

Access to Additional Content

for

AIA/NAS NAS3500 Rev.1, Dated: September 30,2016

(Click [here](#) to view the publication)

This Page is not part of the original publication

This page has been added by IHS as a convenience to the user in order to provide access to additional content as authorized by the Copyright holder of this document

Click the link(s) below to access the content and use normal procedures for downloading or opening the files.

- [NAS3500 Rev.1 TDP NAS Scorecard Excel sheet](#)

*Information contained in the above is the property of the Copyright holder and all
Notice of Disclaimer & Limitation of Liability of the Copyright holder apply.*

If you have any questions, or need technical assistance please contact [IHS Support](#).



IHS Additional Content Page

FED. SUPPLY CLASS

NAS3500

TECHNICAL DATA PACKAGE: COMPOSITION, COMMUNICATION, AND APPLICATION

STANDARD PRACTICE



AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME
PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

REVISION DATE: SEPTEMBER 30, 2016

ISSUE DATE: NOVEMBER 2008

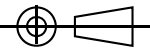
THIRD ANGLE PROJECTION 	CUSTODIAN ENGINEERING MANAGEMENT COMMITTEE	REVISION 1
PROCUREMENT SPECIFICATION NONE	TITLE TECHNICAL DATA PACKAGE: COMPOSITION, COMMUNICATION, AND APPLICATION	CLASSIFICATION STANDARD PRACTICE NAS3500 SHEET 1 OF 34

TABLE OF CONTENTS

1.	INTRODUCTION	4
2.	TDP VARIANTS AND NAS ELEMENTS	4
2.1	Applicability for TDP Variants and Aerospace Products	5
2.2	NAS Elements	5
2.2.1	TDP Composition	5
2.2.2	TDP Communication	5
2.2.3	TDP Application	5
3.	USING THE NAS: TDP CONSTRUCTION, COMMUNICATION, AND COLLABORATION	6
3.1	TDP Scorecard and Compliance Template	6
3.1.1	TDP Scorecard	7
3.1.2	Completing the Scorecards to Create an NAS Compliance Template	8
4.	NAS COMPLIANCE: CORE REQUIREMENTS AND CATEGORIES	10
4.1	Core Requirements	10
4.2	Compliance Categories	11
5.	GUIDANCE	12
6.	REFERENCES	12
7.	GLOSSARY OF TERMS	13

FIGURES

Figure 1 – Cover Sheet	7
Figure 2 – Scorecard tab example	8
Figure 3 – Compliance Template	9
Figure 4 – Scorecard core requirements	11
Figure 5 – Compliance categories	12
Figure A1 – TDP role over the product lifecycle	17
Figure C1 – Cover Sheet	19
Figure C2 – TAB A, Composition	20
Figure C3 – TAB B, Communication	21
Figure C4 – TAB C, Application	22
Figure F1 – Cover sheet, scorecard, compliance template	27
Figure F2 – Completed cover sheet	28
Figure F3 – TDP type selection	29
Figure F4 – “Other” box for scorecard customization	29
Figure F5 – “N/A” Column	30
Figure F6 – Source Controlled scorecard with build-to-print elements included	31
Figure F7 – “Accept” and “Clarify” process at recipient	32
Figure F8 – Completed Compliance Template	32
Figure F9 – TDP type error messages	33
Figure F10 – Error message for unchecked boxes	33
Figure F11 – Error message for checking source controlled lines in build-to-print scorecard	33
Figure F12 – Error message for marking “core” items “N/A”	34
Figure F13 – Recipient error message	34
Figure F14 – Calculate, reset, and clear options	34

REVISION

1



NAS3500nts

SHEET 2

Document Sharing Hub

APPENDICES

Appendix A – Technical Data Package Background, Purpose, and Description.....	15
Appendix B – TDP Scorecard and Template Process Flow	18
Appendix C – Cover Sheet and Scorecard	19
Appendix D – NAS Compliance Template.....	23
Appendix E – Source Controlled Considerations	24
Appendix F – NAS3500 Scorecard Application Guide	26

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME
PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

FORM 16-01

REVISION

1



NAS3500

SHEET 3

Document Sharing Hub

1. INTRODUCTION

NAS3500 was originally published in November 2008. Since that time interest in, and guidance for, technical data packages has grown. Department of Defense acquisition entities, working through the DOD Engineering Drawing Modeling Working Group (DEDMWG) have undertaken extension of MIL-DTL-31000, which has been renamed MIL-STD-31000. Since publication of NAS3500, AIA has worked with the DEDMWG to focus on the complementary aspects of the standards and to more closely align them.

When this revision to NAS3500 was launched, a joint team comprised of AIA and DEDMWG representatives was formed to support the revision process, with the intent of further enhancing the relationship between the two standards. This revision to NAS3500 reflects the results of that effort and specific references to the nature and complementary applications of MIL-STD-31000 and NAS3500 are made in this NAS3500 revision.

The two standards have complementary but distinct roles. MIL-STD-31000 is geared to the system level and serves as a TDP planning document. NAS3500 focuses on specific products and serves as a TDP execution document. Applied together, they can support the full lifecycle of a DOD program. In addition, NAS3500 can be applied independently in support of non-DOD/commercial programs.

For purposes of this Standard, a technical data package (TDP) is defined as:

The collection of data enabling design, production, delivery, and/or maintenance that communicates a customer's product definition, performance criteria, and method of verification to the source(s) of the deliverable.

The purpose of this standard is to facilitate mission assurance and characteristic accountability through better composition, communication, and application of technical data. In addition, it seeks to address and offer guidance for resolution of key issues raised by the aerospace industry and Government agencies, including:

- Technical data quality and completeness over the product lifecycle;
- Interoperability of technical data and data formats;
- Access to essential technical data details, such as current specifications, by members of the aerospace supply chain; and
- Ability to effectively share technical data and collaborate during the full product lifecycle, ranging from early development through production and maintenance.

This revised standard continues to complement the multiple industry and Government initiatives underway to address various aspects of the technical data requirements issue. It leverages existing industry regulatory and guidance documents such as the AS9100 family of quality standards, ASME Y14.41, and ISO 10303; and Government guidance documents, including MIL-STD-31000, SECNAVINST 4140.2, and DOD-STD- 2101.

Additional background on this Standard and its origins are featured in Appendix A. Key terms used in this Standard, including mission assurance and characteristic accountability, are defined in the context of this Standard in Section 7, Glossary of Terms.

NAS3500 offers guidance that will enable the aerospace supply chain at every level, and at every stage of the product lifecycle, to apply technical data packages that result in reduced time-to-market and affordable deliverables that meet design intent and ensure product integrity.

2. TDP VARIANTS AND NAS ELEMENTS

The data medium for a TDP can range from legacy 2D paper to CAD images and solid models. Similarly, the medium for preparation and transmittal of a TDP can range from paper/fax/mail to the most sophisticated forms of electronics.

REVISION

1



NAS3500ents

SHEET 4

Document Sharing Hub

Model-centric efforts are emerging as the norm for current new product development and acquisition. However, a substantial level of TDP activity is based on legacy data for which no computer-generated data exists. In a model-centric environment, the full TDP reflects a range of documents and other information that typically resides outside the master model. These must be properly captured and conveyed to ensure that an NAS-compliant TDP is established. In a legacy environment, key data can range from ambiguous, to unavailable, to illegible, depending on the age and nature of the data. The risks inherent with such data must be documented and understood by all those involved in acquiring and delivering a product if an NAS-compliant TDP is to be realized.

NAS3500 considers the full range of TDP variants, from the oldest legacy systems to new products currently in concept definition. The realization of an NAS-compliant TDP is not dependent on the age or the format of the data. Rather, compliance is based on completeness and adequacy of the TDP regardless of when it was generated, how it is delivered, or in what medium it is provided.

2.1 Applicability for TDP Variants and Aerospace Products

This standard applies to TDPs for build-to-print and source controlled products. Build-to-print are those designs provided to the source (either internal or external supplier) by the prime or other engineering source (e.g., Government agency). Source controlled are those products for which a supplier has design authority and which are provided to a customer based on a performance specification, statement of work, or similar document.

This standard is applicable to all aerospace products that meet these criteria, for all stages of the product lifecycle, including concept definition, preliminary design, detailed design & validation, production & deployment, and support & maintenance. This standard can be applied by primes or Government agencies as they flow TDPs to their supply chains. An important aspect of the Standard is its bi-directional feature, enabling suppliers (i.e., "recipients") to consistently review the degree of compliance of the TDPs they receive from their customers (i.e., "senders"), and accept or seek clarification, based on completeness, accuracy, and other criteria. Through this feature NAS3500 will help customers and their suppliers set expectations and manage risk. Use of NAS3500 will facilitate mission assurance by clearly isolating and collaboratively addressing specific areas of risk.

2.2 NAS Elements

To enable characteristic accountability and achieve mission assurance, the focus of this standard goes beyond simply the content of the TDP. While content is essential, the full realization of a successful TDP is dependent on communication and application as well. Compliance elements are composition, communication, and application. They are described in the succeeding sections.

2.2.1 TDP Composition

Composition consists of documents and other content that provide the product images, physical/functional interfaces, performance criteria, and method of verification described in the TDP definition. Composition can range from a paper drawing to the most sophisticated CAD model, accompanied by annotations, specifications, and all other relevant supporting documentation, including statements of work and performance specifications.

2.2.2 TDP Communication

Communication consists of the flow, delivery, and interpretation of the TDP. Ideally, this communication is collaborative, enabling full accessibility to relevant documents, the ability to achieve mutual understanding of the TDP, methods to address issues and reconcile differences, and the means to achieve verification.

2.2.3 TDP Application

Application consists of the methods and tools to enable composition and communication of the TDP. At a minimum, application sets expectations based on the completeness and adequacy of the TDP. It then considers the medium by which the TDP is communicated—ranging from paper to fully automated electronic—as well as the tools applied to facilitate communication through the various media.

REVISION

1



NAS3500
SHEET 5

Document Sharing Hub

3. USING THE NAS: TDP CONSTRUCTION, COMMUNICATION, AND COLLABORATION

A TDP is constructed from documents consisting of paper and/or electronic data. The process of interpreting and using that data determines whether the resulting deliverable meets design intent. Fundamental to this process is the communication and application of that data. An important consideration in the application of this Standard is to understand the definition and roles of those referred as the "sender" and the "recipient." As used in the Standard, the roles are:

- A "sender" is generally the design authority or ultimate customer for a product. As such, a sender can be an aerospace industry prime or OEM, which is sending a TDP to either internal sources or to members of the extended supply chain. A sender can also be a Government agency, which is sending a TDP either directly to a source or to an intermediate Government agency that has responsibility for the actual purchase of a deliverable. In this case, the "sender" Government agency might be an Air Force Logistics Center or a comparable Army or Navy facility. The intermediate Government agency would be a Defense Logistics Agency center or similar organization.
- A "recipient" is generally the source of the deliverable. In the aerospace industry, this can be an internal production source or a member of the extended supply chain.

However, in the context of the inter-agency Government flow described above, the recipient can be an intermediate organization that flows the TDP to another "recipient" that is, in fact the source for the deliverable. The role of the recipient is critical to the successful application of this Standard, because the recipient must carefully evaluate the TDP as sent and either accept or seek clarification of specific elements of the TDP.

Use of this standard will facilitate the process of helping senders provide the best possible TDP and recipients receive a TDP that is complete, accurate, and understandable. Completion of a TDP "scorecard" will enable the sender to assess whether the TDP is adequate and allow the recipient to provide feedback, based on the recipient's interpretation of the TDP. A scorecard is provided that addresses each of the NAS compliance elements: composition, communication, and application.

As each discrete item of TDP composition, communication, and application is identified as part of a given TDP, the sender has the option to state whether that discrete item is included in the TDP or is not applicable. For each item that is declared in or out of the TDP, the recipient can either accept the item as sent or request clarification. It is through this send/receive and accept/clarify process that the sender and recipient enter into the collaborative process to ensure that the TDP will lead to a deliverable that meets design intent. Appendix B provides a flow diagram that illustrates the send/receive and accept/clarify process.

Completion of the scorecard will result in a summary document, or compliance template, that illustrates the combined results of the scorecard. This template will tell the sender and recipient whether the TDP is compliant with the NAS and apply a score indicating the degree of compliance. The compliance template will document all of the areas of mutual acceptance, identify the areas that need clarification, and provide a section for identification of risk mitigation actions.

3.1 TDP Scorecard and Compliance Template

An electronic scorecard that can be downloaded is provided with this Standard when it is obtained from AIA. By checking the appropriate boxes, the scorecard is populated. When both the sender and recipient have completed the scorecard, a TDP compliance template is created.

When all entries have been entered by the sender and recipient, an NAS compliance score will be generated and the areas of risk will be highlighted. The compliance score is the result of the number of "core" and other requirements identified on the scorecards by the sender. A recipient might ask for clarification, which will cause the unresolved core requirements to show up in the "request clarification" section of the TDP template. Core requirements and compliance categories are discussed further in Section 4.0 of this Standard.

REVISION

1



NAS3500ents

SHEET 6

Document Sharing Hub

3.1.1 TDP Scorecard

The scorecard includes a cover sheet and three separate tabs. The cover sheet is illustrated in Figure 1. A representative scorecard tab is illustrated in Figure 2. The tabs are:

- **Tab A Composition**—addresses the actual content of the TDP, including the physical definition of the product, supporting data, verification data, and any undefined requirements. The composition tab can be tailored for either build-to-print or source controlled, by checking the appropriate box. When the “source controlled” box is checked, section A5 of the scorecard is activated, enabling application of the source controlled criteria. When enabling the source controlled section of the template, the user retains the capability to apply build-to-print requirements, as appropriate.
- **Tab B Communication**—addresses the quality of the documents within the TDP (e.g., legibility), completeness, verification criteria and methodology. The communication tab applies to both build-to-print and source controlled TDPs.
- **Tab C Application**—addresses expectations, tools, and methods. The application tab applies to both build-to-print and source controlled TDPs.

The scorecard cover sheet has two primary sections: the heading and individual boxes for information. Figure 1 illustrates the cover sheet.

1. Cover Sheet Heading Box

2. Boxes for specific product, sender, and recipient information

National Aerospace Standard Technical Data Package Scorecard & Template Cover Sheet	
1	Issuing Organization (i.e., Sender: Prime, OEM, Government Agency)
2	Receiving Organization -if applicable (i.e., Recipient: supplier, Government Agency)
3	Part Number/NSN & Name/Nomenclature
4	Drawing Number & Revision
5	TDP Number (if applicable)
6	Next Higher Assembly (if applicable)
7	Purchase Order/Solicitation Number
8	Other

FIGURE 1 – COVER SHEET

The two cover sheet features are:

1. **Heading.** The heading box makes clear that this is part of the NAS TDP.
2. **Information boxes.** These boxes help all users of the scorecard identify the specific product and program the NAS is applied to, and provide any additional relevant data pertaining to the TDP.

Figure 2 illustrates a portion of a representative scorecard tab and highlights the eight features that are common to all three scorecard tabs. Appendix B includes samples of all the scorecards.

REVISION
1

FIGURE 2 – SCORECARD TAB EXAMPLE

The eight scorecard features, as shown in Figure 1, are:

1. Scorecard Tab & Name. The designation of "A" and "Composition" identifies the scorecard tab.
2. Build-to-Print and Source Controlled Check Boxes. Checking these boxes activates the elements of the scorecard to be applied, based on the type of TDP.
3. Scorecard Primary Line Item. The primary line item designates the higher level aspects of technical data, such as "product physical definition."
4. Scorecard Detail Line Item. The detail line item further defines the technical data under a primary heading, e.g., "3D model with product manufacturing information" as a further delineation of "product physical definition."
5. "Core" Requirement. A core requirement is one that must be addressed in order for a TDP to be minimally compliant to this Standard. The core requirements are highlighted on each scorecard tab. There are a total of ten core requirements for build-to-print and seven for source controlled. These are discussed further in Section 4.1.
6. Source Controlled Criteria. The criteria that are specifically applicable to source controlled TDPs are contained in section A5. These criteria are activated when the "source controlled" box on the scorecard is checked. As noted above, the user has the option to apply only these criteria for source controlled as well as any or all of the build-to-print criteria, as appropriate.
7. Sender Check Boxes. The sender of the TDP can check any of two boxes for each primary and detail line item. By checking "Yes" the sender is letting the recipient know that the line item is addressed in the TDP. By checking "N/A" the sender is informing the recipient that the line item is not part of the TDP.
8. Recipient Check Boxes. If the recipient concurs with a line that the sender has checked "Yes," the recipient can check the "Accept" box. If the recipient does not fully concur, or has questions regarding a particular line item, the "Clarify" box can be checked.

3.1.2 Completing the Scorecards to Create an NAS Compliance Template

When the sender and recipient have completed each line item on the three scorecards, input to the NAS TDP compliance template is generated. The template contains three primary sections:

REVISION

1



NAS3500

SHEET 8

Document Sharing Hub

- Areas of concurrence from each scorecard. This section captures each line item that the sender has marked "Yes" and the recipient has marked "Accept." By highlighting the areas of concurrence, the sender and recipient can focus on the exceptions.
- Areas seeking clarification from each scorecard. This section illustrates the line items that the recipient has marked "Clarify." This is the second step in the collaborative process as the sender and recipient consider the exceptions. These areas of clarification may be as simple as a missing drawing sheet or as complex as a technical requirement that cannot be met within existing process capability. It is these areas of clarification that bound the risk within the TDP that must be mutually addressed.
- Areas of risk mitigation. This section is "open." It allows the sender and the recipient to express how they will address risk areas, including those needing clarification.

Scorecard customization. It is permissible to customize the scorecard. A series of "Other" line items are included for this purpose. Using these lines, a sender can add relevant aspects of a TDP that might be important to the deliverable. However, it is not permissible, as part of the customization process, to eliminate any of the "core" requirements for either build-to-print or source controlled TDPs.

When the template is completed, the sender and recipient should focus their attentions and efforts on addressing and mitigating the areas risk. That is, they should not engage in a game of administrative "ping pong" in continuously checking boxes in the scorecards until all of the clarification areas are eliminated, but rather they should work on resolution of those exceptions and the specific activities needed to complete the risk mitigation activities.

Figure 3 illustrates the compliance template, with key features highlighted. Appendix C includes a sample of a compliance template.

1. Line item results from each scorecard tab—all of the “Yes” sender inputs and “Accept” recipient input

TDP NAS Compliance Template									
Scorecard Results									
SCORE	#	Composition	Score	#	Communication	Score	#	Application	Score
	A1.1	2D hardcopy image—paper or “electronic paper” (e.g., PDF)	1	B1.1.1	100% legible to recipient	1	C2.1.1	Paper	1
	A2.1.1	Spec identified with appropriate revision levels	1	B3	Point of contact for technical issues and mechanism understood	1	C2.4.2	ITAR/Export Control compliant	1
	A2.2.1	Materials called out	1	B4.2.1	First article inspection in accordance with AS9102 (or other standards)	1			
	A2.3.1	Process as called out	1	B4.2.2	Using mutually agreed to tools and format	1			
	A2.4.1	Accountable characteristics identified	1						
	A2.4.3	Comprehensive Bill of Characteristics established	1						
	A3.1	Information complete to pass first article and/or acceptance test	1						
	A3.4	Certification requirements (e.g., certificates of conformance)	1						
		Total	8		Total	4		Total	2
									Total
									14
RECIPIENT CLARIFICATION									
	#	Composition	Score	#	Communication	Score	#	Application	Score
	A2.4.3	Comprehensive Bill of Characteristics established	1	B4.2.2	Using mutually agreed to tools and format	1	C2.4.2	ITAR/Export Control compliant	1
4. Areas in which recipient has checked “Clarify” on the scorecard									
Risk Mitigation Activities									
Work on establishing BOC Plan to apply Excel format ITAR rules to be defined in SOW									

2. Summary and total scores, based on line item input

3. NAS Level, based on score

TDP NAS Level

1

5. Risk mitigation activity, based on addressing the "Clarify" inputs

FIGURE 3 – COMPLIANCE TEMPLATE

The five template features, as shown in Figure 3, are:

1. Line Item Results. Each detail line item from the scorecards for which there is a "Yes" from the sender and an "Accept" from the recipient is identified on the template. A point for each line item is applied against the overall TDP compliance score.
2. Summary and Total Score. Each scorecard tab receives a score and the sum of the three scorecard tabs provides a summary score.
3. NAS Category. The TDP receives an NAS category designation based on the total score. NAS category determination is described further in Section 4.2.
4. Clarification Areas. Each scorecard detail line item marked "Clarify" by the recipient is illustrated in this section of the template, even if the sender marked this line item "Yes."
5. Risk Mitigation Activity. This section enables the sender and recipient to collaborate on how they plan to address the line items requiring clarification, as well as any other of risk that either the sender or recipient might identify.

Creation of the scorecards and generation of the compliance template will provide the sender and the recipient with an overall understanding of the TDP and its areas of potential risk. By isolating specific areas for clarification, they will be able to focus on the exceptions. This will, in turn, provide the baseline for a collaborative dialogue to achieve mission assurance. All of these things can take place regardless of whether the TDP is compliant with this NAS. However, an NAS compliant TDP is less likely to engender as much risk or require as much effort to address areas of risk. For this reason, this Standard identifies the necessary "core" requirements associated with minimal NAS compliance and offers successively higher categories of compliance, based on realization of these minimum requirements, combined with additional scorecard results. The succeeding section describes the core requirements and categories of NAS compliance.

4. NAS COMPLIANCE: CORE REQUIREMENTS AND CATEGORIES

4.1 Core Requirements

Minimal, or core requirements, are independent of the age or medium of a TDP. These requirements are founded on very basic principles such as completeness and legibility. They anticipate that the sender of the TDP understands the product requirements and expectations. They further anticipate that the recipient of the TDP has sufficient experience to produce good products from a TDP that provides complete and legible requirements.

Because design practices and the nature of aerospace products can vary widely, the NAS core requirements are primarily about how those requirements and expectations are articulated—recognizing the wide range of products and processes that might apply this standard—rather than the specific data that is conveyed in a TDP.

As such, the characteristic data for an electronic component might be expressed in input/output terms, while similar data for a mechanical component will likely be in dimensions and geometries. What these two disparate products have in common is that their characteristic-level requirements must still be clearly articulated, legible, and provided in an unambiguous way so that a qualified recipient can turn these abstract requirements into a tangible product. For this reason, a product image, identification of accountable characteristics, and 100% legibility are "core" requirements for any build-to-print TDP—regardless of the product, process, or medium for providing the data.

Similarly, a TDP for a source controlled component must have an understandable performance specification or statement of work, a definition of the performance requirements, the interface requirements—both physical and performance, and the verification requirements. There are ten core requirements for a build-to-print TDP. There are seven core requirements for a source controlled TDP. These core requirements, as expressed on each scorecard, are illustrated in Figure 4.

REVISION

1



NAS3500ents
SHEET 10

Document Sharing Hub