

**Manual of Petroleum
Measurement Standards
Chapter 13—Statistical Aspects of
Measuring and Sampling**

**Section 2—Methods of Evaluating
Meter Proving Data**

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Contents

	Page
1 Scope	1
2 Normative References	1
3 Terms, Definitions, and Acronyms	1
4 Significance and Use	3
5 Elements that Influence Meter Factors	3
6 General Suggestions to Improve the Monitoring Process	4
7 Data Signals	4
8 Ways to Monitor Meter Factors	5
8.1 General	5
8.2 Logging	5
8.3 Run Charting	8
8.4 Univariate Control Charting	10
8.5 Multivariate Control Charts for Meter Factors	14
Annex A (informative) Tests for Normality	17
Annex B (informative) Other Charts	21
Annex C (informative) Data Tables for Charts in Main Body	24
Annex D (informative) Runs Rules	30
Bibliography	31
Figures	
1 Three Patterns that Suggest Further Investigation	8
2 Basic Run Charts	9
3 Run Chart of Deviations from the Curve with Fixed Limits of $\pm 0.15\%$ Deviation from the Curve on the Primary y-axis and Relative Deviation on the Secondary y-axis	10
4 Control Chart of Meter Factors using <i>sd</i> of Trial Factors	11
5 Control Chart of Meter Factors using Range % of the Trial Factors	12
6 Control Chart of Meter Factors using Moving Range (mR) of the Meter Factors	12
7 Control Chart of Meter Factors Using Limits Calculated from Moving Averages	13
8 Generalized Multivariate Chart	15
9 Multivariate Chart for Table 3 Data and the Associated Four Univariate Charts	16
A.1 Normal Probability Plot for Table 3 Data	17
A.2 Normal Probability Plots for Non-normal Data	19
B.1 Run Chart using Policy Run-to-Run Limit of 0.05 %	21
B.2 Control Chart with Limits Calculated from Percentiles of the Meter Factors	22
Tables	
1 Responses to Consider when Limits are Exceeded	4
2 Meaning of Column Titles in Table 3	6
3 Meter Factor Log	7
4 Relative Contribution of Each Component to the T-squared Statistic	16
A.1 Data for the QQ Plot in Figure A.1	18
A.2 Anderson-Darling Statistics for Table 3 Data	20
A.3 Shapiro-Wilk Statistics for Table 3 Data	20

Contents

	Page
Tables (Continued)	
B.2 Data Set for the Control Chart Based on Percentiles	25
C.4 Underlying Data for Figure 4	26
C.5 Underlying Data for Figure 5	26
C.6 Underlying Data for Figure 6	27
C.7 Underlying Data for Figure 7	29

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Introduction

Minimizing petroleum measurement errors, estimating remaining errors and informing affected parties of errors is important to the petroleum industry. A consistent basis for estimating the size and significance of errors is essential for communication among affected parties. A fundamental source of measurement error is the inaccuracy of the meter factor which is a number that represents the performance of a meter throughout a batch.

Meter factors are monitored to gain confidence in the reported volumes and to detect trends or sudden deviations as indications of when to perform maintenance on or calibration of measurement equipment. The purpose of this standard is to suggest procedures for monitoring variations in meter factors so that uncertainties are understood and consistent with the objectives of parties affected by the measurement operations. The procedures for monitoring meter performance, limits on meter factor variations and actions to take because of these variations are left to the agreement among the parties affected by the measurement operations which can depend on company policy, contract agreements, regulations and laws.

Section 2—Methods of Evaluating Meter Proving Data

1 Scope

This standard establishes the basic concepts and procedures to estimate and report meter performance uncertainty in consistent and comparable ways.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the reference document (including any amendments) applies.

API Manual of Petroleum Measurement Standards (MPMS) Chapter 1, Online Terms and Definitions Database

API MPMS Chapter 4, Proving Systems

API MPMS Chapter 5, Metering

API MPMS Chapter 12, Calculation of Petroleum Quantities

API MPMS Chapter 13.3, Measurement Uncertainty Quantities

3 Terms, Definitions, and Acronyms

For the purposes of this document, the following terms and definitions apply. Terms of more general use may be found in the *API MPMS Chapter 1, Online Terms and Definitions Database*. Acronyms are defined in the text at first use.

3.1

3 standard deviation limit

A control limit equal to 3 standard deviations from the arithmetic mean of the set.

NOTE For a set of normal data this limit is also known as the 3-sigma limit.

3.2

action limits

Horizontal lines found on a run chart or control chart which, if exceeded, suggests that some sort of action is necessary to modify the underlying process or to modify the reports generated from the process. Related terms: tolerance limit, warning limit.

3.3

central line

A line on a control chart or run chart that represents the central value.

3.4

central value

The mean value of the statistic under consideration. Synonym: central tendency.

3.5

control chart

A graphical method for evaluating whether a process is in or out of statistical control.