

**MINUTES**

**of the**

**1<sup>st</sup> MMPDS and  
101<sup>st</sup> MIL-HDBK-5  
Coordination Meeting**

**held in**

**Atlantic City, NJ**

**April 23-25, 2002**

**Compiled by**

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**for**

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**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

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**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

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**Contents**

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|   | <b>Page</b> |
|---|-------------|
| I. Chairman’s Remarks .....   | 1           |
| II. Approval of the 100 <sup>th</sup> Meeting Minutes .....   | 2           |
| III. Special Presentations .....  | 2           |
| IV. Order of Business .....   | 2           |
| Chapter 1. General.....   | 3           |
| Chapter 2. Steel Alloys.....  | 6           |
| Chapter 3. Aluminum Alloys.....   | 6           |
| Chapter 4. Magnesium Alloys .....   | 10          |
| Chapter 5. Titanium Alloys .....  | 11          |
| Chapter 6. Heat-Resistant Alloys .....  | 11          |
| Chapter 7. Miscellaneous Alloys and Hybrid Materials.....   | 12          |
| Chapter 8. Structural Joints .....  | 13          |
| Chapter 9. Guidelines for the Presentation of Data .....  | 14          |
| V. Attachments  |             |
| Attendance and Distribution List for 101 <sup>st</sup> MIL-HDBK-5 Meeting.....                              | 17          |
| Changes and Additions for MIL-HDBK-5H, Approved at the 100 <sup>th</sup> Meeting .....                      | 31          |
| Item Numbers Assigned.....  | 33          |
| Special Presentation – “FAA Aging Aircraft Research”, C. Smith, FAA William J. Hughes Technical Center..... | 35          |
| Special Presentation – “Proposed Revision to 14 CFR 25.613”, R. Eastin, FAA .....                           | 77          |
| Special Presentation – “EB Melting of Ti-6Al-4V”, J.R. Wood, Allvac.....                                    | 81          |

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

---

**Contents (Continued)**

---

|   | <b>Page</b> |
|---|-------------|
| Item 02-14. Design Minimum Properties for 7150-T77511 Extruded Wide Panels .....  | 97          |
| Special Presentation – “Aluminum Alloy 1933T3 (T73) Forging”, V. Liebov,<br>All-Russian Scientific Research Institute ..... | 99          |
| Item 02-08. Mechanical Properties for Ti-4.5Al-3V-2Fe-2Mo Titanium<br>Alloy Bar.....  | 111         |
| Item 02-09. Derived Properties for Ti-4.5Al-3V-2Fe-2Mo Titanium Alloy Sheet .....   | 113         |
| Item 02-17. Addition of Stress-Strain Curves for Haynes 230 Plate .....   | 115         |
| Special Presentation - “Powder Metallurgy-Based Discontinuously Reinforced<br>Aluminum (DRA)”, M. van den Bergh, DWA .....  | 119         |
| Item 99-27 Revised Analytical Technique for Analysis of Fastened Joints .....   | 127         |

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

**held in  
Atlantic City, NJ  
April 23-25, 2002**

Notes: For the sake of simplicity the traditional terminology of MIL-HDBK-5 or MIL-5 is maintained throughout these minutes. However, actions taken on these agenda items at the above meeting also apply to the new MMPDS Handbook, which will be issued by the FAA in early 2003.

Where reference is made to the “next coordination meeting” or the “2<sup>nd</sup> MMPDS meeting” it can be assumed this meeting will take place in October 2002 in the Cocoa Beach, FL area. Details concerning meeting arrangements are still being resolved. A formal meeting announcement will be distributed in June.

The site chosen for the 3<sup>rd</sup> MMPDS meeting was Las Vegas, NV. No meeting arrangements have yet been made, but the plan is for that meeting to take place in April 2003.

**I. Chairman’s Remarks**

Welcome to the 101<sup>st</sup> meeting of the MIL-HDBK-5 Coordination Committee. This is also the 1<sup>st</sup> meeting of the MMPDS Coordination Committee. The purpose of these handbooks is to provide a repository of statistically reliable design allowables for use in the design of military and civilian aircraft. This process has been in existence since approximately 1938. Prior to MIL-HDBK-5, each branch of the service and the predecessor to the FAA, each aircraft company and metal producer had their own requirements or allowables. The use of MIL-HDBK-5 was required for all military systems and civilian aircraft for many years. Its use is endorsed by the FAA as well as the computational methods for design allowables. The handbook has become a global document with worldwide circulation and use. The MMPDS will continue this legacy.

MIL-HDBK-5 is maintained by the Air Force at Wright-Patterson AFB. Funding is currently provided solely by the FAA. Coordination support is counted on from other DoD agencies and the FAA. The document is continually updated and improved by your contributions at this meeting and through the efforts of Battelle as our support contractor.

The purpose of these bi-annual meetings is to allow members of the aerospace industry an opportunity to make suggestions for modifications and request additions to the document. The bi-annual meetings allow the Handbook to be timely and to keep up with changing needs within the community.

As with any specification document, it requires coordination between the supporting services and industrial groups represented. As a result of these meetings we can accomplish the coordination face-to-face and on-site. The use of task groups and the main meeting format serves this process quite well.

Our operating rules require that the membership have a chance to review items prior to discussion and approval. Item numbers are usually established at a meeting, printed in the minutes from that meeting and proposed action is documented in the agenda for the next meeting. After discussion it is either accepted or rejected. In practice there may be changes and modifications resulting from discussions at the meetings in which some items may be spread out

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

over several meetings. It is not necessary to wait to suggest new items at a meeting. Items may be proposed at anytime during the year and they will be placed on the agenda for discussion at the next meeting.

Regarding the approval process....we are not a completely democratic organization. The Air Force has the responsibility as custodians of the Handbook for what goes in or comes out, as will the FAA with the MMPDS. It would, however, be shortsighted not to take the advice and expertise provided by the knowledge represented here today when making these decisions. We strive to do this by obtaining your consensus on each item. At times we have no alternative but to take a vote and go with the majority. Rarely will we as the regulatory and custodial agencies go against the popular choices made by the group.

**Steven R. Thompson, DOD Co-Chair MIL-HDBK-5**

John Bakuckas, FAA Co-Chair MIL-HDBK-5, and Catherine Bigelow, Air Worthiness Assurance R&D Branch Manager, FAA Technical Center, also made welcoming and introductory remarks.

**II. Approval of 100<sup>th</sup> Meeting Minutes**

The minutes of the 100<sup>th</sup> meeting were approved as distributed.

**III. Special Presentations** – Copies of these special presentations are included in the minutes.

- a. C. Smith, FAA Aging Aircraft Research Program
- b. R. Eastin, Proposed Changes to FAA Regulations, 14 CFR, Part 25

**IV. Order of Business**

The Order in which items were discussed followed the chronology of the final agenda, which was included on pages 5-13 of the meeting handout. Activity on specific agenda items is recorded in these minutes in order, by chapter. A list of new item numbers assigned at this meeting is also attached.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

**CHAPTER 1. GENERAL**

No Item No.     **AMS Coordination. (GCC)** J. Jackson, Battelle, reviewed a handout on relevant AMS material specifications that were approved or initiated between the 100<sup>th</sup> and 101<sup>st</sup> coordination meetings. The Fall AMS meeting will be held September 30-October 4 in Seattle, WA.

Action: Item continued.

No Item No.     **Meetings of Potential Interest to MIL-HDBK-5 Coordination Members. (GCC)** R. Rice, Battelle, reviewed this agenda item. He noted that the current list of technical meetings also contains relevant technical society website addresses.

Action: Item continued.

No Item No.     **Cancellation of Government Specifications and Subsequent Replacement Specifications. (GCC)** J. Jackson reviewed a handout on the most recent information available from SAE/AMS. Changes suggested by R. Steffen, Raytheon, were included in the handout. Separate agenda items will be presented at the fall meeting to implement these changes.

Action: Item continued.

No Item No.     **Collection of Additional Fatigue, Fatigue Crack Growth, and Fracture Toughness Data. (GCC)** R. Rice proposed closure of this item without further action. This item has been kept open for the past few years to highlight continuing interest within the MIL-HDBK-5 coordination group to expand statistically-based coverage of fatigue, fatigue crack growth and fracture toughness behavior of materials in MIL-HDBK-5. However, the current scope of work for MIL-HDBK-5 coordination does not support substantial activity in this area.

Battelle will continue to collect fatigue, crack growth and fracture toughness data on materials of interest to the MIL-HDBK-5 coordination group, and include those data with other static property data proposals, where this can be done with very limited effort. However, analyses of other, more substantial fatigue, crack growth and fracture toughness databases will be put on hold for future consideration.

Action: Item closed with no further action.

No Item No.     **Special Presentation. (GCC)** C. Smith, FAA William J. Hughes Technical Center, gave a special presentation on the FAA aging aircraft research program. A copy of his presentation is enclosed.

Action: Item closed

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

No Item No. **Special Presentation. (GCC)** R. Eastin, FAA, Chief Scientific/Technical Advisor – Fracture Mechanics, gave a special presentation on proposed changes to FAA Regulations, 14 CFR Part 25 Revised Requirement for Material Strength Properties and Design Values for Transport Airplanes and Notice of Proposed Advisory Circular (AC) 25.613-1X; Proposed Rule and Notice. A copy of his presentation is enclosed.

No Item No. **Special Presentation. (GCC)** J.R. Wood, Allvac, gave a special presentation on EB Melting of Ti-6Al-4V. A copy of his presentation is enclosed.

Action: Item closed

No Item No. **Government Steering Group. (GSG)** S. Thompson, AFRL/MLSC, gave a brief GSG status report at the General Coordination Committee (GCC) meeting on Thursday morning. A closed meeting of the GSG was held on Monday, April 22<sup>nd</sup>, beginning at 3:15pm.

S. Thompson reported on one GSG discussion topic of particular note. He indicated that the GSG members had discussed removal of *Section 8.2 Metallurgical Joints* from the Handbook because it has not been updated for more than 20 years and no broad-based effort is planned to update this section in the near future. However, GSG discussions 2 weeks following the meeting regarding this issue have led to a reversal of thought and these sections will remain intact and unchanged.

Action: Item continued

No Item No. **Airframer Steering Group. (ASG)** J.T. Amin, Lockheed, provided a brief ASG status report at the General Coordination Committee (GCC) meeting on Thursday morning.

Action: Item continued. An assignment was given for the next meeting regarding Item 94-26 on Production Methods and Their Impact on Design Allowables. The ASG was asked to determine the trigger mechanisms for this item.

No Item No. **Industrial Steering Group. (GCC)** The 9<sup>th</sup> ISG meeting was held on Monday, April 22<sup>nd</sup>. The morning session was limited to representatives of current ISG member companies. However, the afternoon session was open to all Handbook coordination-meeting attendees.

The first edition of the ISG bylaws was approved in the morning session. (An electronic copy of these bylaws will be distributed to all ISG meeting attendees along with the meeting minutes, which will be distributed before the end of May.) The first portion of the afternoon session focused on current ISG software and database development activities, while the latter portion of the afternoon session included 3 technical presentations on Statistical Process Control, Electronic Submission of Certification Data, and Static Allowables for Ti-6Al-4V Bar and Plate. A copy of these ISG presentations is included as an attachment to these minutes.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

At the GCC meeting R. Rice mentioned that the top level of the ISG website will be made available to the public in the near future. This is being done to facilitate broad, electronic distribution of general information about the most recent and upcoming MIL-HDBK-5, MMPDS, and ISG coordination meetings. Current ISG and GSG members will also use this public website address as their access point to (password protected) sublevels of the website. A summary of the available statistical analysis software, mechanical property databases and supporting documentation currently available at the website sublevels will be accessible to all users.

Action: Item continued.

No Item No. **Guidelines Task Group. (GTG)** R. Rice led the discussion of current Chapter 9 items in the Guidelines Task Group meeting, which took place on Tuesday, April 23<sup>rd</sup>. The status of each of the GTG items is reviewed later in these minutes.

Action: Item continued.

No Item No. **Materials Task Group. (MTG)** J. Jackson led the discussion of the new and continued materials items for Chapters 2 through 7 in the Materials Task Group meeting, which was held on Wednesday, April 24<sup>th</sup>. The status of each of the MTG items is reviewed later in these minutes.

Action: Item continued.

No Item No. **Electronic Submission of Aircraft Material Certification Data. (MTG)** J. Pillers, Boeing, requested the addition of this discussion item to the agenda. S. Fantle, Boeing, gave a presentation on this subject at the Monday afternoon session of the ISG meeting. R. Rice indicated that this item would be closed with no further action unless specific recommendations for guideline changes pertaining to this topic were identified prior to publication of the meeting minutes.

Action: Item closed.

No Item No. **Statistics Working Group. (SWG)** H. Tsai, Battelle, led the discussion of new and continued statistics items at the Statistics Working Group meeting, which was held on Tuesday, April 23<sup>rd</sup>. The status of each of the SWG items is reviewed later in these minutes.

Action: Item continued.

Item 02-19 **Commonly Used Formulas. (GTG)** R. Rice reviewed this brief agenda item, which covered the insertion of the Ramberg-Osgood equation in Section 1.3 of the Handbook.

Action: New number assigned. Item approved and closed. Change will be included in MIL-HDBK-5J and MMPDS-01 as shown on agenda page 18.

# MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5 COORDINATION MEETING

## CHAPTER 2. STEEL ALLOYS

Item 01-07 **Fracture Toughness Properties of AerMet 100. (MTG)** J. Jackson reviewed this agenda item. She noted that the L-T orientation should not have been included on pages 1 and 5 in the agenda item.

Action: Approved and closed. Revisions to Table 2.1.2.1.3, as shown on agenda page 28, and to Section 1.4.12.3, as shown on agenda page 30, will be included in MIL-HDBK-5J and MMPDS-01.

Item 02-01 **Design Properties for Custom 465 in the H950 & H1000 Conditions (MTG).** J. Jackson presented the data proposal enclosed in the original agenda package for this new steel alloy. Only S-basis properties were proposed at this time, but A- and B-basis properties will be calculated and proposed after data from the required minimum number of heats has been added to the database.

Action: Item approved and closed. New section will be published in next revision as shown in agenda pages 45-47 and handout pages 77-80 (stress-strain curves). Table 2.1.2.1.3 will be updated as shown in the agenda on page 48.

## CHAPTER 3. ALUMINUM ALLOYS

Item 95-28 **Review of the Fracture Toughness Tables in Chapter 3. (MTG)** R. Rice proposed closure of this item without further action, since the current scope of work for MIL-HDBK-5 coordination does not support substantial activity in this area. Battelle will continue to collect plane strain fracture toughness data for inclusion in Table 3.1.2.1.6 of MIL-HDBK-5 in conjunction with other static property data proposals, where this can be done with very limited effort.

Action: Item closed with no further action.

Item 98-2 **Design Properties for Russian Alloy 1163-T7 (2224A-T351). (MTG)** J. Jackson presented a status report. No progress is anticipated on this item within the next 6 months. A new item will be opened after an AMS specification has been approved for this material.

Action: Item closed with no action.

Item 00-5 **Review of Converted Effect of Temperature Curves in MIL-HDBK-5. (MTG)** R. Rice briefly reviewed the work that was done on this "house-keeping" item before Change Notice 1 of MIL-HDBK-5H was published.

Action: Item closed with no further action.

Item 00-6 **A and B-Basis Properties for 2297-T87 Plate. (MTG)** J. Jackson reviewed the enclosed agenda item. The AMS specification was not approved soon enough to

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

include this alloy in Change Notice 1. The AMS specification (AMS 4330) was subsequently approved. Some mechanical property testing was still underway at the time of the Spring 2002 coordination meeting.

Action: Item continued. Due to the recent transition at McCook Metals, they requested that this item be held for approval in the fall meeting.

- Item 00-9      **Including EXCO Ratings in MIL-HDBK-5. (MTG)** R. Rice reviewed a handout on this item. He noted that the current ASTM standard for establishing EXCO ratings on aluminum alloys, G34, includes documentation of considerable uncertainty in the EXCO rating process, especially on materials displaying intermediate levels of exfoliation corrosion resistance. He recommended that EXCO ratings not be included in MIL-HDBK-5 until the documented accuracy of the supporting standard can be improved. J.T. Amin noted that improvements have been made in the 2001 revision of ASTM G34, which will make it easier to accurately establish EXCO ratings.

Action: Item continued.

- Item 00-10    **Reference for Weldability of Aluminum in Section 3.1.3.4. (MTG)** J. Jackson reviewed this brief agenda item. Revised wording of this section, as shown on agenda pages 59-60, was accepted.

Action: Item continued. A final decision will be made at the fall meeting regarding modification or deletion of Table 3.1.3.4.

- Item 01-08    **Update Test Methods for Plane-Stress Fracture Toughness Data. (MTG)** R. Rice presented a handout on recommended new guidelines for the collection, analysis and presentation of plane-stress fracture toughness data in MIL-HDBK-5. He noted that the only plane stress fracture toughness data currently included in MIL-HDBK-5 are residual strength curves on several aluminum sheet products, which were put in the handbook at least 15 years ago. The procedures used to develop these residual strength curves are not supported in current ASTM standards. R. Rice noted that ASTM E561, which focuses on methods for determining R-curves, would probably be the most appropriate ASTM standard to base modified guidelines for analysis and inclusion of plane-stress fracture toughness data in MIL-HDBK-5.

There was considerable debate within the MTG about whether initial exploratory work on updated MIL-HDBK-5 guidelines for plane stress fracture toughness determination should continue. As a compromise, it was agreed that coordination members would go back to the fracture experts within their respective companies and obtain more quantitative information on what kind of plane stress fracture toughness information would be most useful to include in MIL-HDBK-5.

Action: Item continued.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

Item 01-09 **Derived Properties for 2297-T87. (MTG)** J. Jackson reviewed this additional item on 2297-T87, which focused on the collection and analysis of derived property data.

Action: Item continued with Item 00-06.

Item 01-11 **A- and B-Basis Properties for 7250-T7451 Aluminum Alloy Plate. (MTG)** J. Jackson presented this agenda data proposal. She noted that the AMS specification for this product was currently out on a 14-Day ballot.

Action: Item continued. Hold due to McCook and Pechiney transition. Add bearing and shear testing in the L and ST orientations.

Item 01-12 **S-Basis Properties for 2026-T3511 Aluminum Alloy Extrusions. (MTG)** J. Jackson reviewed this agenda item. At the 100<sup>th</sup> coordination meeting it was agreed to publish S-basis properties on this material in CN1 if the AMS Aerospace Council (ASC) finalized the specification with no change by 4/24/01. Since this deadline was not met, the item was continued. However, AMS 4338 was subsequently published in November 2001. Minor editorial corrections were made to the proposed MIL-5 table (to make thickness breaks consistent with the approved AMS specification). The corrected table was included in the agenda.

Action: Item approved and closed. The new section as shown on agenda pages 92 and 93 will be included in MIL-HDBK-5J and MMPDS.

Item 01-15 **S-Basis Properties for 7055-T76511 Aluminum Extrusions (MTG).** J. Jackson presented the enclosed data proposal. She noted that AMS 4336 was published in March 2002.

Action: Item continued. Approved L properties. Alcoa will generate data for the additional 3 LT orientation lots needed to meet the guideline requirements for publication of LT design allowables.

Item 01-16 **A- and B-Basis Tensile Properties for 7249-T76511 Aluminum Alloy Wide Extrusions. (MTG)** J. Jackson reviewed the agenda item. Design allowables were proposed on this material at the 100<sup>th</sup> coordination meeting, but it was not possible to include them in Change Notice 1, because of a delay in the publication of the AMS specification. The updated AMS draft specification, which is currently out for a 14-Day ballot, proposes to combine narrow and wide extrusions. Bearing and shear properties for the LT direction need to be generated. The bearing and shear minima will reference the grain and loading directions.

Action: Item continued.

Item 02-02 **Reduced Beryllium Replacement for D357-T6. (MTG)** J. Jackson presented this brief data proposal. She noted that AMS specification 4288 was published in November 2001. Additional tensile data up to 2 inches and derived property data are still needed before this material is approved for inclusion on an A- and B-basis in the Handbook. Alternatively, assuming there are sufficient data for verification

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

of the S-basis values for the new AMS, a separate, S-basis, column could be proposed for addition to the existing D357-T6 table. Additional data are requested from additional foundries; in particular data on sand and investment castings.

On agenda page 125, it was agreed that the wording “is an ultra-low beryllium version” should be replaced with “a beryllium-free version”. Table 3.9.7(a) will also be modified to show the new specifications.

Action: Item continued.

- Item 02-03      **Reduced Beryllium Replacement for A357-T6. (MTG)** J. Jackson presented the enclosed brief data proposal. AMS specification 4219 was published in Nov. 2001. However, it should be noted that no test data are currently available in the MIL-HDBK-5 files on reduced beryllium A357-T6; the proposed S-basis properties for reduced beryllium A357-T6 were based on reduced beryllium D357-T6 test data.

Action: Item continued. Same action plan as Item 02-02.

- Item 02-04      **A- and B-Basis for 2026-T3511 Aluminum Alloy Extrusions. (MTG)** J. Jackson presented this data proposal. Data supporting S-basis properties were reviewed at the 100<sup>th</sup> meeting. Additional data were subsequently submitted for A and B-basis properties.

Action: Item approved and closed. Table on page 137 will be included with new section from Item 01-12.

- Item 02-05      **T<sub>99</sub> Values for 7075-T73 & T7352 Die Forgings (MTG).** J. Jackson reviewed this agenda item. The rounded T<sub>99</sub> values were not shown in Table 3.7.6.0(e<sub>2</sub>). The previous footnote stated the T<sub>99</sub> values were higher, but did not show these values.

Action: Item approved and closed. Table 3.7.6.0(e<sub>2</sub>) will be modified as shown in the agenda on page 140 to identify the rounded T<sub>99</sub> values.

- Item 02-06      **Effect of Exposure at Elevated Temperature Curves (MTG).** J. Jackson reviewed this editorial item, which was created to prevent the possible misinterpretation of exposure data presented in Figures 3.2.3.3.1 (c) and (d); 3.2.3.4.1 (c) and (d); 3.2.3.4.5 (a) and (b); 3.3.4.5 (a) and (b); and 3.2.3.5.5 (a) and (b).

Action: Item approved and closed. Corrections made in MIL-HDBK-5H, Change Notice 1.

- Item 02-07      **Correlative Information Correction for Figure 3.7.8.1.8(c), 7175-T73511 Extrusion (MTG).** R. Rice presented this brief editorial item. It was presented as an information item only, since the corrected equivalent stress equation was already published in Change Notice 1 of MIL-HDBK-5H.

Action: Item approved and closed. Corrections made in MIL-HDBK-5H, Change Notice 1.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

- Item 02-10      **Design Minimum Properties for 7055-T74511 Extrusions. (MTG)** J. Jackson presented the data proposal on this new item. The draft AMS specification has been submitted to the Aerospace Council.
- Action: Item continued. Approved “L” properties. Alcoa will generate an additional 3 lots for LT data (7 pairs submitted, need 10) to complete the design allowables.
- Item 02-14      **Design Minimum Properties for 7150-T77511 Extruded Wide Panels (MTG).** J. Jackson presented the data proposal on this new item. The draft AMS specification has been submitted to Aerospace Council.
- Action: Item approved pending ASC approval of AMS specification and with modification to table heading. Delete circle size callout in table heading. A corrected table, as it will appear in MIL-HDBK-5J, is attached.
- No Item No.      **A- and B-Basis Properties for 7050-T7651 Aluminum, 1.0 – 1.5 Inch Thick Plate (MTG).** R. Rice reviewed a handout of the results of the reanalysis of strength data on this alloy using the recently accepted Pearson method.
- Action: Item continued. Assigned Item No. 02-16. Since this was a handout, the item will be continued to the Fall meeting for final approval.
- No Item No.      **Stress Corrosion Threshold Values in MIL-HDBK-5. (MTG)** R. Rice reviewed a handout on this item. The goal, which was first proposed by T. Khaled, FAA, is to develop guidelines for the inclusion of quantitative data on stress corrosion cracking (in terms of stress and time) in MIL-HDBK-5. Ultimately, it is hoped that these quantitative data will replace the current letter ratings. R. Rice described the requirements for an experimental database that would allow the definition of stress (to avoid SCC) versus time curves. I. Ibrahim, Boeing, indicated that it was his opinion that the publication of  $K_{ISCC}$  values in MIL-HDBK-5 would be sufficient. S. Thompson, AFRL, indicated the appropriate ASTM standard to consider for this kind of testing would be ASTM E1681<sup>1</sup>.
- Action: Item continued to Fall coordination meeting. S. Thompson agreed to give a report on  $K_{I_{eac}}$  testing issues at the next meeting.
- No Item No.      **Aluminum Alloy 1933T3 (T73) Forging. (MTG)** V. Liebov, Russian Interstate Aviation Committee gave a brief presentation. A copy of his presentation is enclosed.

**CHAPTER 4. MAGNESIUM ALLOYS**

No items considered.

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<sup>1</sup> ASTM E1681, “Standard Test Method for Determining Threshold Stress Intensity Factor for Environment-Assisted Cracking of Metallic Materials”, American Society for Testing and Materials.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

**CHAPTER 5. TITANIUM ALLOYS**

Item 99-11      **A- and B-Basis Design Mechanical Properties for Ti-6-4 Castings. (MTG)** J. Jackson reviewed this agenda item. She reported that the draft AMS specification was currently out for review on a 14-Day ballot. She noted that the draft specification was changed to include 3 thickness breaks as shown in handout. Stewart Veeck, Howmet, agreed to submit physical properties on this material to include in the data proposal that will be reviewed at the Fall meeting. J. Jackson also agreed to coordinate with the AMS editor on any changes that may be needed in AMS 4985.

Action: Item continued to Fall. Add physical properties. Seek approval in the Fall.

Item 02-08      **Mechanical Properties for Ti-4.5Al-3V-2Fe-2Mo Titanium Alloy Bar (MTG).** J. Jackson reviewed the agenda item. A decision was made to add the testing orientation to the shear properties. H. Fukai, NKK, has sent information regarding specific longitudinal test direction as being L-R.

Action: Item approved and closed. Shear test direction will be noted as shown in enclosed table.

Item 02-09      **Derived Properties for Ti-4.5Al-3V-2Fe-2Mo Titanium Alloy Sheet (MTG).** J. Jackson reviewed the agenda item.

Action: Item approved and closed subsequent to editorial changes for bearing and shear directions as shown in the enclosed table.

Item 02-15      **A- and B-Basis Design Minimums for Ti-6Al-4V Plate (MTG).** J. Jackson reviewed the agenda item.

Action: Item approved and closed.

**CHAPTER 6. HEAT RESISTANT ALLOYS**

Item 01-14      **A- and B-Basis Properties for HAYNES® HR-120® Alloy Sheet, Strip, and Plate. (MTG)** J. Jackson provided a status report on this item, which was approved at the last meeting pending approval of the AMS specification. The newly released specification on this alloy is AMS 5916. The corrected item (including the new AMS specification) was shown in the handout.

Action: Item approved and closed.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

No Item No.     **Consideration of Inconel 617 Sheet for Inclusion in MIL-HDBK-5 (MTG).** R. Rice indicated that the results of his informal survey had shown no strong interest in putting this material in MIL-HDBK-5. A decision was made to verify that an AMS specification existed for the material and to incorporate minimum properties in the Handbook only if sufficient data already exist in the files for A- and B-basis.

Subsequent investigation revealed that three AMS specifications exist for Inconel 617; AMS 5887 for bars, forgings and rings, AMS 5888 for plate, and AMS 5889 for sheet and strip. There may be sufficient data for A- and B-basis tensile properties at room temperature for the plate product up to 1 inch in thickness (depending on whether the data can be described by a Weibull or Pearson distribution), but there is insufficient elevated temperature data to perform such an analysis. On that basis the item has been closed. If further interest in this material is identified and additional data are supplied, a new item will be opened to cover the incorporation of this material into MIL-HDBK-5.

Action: Item closed, no action.

No Item No.     **Addition of Stress-Strain Curves for Haynes 230 Plate. (MTG)** R. Rice reviewed this brief agenda item.

Action: Assigned item number 02-17. Item approved and closed with correction to strain axis title as shown in enclosed figure.

**CHAPTER 7. MISCELLANEOUS ALLOYS AND HYBRID MATERIALS**

Item 02-11     **Full Range Stress Strain Curves for 2024-T3/Aramid Fiber Laminate. (MTG)**  
R. Rice presented this informational item. He indicated that no action by the coordination group was necessary on this item since the corrections to Figures 7.5.1.1.6 (i)-(l) were included in Change Notice 1.

Action: Item approved and closed. Editorial corrections made in MIL-HDBK-5H, Change Notice 1.

No Item No.     **Recent Design Allowables Development Efforts on 6092 Metal Matrix Composites. (MTG)** M. van den Bergh, DWA Aluminum Composites, gave a brief presentation. A copy of his presentation is enclosed.

Action: Item closed with no action.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

**CHAPTER 8. STRUCTURAL JOINTS**

Item 99-13      **Addition of Brazing Strength Design Factors. (FTG)** N. Ontko indicated that, at present, there were too many variables associated with the use of brazed joints in aircraft structures to develop reliable statistical minimum properties in MIL-HDBK-5.

Action: Item closed with no action.

Item 01-17      **Addition of Section 8.1.1.2 Data Sources. (FTG)** N. Ontko indicated that the FTG had approved the following modified form of the proposed cautionary wording:

**“Warning: Caution should be exercised to ensure that use of static joint strength data is applicable only for the data producer(s) indicated by the footnote on each table.”**

Action: The above cautionary statement was approved on a 60-day basis (The item will be considered approved if no negative comments are received within 60 days of distribution of the meeting minutes. If negative technical comments are received within this time period the item will be held open for further review at the next coordination meeting.)

No Item No.      **Fastener Task Group. (FTG)** As the acting chair of the Fastener Task Group, N. Ontko led discussions at the Fastener Task Group meeting. He indicated that the primary focus of discussions was on the new proposed statistical procedure for the analysis of fastened joints (see Item 99-27). Since this discussion was not fastener-system specific and was also of interest to fastener industry representatives who attended, the FTG and FIWG chose to meet together for the duration of their meetings on April 24<sup>th</sup>.

Action: Item continued.

No Item No.      **Fastener Industry Working Group. (FIWG)** As noted in the above FTG item summary, the Fastener Industry Working Group met with the Fastener Task Group all day on Wednesday, April 24<sup>th</sup>. During these joint meetings the primary focus of discussion was on the proposed new analytical methods for developing fastener design allowables.

Action: Item continued.

Item 02-12      **Update of Fastener Index and Editorial Correction of Fastener Summary Tables. (FTG)** N. Ontko indicated there was not significant controversy within the FTG or FIWG with regard to this agenda item.

Action: Editorial corrections approved. Item closed.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

Item 02-13      **Correction to Yield Strength Value in Table 8.1.3.2.1(f) Covering Design Allowables for MS20601AD Rivets. (FTG)** N. Ontko briefly reviewed this editorial item.

Action: Item approved and closed.

No Item No.      **Reconsideration of Item 97-9. Static Joint Strength of HC3214 Blind Flush Head Rivets in Clad 2024 Sheet. (FTG)** N. Ontko indicated that design allowables for HC3214 blind rivets were approved several meetings ago, as noted on page 200 of the 95<sup>th</sup> meeting minutes, but the new fastener table was inadvertently omitted from Change Notice 1 of Revision H.

Action: Assigned item number 02-20. Item approved and closed. Table will be included in MIL-HDBK-5J and MMPDS.

**CHAPTER 9. GUIDELINES FOR THE PRESENTATION OF DATA**

Item 94-26      **Production Methods and Their Impact on Design Allowables. (GTG)** R. Rice led the discussion on this long-standing item. Applicable statistical procedures have been developed by the SWG for evaluating whether a change in production methods has had an impact on a material's design allowables, as documented in prior meeting minutes under this item. However, several important engineering issues have not yet been resolved, including – 1) what constitutes a potentially significant processing change from an engineering perspective, and 2) what actions should be taken if a processing change is found to have a probable impact on design allowables. R. Rice requested that the Airframer Steering Group address this issue. J.T. Amin, Lockheed, agreed to coordinate this issue with the ASG membership.

Action: Item continued. The ASG will review the engineering issues associated with Item 94-26 and bring their recommendations for guideline changes to the GTG at the next coordination meeting.

Item 98-3      **Procedure for Analyzing Lower Tail Censoring. (SWG)** H. Tsai, Battelle, reviewed a handout on this item at the SWG meeting. She described the status of current statistical procedures development work and described plans for preparation of a guideline proposal for review at the 2<sup>nd</sup> MMPDS coordination meeting.

Action: Item continued.

Item 98-7      **Complete Restructuring of Chapter 9 Guidelines to Improve Usability. (GTG)** R. Rice reviewed this agenda item. He requested all reviewer comments be sent to him by August 1, 2002, so that a final draft of Chapter 9 can be prepared and distributed several months in advance of the 2<sup>nd</sup> MMPDS coordination meeting.

## MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5 COORDINATION MEETING

As mentioned in the meeting agenda, the draft guidelines may be downloaded as a pdf file from a public FTP site as Chapter9revised.pdf. The following protocol should be used to access the following FTP site: [ftp 131.167.253.4](ftp://131.167.253.4) . The username to enter is: mil-hbk5 , and the password is 99ftp008 . The pdf file is located in Projects/Folder006. Use the get command to transfer the file.

Alternatively, a hard copy may be requested from R. Rice at Battelle.

Action: Continued for fall approval. Volunteer reviewers are to submit suggested changes by 8/1/02.

Item 99-27

**Revised Analytical Techniques for Analysis of Fastened Joints. (FIWG) R.** Rice, R. Yano, Battelle, and S. Ford, Tec Con, Inc., reviewed a handout covering the status of the proposed new statistical procedure for analyzing fastened joints. Extensive discussion of the proposal took place. It was agreed that B-basis ultimate strength values should be computed as part of this procedure. However, a consensus was not reached regarding whether B-basis or 95% confidence mean yield strength values should be computed with this new procedure. Battelle was asked to perform supplemental calculations on the fastener systems included in the current Item 99-27 handout to demonstrate the performance of a potential alternative regression model and to construct 95% confidence mean yield strength curves.

Action: Item continued. Goal is to obtain approval of this item at Fall meeting.

Item 00-13

**Rewrite of Section 9.4 Properties of Joints and Structures. (FTG) N.** Ontko presented a status report on this item. It was noted that this item is closely linked with Items 98-07 and 99-27, because the revised version of Section 9.4, must be incorporated into the restructured Handbook guidelines, and include the revised analytical technique for analyzing fastened joints.

Action: Item continued. Guideline proposal to be prepared for fall meeting.

Item 01-01

**Regression for Skewed Data. (SWG) H.** Tsai reviewed this agenda item at the SWG meeting. She noted that this item covers the development of a statistical procedure for analyzing skewed data that also display a significant effect of thickness on strength. She detailed plans for refining, validating and implementing the new procedure.

Action: Item continued.

Item 01-02

**Proposal to Change Backoff Limit to Percentage of Standard Deviation in the Sequential Weibull and Sequential Pearson Procedures. (SWG) H.** Tsai reviewed this brief agenda item at the SWG meeting. It was agreed that a guideline proposal should be prepared on this issue for review at the fall coordination meeting.

Action: Item continued.

**MINUTES OF THE 1<sup>st</sup> MMPDS AND 101<sup>st</sup> MIL-HDBK-5  
COORDINATION MEETING**

Item 01-04     **Reevaluation of Statistical Procedures for Calculation of S-Basis Design Values. (SWG)** R. Rice and H. Tsai reviewed a handout on this item at the SWG meeting. R. Rice noted that this item was created to address the limitations of the normal analysis procedures currently used by SAE/AMS to compute S-basis design values. They reviewed a draft statistical procedure, based on the Pearson distribution, that they believe the MIL-HDBK-5 coordination group should work to have adopted by SAE/AMS. P. Brouwer and J. Jackson agreed to work together on gaining AMS approval of the new procedure. Assuming that AMS eventually adopts some form of this new procedure, it will be used to propose an update to Section 9.1.6.8 of MIL-HDBK-5 (see Item 01-05).

Action: Item continued. General procedure approved, however, small sample k factors must still be verified.

Item 01-05     **Revise Section 9.1.6.8 in Coordination with SAE/AMS. (GTG)** J. Jackson briefly commented on this new item, which was established to cover the modification of Section 9.1.6.8 of MIL-HDBK-5, “Guideline Requirements for Specification Minimum Design Mechanical Properties”. Development of the proposed new procedure and its coordination with the SAE/AMS committee is being covered under Item 01-04. A formal proposal for revision of Section 9.1.6.8 of the Handbook will await approval of the Item 01-04 statistical procedures by the SAE/AMS committee.

Action: Item continued.

Item 01-06     **Historical Review of MIL-HDBK-5 Round-off Procedures. (GTG)** J. Jackson led the discussion on this item. It was agreed that a guideline proposal to change the traditional MIL-HDBK-5 round-off procedure to the ASTM standard procedure should be prepared for review at the fall meeting.

Action: Item continued.

No Item No.    **Testing Direction for Die Forging (MTG).** – R. Rice reviewed this brief editorial item.

Action: Assign item number 02-18. Item approved and closed.

No Item No.    **Define Lower Bound Properties for Elongation (SWG)** – R. Rice reviewed a handout on this item. It was agreed that improved methods for defining S-basis elongation values would be very useful. However, it was also agreed that there should not be a change in the long-standing policy to report only S-basis design values in MIL-HDBK-5. R. Rice assured ISG members that any changes approved by the MIL-HDBK-5 committee for calculation of more realistic S-basis minimum elongation values would be incorporated into the ISG statistical analysis software.

Action: Item continued for further discussion.