



QSE Academy

QMS ARCHITECTURE AND DEPLOYMENT PLAN

Quality Management System per ISO 9001:2015

MetalForge Inc.

Strategic Roadmap — 12 Months to Certification

Document prepared for the Executive Committee

Version 1.0 — April 2026

QSE Academy

Executive Summary

This document presents the complete architecture of MetalForge Inc.'s Quality Management System (QMS) and the roadmap to achieve ISO 9001:2015 certification within a 12-month timeframe.

Ambition

MetalForge Inc. is implementing a QMS to: (1) meet the requirements of its Tier 2 automotive customers who now condition their orders on certification; (2) prepare entry into the aerospace market through a future AS9100D certification within a 3-year horizon; (3) reduce the current non-quality rate from 3.5% to below 1.5%; (4) secure and transfer the know-how of senior operators approaching retirement.

Selected Architecture

The QMS is structured around 9 processes grouped into 3 families (3 management processes, 3 operational processes, 3 support processes), documented by 57 documents (14 ISO-mandatory, 29 best-practice recommended, 14 sector-specific automotive/aerospace). The set covers all 10 clauses of ISO 9001:2015, with particular attention to traceability, calibration, and nonconformity control requirements driven by the sector.

Three-Phase Deployment over 12 Months

The roadmap articulates three coherent phases: Phase 1 (months 1-3) for the strategic foundation and process mapping, Phase 2 (months 4-8) for operational rollout of procedures and a mock audit, Phase 3 (months 9-12) for consolidation and certification.

Budget and Resources

The project mobilizes the hiring of a dedicated Quality Manager (planned in phase 1), support from an external consultant over the first 9 months, a company-wide training investment, and a tooling budget (quality software, additional measurement equipment). Project budget estimated in the range of \$35,000 to \$50,000, excluding the Quality Manager salary.

Key Project Figures

9 Processes	57 QMS documents	12 Months to certification	45 Employees engaged
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1. Context and Project Drivers

1.1 MetalForge Inc. Context

MetalForge Inc. is a 45-employee family-owned SME based in Cleveland, Ohio, specialized in precision machining for automotive and aerospace subcontracting. Founded in 1998, the company has built its reputation on technical mastery and flexibility, but operates in an environment where customer requirements are rising and where quality certification is becoming a condition of access to the most profitable markets.

1.2 The Four Project Drivers

The ISO 9001 certification project responds to four strategic drivers identified during the management review:

- Commercial pressure:** two Tier 2 automotive customers have notified that ISO 9001 certification will become mandatory to renew contracts in 2027. The absence of certification represents a risk of losing 40% of revenue.
- Aerospace ambition:** MetalForge targets an AS9100D certification within a 3-year horizon to access the aerospace market (margins 15-25% higher). ISO 9001 is the essential prerequisite.
- Internal performance:** the current non-quality rate (3.5% of revenue, approximately \$260,000 per year) must be cut in half. A structured QMS is the identified lever.
- Knowledge transfer:** three senior operators representing 35 years of cumulative experience will retire within 18 months. Formalizing know-how through the QMS is a matter of industrial survival.

1.3 Priority Interested Parties

The analysis of interested parties per clause 4.2 of the standard identifies the following stakeholders as priorities for the QMS:

Interested Party	Needs and Expectations	QMS Response
Tier 2 automotive customers	ISO 9001 certification, product traceability, zero defects delivered	Certified QMS, PROC-011 Traceability, reinforced dimensional control
Aerospace prime contractors	Reliability, material traceability, demonstrable competencies	Systematic calibration, skills matrix, process audits
Employees	Clear roles, recognition of know-how, training	Job descriptions, skills matrix, annual training plan
Critical suppliers	Order visibility, clear specifications, fair evaluation	PROC-008 Purchasing, technical specifications, supplier evaluation

Interested Party	Needs and Expectations	QMS Response
Regulatory bodies (EPA, OSHA)	Environmental compliance, emissions tracking, workplace safety	Interfaces with EHS system (out of QMS scope but coordinated)

2. Global QMS Architecture

2.1 The Three Process Families

The chosen architecture relies on the classic three-family typology, which ensures clear understanding for all employees and facilitates ownership by process owners.

Management Processes (QM) — 3 processes

They steer, orient, and improve the QMS. They are led by Top Management and the future Quality Manager.

- **QM-01 Strategic Steering and Management Review:** defines policy, sets objectives, allocates resources, conducts the annual review
- **QM-02 Continuous Improvement and Risk Management:** handles nonconformities, drives corrective actions, leads internal audits, manages risks and opportunities
- **QM-03 Customer Focus and Satisfaction:** measures satisfaction, handles complaints, channels the voice of the customer through the system

Operational Processes (OP) — 3 processes

They form the customer value chain. They transform requirements into compliant delivered products.

- **OP-01 Sales and Contract Review:** feasibility study, quoting, validation of requirements before commitment
- **OP-02 Production (machining and inspection):** transformation of raw material into compliant finished parts, core business
- **OP-03 Logistics and Delivery:** packaging, marking, shipping with full traceability

Support Processes (SP) — 3 processes

They provide the operational processes with the resources needed for their performance.

- **SP-01 Purchasing and Supplier Control:** raw material procurement, evaluation and monitoring of critical suppliers
- **SP-02 Human Resources and Competence:** recruitment, training, skills development, evaluation
- **SP-03 Equipment and Infrastructure:** machine maintenance, measurement instrument calibration, facilities management

2.2 Articulation Logic

The architecture works according to a simple logic: management processes set the direction and steer performance, operational processes generate customer value, support processes provide the operational processes with resources. Interactions between processes are formalized in the interaction matrix (12 major flows documented).

This architecture offers three advantages for MetalForge:

- Immediate readability for customer auditors, who recognize a standard, proven structure
- Easier ownership by process owners, who clearly identify their role and interfaces
- Scalability toward AS9100D (aerospace), which builds on the same structure with additional requirements, without questioning the architecture

2.3 QMS Documentation

The QMS is documented by 57 documents structured in four levels:

Level	Content	Count	Examples
Level 1 — Strategic	Policy, objectives, context, scope, quality manual	5 documents	QM-001, POL-001, OBJ-001, CTX-001, SCO-001
Level 2 — Mapping and Sheets	Mapping, interaction matrix, sheets for the 9 processes	11 documents	MAP-001, MAT-INT-001, PS-QM01 to PS-SP03
Level 3 — Procedures and Instructions	General procedures, operational procedures, technical instructions	19 documents	PROC-001 to PROC-014, WI-OP02-01 to WI-SP03-02
Level 4 — Records and Forms	Activity traces, conformity evidence, history	22 documents	REC-MR-001 (Mgmt Review), REC-NC-001 (NC), REC-HR-003 (training)

This documentation pyramid ensures that no ISO 9001 requirement is left without a documentary answer, while avoiding the over-documentation that would smother operations.

3. The Three Phases of Deployment

QMS deployment is structured in three sequential phases covering 12 months. Each phase has a clear purpose, specific deliverables, and a validation milestone. This sequence has been calibrated to minimize the load on operations while meeting the targeted certification deadline.

PHASE 1 — FOUNDATIONAL CORE

Months 1 to 3 — Laying the strategic foundations

Purpose

Frame the project, hire the Quality Manager, conduct the initial diagnosis, define the scope and strategic foundations of the QMS. At the end of this phase, MetalForge has a clear view of what exists, what is missing, and what will be built.

Deliverables Produced

- Quality Policy signed by the President
- Context analysis and interested parties mapping
- Quality objectives broken down by process with measurable targets
- Process mapping validated by the Executive Committee
- Process sheets for the 9 QMS processes (initial version)
- Quality Manual in draft version
- QMS scope formalized

Key Milestones

- **M+1:** Quality Manager hire validated
- **M+2:** Kickoff meeting with all process owners
- **M+3:** End-of-Phase-1 review with foundation validated by Management

Mobilized Actors

- President (project sponsor, policy validation)
- Newly hired Quality Manager (facilitation, drafting)
- Owners of the 9 processes (contribution to their respective sheets)
- External QMS consultant (methodological support)

Estimated Phase 1 Budget

Quality Manager hire (annualized cost \$80,000), consultant support (8 days at \$1,500/day = \$12,000), initial training of Management and process owners (\$6,000). Total Phase 1 (excluding Quality Manager salary): approximately \$18,000.

PHASE 2 — OPERATIONAL ROLLOUT

Months 4 to 8 — Formalize and deploy operational processes

Purpose

Produce the procedures, instructions, and records that will structure daily operations. This is the heaviest phase in documentary volume, but also the most transformative: each procedure written is a way of working that becomes clearer, shared, and improved.

Deliverables Produced

- 6 general procedures (document control, audits, management review, NC, risks, communication)
- 8 operational procedures (sales, purchasing, production, inspection, traceability, training, calibration, maintenance)
- 5 technical instructions (machining, inspection, NC handling, CNC maintenance, calibration)
- 12 core records / forms (work order, traveler, inspection report, NC sheet, action plan, etc.)
- First internal mock audit at M+7 conducted with external consultant
- Action plan to address findings from the mock audit

Key Milestones

- **M+4:** Completion of the 6 general procedures
- **M+6:** Completion of operational procedures and deployment on the floor
- **M+7:** Full mock audit covering the 9 processes
- **M+8:** Phase 2 close-out with findings review and remediation plan

Major Risk for this Phase

Overload on operational owners, who must draft their documentation while ensuring production. Mitigation: close support from the Quality Manager (assisted drafting, templates provided), strict prioritization of documents, and regular communication in the Executive Committee on resources needed.

PHASE 3 — CONSOLIDATION AND CERTIFICATION

Months 9 to 12 — Consolidate, audit, certify

Purpose

Finalize the support documentation (HR, equipment), conduct a complete cycle of internal audits, hold the first management review in the sense of the standard, address findings, and present for the certification audit in optimal conditions.

Deliverables Produced

- 17 final documents (HR and equipment process sheets, maintenance instructions, HR and equipment records)
- Internal audit program covering the 9 processes (minimum 4 audits over the period)

- Internal audit reports and consolidated action plan
- First management review formalized per clause 9.3 of the standard
- Certification dossier (application to the certification body, audit scheduling)
- Successful certification audit

Key Milestones

- **M+9:** Full internal audit cycle launched
- **M+10:** First formal management review with signed minutes
- **M+11:** Final mock audit and resolution of remaining findings
- **M+12:** Certification audit by the certification body (BSI, SGS, DNV, LRQA, or equivalent)

Success Condition for this Phase

The real maturity of processes (not only documentary) across the entire scope. The certification audit does not validate the quality of documents but the reality of their application. Hence the importance of a seriously conducted Phase 2 and a rigorous first cycle of internal audits in Phase 3.

4. Project Governance

The governance of the QMS deployment project relies on three bodies with clearly distinct roles.

4.1 The Quality Steering Committee

Strategic body that validates major directions. Composition: President (chair), Quality Manager, process owners (Production, Sales, Purchasing, HR), external consultant (phase 1 through phase 3). Frequency: monthly. Duration: 2 hours. Deliverables: documented decisions, resource allocation, priority arbitration.

4.2 The Operational Project Team

Execution body. Composition: Quality Manager (facilitator), process owners on rotation by topic, field referents (shop foreman, inspectors). Frequency: weekly. Duration: 1 hour. Deliverables: documentary progress, escalation of issues, validation of intermediate deliverables.

4.3 Management Review

Annual body required by clause 9.3 of the standard. Composition: President (chair), Quality Manager, all process owners. Duration: 1 full day. Deliverables: formal minutes covering the 15 required inputs (audit results, customer satisfaction, process performance, NCs, corrective actions, opportunities, resource adequacy, effectiveness of actions on risks, etc.) and the 8 outputs (decisions, improvement opportunities, QMS modification needs, resource needs).

4.4 Key Roles

Role	Responsibilities	Time Commitment
President	Sponsor, policy validation, resource allocation, visible leadership	5-10% of time over 12 months, peak in phases 1 and 3
Quality Manager	Project facilitation, drafting, owner support, consultant and certification interfaces	100% dedicated in phases 1 and 2, then integrated into regular operations
Process Owners	Drafting process sheet, animating process, reporting indicators	15-25% of time, variable by phase and process
External Consultant	Methodology, templates, critical review of deliverables, mock audit	Periodic intervention: approximately 25 days over 9 months
All Employees	Procedure ownership, audit participation, continuous improvement	2-5% of time (training, awareness, audit participation)

5. Critical Success Factors and Risk Management

5.1 Critical Success Factors

Four factors condition project success based on lessons learned from similar projects:

- **Visible and continuous engagement of the President:** presence at steering committees, signature of key documents, public communication to staff are essential. A QMS project perceived as only the Quality Manager's project fails.
- **Fast hiring of a competent Quality Manager:** ideally with 3 to 5 years of experience in a similar industrial sector, ASQ or IRCA training or equivalent. Key profile for project success.
- **Selection of an experienced external consultant:** solid ISO 9001 expertise, SME metals manufacturing experience, ability to support beyond pure methodology. This choice is an investment that conditions deliverable quality.
- **Regular and concrete communication:** posting of progress, positive reporting of early results (NC reduction for example), recognition of field contributions. Avoids the feeling of bureaucratic overload.

5.2 Project Risks and Mitigation Actions

Risk	Probability	Impact	Mitigation Action
Delay in Quality Manager hiring	Medium	High	Launch recruitment by M-2, dual channel (agency + LinkedIn), plan reinforced consultant in transition
Operational owner overload in Phase 2	High	Medium	Templates provided, assisted drafting, strict document prioritization, Phase 2 extension if needed
Mock audit at M+7 revealing major findings	Medium	High	Mock audit by competent external consultant, corrective action plan from M+7, 5-month buffer before certification
Motivation drop in Phase 3 (project fatigue)	Medium	Medium	Valorization of early results, communication on certification deadline, internal celebration event
Failed certification audit at M+12	Low	Critical	Two mock audits (M+7 and M+11), rigor on finding resolution, pragmatic certification body choice
Customer requirements evolving during project	Low	Medium	Active commercial intelligence, QMS architecture scalable to AS9100D and IATF 16949

6. Conclusion and Next Steps

MetalForge Inc.'s ISO 9001:2015 certification project is structured around a proven architecture (9 processes in 3 families), proportionate documentation (57 documents including 14 ISO-mandatory), a sequenced 3-phase deployment over 12 months, and clear governance at three levels.

The four strategic drivers (automotive commercial pressure, aerospace ambition, non-quality cost reduction, know-how transfer) give the project a solid justification that must be regularly reminded to staff to maintain engagement.

Critical success factors are now identified, risks are analyzed and under control. Project success will depend mainly on the quality of leadership by the President and the profile of the Quality Manager who will be hired.

Three Immediate Decisions Required

To effectively launch the project, three Executive Committee decisions are required within 30 days:

- Validation of the overall project budget (approximately \$50,000 excluding Quality Manager cost)
- Launch of the Quality Manager recruitment (job posting, agency shortlist)

- Selection of the external consultant (consultation of 3 firms, argued choice)

The First Milestone: The Kickoff

Once these three decisions are made, the project kickoff can be organized. It will be a launch meeting with all employees, facilitated by the President, who will present the vision, the stakes, and Management's commitment. This moment is strategic: it largely conditions collective mobilization.

This document will be updated at the end of each phase to reflect actual progress, observed deviations, and decisions taken. It serves as the reference document for Management steering points and Board communications.

Document Approval

Action	Name and Role	Date	Signature
Prepared by	Quality Manager / Consultant	___/___/___	
Reviewed by	Quality Steering Committee	___/___/___	
Approved by	President	___/___/___	

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