

## Comparison & Analysis of the definitions of Quality Concept in Codes & Std.

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### 1. Introduction

Since the Industrial Revolution the concept “Quality” has become so widely known and began to be applied to every industries rapidly concerned to machinery in the world. Though a original meaning of Quality was related to the increase in production, it began to shift toward intrinsic performance and faithfulness to its intended use gradually. The meaning of “Quality” was conformance to requirements. It was prescribed in the famous book. “Quality is free” by Crosby P.B, Crosby). [1]Grocock, J.M stipulated quality concept to “Conformance or Fitness for Use” [2]. Seghezzi, H.D has defined it “Conformance with requirements or Fitness for intended Use” in the book “What is Quality?” [3]. Thus Quality Concept are be almost identical nearly alike. But minor differences of definition can be affected serious damages or superiority of last productions in its quality.

### 2. Features of quality

In this section, above all, some features of quality used in industry for market concept are described. This concept includes the historical definition derived from great quality man to promoted the miracle advance in the world quality progress history. Quality is a strategic variable and the basic condition for securing markets and generating profitability in industry fields.

#### 2.1 Quality definition

Quality is a strategic variable and one of the strong resources for strengthen their markets and generating new markets in diverse industry divisions. In market Quality definitions are as followings: Firstly, Quality means a level at which a particular product has to satisfy a particular consumer. Secondly, it means the level at which a particular product potentially satisfies a common consumer. Thirdly, it means a level at which a particular product has to match its product plan and product specifications. Fourthly, it means the level at which a particular product is preferred over another product same in price and delivery conditions. on a basis of the consumer’s test result. Fifthly, Quality means the level of extrinsic factors and internal features in its

inside. Lastly quality means something that consumers generally make an evaluation for use without particular standards. A point in the view of industrial, generally quality have exact goals to satisfy the consumers. The reason is that Product characteristics and zero-defects should be emphasized in quality assurance programs.

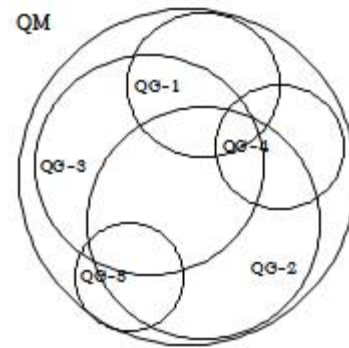


Fig. 1. Characterized requirements to Quality Group & Categories on its activities derived from quality behavior

#### 2.2 Nuclear Quality Definition

The Definition of “Nuclear Quality” in nuclear industry has special terms because its impact is so great that it is international. Above all, the definition of nuclear QA in 10 CFR Part 50 Appendix B, everybody calls it in the first place, is followings. “Quality assurance” comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements. The relevant section in the Code of Federal Regulations, 10 CFR Part 50 Appendix B, [4] best explains the applicability of both the regulations and described as like this—all activities affecting the safety related functions of those structures, systems, and components; these activities include designing, purchasing, fabricating, handling, shipping, storing,

cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying. It is important to note that the phrase “all activities affecting the safety related functions” limits the scope of NQA-1’s applicability. Many of the buildings and systems at a nuclear facility do not perform safety-related functions, and thus can fall under less stringent regulations and standards such as ISO-9000 Series.

Group	Num-ber	Applicable Requirement
QG-1	3	Design Control Instruction, Procedures and Drawings Document Control
QG-2	6(1)	Control of Purchased Items and Services Audits / Corrective Action Organization / Quality Assurance Program Control of Nonconforming Items
QG-3	5(2)	Procurement Document Control Control of Special Processes Quality Assurance Record /Design Control Control of Measuring & Test Equipment
QG-4	3	Identification & Control of Materials, Parts , Component Inspection, Test, and Operating Status Handling, Storage and Shipping
QG-5	4(1)	Control of Special Processes Inspection Control of Nonconforming Items Test Control

Fig. 2. Classified Dispositions of Criteria by QA/QC Concept base on Quality Activities & Procedures

### 2.3 Definitions in Codes & Std.

In ASME NQA-1,1994 Ed., the definition of Quality Assurance is this: all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. In IAEA Series, QA definition is followings: An interdisciplinary management tool that provide a mean for ensuring that all works is adequately planned,correctly performed and assured. It provides a systematic approach for accomplishing work ultimate goal of doing the job right the first time.(IAEA 50C/SG-Q)

I-QA	Audits and surveillance of internal work and processes
E-QA	Audits and surveillance of suppliers and vendors
QC	Inspections & surveillance of internal work and processes

Fig. 3. Each Areal Quality Function and detail activities to assure QA/QC Goals and Targets [5]

In our analysis and comparison, some minor differences exist between their definitions and terms of each quality code&standards. It shows each code&stds have been developed and are still on the ways transmutative situations. The reasons are that things have changed greatly with rapid industrial development, science technologies and globalization.

### 3. Requirement Analysis on Quality Concept

Figure 1. shows diverse characteristic features in several requirements between QA and QC of codes&stds. It can be considered that QG-1, QG-4 and QG-5 have requirements related to quality control components than quality assurance feature in their characteristic circumstances. While these requirements in quality groups show QA components, QG-2 and QG-3 have such requirements concerned to quality assurance features. In the case of the requirements and elements of QG-2 or QG-3 are to be spread all of the fields and divisions to manage and perform them in organization and a certain system need to quality activities. Also, QG-2 or QG-3 elements and requirements need much management factor in internal or external environments to achieve their goals and missions as can be recognized in Figure 3. These several circles shows behavior activity categories of the requirements 18 criterias in Figure 1. accordance to Figure 2. Especially, in QG-2 and QG-3, there are overlapped requirements and elements. The requirement “control of purchased Items and Services”, with the range of activities are to be applied all of the divisions and various steps because this purchase activities are distributed from design to receiving inspections.

### 4. Conclusions

Analysis of definitions in Quality Code & Std. is very difficult work and cautious studies because minor differences from definitions or term characterization activities and other choices of terms result in diametrical products and achievements inexpectantly. Especially, establishing a certain quality program like NQA-1 for the construction of a nuclear facilities requires a significant level of organizational infrastructure. It means that a QA Code & Std. includes having the authority to stop work or bring an issue independently “up the chain” to the top manager or other top executive as defined by the organization’s governance. Thus, the centerpiece of a certain organization’s implementation tool will be a quality assurance program, which should be based on a set of verifiable procedures that are directly traceable to another strong Quality Codes & Std.

### REFERENCES

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