

Draft of Glossary in Annex40 (PDF Version)

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Document identification	
Type of documents:	Glossary <input checked="" type="checkbox"/> Cx process <input type="checkbox"/> Project <input type="checkbox"/> Tool <input type="checkbox"/> Model <input type="checkbox"/>
Type of building:	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/>
Type of commissioning:	Initial-Cx <input checked="" type="checkbox"/> Re-Cx <input type="checkbox"/> Retro-Cx <input type="checkbox"/> On-going Cx <input type="checkbox"/>
Glossary check:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
MQC task:	Pre-Design <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Elaboration <input checked="" type="checkbox"/> Construction <input checked="" type="checkbox"/> Occupancy & Operation <input checked="" type="checkbox"/>
Other indications:	

A. Glossary Definitions

Commissioning (Cx): Clarifying Owner's Project Requirements (OPR) from viewpoints of environment, energy and facility usage, and auditing and verifying different judgments, actions and documentations in the Commissioning Process (CxP) in order to realize a performance of building system requested in the OPR through the life of the building. (*See Explanation*)

Commissioning Process (CxP): A quality-oriented process to accomplish the Commissioning (Cx) aim. (*See Explanation*)

Commissioning Authority (CA): An entity person, company or organization designated by the owner, and taking responsibility of managing the overall Commissioning Process (CxP). (*See Explanation*)

Commissioning Team: Commissioning Team consists of the Commissioning Authority (CA) and the assistants. The Design Professional (DP) and the contractor for the project are not included in the Commissioning Team in the Initial Commissioning (I-Cx) process for securing independence of the Commissioning (Cx).

Commissioning Relating Parties: Commissioning Relating Parties cooperate with the Commissioning Team owing to share information, to promote instruction and communication and finally to implement the Commissioning Process (CxP) smoothly. This includes the owner, the Design Professional (DP) and the contractor, etc. relating the project according to the Commissioning Phases and Steps.

Commissioning Process Progress Report: A progress report of the Commissioning Process (CxP) submitted by the Commissioning Authority (CA) to the owner when a Commissioning (Cx) phase or step in the CxP, a content of the contract or the budget year is finished.

Issues Log: A formal document of recorded questions, answers, proposals and resolutions occurring during the Commissioning Process (CxP).

Owner's Program (OP): A document written by the owner that describes the owner's overall vision and philosophy including environment and energy issues on the project. The OP includes the outline and profitability of the project, expectation of how it will be used and operated, and the baseline and distribution of the project budgets.

Risk Evaluation (RE): A specification given by the Owner or the Commissioning Authority (CA), in which the accepted risk level for the buildings HVAC systems is fixed. (*See Explanation*)

Design Requirements (DR): A document written by the Commissioning Authority (CA) based on the Owner's Program (OP) that details the building type, project risks, the conditions of use and Acceptable Performance of the building energy and indoor air quality with harmonization between the budget and performance of the project.

Acceptable Performance: Permissible environment and energy performance values of equipment and systems such as seasonal/time fluctuations and space distributions occurring under all ranges of actual loads. (*See Explanation*)

Owner's Project Requirements (OPR): A document developed by the owner with help of the Commissioning Authority (CA) based on the Owner's Program (OP) and the Design Requirements (DR). The OPR should be a target of the Commissioning (Cx) after the Pre-Design Phase. If the OP and the DR are satisfied fully, these documents can be filed together as the OPR.

Commissioning Plan: A document written by the Commissioning Authority (CA) that defines the contents of Commissioning Process (CxP) according to the project risk and complexity in order to completely finish the each Commissioning (Cx) phase and/or step. The Commissioning Plan can be defined through customization of Standard Models of Commissioning Plans (SMCxP). (*See Explanation*)

Standard Models of Commissioning Plans (SMCxP): Standard models which list typical tasks to be realized in the Commissioning Process (CxP), which prepare five building types of models with three Cx levels in each according to the project risk and complexity. *(See Explanation)*

Request for Proposal (RFP): A document written by the owner to solicit a Commissioning Authority (CA) or to select a Design Professional for the project. A request document for a design competition is one kind of the RFP for the Design Professional.

Design Professional: A legal representative among a design team for the project.

Schematic Planning Documents: Documents presented to the owner by the Design Professional when the Design Professional begins a preliminary design, which include a design philosophy, environment and energy criteria, needed functions, quality of environmental control, and outlines of building systems meeting with the Owner's Project Requirement (OPR).
(See Explanation)

Preliminary Design Documents: Documents made by the Design Professional for the purpose of confirming design contents before a working design starts, which include table and layout of equipment, schematic of ducts and pipes system, schematic of control system, Basis of Design, a draft of Design Intent Document and Commissioning Specification based on the Schematic Planning Documents. *(See Explanation)*

Basis of Design: All information necessary to accomplish the Design Requirements (DR), which include weather data, interior environmental criteria, other pertinent design assumptions, cost goals, references to applicable codes, standards and regulations, and guidelines and tools for prediction of environment and energy performance.

Design Intent Document: A document written by the Design Professional as a part of Design Documents, which includes design intent, outline and basis of design.

Commissioning Specification: A document developed by the Design Professional as a part of Design Documents that details objective, scope, targeted items and performance description on the Commissioning (Cx) after the Design Phase based on the Commissioning Plan.

Design Documents: All documents of design works made by the Design Professional including working design, construction specification, Design Intent Document and Guide for System Control and Operation. In the Design Documents, Commissioning Specification, technical guide for performance prediction of equipment, method of control and calculation, references for performance verification, demanded and estimated values of environment and energy performance, and manual for operating systems should be written clearly.

Construction Documents: All documents for the construction contracts made by the contractor. The Construction Documents include the Design Documents, the range of construction, the content of work, the responsibility and the cost for Cx, and the documents needed for the bidding.

Guide for System Control and Operation: A guide made by the Design Professional from a viewpoint of design in order to inform operating and maintenance staffs of system structure, design intent, system control, and guideline of system operation.
(See Explanation)

Preparation Procedure for Commissioning Starting at Construction Phase: Specific actions that should be performed before Construction phase when Commissioning (Cx) of Pre-Design Phase and Design Phase have not been implemented.
(See Explanation)

Testing, Adjusting and Balancing (TAB): A testing work of constructed, installed and placed equipment and systems conducted by the contractor so that the equipment and systems can work as specifications written in Design Documents. It includes adjusting water flow in pipes and air flow in ducts, and tuning control parameters.

As-Built Records: Documents that accurately represent actual installed conditions, equipment, and systems, such as drawings, computer graphics, equipment data sheets, operation manuals, maintenance manuals, and the training program and videotapes.

System Manual: Summarized documents for system operation and maintenance, which is further developed from As-Built Records and Guide for System Control and Operation, including additional information collected during the Commissioning Process (CxP).

Certificate of Readiness: A document stating that all equipment, systems, and controls have been correctly installed; operated as specified; tested, adjusted and balanced; and are verified as ready for Functional Performance Testing and other acceptance procedures. The CA issues the Certificate of Readiness to the contractor after verifying the results of TAB work.

Functional Performance Testing (FPT): A Functional Performance Test is a set of tests that define the functionality and verify the behavior of a system. These tests are usually defined by the Commissioning Authority (CA) in order to verify if building systems are completed to satisfy the Owner's Project Requirements (OPR) and demonstrate functional performance. The CA may conduct the tests directly, or other members of the Commissioning Team may conduct them. These tests occur in the Evaluation and Construction Phase. (*See Explanation*)

B. Glossary Explanations

Commissioning (Cx):

Cx is performed under instruction of a qualified CA for the purpose of ensuring that building systems are designed, installed and functionally tested, and capable of being operated and maintained to meet with OPR from viewpoints of environment, energy and facility usage. These viewpoints mean to keep indoor environment in healthy and comfortable conditions, to minimize amount of energy consumed and discharged, to conserve urban/global environment, to keep maintainability of the building systems and to give a long-life to the building systems.

Commissioning Process (CxP):

Initial CxP has hierarchically two Stages, five Phases and nine Steps as follows. Simple explanations on the four types of CxP including Initial Cx are listed below, and the details on the phases and steps are in the last of Glossary Explanation section.

- Initial Commissioning Process -

Production Stage

- 1) Pre-Design Phase
 - a) Program Step
 - b) Planning Step
- 2) Design Phase
 - a) Preliminary Design Step
 - b) Working Design Step
- 3) Elaboration Phase
 - a) Elaboration Step
- 4) Construction Phase
 - a) Construction Step
 - b) Acceptance Step

Operation & Maintenance Stage

- 5) Occupancy & Operation Phase
 - a) Post-Acceptance Step
 - b) Ordinary Operation Step

- Four Types of Commissioning Process -

- 1) **Initial Commissioning (I-Cx):** A type of Cx applied to a production of a new building and/or an installation of new systems, which is defined as a systematic process beginning with Program Step and ending with Post-Acceptance Step. Basically, the range of CxP implemented depends on the owner's wish and can be defined in a contract between the owner and a CA. However, it is strongly recommended that the I-Cx has consistency in the process. As defined, in case of installing new equipment in an existing building (e.g. installing a new cooling system in an existing building which previously only had a heating system), it should be referred to as the I-Cx.
- 2) **Retro-Commissioning (Retro-Cx):** First time Cx implemented in an existing building in which a documented Cx was not implemented before. In many cases, Design Documents of the existing building have been lost or unmatched with the current situation. Therefore, the Retro-Cx would include verification process on the design such as shown in parts of the I-Cx.
- 3) **Re-Commissioning (Re-Cx):** A Cx implemented after the I-Cx or the Retro-Cx when the owner hopes to verify, improve and document the performance of building systems. Reasons to re-commission a building are diverse. It could be a modification in the user requirements, the discovery of underperformance of the systems, the wish to fix faults found during the I-Cx, etc. Periodic Re-Cx ensures that the original performance persists. The Re-Cx is the event that reapplies the original Cx in order to keep the building systems performance.
- 4) **On-Going Commissioning (On-Going Cx):** A Cx conducted continually for the purposes of maintaining, improving and optimizing the performance of building systems after the I-Cx or the Retro-Cx. The large difference between On-Going Cx and periodic Re-Cx is that the Re-Cx refers to the original building systems performance, but the On-Going Cx lays emphasis on the performance optimization. The On-Going Cx is a successive CxP during Operation & Maintenance Stage to resolve operational problems, improve comfort, optimize energy use, and recommend retrofits if necessary.

Commissioning Authority (CA):

In some countries, one considers that CA must be qualified by an organization for certification authorized by the nation or the state. The CA shall refer directly to the owner. For the purpose of securing its independence, the CA is generally not selected among the Design Professional or the contractor in the I-Cx. The CA organizes a Commissioning Team that consists of responsible persons for working together in carrying out the Cx according to the project risk and complexity, and plays a role of representative in the Commissioning Team. The CA submits to the owner the Commissioning Process Progress Report and manages the exchanges of Issues Log among the owner and the Commissioning Team during the CxP.

Risk Evaluation (RE):

Process in which the risks related to the HVAC system, which do not meet the owners project requirements (OPR), are identified. It is an overall evaluation of qualitative and quantitative damage, relevance, duration, etc. if the system does not meet the requirements (e.g. human risks like responsibility, consciousness, quality of risk evaluation, risk monitoring, image, as well as system risks like time to discover and react in case of failure, trends, risk management, time to get under control, etc.).

By identifying the main risks of damages towards human health, environment load, energy saving, cost, etc. and the probability of its occurrences and classification in one of the categories low, normal and high for the importance of the damage as well as for the probability of occurrence, an indicator of the further risk handling in the Cx process is given by choosing the appropriate Cx-level.

Handling in practice (see also fig. risk handling flow):

- 1) If the main risks are classified to be “normal” for damage as well as for the probability of occurrence, the evaluated risk for the HVAC system is considered to be “normal”. That means, that the SMCxP Level x correspond to the building type x.
- 2) If both, the damage and the probability is considered to be “high”, the evaluated risk for the HVAC system is considered to be “high”. In this case it is recommended to increase the SMCxP Level to the building type x+1.
- 3) If both, the damage and the probability are considered to be “low”, the evaluated risk for the HVAC system is considered to be “low”. In this case it is recommended to decrease the SMCxP Level to the building type x-1.
- 4) If one criteria, the damage or the probability, is considered to be “normal” and the other “high” respectively “low”, the evaluated risk for the HVAC system is considered to be “high”, respectively “low”. In this case it is recommended to change the SMCxP Level to the building type x+1, respectively x-1.
- 5) If one criteria, the damage or the probability, is considered to be “low” and the other “high”, the evaluated risk for the HVAC system is considered to be “normal”. In this case the SMCxP Level can be left to the corresponding building type x.

Acceptable Performance:

The permissible values include time fluctuations, space distributions, etc. The examples are as follows: for equipment, basis of FPT, for systems, reference of simulation and basis of evaluation of actual measured data, and for environmental conditions can be evaluation of system control characteristic and capacity.

Commissioning Plan:

The Commissioning Plan includes the Commissioning Specification and the estimation of Cx costs. As defined, the Design Professional makes the Design Documents including the Commissioning Specification, etc., but the OPR that should be basis of doing the works does not include the outlines of Cx. The CA develops the document of the plan in increasing detail according to the Cx progress. Therefore, the phase and/or step name and the version number should be added in the document.

Standard Models of Commissioning Plans (SMCxP):

The SMCxP are made by Annex40, Subtask A2, to help understand the CxP and to be applied as one of the Cx tools. The SMCxP prepare five building types of models and three Cx levels of models in each building type. The building types are defined as Type 1-5 based on the building size and the complexity of the building system, and the Cx levels are defined as Level 1-3 based on the concept of risk evaluation. The Cx levels are identified by the risk damages towards human health, environment load, energy saving, cost, etc. (x-axis) and the probability of occurrences (y-axis). In real projects, the SMCxP would be modified according to the project's characteristics and the social custom in each country and/or state. The example is shown as Japanese MQC (Model Quality Control) for Cx, and the details of CxP are written in the matrix. The five building types are as follows.

- 1) Type 5: Complex Critical Building

e.g.: a laboratory with complex HVAC systems and high requirements on the indoor environment linked to the process in the laboratory

- 2) Type 4: Large Commercial Building with Central HVAC System
e.g.: an office building including offices, meeting rooms, restaurant but without critical parts such as large computer center
- 3) Type 3: Medium Size Building with Central HVAC System
e.g.: 20 apartments in one building with a collective hydronic system and a collective mechanical ventilation system
- 4) Type 2: Medium Size Building with Independent HVAC units
e.g.: a store with roof top package units
- 5) Type 1: Small Size Building with Simple HVAC system
e.g.: a detached house

Schematic Planning Documents:

If the design proposal made by the Design Professional is adequate, it can be applied as the Schematic Planning Documents. However, if the OPR and the Commissioning Plan are further developed, the Schematic Planning Documents should be made anew.

Preliminary Design Documents:

At the end of preliminary design completion, all contents of the Preliminary Design Documents should meet with related laws and regulations. The CA judges the appropriateness of the contents and organization written in the Preliminary Design Documents such as if they meet with the OPR, if the design intent is appropriate and if the quality control of the design process is accurate.

Guide for system Control and Operation:

Generally, it is not easy for the operating and maintenance staffs to understand the systems control and operation from only the working design. The system diagrams, the lists of equipment and the explanations should be included in the guide. In case that most of the contents are in the Design Intent Documents, the Design Intent Documents can be applied as the guide on condition that the contents from actual viewpoint of the operation and maintenance are added with the Design Intent Document.

Preparation Procedure for Commissioning starting at Construction Phase:

Preparatory procedure for the Cx is needed when the Cx of the Pre-Design and Design Phases have not been implemented. The CA audits related documents (e.g. OPR and Design Documents, or resembling documents if insufficient), clarifies the possibility of Cx, and informs the owner if there is incomplete design. The owner and the Design Professional have a meeting to resolve the problem. The role of CA at this meeting is to give the owner and the Design Professional an unbiased advice based on a professional knowledge to obtain the harmonization of design and requested quality.

Functional Performance Testing (FPT):

In case of the systems having seasonal performance like HVAC system, the FPT should be continued for at least one year, and decides the initial performance of the system after that. For instance, the FPT of HVAC system means to verify that the equipment, subsystem and total system work with in harmony (including the stability and durability) to show the final function of the building air-conditioning, and the objective environment written in the Design Documents can be realized within the energy consumption predicted. The FPT lays emphasis on the harmonization in the system, and should be differentiated from the TAB on the performance of equipment itself.

Phases and Steps in Commissioning Process:

1) Pre-Design Phase

Pre-Design Phase is the first phase of I-Cx process, and divided into two steps, which are Program Step and Planning Step. In the Program Step, the owner spreads out the project concept as the OP. In the Planning Step, the owner makes the OPR with the CA. The role of CA at this phase is to give the owner guidance for making the OPR, and to develop the Commissioning Plan based on it.

a) Program Step

In the Program Step, the owner's philosophy on the building environment and performance is established as the OP. The OP includes the outline and profitability of the project and the concept on the energy conservation and urban/global environmental contribution. The owner makes a RFP of CA, and solicits a CA. In this step, the owner can ask for inside and/or outside professionals on technology, finance, business and construction.

b) Planning Step

In the Planning Step, the CA makes the DR, and the owner makes the OPR so that a Design Professional can propose a concrete design. The OPR is developed based on the OP and the DR. The owner gives a RFP of Design Professional, and then selects a Design Professional for the project. Generally, the milestone between the Program Step and the Planning Step is when the CA begins to join the project. The CA makes a Commissioning Plan, and helps the owner or acts for the owner if necessary to make the OPR and the RFP of Design Professional and selection criteria of Design Professional. In this step, the CA considers opinions of construction manager, facility manager, financial advisor, operation and maintenance staff, occupants, etc., and identifies systems targeted for the Cx and documents them. At the same time, the CA helps the owner to estimate costs for design, construction, TAB, different consulting works, etc. and investigates laws and regulations relating to the Cx. The scope of the work in this step widely varies depending on the project size and owner's requests for Cx, but the works explained as above are key points for successful Cx.

2) Design Phase

Design Phase begins with making Schematic Planning Documents after the Design Professional for the project was selected during the Planning Step, and ends with completion of Design Documents and with handing over them to the owner. According to the contract, the Design Professional might have the responsibility to make a costs/amounts document based on the Design Documents, present the design works on site, make a questions/answers document, etc. The Design Phase is divided into two steps, which are Preliminary Design Step and Working Design Step.

a) Preliminary Design Step

The Preliminary Design Step begins with making the Schematic Planning Documents and ends with completion of the Preliminary Design Documents. The milestone of this step's end is a submission of the Preliminary Design Documents. All contents of the documents must comply with laws and regulations on the building systems. The CA verifies the appropriateness of the Schematic Planning Documents and the Preliminary Design Documents, clarifies the procedure and schedule of Cx, and looks over the Commissioning Plan again to coordinate with the design intent so that the Design Professional can clearly write the Commissioning Specification in the Design Documents.

b) Working Design Step

During Working Design Step, the Preliminary Design Documents are further developed into the final Design Documents. The Design Professional evolves the draft of Design Intent Document included in the Preliminary Design Documents, and makes the final Design Documents based on it. The CA audits the accuracy of the contents of the documents and verifies that the contents would be fully completed. The details of the design works, their reviews, and the quality and schedule control are, of course, the responsibility of the Design Professional, but if the management looks improper or includes any improper changes contrary to the OPR, the CA should point them out directly to the Design Professional or indirectly through the owner depending on the situation and characteristic of the matters, and should instruct their correction based on the owner's decision making.

3) Elaboration Phase (Elaboration Step)

Elaboration Phase is a transitional phase between the completion of design works and the start of construction. During this phase, the completion of the Construction Documents, the bidding, the assessing and the contracting for the construction order are performed. The leading person in this phase is of course the owner or the project manager/the construction manager acting for the owner, but in case of a private construction, the Design Professional might participate in the work of making the Construction Documents. The role of the CA is to help the Commissioning Relating Parties so that the information on the assigned work and the responsibility for the Cx is well-shared among the bidding companies. In rare cases that Cx starts without implementing the Pre-Design Phase and Design Phase, the Preparation Procedure for Commissioning starting at Construction Phase that shall be taken for the post facto CxP may be assigned to this phase.

4) Construction Phase

Construction Phase is divided into two steps, which are Construction Step and Acceptance Step. In the Construction Step, contracting based on the Design Documents is done, and the construction of building systems is started and completed under the construction supervision. Appropriate TAB works are also implemented by the contractor. In the Acceptance Step, FPT is completed by the instruction of CA based on the results of TAB works, and then the building systems are handed over to the owner. The roles of CA are to cope with design changes and to verify the appropriateness of construction supervision and construction control, to inspect a process of TAB works, to implement FPT, to plan a schedule of education and training for operation and maintenance staff and to carry it out.

a) Construction Step

The contractor makes shop drawings based on the Design Documents, controls schedule and quality of the construction under the instruction of construction supervisor, installs ducts, pipes, wires and equipment, and implements TAB works. The roles of CA during this step are to correctly convey changes of OPR to the relating parties or proposal of design changes to the owner through the construction supervisor, and to advise them the necessity and the possibility of realization from a viewpoint of requested performance. The CA also audits if the construction supervision and control rightly perform those roles, supervises the TAB works, and confirms the maintainability of building systems with the owner or as acting for the owner.

b) Acceptance Step

Acceptance Step is a final step before the building systems are handed over to the owner. The contractor finishes the TAB works of equipment and systems including Building and Energy Management System (BEMS), and completes As-Built Records and System Manual. The CA verifies if the TAB works was correctly implemented and the As-Built Records are documented rightly and fully. These results are documented by the CA and the document is presented to the contractor as a Certificate of Readiness. The CA also audits by FPT if the equipment and systems work with the OPR. The Design Professional and/or the contractor are requested to solve any faults revealed at this step and to readjust the systems as properly and quickly as possible. The CA plans education and training program, and manages it so that the operation and maintenance staffs could completely understand the Design Intent Documents and the Guide for system Control and Operation. If the CA judges the construction inappropriate and the rested time for the readjustment before occupancy is insufficient, the CA makes the list of faults to be readjusted by the Design Professional, the contractor and/or the manufacturer, and suggests to the owner that these faults shall be corrected during the next Occupancy & Operation Phase's Cx.

5) Occupancy & Operation Phase

Occupancy & Operation Phase is a phase after building systems were completed and handed over to the owner. The Occupancy & Operation Phase is divided into two steps, which are Post-Acceptance Step and Ordinary Operation Step. In this phase, the FPT of building systems has been already decided by the precedent phases, the building systems are operating properly, and the operation and maintenance staffs have been educated and trained. However, in case of systems that need seasonal Cx such as an air-conditioning system, the initial performance of the systems is decided by FPT at least one year after the completion of building systems. The Post-Acceptance Step can be applied in that case. The Ordinary Operation Step continues after the Post-Acceptance Step. The I-Cx process begins with the Program Step and ends with the Post-Acceptance Step. If the systems commissioned do not have seasonal changes of the performance, the Post-Acceptance Step is skipped.

a) Post-Acceptance Step

Post-acceptance Step is applied in building systems which the performance is seasonally changed and the DR demands the annual performance like an air-conditioning system. This Post-Acceptance Step is placed as the final step of I-Cx process. The role of CA in this step is to identify the seasonal system performance. That is, in case of air conditioning system, identifying the system performance for peak cooling season, peak heating season and intermediate season co-existing both modes of cooling and heating. The Post-Acceptance Step's Cx includes the seasonal FPT, and the annual performance evaluation and stability of automatic control response, which would be implemented using BEMS in most cases. The faults that were listed up at the Acceptance Step to be solved and are found newly during this step should be corrected and readjusted as early as possible. All of the I-Cx is completed if this step is finished. The CA makes a final Cx report and submits it to the owner. The Post-Acceptance Step's term mostly coincides with the warranty term of the construction, and the seasonal FPT above mentioned is considered to be requested in the range of the construction. There would be a case that the final payment of project is postponed until one year after the occupation, but the milestone between the Acceptance and Post-Acceptance Steps is guided by this GLOSSARY.

b) Ordinary Operation Step

Ordinary Operation Step is defined as a step following Post-Acceptance Step of I-Cx. If the I-Cx itself or the Post-Acceptance Step is not applied, this step would be matched with the Occupancy & Operation Phase. In this step, the evaluation works for the Re-Cx and/or On-Going Cx to identify the unresolved issues, the desired changes, the Cx weakness items, the Cx improvements items, the warranty action items, etc. should be necessary. The repeated Re-Cx could correct faults, and the evolution to the On-Going Cx could maintain the building systems in optimal condition through life of the building.

C. Figures related to Glossary

Fig.1 Commissioning Documents Flow

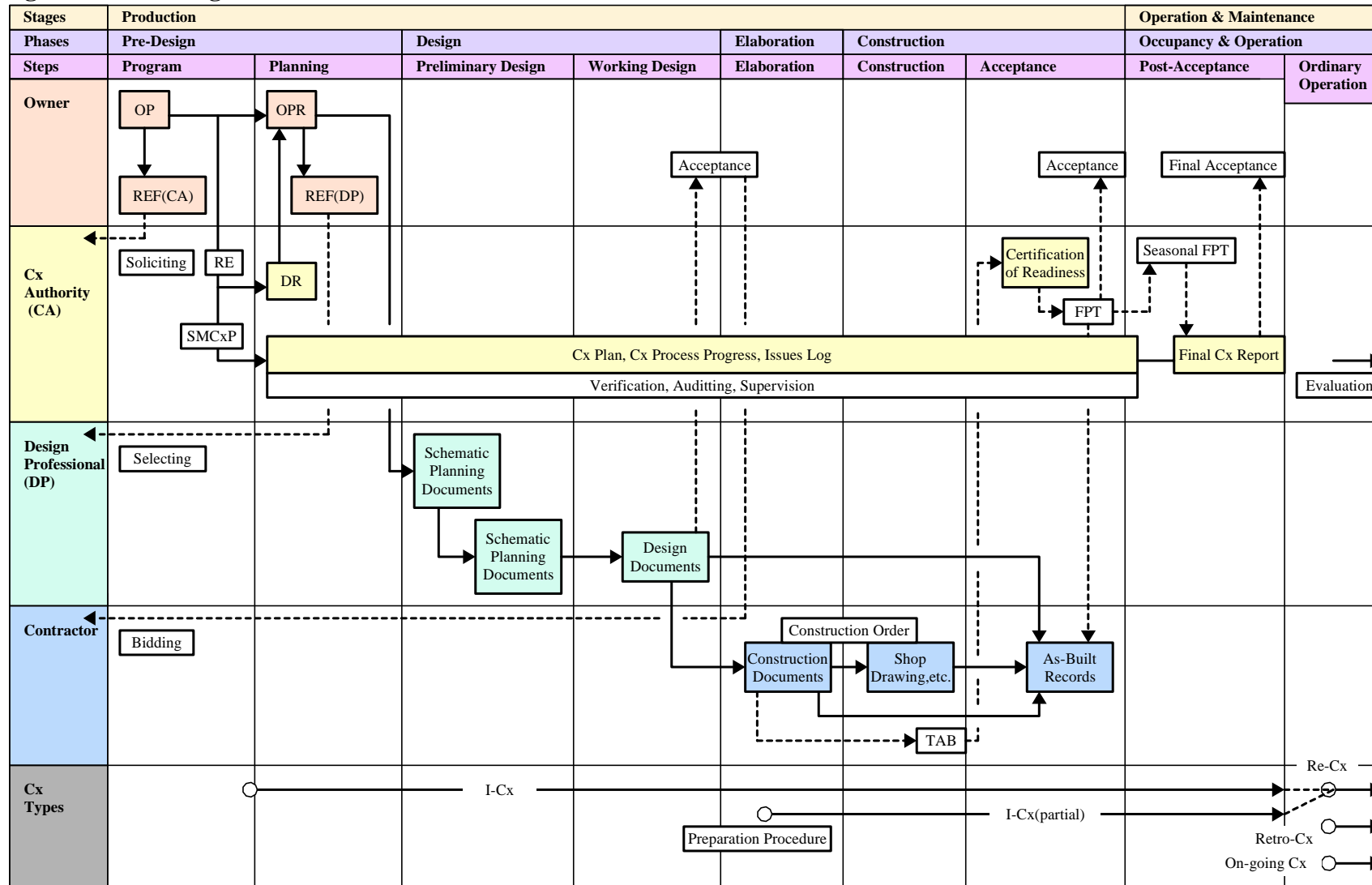


Fig2. Building Type and SMCxP Level

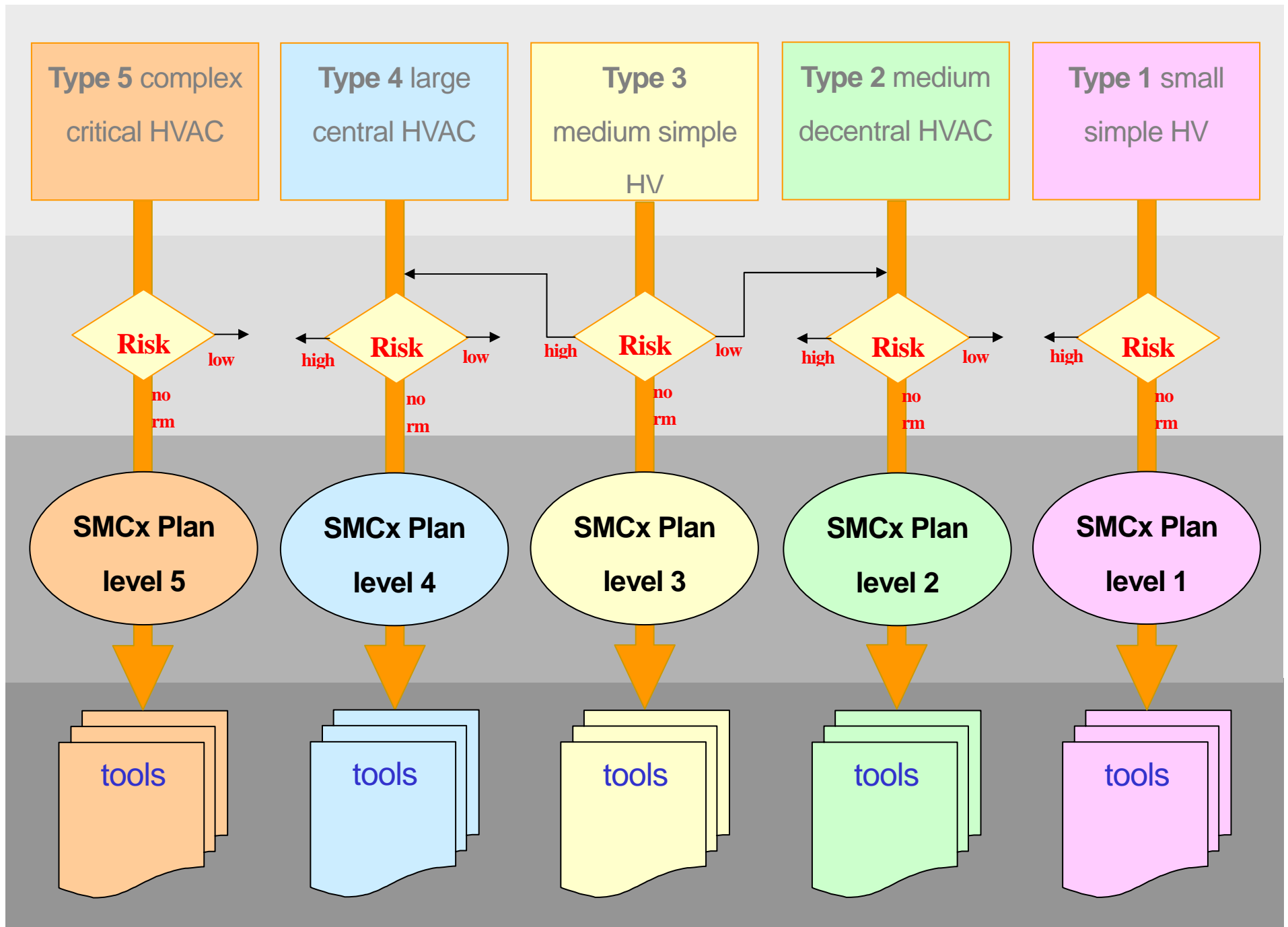


Fig3. Risk Handling Flow

