APPENDIX

Suspension Line Temperatures

From an analysis performed by the thermodynamics group, the peak temperature predicted on the suspension line was 340°F. This temperature is for an ejection at 3.2 Mach at 95,000 ft. where the peak horizontal ribbon temperature is 590°F. While no data could be found for temperature exposures of a few seconds which exist in this application, the strength of nylon shown below is for temperature exposures of five to ten minutes. It should be noted that the peak drogue load and peak temperature do not coincide.

Ejection At		1.4 Mach 450 KEAS 36,500 ft.	[redacted] 450 KEAS 69,300 ft.	[redacted] 5X1 5X1
Peak Temperature	Horizontal Ribbon Suspension Line	Low Low	500°F 300°F	590°F 340°F
Suspension Line Total Limit Load	Maximum At Peak Temperature	9,650 lb. 9,650 lb.	4,100 lb. 2,600 lb.	1,200 lb. 1,100 lb.
Nylon Suspension Line Total Strength at Peak Temperature *		16,000 lb.	8,700 lb.	7,600 lb.
Limit Margin of Safety ($\frac{P_{allow}}{P}$ - 1)		.66	2.45	5.90

Since the critical condition on the suspension lines occurs for an ejection at 1.4 Mach where the temperature is low, the use of HT-1 (Nomex) would not produce a stronger suspension system for this critical condition.

There are three advantages that regular nylon has over HT-1:

1. Equivalent HT-1 suspension lines would have about 25% more bulk and would cause packing problems.
2. Nylon has greater energy absorption characteristics since HT-1 has about 75% of the elongation of nylon.
3. HT-1 costs six to seven times as much as regular nylon.

* Allowable strength figures are based on ratios derived from Fig. 18 of Part II for nylon shroud cord MIL-C-5040, Type III from the following reference.

Coplan, M. J. and Singer, E., A Study of the Effect of Temperatures on Textile Materials, Part I, March 1953, and Part II, July 1953, WADC-TR 53-21, Part I and Part II.