2 Sources of Cryogenic Data and Information

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Abstract

It is commonly known that cryogenic data, technology, and information are applied across many military, National Aeronautics and Space Administration (NASA), and civilian product lines. Before 1950, however, there was no centralized US source of cryogenic technology data. The Cryogenic Data Center of the National Bureau of Standards (NBS) maintained a database of cryogenic technical documents that served the national need well from the mid 1950s to the early 1980s. The database, maintained on a mainframe computer, was a highly specific bibliography of cryogenic literature and thermophysical properties that covered over 100 years of data. In 1983, however, the Cryogenic Data Center was discontinued when NBS’s mission and scope were redefined. In 1998, NASA contracted with the Chemical Propulsion Information Agency (CPIA) and Technology Applications, Inc. (TAI) to reconstitute and update Cryogenic Data Center information and establish a self-sufficient entity to provide technical services for the cryogenic community. The Cryogenic Information Center (CIC) provided this service until 2004, when it was discontinued due to a lack of market interest. The CIC technical assets were distributed to NASA Marshall Space Flight Center and the National Institute of Standards and Technology. Plans are under way in 2006 for CPIA to launch an e-commerce cryogenic website to offer bibliography data with capability to download cryogenic documents.

2.1 Introduction

Prior to 1959 there were only two cryogenic engineering books: \textit{Separation of Gases} by Ruhemann and \textit{Cryogenic Engineering} by Scott [1]. For many years, this field of research was restricted to only a few laboratories. Many of the earlier books on low-temperature physics contained a great deal of material which is now considered to be cryogenic engineering. During these early years, several important applications of cryogenics were developed; as a result, a large number of engineers became engaged in efforts that required very low temperatures and
hardware to accomplish the delivery of the applications hardware. Very quickly, numerous papers were published and a few books on the subject appeared with these applications.

Much of this cryogenic research and development (R&D) activity came as a result of funding from the Department of Defense (DoD), the Department of Energy, and the National Aeronautics and Space Administration (NASA). This R&D activity provided a trained cadre of engineers and scientists working in cryogenics, providing cryogenic technical know-how, and building a technical base of cryogenic engineering information which helped make the US cryogenics industry what it is today. For the 30-year period starting in the mid 1950s, the National Bureau of Standards (NBS) Cryogenic Data Center captured much of this information in the form of a bibliography and many technical documents.

With the discontinuance of the Cryogenic Data Center in the early 1980s, there was a period of 15 years where there was no centralized US source of cryogenic technical data. In 1997, the Cryogenic Information Center (CIC), a not-for-profit corporation, was established to preserve and distribute cryogenic information to the government, industry, and academia. The CIC accessed the long history of information traceable back to the Cryogenic Data Center. The heart of the CIC was a uniform, consistent source of cryogenic data that comprised previous analyses, designs, materials and processes, and test information. The CIC’s resources included the largest and most comprehensive collection of cryogenic-related articles, papers, and journals, with citations going back as far as 1829.

With the demise of the CIC at the end of 2004 due to lack of market interest, the technical assets have been distributed to NASA Marshall Space Flight Center (MSFC) and the National Institute of Standards and Technology (NIST). The Chemical Propulsion Information Agency (CPIA), one of the 11 Information Analysis Centers (IACs) of the Defense Technical Information Center (DTIC), has presented a plan to make the bibliography database and technical documents available to the cryogenics community at an e-commerce website. The CPIA plans to launch this website in 2006.

2.2 Early Sources of Data

Before the mid 1950s there was no single source of comprehensive fluid or material properties for low-temperature applications. Cryogenic data were hard to find and not always in a form convenient for use. To complete a cryogenic system design, engineers relied on multiple books, handbooks, and compendiums, each with a bit of information needed for material and fluid data. From the authors’ experience, a few engineers in each organization seemed to collect this precious cryogenic data: fluids data usually in the hands of a thermal engineer and materials data with a structural engineer. The best engineers in the organization were those who had this information at their fingertips, and the young engineers naturally gravitated to these engineers as sources of data, relying on them for these data as well as design and analysis advice.