

Date: June 8, 1999

To: MIL-HDBK-5 Coordination Group

Subject: Minutes of the 97th MIL-HDBK-5 Coordination Meeting

The minutes and attachments for the 97th MIL-HDBK-5 Coordination Meeting, held April 26-29, 1999, are enclosed. I would like to thank each of you for your participation. It is your input, obtained through your comments and contributions, that has helped make MIL-HDBK-5 very credible.

The next (98th) MIL-HDBK-5 Meeting will be held in Raleigh, North Carolina, the week of October 18-21, 1999. Information concerning this meeting is contained with these minutes. A formal meeting announcement will be distributed in July 1999.

If you have any items you wish to have included on the agenda for the next meeting, please provide the data/information as soon as possible to allow time for complete and proper analysis. This will enhance the likelihood of approval of the item at the 98th meeting.

Sincerely,

Neal Ontko, Chairman
MIL-HDBK-5 Coordination Group
Air Force Research Laboratory
Materials and Manufacturing Directorate
Wright-Patterson AFB, OH 45433-7718

Enclosures

NO/RCR/DFL:bkb

Minutes

for the

97th MIL-HDBK-5 Coordination Meeting

held in

**Albuquerque, New Mexico
April 26-29, 1999**

by

**BATTELLE
505 King Avenue
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for

**Air Force Research Laboratory
Wright-Patterson Air Force Base, Ohio 45433**

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**MINUTES OF THE 97th MIL-HDBK-5
COORDINATION MEETING**

held in

Albuquerque, New Mexico

on

April 26-29, 1999

I. Chairman's Remarks

The Chairman, Neal Ontko, Air Force Research Laboratory (AFRL), Materials and Manufacturing Directorate (ML), opened the meeting and welcomed attendees. He reviewed briefly the history of the MIL-HDBK-5 program. The Chairman indicated that MIL-HDBK-5 has been maintained as a joint effort of the Department of Defense and the Federal Aviation Administration (FAA), and previously funded by the Air Force and FAA. The purpose of the MIL-HDBK-5 semiannual meetings is to obtain coordination of changes and additions to the Handbook among industry, DoD, and FAA. Items for changes and additions, which may be introduced by any participant, are discussed at the meeting and a consensus is obtained. As with any military specification, actual approval of individual items is the responsibility of the coordinating governmental agency. In the event of unresolved issues, the preparing agency, in this case the Air Force as represented by the Chairman, is the final approving authority. The Chairman urged each person, particularly new attendees, to participate in discussion of the agenda items and to voice their company's viewpoint.

The Chairman gave the participants an opportunity to introduce themselves. A list of attendees with their telephone number, facsimile number, and E-mail address is attached. It was indicated that modifications and additions to the Handbook approved at this meeting will be prepared in final format by Battelle and will appear in MIL-HDBK-5H, Change Notice 1. A list of changes and additions approved at the 97th meeting is included as an attachment to the minutes.

The Chairman announced the next (98th) MIL-HDBK-5 Meeting will be held in Raleigh, North Carolina. The meeting will be held October 18-21, 1999. The initial announcement for this meeting is attached. The first choice of the group (based on a vote taken at the 96th coordination meeting) for the Spring 2000 meeting was Phoenix, Arizona, with the back up location being Salt Lake City, Utah. The Fall 2000 meeting (our 100th meeting) is scheduled to be held in Dayton, Ohio, sometime in October-November.

Future meetings are dependent on continued funding.

II. Approval of 96th Meeting Minutes

The minutes of the 96th meeting were approved with the following editorial changes:

- Page 8, Item 98-14 should read "A- and B-basis Tensile Properties for 7150-T7751 Aluminum Alloy Plate".

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III. Retirements/Announcements

Ron Wygonik, formerly with the Alcoa Technical Center, notified the MIL-HDBK-5 coordination group that he has begun “full-time retirement”.

Although not announced at the meeting, it should be noted that David Lahrman has decided to leave Battelle and to take a new position at LSP Technologies. His technical activities in support of MIL-HDBK-5 and SAE/AMS coordination will be picked up by Bill Benson and Jana Jackson. Their phone numbers and email addresses are included with these meeting minutes.

IV. Order of Business

The 97th meeting followed the format established at the 93rd meeting. The order in which items were discussed followed the chronology of the agenda. The activity on specific agenda items is recorded in these minutes in numerical order, by chapter. A list of new item numbers assigned at this meeting is attached.

Some of the items were approved on a 60-day basis; this indicates that comments may be made on these items within 60 days from the date of the cover letter. Comments should be provided to either the Chairman or Secretary of the Handbook. If no comments are received on an item within the 60-day period, the item is considered approved and will appear in MIL-HDBK-5H, Change Notice 1. If there are negative comments that are considered technical in nature, approval of the item will be withdrawn and the item will be readdressed at the next meeting.

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CHAPTER 1. GENERAL

No Item No. **AMS Coordination. (GCC)** D. Lahrman, Battelle, provided a brief summary of SAE/AMS activities. The Spring 1999 SAE/AMS meeting occurred two weeks before the MIL-HDBK-5 meeting. The items of interest to the MIL-HDBK-5 Coordination Group are summarized below.

A table is included in an attachment to the minutes that summarizes the actions taken for the AMS specifications contained in MIL-HDBK-5. Also included in the table are the draft specifications being sponsored. Some of the draft specifications are of interest to MIL-HDBK-5 as indicated below and may be included, pending approval and submission of the appropriate data.

6092/SiC/25p-T6P Aluminum Alloy, Particulate Reinforced Extrusion. AMS 4265. M. Van den Bergh, DWA, made revisions to this specification, to correct the minimum mechanical properties and processing changes. Committee D decided at the Fall 1997 meeting that the revision constituted a downgrade since the minimum mechanical properties were reduced. The data provided to MIL-HDBK-5 for analysis supports the lower properties. The recommendation from Committee D was to circulate this as a new draft specification on a 28-day ballot. The current specification will be either canceled or superseded. The draft specification has not been provided to SAE/AMS.

6092/SiC/17.5p-T6P Aluminum Alloy, Particulate Reinforced Extrusions. Draft D-94AR, M. Van den Bergh is to submit a 28-day redraft. The redraft has not been submitted to SAE/AMS.

6092/SiC/17.5p-T6P Aluminum Alloy, Particulate Reinforced Sheet. An SAE/AMS specification number was assigned; however, the SAE/AMS editorial consultant noticed that the heat treatment process was not contained in the specification. He will discuss the issue with Committee D chairman to resolve the issue. A 21-day priority ballot may be circulated to allow committee members to comment on the addition of the heat treatment procedure to the specification.

7040-T7451 Aluminum Alloy, Plate. Draft D-99AA, Guy-Michel Raynaud, Pechiney, reviewed a 28-day ballot. There were technical comments against some of the paragraphs including the proposed minimum tensile values. These technical comments were discussed and resolved at the meeting except for the proposed values and a requirement to obtain a UNS number. A 14-day ballot will be sent to the committee members for review and comment once the proposed minimum mechanical properties and the UNS number are secured.

Action: Item continued.

No Item No. **Meetings of Potential Interest to MIL-HDBK-5 Coordination Members. (GCC)** D. Lahrman reviewed the list of meetings of interest to the group. Some changes were noted at the meeting. A revised copy of the meetings is included in

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the attachment to the minutes. If you wish to obtain additional information about a particular meeting, please call the indicated point of contact.

Action: Item continued.

No Item No. **Cancellation of Government Specifications and Subsequent Replacement Specifications. (GCC)** D. Lahrman provided a status report. Currently, 154 MIL and Fed specifications have been converted to AMS word-for-word specifications. Some of these specifications are in the process of being canceled and superseded with existing AMS specifications.

There was some discussion on revising the converted word-for-word specifications; however, it was agreed by the Metals Coordinating committee not to convert these specifications. New AMS specifications will be prepared and existing ones revised to accommodate the cancellation and supersedure of the word-for-word specifications.

Action: Item continued.

No Item No. **Collection of Additional Fatigue, Fatigue Crack Growth, and Fracture Toughness Data. (GCC)** R. Rice, Battelle, indicated an ongoing interest in the addition of fatigue, fatigue crack growth, and fracture toughness (plane stress and plane strain) data in MIL-HDBK-5. He made reference to a substantial collection of fatigue data on 7050-T7451 thick plate provided by Century Aluminum and cited a recent ASTM paper that he wrote in conjunction with J. Deschappelles, Century Aluminum, based on these data¹. Mr. Rice said he would prepare a proposal for the 98th meeting agenda to incorporate these data into MIL-HDBK-5.

Mr. Rice also indicated it would be a good time to update the fatigue curves in MIL-HDBK-5 that represent other 7050 product forms, since most of the S/N curves representing forged and extruded 7050 products are based on material produced in the 1970s. All 7050 fatigue data submitted prior to July 30, 1999 will be considered for inclusion in a data proposal for the 98th meeting agenda.

Action: Item continued.

Item 96-11 **Chapter 1 Revision. (GTG)** R. Rice reviewed a number of editorial changes that have been proposed for the Chapter 1 revision. He indicated that all editorial comments received by May 14th would be incorporated in the final draft version of Chapter 1 and included in the meeting minutes.

¹ Deschappelles, J.B. and Rice, R.C., “**Improved Fatigue Resistance of 7050 Thick Plate Aluminum Through Minimization of Microporosity**”, *Effects of Product Quality and Design Criteria on Structural Integrity*, ASTM STP 1337, R.C. Rice and D.E. Tritsch, Eds., American Society for Testing and Materials, 1998.

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Action: Item approved, assuming no negative votes are received during the 60-day period following issue of the meeting minutes (traditionally noted as 60-day approval). Revision to appear in MIL-HDBK-5H, Change Notice 1.

No Item No. **Special Presentation. (GCC).** T. Bosworth, Air Force consultant, gave a detailed presentation on technical issues associated with inspection and certification of aircraft weldments. A copy of the viewgraphs from his presentation is included as an attachment to the meeting minutes.

Action: Item continued, one or two special presentations to be set up for the next meeting.

No Item No. **Special Presentation. (GCC).** J. Pratt, Textron Aerospace Fasteners, gave a presentation on finite element analysis of a fastened joint system. A copy of the viewgraphs from his presentation is included as an attachment to the meeting minutes.

Action: Item continued, one or two special presentations to be set up for the next meeting.

No Item No. **Discussion of ASTM Reference Standards. (GCC).** T. Kilinski, Battelle, gave an update on the status of two ASTM Test Standards, E9 (Compression) and E238 (Pin-Bearing). Mr. Kilinski is now the Working Group leader for these tasks, and at the last ASTM meeting, there was discussion pertaining to the removal of these Standards from print. The reason is the same for both standards, no precision and bias (P&B) statement exists. Both standards were due for re-approval in 1996, but both standards received negative votes due to the lack of a P&B statement. The votes were found to be persuasive, but the standards were kept in the handbook under the context that the P&B statement would be completed for the next ballot. No work has been initiated so far, however, if the work is not completed by the next re-balloting period (Fall, 2000), the standards would be removed automatically.

These two test standards are critical documents for derived properties within MIL-HDBK-5. If removed from ASTM procedures, there would be no reference to perform these tests. To maintain the documents within ASTM, the following needs to be accomplished:

- 1) Update the test standards to current format. Mr. Kilinski will complete this effort.
- 2) Show that the standards are used by industry. **Please send a short letter explaining the need to maintain these standards to Mr. Kilinski at kilinski@battelle.org** (or fax to 614/424-4882). Also indicate if you would be willing to be a member of the E28 Mechanical Testing Subcommittee, which would allow voting privileges on task group issues (like this one). Attendance at ASTM meetings is not required, voting is conducted

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through mailings. **Please respond by July 15**, to allow time to submit documentation to ASTM for the Fall 1999 meeting.

- 3) Indicate if your company would be willing to participate in a round-robin test program to generate the required data to complete the P&B statement. Details of such a program would follow to those able to participate (donation of material, machining of samples, or conduct of testing) at a later date – not as part of the MIL-HDBK-5 Program.

Action: Item continued.

No Item No. **Industrial Steering Group. (GCC).** R. Rice briefly reviewed the activities of the Industrial Steering Group, which met on Monday, April 26th. The first activity he noted was the development of a statistical analysis software product that has been designed to facilitate the analysis of mechanical property data in conformance with MIL-HDBK-5 guidelines. The second activity he cited was the development of a web-site for MIL-HDBK-5 that will allow electronic access to the Handbook, and prior meeting agendas, handouts and minutes. It will also include special ISG-company-accessible features, such as a Technical Interchange Forum and a searchable CAD-compatible database of MIL-HDBK-5 mechanical properties.

Mr. Rice also reviewed a list of alloys, tempers, and product forms that were ranked by ISG member companies to be high priority for upgrading from S-basis to A- and B-basis within MIL-HDBK-5. A copy of the email provided by D. Richardson, Lockheed, that includes these priority lists is included as an attachment to these minutes.

Action: Item continued.

No Item No. **Guidelines Task Group. (GTG).** The Guidelines Task Group met on Tuesday, April 27th and reviewed all GTG items included in the agenda package.

Action: Item continued.

No Item No. **Materials Task Group. (MTG).** The Materials Task Group met on Wednesday, April 28th and reviewed all MTG items included in the agenda package.

Action: Item continued.

No Item No. **Statistics Working Group. (SWG).** The Statistics Working Group met on Tuesday, April 27th prior to the GTG meeting and reviewed all SWG items included in the agenda package.

Action: Item continued.

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CHAPTER 2. STEEL ALLOYS

Item 95-2

Replacement of Cancelled MIL-Specifications in Chapter 2. (MTG)

D. Lahrman reviewed the item. There was only one comment to the proposed item. The title of Table 2.7.1.0(b) was revised to read "Design Mechanical and Physical Properties of AISI 301 Stainless Steel". The words "and Other Annealed" were removed since the AMS specifications in the table only refer to 301 stainless steel. MIL-S-5059 did contain the annealed properties for other stainless steels.

Action: Item approved. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 98-10

A- and B-Basis Properties for AerMet 100 (280 ksi). (MTG) D. Lahrman reviewed the item. The longitudinal properties were computed with the non-parametric method. However, there were an insufficient number of observations to compute the transverse properties with the non-parametric method and the parametric methods were rejected. In addition, the F_{tu} T_{99} value for the longitudinal grain direction does not support the S-basis value, there was a 9 ksi difference between the S-basis value and the T_{99} value. (The Handbook does contain A-basis values that are lower than the S-basis values, e.g. 7050-T7651 plate.) The committee recommended additional data be obtained for the transverse grain direction so the non-parametric method could be used to compute the T_{99} and T_{90} values.

Action: Item continued.

CHAPTER 3. ALUMINUM ALLOYS

No Item No.

Die Forging Work Group. (DFWG) P. Brouwer, Alcoa, Chairman of the DFWG, reviewed current group activities. The DFWG minutes are included as an attachment to the minutes.

Action: Item continued.

Item 95-28

Review of the Fracture Toughness Tables in Chapter 3. (MTG) R. Rice discussed ongoing efforts to collect new fracture toughness data to update the fracture toughness tables included in Chapter 3 of MIL-HDBK-5. He gave a short presentation on the effect of product thickness, tensile yield strength and grain direction on the plane strain fracture toughness of 7050-T7451 thick plate. (The absolute fracture toughness values were omitted from the presentation, since the data trends were based on material from a single supplier.) He thanked M. Niedzinski, McCook Metals Ltd., for providing the large collection of receiving inspection fracture toughness data on this alloy, and requested that similar data collections be provided on other fracture-resistant aluminum alloys. A copy of the normalized fracture toughness viewgraphs is included as an attachment to the minutes.

Action: Item continued.

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Item 97-5 **A- and B-Basis and Derived Properties for 7050-T7451 Aluminum Alloy Plate, 6.001 to 8.000 inches. (MTG)** D. Lahrman reviewed the item. The T_{99} values computed with the Weibull method support the S-basis values except for the short transverse grain direction in the 6.001 to 7.000 inch thickness range. However, the T_{99} value computed with the adjusted normal method does support the S-basis value.

Two approaches were reviewed for computing the derived properties. A handout was provided at the meeting showing the compression, bearing, and shear properties for these two approaches. It was agreed at the meeting to use the derived properties computed with the data from the 6.001 to 8.000-inch thickness range. P. Brouwer also noted the T_{90} value from the adjusted normal method should also be used to compute the derived properties for the short transverse grain direction in the 6.001 to 7.000-inch thickness range. The T_{99} value from the adjusted normal and the T_{90} from the Weibull method were used. The committee recommended a proposal be prepared for the next meeting containing values based upon the above comments.

Action: Item continued.

Item 97-6 **A- and B-Basis and Derived Properties for Bare 2424-T3 Aluminum Alloy Sheet. (MTG)** D. Lahrman reviewed this item. Only one comment was provided; the shear test method was stated as ASTM B769 in footnote “b” in Table 3.2.8.0(b₁). For sheet materials, the shear test method typically used is ASTM B831. M. Fernandes, Kaiser, who provided these data, agreed to identify the shear test method used to obtain the shear properties.

Action: 60-day approval. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 97-7 **A- and B-Basis and Derived Properties for Clad 2424-T3 Aluminum Alloy Sheet. (MTG)** D. Lahrman reviewed this item. Only one comment was provided; the shear test method was stated as ASTM B769 in footnote “b” in Table 3.2.8.0(b₁). For sheet materials, the shear test method typically used is ASTM B831. M. Fernandes, Kaiser, who provided these data, agreed to identify the shear test method used to obtain the shear properties.

Action: 60-day approval. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 98-2 **Design Properties for Russian Alloy 1163-T7. (MTG)** R. Rice indicated that this alloy has been given an Aluminum Association designation of 2224A-T351. V. Leibov, Russian Aviation Register, has initiated efforts to develop an SAE/AMS specification for this foreign-produced alloy. Until the AMS specification has been approved, efforts will focus on inclusion of design properties for this material in the Preliminary Material Properties Handbook.

At recent coordination meetings, Mr. Rice raised concerns about the possibility of lower-tail censoring in the tensile property data sets provided for the 1163-T7

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product. V. Liebov confirmed that the data sets had been censored in this way and he offered to provide an electronic copy of the data sets without lower tail censoring. This updated database will be used to compile the statistical properties that are included in the PMP Handbook.

Action: Item continued.

Item 98-14 **A- and B-Basis Tensile Properties for 7150-T7751 Aluminum Alloy Plate. (MTG).** P. Brouwer indicated the data are being collected and will be provided in early summer to Battelle for review and analysis.

Action: Item continued.

Item 98-15 **A- and B-Basis Tensile Properties for 7150-T77511 Aluminum Alloy Extrusions. (MTG).** P. Brouwer indicated the data are being collected and will be provided in early summer to Battelle for review and analysis.

Action: Item continued.

Item 98-16 **A- and B-Basis Tensile Properties for 7050-T74 Aluminum Alloy Die Forgings. (MTG).** P. Brouwer indicated the data are being collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-17 **A- and B-Basis Tensile Properties for 7050-T7452 Aluminum Alloy Die Forgings. (MTG).** P. Brouwer indicated the data are being collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-18 **Clad 2524-T3 Sheet and Plate Typical Stress-Strain Curves. (MTG)** At the 96th meeting it was stated the Ramberg-Osgood number computed for the longitudinal grain direction was approximately 260. This value is well above the typical range of Ramberg-Osgood values of 2 to 40. P. Brouwer provided a status report; he indicated additional data were being generated to determine if the Ramberg-Osgood number of 260 for the longitudinal grain direction is appropriate.

Action: Item continued.

Item 98-23 **Collection of Plane-Stress Fracture Toughness Data. (MTG)** R. Rice requested submission of plane-stress fracture toughness data for inclusion in MIL-HDBK-5. The primary focus is on aluminum alloys, although residual strength and R-curve type fracture toughness data on other alloy systems are also of interest.

Action: Item continued.

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Item 98-24 **Addition of Footnote for Definition of Grain Direction in the Die Forging Tables. (MTG)** D. Lahrman stated this item was previously dealt with in items 95-29 and 95-33. Therefore, no additional changes are needed. This item was closed with no action.

Action: Item closed with no action.

No Item No. **Precision Modulus Procedure. (GTG)** D. Lahrman provided a status report. Little progress has been made on this item since the last meeting. Additional test houses (total of 8) are needed to proceed to obtain an ASTM specification. To date there are only three involved in the round-robin testing: AFRL, Alcoa, and Battelle.

R. Seeley, Haynes International, suggested the dynamic modulus method be used to obtain a value. It was agreed it would be appropriate to obtain modulus values with this method. A test source will be identified and samples of the 6061-T6 material will be provided for testing.

Action: Item continued.

Item 99-5 **Proposed Revision to Stress-Corrosion Cracking Resistance Definitions in MIL-HDBK-5. (MTG)** R. Rice reviewed this agenda item and noted several minor editorial corrections.

Action: Item approved.

Item 99-6 **Further Clarification of Inferior Stress-Corrosion Cracking Resistance of Several Aluminum Alloys in MIL-HDBK-5. (MTG)** R. Rice reviewed this agenda item. It was accepted as proposed.

Action: Item approved.

CHAPTER 4. MAGNESIUM ALLOYS

No items presented.

CHAPTER 5. TITANIUM ALLOYS

No items presented.

CHAPTER 6. HEAT RESISTANT ALLOYS

No items presented.

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CHAPTER 7. MISCELLANEOUS ALLOYS AND HYBRID MATERIALS

Item 95-35 **A- and B-Basis and Derived Properties Program for 6092/SiC/25p-T6P Particulate Extrusion. (MTG)** D. Lahrman provided a status report and recommended this item be withheld from the agenda until the revised SAE/AMS specification is approved.

Action: Item will be withheld from consideration in future agendas until AMS specifications are issued.

Item 95-36 **A- and B-Basis and Derived Properties Program for 6092/SiC/17.5p-T6P Particulate Reinforced Extrusion. (MTG)** D. Lahrman provided a status report and recommended this item be withheld from the agenda until the SAE/AMS specification is approved.

Action: Item will be withheld from consideration in future agendas until AMS specifications are issued.

Item 96-19 **A- and B-Basis and Derived Properties Program for 6092/SiC/17.5p-T6P Reinforced Rolled Sheet. (MTG)** D. Lahrman provided a status report and recommended this item be withheld from the agenda until the SAE/AMS specification is approved.

Action: Item will be withheld from consideration in future agendas until AMS specifications are issued.

CHAPTER 8. STRUCTURAL JOINTS

Item 95-13 **Static Joint Strength of AF3222 Blind 100-Degree Flush Head Rivets in Clad 2024-T3 Sheet. (FTG)** and

Item 95-14 **Static Joint Strength of AF3223 Blind Protruding Head Rivets in Clad 2024-T3 Sheet. (FTG)** S. Ford, TecCon Inc., reported that these items will be closed without action, and included in the combined reanalysis to replace the existing M7885 tables with individual company tables to be submitted in the next meeting agenda.

Action: Items closed without action.

Item 95-15 **Static Joint Strength of CR3222 Blind 100-Degree Flush Head Rivets in Clad 2024-T3 Sheet. (FTG)** and

Item 95-16 **Static Joint Strength of CR3223 Blind Protruding Head Rivets in Clad 2024-T3 Sheet. (FTG)** S. Ford reported that these items would be closed without action, and the data would be included in the combined reanalysis to replace the existing M7885 tables with individual company tables to be submitted in the next meeting agenda.

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Action: Items closed without action.

Item 95-37 **Static Joint Strength of AHG AL905 100-Degree Flush Head 7050 Rivets in Clad 2024-T3 Sheet. (FTG)** S. Keener, Boeing Long Beach, reported that he had made significant progress in the analysis of the data, and that the ultimate allowable curve was completed and the yield analysis needs to be verified. He will conclude the analysis and prepare an item for inclusion in the next meeting agenda.

Action: Item continued.

No Item No. **Fastener Industry Working Group. (FIWG)** J. Pratt, Textron Aerospace Fasteners, discussed the progress of the group. The minutes for the FIWG meeting are included as an attachment to these MIL-HDBK-5 meeting minutes.

Action: Item continued.

Item 99-7 **Immediate Removal of M7885 Tables. (FTG)** S. Ford reported that the Fastener Task Group had agreed the M7885 tables [8.1.3.1.2(k), 8.1.3.1.2(l), 8.1.3.2.1(o), and 8.1.3.2(p)] should be removed from the Handbook at the earliest possible change notice. DISC has issued a cancellation notice for all MIL-R-7885 Blind Rivets dated December 23, 1998. In this notice they indicated that “Future acquisitions for this product should refer to NAS930X.” The Fastener Task Group is concerned that some designers may misconstrue the preceding statement to imply design equivalency, which is not the case.

Action: Item Approved. The M7785 Tables will be removed from the Handbook as part of the next update, which will be Change Notice 1 of Revision H.

Item 99-8 **Inclusion of NAS 1931B (S) in Table 8.1.3.2.2(g).** S. Ford reported that the report that was sent to each FTG member proved that the single action fastener met or exceeded the joint allowables of the double action fastener in all cases. He also indicated that the drive anvil fastener appeared to do the same. It was suggested that a plot showing the original allowables compared to the single action parts be included. If the report for the drive anvil parts can be completed and reviewed before the next agenda, both tables could be approved at the next meeting.

Action: Item continued.

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CHAPTER 9. GUIDELINES FOR THE PRESENTATION OF DATA

- Item 94-26 **Production Methods and Their Impact on Design Allowables. (SWG)** R. Rice reviewed the status of this item. He discussed the results of a working group teleconference, as documented under this item number in the meeting Handout. He indicated that work would continue on this topic towards the development of a guideline proposal for the next meeting.
- Action: Item continued.
- Item 95-27 **Guidelines for the Introduction of Foreign Materials into MIL-HDBK-5. (GTG)** R. Rice reviewed this agenda item and documented several minor editorial changes to the guideline proposal.
- Action: 60-day approval. Revision to appear in MIL-HDBK-5H, Change Notice 1.
- Item 96-12 **Preliminary Design Handbook Concept. (GTG)** R. Rice reviewed this agenda item and discussed minor proposed editorial changes.
- Action: 60-day approval. Revision to appear in MIL-HDBK-5H, Change Notice 1.
- Item 98-3 **Procedure for Analyzing Lower Tail Censoring. (SWG)** R. Rice indicated that no progress had been made on this item since the last meeting. He noted that tensile property data promised by V. Liebov on 1163-T7, which will include previously censored lower tail observations, will provide several excellent test cases for any statistical methods that are developed.
- Action: Item continued.
- Item 98-7 **Complete Restructuring of Chapter 9 Guidelines to Improve Usability. (GTG)** R. Rice reviewed the progress on this major item. He indicated the first complete draft revision of Chapter 9 was distributed to a volunteer review group in early March. The initial reviewers consisted of R. Goode, Lockheed Martin Vought Systems; J. Bunch, Northrop Grumman; D. Richardson, Lockheed Martin Aeronautical Systems; S. Thompson, AFRL; and N. Ontko, AFRL. At the meeting, several additional people volunteered to review portions of the first draft of the Chapter 9 rewrite. These volunteers included A. Meisels, Boeing-Canoga Park; I. Ibrahim, Boeing-North American; M. Niedzinski, McCook Metals; Jay Goodman, Alcoa; and C. Darling, Pratt & Whitney. Mr. Rice asked that all reviewer comments on this first draft be submitted to him by August 15, 1999. He indicated that his near-term plan was to complete the second draft of Chapter 9 by the 98th coordination meeting, and his long-term goal was to gain approval of the new edition of Chapter 9 by the 99th coordination meeting.
- Action: Item Continued.
- No Item No. **Recommendation for Revision of Fastener Guidelines. (FIWG)** S. Ford explained that the writing of a revised guideline was on hold until the revised

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analytical technique for analysis of fastened joints was completed, since this was a significant section of the guidelines.

Action: Item continued.

- No Item No. **Revised Analytical Techniques for Analysis of Fastened Joints. (FIWG)**
T. Kilinski, Battelle, summarized the status of this item, which was discussed in detail at the Fastener Task Group and the Fastener Industry Working Group meetings. A second order polynomial fit method for determining design allowables using a B-basis approach was showing good results when applied to a blind fastener data set. Further work will be completed as budget is available. The focus for additional work will be to adjust the exponent value to provide a better fit at low t/D values, perform the analysis using data for different fastener types, and determine how best to transition from the curve fit to the shear cut-off value.

Action: Item continued.

- Item 99-1 **Proposed Modification to Figure 9.2.6-Procedure for Computation of T₉₉ and T₉₀ Values. (SWG)** R. Rice reviewed this brief agenda item. There is some controversy about whether the current version of the flow chart shown in Figure 9.2.6 accurately reflects the sequencing of statistical procedures called out in the MIL-HDBK-5 guidelines. The SWG agreed to review the flow chart proposed by D. Richardson, and they agreed to either endorse this flow chart or suggest an alternative one that is entirely consistent with the present guidelines for the next meeting.

Action: Item continued.

- Item 99-2 **Addition of Pearson Probability Plots to MIL-HDBK-5 Guidelines. (SWG)**
R. Rice reviewed this agenda item, which was approved as presented.

Action: Item approved. Revision to appear in MIL-HDBK-5H, Change Notice 1.

- No Item No. **Calculation of Metric Equivalent Design Properties From MIL-HDBK-5 Tables. (GTG)** R. Rice reviewed this agenda item. After considerable debate on this issue it was agreed that the only change that should be made to the Handbook will be the addition of a cautionary footnote (about errors that can accumulate from repeated English-metric units conversions) to the table of metric conversion factors included in Appendix A. This small item will be prepared for inclusion in the next meeting agenda.

Action: Item continued.

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No Item No. **Materials for Inclusion in the PMP Handbook. (MTG)** R. Rice reviewed the status of data collection and analysis efforts undertaken by Battelle under separate 6.3 level funding from the Air Force.

Action: Item presented for information only. No action required by MIL-HDBK-5 Coordination Committee.

Item 99-3 **Implications of the Normal Method for Computing Tolerance Bounds. (SWG)**
R. Rice reviewed this brief agenda item. It was approved as presented.

Action: 60-day approval. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 99-4 **Selecting the Appropriate Regression Method. (SWG)** R. Rice reviewed this agenda item. Several minor issues were raised within the SWG, so the item was held open for reconsideration at the 98th coordination meeting.

Action: Item continued.