

Design and Construction of Large, Welded, Low-Pressure Storage Tanks

API STANDARD 620
TENTH EDITION, FEBRUARY 2002

ADDENDUM 1, JUNE 2004



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Downstream Segment

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FOREWORD

This standard is based on the accumulated knowledge and experience of purchasers and manufacturers of welded, low-pressure oil storage tanks of various sizes and capacities for internal pressures not more than 15 pounds per square inch gauge. The object of this publication is to provide a purchase specification to facilitate the manufacture and procurement of such storage tanks.

If tanks are purchased in accordance with the specifications of this standard, the purchaser is required to specify certain basic requirements. The purchaser may desire to modify, delete, or amplify sections of this standard, but reference shall not be made to this standard on the nameplate or manufacturer's certification for tanks that do not fulfill the minimum requirements or that exceed the limitations of this standard. It is strongly recommended that such modifications, deletions, or amplifications be made by supplementing this standard, rather than by rewriting or incorporating sections of it into another complete standard.

Each edition, revision, or addenda to this API standard may be used beginning with the date of issuance shown on the cover page for that edition, revision, or addenda. Each edition, revision, or addenda to this API standard becomes effective six months after the date of issuance for equipment that is certified by the manufacturer as being designed, fabricated, constructed, examined, and tested per this standard. During the six-month time between the date of issuance of the edition, revision, or addenda and the effective date, the purchaser and manufacturer shall specify to which edition, revision, or addenda the equipment is to be built.

The design rules given in this standard are minimum requirements. More stringent design rules specified by the purchaser or furnished by the manufacturer are acceptable when mutually agreed upon by the purchaser and the manufacturer. This standard is not to be interpreted as approving, recommending, or endorsing any specific design, nor as limiting the method of design or construction.

This standard is not intended to cover storage tanks that are to be erected in areas subject to regulations more stringent than the specifications of this standard. When this standard is specified for such tanks, it should be followed insofar as it does not conflict with local requirements.

After revisions to this standard have been issued, they may be applied to tanks to be completed after the date of issue. The tank nameplate shall state the date of the edition and any revision to that edition to which the tank is designed and constructed.

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Design and Construction of Large, Welded, Low-Pressure Storage Tanks

SECTION 1—SCOPE

1.1 GENERAL

The API Downstream Segment has prepared this standard to cover large, field-assembled storage tanks of the type described in 1.2 that contain petroleum intermediates (gases or vapors) and finished products, as well as other liquid products commonly handled and stored by the various branches of the industry.

The rules presented in this standard cannot cover all details of design and construction because of the variety of tank sizes and shapes that may be constructed. Where complete rules for a specific design are not given, the intent is for the manufacturer—subject to the approval of the purchaser's authorized representative—to provide design and construction details that are as safe as those which would otherwise be provided by this standard.

The manufacturer of a low-pressure storage tank that will bear the API Std 620 nameplate shall ensure that the tank is constructed in accordance with the requirements of this standard.

The rules presented in this standard are further intended to ensure that the application of the nameplate shall be subject to the approval of a qualified inspector who has made the checks and inspections that are prescribed for the design, materials, fabrication, and testing of the completed tank.

1.2 COVERAGE

1.2.1 This standard covers the design and construction of large, welded, low-pressure carbon steel above ground storage tanks (including flat-bottom tanks) that have a single vertical axis of revolution. This standard does not cover design procedures for tanks that have walls shaped in such a way that the walls cannot be generated in their entirety by the rotation of a suitable contour around a single vertical axis of revolution.

1.2.2 The tanks described in this standard are designed for metal temperatures not greater than 250°F and with pressures in their gas or vapor spaces not more than 15 lbf/in.² gauge.

1.2.3 The basic rules in this standard provide for installation in areas where the lowest recorded 1-day mean atmospheric temperature is – 50°F. Appendix S covers stainless steel low-pressure storage tanks in ambient temperature service in all areas, without limit on low temperatures. Appendix R covers low-pressure storage tanks for refrigerated products at temperatures from + 40°F to – 60°F. Appendix Q covers low-pressure storage tanks for liquefied hydrocarbon gases at temperatures not lower than – 270°F.

1.2.4 The rules in this standard are applicable to tanks that are intended to (a) hold or store liquids with gases or vapors above their surface or (b) hold or store gases or vapors alone. These rules do not apply to lift-type gas holders.

1.2.5 Although the rules in this standard do not cover horizontal tanks, they are not intended to preclude the application of appropriate portions to the design and construction of horizontal tanks designed in accordance with good engineering practice. The details for horizontal tanks not covered by these rules shall be equally as safe as the design and construction details provided for the tank shapes that are expressly covered in this standard.

1.2.6 Appendix A provides information on the preparation and submission of technical inquiries as well as responses to recent inquiries.

1.2.7 Appendix B covers the use of plate and pipe materials that are not completely identified with any of the specifications listed in this standard.

1.2.8 Appendix C provides information on subgrade and foundation loading conditions and foundation construction practices.

1.2.9 Appendix D provides information about imposed loads and stresses from external supports attached to a tank wall.

1.2.10 Appendix E provides considerations for the design of internal and external structural supports.

1.2.11 Appendix F illustrates through examples how the rules in this standard are applied to various design problems.

1.2.12 Appendix G provides considerations for service conditions that affect the selection of a corrosion allowance; concerns for hydrogen-induced cracking effects are specifically noted.

1.2.13 Appendix H covers preheat and post-heat stress-relief practices for improved notch toughness.

1.2.14 Appendix I covers a suggested practice for peening weldments to reduce internal stresses.

1.2.15 Appendix J is reserved for future use.

1.2.16 Appendix K provides considerations for determining the capacity of tank venting devices.

1.2.17 Appendix L covers requirements for the design of storage tanks subject to seismic load.