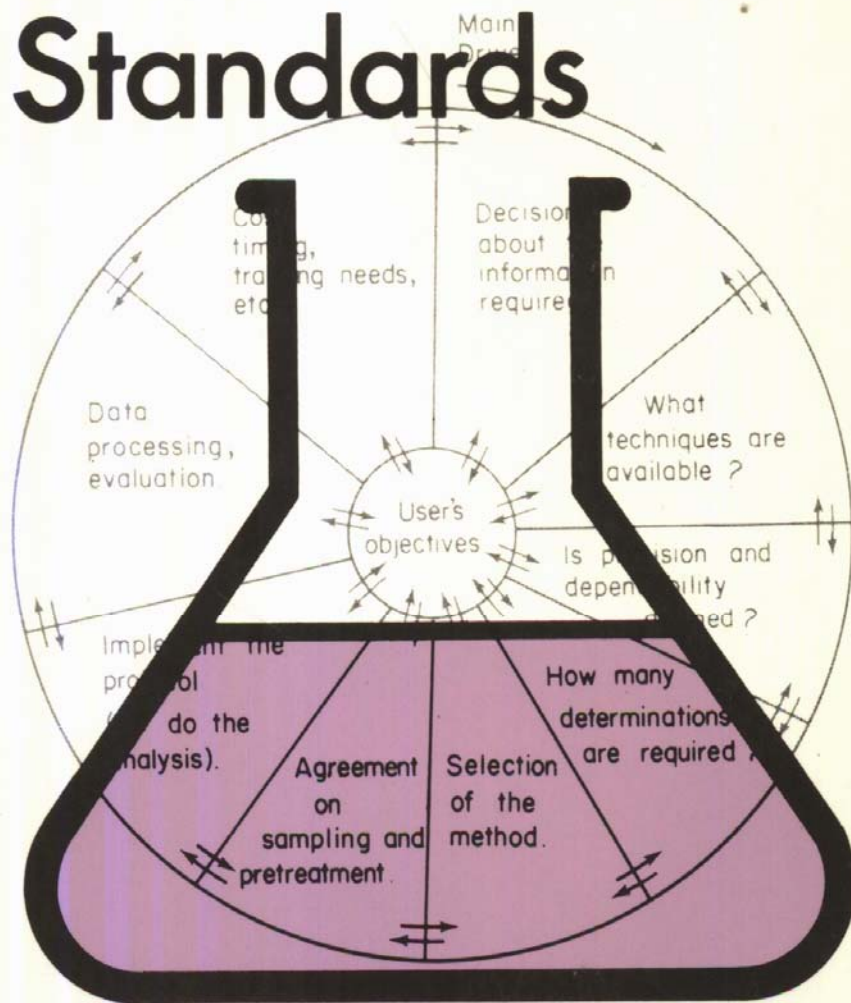




Samples and Standards



Brian W. Woodget and
Derek Cooper

Contents

Study Guide	xv
Bibliography.	xvii
1. The Analyst's Approach	1
1.1. The Purpose of Analysis.	1
1.2. Steps in a Chemical Analysis	6
1.3. Case-study: A Problem of Sludge	7
1.4. The Plan for a Chemical Analysis	10
1.5. Case Studies and the Analytical Context.	21
1.6. Analytical Methods	29
2. Introduction to Sampling	34
3. Design of a Sampling Procedure.	39
3.1. Statistics in Sampling	40
3.2. Determination of Sample Size	48
3.3. Taking of Increments	52
3.4. The Sampling Programme	56
4. Methods of Taking Samples	60
4.1. Sampling of Solid Materials	63
4.2. Sampling of Liquids	71
4.3. Sampling of Gases	79
4.4. Methods for Obtaining the Analysis Sample	87
5. Standardisation and Calibration	92
5.1. General Considerations	92
5.2. Absolute Methods	93
5.3. Comparative Methods	96
5.4. Primary Standards for Use in Classical Analysis	103

6. Analytical Standards and Calibration Curves	109
6.1. Simple Linear Functions	109
6.2. Non-linear Calibration Plots	120
6.3. Abridged Methods of Calibration	128
6.4. Choice of Standard Materials	132
6.5. Preparation of Calibration Graphs	137
6.6. Matrix Matching	142
6.7. Bracketing of Standards	143
7. Standard-addition Methods	146
7.1. Method of Single Standard-addition	147
7.2. Method of Multiple Standard-additions	155
7.3. Optimum Number and Value of Standards	167
8. Internal-standard Methods	171
8.1. Method of Single Internal-standard	174
8.2. Method of Multiple Internal-standards	178
8.3. Choice of an Internal-standard	184
9. Calibration by Computational Means	187
9.1. Functions Performed by a Microcomputer in Modern Laboratory Instrumentation	187
9.2. Calibration Techniques with Computer- controlled or Computer-assisted Instrumentation	191
9.3. The Laboratory Data Station	192
9.4. Example of Laboratory Based Computerised Instrumentation	192
10. Comparison of Calibration Procedures	201
10.1. Calibration Methods in Gas Analysis	205
11. Monitoring the Performance of Analytical Procedures	213
11.1. Use of Reference Materials and Certified Reference Materials	214
11.2. Use of Synthetic Samples and 'Spiked' Samples	216
11.3. Standard Methods of Analysis	218
11.4. Assessment of Analytical Performance	219

Self Assessment Questions and Responses	224
Units of Measurement	295