

## MANUAL ON HYDROCARBON ANALYSIS

### PURPOSE OF MANUAL

The purpose of this manual on the analysis of hydrocarbons is to provide a collection of methods and to make them more useful by showing how they fit into a general scheme of analysis. Some historical background is also supplied that will help to explain why some methods are available in ASTM form and some are not. The perspective thus provided may encourage the preparation of additional methods in ASTM form so that this manual may be more complete in the future.

### INTRODUCTION

#### **Nature of Short Analysis—Need for Cross-Check Methods**

The analysis of hydrocarbon mixtures, particularly from petroleum and coal, can be done in a variety of ways depending on how much information is needed and how thorough an analysis is justified (1-16).<sup>1</sup> An example of an extremely thorough analysis is that performed by the American Petroleum Institute Research Project No. 6, which has been working 40 years, and has spent over 2 million dollars, on the analysis of one sample of crude oil (1,2). Work of this sort provides fundamental information and has developed separation procedures which aid in setting up more rapid methods for general use.

The so-called "short-cut" methods suitable for routine use usually depend on simplifying assumptions that are satisfactory for most samples but may not apply in the case of unusual samples. It is therefore highly desirable to have alternative short methods of analysis which do not involve the same simplifying

ing assumptions. If an analysis for a component, for example, per cent aromatics, is carried out by two independent methods and the results agree, one can be reasonably sure that the answer is correct. If they disagree, more work is indicated to find out why the sample is unusual and what the true composition is.

This does not mean that every analysis must be made by two different methods. An experienced analyst, knowing something about the type of sample, can usually select a reliable procedure for the sample at hand. For unusual samples, however, the use of cross-check procedures is essential. For this reason it has been the practice of Research Division IV of ASTM Committee D-2 on Petroleum Products and Lubricants to put in ASTM form alternative procedures for the determination of the same component. These alternative procedures can be used for cross-check purposes, since they do not depend on the same simplifying assumptions.

#### **Nomenclature**

The nomenclature of hydrocarbon types as used in ASTM methods is in

<sup>1</sup> The boldface numbers in parentheses refer to the list of references at the end of this section; see p. 14.