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QUALITY ASSURANCE STANDARD FOR DIGITAL PRODUCT DEFINITION AT BOEING SUPPLIERS

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Abstract

Document D6-51991, Quality Assurance Standard for Digital Product Definition (DPD) at Boeing Suppliers, provides uniform specifications for supplier control of Boeing Digital Product Definition data.

Maintenance

Maintenance of Document D6-51991, Quality Assurance Standard for Digital Product Definition at Boeing Suppliers, will be through the BCAG Global Partners and Procurement Quality Assurance Department. Revisions to D6-51991 must be in accordance with established procedures.

Purpose

This standard establishes requirements for Boeing suppliers' DPD quality assurance/quality control system. The requirements contained in this document are intended to facilitate supplier deployment of DPD processes and to achieve technical coordination between customer, supplier and sub-tier supplier.

Scope

This document is a supplement to the Boeing Quality Management System, D6-82479 and describes the requirements for supplier digital data system controls. To use Boeing furnished datasets as authority for design, manufacture and inspection, a supplier must be approved to a Boeing recognized quality system and comply with this document. Boeing shall document supplier compliance as a special capability in the Boeing Approved Supplier List.

These requirements provide the basis for suppliers to create and implement plans, user level procedures and process documentation for the use of digital design data. The supplier will have defined and reliable configuration management and Quality Assurance (QA) processes in place reflecting its methods of operation. Supplier is required to maintain integrity of DPD type design through all operations when new DPD methods are deployed. It is anticipated that suppliers will utilize DPD processes to continuously improve the quality of delivered product.

The application of this document is required for all phases of design and inspection when Boeing digital product definition data is used in Supplier DPD systems to produce product(s) or digital data for product acceptance (including accountable tooling and tooling used for inspection).

If a supplier is sending digital product definition data to Boeing, the requirements are obtained from the procurement agent and the purchase order, and the supplier must meet applicable data exchange requirements.

Authority and Responsibility of Authorized Boeing Quality Assurance Representatives

The Boeing quality assurance representative shall have access to supplier's documented DPD process and related documentation.

The Boeing representative shall verify conformance and document the supplier's DPD, MBD and CMS capabilities.

The Boeing representative shall maintain open lines of communication between Boeing, supplier and sub-tier supplier as required for technical coordination and to facilitate changing digital processes to improve product quality.

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1. Digital Product Definition Quality Assurance Procedures and Documented Processes

1.1. The Supplier shall develop and maintain comprehensive documented DPD processes and/or procedures that assure integrity of product engineering and/or tooling, and configuration is maintained throughout the supplier's DPD system from receipt of Boeing data through creation of derivatives to product acceptance and process improvement.

1.2. This documented process shall specifically address the processes and techniques unique to all DPD processes beginning with the delivery of customer authority data.

1.3. It is recommended that supplier documented DPD processes describe a single, consistent configuration management and QA process to meet all customer (Boeing, other companies, regulatory agencies, etc.) DPD requirements. This documented process shall remain in effect throughout the life of the contract.

The supplier shall maintain open lines of communication with Boeing and at a minimum the supplier will notify their Boeing Rep within 30 days of any changes to:

1. The Documented DPD Processes
2. CAD, CAM, CAI software
3. Measurement equipment

Additionally, the supplier will submit a DPD Capability Questionnaire annually to their Boeing Rep. The questionnaire is available through the Boeing Procurement Agent, Boeing PQA Representative, or Boeing supplier web portal.

1.4. Boeing reserves the right to survey and/or review the supplier's DPD system to verify effectiveness of the supplier's documented DPD processes and procedures.

1.5. The quality organization shall be responsible for the documented DPD processes with procedures for change control and notification to affected organizations. The authority and responsibility for each element of the documented DPD processes shall be defined and documented to assure consistent implementation.

1.6. The supplier shall include a flow diagram in the documented process that graphically depicts the flow of data through the DPD system from receipt of Boeing DPD data, through all supplier user organizations creating derivatives, to product validation, and in analysis of measurements for process improvements. The flow diagram shall specify all segregated, secure storage locations of authority and derivative media. The diagram shall specify all supplier departmental functions responsible for performance of CAD/CAM operations including the delivery of Boeing data to sub-tier suppliers. The flow diagram shall identify the documented DPD processes associated with control of the datasets and derivatives.

1.7. Elements of the documented DPD processes shall address, but not be limited to, the elements in sections 2.0 through 11.0.

These sections in D6-51991 may be addressed in other supplier documents. If so, reference to these shall be made in the documented process.

2. Configuration Management and Media Security

2.1 The supplier shall develop and maintain a documented processes to ensure the configuration of Boeing DPD controlled production hardware and tooling. Procedures or documented processes will be in place to ensure that configuration of the following DPD systems are identified, controlled and recorded:

a) Product acceptance software (PAS)
b) Computerized measurement systems (CMS)
c) CAD/CAM software and datasets
d) Data analysis software
e) Supplier generated datasets (derivative datasets)
f) Datasets provided by the supplier to all sub-tier suppliers

2.1.1 The supplier shall develop and maintain documented processes for configuration identification and control of CAM software and datasets. Objective evidence for verification of numerically controlled machinery and dataset performance must be obtained no later than first production use and is required for release for production.

2.2 The Supplier shall develop and maintain documented processes used to ensure the integrity and security of customer supplied DPD data, supplier extracted data and/or supplier generated definition data.

2.2.1 These documented processes shall include requirements for:

a) Storage of controlled data and digital product acceptance datasets.
b) Access and archiving procedures with read/write protection, including passwords, which ensure access control per the time specified per program or contract requirements.
c) Encryption protection for sending/receiving of electronically transmitted data.
d) Establishing and maintaining a data backup system including remote storage and disaster recovery.

2.3 The supplier shall provide a system for formal release of DPD datasets which ensures that only current authority datasets are available for use in production and inspection. A record of the key identifiers of Boeing authority datasets (drawing, sheet, revision level and/or dataset name) and those key identification and naming conventions created for authority supplier derivatives must be readily available during measurement, verification and data analysis processes for product acceptance by supplier, sub-tier and Boeing QA representatives

2.3.1 A system for change accountability and configuration management for all datasets and dataset derivatives (including graphical/geometric electronic data, CAE datasets and supplier hardcopy reports) will be maintained by the supplier.

3. Product Acceptance Software

3.1 The supplier shall document and maintain documented processes for control of Product Acceptance Software (PAS).

3.1.1 Supplier must document and maintain PAS procedures and reference applicable documents in their documented DPD processes. Procedures or documented processes shall provide for identification of software for a QA application, control of the QA approved version for product acceptance, and control of obsolete software. All changes to PAS shall be documented and approved by supplier's QA.

3.1.2 Supplier will develop and maintain documented processes for reporting, tracking and resolving software related product acceptance problems

3.1.3 Procedures or documented processes will be maintained to prevent unauthorized changes, to limit personnel access to software files, and to separate archives for masters and duplicates. Supplier PAS storage methods will take measures to minimize deterioration or regeneration of errors and to assure that reproduction of code occurs error free.

3.1.4 Supplier PAS must be verified prior to product acceptance use. The supplier will establish and maintain a procedure independent of the software developer to determine that the software, and subsequent revisions, accomplishes its intended function. A formal means of identifying approved PAS is required with configuration control and QA management procedures for relating the PAS to the product being accepted.

3.2 Software developed by suppliers requires plans and instructions for building, configuration management, loading and testing of code.

4. Internal Quality Audits

4.1 Internal Quality Audit procedures shall include provisions for auditing all operations affecting DPD data and related documentation to assure compliance with contractual requirements, software and production part quality standards, and the observance of security restrictions. The audit plan shall include provisions for audit of sub-tier suppliers using DPD data on Boeing products and tooling.

4.2 Results of all audits will be documented and maintained for review by an authorized Boeing representative per contract requirements.

5. Problem Reporting and Corrective Action

5.1 The Supplier shall assure that nonconforming digital product definition datasets are identified as discrepant, segregated and reviewed for disposition.

5.2 The supplier's documented procedure for corrective action shall include reporting, tracking and resolving all transmission, hardware, software and dataset problems and product deficiencies.

6. Procurement Control

6.1 The supplier will flow down the requirements of this document (D6-51991) to their sub-tier suppliers and document sub-tier supplier compliance when Boeing authority datasets or dataset derivatives are used for manufacturing or product acceptance. This would include design collaboration when design responsibility is shared with sub-tier suppliers.

6.2 The supplier will be responsible to Boeing for the maintenance, change incorporation, use of datasets and observance of security restrictions by their sub-tiers for design, manufacturing and inspection. The supplier is fully responsible for and will establish procedural controls to assure Boeing datasets transferred (authority or derivative) between their company divisions and all levels of their sub-tier suppliers will be in compliance to the ITAR, MLA, MA, TAA, EAR and Boeing contract agreements.

6.3 The supplier will ensure design responsibility provided by sub-tier suppliers Boeing shares design responsibility through design collaboration and product is designed by engineers contracting design services using a

6.4 Boeing reserves the right to survey and/or review the DPD quality assurance and configuration management systems of these sub-tiers.

7 Control of Measurement Equipment

7.1 The supplier will develop and maintain a system for periodic maintenance of digital measurement equipment. These controls will provide records of date of acceptance/rejection and next maintenance due date. Measurement equipment will be physically identified in accordance with certification records. This includes all CMS equipment, N/C (CAM) equipment with calibrated inspection probe capability, Optical Projection Ply Locating Machines (OLT's), ply cutters, and plotters used to produce drawings, mylars or other inspection or tooling media. Calibration shall be traceable to NIST or equivalent standard and shall meet original equipment manufacturer requirements.

7.2 Suppliers using CMS and OLT's for fabrication and/or inspection of Boeing products (parts and tools) must document and control their CMS processes. Suppliers must comply with the product acceptance software, measurement equipment, inspection media and training requirements for portable CMS. Additional portable CMS requirements are stated below and require capability approval by Boeing:

7.2.1 The supplier must document inventory of all specific components used for PCMS measurements that affect the integrity of data collection. The supplier shall document and implement periodic calibration and certification of these components. The supplier shall retain PCMS original equipment manufacturer specifications for accuracy and repeatability certification.

7.2.2 The supplier and its sub-tier suppliers utilizing PCMS and OLT's must have processes and documented procedures that provide adequate training and procedural

methods to perform acceptance on measurements. These must include at a minimum, but not limited to:

a) Create acceptance criteria used by operator and quality assurance
b) Develop and use of scale factors to compensate measurements for coefficient of thermal expansion and to verify accuracy
c) Establish, transform and manipulate coordinate systems
d) Establish data collection parameters and requirements
e) Establish special targeting and target adapter requirements
f) Equipment handling, equipment set-up, multi station set-up, field checks and calibrations
g) Data analysis, format, storage and reporting

8. Inspection Media

8.1 The supplier shall ensure that all digital measurement operations performed on each part or tool are planned. Supplier's QA organizations are responsible, at a minimum, for digital inspection media, measurement instructions and analysis of data for product acceptance. Measurement planning shall give consideration to the following activities, as appropriate, in meeting the specified design requirements:

8.1.1 Description of the method and instructions for validation of each product feature for first article inspection and for documentation of the analysis of inspection and test results used as a basis for all quality/inspection adjustments. To validate product features with methods other than dimensional measurement, the supplier must document the media and/or process used.

8.1.2 Selection of specific stages of production to perform feature measurements to monitor production capability, ensure validation of all specified requirements, and integrate manufacturing and measurement processes.

8.1.3 Analysis and delivery of measurement data for engineering disposition, design improvement, process control and defect reduction.

8.2 The Supplier shall develop and maintain documented processes to extract inspection media and other measurement data from DPD datasets, including delivery and control of the media. This will include documented inspection plans and/or equivalent procedures that:

a) Assure inspection media is independently derived from the authority dataset.
b) Are performed by qualified personnel.
c) Contain graphics and text sufficient to illustrate inspection operation and result for each product feature.
d) Are traceable to authority source and any additional derivative media used.

Note: Derivative datasets will be stored and readily comparable to the authority source.

8.2.1 When a supplier uses authority datasets for inspection purposes, any data extracted from those datasets used for product acceptance must have an approved documented process and be under configuration control. This may include 2-D production illustrations, shop aids, or drawings to facilitate manufacturing and inspection. In addition, any output data generated from plots and CMS inspection processes must have evidence of QA acceptance and be under

configuration control. Traceability of CMS data back to the original Boeing authority dataset is required.

8.2.2 Data or datasets identified as "REFERENCE ONLY" may not be used for product acceptance purposes.

8.2.3 Supplier may use definition of MDD, MDI, MDS or other digital definition, including IGES or STEP format, as authority for product acceptance when supplied by Boeing according to an MDR process.

8.3 DPD datasets with reduced content, including MBD datasets without 2D views, may require users at supplier to extract information from the dataset sufficient to instruct and document manufacturing and inspection activity for the product. Additionally MBD requires capability assessment by Boeing. A LEV, 2D sketches/views and/or datasets may be used to convey manufacturing and inspection information as required to fit the supplier's methods of operation.

Note: Use of a LEV requires compliance with sections 3.0, 8.2, and 9.0 of this document, as applicable.

8.3.1 When planning measurements for product acceptance, supplier's QA must verify that all design requirements (e.g., all features defined by feature control frames, annotation, specifications, notes and other specified requirements in the authority DPD dataset and associated parts list including dimensional and other properties) are identified and planned for inspection/validation.

8.4 Accuracy of plots used for inspection media will be verified prior to use.

9. Data Exchange Methods

9.1 The supplier shall document the current level of hardware configuration, software, software revisions and other digital system information (e.g. PTF(s), project files) required to maintain compatibility with Boeing supplied datasets and/or data exchange formats per applicable Boeing system(s) requirement documents. This includes CAD, LEV, data exchange and other computing equipment that receives authority data and/or is installed/tested by Boeing. Supplier shall comply with and reference applicable synchronization documents in their documented DPD processes.

9.1.1 Supplier must have a documented process that ensures they can receive, validate transfer, file and document (per Section 2) authority dataset without change to the data integrity. Only then can the dataset be used as authority for product acceptance.

9.2 The supplier shall notify Boeing of their equipment configuration and changes when necessary to maintain CAD synchronization requirements within 30 days of change notification.

9.3 When Boeing DPD data containing 3D geometry is received in translated format (e.g., IGES, STEP), the supplier must verify their translation of each dataset or have a process to verify and validate translation software (per Section 3.), in order to maintain authority status.

9.4 When a supplier translates Boeing authority datasets from their native CAD system to their manufacturing or inspection software, the translation must be verified. The verification process will include validation back to the authority model and objective evidence of completion. Examples of translation verification processes include point cloud verification, model/surface comparison, and dimensional comparisons.

10. Tooling

10.1 The supplier shall describe documented processes to ensure release, acceptance, identification, security, access and change control of tool design and tool inspection datasets. This includes ERS datasets which will be accepted according to a documented installation procedure. Tooling datasets will have traceability to current authority engineering and derivative tooling dataset sources. The engineering authority dataset(s) will be identified on the tool design when applicable.

10.2 All digitally defined tools and physical inspection media (check fixtures, templates, etc.) will be identified and traceable to the authority tool design dataset and any tool inspection datasets. These tools and tooling media will be accepted and periodically validated to the authority design at a frequency determined to ensure accuracy and repeatability of the tool before use. Periodic inspection of digitally defined tools will meet the requirements of section 8.0 of this document as applicable.

11. Training and Process Performer

11.1 The supplier shall ensure that personnel having DPD system access have completed training adequate to perform digital product acceptance activities including digital inspection media generation and 3D data collection. If these activities are performed by individuals other than the supplier's quality assurance personnel, the supplier shall define the specific tasks and responsibilities that are authorized and the corresponding requirements and training necessary to perform those tasks.

11.2 Suppliers shall define training requirements to assure competence and maintain employee training records, including on-the-job-training, for all DPD system users. This includes changes driven by new equipment, software or Boeing program requirements.

Definitions

ANNOTATION

Dimensions, tolerances, notes, text and symbology visible without any interrogation of the model.

AUTHORITY

Undisputed source of Boeing approved type design used for product manufacture and quality assurance acceptance.

CAD

Computer Aided Design - (1) Any computer system or program that supports the design process. (2) The use of computers to assist engineering design in developing, producing and evaluating design, data and drawings. (For brevity, CAD is also referred to as the organization engaged in computer-aided design.)

CAE

Computer Aided Engineering - The use of computers to develop engineering data to supplement engineering designs for use in product production and inspection.

Note: Specific for BCAG DCAC processes, CAE data is extracted from PDM in the form of hardcopy reports or electronic PDM STEP Dataset transactions. The dataset contains bill of material (BOM) information (Parts Lists, Picture Sheet Data Lists, Tool Parts List, etc.) used by Boeing and suppliers to define and accept products.

CAM

Computer Aided Manufacturing – Also known as numerical control (NC). The use of computers and computer data in the development and production of all part types (products) including fabrication, assembly and installation.

CATIA

Computer-graphics Aided Three-dimensional Interactive Application. A CAD system with interactive graphics design software modules used to create 3D and 2D geometric designs of products.

CMS

Coordinate Measurement Systems - Also known as Computer Aided Inspection (CAI) and Computer Aided Measurement Systems (CAMS). Measurement equipment such as Coordinate Measuring Machines (CMM), Laser Tracker, and numerical controlled machinery with inspection probe capability which are used to support inspection activity.

CUSTOMER

The party (individual, project, or organization internal to or external to the company) responsible for accepting the product or for authorizing payment. Customers may or may not be users.

DATASET

Information prepared and maintained by electronic means (CAD/CAM), and provided by electronic data access, interchange, transfer, or on electronic media.

DERIVATIVE

A reproduction of all or part of an authority dataset. Derivatives include paper and mylar plots, tool designs, inspection datasets created to analyze as-built designs, check templates, numerical control (N/C) datasets/media, datasets with nominal values for CMS use, QA inspection plans and other extractions (dimensions, views, etc.) for inspection/measurement use.

DPD

Digital Product Definition – The electronic data elements that specify the 3D Computer Aided Design (CAD) geometry and all design requirements for a product (including notation and parts lists), and the use of this data throughout an integrated CAD/Computer Aided Manufacturing (CAM) and Coordinate Measurement Systems (CMS).

EAR

Export Administration Regulations. This is the Dep't of Commerce agency, (Commercial or Dual Use)

ERS

Enhanced Reference System – A permanent reference system, established for the life of a tool, which is documented from a design reference system or created specifically for CMS. The ERS is used to provide a large number of known point coordinates for use in tool transformations; this allows rapid and accurate measurement in all areas of the tool.

FEATURE

Feature - Any hardware design attribute or characteristic. This includes physical portions of hardware such as a surface, face, edge, radius, hole, tab, slot, pin, etc., and requirements such as non destructive inspection (NDI) and interchangeability and replaceability (I&R). All features require validation to conform the product to the design authority. All features have associated notes and/or Geometric Dimensioning and Tolerancing Feature Control Frames (FCF) and one note or FCF may refer to several features.

IGES

Initial Graphics Exchange Specification - The American National Standards Institute (ANSI) data standard for the exchange of computer graphics generated product definition (no solids) between different manufacturers' CAD/CAM systems.

INSPECTION PLAN (Criteria)

A description of 2D and/or 3D computer generated inspection media/methods derived from authority DPD datasets and used to communicate inspection requirements and media usage to manufacturing and inspection areas. Typical plans include engineering and plan configuration/ traceability, overlay/setup instructions and a list and/or graphic representation of the features to be inspected.

ITAR

International Traffic in Arms Regulations - Dep't of State (Military)

LEV

Low End Viewer – An entry level visualization CAD system used to view, analyze, extract and print dimensional and other required data from the DPD dataset.

MA

Manufacturing Agreement- an agreement whereby a US person grants a foreign person an authorization to manufacture defense articles abroad and which involves or contemplates:

1. The export of technical data or defense articles or the performance of a defense service: or
2. The use by the foreign person of technical data or defense articles previously exported by the US person

MBD

Model Based Definition – A Boeing dataset containing the exact solid, its associated 3D geometry and 3D annotation of the product's dimensions and tolerances (and may include parts/notes list) to specify a complete product definition. This dataset does not contain a conventional 2D drawing. MBD is one possible format of DPD.

(Note: Model Based Definition provides a single-source of definition, and it reduces conflict between CAD and paper drawings)

MDD

Master Dimension Definition - A mathematically controlled surface definition which is computer generated. This definition consists of control curves defining the surface in two

planes and the information in a logical form necessary to develop the third plane and/or any cross section. Each surface is uniquely identified by number.

MDI

Master Dimensions Identifier - A number identifying an array of coordinate data used by Design, Manufacturing and Inspection to describe an element of a surface or product configuration. The data may be an extraction from an MDD or any CATIA/APT designed surface.

MDR

Master Dimension Request -. A process used by suppliers, without demonstrated digital product definition capability(s) per requirements of this document, to request and receive 3D surface definitions and/or inspection media extractions from Boeing. Data format may be printouts, disks, plots, etc. with evidence of Boeing QA acceptance and traceability. Supplier shall contact Boeing procurement agent for process instructions.

MDS

Master Dimension Surface - A computer generated, mathematically controlled CATIA 3D surface definition. Each surface is uniquely identified by number.

MEASUREMENT PLANNING

Process to coordinate all measurement activity for parts, assemblies or tooling products. A team including design, manufacturing and measurement (QA) specialists determine the measurement and/or validation methods and stage in production for all specified product features. Data is collected for both process control and product acceptance. Measurement planning seeks continuous improvement and innovative validation methods including integration of manufacturing and measurement operations to reduce defects and cycle time.

PAS

Product Acceptance Software - DPD software (including CAD, LEV, data exchange, and CMS systems) used to inspect and accept parts, assemblies, tooling and systems.

(NOTE: Not embedded or loadable Airborne S/W)

PCMS

Portable Coordinate Measurement Systems – See CMS for definition.

PDM STEP

Product Data Manager (PDM) dataset(s) in STEP format with bill of material (BOM) information (Parts Lists, Picture Sheet Data Lists, Tool Parts List, etc.) used by BCAG to define CAE requirements. This dataset can be communicated to Boeing suppliers in a digital format.

PTF

CATIA Program Temporary Fixes – Software changes or additions released by the software manufacturer to correct user application problems before the next major software version is available. Reference D6-56199 for CATIA software version(s) and PTF(s) installed on BCAG CATIA systems.

PROCESS CONTROL

Use of in-process checks to determine performance parameters of manufacturing operations. Data collected is used to determine when adjustment is needed to reduce manufacturing variability.

REDUCED CONTENT DRAWING

Any DPD design dataset without full dimensioning of product features on a 2D sheet. This includes Reduced Dimension Drawings (RDD) and "Simplified Drawings" which contain reference to 3D surface definition or CAD geometry.

REFERENCE ONLY (REF)

(1) Notation indicating which layers or features of a design are not reliable or authorized for manufacturing and inspection use (2) Marked "Reference Only" datasets whose definition is not reliable and not authorized for design, manufacture or inspection.

STEP

Standard for the Exchange of Product model data. – Standard developed by the International Standards Organization for exchange of digital product data. It seeks to improve upon IGES by increasing the ability to transfer entire product life cycle data.

SUPPLIER

(1) An entity delivering products or performing services being acquired. (2) An individual, partnership, company, corporation, association, or other service having an agreement (contract) with an acquirer for the design, development, manufacture, maintenance, modification, or supply of items under the terms of an agreement (contract).

SUB-TIER SUPPLIER

An entity working under supplier contract(s) and providing products or services on Boeing programs.

TAA

Technical Assistance Agreement - An agreement for the performance of a defense service(s) or the disclosure of technical data, as opposed to an agreement granting a right to manufacture defense articles. Assembly of defense articles is included under this section, provided production rights or manufacturing know-how are not conveyed. Should such rights be transferred, a Manufacturing License Agreement (MLA) is required.

TRANSLATION

Translations occur when a digital dataset is changed from its original CAD system format to another CAD, CAM, CAI application format and require verification.

References

The current issue of the following references is considered a part of this standard to the extent herein indicated.

D6-82479	Boeing Quality Management System Requirements for Suppliers

The following documents define specific Digital Product Definition (DPD) processes. Supplier shall contact their Boeing Procurement Agent to request applicable documents.

PRO-5159	Assessment of Boeing Suppliers Digital Product Definition Capability
TA-PD-287	Electronic Exchange of Product Definition Data to Suppliers
DAC-SIM-099	Digital Data Packaging and Downloading
D6-56199	Hardware and Software Compatibility Requirements for Suppliers Use of BCAG CATIA Native Datasets as Authority for Design, Manufacturing and Inspection
D6-81491	Authority and Usage of CATIA Native, CATIA IGES and PDM STEP Datasets
D6-56643-700	IGES_CHK Program Users Guide
D6-56643-701	DEL_LAY Program Users Guide
D6-55902	Qualification of Equipment for Fabrication of Composite Structure
D33200	Boeing Suppliers' Tooling Document
D6-82253	Digital Exchange Requirements for PDM STEP Part 21 Data
D016Z003-01	Performing First Article Inspection using MBD (787 program)
D034Z002-01	787 Defined Products Distributed to Partners and Suppliers (787 program)

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Revision Letter	**I**
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