SAE Aerospace
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AEROSPACE STANDARD

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(R) Quality Management Systems - Nonconformance Documentation

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RATIONALE

This standard has been significantly revised further defining process requirements and data expectations; restructuring the nonconformity documentation data and providing further definition of data descriptions; and providing process defect, cause, and corrective action codes.

This standard was created to provide for the uniform submittal of nonconformance information for notification and/or approval when contractually invoked at any level or as guidance within the aviation, space, and defense industries. This standard can be invoked as a stand alone requirement or used in conjunction with AS/EN/JISQ series standards (i.e., 9100, 9110, 9120).

FOREWORD

To assure customer satisfaction, aerospace industry organizations must produce, and continually improve, safe, reliable products that meet or exceed customer and regulatory authority requirements. The globalization of the aerospace industry, and the resulting diversity of regional/national requirements and expectations, has complicated this objective. End-product organizations face the challenge of assuring the quality of, and integrating, product purchased from suppliers throughout the world and at all levels within the supply chain. Aerospace suppliers and processors face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

The aerospace industry established the International Aerospace Quality Group (IAQG) for the purpose of achieving significant improvements in quality and safety, and reductions in cost, throughout the value stream. This organization includes representation from aerospace companies in the Americas, Asia/Pacific, and Europe.

This document standardizes requirements for nonconformance data definition and documentation for the aerospace industry. The establishment of common requirements, for use at all levels of the supply-chain, by organizations, should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.

TABLE OF CONTENTS

1. SCOPE

This standard defines the common nonconformance data definition and documentation that an internal or external supplier or sub-tier supplier must submit when informing a customer of a nonconformity. The requirements shall be are applicable for reporting a nonconforming product to the owner/operator (i.e., end item user), if specified by contract.

Reporting of nonconformance data, either electronically or conventionally on paper, is subject to the terms and conditions of the contract. This also includes, where applicable, data access under export control regulations.

1.1 Purpose

The process of exchanging coordinating and approving nonconformance data via waiver/concession or product quality escape varies with the multiple relationships and agreements among all parties concerned. The information provided by this standard forms an architecture for submitting and managing data that allows for concise and accurate communication using various methods. The main objective of this standard is to provide the definition of a data set that can be integrated into any form of communication (e.g., electronic data interchange, submission of conventional paper forms).

2. APPLICABLE DOCUMENTS

The following documents are directly associated to the application of this standard. For dated references, only the edition cited applies. For updated references, the latest edition of the document, including any amendments applies.

AS/EN/JSIQ 9100	Quality Management Systems – Aerospace – Requirements
AS/EN 9110	Quality Management Systems – Aerospace – Requirements for Maintenance Organizations
AS/EN/SJAC 9102	Aerospace First Article Inspection Requirements
AS/EN/SJAC 9103	Variation Management of Key Characteristics
AS/EN 9120	Quality Management Systems – Aerospace – Requirements for Stockist Distributors
ISO 9000:2000	Quality management systems – Fundamentals and vocabulary

3. DEFINITIONS

For the purposes of this standard, the terms and definitions stated in ISO 9000 and the following apply:

3.1 Customer

The recipient of a product provided by an internal/external supplier or sub-tier supplier.

3.2 Mandatory

Common and transferable data systematically filled in and provided. The data field must be printed out on the paper form.

3.3 Optional

All data fields that are not defined as mandatory by this standard. These fields may be requested by a customer or need by the originator for their own purposes.

3.4 Product

Any vehicle, engine, equipment, component, or parts and materials thereof.

3.5 Product Quality Escape

Any product released by an internal or external supplier or sub-tier supplier that is subsequently determined to be nonconforming to contract and/or product specification requirements.

3.6 Waiver/Concession:

Written authorization from the customer to the internal or external supplier to use or release a product which does not conform to the specified requirements

NOTE: Waiver/concession and product quality escape differ with respect to the point in time when a nonconformance is detected during the product life cyle. Waiver/concession is evident before delivery to the the customer, while a product quality escape is identified after delivery to the customer.

4. REQUIREMENTS

4.1 Data related to the description of a nonconformity (i.e., content, format, size) shall be in accordance with the complete set defined in Appendix A, "LIST OF NONCONFORMANCE DOCUMENTATION".

a. Mandatory data fields, identified in bold text and marked with an asterisk (*) shall be systematically recorded and reported to the customer.

b. Optional data fields shall be recorded when requested by the customer or due to originator's needs.

NOTE 1: For any data field, whether mandatory or optional, recorded and reported to the customer that is not applicable shall have N/A entered in the field, prior to final approval/signature.

NOTE 2: Customers may require different optional data fields be recorded and reported. It is therefore recommended to ensure the Information Technology System is capable of modifying the optional data fields and inactivating those not being used to be able to fulfill new customer’s requirements and where existing customers change their requirements.

4.2 The entities responsible for entering and approving/acknowledging nonconformance data shall respond in accordance with the terms and conditions of the contract and/or the needs of the originator.

4.3 Attached files shall be in a protected format (e.g., pdf, tif, jpg). Formats which can be easily changed (e.g., doc, xls, ppt) should be avoided. In such cases, appropriate precautions shall be taken to prevent inadvertent changes to the document.

4.4 Some data systems actually impose file-size constraints (e.g., maximum 500 kbyte). Due to the fact that pictures, tables, etc. occupy large amounts of electronic memory space, a “file optimization tool” (e.g., number of dpi, appropriate compressed format) should be used to minimize the size of attached files.

4.5 When the description of a nonconformity is not required in an electronic format and/or is required as a printout, it shall be in a format similar to the example depicted in Appendix B, “FORM LAYOUT EXAMPLE”. However, the size and order of the fields may be changed to suit the individual application provided that:

a. The box numbers, description, and contents allocation specified in this standard are maintained.

b. The form is not changed to the extent that would make it unrecognizable.

c. It is in line with contractual/regulatory requirements.

When required, continuation/additional sheets and attachments shall include the same reference number as the original document.

NOTE: Reference Appendix A, “LIST OF NONCONFORMANCE DOCUMENTATION DATA”, the data fields ‘Nonconformance Description’ (see No. 19) and ‘Description’ (No. 25) may be presented either as a summary or in a clearly defined sub-structure (see No. 19a-i and No. 25a-e).

4.6 The forms may be pre-printed, computer generated, or accessed via a net-based system (intranet/internet), but in all cases, the printing of lines and characters shall be clear and legible. The details entered on the forms shall preferably be machine/computer printed, but may be handwritten as long as block letters are used and the document remains legible. The use of abbreviations should be kept at a minimum.

4.7 The information in the data fields shall be in English at a minimum, but other languages may be acceptable (e.g., bilingual: English and native) when in line with contractual requirements. The use of abbreviations should be kept at a minimum.

5. CODE CATALOG:

The following codes are recommended to define affected processes, causes for process deviations, and corrective actions taken to remedy the nonconformance. If codes are defined by the terms and conditions of the contract and/or the originators already have codes defined that satisfying their needs, these codes shall take precedence over those proposed in the following sections.

5.1 Process Codes

A product nonconformance is typically associated to a process deviation. See Table 1, “NONCONFORMANCE PROCESS CODES”, for a list of process codes.

5.2 Cause Codes

The causes for process deviations are defined in Table 2, “NONCONFORMANCE CAUSE CODES”. In order to assist categorization, the list is set up to facilitate the use of process improvement tools (e.g., cause and effect diagram). The ‘Main Term’ code can be used as the cause code, if appropriate, or further definition may be provided.

NOTE: One or more cause codes may be used to define the cause(s) for a product nonconformance.

5.3 Corrective Action Codes

The corrective action codes defined in Table 3, “NONCONFORMANCE CORRECTIVE ACTION CODES”, are not intended to directly correspond to the cause codes identified in Table 2.

NOTE: One or more corrective action codes may be used to define the corrective action(s) taken for a product nonconformance/cause code.

TABLE 1 - NONCONFORMANCE PROCESS CODES

MAIN TERM	PROCESS CODE	DEFINITION / DESCRIPTION
P1 – Shipping and Transportation	P11	Shipping
	P12	Transportation
	P13	Packaging
P2 - Manufacturing	P201	Assembly
	P202	Test
	P203	Balancing
	P204	Benching
	P205	Blasting
	P206	Bonding
	P207	Brazing
	P208	Broaching
	P209	Casting
	P210	Cleaning
	P211	Coating
	P212	Composite Manufacturing
	P213	Crimping
	P214	Deburring
	P215	Drilling
	P216	Electrochemical Processing
	P217	Etching
	P218	Forging
	P219	Forming
	P220	Grinding
	P221	Heat Treatment
	P222	Precision Hole Making
	P223	Honing and Lapping
	P224	Hot Isostatic Pressing
	P225	Inspection
	P226	Machining
	P227	Marking
	P228	Melting
	P229	Milling
	P230	Molding
	P231	Painting
	P232	Peening
	P233	Plating
	P234	Polishing
	P235	Riveting
	P236	Rolling / Pressing
	P237	Soldering
	P238	Stamping
	P239	Surface Treatment
	P240	Turning
	P241	Welding
P3 – Document Preparation	P31	Documentation Error
	P32	Incomplete

TABLE 2 - NONCONFORMANCE CAUSE CODES

MAIN TERM	CAUSE CODE	DEFINITION / DESCRIPTION
C1 – Machine (Machine and Equipment)	C11	Machine or equipment related
	C12	Fixture related
	C13	Tool related
C2 – Management (Quality Management System, Planning, Education/Training)	C21	Training was insufficient or inadequate
	C22	Responsibilities not defined or not understood
	C23	Resources competencies were inadequate
	C24	Communication issues (e.g., shift hand over between operators
	C25	Planning and controls were insufficient
	C26	Instructions or requirements were insufficient or inadequate
C3 – People (Employees)	C31	Instruction or requirements were not followed
	C32	Wrong decision was made
	C33	A reading error was made
	C34	Material handling error
	C35	Known defect or issue not reported or inadequately reported
C4 – Material (Material/Product Conditions)	C41	Material did not comply with specification
	C42	Material shelf life expired
	C43	Contamination of product
C5 – Method Method and Processes)	C51	Validation of process was insufficient
	C52	Manufacturing process capability was insufficient or inadequate
	C53	Packaging, labeling, or identification of material was inadequate
	C54	Design process was inadequate
C6 – Environment (Temperature, Electricity, External Influence)	C61	Natural disaster (e.g., earthquake, flood)
	C62	Information technology system failure
	C63	Fire or power outage
	C64	Unpredictable event (e.g., theft, sabotage)
	C65	Environmental conditions were inadequate (e.g., climate)
	C66	Lighting conditions were inadequate
	C67	Ergonomic conditions were poor (e.g., unsuitable equipment set-up)
C7 – Measurement (Equipment and Control of Parameters)	C71	Inspection tool inadequate (e.g., insufficient accuracy)
	C72	Uncalibrated inspection tool used
	C73	Calibration error
	C74	Instruments, displays, or controls were inadequate
	C75	Transcription error while recording result
	C76	Verification method (i.e., inspection, sampling) was inadequate
	C77	Inspection criteria was inappropriate or unclear

TABLE 3 - NONCONFORMANCE CORRECTIVE ACTION CODES

MAIN TERM	CORRECTIVE ACTION CODE	DEFINITION / DESCRIPTION
A1 – Machine	A11	Machine or equipment corrected
	A12	Fixture corrected
	A13	Tool corrected
A2 – Management	A21	Training provided
	A22	Responsibilities defined and communicated
	A23	Appropriate resources provided
	A24	Communication improved
	A25	Planning and controls improved
	A26	Instructions and requirements corrected
A3 – People	A31	Training performed
	A32	Instructions or requirements updated and highlighted to staff
	A33	Handling process and instructions improved
	A34	No action (human factor)
A4 – Material	A41	Material ordering process and rules reviewed
	A42	Life limited product related processes and rules updated / applied
A5 – Method	A51	Process validation improved
	A52	Process capability reviewed and improvement implemented
	A53	Packing labeling and identification process and rules corrected
	A54	Design process improved
A6 – Environment	A61	No action
	A62	Information technology system improved
	A63	Environmental conditions improved
	A64	Lighting improved
	A65	Ergonomic conditions improved
A7 – Measurement	A71	Inspection tool corrected
	A72	Inspection tool calibrated
	A73	Instruments, displays, and controls corrected
	A74	Verification methods improved
	A75	Inspection criteria and process corrected

6. NOTES

6.1 The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document.

APPENDIX A- LIST OF NONCONFORMANCE DOCUMENTATIN DATA (MANDATORY FIELDS BOLDED WITH *)

No.	Data Field Title	Description	Data	Data Type	Data Size (In digits)	Comments
DOCUMENT IDENTIFICATION						
1	**Originator Ref. No. ***	Unique reference number assigned by the originator in accordance with Customer instructions	Numerals/letters	Alpha-numeric	4 minimum 20 maximum	
1a	Customer Ref. No.	Customer or Partner specific number	Numerals/letters	Alpha-numeric	4 minimum 20 maximum	Identify, if different than No. 1
2	**Originator's Company ***	Identification of originator	Supplier Code	Alpha-numeric	50 maximum	Name or code number
3	Customer's Company	Identification of recipient	Customer Code	Alpha-numeric	50 maximum	Name or code number
4	**Revision/Issue ***	Document issue or level of document revision	Numerals/letters	Alpha-numeric	1 minimum 10 maximum	
5	**Originator/Contact ***	Point of contact to consult	Name, phone, fax, e-mail, user key, etc.	Alpha-numeric	50 maximum	
6	**Page of Pages ***	Sheet number and total number of sheets (paper form)	Number of line items	Numeric	1 minimum 6 maximum	Pagination for printouts
IDENTIFICATION OF PRODUCT AFFECTED						
7	Program	Name/title of program, project, or model	Numerals/letters	Alpha-numeric	50 maximum	
8	**Customer Part No. ***	Lowest level part number containing the nonconformity	Part number assigned by the customer	Alpha-numeric	1 minimum 19 maximum	If known by supplier
8a	Supplier Part No.	Lowest level part number containing the nonconformity	Part number assigned by the supplier	Alpha-numeric	1 minimum 19 maximum	Identify, if different from No. 8
9	**Part Name ***	Part/product description	Nomenclature	Alpha-numeric	2 minimum 50 maximum	
10	**S/N or ID No. ***	Part serial number, batch number, lot number, identification number	Numerals/letters	Alpha-numeric	1 minimum 25 maximum	If multiple units of the same part number are affected, all S/Ns must be listed

No.	Data Field Title	Description	Data	Data Type	Data Size (In digits)	Comments
11	**NC Qty. ***	Quantity of affected parts	Number of nonconforming parts	Numeric	1 minimum 10 maximum	
12	Order Qty.	Total quantity of ordered parts	Number of total order	Numeric	1 minimum 10 maximum	Actual order or lot size
13	Work/Purchase/Order No.	Internal order number	Number on order	Alpha-numeric	2 minimum 15 maximum	
14	Assembly Dwg. No.	Assembly drawing number	Supplier Code	Alpha-numeric	2 minimum 50 maximum	
15	Assembly S/N	Assembly serial number	Customer Code	Alpha-numeric	1 minimum 25 maximum	
16	LRU or Sub-assembly No.	Lowest line replaceable unit or sub-assembly containing the nonconforming part	Number or name	Alpha-numeric	50 maximum	
17	Final Product Manufacturer S/N	Highest assembly part S/N (e.g., engine, aircraft, spacecraft)	Numerals/letters	Alpha-numeric	1 minimum 25 maximum	
18	Product Category	Product engineering classification (production, development/test)	Numerals/letters	Alpha-numeric	1 minimum 8 maximum	In accordance with contractual requirements
DESCRIPTION OF NONCONFORMITY … All nonconformities (on one or several parts of the same part number/line item based) must be described.						
19	**Nonconformance Description ***	Text description (e.g., attribute characteristics)	Numerals/letters	Alpha-numeric	2000 maximum	Additional information not contained in other data boxes below
19a	Document Reference	Reference to number/title of drawing, specification, process sheet, etc.	Numerals/letters	Alpha-numeric	2 minimum 25 maximum	Requirements
19b	Index	Applicable document revision, in accordance with contract	Numerals/letters	Alpha-numeric	1 minimum 3 maximum	
19c	Previous Dispositions/Concessions	Previous dispositions or concessions for the same part number	Numerals/letters	Alpha-numeric	1 minimum 15 maximum	Recurrence of nonconformity; previous cases of the same condition affecting other parts

No.	Data Field Title	Description	Data	Data Type	Data Size (In digits)	Comments
19d	Zone	Sheet/zone of drawing or specification chapter	Numerals/letters	Alpha-numeric	1 minimum 4 maximum	
19e	KPC	Key process characteristic or classification	Numerals/letters	Alpha-numeric	1 minimum 8 maximum	If classified on the customer design/drawing
19f	Char. Item No.	Item number on drawing	Numerals/letters	Alpha-numeric	1 minimum 5 maximum	As identified on the drawing by balloon or item number
19g	Specified Requirement	Required dimension, including tolerance	Numerals/letters	Alpha-numeric	1 minimum 22 maximum	
19h	Actual Condition	Dimension plus unit	Numerals/letters	Alpha-numeric	2 minimum 22 maximum	
19i	Over Max./Under Min.	Value in relation to the specified value	Numerals/letters	Alpha-numeric	2 minimum 10 maximum	
20	**Attachment ***	Attached information (e.g., sketch)	Files	Alpha-numeric	2 minimum 20 maximum	Requirements defined in section 4 of standard
21	Process/NC Code	Reference to applicable codes	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	List all applicable codes
22	Supplier Remarks	Description of the recommended disposition and NC category; provided by supplier	Numerals/letters	Alpha-numeric	2000 maximum	
DESCRIPTION OF CAUSE/CORRECTIVE ACTION						
23	Cause Code	Cause, immediate and long-term corrective action; implementation	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	Special contract requirements must be in place to report and monitor codes; see section 5 of standard for requirements and codes
24	Corr. Action Code	Log number that references electronic corrective action form	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	Same as comments defined in No. 23, except associated to corrective action codes