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TATB PBX FORMULATION
(EVALUATION OF HOLSTON PROCESS)

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DEVELOPMENT DIVISION

MARCH 1977

Process Development
Endeavor No. 106

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ABSTRACT

Three Holston lots of TATB PBX were tested for physical strength. Two of the lots were LASL X-0290 (5% Kel-F) which used standard aminated TATB while the third lot was made from wet aminated TATB at the 7.5% Kel-F composition. Tensile stress of the wet aminated batch was low. The standard aminated X-0290 lots had acceptable stress and strain.

Three other lots of PBX made at Pantex using the Holston process with standard aminated TATB were also tested for physical strength.

INTRODUCTION

The programatic requirements for TATB PBX will be met by Holston; therefore, it is necessary for Holston produced PBX to have adequate physical strength. Pantex has been involved in the transfer of processing technology to Holston and the evaluation of their material and processing methods.

HOLSTON PROCEDURE

The Holston and Pantex processing methods differ as to solvent systems and methods to achieve granulation. The solvent used by Holston is ethyl acetate, which has a reasonably high solubility in water. Basically, a slurry is formed at a low water level with TATB and the lacquer; then the granules are formed by quenching or by adding water to extract sufficient solvent to cause the granules to form. After an annealing period to solidify the granules, the solvent is stripped by distillation.

EVALUATION OF PBX MADE AT HOLSTON

Tensile strength data for the three lots made at Holston are given in Fig. 1. A curve for a Pantex produced lot, B-14, is included for comparison. Also additional physical properties information are given in Table I.

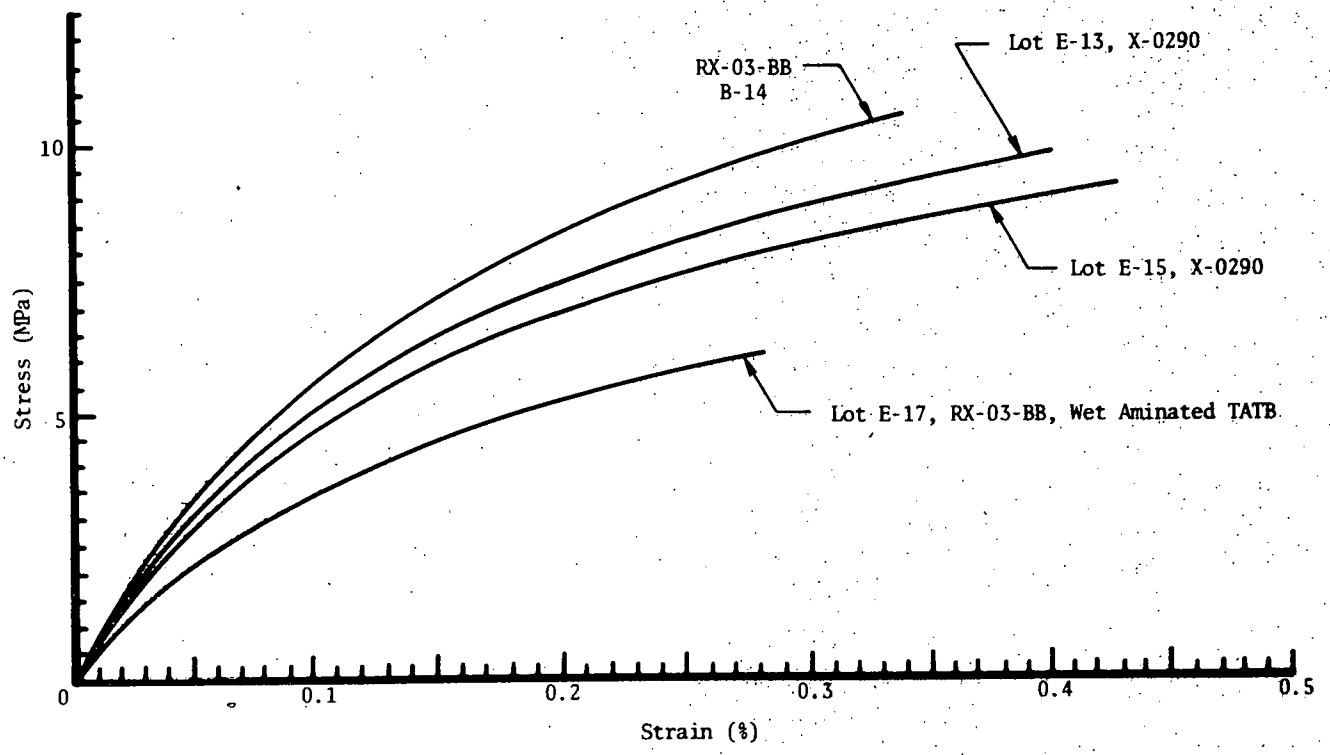

Fig. 1. Holston Made PBX (Tensile Strength)

Table I. Evaluation of PBX Made at Holston

Type		Nominal %		Lot	Lot or Batch		Tensile		Compression		
LASL	LLL	Kel-F	TATB	I.D.	Size	Billet Density	Stress (MPa)	Strain (%)	Stress (MPa)	Maximum Strain (%)	Ultimate Strain (%)
X-0290	RX-03-AU	5	Dry A	E 13	25 lbs	1.898	9.72	0.40	23.44	2.50	4.68
X-0290	RX-03-AU	5	Dry A	E 15	250 lbs	1.889	9.20	0.43	22.88	2.58	6.36
						1.891*	8.96*	0.43*	22.37*	2.70*	5.96*
	RX-03-BB	7.5	Wet A	E 17	25 lbs	1.913	6.19	0.29	18.24	2.03	6.83
						1.910*	6.17*	0.23*	16.81*	2.03*	8.36*

**Duplicate pressing and test*

These preliminary physical properties results indicate that the PBX made from standard aminated TATB has acceptable strength. The strength of the PBX made from wet aminated TATB, however, was too low to be useful.

EVALUATION OF HOLSTON PROCESS

Three large batches of TATB PBX (two RX-03-BB and one X-0290) were made at Pantex from standard aminated TATB in the 300-gallon kettle by the Holston processing method. Tensile strength curves are given in Fig. 2 and additional information shown in Table II. Results appear to be satisfactory.

CONCLUSION

Preliminary results indicate that the Holston process for making PBX yields material with acceptable physical properties with standard aminated TATB but not with wet aminated material.

An additional series of batches representing approximately 2000 pounds of X-0290 has been received from Holston. Also included is a small 25-pound lot of RX-03-BB. Physical properties will be measured for these batches.

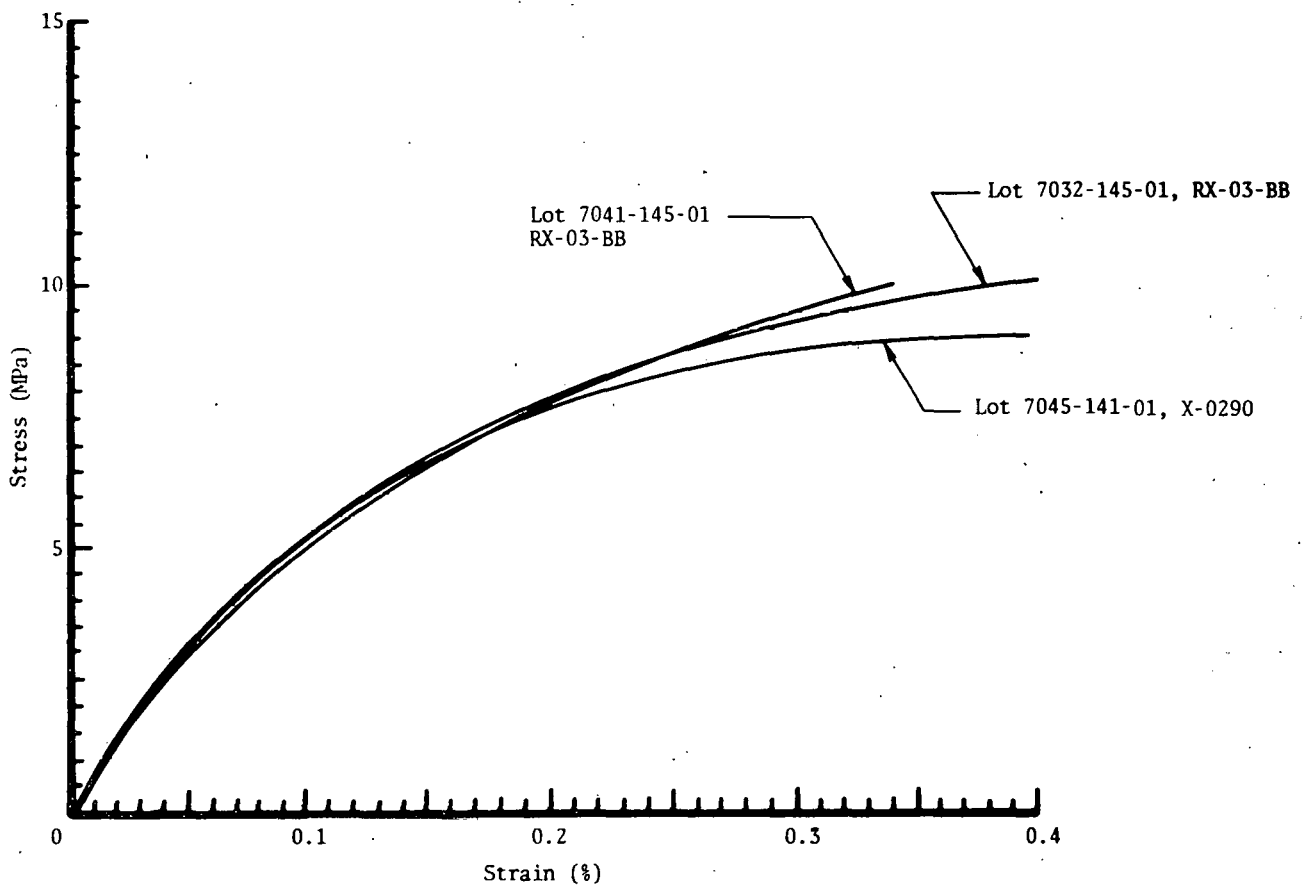

Fig. 2. Holston Process Method (Tensile Strength)

Table II. Evaluation of Holston Ethyl Acetate Process - 300 Gallon Kettle - PBX Model at Pantex

Material Identification	Type	Specimen Density	Tensile		Compression		
			Stress (MPa)	Strain (%)	Stress (MPa)	Maximum Strain (%)	Ultimate Strain (%)
7041-145-01	RX-03-BB	1.897	9.80	0.34	22.74	2.09	7.14
7045-141-01	X-0290	1.891	8.87	0.40	22.77	2.00	4.67
7032-145-01	RX-03-BB	1.907	10.60	0.40	22.29	2.43	5.96