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(R) Aerospace Series - Quality Management Systems -
Nonconformance Data Definition and Documentation

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 industry. This standard can be invoked as a stand-alone requirement or used in conjunction with 9100-series standards (i.e., 9100, 9110, 9120).

FOREWORD

To assure customer satisfaction, aviation, space, and defense industry organizations must produce, and continually improve, safe, reliable products that meet or exceed customer and regulatory authority requirements. The globalization of the 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. Industry suppliers and processors face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

The aviation, space, and defense 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 companies in the Americas, Asia/Pacific, and Europe.

This document standardizes requirements for nonconformance data definition and documentation for the 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.

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1. SCOPE

This standard defines the common nonconformance data definition and documentation that shall be exchanged between an internal/external supplier or sub-tier supplier, and the customer when informing about a nonconformity requiring formal decision. The requirements are applicable, partly or totally, when reporting a product nonconformity to the owner or operator, as user of the end item (e.g., engine, aircraft, spacecraft, helicopter), if specified by contract.

The process of exchanging, coordinating, and approving nonconformance data varies with the multiple relationships and agreements among all parties concerned. The information provided by this standard forms guidelines for submitting and managing of data through accurate communication. The main objective 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).

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.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AS9100 Quality Management Systems – Requirements for Aviation, Space and Defense Organizations

AS9110 Quality Management Systems – Requirements for Aviation Maintenance Organizations

AS9120 Quality Management Systems – Requirements for Aviation, Space and Defense Distributors

2.2 ISO Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 9000:2005 Quality management systems – Fundamentals and vocabulary

3. TERMS AND 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 Data

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

3.3 Optional Data

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

3.4 Product

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

3.5 Product Quality Escape

Any product released by an internal/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/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 cycle. Waiver/concession is evident before delivery to 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 and the contractual requirements.

- 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 required, provided that it is not in contradiction with contractual requirements.

NOTE 1: For any data field, whether mandatory or optional data, 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. This includes the capability of the Information Technology System to process with data types and data sizes specified in this standard.

4.2 Nonconformity data recording and approval shall be in accordance with contractual and regulatory requirements.

4.3 Attached files should be in a protected format (e.g., pdf, tif, jpg), whenever possible. Where this is not practical, appropriate precautions shall be taken to prevent inadvertent changes.

4.4 Where file sizes are constrained, file size optimization tool shall be used. If a file compression is not capable of meeting file size constraints, the data exchange has to be agreed upon between both parties [e.g., via compact disk, USB flash drive, e-mail correspondence, direct access to data system].

4.5 A nonconformance form shall contain, at a minimum, the fields defined in Appendix A and depicted in the example provided (see Appendix B). However, the size and order of the fields may be changed to suit the individual application provided that:

- a. The contents of the boxes specified in this standard are maintained; alternatively a cross reference can be used.
- b. The form is identified as a nonconformance record.
- c. Complies with contractual/regulatory requirements.

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

NOTE: Reference Appendix A, the data fields 'Nonconformance Description' (see No. 19) and 'Disposition' (see No. 25) may be presented either as a summary or in a clearly defined sub-structure (see No. 19 a-i and No. 25 a-e).

4.7 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 capital letters are used and the document remains legible.

NOTE: The use of abbreviations should be kept at a minimum.

4.8 The information shall be in English, but other languages are acceptable (e.g., bilingual: English and native) when specified in the contract.

NOTE: The use of abbreviations should be kept to a minimum.

5. CODE CATALOG

The following codes are recommended for codifying affected processes, causes of process deviations, and corrections made to remedy the nonconformity. If codes are defined by a contract and/or the originators already have codes defined that satisfy their needs, these codes shall take precedence over the following.

NOTE: The following codes represent a minimum selection of possible variances. In case of needing additional code definitions (e.g., software, electronic, composites, structures), the tables can be enhanced by using the existing structure.

5.1 Nonconformance Process Codes

A product nonconformance is typically associated with a process deviation. See Table 1 for a selection processes.

5.2 Nonconformance Cause Codes

The causes of process deviations are defined in Table 2. 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 1: One or more cause codes may be used to define the cause(s) for a product nonconformity.

NOTE 2: The allocation of a cause code could be either apparent (preliminary/initial) or final, depending on the status of root cause analysis. For further support see Supply Chain Management Handbook (SCMH); "Root Cause Analysis and Problem Solving" Chapter – www.iag.org/scmh.

5.3 Nonconformance Corrective Action Codes

Common corrective action codes are defined in Table 3; intended to correspond directly to the cause codes identified in Table 2, as appropriate.

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	Order Preparation
	P14	Preparation of Packaging
	P15	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
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 A change bar (|) 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, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

APPENDIX A – LIST OF NONCONFORMANCE DOCUMENTATION DATA (mandatory data fields bolded with *)

No.	Data Field Title	Description	Data	Data Type	Data Size (in digits)	Comments
DOCUMENT IDENTIFICATION						
1	Document Ref. No. *	Unique reference number assigned by the originator	Numerals/letters	Alpha-numeric	4 minimum 20 maximum	In accordance with contractual requirements
2	Customer Ref. No.	Customer or Partner specific number	Numerals/letters	Alpha-numeric	4 minimum 20 maximum	Identify, if different from field number 1
3	Customer's Company	Identification of customer	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	First issue can be blank (contracted with Customer)
5	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						
6	Program	Name/title of program, project, or model	Numerals/letters	Alpha-numeric	50 maximum	
7	Part No. *	Lowest level part number containing the nonconformity	Number identified in the drawing or contract	Alpha-numeric	1 minimum 25 maximum	If known by supplier
7a	Other Part No.	Lowest level part number containing the nonconformity	Part number or code assigned by the customer or supplier	Alpha-numeric	1 minimum 25 maximum	If different from field number 9 and according to contract requirements
8	Part Name *	Part/product description	Nomenclature	Alpha-numeric	2 minimum 50 maximum	
9	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 unique numbers shall be listed
10	NC Qty. *	Quantity of affected parts	Number of nonconforming parts	Numeric	1 minimum 10 maximum	
11	Order Qty.	Total quantity of ordered parts	Number of total order	Numeric	1 minimum 10 maximum	Actual order or lot size
12	Work/Purchase/Order No.	Internal order number	Number on order	Alpha-numeric	2 minimum 15 maximum	

No.	Data Field Title	Description	Data	Data Type	Data Size (in digits)	Comments
13	Dwg. No. / Issue	Drawing number and issue	Supplier Code	Alpha-numeric	2 minimum 50 maximum	
14	LRU or Sub-assembly Name / Ref.	Lowest Line Replaceable Unit (LRU) or sub-assembly containing the nonconforming part	Number or name	Alpha-numeric	50 maximum	
15	LRU or Sub-assembly S/N	Lowest LRU or sub-assembly serial number	Customer Code	Alpha-numeric	1 minimum 50 maximum	
16	Final Product Manufacturer S/N	Highest assembly part S/N (e.g., engine, aircraft, spacecraft)	Numerals/letters	Alpha-numeric	1 minimum 25 maximum	
17	Product Category	Product engineering classification (production, development/test)	Numerals/letters	Alpha-numeric	1 minimum 8 maximum	In accordance with contractual requirements
18	ATA Chapter	Air Transport Association (ATA) chapter for equipment	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) must be described as a separate line item.						
19	Nonconformance Description *	Text description (e.g., attribute characteristics)	Numerals/letters	Alpha-numeric	4000 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	Reference to previous dispositions (waivers/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
19d	Zone	Sheet/zone of drawing or specification chapter	Numerals/letters	Alpha-numeric	1 minimum 4 maximum	
19e	KPC	Key product or process characteristic	Numerals/letters	Alpha-numeric	1 minimum 8 maximum	If defined 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	

No.	Data Field Title	Description	Data	Data Type	Data Size (in digits)	Comments
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 *	Yes / No or number of pages/files (e.g., sketch, calculation note)	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	Requirements defined in clause 4 of standard
21	Process Code	Reference to applicable codes	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	See Table 1, "Nonconformance Process Codes"
22	Supplier Remarks	Description of the recommended disposition, nonconformance category, proposed rework solution, etc.; provided by supplier	Numerals/letters	Alpha-numeric	2000 maximum	
DESCRIPTION OF CAUSE/CORRECTIVE ACTION						
23	Cause Code	Cause code or information about cause of nonconformity	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	See Table 2, "Nonconformance Cause Codes"
24	Corr. Action Code	Immediate and/or long-term corrective action, or log number that references corrective action form	Numerals/letters	Alpha-numeric	2 minimum 20 maximum	See Table 3, "Nonconformance Corrective Action Codes"
DISPOSITION OF NONCONFORMITY ... Each nonconformity identified must be dispositioned.						
25	Disposition *	Decision by material review board, design office, quality department, etc.	Numerals/letters	Alpha-numeric	2000 maximum	For each nonconformity per affected part (e.g., several S/Ns affected)
25a	NC Category	Classification of the nonconformity (e.g., major / minor, I / II / III)	Numerals/letters	Alpha-numeric	1 minimum 8 maximum	Classification of each nonconformity or complete data set
25b	Limitation	Yes or None (check box)	Numerals/letters	Alpha	1 minimum 3 maximum	
25c	Limitation Description	Description of limitation imposed on part	Numerals/letters	Alpha-numeric	400 maximum	For example: limited flight hours or use limitations
25d	Parts Marking	Number or code to be marked on the part	Numerals/letters	Alpha-numeric	1 minimum 10 maximum	