

MIL-Q-9858A, the Origin of ISO 9001

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Introduction

Military Specification MIL-Q-9858A (Quality Program Requirements) of the U.S. government (first issued as MIL-Q-9858 on April 9, 1959 and revised to MIL-Q-9858A on December 16, 1963) is the origin of ISO 9001 standard and all other quality management system standards and regulations over the world. I would like to present its outline in this article. MIL-Q-9858A is titled "specification", because it was intended to be used as a contract specification for military contractors. However, it is actually a "quality management system standard" in its nature. It is still one of my favorite standards although it has been already withdrawn by the US. government in 1996 because of a policy decision to support industry consensus standards over government directives.

Why and How MIL-Q-9858A Was Established?

In the United States, where the quality control and quality management were originated, the government has first developed and instituted the quality control specification MIL-Q-5923 around 1950, and applied it to the suppliers and contractors for products and services in military industry. After using this specification for procurement control several years, the government has come to think that there would be a better way to assure needed product quality than quality control which is merely focusing on inspection and testing at downstream processes. That was the motive for the government to establish the new contract specification MIL-Q-9858A.

It is clearly stated in Clause 8.1 (Intended Use) of MIL-Q-9858A,

"Total conformance to contract requirements cannot be obtained effectively and economically solely by controlling inspection and testing. Therefore, it is essential to control work operations and manufacturing processes as well as inspections and tests. The purpose of this control is not only to assure that particular units of hardware conform to contractual requirements, but also to assure interface compatibility among these units of hardware when they collectively comprise major equipments, sub-systems and systems."

This means that in order to assure the conformance of the product to requirements, it is indispensable that all the company functions and activities are well organized and managed systematically. In other words, the companies with well organized management system are reliable enough. They called the good system meeting MIL-Q-9858A "quality assurance program" ("quality system" in current ISO term), which gives us more efficiency with less inspection and testing if implemented appropriately.

Spreading of Quality Assurance Concept to all over the World

In the United States, the concept of quality assurance system established in this MIL-Q-9858A was cascaded to non-military industries since the latter part of 1960's. It was first to nuclear power industry, as the regulation, 10CFR50, Appendix B, then, adopted for non-nuclear industries as ANSI Z 1.8 – 1971, and ANSI/ASQC Z 1.15 – 1979. ANSI/ASQC Z 1.15 – 1979 and MIL-Q-9858A were used as the basis for the regulation requirements Good Manufacturing Practice (GMP) of the FDA for the USA pharmaceutical and medical device industry, including those of the Big Three (GM, Ford, and Chrysler). 10CFR50, Appendix B later became the ASME Codes and ANSI N 45 series standards for nuclear power plant industry.

In the meantime, MIL-Q-9858A was introduced to European countries through NATO, and it was adopted by many countries as their national quality system standards, such as BS 5179 and BS 5750 in UK, DIN quality standard in Germany, NF quality standard in France, etc. In Japan, the Defense Agency of the Japanese government has adopted MIL-Q-9858A as their purchase quality standard in 1960's. It was then cascaded to the Ministry of Trade and Industry to be used for non-military industries as the criteria for the government certification program of good manufacturers. (This fact is not so well known in Japan. I got this from a government Officer.)

After first reviewing ISO 9001:1987 in January 1988, I felt on the spot that MIL-Q-9858A is the origin or the grandfather of ISO 9001, and it caused me to draw the chart as the Figure below, and distributed it to many quality professionals and training course providers in the United States and Japan since 1991.

MIL-Q-9858A as compared with ISO 9001

In general, many phrases and wording including terminology in ISO 9001 Standard are identical with or very close to those in MIL-Q-9858A. Key factors of quality assurance in MIL-Q-9858A are as follows:

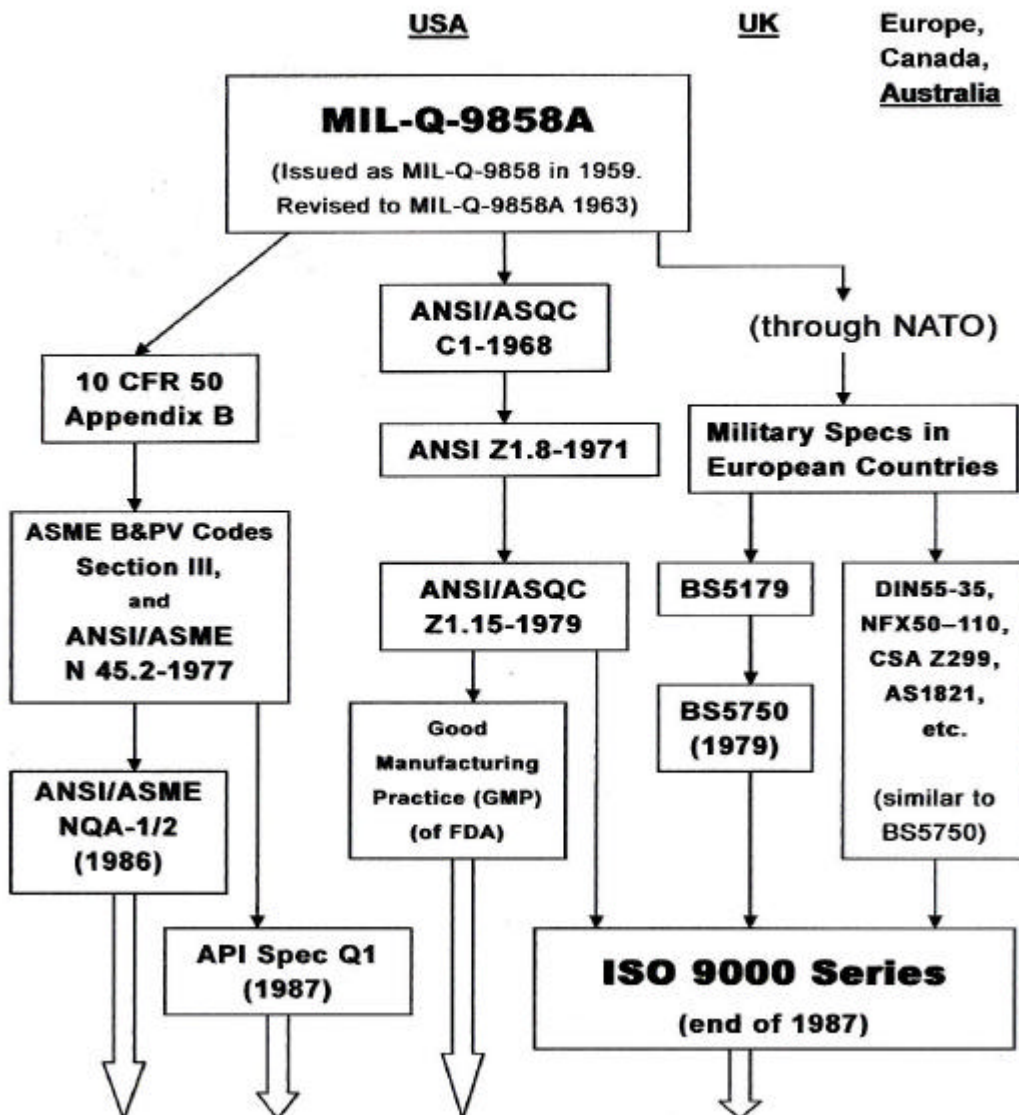
(1) Management

MIL-Q-9858A starts with the requirements for management. Management review requirement is included in Clause 3.1 (Organization), "Management regularly shall review the status and adequacy of the quality program." Effectiveness of the program (system) is required in Clauses 1.3 and 3.1.

(2) Quality planning and contract review

Quality planning is described in Clause 3.2. Contract review is included in quality planning. It is for the quality planning for each individual contract or customer order.

History of Quality System Standards/Codes



(3) Control of all operations

Control of operations in MIL-Q-9858A covers all stages of production process (or product realization in ISO 9001:2000 terms), from design control, purchasing materials through packaging and shipment of the product. This includes the operation of services (including installation and construction). So this can be applied also for service industries.

For production control, it is written in the way that the producer can successfully produce its product if they control and manage the production following the way described in MIL-Q-9858A. Therefore, it is very useful for manufacturers.

(4) **Material control (handling, storage and identification)**

For material control, MIL-Q-9858A describes it more specifically and in detail than ISO 9001 does.

(5) **Corrective action**

Specific requirements and procedures for corrective action are clearly defined in Clause 3.5. Review of the adequacy of such measures and monitoring of the effectiveness of corrective action taken is required.

(6) **Statistical techniques**

The application of sampling plans such as MIL-STD-105, MIL-STD-414 are clearly defined and encouraged in Clause 6.6 (Statistical Quality Control and Analysis). (MIL-STD-105, MIL-STD-414, and other military standards for sampling plans are adopted by many countries world over for their national standards.) Other statistical techniques are not specified particularly. It may have been from the consideration not to compel manufacturers to use techniques more than necessarily.

(7) **Customer property and customer representative**

Clause 7.2 (Government property) and Clause 4.4 (Use of Contractor's Inspection Equipment by the government representative) are to protect the supplier or manufacturer. These clauses show that the U. S. government has been fair and considerate to suppliers and contractors. Clauses 7.2.1 and 7.2.2 became the clause of Customer supplied materials in ISO 9001. You have to understand that this clause of ISO 9001 is not intended to be a cumbersome requirement but copied from the clause in MIL-Q-9858A originally intended to protect the supplier.

(8) **Audits**

The requirement for internal audit is not included in MIL-Q-9858A. However, many companies have started the internal audit programs in 1960's. Supplier audit is impliedly mentioned in Clause 5.1.

(9) **Quality Cost (unique to MIL-Q-9858A)**

The unique requirement to MIL-Q-9858A is that for quality cost, which was not inherited to almost all later standards in the world. This requirement must have been from the consideration to make contractors or manufacturers aware of the importance of quality.

From the overview made above, the key elements such as management (including management review), quality planning, almost all phases of operation processes (product realization), and corrective action in MIL-Q-9858A are about the same as

those in ISO 9001. MIL-Q-9858A is more specific and substantial than ISO 9001 in production control, material control, and statistical techniques. Other elements making their difference are internal audit and quality cost only.

From the latter part of 1970's through 1980's, the company I worked for had to be in compliance with all of ANSI Z 1.15, BS 5179, BS 5750, ASME Codes, and many other major standards including MIL-Q-9858A. After reading MIL-Q-9858A again and again comparing with other quality system standards, I have come to think it is the precious historical asset or cultural heritage of the United States.

MIL-Q-9858A lasted more than 30 years with no change because it was well written. Although the US government (DoD) has withdrawn MIL-Q-9858A in 1996, some industries in the States are still using MIL-Q-9858A as the criteria for approval of suppliers or baseline of company management. MIL-Q-9858A is like a phoenix, still alive even after the US government made it obsolete. It is because MIL-Q-9858A is very good and it is still convenient to use it for some suppliers, I guess. Another reason is that in a government related project, the standard is in effect at the legal authorization throughout the project. The old MIL-Q-9858A helped many contractors and suppliers do right control right, as a good guidance for a long time.

Conclusion

MIL-Q-9858A is a very good management system standard. If we read this, we can understand that all ISO 9001 requirements are nothing new, but have been the matters of common sense in management since many decades ago. I sincerely recommend that all people who are engaged in any of ISO related business should fully study MIL-Q-9858A, to understand the background and true meaning of all ISO requirements much better. A copy of MIL-Q-9858A is attached hereto for the reader's convenience. I have reconstructed it after MIL-Q-9858A has been removed from the government's website and technical libraries of most companies.

MIL-Q-9858A, as well as MIL-I-45208 (Specification for Inspection System Requirements.) and MIL-C-45662 (Specification for Calibration System Requirements) may be said to be part of American history. The people of good old days who established such specifications were great, and we have to respect and maintain the cultural heritage thanks to their efforts.

Note: The author is thankful to Dennis Arter, "The Auditguy," for his technical review of this article. Mr. Arter wrote the popular ASQ book *Quality Audits for Improved Performance*. He has been my friend and colleague for over 15 years.

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P. 6 thru 8 of ASQ CSD Partnership News Sept 2004