MATERIALS ENGINEERING LABORATORY
FINAL REPORT, LF-8 AND LF-9
SUPPORT PAD FABRICATION

<u>Order Number</u>	<u>LASL Engineer</u>
CM6-32709-1	R. B. Ferrell

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INTRODUCTION

This project was for the fabrication of 50 LF-8 and LF-9 support pads (holder assemblies) and covered the period July 1, 1976 through October 30, 1976. The initial starting point for this project was the support pad ("clamshell") illustrated in Figure 4 of Final Report GEPP-253, Materials Engineering Laboratory, September 1976. As progress was made in coordinating all of the piece parts going into the assembly, modification of the support pad was also required. To clarify the impact of this evolution on GEND development efforts for the support pad, the program is divided into three categories: (1) mold fabrication, (2) support pad fabrication and (3) capability studies.

MOLD FABRICATION

The old mold design for the support pad is shown in Figure 1. One of the major problems encountered in its utilization was the difficulty in pouring the thick mix into the mold, which generated excessive voids in the piece part. The design revision necessitated the fabrication of new molds, and, as part of the design revision, improved means of pouring were also explored. The final result was the elimination of all inserts but the essential support pad shapes and a wide open pouring area. This is illustrated in Figure 2. The resulting sprues were removed by a simple milling operation.

7687-2

Figure 1. Final Mold Design Utilized for
ICO CM6-23383-1

76143-1

Figure 2. Final Mold Design Evolved for the
Fabrication Latest Support Pad Configuration

SUPPORT PAD FABRICATION

The various stages in the evolution of the new support pad design is illustrated in Figure 3. Along with dimensional changes, the insert positions were also shifted. Each of these reflect an accompanying mold change. The unit labeled "B" in Figure 3 shows the open pouring area on the base pad and the units labeled "A" and "B" show the pouring area for the top pad.

76143-2

- A. Configuration at the start of this phase of the program.
- B. Final sprue configuration, increased length, instrumentation cavity and repositioned inserts.
- C. Finished pads after milling to dimensions and connecting passages.

Figure 3. LF-8 and LF-9 Support Pads

The original contours for the piece part were duplicated from a support pad that Sandia Laboratories, Albuquerque (SLA) had modified and indicated that it had the desired shape. Having established that the design was apparently as desired by Los Alamos Scientific Laboratory (LASL), 50 support pads were fabricated. These were shipped in lots as shown in Table 1.

Table 1. Pad Shipping Dates

No. Pads	Date Shipped
12	10/6/76
1	10/11/76
11	10/12/76
12	10/18/76
14	10/22/76
50 - Total	

A meeting was held October 11-12, 1976 at SLA and LASL with Messrs. Ferrell, Sarason and Fox to demonstrate the utilization of the support pads within the weapon. The PAPI* foam assembly into which the pads are placed had to be modified to accept the new design and assembly of the components was attempted. It was evident that there were still slight variations in the pads that prevented proper assembly. It was also apparent that the top contour was critical and that all vertical surfaces would have to be machined perpendicular to the base. Tolerances expected were tight. These later concepts were new, as the normal 1" taper had been acceptable previously. Copies of process and material drawings for the preparation of the support pads were given to Mr. Ferrell for his information and use.

*Trademark, Polymer Chemicals Div., Upjohn Co.

CAPABILITY STUDIES

Since the contours of the support pads were all replicates of the one sample that had been reworked by SLA and indicated as being the shape desired, a capability study was made to assess how well these agreed with the drawings. Data are shown in Appendix A. As may be seen, the length, width and height dimensions were in good agreement with the drawing. However, the 12.5 in. spherical radius deviated slightly and the 5.365 in. radius had not been properly contoured when the additional 1/2 in. was added.

To correct these deviations, a metal master is being fabricated that will provide the exact dimensions required. This will be used to fabricate the plastic tooling for the preparation of any future support pads needed while metal tooling is being acquired.

APPENDIX A

CAPABILITY STUDY DATA

A-2

Capability Studies FC-280 A (3-71)

Drawing Title HOLDER ASM. Dwg No. 46D920925 Rev. D Req. No. OR2451
 Requester R.L. SURETTE, J.C. HAMMACK Charge No. OR-2451 Lot No. N/A
EX 351
 Completed By WM. MACGREGOR MC No. EN No. Date 10-7-76
 EEN

Comments / Notes

Pg 1 of Pgs

1. MEASURED DIMENSIONS RED CIRCLED ON DRAWING SUPPLIED WITH PARTS.
2. THE $12.685 \pm .015$ SPHER R. WAS MEASURED USING TWO METHODS.
 - A. FINDING THE ACTUAL RADIUS. (SEE SKETCH #1).
 - B. USING THE NOMINAL DIMENSION ON THE DRAWING AND MEASURING THE DEVIATION OF THE RADIUS(SEE SKETCH #2).
- NOTE: NO DIMENSIONS ON DRAWING FOR THE A-A SECTION OF THE SPHER R SEEN ON SKETCH 1 AND 2.
3. ALL OTHER DIMENSIONS ARE RECORDED ON FC-280.

WM. MACGREGOR
 CAP STUDIES
 EXT. 351

[illegible]

HOLDER ASSEMBLY (TOP)

Sketch No. 1. This represents actual measurements.

HOLDER ASSEMBLY (TOP)

Sketch No. 2. This represents the deviation from drawing using nominal dimensions for datums.

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