FIRE RESISTANT AIRCRAFT SEAT MATERIALS

ABSTRACT

This presentation reviews the earlier Phase I program which was oriented toward establishment of a technical data base for individual seat materials in order to facilitate materials selection.

The main focus is on the current follow-on Phase II program. This program examines the thermal response of multi-layer constructions representative of the basic functional layers of a typical future seat. These functional layers include (1) decorative fabric cover, (2) slip sheet (topper), (3) fire blocking layer, (4) cushion reinforcement, and (5) cushioning layer.

The status of the current test program and test results are reported. The implications for material selection for full-scale seats are discussed.
FIRE RESISTANT AIRCRAFT SEAT MATERIALS

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MATERIAL TEST CRITERIA FOR PROGRAM INCORPORATION

1. TEST QUANTITIES MUST BE AVAILABLE FOR PHASE I TESTING BEFORE 1 APRIL 1977

2. QUANTITIES MUST BE AVAILABLE FOR FULL-SCALE SEAT FABRICATION 1 OCTOBER 1977

3. MATERIALS MUST BE COMMERCIALY AVAILABLE BY 1980

4. MATERIALS MUST WITHSTAND ENVIRONMENT OF -40°F TO 180°F
FUTURE SEAT COMPONENTS

- DECORATIVE FABRIC COVER
- SLIP SHEET (TOPPER)
- FIRE BLOCKING LAYER
- CUSHION REINFORCEMENT
- CUSHIONING LAYER

SELECTION BASIS
- JUDGEMENT SELECTION
- ABRASION TESTS
- HEAT RELEASE RATE TESTING

NOTE: SOME COMPONENTS MAY NOT BE INCLUDED IN ALL DESIGNS
HEAT RELEASE RATE TESTING

PART 1  STANDARD CUSHION LAYER OF GLASS BLOCKING WITH VARIOUS UPPER LAYERS

PART 2  SELECTED UPPER LAYERS FROM PART 1 WITH VARIOUS CUSHION LAYERS
PART 1. HRR AT 3.5 W/cm²

ML SPECIMEN: 8
- TC #3
- 20787 KERMEL WOOL BLEND (101)
- SLIP COVER NOMEX III (214)
- ADHESIVE: R2332 N/F
- FIRE BLOCK: 400-11 DURETTE BATT (216)
- TC #2
- REINFORCEMENT: NOMEX III
- ADHESIVE: R2332 N/F
- TC #1
- CUSHION: GLASS BLOCK (FG215)

ML SPECIMEN: 5
- TC #3
- 20787 KERMEL WOOL BLEND (101)
- FIRE BLOCK: VONAR 3 (210)
- TC #2
- REINFORCEMENT: NOMEX III (214)
- TC #1
- ADHESIVE: R2332 N/F
- CUSHION: GLASS FIBER BLOCK (FG215)
PART 1  HRR-MULTILAYER SPECIMENS - 3.5 W/CM²
PART 2. HRR AT 3.5 W/cm²

ML SPECIMEN: 12
- TC#3
20787 KERVEL WOOL BLEND (101)
SLIP COVER NOMEX III (214)
ADHESIVE: R2332 N/F
FIRE BLOCK: 400-II DURETT BATT (216)
REINFORCEMENT: NOMEX III
ADHESIVE: R2332 N/F
CUSHION: N. 200 POLYIMIDE FOAM

1 - 12
1 - 18
1 - 10 BASELINE
EXCEPT 1/2'' t

ML SPECIMEN: 18
- TC#3
20787 KERVEL WOOL BLEND (101)
FIRE BLOCK: VONAR 3
REINFORCEMENT: NOMEX III
ADHESIVE: R2332 N/F
CUSHION: 9FR618 SILICONE FOAM (309)
PART 2  HRR - MULTILAYER SPECIMENS - 3.5 W/CM²
DISCUSSION

1. MATERIAL PROPERTIES USED IN DETERMINING SELECTION CANNOT BE INDEPENDENT OF END USE

2. TWO IMPORTANT ASPECTS OF HEAT RELEASE MUST BE CONSIDERED
   a. EARLY RATE OF RELEASE
   b. TOTAL HEAT RELEASED

3. CONDITIONS OF TEST ASSUMED IN FLIGHT FIRE WITH CONDITIONS OF EXCESS OXYGEN

4. NEW MATERIALS WITH FUTURE SIGNIFICANCE
   POLYPHOSPHAZENE FOAM
   POLYIMIDE FOAM
   HEAT STABILIZED PBI FABRIC