

Vehicle Tank Meters



Inspector's Manual

Table of Contents

	<u>Page</u>
Acknowledgements	v
Chapter 1 – Introduction to the Module	
Chapter Objectives	1-1
The NIST Training Program	1-1
Course Objectives	1-2
Prerequisites	1-4
Summary	1-4
Chapter 2 – The Vehicle-Tank Metering System	
Chapter Objectives	2-1
Introduction	2-1
Vehicle-Tank Meters and Their Relation to Other LMDs	2-1
The Vehicle-Tank Metering System	2-4
Gravity-Discharge and Power-Operated Systems	2-5
Summary	2-8
Chapter 3 – The Operation of Vehicle-Tank Metering Systems	
Chapter Objectives	3-1
Introduction	3-1
The Vehicle Tank and Intake Lines	3-1
The Air Eliminator	3-2
The Meter	3-8
The Register	3-11
The Calibrator	3-17
The Printer	3-17
Temperature Compensators	3-18
The Control Valve	3-18
The Preset Control	3-20
The Discharge Hose	3-21
Summary	3-21
Chapter 4 – Preliminaries to the Field Examination	
Chapter Objectives	4-1
Introduction	4-1
Test Equipment	4-2
Report Forms	4-17
Safety	4-19
Summary	4-21

	<u>Page</u>
Chapter 5 – The Inspection	
Chapter Objectives	5-1
Introduction	5-1
Inspection	5-4
General Considerations	5-6
Marking	5-13
Indicating and Recording Elements	5-18
Measuring Elements	5-34
Piping	5-39
Summary	5-42
Chapter 6 – The Test	
Chapter Objectives	6-1
Introduction	6-1
Pre-Test Determinations	6-5
The Test	6-14
Summary	6-29
Chapter 7 – Post-Test Tasks	
Chapter Objectives	7-1
Introduction	7-1
The Security Seal	7-2
Evaluating Examination Results	7-3
Determination of Compliance Action	7-3
Notifying the Owner or Operator	7-5
Marking the Device	7-6
Report Forms and Record Keeping	7-6
Summary	7-7

Examination Procedure Outline 23, Vehicle-Tank Meters, Power-Operated

Examination Procedure Outline 24, Vehicle-Tank Meters, Gravity-Discharge

Acknowledgments

Developing a national training program for weights and measures officials is a challenging and ambitious project. It requires time, dedication, and expertise from individuals from a variety of constituencies involved in the profession.

It is impossible to list the names of the many people who contributed to the development of this course. However, gratitude is extended to the following groups, whose dedication and commitment made this training program a reality:

- Members of the Committee on Education, Administration, and Consumer Affairs of the National Conference on Weights and Measures
- The staff of the Weights and Measures Division of the National Institute of Standards and Technology
- Department of Agriculture, Weights and Measures, of the State of Maryland
- Office of Weights and Measures of the Commonwealth of Virginia
- Representatives from several manufacturers of weighing and measuring equipment, including Brooks Instrument Division of Emerson Electric Co., Liquid Controls Corp., Meter Manufacturers Technical Committee, Midwest Computer Register Corp., Actaris (formerly) Neptune Measurement Co., Seraphin Test Measure Co., FMC/Smith Meter, Inc., and Tokheim Corp.

- The Working Group for the original vehicle-tank meters training course:

Vernon Bowen, Georgia Dept. of Agriculture
Martin Coile, Georgia Dept. of Agriculture
Clark DeLoach, Brooks Meter
Steve Dill, Georgia Dept. of Agriculture
Charles Howard, Brooks Meter
James Meeks, Georgia Dept. of Agriculture
Arnold Roberts, Brooks Meter
Tom Scott, North Carolina Dept. of Agriculture
Curt Williams, Georgia Dept. of Agriculture

- The groups that sponsored field tests of the module:

The Commonwealth of Massachusetts, Division of Standards, in cooperation with the Massachusetts Weights and Measures Association

The Department of Consumer Protection and Weights and Measures, Bucks County, Pennsylvania

It is sincerely hoped that this course helps weights and measures officials throughout the country meet their personal and professional objectives.

The staff of Industrial Training Corporation.

Acknowledgments for Revisions

Thanks are extended to the following individuals who made revisions to this document possible:

1991 Revision:

- Richard L. Whipple (retired), National Institute of Standards and Technology (NIST) Weights and Measures Division (WMD, formerly the Office of Weights and Measures), who prepared the revision, and
- Members of the NCWM Committee on Education, Administration, and Consumer Affairs, who reviewed the draft revision: Maxwell H. Gray (FL), Chairman; Martin T. Coile (GA); James D. Harnett (Orange County, CA); Raymond Kalentkowski (CT); Michelle I. Phillips (City of Indianapolis, IN).

1995 Revision: Richard L. Whipple (Retired), Terry L. Grimes, Juana S. Williams, and Tina G. Butcher, NIST WMD, who prepared the revision.

2000 Revision: Tina Butcher and Gail Newrock, NIST WMD, who prepared the revision.

2001 Revision: Tina Butcher, NIST WMD, who prepared the revision.

2002 Revision: Richard Suiter, NIST WMD, who prepared the revision.

2003 Revision: G. Diane Lee, NIST WMD who prepared the revision.

2006 & 2007 Revisions: Tina Butcher, G. Diane Lee, Richard Suiter, and Juana Williams, NIST WMD who prepared these revisions.

2010 Revision: Tina Butcher, G. Diane Lee, and Juana Williams, NIST WMD who prepared the revision.

Note: As of 2002 the Weights and Measures Program (also know as the Office of Weights and Measures) became the Weights and Measures Division.