MASTER

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STABILITY OF DENSITY IN SMALL PRESSINGS
OF LX-14

J. D. Harrell

DEVELOPMENT DIVISION

JULY - SEPTEMBER 1975

Normal Process Development
Endeavor No. 105

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ABSTRACT

Bartherm is an ancillary pressing process that can be used to increase and equalize the as-pressed density of PBX parts. The process is relatively new and it was not known if the induced density changes were permanent. Small parts that were processed by the bartherm technique have not experienced a change of density in approximately one and one-half years of observation and the density increase appears to be permanent.

DISCUSSION

The bartherm process confines a prepressed PBX part in a suitable fluid and is maintained, or cycled, at specific conditions of pressure (1.7 MPa) and temperature (74 C) for periods of several days. A detailed description of the process is given in the January - March 1975 MHSMP-75-20F report. This study presents the densities observed since that time.

The bartherm treatment of the parts under observation consisted of various heat inputs during a 7-day period while holding at a constant pressure of 1.7 MPa. The parts receiving the least total heat input are described in Table I as Relative Heat No. 1. The other parts received a greater total heat input which increased to a constant 74 C during the 7-day confinement (Relative Heat No. 4).

Each value quoted in Table I is an average of seven or eight pieces. The physical dimensions of each piece have been measured and recorded at the same time the densities were measured. The dimensions will serve as backup information if a discrepancy occurred in the density data. Such has not happened and the physical dimension data are repeating, although not as accurately as the density information.

A portion of Table I is enclosed in a dotted line to indicate the uniformity of these data. The original, or before bartherming, data have a much larger value of standard deviation. In each case the standard deviation decreased to approximately one-third of its original value.

CONCLUSIONS

The density increase due to the bartherm process has been measured and observed for 14 to 16 months. The final density produced by the bartherm process has remained constant during this time and should be considered to be a permanent change.

Bartherm pressures in the range of 5 to 9 MPa should be investigated, as should massive pressings, in the range of 136 kg.

Table I. Long-Term Density: LX-14 Pressings

	Relative Heat No. 1	Relative Heat No. 2	Relative Heat No. 3	Relative Heat No. 4
<u>As-Pressed</u>	1.827 Mg/m ³	1.826 Mg/m ³	1.830 Mg/m ³	1.825 Mg/m ³
% TMD	98.7%	98.7%	98.9%	98.6%
Sigma	0.0019	0.0020	0.0022	0.0018
<u>Barthermed</u>	1.838 Mg/m ³	1.842 Mg/m ³	1.841 Mg/m ³	1.842 Mg/m ³
% TMD	99.4%	99.6%	99.5%	99.6%
Sigma	0.0006	0.0007	0.0007	0.0005
<u>Stored 6 - 8 Mos.</u>	1.837 Mg/m ³	1.842 Mg/m ³	1.841 Mg/m ³	1.842 Mg/m ³
% TMD	99.3%	99.6%	99.5%	99.6%
Sigma	0.0005	0.0005	0.0008	0.0005
<u>Stored 14 - 16 Mos.</u>	1.837 Mg/m ³	1.846 Mg/m ³	1.842 Mg/m ³	1.842 Mg/m ³
% TMD	99.3%	99.6%	99.6%	99.6%
Sigma	0.0005	0.0006	0.0008	0.0007