

## 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.

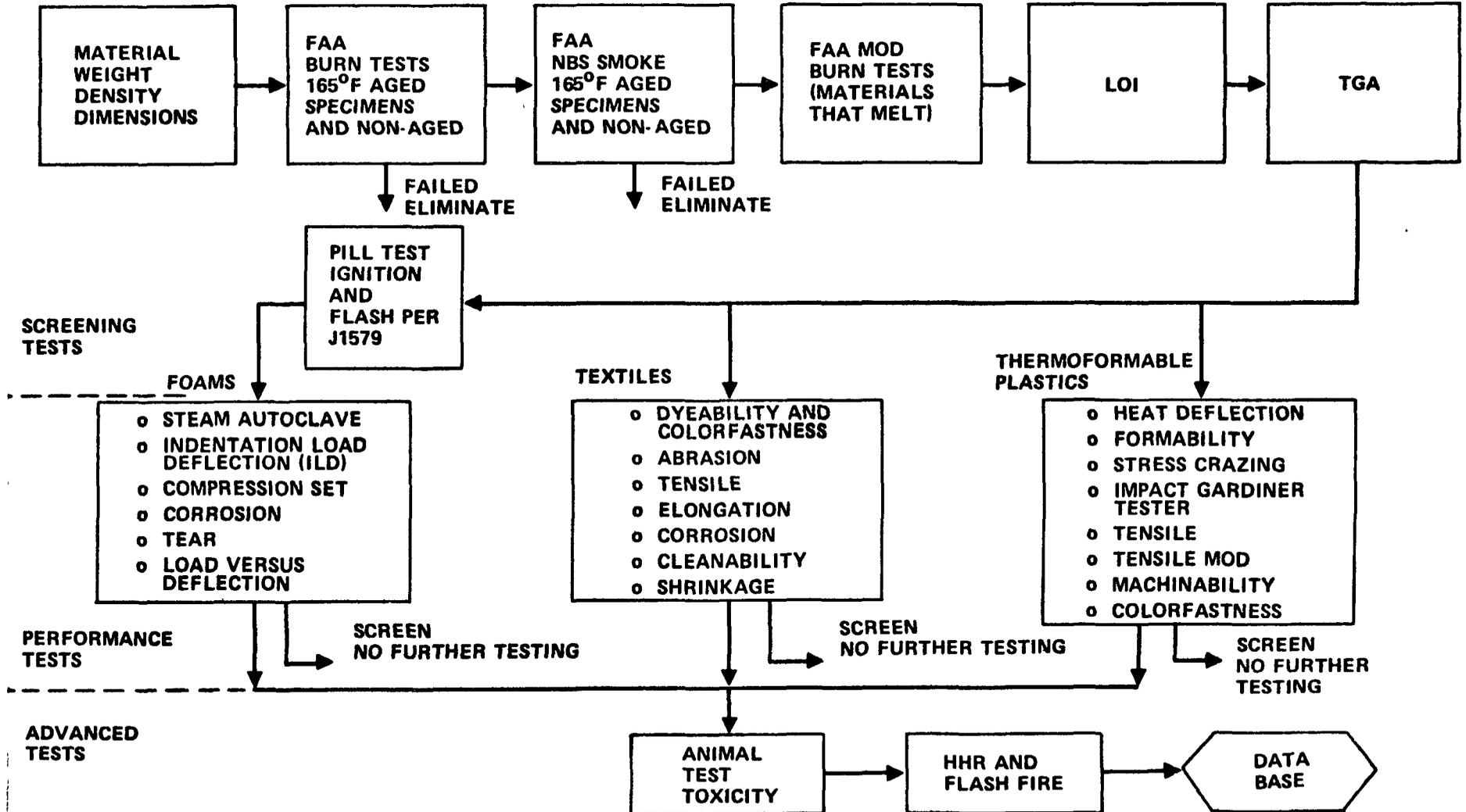
The status of the current test program and test results are reported. The implications for material selection for full-scale seats are discussed.

# **FIRE RESISTANT AIRCRAFT SEAT MATERIALS**

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# PHASE I MATERIAL TEST PROGRAM

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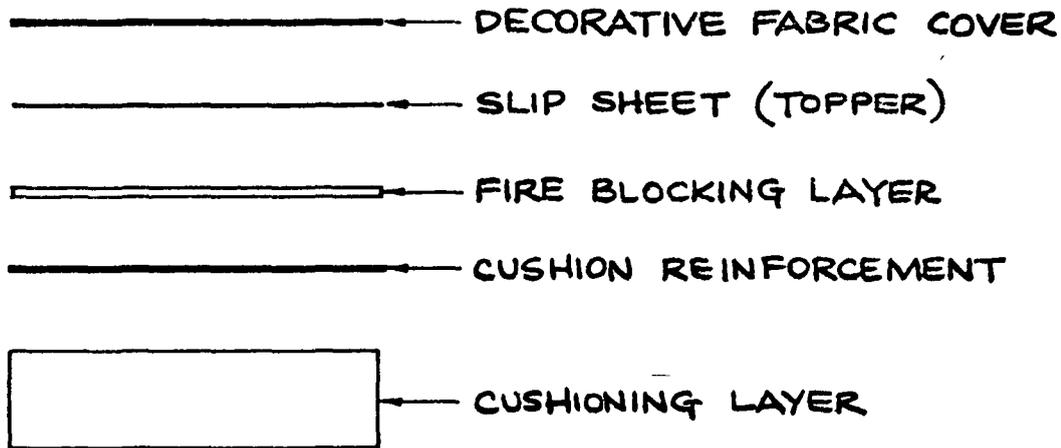


## **MATERIAL TEST CRITERIA FOR PROGRAM INCORPORATION**

- 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

426



SELECTION BASIS  
JUDGEMENT SELECTION  
ABRASION TESTS  
HEAT RELEASE RATE TESTING

NOTE: SOME COMPONENTS MAY NOT BE INCLUDED IN ALL DESIGNS

# HEAT RELEASE RATE TESTING

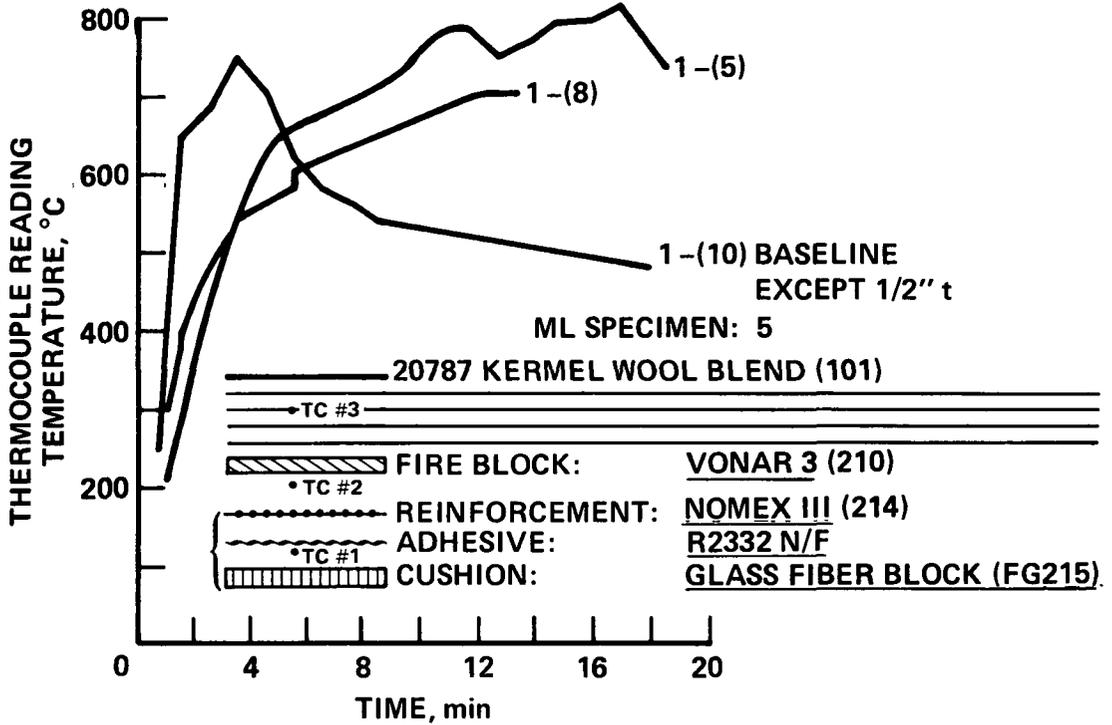
PART 1 STANDARD CUSHION LAYER OF GLASS  
BLOCKING WITH VARIOUS UPPER  
LAYERS

427 PART 2 SELECTED UPPER LAYERS FROM  
PART 1 WITH VARIOUS CUSHION  
LAYERS

# PART 1. HRR AT 3.5 W/cm<sup>2</sup>

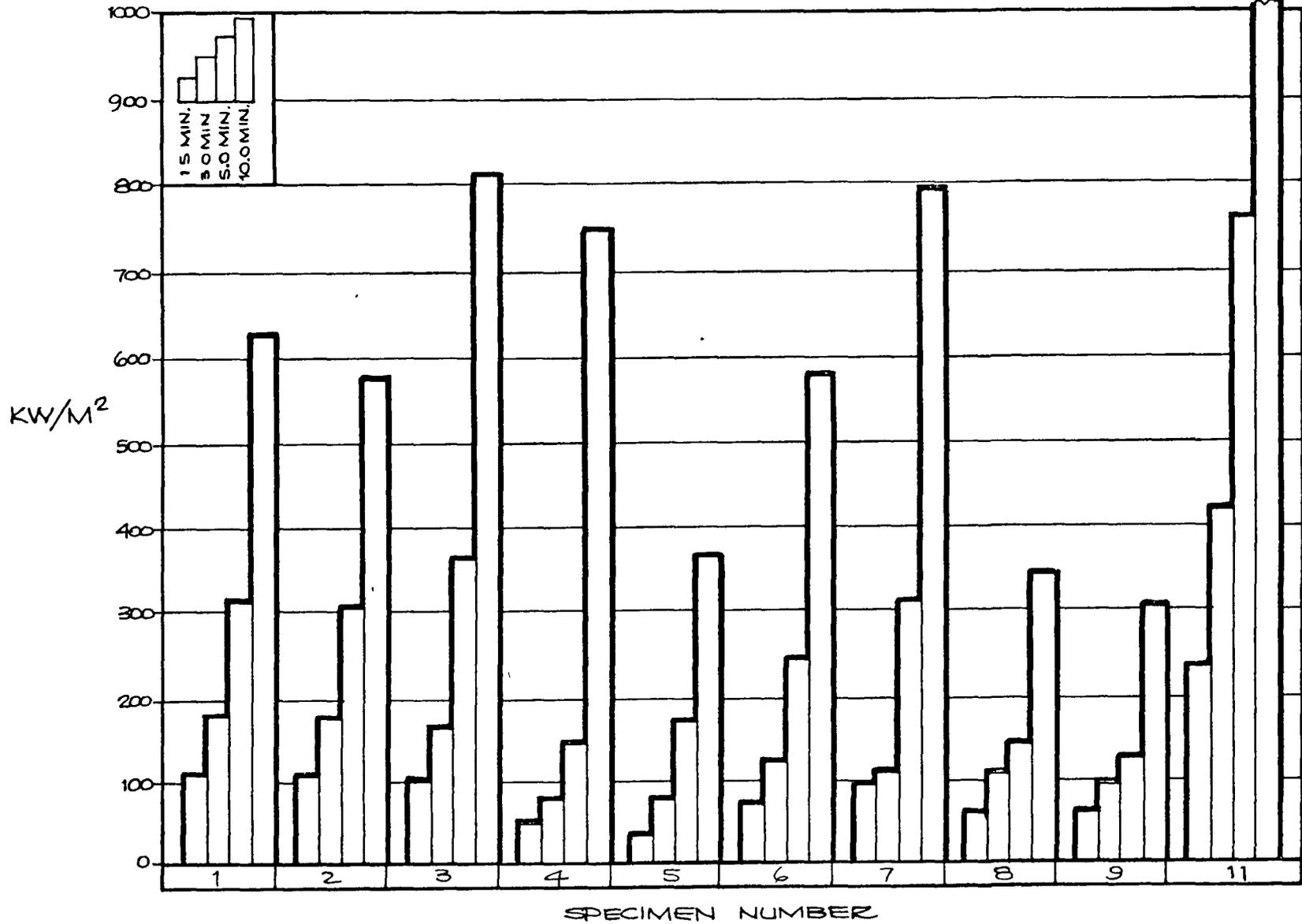
ML SPECIMEN: 8

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

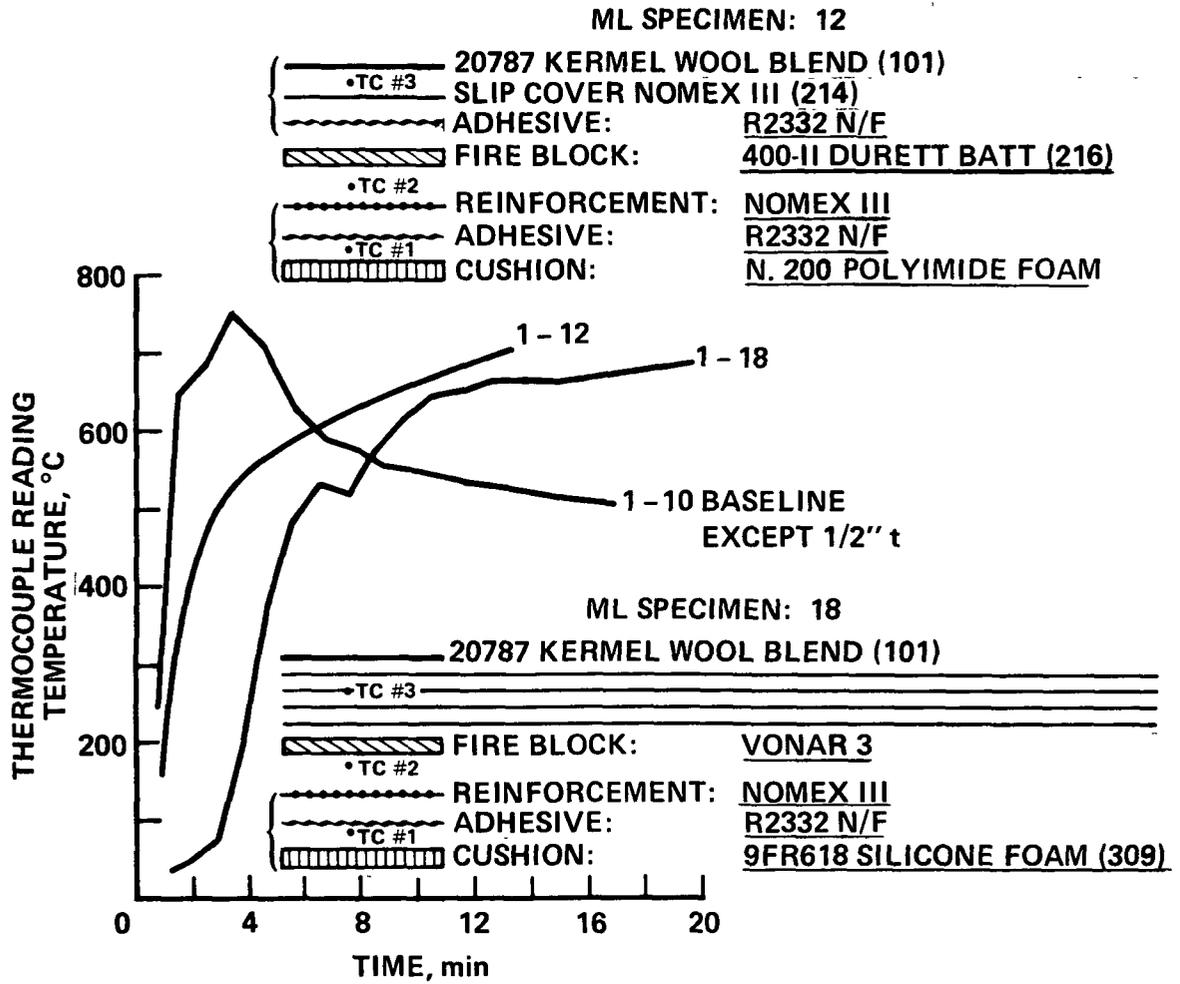


# PART 1 HRR-MULTILAYER SPECIMENS - 3.5 W/CM<sup>2</sup>

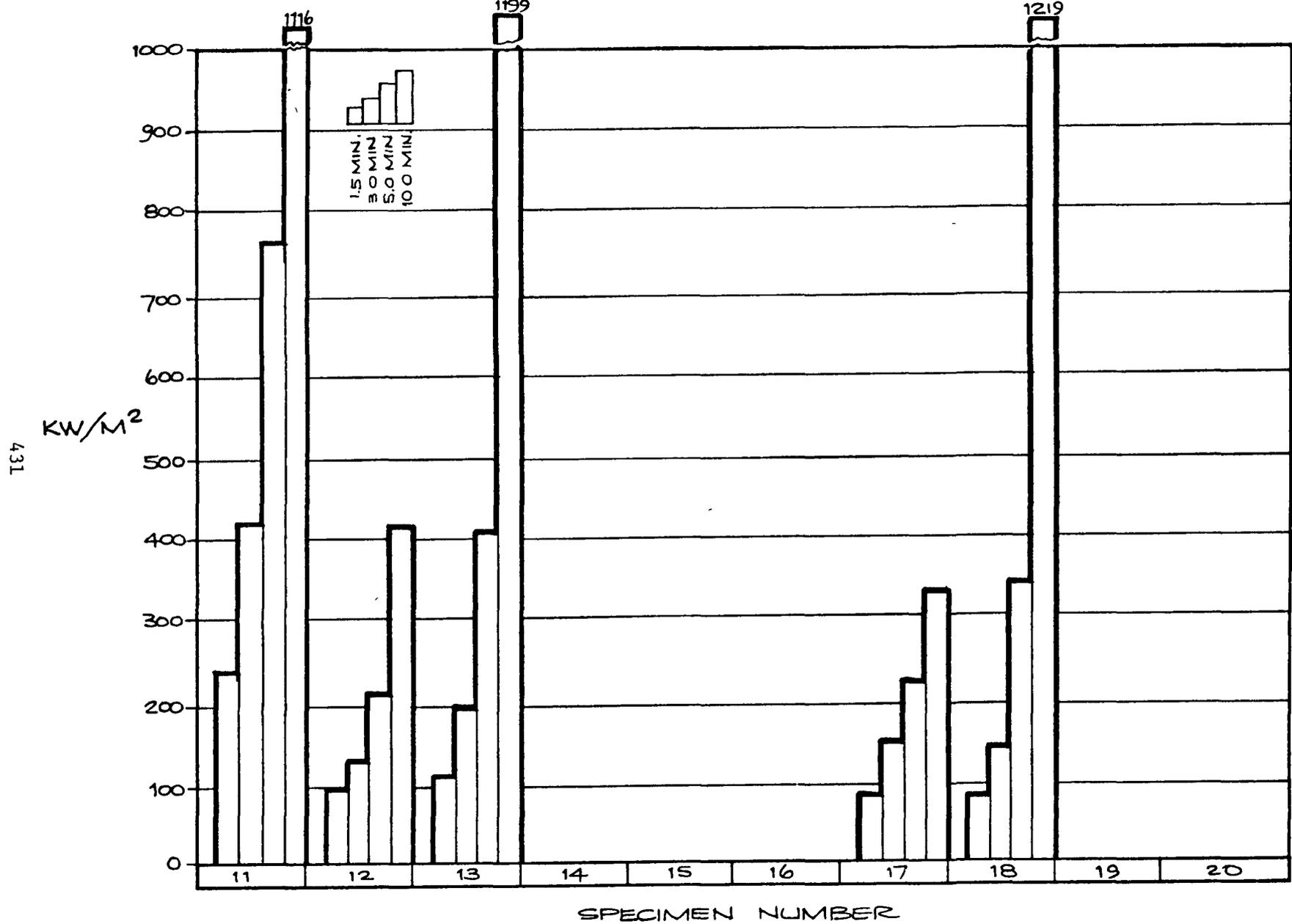
429



## PART 2. HRR AT 3.5 W/cm<sup>2</sup>



# PART 2 HRR-MULTILAYER SPECIMENS - 3.5 W/CM<sup>2</sup>



# 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