ISO 9001:2000 – CMMI v1.1 Mappings

It is always difficult to determine the appropriate granularity of maps between models. Mapping at a high level may not provide enough insight into similarities and differences. Mapping at a very low level, on the other hand, results in an overwhelming number of connections which also fails to properly illuminate model correspondence.

The mappings presented here address the middle ground. Each ISO 9001 “shall” statement has been mapped to a CMMI practice, using only the most prominent correspondence. If an ISO “shall” statement strongly maps to a CMMI specific practice, we do not indicate mappings to other specific practices that may show some weaker correspondence. The map thus serves as an indicator of correspondence rather than as an implementation guideline.

One should keep in mind that this is a many-to-many mapping, meaning that one ISO statement may correspond to more than one CMMI specific or generic practice, and vice versa.

As with all mappings, it is subjective. Although maps are convenient, they cannot replace an understanding of the frameworks being mapped. Stretching the correspondence may be counterproductive and misleading.

Mapping: ISO 9001:2000 to CMMI

Tables below show the mapping of each ISO 9001:2000 section to the CMMI.

Mapping is done at the “shall-level”. Verbatim text from the ISO standard is maintained only in the titles, all other ISO text is replaced with keyword phrases corresponding to the ISO requirements.

“All” in the PA column means that the identified generic practices in every process area correspond to that ISO statement. Similarly, “All” in the Practice column means that all specific practices in the indicated process area correspond to the specific ISO statement or a group of statements. A judgment of the strength of the correspondence is shown as:

S – strong match; M – medium; W – weak

The tables do not indicate a mapping between CMMI generic and specific goals and ISO requirements. Although the goals can be mapped to ISO statements, such a mapping has no meaning in CMMI terms. In the CMMI, specific or generic practices are associated with corresponding goals. In other words, goals aggregate those practices to indicate some unique characteristics of the process area or its institutionalization and do not stand by themselves.

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
4.0	**Quality Management System**				
4.1	**General requirements**				
	Establish QMS				
	Identify processes	OPD OPF All	SP 1.1 SP 2.2 GP 2.1, 2.2, 2.3, 2.6, 2.8, 2.9	**S**	
	Manage using ISO standard	All	GP 2.1	**S**	
	Control outsourced processes	SAM	SP 2.2	**S**	
	Outsourced process control in QMS	SAM	SP 1.3	**M**	CMMI is not as strong
4.2	**Documentation requirements**				
4.2.1	**General**				
	Document quality manual	OPD All	SP 1.1 GP 2.1	**M**	CMMI satisfies mostly clause (d)
4.2.2	**Quality Manual**				
	Establish quality manual	OPD All	SP 1.1 GP 2.2	**S**	
4.2.3	**Control of documents**				
	Control required documents	All	GP 2.6	**S**	
	Control records				In process improvement “records” are known as “objective evidence”; this evidence is needed to show that a practice was implemented.
	Document control procedure	CM	All	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
4.2.4	**Control of records**				
	Records provide evidence of conformity				see 4.2.3
	Records identifiable				see 4.2.3
	Record control procedure	All CM	GP 2.6 GP 2.2	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
5.0	**Management responsibility**				
5.1	**Management commitment**				
	Provide evidence of commitment	All	GP 2.1	**M**	CMMI is weaker
5.2	**Customer focus**				
	Determine customer requirements	All RD	GP 2.7 SP 1.1-1, 1.1-2, 1.2, SP 2.1	**M**	CMMI not explicitly aimed at customer satisfaction
5.3	**Quality policy**				
	Top management quality policy responsibility	All OPF	GP 2.1 SP 1.1	**S**	CMMI is more specific on policy content; GP 2.1 is for each PA and is therefore more detailed (at the PA level)
5.4	**Planning**				
5.4.1	**Quality objectives**				
	Objectives established at appropriate levels	OPF OPP QPM	SP 1.1 SP 1.3 SP 1.1, 1.2, 1.3	**S**	
	Measurable objectives	OPP QPM	SP 1.3 SP 1.1	**S**	
5.4.2	**Quality management system planning**				
	Plan to meet quality objectives	OPD All	All GP 2.2, 3.1	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
5.5	**Responsibility, authority and communication**				
5.5.1	**Responsibility and authority**				
	Top management defines responsibility	All	GP 2.4	**S**	
5.5.2	**Management representative**				Concept is not explicit in the CMMI
	Appoint member of management				
	Representative responsibility and authority	OPF	GP 2.4	**W**	
5.5.3	**Internal communication**				Concept is not explicit in the CMMI
	Establish communication processes	OPD OPF	GP 2.1 SP 1.1	**W**	CMMI is much weaker. No requirement to communicate effectiveness
5.6	**Management review**				
5.6.1	**General**				
	Review QMS	All	GP 2.10	**S**	
	Assess improvement opportunities	OPF	SP 1.2, 1.3	**S**	
	Maintain records				Implicit in the CMMI, see 4.2.3 for explanation
5.6.2	**Review input**				
	Enumerates inputs for reviews	All PMC	GP 2.10 SP 1.6, 1.7 SP 2.1, 2.2, 2.3	**S**	
5.6.3	**Review output**				
	Enumerates outputs from reviews	All PMC	GP 2.10 SP 1.6, 1.7 SP 2.1, 2.2, 2.3	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
6.0	**Resource Management**				
6.1	**Provision of resources**				
	Determine resource needs	All	GP 2.3	**S**	
6.2	**Human resources**				
6.2.1	**General**				
	Staff has needed skills	All	GP 2.5	**S**	
6.2.2	**Competence, awareness and training**				
	Ensure competence, provide training, keep records	OT OEI	SP 1.1, 1.2, 1.3, 1.4, SP 2.1, 2.2, 2.3 SP 1.3	**S**	
6.3	**Infrastructure**				
	Provide services and equipment	OEI	SP 1.2	**S**	This is in the IPPD
6.4	**Work environment**				
	Maintain environment to meet requirements	PP OEI	SP 2.4 SP 1.2	**M**	Not explicitly covered in the CMMI. PP address facilities; OEI addresses “integrated work environment”

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.0	**Product realization**				
7.1	**Planning product realization**				
	Develop needed processes	OPD	SP 1.1, 1.2, 1.3	**S**	
	Planning is consistent with other processes	OPD All	SP 1.1 GP 2.2, 3.1	**S**	
	Address objectives and verification	PP QPM	SP 1.1, 1.2, 1.3, 1.4 SP 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7 1.1	**S**	SP 3.1 – 3.3 are not specifically required
	Plans in appropriate format	PP IPM	SP 2.7 SP 1.1, 1.3, 1.4,	**S**	
7.2	**Customer—related processes**				
7.2.1	**Determination of requirements related to the product**				
	Determine customer and other requirements	RD REQM TS	SP 1.1-2, 1.2, SP 2.1, 2.2, 2.3, SP 3.1, 3.2 SP 1.1 SP 1.2	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.2.2	**Review of requirements related to the product**	RD	SP 3.5	**S**	ISO is less specific than CMMI
	Organization reviews requirements	RD VER	GP 2.10 SP 1.2, 3.5 SP 2.2	**S**	
	Review before commitment				
	Requirements are defined	REQM	SP 1.1, 1.2, 1.5	**S**	
	Records are kept				Not specifically required by the CMMI
	Confirm understanding of requirements	RD	SP 2.1, 3.5	**S**	
	Keep documents current when requirements change	REQM	SP 1.3	**S**	
7.2.3	**Customer communication**				
	Communicate effectively with customers	RD IPM MA REQM	GP 2.7 SP 2.1, 2.2, 2.3 SP 2.4 SP 1.2	**M**	CMMI is weaker (less explicit)

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.3	**Design and development**				
7.3.1	**Design and development planning**				
	Plan development	PP IPM VER VAL	SP 1.1, 1.2, SP 1.1, 1.3, 1.4 SP 1.1 SP 1.1	**S**	
	Determine development stages and verifications	TS PI	SP 1.1, 1.2, 1.3, SP 2.1, 2.2, 2.3, 2.4, SP 3.1, 3.2 SP 1.1, 1.2, 1.3, SP 2.1, 2.2	**S**	
	Manage interfaces	IPM	SP 2.1, 2.2, 2.3, SP 3.1, 3.2, SP 4.1, 4.2, 4.3	**S**	Note: ” 3.x and 4.x are in the IPPD
	Update plans during development	PP IPM	All SP 1.3	**S**	
7.3.2	**Design and development inputs**				
	Determine inputs to development processes	RD	SP 1.1, 1.2, SP 2.1 SP 3.2	**S**	
	Inputs include product, regulatory, and other requirements	RD	SP 1.1, 1.2, SP 2.1	**S**	

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.3.2	**Design and development inputs (continued)**				
	Review inputs	RD	SP 3.3, 3.4, 3.5 GP 2.7, 2.10	**S**	
	Requirements are consistent and clear	RD	SP 3.3, 3.4, 3.5	**S**	
7.3.3	**Design and development outputs**				
	Outputs are verifiable	TS IPM	SP 2.2-3 SP 1.1	**S**	More general
	Outputs approved				
	Development requirements are met	TS	All	**S**	
7.3.4	**Design and development review**				
	Development reviewed and evaluated	PMC	SP 1.6, 1.7	**S**	
	Appropriate functions participate in reviews	PMC	GP 2.7	**S**	
	Records of review are kept				"evidence" in the CMMI
7.3.5	**Design and development verification**				
	Ensure requirements are met	VER	SP 1.1, 1.2, 1.3, SP 2.1, 2.2, 2.3, SP 3.1, 3.2	**S**	
	Keep verification records				see 4.2.3 for explanation
7.3.6	**Design and development validation**				
	Validation follows plans	VAL	SP 1.1, 1.2, 1.3, SP 2.1, 2.2	**S**	
	Validate before delivery				Not explicit in the CMMI
	Keep validation records				see 4.2.3 for explanation

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.3.7	**Control of design and development changes**				
	Identify changes	TS & PI	GP 2.6	**S**	
	Review and approve changes	CM	All	**S**	
	Evaluate effect of changes	CM	All	**S**	
	Keep records of changes	CM	All	**S**	
7.4	**Purchasing**				
7.4.1	**Purchasing process**				
	Purchased product meets requirements	SAM TS	GP 2.9 SP 1.1, 1.2, 1.3	**S**	
	Control of supplier depends on product	SAM	SP 2.2	**M**	CMMI is weaker
	Suppliers selected based on ability	SAM	SP 1.2	**S**	
	Selection criteria established	SAM	SP 1.2	**S**	
	Records of evaluations kept	SAM	SP 1.2	**M**	CMMI is weaker
7.4.2	**Purchasing information**				
	Product requirements described	SAM	SP 1.1 SP 2.1	**S**	
	Adequate requirements described	SAM	SP 1.3	**S**	
7.4.3	**Verification of purchased product**				
	Ensure product meets requirements	SAM VER	SP 2.2, 2.3 SP 3.1	**S**	
	Supplier site verification	SAM	SP 2.3	**W**	CMMI is not explicit

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.5	**Production and service provision**				
7.5.1	**Control of production and service provision**				
	Plan service provision	TS	SP 3.1, .32	**M**	CMMI is weaker
	Control addresses information, equipment, and activities	TS	GP 2.2, 2.3, 2.6, 2.8	**M**	CMMI is weaker; "post-delivery" not addressed in the CMMI
7.5.2	**Validation of processes for production and service provision**				
	Validate production & service processes	VAL	SP 1.1	**S**	
	Demonstrate ability to meet planned results	VAL	All	**S**	
	Establish review criteria and methods	VAL	SP 1.2, 1.3, SP 2.1, 2.2	**S**	
7.5.3	**Identification and traceability**				
	Identify products	CM	SP 1.1, SP 2.1, 2.2	**S**	
	Identify monitoring requirements	PI	SP 3.1, 3.2, 3.3	**S**	
	Control traceability	PI REQM CM	SP 3.1, 3.2 SP 1.4 SP 1.3, SP 2.2, SP 3.1	**S**	
7.5.4	**Customer property**				Not explicitly addressed in CMMI
	Exercise care				
	Identify property				
	Report damage				
7.5.5	**Preservation of Product**				Not explicitly addressed in CMMI
	Maintain conformity during delivery	PI	SP 3.4	**M**	CMMI is less explicit
	Preserve identification	PI	SP 3.4	**M**	CMMI is less explicit
	Preserve product component parts	PI	SP 3.4	**M**	CMMI is less explicit

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
7.6	**Control and monitoring of measuring devices**				
	Determine monitoring and device needed	VER VAL	GP 2.8 GP 2.8	**S**	
	Establish monitoring processes	MA	GP 2.1, 2.2, 2.8, 2.9, 2.10	**S**	
	Calibrate measuring equipment				Not in the CMMI. CM practices can be used, where applicable
	Assess prior measurement results				Not in the CMMI; CM practices can be used, where applicable
	Take action on equipment				Not in the CMMI; CM practices can be used, where applicable
	Keep calibration records				Not in the CMMI; CM practices can be used, where applicable
	Confirm applicability of software				Not in the CMMI; CM practices can be used, where applicable
	Confirm software before use				Not in the CMMI; CM practices can be used, where applicable

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
8.0	**Measurement, analysis and improvement**				
8.1	**General**				
	Plan monitoring and measurement	MA	GP 2.2 SP 1.1, 1.2, 1.3, 1.4	**S**	
	Determine methods and techniques	QPM	SP 2.1, 2.2, 2.3, 2.4	**S**	
8.2	**Monitoring and measurement**				
8.2.1	**Customer satisfaction**				
	Monitor customer perceptions	MA PMC	SP 1.1, 1.2 SP 2.2 SP 1.5	**M**	CMMI not very strong
	Define methods for measuring satisfaction				Not addressed in the CMMI
8.2.2	**Internal audit**				
	Conduct planned audits	OPF PPQA	SP 1.1, 1.2 All	**S**	
	Audits consider process importance	OPF PPQA	SP 1.1, 1.2 GP 2.2	**S**	
	Define audit criteria	OPF	SP 1.1, 1.2	**S**	
	Select objective auditors				Not addressed in the CMMI
	Don't audit own output				Not addressed in the CMMI
	Documented procedure defines audits	OPF MA PPQA	GP 2.4 SP 2.4 GP 2.4	**S**	Process Improvement Plan CMMI is more explicit
	Actions taken promptly	OPF PPQA	GP 2.1 SP 1.3 GP 2.6	**S**	
	Verify actions taken	OPF PPQA	SP 2.1, 2.2 GP 2.9	**S**	CMMI is more detailed (SP 2.3, 2.4 not specifically required by ISO)

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
8.2.3	**Monitoring and measurement of process**				
	Use suitable methods	All	GP 2.8	**S**	
	Demonstrate process capability	MA	GP 2.2 SP 1.2, 1.3	**S**	
	Take corrective actions	QPM PMC	SP 2.2, 2.3 SP 2.1, 2.2, 2.3	**S**	
8.2.4	**Monitoring and measurement of product**				
	Monitor product characteristics	VAL VER	SP 2.1, 2.2 SP 3.1, 3.2	**S**	
	Measure at appropriate stages	VER	SP 1.1, 1.3 SP 2.1, 2.2, 2.3	**S**	
	Maintain conformity record	REQM SAM PPQA VAL	SP 1.1 SP 1.3 SP 1.2 SP 1.3	**S**	
	Maintain release records				see 4.2.3 for explanation
	Don't release until product realization plans are implemented	CM	SP 3.2	**M**	CMMI is weaker
8.3	**Control of nonconforming product**				
	Identify and control nonconforming product	CM			Not explicitly required by CMMI
	Define control of nonconforming product				
	Dealing with nonconforming product	PMC	SP 2.1, 2..2, 2.3		
	Keep records of nonconformities				
	Re-verify corrected nonconformance				
	Take action after delivery				

ISO 9001:2000		CMMI PA	CMMI Practice	Strength	Comments
8.4	**Analysis of data**				
	Collect data on QMS effectiveness	MA OPF All	SP 2.2, 2.3, 2.4 SP 1.3 GP 3.2	**S**	
	Include monitoring data				see 4.2.3 for explanation
	Analyze conformance and customer satisfaction	MA RD QPM CAR SAM	SP 2.2 SP 1.1, 1.2, 2.1, SP 3.1, 3.2, 3.3, 3.4 SP 1.4 SP 1.1, 1.2 SP 2.2	**M**	Customer satisfaction is not explicit
8.5	**Improvement**				
8.5.1	**Continual improvement**				
	Improve QMS effectiveness	OPF OID MA	SP 1.1, 1.3 SP 1.1 SP 1.1, 1.2, 1.4, SP 2.1, 2.2	**S**	
8.5.2	**Corrective action**				
	Eliminate causes of nonconformities	OPF	SP 2.1, 2.2, 2.3	**S**	
	Take appropriate actions				
	Documented procedure defines corrective actions	PMC	SP 2.1, 2.2, 2.3	**S**	
8.5.3	**Preventive action**				
	Determine action to prevent nonconformity	OPF	SP 2.4	**S**	
	Take appropriate actions				Not in the CMMI
	Documented procedure defines preventive actions	CAR	SP 1.1, 1.2 SP 2.1, 2.2, 2.3	**M**	The CMMI is weaker, but also more sophisticated (CAR is Level 5 – staged)

Mapping: CMMI to ISO 9001:2000

The CMMI to ISO 9001 mapping was mechanically constructed from the ISO 9001 to CMMI map rather than from an independent analysis.

The first table shows the per-Process Area mapping from the CMMI to individual ISO sections. The second table shows the mapping from CMMI generic practices to the corresponding ISO sections. A blank in the ISO column indicates that there is no correspondence between the frameworks.

Goal	Specific Practice	Description	ISO 9001:2000
		Organizational Process Focus	
SG 1		Determine Process-Improvement Opportunities	
	SP 1.1-1	Establish Organizational Process Needs	5.3, 5.4.1, 5.5.3, 5.6.1, 8.2.2, 8.5.1
	SP 1.2-1	Appraise the Organization's Processes	5.6.1, 8.2.2
	SP 1.3-1	Identify the Organization's Process Improvements	8.4, 8.5.1
SG 2		Plan and Implement Process-Improvement Activities	
	SP 2.1-1	Establish Process Action Plans	8.2.2, 8.5.1
	SP 2.2-1	Implement Process Action Plans	4.1, 8.2.2, 8.5.1
	SP 2.3-1	Deploy Organizational Process Assets	8.5.1
	SP 2.4-1	Incorporate Process-Related Experiences into the Organizational Process Assets	8.5.3
		Organizational Process Definition	
SG 1		Establish Organizational Process Assets	
	SP 1.1-1	Establish Standard Processes	4.1, 4.2.1, 4.2.2, 5.4.2, 7.1
	SP 1.2-1	Establish Life-Cycle Model Descriptions	5.4.2, 7.1
	SP 1.3-1	Establish Tailoring Criteria and Guidelines	5.4.2, 7.1
	SP 1.4-1	Establish the Organization's Measurement Repository	5.4.2
	SP 1.5-1	Establish the Organization's Process Asset Library	5.4.2
		Organizational Training	
SG 1		Establish an Organizational Training Capability	
	SP 1.1-1	Establish the Strategic Training Needs	6.2.2
	SP 1.2-1	Determine Which Training Needs Are the Responsibility of the Organization	6.2.2
	SP 1.3-1	Establish an Organizational Training Tactical Plan	6.2.2
	SP 1.4-1	Establish Training Capability	6.2.2
SG 2		Provide Necessary Training	
	SP 2.1-1	Deliver Training	6.2.2
	SP 2.2-1	Establish Training Records	6.2.2

Goal	Specific Practice	Description	ISO 9001:2000
	SP 2.3-1	Assess Training Effectiveness	6.2.2
		Organizational Process Performance	
SG 1		Establish Performance Baselines and Models	
	SP 1.1-1	Select Processes	
	SP 1.2-1	Establish Process Performance Measures	
	SP 1.3-1	Establish Quality and Process-Performance Objectives	5.4.1
	SP 1.4-1	Establish Process Performance Baselines	
	SP 1.5-1	Establish Process Performance Models	
		Organizational Innovation and Deployment	
SG 1		Select Improvements	
	SP 1.1-1	Collect and Analyze Improvement Proposals	8.5.1
	SP 1.2-1	Identify and Analyze Innovations	
	SP 1.3-1	Pilot Improvements	
	SP 1.4-1	Select Improvements for Deployment	
SG 2		Deploy Improvements	
	SP 2.1-1	Plan the Deployment	
	SP 2.2-1	Manage the Deployment	
	SP 2.3-1	Measure Improvement Effects	
		Project Planning	
SG 1		Establish Estimates	
	SP 1.1-1	Estimate the Scope of the Project	7.1, 7.3.1
	SP 1.2-1	Establish Estimates of Work Product and Task Attributes	7.1, 7.3.1
	SP 1.3-1	Define Project Life Cycle	7.1, 7.3.1
	SP 1.4-1	Determine Estimates of Effort and Cost	7.3.1
SG 2		Develop a Project Plan	
	SP 2.1-1	Establish the Budget and Schedule	7.1, 7.3.1
	SP 2.2-1	Identify Project Risks	7.1, 7.3.1
	SP 2.3-1	Plan for Data Management	7.1, 7.3.1
	SP 2.4-1	Plan for Project Resources	6.4, 7.1, 7.3.1

Goal	Specific Practice	Description	ISO 9001:2000
	SP 2.5-1	Plan for Needed Knowledge and Skills	7.1, 7.3.1
	SP 2.6-1	Plan Stakeholder Involvement	7.1, 7.3.1
	SP 2.7-1	Establish the Project Plan	7.1, 7.3.1
SG 3		Obtain Commitment to the Plan	
	SP 3.1-1	Review Plans that Affect the Project	7.3.1
	SP 3.2-1	Reconcile Work and Resource Levels	7.3.1
	SP 3.3-1	Obtain Plan Commitment	7.3.1
		Project Monitoring and Control	
SG 1		Monitor Project Against Plan	
	SP 1.1-1	Monitor Project Planning Parameters	
	SP 1.2-1	Monitor Commitments	
	SP 1.3-1	Monitor Project Risks	
	SP 1.4-1	Monitor Data Management	
	SP 1.5-1	Monitor Stakeholder Involvement	8.2.1
	SP 1.6-1	Conduct Progress Reviews	5.6.2, 5.6.3, 7.3.4
	SP 1.7-1	Conduct Milestone Reviews	5.6.2, 5.6.3, 7.3.4
SG 2		Manage Corrective Action to Closure	
	SP 2.1-1	Analyze Issues	5.6.2, 5.6.3, 8.2.3, 8.3, 8.5.2
	SP 2.2-1	Take Corrective Action	5.6.2, 5.6.3, 8.2.3, 8.3, 8.5.2
	SP 2.3-1	Manage Corrective Action	5.6.2, 5.6.3, 8.2.3, 8.3, 8.5.2
		Supplier Agreement Management	
SG 1		Establish Supplier Agreements	
	SP 1.1-1	Determine Acquisition Type	7.4.1, 7.4.2
	SP 1.2-1	Select Suppliers	7.4.1
	SP 1.3-1	Establish Supplier Agreements	4.1, 7.4.2, 8.2.4
SG 2		Satisfy Supplier Agreements	
	SP 2.1-1	Review COTS Products	7.4.2, 7.4.3

Goal	Specific Practice	Description	ISO 9001:2000
	SP 2.2-1	Execute the Supplier Agreement	4.1, 7.4.3, 8.4
	SP 2.3-1	Accept the Acquired Product	7.4.3
	SP 2.4-1	Transition Products	
		Integrated Project Management for IPPD	
SG 1		Use the Project's Defined Process	
	SP 1.1-1	Establish the Project's Defined Process	7.1, 7.3.1, 7.3.3
	SP 1.2-1	Use Organizational Process Assets for Planning Project Activities	
	SP 1.3-1	Integrate Plans	7.1, 7.3.1
	SP 1.4-1	Manage the Project Using the Integrated Plans	7.1, 7.3.1
	SP 1.5-1	Contribute to the Organizational Process Assets	
SG 2		Coordinate and Collaborate with Relevant Stakeholders	
	SP 2.1-1	Manage Stakeholder Involvement	7.2.3, 7.3.1
	SP 2.2-1	Manage Dependencies	7.2.3, 7.3.1
	SP 2.3-1	Resolve Coordination Issues	7.3.1
SG 3		Use the Project's Shared Vision for IPPD	
	SP 3.1-1	Define Project's Shared-Vision Context	7.3.1
	SP 3.2-1	Establish the Project's Shared Vision	7.3.1
SG 4		Organize Integrated Teams for IPPD	
	SP 4.1-1	Determine Integrated Team Structure for the Project	7.3.1
	SP 4.2-1	Develop a Preliminary Distribution of Requirements to Integrated Teams	7.3.1
	SP 4.3-1	Establish Integrated Teams	7.3.1
		Risk Management	
SG 1		Prepare for Risk Management	
	SP 1.1-1	Determine Risk Sources and Categories	
	SP 1.2-1	Define Risk Parameters	
	SP 1.3-1	Establish a Risk Management Strategy	
SG 2		Identify and Analyze Risks	
	SP 2.1-1	Identify Risks	
	SP 2.2-1	Evaluate, Categorize, and Prioritize Risks	

Goal	Specific Practice	Description	ISO 9001:2000
SG 3		Mitigate Risks	
	SP 3.1-1	Develop Risk Mitigation Plans	
	SP 3.2-1	Implement Risk Mitigation Plans	
		Integrated Teaming	
SG 1		Establish Team Composition	
	SP 1.1-1	Identify Team Tasks	
	SP 1.2-1	Identify Needed Knowledge and Skills	
	SP 1.3-1	Assign Appropriate Team Members	
SG 2		Govern Team Operation	
	SP 2.1-1	Establish a Shared Vision	
	SP 2.2-1	Establish a Team Charter	
	SP 2.3-1	Define Roles and Responsibilities	
	SP 2.4-1	Establish Operating Procedures	
	SP 2.5-1	Collaborate among Interfacing Teams	
		Quantitative Project Management	
SG 1		Quantitatively Manage the Project	
	SP 1.1-1	Establish the Project's Objectives	5.4.1, 7.1
	SP 1.2-1	Compose the Defined Process	5.4.1
	SP 1.3-1	Select the Subprocesses that Will Be Statistically Managed	5.4.1
	SP 1.4-1	Manage Project Performance	
SG 2		Statistically Manage Subprocess Performance	
	SP 2.1-1	Select Measures and Analytic Techniques	8.1
	SP 2.2-1	Apply Statistical Methods to Understand Variation	8.1, 8.2.3
	SP 2.3-1	Monitor Performance of the Selected Subprocesses	8.1, 8.2.3
	SP 2.4-1	Record Statistical Management Data	8.1
		Requirements Management	
SG 1		Manage Requirements	
	SP 1.1-1	Obtain an Understanding of Requirements	7.2.1, .7.2.2, 8.2.4
	SP 1.2-2	Obtain Commitment to Requirements	7.2.3
	SP 1.3-1	Manage Requirements Changes	7.2.2

Goal	Specific Practice	Description	ISO 9001:2000
	SP 1.4-2	Maintain Bi-directional Traceability of Requirements	7.5.3
	SP 1.5-1	Identify Inconsistencies between Project Work and Requirements	7.2.2
		Requirements Development	
SG 1		Develop Customer Requirements	
	SP 1.1-1	Collect Stakeholder Needs	5.2, 7.2.1, 7.3.2, 8.4
	SP 1.1-2	Elicit Needs	5.2, 7.2.1, 7.2.2, 7.3.2, 8.4
	SP 1.2-1	Develop the Customer Requirements	5.2, 7.2.1, 7.3.2
SG 2		Develop Product Requirements	
	SP 2.1-1	Establish Product and Product-Component Requirements	5.2, 7.2.1, 7.2.2, 7.3.2, 8.4
	SP 2.2-1	Allocate Product-Component Requirements	7.2.1
	SP 2.3-1	Identify Interface Requirements	7.2.1
SG 3		Analyze and Validate Requirements	
	SP 3.1-1	Establish Operational Concepts and Scenarios	7.2.1, 8.4
	SP 3.2-1	Establish a Definition of Required Functionality	7.2.1, 7.3.2, 8.4
	SP 3.3-1	Analyze Requirements	8.4, 7.3.2
	SP 3.4-3	Analyze Requirements to Achieve Balance	8.4, 7.3.2
	SP 3.5-1	Validate Requirements	7.2.2, 7.3.2
	SP 3.5-2	Validate Requirements with Comprehensive Methods	7.2.2, 7.3.2
		Technical Solution	
SG 1		Select Product-Component Solutions	
	SP 1.1-1	Develop Alternative Solutions and Selection Criteria	7.3.1, 7.3.3, 7.4.1
	SP 1.1-2	Develop Detailed Alternative Solutions and Selection Criteria	7.3.1, 7.3.3, 7.4.1
	SP 1.2-2	Evolve Operational Concepts and Scenarios	7.2.1, 7.3.1, 7.3.3, 7.4.1
	SP 1.3-1	Select Product-Component Solutions	7.3.1, 7.3.3, 7.4.1
SG 2		Develop the Design	
	SP 2.1-1	Design the Product or Product Component	7.3.1, 7.3.3
	SP 2.2-3	Establish a Technical Data Package	7.3.1, 7.3.3
	SP 2.3-1	Establish Interface Descriptions	7.3.1, 7.3.3

Goal	Specific Practice	Description	ISO 9001:2000
	SP 2.3-3	Design Interfaces Using Criteria	7.3.1, 7.3.3
	SP 2.4-3	Perform Make, Buy, or Reuse Analyses	7.3.1, 7.3.3
SG 3		Implement the Product Design	
	SP 3.1-1	Implement the Design	7.3.1, 7.5.1
	SP 3.2-1	Develop Product Support Documentation	7.3.1, 7.5.1
		Product Integration	
SG 1		Prepare for Product Integration	
	SP 1.1-1	Determine Integration Sequence	7.3.1
	SP 1.2-2	Establish the Product Integration Environment	7.3.1
	SP 1.3-3	Establish Product Integration Procedures and Criteria	7.3.1
SG 2		Ensure Interface Compatibility	
	SP 2.1-1	Review Interface Descriptions for Completeness	7.3.1
	SP 2.2-1	Manage Interfaces	7.3.1
SG 3		Assemble Product Components and Deliver the Product	
	SP 3.1-1	Confirm Readiness of Product Components for Integration	7.5.3
	SP 3.2-1	Assemble Product Components	7.5.3
	SP 3.3-1	Evaluate Assembled Product Components	7.5.3
	SP 3.4-1	Package and Deliver the Product or Product Component	7.5.5
		Verification	
SG 1		Prepare for Verification	
	SP 1.1-1	Select Work Products for Verification	7.3.1, 7.3.5, 8.2.4
	SP 1.2-2	Establish the Verification Environment	7.3.5
	SP 1.3-3	Establish Verification Procedures and Criteria	7.3.5, 8.2.4
SG 2		Perform Peer Reviews	
	SP 2.1-1	Prepare for Peer Reviews	7.3.5, 8.2.4
	SP 2.2-1	Conduct Peer Reviews	7.3.5, 8.2.4
	SP 2.3-2	Analyze Peer Review Data	7.3.5
SG 3		Verify Selected Work Products	
	SP 3.1-1	Perform Verification	7.2.2, 7.3.5, 7.4.3, 8.2.4

Goal	Specific Practice	Description	ISO 9001:2000
	SP 3.2-2	Analyze Verification Results and Identify Corrective Action	7.3.5, 8.2.4
		Validation	
SG 1		Prepare for Validation	
	SP 1.1-1	Select Products for Validation	7.3.1, 7.3.6, 7.5.2
	SP 1.2-2	Establish the Validation Environment	7.3.6, 7.5.2
	SP 1.3-3	Establish Validation Procedures and Criteria	7.3.6, 7.5.2, 8.2.4
SG 2		Validate Product or Product Components	
	SP 2.1-1	Perform Validation	7.3.6, 7.5.2, 8.2.4
	SP 2.2-1	Analyze Validation Results	7.3.6, 7.5.2, 8.2.4
		Configuration Management	
SG 1		Establish Baselines	
	SP 1.1-1	Identify Configuration Items	4.2.3, 7.3.7, 7.5.3, 8.3
	SP 1.2-1	Establish a Configuration Management System	4.2.3, 7.3.7, 8.3
	SP 1.3-1	Create or Release Baselines	4.2.3, 7.3.7, 7.5.3, 8.3
SG 2		Track and Control Changes	
	SP 2.1-1	Track Change Requests	4.2.3, 7.3.7, 7.5.3, 8.3
	SP 2.2-1	Control Configuration Items	4.2.3, 7.3.7, 7.5.3, 8.3
SG 3		Establish Integrity	
	SP 3.1-1	Establish Configuration Management Records	4.2.3, 7.3.7, 7.5.3, 8.3
	SP 3.2-1	Perform Configuration Audits	4.2.3, 7.3.7, 8.2.4, 8.3
		Process and Product Quality Assurance	
SG 1		Objectively Evaluate Processes and Work Products	8.2.2
	SP 1.1-1	Objectively Evaluate Processes	8.2.2
	SP 1.2-1	Objectively Evaluate Work Products and Services	8.2.2, 8.2.4
SG 2		Provide Objective Insight	8.2.2

Goal	Specific Practice	Description	ISO 9001:2000
	SP 2.1-1	Communicate and Ensure Resolution of Noncompliance Issues	8.2.2
	SP 2.2-1	Establish Records	8.2.2
		Measurement and Analysis	
SG 1		Align Measurement and Analysis Activities	
	SP 1.1-1	Establish Measurement Objectives	8.1, 8.2.1, 8.5.1
	SP 1.2-1	Specify Measures	8.1, 8.2.1, 8.2.3, 8.5.1
	SP 1.3-1	Specify Data Collection and Storage Procedures	8.1, 8.2.3
	SP 1.4-1	Specify Analysis Procedures	8.1, 8.5.1
SG 2		Provide Measurement Results	
	SP 2.1-1	Collect Measurement Data	8.2.1, 8.4, 8.5.1
	SP 2.2-1	Analyze Measurement Data	8.4, 8.5.1
	SP 2.3-1	Store Data and Results	8.4
	SP 2.4-1	Communicate Results	7.2.3, 8.2.2
		Decision Analysis and Resolution	
SG 1		Evaluate Alternatives	
	SP 1.1-1	Establish Guidelines for Decision Analysis	
	SP 1.2-1	Establish Evaluation Criteria	
	SP 1.3-1	Identify Alternative Solutions	
	SP 1.4-1	Select Evaluation Methods	
	SP 1.5-1	Evaluate Alternatives	
	SP 1.6-1	Select Solutions	
		Organizational Environment for Integration	
SG 1		Provide IPPD Infrastructure	
	SP 1.1-1	Establish the Organization's Shared Vision	
	SP 1.2-1	Establish an Integrated Work Environment	6.3, 6.4
	SP 1.3-1	Identify IPPD-Unique Skill Requirements	6.2.2
SG 2		Manage People for Integration	
	SP 2.1-1	Establish Leadership Mechanisms	
	SP 2.2-1	Establish Incentives for Integration	
	SP 2.3-1	Establish Mechanisms to Balance Team and Home Organization Responsibilities	

Goal	Specific Practice	Description	ISO 9001:2000
		Causal Analysis and Resolution	
SG 1		Determine Causes of Defects	
	SP 1.1-1	Select Defect Data for Analysis	8.4, 8.5.3
	SP 1.2-1	Analyze Causes	8.4, 8.5.3
SG 2		Address Causes of Defects	
	SP 2.1-1	Implement the Action Proposals	8.5.3
	SP 2.2-1	Evaluate the Effect of Changes	8.5.3
	SP 2.3-1	Record Data	8.5.3

Generic Goal	Generic Practices	Description	PA	ISO 9001:2000
GG 1		***Achieve Specific Goals***		
	GP 1.1	Perform Base Practices		
GG 2		***Institutionalize a Managed Process***		
	GP 2.1	Establish an Organizational Policy	All	4.1, 4.2.1, 5.1
			OPD	5.5.3
			MA	7.6
			OPF	8.2.2
	GP 2.2	Plan the Process	All	4.1, 4.2.2, 5.4.2, 7.1
			TS	7.5.1
			MA	7.6, 8.1, 8.2.3
	GP 2.3	Provide Resources	All	4.1, 6.1
			TS	7.5.1
	GP 2.4	Assign Responsibility	All	5.5.1
			OPF	8.2.2
			PPQA	8.2.2
	GP 2.5	Train People	All	6.2.1
	GP 2.6	Manage Configurations	All	4.1, 4.2.3, 4.2.4
			PI	7.3.7
			TS	7.3.7, 7.5.1
	GP 2.7	Identify and Involve Relevant Stakeholders	All	5.1
			RD	7.2.3, 7.3.2
			PMC	7.3.4
	GP 2.8	Monitor and Control the Process	All	4.1, 8.2.3
			TS	7.5.1
			VER	7.6
			VAL	7.6
			MA	7.6
	GP 2.9	Objectively Evaluate Adherence	All	4.1
			MA	7.6
			PPQA	8.2.2

Generic Goal	Generic Practices	Description	PA	ISO 9001:2000
	GP 2.10	Review Status with Higher Level Management	All	5.6.1, 5.6.2, 5.6.3
			RD	7.2.2, 7.3.2
			MA	7.6
GG 3		***Institutionalize a Defined Process***		
	GP 3.1	Establish a Defined Process	All	5.4.2, 7.1
	GP 3.2	Collect Improvement Information	All	8.4
GG 4		***Institutionalize a Quantitatively Managed Process***		
	GP 4.1	Establish Quantitative Objectives for the Process		
	GP 4.2	Stabilize Subprocess Performance		
GG 5		***Institutionalize an Optimizing Process***		
	GP 5.1	Ensure Continuous Process Improvement		
	GP 5.2	Correct Root Causes of Problems		

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