



AF 9100:2026

Aerospace Quality Management System

WORK INSTRUCTION

Requirement Decomposition and Bidirectional Traceability

AF-WI-9100-001

FIRST EDITION

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Publication identity and application

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Use and document-control boundary

This companion implements the supplied AF 9100 requirement basis without changing the original standard. Its process allocation, examples, checklists and record design are authored implementation material. Actual mission or product limits, specialist procedures, permissions and genuine observations must be completed before consequential use. Applicable source minima and independent decision conditions cannot be reduced by this companion.

The printed edition date identifies the companion series; it is not evidence that later preparation, review or operational decisions occurred on that date. New support codes in this set are proposed allocations for controlled registration. Established AF-IG-9100-001, AF-FAQ-9100-001 and AF-TR-9100-001 identities are retained; earlier files, the corporate master list and ASTRA codes are not overwritten.

Equivalent combined or digital records are permitted when all required fields, relationships, authority and history remain intact. A completed PDF field or typed name is not evidence of an authenticated approval. Blank records in this delivery contain no invented applicant, signature, event or result.

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Select actual scope → complete application criteria → use the applicable procedure and technical book → capture authentic evidence → evaluate every applicable condition → obtain the required independent decision. Document availability does not establish implementation or conformity.

1 Purpose and controlled work

Use this instruction within the adopted local process and exact source scope. It supports reproducible execution but does not replace the complete applicable AF requirements or actual technical authorization.

2 Detailed work sequence

1. Freeze the source

Record edition, exact subclause and lettered paragraph, source page and evaluated object.

2. Separate independent conditions

Create a stable child identifier for each independently testable condition without deleting qualifications, exceptions or prohibitions.

3. State applicability

Record trigger, retained responsibility, evidence for exclusion and independent approval. Missing data remain HOLD.

4. Complete the predicate

Identify numeric value, units and inclusivity or an observable attribute; predefine method, validity and uncertainty before results.

5. Link both directions

Trace requirement to configuration, method, observation and decision and trace selected released output back to every required source.

6. Reconcile closure

Retain every open, failed and rejected condition and all continuation records. Count progress separately from the conjunctive grant decision.

3 Safe adverse-case execution matrix

Challenge	Required behavior
Missing essential criterion	HOLD; complete the prospective technical basis.
Wrong object or loaded configuration	HOLD; reconcile identity and relevant verification.
Invalid measurement or negative uncertainty	HOLD; reject invalid input and review affected conclusions.
Interval overlaps the limit under DR-A	HOLD; neither demonstrated conformity nor proven physical defect.
Valid essential failure with high total score	FAIL / no dependent positive release.
Open minor at new attestation	No grant, renewal or extension until verified closure.
Evaluator approves own third-party case	Block assignment; require competent independent decision.
Expired person authority at event time	Block dependent reliance; later renewal does not repair the past.
Unavailable source labeled N/A	Reject exclusion; restore the not-demonstrated state.
A test record is published as live	Stop publication and isolate the test system.
Missing evidence link after recovery	Hold assured use until semantic integrity is established.
Same file count, wrong current status	Fail reconciliation and correct the affected state.
Appeal used to revive suspended status	No automatic reinstatement or extension.
Suspension clock reset with new number	Reject reset; preserve original resolution deadline.
Closed provider without receiving custodian	Incomplete closure; assign and accept continuing duties.

4 Actual execution and verification record

Test / work item ID and exact source

Actual local system, method or calculation baseline

Preconditions and input / protected test environment

Independently specified expected behavior

Actual steps and observed result / raw evidence

Original defect, consequences and affected prior outputs

Correction, original-case retest and regression

Tester, reviewer and genuine acceptance / unresolved restrictions

Appendix A — Controlling source and evidence

Source: AF 9100:2026, Aerospace Quality Management System, FIRST EDITION, 29 September 2026; supplied 131-page PDF. Source page references below locate the original publication. These excerpts are read with the complete applicable standard; local implementation sequences do not replace it.

2.4 Normative annexes and evidence conventions

SOURCE p. 11 | Normative when applicable

2.4(a) The status stated at each annex heading controls its use. Normative annexes impose requirements when triggered by activity or assessment route. Annex N has separately identified normative and informative portions. Other informative annexes explain methods and examples but do not create universal acceptance thresholds.

2.4(b) Equivalent record formats are permitted where every required field, relationship, approval and integrity control is retained. “Not applicable”, “accepted risk” and “covered by supplier” are not evidence without a justified applicability or decision record. Synthetic example values shall never be copied into a real record as actual observations.

2.4(c) A compound requirement shall be assessed against every applicable condition. Checklist compression shall not remove conditions. A requirement is not satisfied merely because a document exists: appropriate implementation and outcome evidence are also required.

Required evidence: Annex applicability; complete evidence fields; evaluated conditions; justified non-applicability.

3.1 Interpretation and evidence convention

SOURCE p. 14 | Normative when applicable

3.1(a) A requirement identifier consists of the subclause and its lettered paragraph, for example 8.1.3(a). The complete paragraph, including each condition joined within it, is applicable unless an approved scope decision establishes otherwise. Evidence notes identify minimum record content, not the only permissible proof of implementation.

3.1(b) “Documented” information may be digital, physical or a controlled combination. A database, model, signed workflow or automated log may satisfy a record requirement if identity, integrity, access, retention and retrievability are demonstrated. A screenshot without provenance is not sufficient evidence of the underlying transaction.

D.1 Requirement-record integrity

SOURCE p. 55 | Normative when applicable

D.1(a) Every controlled product or service requirement shall have an identifier, statement, source, owner, revision, rationale, applicability, verification method and acceptance criteria. Derived and safety-related requirements shall include their parent link and approving authority.

D.1(b) The organization shall maintain traceability through allocation, implementation, verification, anomaly resolution and release. Traceability completeness shall be evaluated for meaning and validity, not only the presence of hyperlinks. Broken or circular links shall be investigated.

D.2 Identifiers, versioning and time

SOURCE p. 55 | Normative when applicable

D.2(a) Identifiers shall remain unique within the defined repository and resolvable after migration. Revision and status shall be distinct; an approved obsolete version shall not appear current. Time records shall identify the relevant time basis and sequence sufficient to reconstruct events.

D.2(b) Units, coordinate systems, reference frames and data encodings shall be explicit where misinterpretation could affect conformity. Imported supplier data shall be checked for mapping errors, truncated precision and semantic differences. Automated exchange shall retain validation results.

D.3 Evidence provenance and tamper indication

SOURCE p. 55 | Normative when applicable

D.3(a) An evidence record shall identify the source system or person, acquisition method, processing, transformations and approvals. Cryptographic hashes or signatures may support integrity but shall not be treated

as proof that the original observation was correct.

D.3(b) Corrections shall preserve the prior evidence and explain why it changed. Access and modification logs shall be protected in accordance with consequence and obligations. Migration shall verify relationships as well as files; a readable PDF without its underlying configuration links may be insufficient. The filled chain demonstrates structure only. It deliberately does not supply a universal stopping-time value, load or speed; those values require a valid system-specific safety basis.

V.1 Assessment planning and evidence sampling

SOURCE p. 87 | Normative when applicable

V.1(a) The assessor shall establish the object, scope, applicable requirements, sites, functions, products, periods and authorized evidence access. Sampling shall consider criticality, changes, poor performance, process diversity and potential systemic failure. Sample limitations shall be recorded and shall constrain the resulting claim.

V.1(b) Assessment shall combine documented arrangements, interviews, observed work and retained results. The reviewer shall test whether records agree across the lifecycle. A completed questionnaire, certificate or policy statement alone shall not demonstrate implementation.

V.1(c) Organizational evaluation time and coverage shall follow Annex AC. The selected object route shall additionally follow Annex AA, and the actual decision shall follow Annex AD. Confidential evidence shall remain accessible to suitably authorized reviewers; unresolved absence of necessary evidence blocks the dependent conclusion.

Required evidence: Scope and route; approved plan; sample rationale; combined evidence; actual limits and access.

V.2 Findings and requirement-level conclusions

SOURCE p. 87 | Normative when applicable

V.2(a) Each finding shall identify the exact requirement, objective evidence, affected scope and gap. Classification shall follow Annex AD. A technical release hold shall be applied where needed irrespective of an administrative grade. Opportunities for improvement shall not conceal nonconformities.

V.2(b) The conclusion shall state conforming, nonconforming, not applicable with approved rationale or not yet demonstrated for each relevant requirement. Aggregate scores shall not offset missing mandatory evidence. The final decision shall identify unresolved issues and the precise scope that the evidence can support.

Required evidence: Requirement-level findings; classification; technical holds; evaluated applicability; clear conclusion. For Annex N, only N.1–N.3 and their required record tables are normative; the numerical worked examples are informative. For Annex AJ, required record fields and controls are normative, while filled sample values are informative.

V.3 Integrated audit trail and sample expansion

SOURCE p. 95 | Normative when applicable

V.3(a) An assessor may select a delivered serial, service event or task authorization and trace it backward through release, requirements, configuration, process, competent performer, measurement and external source. The assessor shall then trace relevant changes, field issues or complaints forward through population identification and corrective action.

V.3(b) When records disagree, the assessor shall expand the trail according to the potential extent and consequence. One successfully traced item does not verify the whole population. An apparent completeness score shall not conceal absent actual measurements, unverified qualifications or unresolved configuration changes.

Required evidence: Complete backward/forward trail; consistency checks; expanded samples; evaluated population limitations.

AJ.2 Requirement and evidence-status dictionary

SOURCE p. 129 | Normative when applicable

AJ.2(a) Evidence status shall distinguish planned, collected, technically reviewed, accepted for the stated purpose, rejected, superseded and unavailable. “Accepted evidence” means adequate for the identified decision use, not unconditional truth or indefinite validity. A planned test shall not appear as completed evidence.

AJ.2(b) Requirement status shall distinguish conforming, nonconforming, not applicable with approved rationale and not yet demonstrated. An indeterminate measurement shall remain not demonstrated for acceptance until valid disposition; it shall not be silently converted into “not applicable”. The status record shall identify the person

and basis of change.

Required evidence: Controlled status dictionary; evidence-purpose linkage; approved applicability; attributable state changes.

Source tables — complete field and decision payloads

Table D-1 — Required lifecycle data entities

Source p. 55 | Required structure when applicable

Entity	Minimum fields	Required relationships
Requirement	ID; revision; statement; source; rationale; criticality; owner; acceptance criterion; status.	Parent need; allocated item/function; verification case; applicable obligation.
Configuration item	ID; type; revision; physical/software identity; owner; baseline; approved use.	Requirements; BOM; interfaces; change history; as-built or deployed instances.
Material or component lot	Source; manufacturer; lot/batch; quantity; condition; certificate; received date.	Incoming verification; process route; consumed serials; split/merge history.
Verification case	ID; method; requirement; configuration; procedure; environment; uncertainty; acceptance rule.	Test article; equipment; raw data; result; anomaly and disposition.
Process execution	Route revision; operation; performer; date/time; equipment; parameters; material; result.	Lot/serial; qualified procedure; inspection; nonconformity; next authorized step.
Change	ID; reason; baseline before/after; impact; approvals; effectivity; verification.	Affected requirements/items; delivered population; suppliers; support information.
Hazard or risk	ID; scenario; consequence; likelihood basis; exposure; controls; owner; residual decision.	Requirements; mitigations; verification evidence; operational limitations.
Release	ID; configuration; scope; acceptance evidence; concessions; restrictions; authorized identity; date.	Requirements baseline; product serial/lot; delivery dossier; service-life status.
Digital artifact	Artifact ID; version; source/build; dependencies; hash; signature; provenance; access class.	Requirements; verification; release; deployment instances; vulnerabilities.
Retirement	Asset identity; condition; hazardous inventory; reuse restrictions; disposition; verifier.	Life history; disposal evidence; retained records; remaining obligations.

Table D-2 — Filled illustrative trace chain

Source p. 55, 56 | Illustrative or explanatory source table

Record	Example value	Connection
Need	NEED-GSC-01: controlled motion during payload handling.	Allocated to SYS-GSC-R12.
Requirement	SYS-GSC-R12 rev B: stop response within a program-defined limit under stated load and speed.	Hazard H-GSC-02; verification V-GSC-12.
Configuration	Controller CTRL-07 rev C; firmware 2.4.1; cart serial GSC-004.	Build manifest BM-241; interface ICD-09 rev D.

Record	Example value	Connection
Verification	V-GSC-12 rev 3; test article GSC-004; report TR-012.	Raw records RAW-012; calibrated timer TM-08; approved decision rule DR-03.
Disposition	Anomaly AN-04 closed after independent retest.	NCR-026; verified corrective action CA-026.
Release	REL-GSC-004 rev 1; approved operating- domain restriction attached.	Release authority RA-02; receiving acknowledgement ACK-004.

Table V-1 — Audit and assessment record fields

Source p. 87 | Required structure when applicable

Field	Minimum required content
Identity and scope	Evaluation ID, date, assessor, object route, entity/person, site, configuration, profile and period.
Requirement	Exact clause and lettered paragraph, normative table condition or profile criterion.
Sample	Records, items, people, sites and periods observed; selection method and limitations.
Evidence	Objective observations, actual results, traceable records and confidentiality controls.
Conclusion	Conforming, nonconforming, approved non-applicability or not yet demonstrated.
Finding and action	Requirement–evidence–gap, grade, extent, protection, cause, actions, owner and original deadline.
Closure and decision	Verified implementation and effectiveness; independent reviewer and decision; actual status and date.

Table AJ-2 — Cross-object record relationships

Source p. 129 | Required structure when applicable

Relationship	Required consistency check
F01 scope → F02 profile	Every claimed object and site is covered by a valid profile and applicable requirements; excluded responsibility is justified.
F03 competence → F04 plan	Assigned evaluators cover routes, sector, criticality, methods and language; conflicts are cleared.
F04 plan → F05 results	Actual objects, sites, methods, samples and configurations match the plan or an approved recorded deviation.
F05 result → F06 finding	Failed or indeterminate criteria are correctly reflected; no favorable score suppresses a critical gap.
F06 closure → F07 decision	Initial/renewal/extension decisions contain no open nonconformity in their scope; effectiveness is verified.
F07 decision → F08 status	The exact scope, dates, restrictions and ongoing/instance basis agree; no claim is broader than its decision.
F09 outsourced work → product/service dossier	Actual performer, source changes, lot identity and evidence reach the final delivered object.

Relationship	Required consistency check
F10 credential → employer task	Credential competence supports, but does not replace, the specific employer authorization.
F11 case → F07/F08 revisions	Appeal or complaint effects change only supported decisions/status and preserve their original history.
F12 body scope → issued reports	Each claimed accredited/authorized activity remains within the actual assessed technical scope.