

Manual of Petroleum Measurement Standards Chapter 2.2G

Calibration of Upright Cylindrical Tanks Using the Total Station Reference Line Method

FIRST EDITION, JULY 2014

REAFFIRMED, NOVEMBER 2019



AMERICAN PETROLEUM INSTITUTE

Special Notes

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed.

Neither API nor any of API's employees, subcontractors, consultants, committees, or other assignees make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or usefulness of the information contained herein, or assume any liability or responsibility for any use, or the results of such use, of any information or process disclosed in this publication. Neither API nor any of API's employees, subcontractors, consultants, or other assignees represent that use of this publication would not infringe upon privately owned rights.

Users of this standard should not rely exclusively on the information contained in this document. Sound business, scientific, engineering, and safety judgment should be used in employing the information contained herein.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any authorities having jurisdiction with which this publication may conflict.

API publications are published to facilitate the broad availability of proven, sound engineering and operating practices. These publications are not intended to obviate the need for applying sound engineering judgment regarding when and where these publications should be utilized. The formulation and publication of API publications is not intended in any way to inhibit anyone from using any other practices.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

All rights reserved. No part of this work may be reproduced, translated, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Contact the Publisher, API Publishing Services, 1220 L Street, NW, Washington, DC 20005.

Copyright © 2014 American Petroleum Institute

Foreword

Chapter 2.2G of the *Manual of Petroleum Measurement Standards* should be used in conjunction with API MPMS Chapter 2.2A, *Measurement and Calibration of Upright Cylindrical Tanks by the Manual Tank Strapping Method*. Units of measure in this publication are in International System (SI) and U.S. customary (USC) units consistent with North American industry practices.

Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the specification.

Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the specification.

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 1220 L Street, NW, Washington, DC 20005.

Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

Contents

	Page
1 Scope	1
2 Normative References.....	1
3 Terms and Definitions.....	1
4 Application of the Total Station Reference Line Method.....	1
5 Electro-optical Device General Requirements.....	1
6 Electro-optical Device Calibration and Recalibration.....	2
7 Electro-optical Device Field Verification.....	2
7.1 Field Verification	2
7.2 Verification Procedure	2
7.3 Acceptability Criteria.....	4
8 Electro-optical Device Field Setup Procedure.....	4
8.1 General	4
8.2 Horizontal and Vertical Stations.....	4
8.3 Horizontal Station Setup.....	4
8.4 Instrument Setup for Vertical Stations at Horizontal Station	5
8.5 Electro-optical Device Stability	5
9 Measurements	5
9.1 Master Tape	5
9.2 Master Working Tape	6
9.3 Working Tape	6
9.4 Reference Circumference.....	7
9.5 Distance and Angular Measurements	9
10 Computation of Course Diameters	9
11 Development of the Capacity Table.....	10
Tables	
1 Number of Horizontal Stations.....	4
2 Reference Circumference Tolerances (Soft Conversions).....	9
Figures	
1 TSRLM Device Verification at Site: Stadia Horizontal	11
2 TSRLM Device Verification at Site: Stadia Vertical	12
3 Distance and Vertical Angle	13
4 Setting Location of Vertical Station Tangential Traverse Method	14