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THERMOPHYSICAL PROPERTIES OF SOME CANDIDATE SUPERORBITAL HEAT SHIELD AND INSULATION MATERIALS

Prepared By
Materials Applications Division
AF Materials Laboratory
Deputy Cmdr/Research & Engineering

6 June 1963

Task 738103

Aeronautical Systems Division
Air Force Systems Command
United States Air Force
Wright-Patterson Air Force Base, Ohio
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I. PURPOSE:

The purpose of this memorandum is to present a concise summary of the most useful thermophysical properties of some candidate heat shield materials for the thermal protection of superorbital lift reentry vehicles.

II. FACTUAL DATA

1. The following materials properties reports and compendia were searched for pertinent data:

   (a) WADC TR58-476
   (b) ASD TR62-215
   (c) TPRC Data Book Vol. 1, 2, & 3
   (d) DMIC Memo 141
   (e) WADC TR57-476
   (f) ASD TR62-765
   (g) DMIC Memo 177

III. CONCLUSIONS

1. The data sheets (Appendix I) constitute Information Processing Section's first compilation in this specific area, and it is intended to be the most complete summary of the data in published unclassified reports and data compendia.

2. In evaluating the reliability of the data, we suggest that the source reference be noted and that they have the following order, the most reliable first:

   (a) TPRC Data Book
   (b) DMIC Memo 141 & 177
   (c) ASD & WADC Technical Reports

3. The emissivity data, while the best available, is probably the least reliable of the data presented.

IV. RECOMMENDATIONS:

It is recommended that this initial review be continued and updated as may be warranted by the availability of new and/or more refined data.
COORDINATION: PREPARED BY:

Edward Dugger, ASRCE-31

John H. Charlesworth, ASRCE-31

PUBLICATION REVIEW

This report has been reviewed and is approved.

D. A. Shin
Chief, Materials Information Branch
Materials Applications Division
AF Materials Laboratory

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ASRCE TM-63-16 2
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<th>Bending (MPa)</th>
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<th>Ductility</th>
<th>Elongation %</th>
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Notes: Indicated are materials from TPE.
Values in parenthesis ( ) from TPE.
Values in parenthesis [ ] from TPE.

*Compilation of Material Data from TPE.*

(Continued...)