DEVELOPMENT OF THE MANUFACTURING CAPABILITIES OF THE HYDROSTATIC EXTRUSION PROCESS

VOLUME II

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FOREWORD

This final technical report in two volumes covers the work performed under Contract AF 33(615)-3190 from 1 December 1964 through 8 July 1967. Volume I covers the results of the experimental work in hydrostatic extrusion and Volume II contains the work relative to design and construction of high-pressure hydrostatic extrusion containers. The manuscript was released by the authors on 29 September 1967 for publication as an AFML technical report.

This contract with Battelle Memorial Institute of Columbus, Ohio, was initiated under Manufacturing Methods Project No. 8-198, "Development of the Manufacturing Capabilities of the Hydrostatic-Extrusion Process". It was administered under the technical direction of Mr. Charles S. Cook until September 1965 and then by Mr. Gerald A. Gegel of the Metallurgical Processing Branch (MATB), Manufacturing Technology Division, Air Force Materials Laboratory, Wright-Patterson Air Force Base, Ohio.

The program was conducted at Battelle with the prime responsibility assigned to the Metalworking Research Division and with Mr. R. J. Fiorentino, Associate Chief, as Project Engineer. Others contributing to the program were Mr. B. D. Richardson, Research Metallurgical Engineer, Mr. G. E. Meyer, Research Metallurgical Engineer, Mr. F. W. Fawn, Technician, Mr. A. M. Sabroff, Division Chief, and Mr. F. W. Boulger, Senior Technical Advisor. The late Mr. W. R. Hansen, Research Metallurgist, made a significant contribution to the program up to the time of his death in August, 1966. Mr. R. L. Jentgen, Associate Chief in the Structural Physics Division, assisted in the fluid and lubrication studies of the program. Dr. J. C. Gerdeen, Senior Research Mechanical Engineer in the Advanced Solid Mechanics Division, conducted the stress analysis for the high-pressure-container-design study. Mr. E. C. Rodabaugh, Mr. M. Vagins, Senior Mechanical Engineers, and Mr. T. J. Atterbury, Chief of the Applied Solid Mechanics Division, also assisted in this study. Mr. R. E. Mesloh, Research Mechanical Engineer of the Applied Solid Mechanics Division, designed an instrument for measuring fluid pressure at elevated temperatures. Data from which this report has been prepared are contained in Battelle Laboratory Record Books Nos. 21799, 21990, 23065, 23287, 23585, 23791, 23836, and 24446.

This project has been accomplished as a part of the Air Force Manufacturing Methods program, the primary object of which is to develop, on a timely basis, manufacturing processes, techniques, and equipment for use in economical production of USAF materials and components. The program encompasses the following technical areas:

Metallurgy – Rolling, Forging, Extruding, Casting, Fiber, Powder.
Chemical – Propellant, Coating, Ceramic, Graphite, Nonmetallics.
Fabrication – Forming, Material Removal, Joining, Components.
Electronics – Solid State, Materials and Special Techniques, Thermionics.

Suggestions concerning additional Manufacturing Methods development required on this or other subjects will be appreciated.

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