

Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities

API STANDARD 2610
SECOND EDITION, MAY 2005



Currently in preview, click buy full version

Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities

Downstream Segment

API STANDARD 2610
SECOND EDITION, MAY 2005



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.

API is not undertaking to meet the duties of employers, manufacturers, or suppliers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations under local, state, or federal laws.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from the employer, the manufacturer or supplier of that material, or the material safety data sheet.

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.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. Sometimes a one-time extension of up to two years will be added to this review cycle. This publication will no longer be in effect five years after its publication, unless as an operative API standard or, where an extension has been granted, upon republication. Status of the publication can be ascertained from the API Standards department telephone (202) 682-8000. A catalog of API publications, programs and services is published annually and updated biannually by API, and available through Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO 80112-5775.

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 standard or comments and questions concerning the procedures under which this standard was developed should be directed in writing to the Director of the Standards Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005. Requests for permission to reproduce or translate all or any part of the material published herein should be addressed to the Director, Business Services.

API standards are published to facilitate the broad availability of proven, sound engineering and operating practices. These standards are not intended to obviate the need for applying sound engineering judgment regarding when and where these standards should be utilized. The formulation and publication of API standards 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, 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, N.W., Washington, D.C. 20005.

FOREWORD

This standard was developed to guide the management of terminals and tanks in a manner that protects the environment and the safety of workers and the public. This standard is intended for petroleum terminal and tank facilities associated with marketing, refining, pipeline, and other similar facilities. This standard may be used as a resource and management guide by those responsible for such facilities and by those working on their behalf. This standard is a compilation of industry knowledge, information, and management practices for all relevant aspects of terminal and tank operations aggregated into an overview document comprising best practices. In instances where greater detail or additional information may be helpful or needed, this standard references other API publications or similar industry guides and standards. It is intended to be consistent with, but is not a substitute for, any applicable local, state, or federal regulations.

The requirements of this standard represent minimum requirements applicable to all facilities within the scope of this document. Some provisions in this standard, as indicated by the use of the word shall, are mandatory and have to be followed to meet the intent of the standard. Some provisions are recommended, as denoted by the word should, but are not mandatory. These provisions will need to be considered based on site-specific factors. Still other provisions are optional, as denoted by the word may. Typically, these will be given where a range of good options exists.

To foster greater awareness and assist the industry in addressing environmental, health, and safety concerns, the API has undertaken the development of this single document aggregating the various standards, specifications, and recommended practices on the design, construction, operation, inspection, and maintenance of petroleum terminals and tanks. API also has significant research underway to assist members in addressing issues of groundwater protection and remediation of soil contamination. This research includes the evaluation of improved leak detection technology and the evaluation of better methods to detect and remediate groundwater and soil contamination.

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 federal, state, or municipal regulation with which this publication may conflict.

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

Currently in preview, click buy full version

CONTENTS

	Page
1 GENERAL.....	1
1.1 Scope and Purpose.....	1
1.2 Nonapplicability and Retroactivity.....	2
1.3 Governmental Requirements and Reviews.....	2
2 REFERENCES.....	2
2.1 Standards.....	2
2.2 Other References.....	7
3 DEFINITIONS.....	7
4 SITE SELECTION AND SPACING REQUIREMENTS.....	8
4.1 Overview.....	8
4.2 Site Selection.....	8
4.3 Spacing Requirements.....	9
5 POLLUTION PREVENTION AND WASTE MANAGEMENT.....	10
5.1 Applicability.....	10
5.2 Waste Management Hierarchy.....	10
5.3 Pollution Prevention.....	11
5.4 Waste Management Practices.....	13
6 SAFE OPERATIONS OF TERMINALS & TANKS.....	14
6.1 General.....	14
6.2 Hazard Identification.....	14
6.3 Operating Procedures.....	14
6.4 Safe Work Practices.....	14
6.5 Emergency Response and Control Procedures.....	14
6.6 Management of Change.....	15
6.7 Training.....	15
6.8 Pre-Startup Safety and Operational Inspection.....	15
6.9 Incident Investigation.....	15
6.10 Contractor Safety.....	16
7 FIRE PREVENTION AND PROTECTION.....	16
7.1 General.....	16
7.2 Fire Prevention.....	16
7.3 Fire Fighting Equipment.....	17
7.4 Fire Extinguishment and Control.....	17
7.5 Fire Protection Water Supplies.....	18
7.6 Fire Emergency Plan.....	18
7.7 Exposure Protection.....	19
7.8 Special Product Considerations.....	19
8 TANKS.....	20
8.1 Aboveground Petroleum Storage Tanks.....	20
8.2 Operations, Inspections, Maintenance, and Repair for Aboveground Tanks.....	23
8.3 Fiberglass Aboveground Storage Tanks.....	24
8.4 Underground Tanks and Piping.....	24

	Page
8.5 Underground Storage Tank Vapor Emissions	24
9 DIKES AND BERMS	24
9.1 Overview	24
9.2 Dikes	24
9.3 Berms	26
10 PIPE, VALVES, PUMPS & PIPING SYSTEMS	26
10.1 General	26
10.2 Material Compatibility	26
10.3 Piping Systems	26
10.4 Piping Components	27
10.5 Pumps	29
10.6 Pipeline Integrity Assurance of Existing Piping Systems	29
10.7 Testing Following Construction	30
11 LOADING, UNLOADING AND PRODUCT TRANSFER FACILITIES	30
11.1 Scope	30
11.2 General Design	30
11.3 Truck Loading/Unloading	31
11.4 Rail Tank Car Loading and Unloading	33
11.5 Marine Loading/Unloading	34
11.6 Aviation Loading/Unloading	35
11.7 Vapor Control	35
11.8 Oxygenate Blending	37
11.9 Emergency Shutdown Systems and Procedures	37
11.10 Product Testing	37
11.11 Communication	37
11.12 Measurements	37
11.13 Valves, Lines, Loading Arms, and Hose Product Identification	38
11.14 Release Prevention System in Loading/Unloading Areas	38
11.15 Maintenance/Testing	38
11.16 Auxiliary Systems	38
12 CORROSION CONTROL	38
12.1 Scope	38
12.2 Protective Coatings	38
12.3 Internal Tank Lining	41
12.4 Cathodic Protection	42
13 STRUCTURES, UTILITIES, AND YARD	43
13.1 Structures	43
13.2 Utilities	44
13.3 Yard	49
14 REMOVALS AND DECOMMISSIONING OF FACILITY	51
14.1 General	51
14.2 Site Control and Protection	53
14.3 Preparations	53
14.4 Execution	53
14.5 Site Assessment and Remediation	53
14.6 Closeout and Cleanup	53

Figures

1	Typical Electric Service and Distribution System Terminals and Bulk Plants . . .	45
2	Segregated Waste Stream in a Typical Terminal.	47
3	Tank Truck Loading Yard Layout without Garage	50
4	Tank Truck Loading Yard Layout with Garage	51
5	Yard Dimensions for Trucks (See Table Above)	52

Currently in preview, click buy full versi

Currently in preview, click buy full version

Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities

1 General

1.1 SCOPE AND PURPOSE

This standard covers the design, construction, operation, inspection, and maintenance of petroleum terminal and tank facilities associated with marketing, refining, pipeline, and other similar activities as stipulated in 1.1.1 through 1.1.7. This standard covers the issues of site selection and spacing, pollution prevention and waste management, safe operation, fire prevention and protection, tanks, dikes and berms, mechanical systems, product transfer, corrosion protection, structures, utilities and yard, and removals and decommissioning.

The purpose of this standard is to consolidate a wide base of current industry experience, knowledge, information, and management practices into a cohesive standard comprising a range of best practices.

Mandatory requirements in this standard are designated by the word “shall” or “must.” Recommendations are designated by the use of the word “should.” Optional items are designated by the word “may” (refer to Section 3). This standard incorporates by reference a number of other standards and recommended practices. The distinctions between mandatory, recommended, and optional provisions in the referenced documents are not changed by the nature of their reference in this standard.

The values stated for this standard are in U.S. Customary units with the International System of units (SI) provided in parentheses.

The petroleum industry is engaged in the manufacture, storage, transportation, blending, and distribution of crude oil and refined products. Individual terminal facilities and plants may perform one or more of these functions. These facilities represent diverse operations ranging from small distribution facilities (e.g., bulk plants and warehouses), to large storage and distribution facilities (e.g., pipeline and marine terminals and wholesale plants), and large integrated facilities (e.g., petroleum refineries, and grease production, oil blending and packaging plants). The specific application of this standard within those various types of operations is itemized in 1.1.1 through 1.1.7.

1.1.1 Petroleum Terminals

Petroleum terminals may include tank farms, loading and unloading areas, pipeline manifolds, storage areas, warehouses, docks, garages, laboratories, and office buildings. Products may be received and distributed by pipeline, marine transport, rail, or truck. Bulk quantities of refined products are stored in aboveground tanks for distribution in smaller quantities to industrial customers, to commercial consumers,

and to retail and wholesale marketing facilities. Petroleum terminals may also store petroleum products in consumer packaging, bulk containers, inside tanks and drums.

1.1.2 Pipeline Tankage Facilities

Pipeline tankage facilities consist of tanks and tank farms used to receive petroleum (crude oil and refined products) from pipelines, trucks, railcars, or marine facilities and to provide surge relief from pipeline operations (see Office of Pipeline Safety, Research and Special Programs Administration regulation 49 *CFR* Part 195 and the U.S. Coast Guard regulation 33 *CFR* Parts 154 and 156).

1.1.3 Refinery Facilities

Provisions for loading and unloading areas, docks, blending and packaging facilities, warehouses, and some refinery tankage facilities are included in this standard. Refinery tankage covered by this standard does not include those aboveground tanks or groups of tanks as defined in 1.2.c (e.g., process tanks).

Examples of covered refinery tankage include tanks that are used to accomplish the following:

- a. Receive incoming crude oil.
- b. Store intermediate products or components outside of the refinery process units.
- c. Store finished products for shipment by truck, marine transport, rail, or pipeline.

Examples of refinery tankage and other equipment specifically excluded are as follows:

- a. Tanks and equipment that are integral to refinery process equipment.
- b. Refinery tanks and other equipment located within the battery limits of process units.
- c. Process equipment located outside the process unit battery limits.
- d. Tanks that contain materials, such as additives, used in refinery processes or utility systems.

1.1.4 Bulk Plants

Although bulk plants typically handle smaller quantities of product, operations and facilities at these plants are similar to those at petroleum terminals. Bulk plants typically receive and distribute product by truck, although some are serviced by rail, marine transport, or pipeline. Bulk plants may also store an inventory of petroleum products in consumer packaging, bulk containers, inside tanks and drums.