



Design For Six Sigma Requirements

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. To outline supplier requirements for support of Design for Six Sigma (DFSS) methods GM is using to assure quality in GM products and processes.

1.2 Applicability. The design, development and validation of GM products (system, subsystem and components) and processes.

1.3 Remarks. DFSS at GM is evidence-based decision-making which includes voice of the customer, robust engineering and statistical methods. The DFSS process flows customer requirements to the design, development and validation of products (system, subsystem and components) and processes. DFSS assures that the design satisfies customer requirements with minimum variation. Participation in, and support of, DFSS activities is required by all suppliers where requested by GM. The supplier shall provide the means to complete GM DFSS activities including, but not limited to samples, data, analyses, simulations, coding, Computer Aided Engineering (CAE) and/or hardware-based experimentation. A supplier may be expected to conduct their own DFSS activities in support of meeting GM performance requirements.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

3 Requirements

3.1 If required by the GM Program Management Team (PMT)/Product Development Team (PDT), DFSS evidence-based decision-making will be supported by the supplier, or presented to GM, on critical design specifications including, but not limited to, data and analysis. These will be a subset of the specifications given as part of the Statement of Requirements (SOR) or problem resolution (five-phase). The GM PMT/PDT, DFSS, and problem resolution teams will indicate which requirements are the critical few. The supplier shall aid GM in the identification of the critical few. The supplier is expected to follow 3.1.1 thru 3.1.4 actions:

3.1.1 The supplier shall support GM DFSS activities by attending project meetings and training, if requested. The supplier shall provide the appropriate engineering requested by GM. A supplier may be expected to conduct their own DFSS, that includes voice of the customer, robust engineering and statistical methods, to make evidence-based decisions to support meeting GM performance requirements. Performance may include quality, reliability and durability.

3.1.2 The supplier is expected to provide to GM an estimate of the capability (Cpk and Ppk) of their design, both the nominal output and the expected variation on the critical few requirements, using physical samples of an appropriate size or Monte Carlo techniques when physical samples are not available or are not practical, The estimate will be accompanied by the list of major design parameters (control factors), each quantified with how the responses were used in the design.

3.1.3 The estimate of the Critical to Quality (CTQ) variation will be accompanied by a list of variation parameters (noise factors, operating conditions) with both their means and standard deviations. These variation parameters should include the major process parameters that are monitored or controlled by supplier control plans.

3.1.4 The performance prediction, in support of DFSS activities, should be done early in the design process before validation hardware is available, or by the timing needed by the PMT/PDT. It is also required for improvements or changes due to problem resolutions.

4 Validation

4.1 General. The validation plan may need to be altered to reflect the findings, i.e., significant noise factors, from the DFSS activities and will be updated by the GM PMT/PDT, DFSS, and/or problem resolution teams.

4.2 Validation Cross Reference Index. Not applicable.

4.3 Supporting Paragraphs. Not applicable.

5 Provisions for Shipping

Not applicable.

6 Notes

6.1 Glossary.

Cpk: Number representing variation and centering, i.e., distance between the process average and the closest specification limit divided by one-half of the process variation.

Ppk: An index used to describe the performance of a process over the processes range of variation.

6.2 Acronyms, Abbreviations, and Symbols.

CAE	Computer Aided Engineering
CTQ	Critical to Quality
DFSS	Design for Six Sigma
PDT	Product Development Team
PMT	Program Management Team
SOR	Statement of Requirements

7 Additional Paragraphs

Not applicable.

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

GMW14887

9 Release and Revisions

This standard was originated in December 2005. It was first approved by Global Design for Six Sigma in May 2006. It was first published in June 2006.

Issue	Publication Date	Description (Organization)
1	MAY 2006	Initial publication.
2	JUL 2011	Five year refresh. (GM Design for Six Sigma)
3	JUL 2020	Revised to current practice. (Quality - GMNA Product Development Quality – Vehicles)