



## AEROSPACE STEP ON A PAGE



### ISO 10303 Standard for the Exchange of Product model data (STEP)

Organizations and industries all over the world exchange product model data. These exchanges can be between requirements/concept, analysis, detailed design/BoM, manufacturing, or lifecycle support processes. Industry and government collaborators developed a suite of standards in the International for Organization Standardization (ISO) to exchange neutral product model data. It is the **ST**andard for the **EX**change of **PR**oduct model data (STEP).

#### ISO 10303 for Aerospace Product Model Data Exchange

The STEP development community is working to ensure these standards support international product model exchange requirements. The aerospace community is participating to ensure that their product model data can be exchanged to support real business processes. Integrated Resource parts in STEP address geometry, materials, tolerances, configuration management, product data management, and other general requirements. Application Protocol (APs) parts have been developed to address specific products and processes.

### AEROSPACE STEP STANDARDS

Almost every AP can be used by most industries and for most products. These are the key aerospace industry needs for product model data exchange using ISO 10303 STEP. Also the APs below can be used in multiple life cycle phases. For example AP 210 can classify requirements according to life cycle and domain context, supports declarations, inputs/outputs, and simulation libraries for analysis processes, supports design and Bill of materials, and provides manufacturing/inspection data for printed wiring/circuit boards.

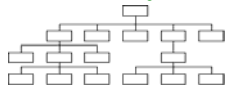
#### Generic Standards

##### AP 203 - Configuration controlled 3D designs of mechanical parts and assemblies

AP 203 is used to exchange geometry, product structure, and configuration management data. Edition 2 adds tolerances, construction history, layers and colors to the 3D exchanges with ISO 10303 re-usable data modules.

#### Requirement and Concept Standards

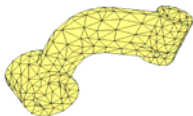
##### AP 233 - Systems engineering data representation



AP 233 addresses the need to exchange system requirements. The scope includes: conformity to the concept of a system; configuration control; requirements, requirement analysis; and functional allocation/ analysis/ behaviour; and physical architecture.

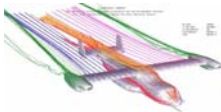
#### Analysis Standards

##### AP 209 - Composite and metal structural analysis and related design



AP 209 specifies computer-interpretable composite and metallic structural product definition data representation such as: shape, idealized analysis shape, finite element analysis (FEA) model, analysis results, and material properties. The design and related analysis information are managed within a PDM product structure.

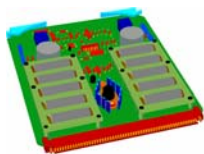
##### AP 237 - Computational fluid dynamics



AP237 defines a data representation for the exchange of fluid dynamics data. The information within scope includes: digital flow field data, surface data, and integrated data from (1) analysis and computation, (2) ground test (e.g., wind tunnel test), and (3) flight test. The first edition focuses on data related to analysis and computation.

#### Detailed Design/Bill of Materials Standards

##### AP 210 - Electronic assembly, interconnect and packaging design



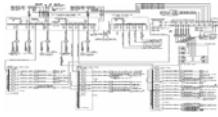
AP210 specifies the data for electromechanical design process. It includes specific data needed to support multi-level hierarchical design of electrical modules including both electrical and mechanical (structural/thermal) aspects of the design. Multiple levels of fidelity are supported by the physical models. A completely neutral electrical/mechanical component library is supported. Detailed layout structures and features are supported for 2D and 3D interconnect, including OEM and Fabricator views.

##### AP 214 - Core data for automotive mechanical design processes



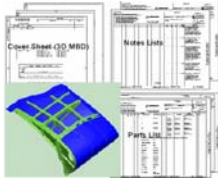
AP 214 is used to exchange mechanical geometry, product structure, configuration management, assemblies, supplier, tolerances and other information. It includes drawing exchange ensuring that a complete manufacturing technical data package can be exchanged.

## AP 212 - Electrotechnical design and installation



AP 212 is a STEP exchange standard that specifies data representation for electrotechnical plants and industrial systems design information. It addresses electrical product definition necessary to support electrical and cable tray: current analysis; equipment; lighting; cable sizing; electrical connectivity checks; and cable tray interference detection.

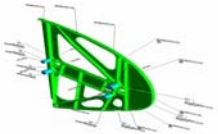
## AP 232 - Technical data packaging: core information and exchange



AP 232 provides the structure to package/relate groups of product information so that configuration controlled exchanges can be achieved. Product information may be exchanged in this AP's STEP format, another AP STEP format, or any other format. This capability will satisfy the industrial need to communicate and share the total design definition of a product among originating organization, partners, vendors, and customers from both a product item perspective and a document based perspective.

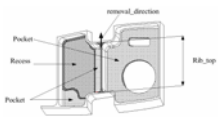
## Manufacturing (Make and Buy) Standards

### AP 219 - Dimensional Inspection



AP 219 will specify information requirements to manage dimensional inspection of solid parts or assemblies, which includes administering, planning, and executing dimensional inspection as well as analyzing and archiving the results. Dimensional inspection can occur at any stage of the life cycle of a product where checking for conformance with a design specification is required.

### AP 224 - Mechanical product definition for process planning using machining features



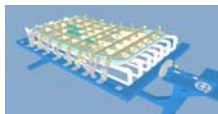
AP224 contains all of the information necessary to manufacture a mechanical part. It provides part features such as pockets, holes, slots, threads and gears, assembly information, geometric and dimensional tolerances, and geometry to support automated generation of macro process plans. Edition 3 adds features to support gears.

### AP 238 - Computer numerical controllers



AP 238 defines a machine independent data input standard for Computerized Numerical Control (CNC) systems. Using STEP-NC, Path Planning and CAD/CAM systems can create machine independent CNC control instructions for cutting, drilling, milling, turning and probing with a machine tool. AP-238 is a STEP integrated version of the ISO 1469.

### AP 240 - Process plans for machined products



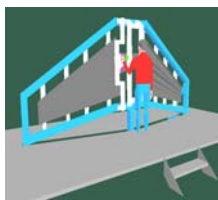
AP 240 defines the information for macro process planning. It provides process plans, revisions, machine tool resources such as fixtures and tools, process planning activities, activity sequencing, setups, materials, properties, process requirement documents, and part shape with features and tolerances.

### ISO 13584 Parts libraries and catalogs (PLIB)

PLIB supports exchange of parts catalogue information between external vendors and internal engineering and procurement parts libraries.

## Lifecycle Support Standards

### AP 239 - Product lifecycle support



AP 239 addresses support of the system from concept to disposal. It enables you to: request, define, justify, approve, schedule and capture feedback on work activities/resources; document product requirements and configuration as-designed, as-built, and as-maintained; provide feedback on product properties, operating states, behaviour and usage; and define support opportunities, facilities, personnel, and organizations for the complete aircraft or spacecraft description of structural envelope, distributed systems, and the subsystems/equipment.

## SUMMARY

Geometry is just one aspect of the product that needs to be shared and archived. The STEP APs capture additional data on components and systems to improve sharing of important aerospace information. Additional information on ISO 10303 parts is at:

ISO TC 184/SC 4 On-Line Information Service for STEP and PLIB - <http://www.tc184-sc4.org/>

ISO Catalog - <http://www.iso.org/iso/en/CatalogueListPage.CatalogueList>

ANSI Catalog - <http://webstore.ansi.org/ansidocstore/default.asp/>

US Technical Advisory Group - <http://www.tc184-sc4-ustag.org>

PDES, Inc. - <http://pdesinc.aticorp.org/>

ProSTEP iViP Association - <http://www.prostep.org/en/>

Product Lifecycle Support, Inc. - <http://www.plcsinc.org/>