

MECHANICAL PROPERTIES TEST

H. D. Johnson

DEVELOPMENT DIVISION

JULY - SEPTEMBER 1971

Normal Process Development
Endeavor No. 239

MASTER

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The project during this period was a study to determine if differences in physical properties can be observed between tensile specimens fabricated from 1.5-inch square sticks and 1.375-inch diameter cored blanks when subjected to creep testing.

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ABSTRACT

Two HE tensile specimen fabrication techniques (saw-cut sticks versus cored sticks) were used. Differences in tensile creep results were not large.

DISCUSSION

Two pressings of LX-09-0 were made (by Manufacturing Division). From one, tensile specimens were made using a saw-cut fabrication technique; and from the other pressing, specimens were made using a coring fabrication technique. The saw-cut tensile specimens (see Table I) were fabricated by Manufacturing Division at Pantex and tested at LLL; the cored tensile specimens were fabricated and tested by Development Division at Pantex.

Tensile specimens were creep tested at 120 F and 20 psi on a 5-channel creep frame. The results of the creep tests are shown in Tables I and II. The cored tensile specimens show an 18% greater strain at failure; however, this increase is only about 3% above one standard deviation at failure.

CONCLUSIONS AND RECOMMENDATIONS

Since both time and strain at failure differ between groups by only a little more than one standard deviation, it can be concluded that the significant differences are not large, and probably not significant. Since there is a possibility that differences in tensile creep results may be due to fabrication techniques, further studies should be made if this factor or the results are of sufficient interest.

TABLE II. Tensile Creep Data From Cored Blanks Tested
at 120° F and 20 psi

Piece No.	Rupture Mode Location	Failure		Time to Rupture (hrs.)
		Strain (min/in)	Time (hrs.)	
509-06-1	6	2930	0.456	0.485
509-06-6	6	3765	0.528	0.585
509-06-8	2	4235	0.559	0.696
509-06-22	2	3860	0.650	0.650
Mean		3697.5	0.5482	0.604
Std. Dev.		476.68	0.0696	0.079