

International Personnel Certification Association



IPC
CERTIFICATION SCHEME

“IPC MANAGEMENT SYSTEMS MANAGERS”

ISSUE 3

International Personnel Certification Association**I P C CERTIFICATION SCHEME**
“IPC MANAGEMENT SYSTEMS MANAGERS”**Classification**

This document is classified as an IPC Criteria Document.

IPC certification scheme lays down the standard framework which all members of IPC MLA for “IPC Management Systems Managers” shall adhere to in the operation of their Management Systems Managers certification programs. The certification scheme will be the primary standard against which members will be assessed for membership in the IPC Multilateral Recognition Agreement (MLA). Members of IPC seeking membership of the IPC MLA must conduct their operations in a way which conforms to all the requirements of the relevant IPC Certification scheme.

IPC Certification scheme is published on the authority of the Members of IPC.

Authorisation

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AVAILABILITY

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PREFACE

This IPC Certification scheme for Management Systems Managers has been prepared by the International Personnel Certification Association (IPC) to provide a common basis for the certification of Management Systems Managers. This Certification scheme can be applied by any PCB that has become a member of IPC by signing the IPC Memorandum of Understanding. It can also be utilized as an endorsed scheme for the operation of IAF MLA on ISO 17024.

This IPC Certification scheme have been developed using ISO 9000 series, ISO 14000 series, ISO 31000 series, ISO 17024 and ISO 17021 as reference standards, taking into account the collective wisdom of the members of IPC, and the requirements of both industry and certification bodies/registrars. This Certification scheme may be the basis upon which Management Systems Managers can be certified as IPC-graded Management Systems Managers.

This endorsed IPC certification scheme may be used freely by Accreditation Bodies, signatories of IAF MLA to ISO 17024, to accredit Personnel Certification bodies. Still those accredited Personnel Certification Bodies and Certified Professionals are not permitted to use IPC name and/or logo, unless being authorized by IPC. (For more details contact IPC secretariat at: secretary@ipcaweb.org)

The certification of an IPC-graded Management Systems Manager only indicates the individual's competence to perform its managerial duties. The IPC scheme does not identify the area of technical competence that an individual may have. The responsibility for identifying that a Management Systems Manager has the necessary knowledge and understanding of the technical environment to perform its duties will still rest with the management of the organization.

All IPC documents are published in English. The English version with the most recent issue and version number and date of each IPC document is the valid version. Members of IPC whose language of operation is not English have the right to translate all IPC documents into their own language of operation.

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SECTION 1 OVERVIEW

1.1 Introduction

1.1.1 This certification scheme has been developed by the IPC - International Personnel Certification Association for the purpose of harmonising the practice of Management Systems (MS) Managers certification worldwide.

1.1.2 The principal objective of this IPC certification scheme is to provide a uniform approach to the certification of MS Managers as the basis for a multilateral recognition framework within IPC.

1.1.3 The process used in developing this certification scheme was to establish firstly the key competence for MS Managers and then determine the methods by which this competence can be demonstrated and evaluated.

1.1.4 This document is divided into five sections:

Section 1	Overview.
Section 2	Job profile of IPC Management Systems Managers
Section 3	Prerequisites of the applicant
Section 4	Competence assessment
Section 5	Certificate award and recertification

1.2 Definitions

For the purpose of this certification scheme, the terms and definitions given by ISO 19011, ISO 17024 and the following ones apply:

Applicant	A person who has submitted an application to be admitted into the certification process
PCB:	Personnel Certification Body
APCB:	Accredited Personnel Certification Body
Competence:	Ability to apply knowledge and skills to achieve intended results
QMS	Quality Management System
EMS	Environmental Management System
RMS	Risk Management System
MMS	Maintenance Management System
MS	Management Systems
MS Manager	Management Systems Manager

1.4 References

Applicable documents: ISO 9000 series, ISO 14000 series, ISO 31000 series, ISO 17024, ISO 17021 family and ISO 17007.

SECTION 2 – JOB PROFILE OF IPC MANAGEMENT SYSTEM MANAGERS

2.1 IPC Quality Managers

Based on their competence within management systems, the IPC Quality Managers are able to initiate, plan, organize the development of a quality management system in an organization, and integrate this system with the existing management systems. The IPC Quality Managers are able to communicate with, and train, the top management, and make the individuals of the organization aware of their responsibility for quality in own area of work. Quality Managers are able to monitor the performance of an organization’s processes and ensure maintenance of the organization’s management systems.

2.2 IPC Environmental Managers

The IPC Environmental Managers are able to initiate, plan and organize the development of an environmental management system in an organization. The IPC Environmental Managers are able to communicate with, and train, the top management in environmental issues, and make the individuals of the organization aware of their responsibility for environmental care in own area of work. IPC Environmental Managers are able to monitor the performance of an organization’s environmental processes and ensure maintenance of these processes.

2.3 IPC Risk Managers

Based on their competence within Risk Management, the IPC Risk Managers are able to initiate, plan and organize the development of a risk management system in an organization, and integrate this system with the existing management systems. The IPC Risk Managers are able to communicate with, and train, the top management, and guide the top management in decision making concerning risk. The Risk Manager shall be able to organize and monitor the risk process of the organization and to guide and support the risk owners in their evaluation.

2.4 IPC Safety Managers

The IPC Safety Managers are able to initiate, plan and organize the development of a safety management system in an organization, and integrate this system with the existing management systems. The IPC Safety Managers are able to communicate with, and train, the top management, and guide the top management in decision making concerning personnel safety. The Safety Manager shall be able to guide the organization, initiate and support safety measures and monitor the safety status of the organization.

2.5 IPC Lean Managers

The IPC Lean Managers are able to analyse all parts of an organization with regard to efficiency and effectiveness, applying the principles of Lean to achieve improvement results. The Lean manager is able to train personnel on all levels of the organization to use improvements methods and reduce waste. The Lean Manager is able to integrate the principles of Lean with the existing management systems and guide the top management in decision making concerning use of improvement methods.

2.6 IPC Maintenance Managers

Based on their competence within Maintenance Management, the IPC Maintenance Managers are able to initiate, plan, and organize the development of a maintenance management system in an organization and integrate this system with the existing management system.

The IPC Maintenance Managers are able to communicate with and train the top management, and guide the top management and make the individuals of the organization aware of the responsibility for maintenance in own area of work. The Maintenance Managers are able to monitor the performance of the maintenance processes and ensure maintenance of the organization.

Therefore the maintenance management function covers all activities of the management that determine the maintenance objectives, strategies, and implementation of them by such means as maintenance planning, maintenance improvement of maintenance activities and economics.

SECTION 3 – PREREQUISITES OF THE APPLICANT

3.1 Education

3.1.1 Applicants for certification should have completed at least secondary education (typically all the years full-time schooling prior to university entrance). Documented evidence of the education claimed will be required.

3.1.2 As an alternative to 3.1.1, applicants may be considered for certification if they can document for instance 10 years full time work experience and satisfy the PCB that they have achieved a satisfactory level of knowledge relevant to Management Systems.

3.1.3 Alternatively to the documentation requirement in 3.1.1 and 3.1.2, the applicants can provide a signed self-declaration, giving information on education and learning institution, alternatively work actually carried out and positions held.

3.2 Work Experience

3.2.1 Applicants for certification with post-secondary education degree shall have for instance 4 years full-time (or part time work that totals the requirement) work experience in a technical, professional or management position of accountability involving the exercise of judgement. This period shall be increased for applicants with secondary education.

3.2.2 Applicants for certification shall provide documentary evidence of work experience; this evidence may be presented in the form of employer references giving information on work actually carried out and positions held.

3.2.3 As an alternative to the documentation requirement in 3.2.2, the applicants can provide a signed self-declaration, giving information on work actually carried out and positions held.

3.3 Management System Work Experience

3.3.1 Applicants for certification shall have relevant experience in the implementation, operation, and/or auditing of management systems within the respective MS Manager classe in this scheme, which provides the practical knowledge necessary to effectively understand the relevant management systems. Minimum experience time may be for instance 2 years.

3.4 Training

Applicants for certification shall have completed training to cover the competence required for the respective MS Manager classes in this scheme. The applicant is responsible for gaining the necessary competences required according to this scheme, and ensure that the training time is sufficient. Training can be performed in courses, self-study of literature, internet study, e-learning or other suitable learning methods. Alternatively, the IPC PCB may state more specific requirements to training, see also IPC-SC-11-002 “IPC Specification on recognition of training courses and training providers” for guidance.

3.5 Managerial Experience

The work experience required in item 3.2 shall include managerial experience directing subordinates or independent responsibility requiring the ability to analyse and to make independent decisions. Minimum managerial experience time may be for instance one year.

SECTION 4 COMPETENCE REQUIRED FOR MS MANAGERS

4.1 Competence required for all classes of MS Managers

4.1.1 Personal behaviour. Applicants for certification shall be able to demonstrate the personal behaviour necessary for the effective and efficient performance of their work. This shall include:

- a) Presentation ability: Ability to present in a convincing manner, ability to point out the important issues
- b) Command of language: Choice of words, ability to formulate concepts and ideas
- c) Behaviour: Body language, command of the situation, ability to be relaxed during a presentation or situation.

4.1.2 Competence. Knowledge and skills for all IPC MS Manager Certification classes

- a) Local laws, regulation and other specific considerations that are relevant to the management system;
- b) How to integrate several management systems (like ISO 9001, 14001 and OHSAS 18001 (ISO 45001)) and evaluate the procedures common to the other management systems;
- c) How to evaluate a process approach and process performance;
- d) How to communicate with senior management;
- e) How to present proposals and results to senior management;
- f) How to establish, plan and execute improvement activities;
- g) How to organize and direct;
- h) How to prevent and resolve conflicts;
- i) How to read and evaluate an organization map (organogram);
- j) How to determine and use appropriate business improvement tools;
- k) How to evaluate the management system effectiveness;
- l) How to stimulate nonconformity and incident reporting in an organization;
- m) How to utilize nonconformity reporting and incident reporting in obtaining improvements.

4.2 Knowledge and skills for each class of IPC MS Managers

Appendix 1: Requirements to IPC Quality Managers

Appendix 2: Requirements to IPC Environmental Managers

Appendix 3: Requirements to IPC Risk Managers

Appendix 4: Requirements to IPC Safety Managers

Appendix 5: Requirements to IPC Lean Management System Managers

Appendix 6: Requirements to IPC Maintenance Managers

SECTION 5 COMPETENCE ASSESSMENT

5.1 The IPC examination system

5.1.1 The IPC examination system requires that the applicant shall pass a written and an oral examination part. Both parts of the examination shall be assessed separately and have to be passed.

5.1.2 If the nature of the examined subject in Risk Management is unsuitable for oral examination, the PCB may choose to omit the oral examination and compensate for this by increasing the comprehensiveness of the written examination.

5.1.3 The IPC examination system is flexible and allows various examination types for both written and oral examination.

5.1.4 The IPC PCB shall maintain a database of examination questions for each examination type in use. The questions shall be adapted to national culture, industries and trades. Examination questions shall be updated regularly to reflect current requirements in standards and practice. The questions used in each examination shall be regularly changed to avoid repeating the same questions over an extended period of time. The examination questions shall reflect the requirements of this certification scheme.

5.1.5 The PCB shall decide if the applicant may or may not use supporting documentation during the exam. The examination questions shall be developed taking this into account.

5.2 Written examination

5.2.1 The written examination may be one, or a combination of several, of the following examination methods. Questions shall be within the area of competence described in this scheme document.

5.2.2 Multiple choice questions: Multiple Choice is a form of assessment in which applicants are asked to select the right answer from several alternatives.

5.2.3 Short open questions: A short open question is a form of assessment in which the applicant is asked to write the answer within a space of 2 – 3 lines. Typical questions are to describe the meaning of a concept, the purpose of a requirement or similar.

5.2.4 Long open questions: A long open question is a form of assessment in which the applicant is asked to write the answer within a space of approximately one A4 page. Typically the question asks the applicant to elaborate on a certain method, requirement in a standard or similar. The question often asks for examples. The intention of the question is often to check the applicant's ability to apply knowledge in a practical manner.

5.2.5 Scenario analysis: This is a form of assessment in which the candidate is asked to analyze described events and conditions. The scenario may describe an organization with certain problems, improvement needs and/or activities to be performed. The question asks the candidate to apply knowledge by suggesting solutions and/or plans for actions. The candidate will have approximately the space of one A4 page for the answer. One scenario may have several questions, often interrelated.

5.2.6 Situational judgment test: A situational judgment test is a form of assessment in which the applicants are presented with a scenario and asked to identify the most appropriate response, or to rank the responses in the order they feel is most effective. After a short description of a typical situation (scenario) there are (4-5) behavior related answers. Only one is correct.

5.2.7 The PCB shall design the written examination by choosing one or more of these question types giving the applicant a sufficient workload.

5.2.8 The written exams can also be carried out through an e-based invigilated examination: In this case the PCB must guarantee the certainty of the applicant identity and that he works without any aid, except for allowed aids to be specified by the PCB.

5.3 Oral examination

5.3.1 In the concept “oral examination” is also included witnessing, workplace observation and similar, often called practical examination.

5.3.2 To be able to handle appeals or complaints, the PCB must ensure evidence of the examination, for example by video recording or by using two examiners.

5.3.3 For oral examination the applicant is given adequate time to prepare for the exam.

5.3.4 Video conference is acceptable if the results of the examination remain valid. In this case the PCB must guarantee the certainty of the applicant identity and that he works without any aid, except for allowed aids to be specified by the PCB.

5.3.5 The oral examination shall be one of the following types:

5.3.6 Case study: Based on a case description, the applicant shall prepare a presentation to the audience (examiner), as described in the scenario text. Typically the text scenario describes a problem on which the applicant shall propose a solution to the management team. Normally the applicant does not receive questions from the audience (examiner).

5.3.7 Role play: The applicant receives a case description, explaining the purpose of the role play and defining own role and tasks. After preparation, the applicant meets the other role players (other applicants or examiners) and leads the role play which is normally a task concerning improvement or management systems development. The other participants in the play also have to prepare for their role. The applicant shall try to achieve the objective defined in the case description of the play.

5.3.8 Structured interview: The applicant receives a description of the area of competence of which the interview will be based, and will be given time to prepare for interview. The interview is conducted by an examiner asking questions from a pre-prepared checklist covering the particular interview. The applicant and examiner may discuss the answers and opinions, in order to determine the level of competence of the applicant. Typical areas are planning audits, preparation of checklists, how to report nonconformities, etc.

5.3.9 Observation/Witnessing: The applicant carries out typical practical tasks. An observer (the examiner) watches, without any intervention, the applicant in carrying out the tasks. Observation can include all phases of the MS Managers work.

5.3.10 The PCB shall design the oral examination by choosing one of these examination types with appropriate workload.

5.4 Failing to pass examination

5.4.1 If the applicant has failed in the written or oral part of the examination, but passed in the other, the applicant may take a new examination in the failed part within 12 months after the exam date.

SECTION 6 CERTIFICATE AWARD AND RECERTIFICATION

6.1 Certificate award

6.1.1 At the point of certificate award, the requirements to the applicant stated in this document shall be fulfilled. The time within an applicant shall fulfill the requirements for certification after issuing the application, shall be defined by the PCB and can not exceed 3 years from the date of examination.

6.1.2 A certificate issued according to this Scheme is valid for up to 3 years.

6.2 Recertification

6.2.1 Recertification may be performed in the time period of 6 months prior to expiry to 6 months after expiry. After this time the certificate may not be recertified, a new examination has to be passed. The new certificate (recertified) is valid for up to 3 years.

6.2.2 All IPC MS certified managers shall provide evidence of maintaining their competence periodically by recertification. Each applicant for recertification shall maintain records of professional development undertaken as described in clause 6.3.

6.2.3 For each re-certification period, IPC MS Managers shall submit documentary evidence of having kept their competence updated. This shall include a written statement of having performed the tasks of the relevant MS Manager of at least one year. The statement may have the form of a signed self declaration.

6.3 Professional Development

6.3.1 Each IPC MS Manager shall, during the three year recertification period, undertake at least 16 hours of professional development. The development may be participation in courses or seminars, self-study or other acceptable means of professional development, and be documented to the PCB's satisfaction prior to recertification.

SECTION 7 COMMON REQUIREMENTS FOR IPC CERTIFICATION SCHEMES

7.1 Reference is made to the document “Common requirements for IPC Certification Schemes”, No. IPC-PL-14-05. This document contains additional, mandatory requirements and guidelines to the present certification scheme.

Appendix 1

Requirements to IPC Quality Management System Managers

Item	Competence requirement	Competence level
A	ISO 9001	Very detailed knowledge. Being able to suggest how to comply to all requirements of the standard
B	Guideline standards ISO 9000 and ISO 9004	General knowledge, type of contents
C	Terminology of ISO 9000	Only main words relevant to quality management
D	The standards: ISO 14001, OHSAS 18001 (ISO 45001), ISO 31000	General overview
E	Develop the organization's internal and external context	Understand the concept of context and be able to assist in developing an organization's context
F	An organization's vision, mission, values and strategy	Being able to assist the management in developing these concepts
G	Organization structures, cultures and job description with responsibility and authority specifications	Being able to understand and assist in improvement
H	Verifying responsibility interfaces	Being able to assist in defining and verifying smooth transition of responsibility in related activities
I	The difference of command lines and information lines	Understanding the difference, being able to educate the organization of the differences
J	Establish and organize projects, different project models: Matrix and independent project organization	Understand the characteristics of the different project organization models and being able to guide the organization on model choice
K	Processes. Tasks of the process owner, process description and graphical presentation, process measurement. Process indicators. Key performance indicators (KPI)	Understand the concept of processes and being able to guide the organization on process establishment and maintenance
L	Customer focus. Be able to understand customer complaints and transfer these to improvement activities	To understand customer expectations and convey them to the organization in order to achieve improvement
M	Motivation of people, motivation theory	Understand the motivation theories of Herzberg, McGregor and Maslow
N	The principles of risk management, application of risk management in decision making	Understand the risk management process of ISO 31000 and being able to support using risk management in decision making
O	Quality management tools: Lean, “7 tools” (Ishikawa) and benchmarking	Understand the principles and being able to support implementing them in the organization
P	Simple statistical methods. Understand the principles of Statistical Process Control	Understand the principles of distributions, histograms, statistical presentation and Statistical Process Control
Q	Competence requirements, training needs, training plans	Being able to analyse and establish training needs and support training execution
R	Audit programmes and internal audits according to ISO 19011	Being able to prepare and audit programme and perform internal audits
S	Management system certification (ISO 17021)	Understanding the requirements to an organization in connection certification

Appendix 2

Requirements to IPC Environmental Management System Managers

Item	Competence requirement	Competence level
A	ISO 14001	Very detailed knowledge. Being able to suggest how to comply to all requirements of the standard
B	Global ecological connections. Spreading pollution by sea and air	Understand global impact on local pollution
C	Effects of pollution on all nature, all living creatures, avoid, reduce and/or control any type of pollution or waste	Fundamentals of pollution. Basic understanding of effect of pollution in living organisms, propagation of pollution
D	Environmental science and technology. Pollution in soil, water and air. Cleaning technology	General overview of technology for cleaning and pollution prevention
E	Toxicology and long term effects	Basic knowledge of poisonous matters and effects
F	“CO ₂ footprint” of goods and services. Environmental accounting.	Understand the principle of footprint and environmental accounting
G	Emergency planning and response, prevention and protection from pollution when occurrence. Training.	Being able to assist in developing emergency plans and training
H	International/regional and national environmental legislation, normative requirements	Overview of national legislation and relevant international regulation
I	ISO 9001, the guideline ISO 14004, ISO 14031, ISO 14020 family, 14064, part 1,2 and 3, ISO 45001, ISO 26000	General knowledge, overview
J	Integrated management systems, necessary processes and procedures for safe operation, value chain control	Being able to integrate environmental management in the general management system of the organization
K	Design, develop, implement, maintain and improve Environmental Management Systems	Being able to specify requirements to the Environmental Management System and monitor implementation
L	Leadership and commitment, ethical responsibility	Knowledge of leadership. Basic knowledge of ethics
M	Identification of environmental aspects	Able to assist the organization
N	Risk management. How to assess the risk of significant environmental impacts and activities identified in the context of the organization’s Environmental Management System	Basic knowledge of risk management
O	Methodologies and techniques to control environmental hazards	Basic knowledge on how to assess and use these methods
P	Environmental Management System roles and responsibilities within the context of the organizational environment	Understanding the role and authority of the Environmental Manager and related personnel
Q	Monitor/assess and determine the suitability and effectiveness of the Environmental Management System	Knowing how to perform basic monitoring and internal audit
R	Life Cycle Assessment	Understanding the concept of Life Cycle Assessment

Item	Competence requirement	Competence level
S	Energy management, ISO 50001	Basic understanding
T	Handling of hazardous good/materials	Able to identify such materials and perform protective measures
U	Project management	Basic knowledge of project management
V	Communication, creating an organizational culture that are able to meet and handle environmental challenges	Understand the concept of culture, being able to participate in creating an environmental culture
W	External and internal reporting of environmental conditions	Being able to perform necessary reporting to authorities or other parties
X	IT solutions for Environmental Management Systems	Being able to specify IT needs in environmental management
Y	Environmental management audit. ISO 19011 and the ISO 17021 family	Understanding of competence requirements for auditors, being able to organize internal audits

Appendix 3

Requirements to IPC Risk Management System Managers

Item	Competence requirement	Competence level
A	ISO 31000	Very detailed knowledge. Being able to develop, implement and maintain systems that will satisfy the guidelines of ISO 31000
B	ISO 31004	Basic knowledge
C	ISO 9000 terminology	Knowledge of terminology applicable to risk management
D	ISO 9001, ISO 14001, OHSAS 18001 (ISO 45001)	Overview of contents
E	The organization's internal and external context	Understanding and be able to develop
F	Relationship between negative (threat) and positive risk (opportunity)	Understand and be able to educate others
G	Risk Manager's tasks	Understand the common tasks of a Risk Manager
H	Risk management documentation, the Risk Register	Being able to develop documentation requirements and Risk Register
I	Use of risk management in the organization's decision processes	Being able to assist top management in decision processes based on risk assessment
J	Risk appetite and risk aversion	Understand underlying forces in risk decisions
K	“Risk owner” duties	Understand Risk Owner duties and being able to support Risk Owners
L	“Communication and consultation” in the Risk Management Process of ISO 31000	Being able to perform planning and execution of “Communication and consultation”
M	ISO 31010 risk analysis methods: 1. Brain storming 2. Presentation of results in a Risk Matrix 3. Preliminary Risk Analysis 4. Failure Modes and Effect Analysis (FMEA and FMECA) 5. “Structured-What-If” analysis 6. Fault tree analysis 7. Event tree analysis 8. Stochastic simulation (Monte Carlo Simulation) 9. Safe job analysis 10. Bow Tie Analysis	Understand the principles and being able to use the risk analyses methods. Being able to assist Risk Owners in using the methods on a basic level
N	ISO 31010 risk analysis methods: HAZOP (Hazard and operability analysis), HAZID (Hazard Identification) and HACCP (Hazard Analysis Critical Control Point)	Understand the principles of the methods
O	Statistics: Arithmetical mean, standard deviation, histogram, distribution, «The S-curve» (accumulated distribution), random numbers, the «Law of Great Numbers». The concept of the «H-value» (frequency of accidents)	Basic knowledge

Item	Competence requirement	Competence level
P	Cases of insignificant probability and extreme consequence	Identifying such cases and being able to assist in sole consequence analysis
Q	Psychological factors in risk, the human factor, chaos handling	Understand human error, factors to avoid such errors, being able to assist in training chaos handling methods
R	Cost/benefit analysis in risk analysis and risk mitigation	Being able to assist in cost/benefit analysis in risk assessment
S	Emergency preparedness and business continuity	Being able to assist the organization to develop appropriate plans for emergencies and business continuity
T	Risks involved in information technology, risk for loss of information, attack on IT systems. Protection against attacks. ISO 27001 and ISO 27005	Understand these risks and support the organization in IT risk questions. General knowledge of ISO 27001 and ISO 27005
U	Object security. Protection against unauthorized access, espionage and other harmful acts	Basic knowledge on methods for assessing vulnerability of harmful acts. Able to identify items and information needing protection
V	Risk of loss of reputation, loss of image	Being able to assist top management in identifying areas vulnerable to loss of reputation and prepare barriers for such loss
W	Financial risks in business operation, risk of investment. Risk of fraud	Basic understanding of financial risks and the motivation factors of fraud
X	How to determine the suitability and effectiveness of the Risk Management System	Being able to monitor and review the performance of the risk management system

Appendix 4

Requirements to IPC Safety Management System Managers

Item	Competence requirement	Competence level
A	ISO 45001 (BS-OHSAS 18001 until ISO 45001 is issued)	Very detailed knowledge. Being able to suggest how to comply to all requirements of the standard
B	ISO 9001 and ISO 14001, ISO 31000	General knowledge, overview
C	National and international laws and regulation on risk	Overview
D	Safety policy, personnel protection	Being able to develop and propose a safety policy and attitude to personnel protection
E	Cost of prevention vs. cost of loss of health	Being able to calculate cost of health loss and perform comparison
F	Design, develop, implement, maintain and improve personnel safety management systems. Employee participation. Awareness training	Being able to perform these duties, and support the management in implementation and operation of the system
G	Integrated management systems, necessary processes and procedures for safe operation	Understand the principles of integrated systems, and participate in integration into other systems
H	Creating a safety culture, means and methods	Being able to support creation of a safety culture
I	Safety improvement projects, planning and execution	Being able to plan and lead development projects
J	Identification of safety aspects	Encourage and support identification and recording of safety issues
K	Risk management. Risk matrix. Relevant types of risk analysis	General knowledge of risk management and -analysis
L	Safe Job Analysis	Understand the principles and application
M	Safety medicine: Stress, ergonomics, toxicology. Exposure to harmful substances or conditions. Health check. First aid training	Basic knowledge, overview of subjects. Ensure first aid training in the organization
N	Handling of hazardous good/materials, marking, data sheet on chemical substances with medical treatment instruction. Personal protection equipment	Availability and updating of data sheets. Knowledge of system for ensuring presence of such information during work with harmful substances and system for ensuring use of personnel protection equipment
O	System of regular safety inspections	Being able to specify system requirements
P	Emergency planning and response. Detection of safety threats, handling of safety threats, normalization	Understanding emergency preparedness systems. Being able to support in developing such systems
Q	Documentation of accidents and severe conditions	Knowing requirements to documentation required by authorities and internally
R	External and internal reporting of safety conditions and incidents. Statistics	Being able to develop, implement and maintain reporting systems
S	Accident and incident investigation, root cause analysis	Being able to lead investigation of events and understand their causes
T	IT solutions for Safety Management Systems	Basic knowledge on requirements to registration and document control functions

Item	Competence requirement	Competence level
U	How to monitor/assess and determine the suitability and effectiveness of the Safety Management System	Being able to establish performance indications for system effectiveness and efficiency
V	Safety management audit. ISO 19011 and the ISO 17021 family	Understanding of competence requirements for auditors, being able to organize internal audits

Appendix 5

Requirements to IPC Lean Management System Managers

Item	Competence requirement	Competence level
A	Lean manufacturing, Lean procurement, Lean administration, Lean engineering	The principles of Lean. Understand the main elements. Be able to assist in implementing Lean in an organization
B	Lean leadership principles, Lean leadership education programs	Understand these principles in order to assist in Lean training
C	Improvement culture	Contribute in generating a Lean culture
D	The Toyota Production System	Basic knowledge and understanding of the main elements of this system
E	System efficiency, productivity measures	Understand the concept of efficiency versus effectiveness. Being able to give guidance on measurement parameters for productivity
F	Standardization of work	Basic knowledge on standardization of work
G	“Seven wastes”: Overproduction, waiting, transporting, inappropriate processing, unnecessary inventory, unnecessary motion, defects	Understand the nature of seven wastes. Where it can occur in production, administration and other places of an organization
H	The A3 method	Understand and being able to guide in using the A3 method of improvement
I	The 5S method	Understand and being able to guide in using the 5S method for organizing work
J	FIFO flow (first in, first out)	Knowledge of the FIFO principle
K	Cause effect diagram (“fishbone diagram”)	Being able to perform a cause and effect analysis with graphical presentation
L	Kanban	Understand the concept of Kanban. Production based on customer orders.
M	Poka-Yoke	Understand the principles of “idiot safe” design
N	Kaizen	Understand the principles of everyday improvements
O	“Just in time” principle	Being able to guide the management of keeping limited stock of parts, relying on supplies on time
P	Lean Six Sigma, DMAIC (Define, Measure, Analyze, Improve and Control)	Understand the basic principles of Lean Six Sigma. Being able to judge if Lean Six Sigma may be utilized in improvement projects
Q	Improvement projects	Knowledge in organizing improvement projects
R	Feedback loops: Plan, do, check, act	Understand the feedback principle. How to implement it
S	Group dynamics, teamwork	Understand the basic principles of group dynamics. How to establish an efficient team
T	Motivation	Knowledge on motivation theory. Maslow, Herzberg
U	Communication	Basic understanding of listening technique
V	Presentation techniques, presentation aids	Being able to present to all levels of an organization and using presentation tools
W	Organization, production processes	Understanding of processes. Being able to assist in developing processes with graphical presentation
X	The matrix project organization model	Understanding the Matrix project model. Being able to assist in establishing a suitable project for improvement purposes
Y	Value stream mapping	Knowing how to map the value chain, where value is created for the customer. Methods of mapping

Appendix 6

Requirements to IPC Maintenance Management System Managers

Item	Competence requirement	Competence level
A	Qualification of maintenance personnel: Understand the relevant national or regional applicable standards (e.g. for Europe: EN-15628 Maintenance – Qualification of maintenance personnel)	Very detailed knowledge
B	Maintenance - Maintenance terminology (e.g. EN-13306 for Europe)	Being able to handle the most central terms in the maintenance
C	Maintenance Performance – KPI (e.g. EN-15341 for Europe).	Being able to develop and analyze the most common Key Performance Indicators.
D	Maintenance within Physical Asset Management (e.g. EN-16646 for Europe)	Being able to understand the asset value, and the contribution of maintenance upon Life Cycle Costing and Life Cycle Profit
E	Maintenance, aims and strategies	Detailed knowledge of developing and introduction of aims and development of strategies to reach the aims.
F	Maintenance concept and best practices	General knowledge of the most central concept e.g. TPM (Total Productive Maintenance), TPS (Toyota Production System), Lean maintenance, WCM (World Class Maintenance), Asset maintenance management, factory of the future, industry 4.0.
G	Maintenance Management and processes	Detailed knowledge in plan, do, check and act within maintenance
H	Maintenance planning and scheduling	Detailed knowledge of principals and methodic
I	Maintenance organization, outsourcing and insourcing	Detailed knowledge of difference organization models
J	CMMS (Computerized Maintenance Management System)	General knowledge of using CMMS in maintenance management.
K		
L	Condition and performance monitoring	General knowledge of techniques and usage
M	Root Cause Analyses	Detailed knowledge of central methodic, e.g. Ischikawa, Mort (Management over risk three)
N	Overall Equipment Effectiveness Overall Craft Effectiveness Profit Loss Indicator	Very detailed knowledge in developing og use.
O	5 and 7 S The steps to achieving all-time highs in productivity, quality, safety, and employee satisfaction	Detailed knowledge of principals and use.
P	Benchmarking and maintenance audits	General knowledge and use
Q	Shut downs and pit-stop	Detailed knowledge in planning execution and continuous improvements

R	Spare parts control in maintenance	General knowledge of spare parts control and use
S	Reliability	Detailed knowledge of criticality, risk, analytical methods e.g. FTA (Fault Tree Analysis), FMEA (Failure Mode Effect Analysis), HAZOP (Hazard and Operability). General knowledge of calculation and optimization.
T	Reliability Centered Maintenance	Detailed knowledge. Being able to understand and the use Reliability Centered Maintenance
U	Production and manufacturing	General knowledge of production management, quality management, bottle necks theory, logistic, SMED (Single Minute Exchange of Dies), flow and process analysis.
V	Safety and vulnerability	General knowledge of how maintenance affect safety and reducing risk
W	Maintenance and dependability during design	General knowledge of how to build in maintenance and dependability in the early life time.
X	Ageing and life extension	General knowledge of the degradation and wearing during life time.
Y	Overview of legislation and technical standards	General knowledge.