INTRODUCTION

Coal and coke are probably the earliest fuels used by mankind even before the dawn of civilization. They truly represent the “fossil” fuels. In spite of their antiquity, their use continues to grow throughout the world to provide heat and electricity to an energy hungry world. For example, in the United States, considered as the “Saudi Arabia” of coal, although the number of operating mines decreased dramatically from over 11,000 in the 1920s to under 1500 today, the coal production continues to rise thanks to the efficient and effective technological means used in the coal mining industry.

In an excellent article published in 2004 at the time of the centennial celebration of the establishment of ASTM’s Committee D05 on Coal and Coke, Janke, Luppens, and Graham provide a comprehensive review of the origin, development, and current status of both the coal industry and Committee D05 (1). It is illuminating to cite some information excerpted from this article.

It is estimated that the United States possesses about 25 percent of the world’s known accessible and minable coal reserves. Production through later decades of the 20th century on into the new millennium rose to nearly 1.1 billion tons a year. Coal is a critical component for manufacturing steel and cement. Coal is used to generate over 50 percent of all electricity produced in the United States. In 1917, 33 million tons of coal was burned annually in the U.S.; today that figure is over 830 million tons.

Over the last century, ASTM Committee D05 on Coal and Coke has led the efforts to standardize the methods for characterization of coal and coke properties. These efforts span a worldwide effort with ties to many other national consensus standard writing organizations, including the International Organization for Standardization (ISO) Technical Committee 27 on Solid Fuels. In virtually all instances, the ASTM D05 standards are considered as the final arbitrator for the quality of a coal or a coke related product. Many other national and international standards are based on original ASTM D05 standards.

There are about 55 analytical test method standards under D05 Committee’s jurisdiction. These standards involve a variety of physical, chemical, and spectroscopic analytical techniques to qualitatively and quantitatively identify over 40 chemical and physical properties of coal, coke, and their products and by-products. These test methods are annually published in the Annual Book of ASTM Standards (2). Additional methods continue to be developed in many energy company laboratories and elsewhere either to improve on the existing methods or to enable determination of other properties.

With the certainty that coal resources will continue to be a dominant contributor to the energy industry in the United States and elsewhere in the world, ASTM Committee D05 continues to provide standards that ensure significant technological, economic, productivity, and environmental benefits from effective utilization of coal resources.

It is certainly not the intention of this author to replace the Annual Book of ASTM Standards with the current book, but rather to develop a complementary manual for the user of ASTM coal and coke test methods. This manual makes available in one handy volume the essential elements of all analytical tests used to characterize coal, coke and their products. It is critical for testing laboratory personnel to be fully familiar with all the details of the tests they are performing. But it is also important for non-laboratory personnel to understand at least the significance, advantages and limitations of particular tests used to characterize coal and coke quality. Buyers and suppliers of coal and coke need to agree on the appropriate product quality specifications, and this can be done only with a thorough understanding of the limitations of these tests.

Product specifications that are not based on realistic testing capabilities can lead to quality complaints and dissatisfaction on the part of both buyers and sellers. As such, we expect that this book will prove useful not only to laboratory personnel, but also to the product specification writers, process engineers, researchers, and marketing staff in understanding the importance and limitations of these tests, so that sound judgments can be made regarding the quality and performance of a company’s products.

All technical information in this manual is based on the year 2007 edition of the Annual Book of ASTM Standards (2). We plan to update the manual at some frequency depending on how many new or significantly revised standards are issued by the Committee D05. If you notice any errors or omissions, please let us know. We will correct them in future editions.

References

