



AF 9100:2026

Aerospace Quality Management System

TECHNICAL PROFILE BOOK

Heavy Industry, Commissioning and Asset Integrity — Technical Application Book

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Publication identity and application

Control	Publication value
Title	Heavy Industry, Commissioning and Asset Integrity — Technical Application Book
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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 Scope, responsibility and source priority

Plant, machinery and associated infrastructure assurance from design basis through hidden-work acceptance, commissioning, integrity monitoring and decommissioning.

Boundary	Required implementation decision
Object and route	Identify ORG, PRD, SVC, PRC, PER, SUB or CAB separately. Combined records do not merge outcomes.
Activity	Apply source technical modules by performed or retained responsibility, including relevant outsourced work.
Authority	Technical release, employer task permission, independent attestation and statutory authorization remain distinct.
Source priority	AF 9100:2026 and all compatible binding obligations control. This companion does not import ASTRA programme rules or external normative schemes.

2 Technical profile and prospective parameter completion

Asset boundary; design/duty limits; protective functions; temporary states; inspection mechanisms; as-built configuration; commissioning hold points; residual inventory

Parameter record	Content required before evaluating results
Identity and trigger	Stable criterion ID, source anchor, owner, actual object, phase, mode and reason it applies.
Limit or attribute	Value/range with compatible units and boundary convention, or an observable state with every essential step.
Technical basis	Actual environment, duty, consequence, derivation, qualified evidence and relevant approval.
Method and representation	Inspection, analysis, demonstration or test; method version, article/population, configuration and validity limits.
Uncertainty and decision	Corrections, model, covariance, coverage, pre-agreed rule, sample/scoring logic and hold conditions.
Authority and change	Technical and independent approvals, actual effectivity, preserved earlier basis and reopening triggers.

The fields above are completed for the actual application. A blank limit, undefined domain or unvalidated method prevents the dependent claim; the book deliberately does not invent one severity, tolerance or task threshold for unrelated applications.

3 Subject-by-subject implementation

17.1 — Industrial system boundary and lifecycle integrity

Source p. 35; complete conditions reproduced in Appendix A.

Implementation record: Asset design basis; boundary drawings; applicable-code register; lifecycle responsibility allocation.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

17.2 — Mechanical integrity and essential services

Source p. 35; complete conditions reproduced in Appendix A.

Implementation record: Integrity-management plan; equipment dossiers; degradation assessments; override and temporary- repair controls.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

17.3 — Fabrication, installation and construction interfaces

Source p. 35; complete conditions reproduced in Appendix A.

Implementation record: Fabrication and installation records; hidden-work inspections; alignment and interface checks; as-built configuration.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

17.4 — Commissioning and operational readiness

Source p. 36; complete conditions reproduced in Appendix A.

Implementation record: Commissioning plan; test records; protective-function verification; open-item disposition; handover acceptance.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

17.5 — Asset inspection and condition-based maintenance

Source p. 36; complete conditions reproduced in Appendix A.

Implementation record: Inspection strategy; condition data; detection capability; remaining-life or repair decisions; interval review.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

17.6 — Industrial modernization and decommissioning

Source p. 36; complete conditions reproduced in Appendix A.

Implementation record: Modernization assessment; verified legacy baseline; decommissioning plan; disposition and transfer records.

Application check: Link each tool, fixture, machine and controlling program to intended use, range, configuration and demonstrated output capability. Include failure behavior and unauthorized-edit prevention.

Review boundary: Missing protective-function evidence or insufficient actual capability prevents operational acceptance. Record each source condition separately in the linked checklist and preserve approved exclusions.

4 Representative evaluation and adverse evidence

Resources, Facility Integrity, Equipment and Tooling

Witness or trace: Use an authorized readiness plan for completion, functional and integrated tests. Separate test acceptance from protective stop conditions; a failed interlock remains a blocking item.

Synthetic challenge: A test stand starts after maintenance but its protective isolation check fails. Hold the affected operation, preserve the failed test and correct and retest isolation. Successful ordinary operation is not evidence of restored protection.

Verification Campaigns, NDT and Test Reporting

Witness or trace: Capture raw inputs and responses, conditions, operator, method version, deviations, interruptions and alarms. Label simulated or model-derived results and expose inaccessible features.

Synthetic challenge: One NDT demonstration detects an easy reference flaw and is claimed to prove all installed defects are detectable. Restrict the conclusion to the demonstrated material, geometry, access and technique. Establish representative defect and statistical evidence before a broader detection claim.

Maintenance, Repair, Distribution and Retirement

Witness or trace: Use an approved repair or overhaul basis and valid detection for hidden damage. A successful bench test cannot reset missing life history or establish an unsupported as-new claim.

Synthetic challenge: A serviceable-looking part is recovered from a stored vehicle with no exposure history. Retain the unknown history and apply the real eligibility and life assessment. Cosmetic condition or a functional check does not establish unrestricted use.

5 Interface records, decisions and continuing use

Record	Required implementation purpose
AF-FR-9100-017	Resources, Facility and Tool Commissioning
AF-FR-9100-023	Sample, Verification Campaign and Technical Report
AF-FR-9100-026	Service, Maintenance, Life and Retirement Record

Qualification, instance acceptance, current operating capability and independent attestation retain separate evidence and decisions. A new site, material, supplier, digital load, use environment or duty requires a relevant difference and requalification review. No previous result transfers automatically because the name is unchanged.

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.

17.1 Industrial system boundary and lifecycle integrity

SOURCE p. 35 | Normative when applicable

17.1(a) The organization shall define the industrial asset or service boundary, design basis, operating limits, interfaces and lifecycle responsibilities. Heavy machinery, process equipment, energy infrastructure, lifting systems and supporting civil works shall be included when they affect the assured output.

17.1(b) Applicable engineering codes, statutory inspections and operating authorizations shall be identified in the program register. This standard provides assurance requirements, not a replacement design code for structures, pressure systems, nuclear installations or lifting equipment.

Required evidence: Asset design basis; boundary drawings; applicable-code register; lifecycle responsibility allocation.

17.2 Mechanical integrity and essential services

SOURCE p. 35 | Normative when applicable

17.2(a) Critical equipment shall have design, material, fabrication, inspection, maintenance and degradation-management evidence appropriate to the duty. Pressure, temperature, load, corrosion, fatigue, vibration and protective-function limits shall be identified as relevant.

17.2(b) Essential utilities and protective systems shall be evaluated for dependency and common-cause failure. Bypasses, overrides and temporary repairs shall have authorization, duration, compensating controls and restoration verification. An operational plant shall not be presumed conforming because it has not yet failed.

Required evidence: Integrity-management plan; equipment dossiers; degradation assessments; override and temporary-repair controls.

17.3 Fabrication, installation and construction interfaces

SOURCE p. 35 | Normative when applicable

17.3(a) The organization shall control materials, fabrication procedures, welds or joints, inspection stages, dimensional interfaces and installation sequence. Construction or installation changes shall be assessed against the approved design basis before concealment or energization.

17.3(b) Foundation, alignment, anchorage, lifting, access and utility interfaces shall be verified where relevant. Hidden work shall have inspection evidence before it becomes inaccessible. The final as-built record shall reflect actual installed conditions, not only the original drawings.

Required evidence: Fabrication and installation records; hidden-work inspections; alignment and interface checks; as-built configuration.

17.4 Commissioning and operational readiness

SOURCE p. 36 | Normative when applicable

17.4(a) Commissioning shall follow an approved plan separating completion checks, functional verification, integrated testing and operational acceptance. The plan shall define safe test conditions, competent personnel, isolation, emergency arrangements and acceptance criteria.

17.4(b) Before handover, protective functions, alarms, interlocks, training, maintenance, spare parts and operating instructions shall be verified. Open items shall be classified according to whether they prevent safe or conforming operation. Production pressure shall not reclassify a blocking item as cosmetic.

Required evidence: Commissioning plan; test records; protective-function verification; open-item disposition; handover acceptance.

17.5 Asset inspection and condition-based maintenance

SOURCE p. 36 | Normative when applicable

17.5(a) Inspection and maintenance intervals shall be based on applicable obligations, consequence, degradation mechanisms, duty and evidence. Condition-monitoring models shall be validated for their decision purpose and

shall not remove mandatory inspections without authorized justification.

17.5(b) Inspection findings shall be trended and connected to remaining-life or repair decisions made by competent technical authorities. Changes in duty or environment shall trigger reassessment. Absence of an alarm shall not establish integrity when the monitoring system cannot detect the relevant failure mode.

Required evidence: Inspection strategy; condition data; detection capability; remaining-life or repair decisions; interval review.

17.6 Industrial modernization and decommissioning

SOURCE p. 36 | Normative when applicable

17.6(a) Retrofits and modernization shall assess compatibility between legacy and new systems, undocumented conditions, cybersecurity, protection functions and operational procedures. Existing equipment shall not be assumed equivalent to current design records without verification.

17.6(b) Decommissioning shall plan isolation, hazardous inventories, structural stability, data retention, waste handling and prevention of unauthorized reuse. Transfer or sale of used equipment shall accurately state condition, known limitations and missing evidence.

Required evidence: Modernization assessment; verified legacy baseline; decommissioning plan; disposition and transfer records.

S.1 Asset and code basis

SOURCE p. 82 | Normative when applicable

S.1(a) The organization shall identify the asset boundary, duty, design assumptions, applicable codes, inspection requirements and authorization responsibilities. Changes in intended duty shall be evaluated against the retained design and integrity basis.

S.1(b) Where legacy evidence is incomplete, the organization shall establish a competent assessment plan rather than asserting compliance from continued operation. The plan shall address inaccessible or hidden conditions that can affect integrity.

S.2 Commissioning record and punch-list controls

SOURCE p. 82 | Normative when applicable

S.2(a) The commissioning record shall distinguish incomplete construction, failed test criteria, deferred non-critical work and operational restrictions. Each open item shall have an owner, technical consequence, dependent activity and closure evidence.

S.2(b) Items affecting safety, statutory acceptance or a mandatory performance criterion shall not be deferred merely by changing their priority code. Conditional handover shall state exactly what may operate and under which controls.

S.3 Integrity assessment and inspection capability

SOURCE p. 82 | Normative when applicable

S.3(a) Inspection methods shall be suitable for the actual degradation mechanism and access condition. Findings shall be interpreted by competent personnel against the applicable technical basis, with uncertainty and limitations stated.

S.3(b) Condition-based maintenance shall not remove a required inspection unless the applicable approval process permits it and the alternative is justified. Monitoring systems shall be checked for sensor health, data integrity and ability to detect the relevant failure mechanism.

S.4 Filled illustrative commissioning disposition

SOURCE p. 82 | Definition, explanation or informative example; no new universal limit

S.4(a) Example: a support facility completes mechanical installation and routine functional checks, but the emergency isolation test fails. The open item is classified as release-blocking for the affected equipment. Training and ordinary performance results do not compensate for that failure.

S.4(b) Release occurs only after correction, retest, independent verification where required, updated as-built information and authorized closure. The example supplies no pressure, load or protection setpoint; those belong to the approved equipment-specific basis.

Source tables — complete field and decision payloads

Table S-1 — Industrial lifecycle evidence

Source p. 82 | Required structure when applicable

Stage / topic	Required evidence	Gate or hold condition
Design basis	Duty, loads, environment, material basis, codes, protection concept and service life.	Unresolved binding design criteria prevent release.
Procurement	Technical scope, qualified sources, material evidence, inspection and notification requirements.	Unapproved critical source or substitution prevents use.
Fabrication	Qualified procedures/personnel, essential variables, inspections and traceability.	Hidden work not accepted without required evidence.
Installation	Foundation, alignment, anchorage, utilities, access and as-built configuration.	Unverified critical interfaces prevent energization.
Protective functions	Alarms, interlocks, isolation, emergency arrangements and bypass controls.	Failed or unverified protective function blocks affected operation.
Commissioning	Approved sequence, safety review, instrumentation, actual results and anomalies.	Test completion alone does not close failed criteria.
Operational readiness	Training, instructions, maintenance, spares, inspections and responsible operator.	No handover with unresolved blocking capability.
Asset integrity	Degradation mechanisms, inspection methods, intervals, findings and technical dispositions.	Adverse condition triggers restriction or repair assessment.
Modification	Change basis, compatibility, hazard review, requalification and documentation.	Temporary modifications require expiry and restoration control.
Retirement	Isolation, hazardous inventories, structural condition, material/data disposal and records.	Disposition must be verified and obligations assigned.

Appendix B — Local implementation and release

Readiness condition	Evidence before consequential use
Authority and responsibility	Actual legal operator, owner, competent technical authority, independent reviewer and permitted result class are recorded.
Scope and criteria	Object, configuration, site, period, trigger, every technical value or observable attribute, units and prospective approval are complete.
Evidence and methods	Original accessible evidence, representative observations, valid methods, uncertainty, adverse cases and limitations support the intended conclusion.
People and independence	Competence is current for each task; genuine conflicts, relevant prior work and needed separation have been checked.
Records and tools	Field meanings, unique IDs, original history, access, retention, recovery and actual deployed workflows have passed local validation.
Decision and public use	All relevant blockers are resolved; required independent decision and written permissions precede the exact public claim.
Continuity and handover	Receiving custody, unresolved duties, corrections and historical decisions survive transfer, retirement or provider closure.

Record the completed local readiness and actual authorization in AF-FR-9100-032 or an equivalent controlled record. Preserve the unchanged source standard and each earlier decision basis. A blocked activity may continue only within a genuinely permitted development boundary, not as a provisional conformity certificate.