6. Applying MRLs in Contract Language

**NEW**

**6.7 MRLs in SAE AS6500**

The SAE AS6500 standard, “Manufacturing Management Program,” is applicable to “all phases of a system acquisition life cycle.” It is intended for use on all programs with manufacturing content. It requires application of proven manufacturing management practices with the goal of delivering affordable and capable systems. This standard was created to implement manufacturing management practices aimed at promoting the timely development, production, modification, fielding, and sustainment of affordable products by addressing manufacturing issues throughout the program life cycle.

AS6500 was designed to be fully compatible with the implementation of assessments of manufacturing readiness using the MRL criteria as a tool to help manage manufacturing risk in acquisition. The Standard requires conducting assessments of manufacturing readiness, the development of a manufacturing plan, and the implementation of best practices to enhance effective manufacturing management and reduce program risk.

**6.7.1 Requirements for Conducting MRL Assessments in AS6500**

When imposed contractually, AS6500 requires the conduct of manufacturing feasibility assessments of each alternative design, the identification of required production processes, and the identification of manufacturing technologies requiring further maturation. Additionally, assessments using MRL criteria are required prior to each major milestone and technical review (e.g., PDR, CDR, PRR, etc.) with presentation of the results. It also requires organizations to:

* Identify MRL targets
* Document manufacturing risks
* Include critical suppliers in MRL assessments
* Develop and implement manufacturing maturation and risk reduction plans for threads that are not at the target MRL

The standard requires Production Readiness Reviews as inputs to the production decision. Assessments using MRL criteria should be used to support the manufacturing related elements of PRRs.

**6.7.2 Requirements for a Manufacturing Plan in AS6500**

Section 6.6 of this Deskbook, “Other Deliverables,” discusses the option of including plans for implementing manufacturing assessments in a Manufacturing Plan. AS6500, Section 6.4, requires the organization to establish and maintain a Manufacturing Plan and lists topics that must be addressed. These topics include:

* Manufacturing methods and processes
* Manufacturing technology investments
* Production control
* Producibility
* Material management
* Manufacturing system verification
* Minimization of scrap, rework and repair
* Facilities
* Tooling
* Test equipment
* Capital commitments
* Personnel with appropriate technical skills and training
* Customer furnished hardware, software, and other items

AS6500 does not specifically require the Manufacturing Plan to address MRLs, nor does it require the plan to be a deliverable document. However, since many of the topics that must be addressed in the Manufacturing Plan per AS6500 correspond to MRL threads, it can be a useful source of information when conducting MRL assessments.

**6.7.3 Requirements for Activities Related to MRL Threads in AS6500**

Contractually requiring assessments using the MRL criteria does not require that certain activities be accomplished. If included in a contract, AS6500 is a standard that requires certain activities to be accomplished. For example, Key Characteristics (KCs), in the criteria for MRL 6, Design Maturity B.2, states that, “Preliminary design KCs have been identified…” The MRL criteria do not require a contractor to identify KCs. Rather, it is an expectation for what should take place with respect to KCs prior to PDR. AS6500, however, specifically requires organizations to identify KCs in the Technical Data Package. If the requirements of AS6500 are implemented, then the MRL 6 criteria should be satisfied.

The activities required by AS6500 and the MRL criteria are highly complementary as shown in Figure 6-1 below. While not every MRL sub-thread is covered, AS6500 does require activities that correspond to all MRL threads. Effective implementation of AS6500 as a best practice will help achieve the target MRL.

| AS6500 Requirement | MRL Thread |
| --- | --- |
| 6.4.1 Supply Chain and Material Management | A. Technology and Industrial Base |
| 6.4.2 Manufacturing Technology Development |
| 6.2.1 Producibility Analysis | B. Design |
| 6.2.1c Design Trade Studies |
| 6.2.2 Key Characteristics |
| 6.2.3 Process FMEAs |
| 6.4.3 Cost | C. Cost & Funding |
| 6.4.1 Supply Chain and Material Management | D. Materials |
| 6.5.8 Supplier Management |
| 6.4.4 Manufacturing Modeling & Simulation | E. Process Capability & control |
| 6.5.3 Continuous Improvement |
| 6.5.4 Process Control Plans |
| 6.5.5 Process Capabilities |
| 6.3 Manufacturing Risk Identification | F. Quality Management |
| 6.5.2 Manufacturing Surveillance |
| 6.5.3 Continuous Improvement |
| 6.5.7 FAIs/FATs |
| 6.5.8 Supplier Management |
| 6.5.9 Supplier Quality |
| 6.4.6 Manufacturing Workforce | G. Manufacturing Workforce |
| 6.4.7 Tooling/Test Equipment/Facilities | H. Facilities |
| 6.4 Manufacturing Planning | I. Manufacturing Management |
| 6.4.5 Manufacturing System Verification |
| 6.5.1 Production Scheduling and Control |
| 6.5.2 Manufacturing Surveillance |

**Figure 6-1. Mapping of MRL Threads to AS6500 Requirements**