYS to axis placement



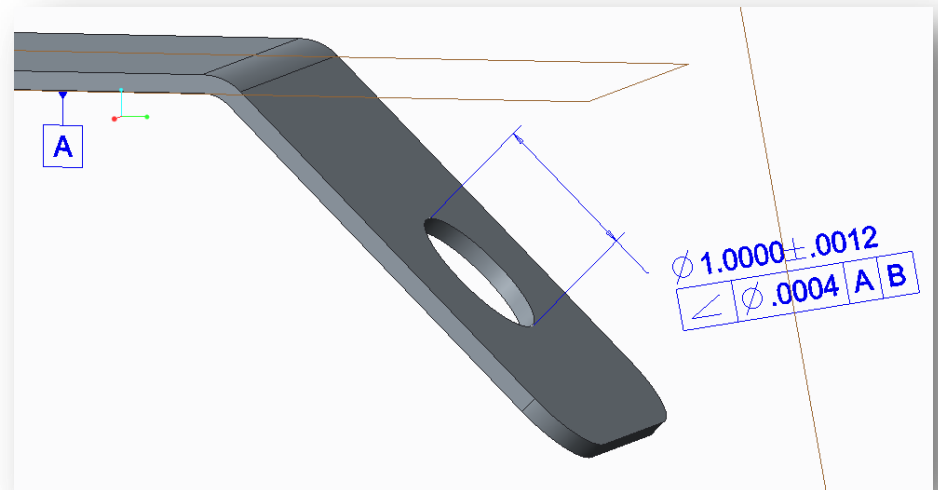
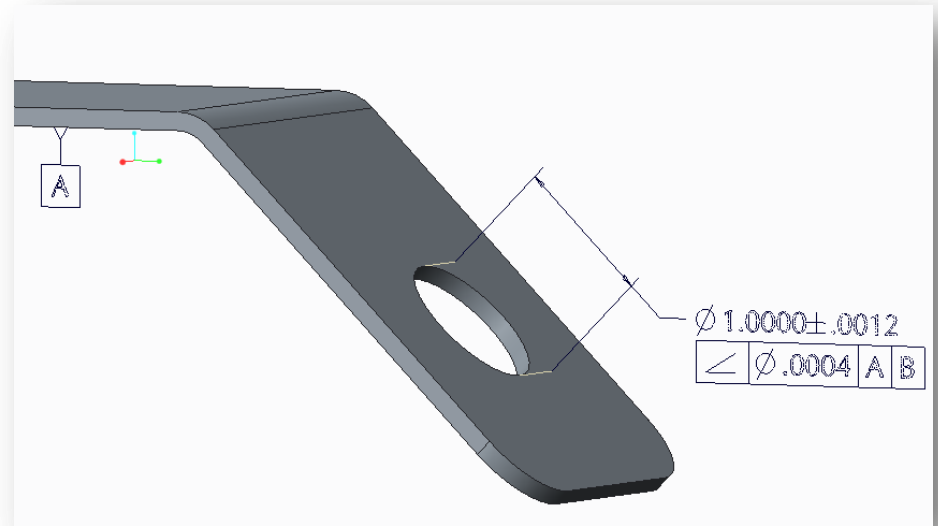
- Center line for cylindrical hole through part
- Reference plane at the upper end of the truncated cone, face normal parallel to the center line of the hole
- Four named axis placements along outer top edge of the part

STEP standard support

Current Implementation (PTC Creo 2.0)

AP214_IS and AP203_E2

- Polyline Presentation
 - Outline and Filled Characters
 - Geometric Elements
 - Import of Composite Curves
- Styling (Color)
- Annotation Planes
 - Infinite plane support
- Link to Geometry



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Current Implementation (PTC Creo 2.0) continued...

AP214_IS and AP203_E2

- PMI Validation Properties
 - Internal implementation
- General Validation Properties
- Feature Control Frames (Semantic)
 - Geometric Tolerance without modifiers or datums
 - Tolerance Zone
 - Projected Tolerance Zone
 - Geometric Tolerance with modifiers

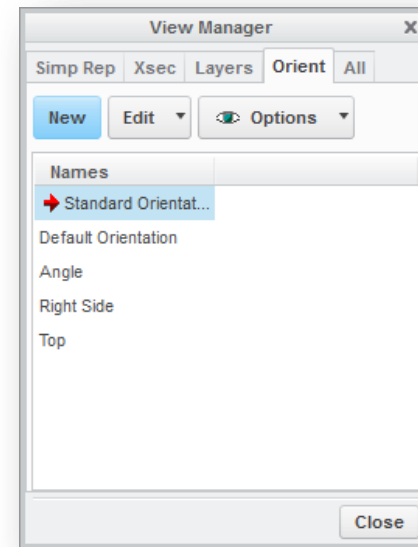
Geometric Validation Properties				
Property	Imported Value	Creo Parametric Value	Difference	Difference (per
Volume	2.810354e+00	2.810354e+00	-4.762630e-10	0.000000e+00
Surface Area	4.863668e+01	4.863668e+01	4.757723e-10	0.000000e+00
CGx	1.250000e+00	1.250000e+00	5.219104e-09	
CGy	2.824772e+00	2.824772e+00	-5.231933e-09	
CGz	-1.615879e-01	-1.615879e-01	1.992926e-08	

Annotation Validation Properties				
Property	Imported Value	Creo Parametric Value	Difference	Own
Total annotation count	2	2	0	
Total view count	0	1	-1	
Length	9.001947e+01	3.544074e+00	8.647540e+01	SIMPL
Centroid X	1.842990e+00	1.842990e+00	-4.440892e-16	SIMPL

Centroid X	1.842990e+00	1.842990e+00	-1.110885e-16	SIMPL
Centroid Y	8.001947e+01	3.544074e+00	8.647540e+01	SIMPL
Surface Area	0	0	-1	
Volume	0	0	0	

AP214_IS and AP203_E2

- Saved Views (PTC “combination states”)
- Application of Values (Semantic)
 - Nominal value (with qualifier)
 - Nominal range with plus/minus bounds
 - Value range, Limits and fits
- Association with Part (Semantic)
 - All Over
 - Multiple Features, Pattern of Features
 - All Around Modifier
 - Between Modifier



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STEP Remaining Gaps (Creo 4.0)

Comments on Support for AP242

Title	Creo 3.0 Plan	Creo 3.0 Status	Priority
Provide architectural foundation for Creo 3 STEP projects	Y	Complete	
[Infrastructure] Provide additional information content	Y	Creo 4 +	High
[Infrastructure] STEP projects preparation work continuation (AP 242 semantic PMI Infrastructure)	Y	Complete	
STEP AP242 Semantic PMI Export into Assembly	Y	Creo 4 +	High
STEP AP242 Semantic PMI Import into Assembly	Y	Creo 4 +	High
STEP AP242 Semantic PMI Export into Part	Y	Creo 4 +	High
STEP AP242 Semantic PMI Import into Part	Y	Creo 4 +	High
Cross-Section Support	Y	Creo 4 +	Medium

- Because AP 242 is a combination of AP 203 and AP 214, a large portion of development has already been done
- AP 242 related work will resume in the next PTC development cycle after AP242 is officially an International Standard

STEP standard support

PTC Windchill STEP Connector (Creo 3.0)

Share PTC Windchill product data with other Enterprise Systems using the STEP (ISO10203 2xx) format

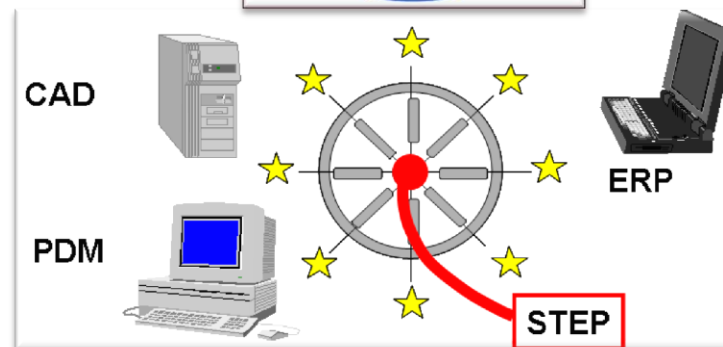
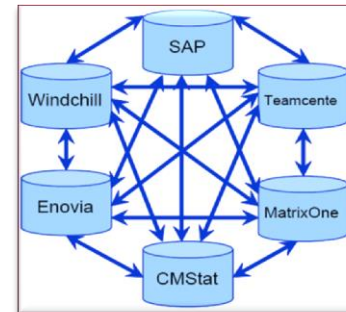
- **Capabilities**

- Ingrained EXPRESS schema support
- Support for AP214 AIM and PLCS
 - More protocols planned for future releases
- Highly Extensible
- Simultaneous support for Multiple APs



- **Benefits**

- Improve enterprise collaboration
- Lower TCO (Total cost-of-ownership)
 - Decrease point-to-point integrations
- Consolidation of Enterprise Systems
- Long Term Retention of data
- Contract compliance



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