

# Recommended Practice for Lightning Protection of Aboveground Storage Tanks for Flammable or Combustible Liquids

**Downstream Segment**

API RECOMMENDED PRACTICE 545  
FIRST EDITION, OCTOBER 2009



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## Foreword

This Recommended Practice (RP) is based on the accumulated knowledge and experience of purchasers and manufacturers of welded steel oil storage tanks of various sizes and capacities for internal pressures not more than 17.2 kPa (2 1/2 psi) gauge. This RP is meant to be a purchase specification to facilitate the manufacture and procurement of storage tanks for the petroleum industry. If the tanks are purchased in accordance with this RP, the purchaser is required to specify certain basic requirements. The purchaser may want to modify, delete, or amplify sections of this RP, but reference to this RP shall not be made on the nameplates of or on the manufacturer's certification for tanks that do not fulfill the minimum requirements of this RP or that exceed its limitations. It is strongly recommended that any modifications, deletions, or amplifications be made by supplementing this RP rather than by rewriting or incorporating sections of it into another complete RP. The design rules given in this RP 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 RP is not to be interpreted as approving, recommending, or endorsing any specific design or as limiting the method of design or construction.

Shall: As used in a RP, "shall" denotes a minimum requirement in order to conform to the specification.

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

This RP is not intended to cover storage tanks that are to be erected in areas subject to regulations more stringent than the specifications in this RP. When this RP is specified for such tanks, it should be followed insofar as it does not conflict with local requirements. The purchaser is responsible for specifying any jurisdictional requirements applicable to the design and construction of the tank. After revisions to this RP have been issued, they may be applied to tanks that are to be completed after the date of issue. The tank nameplate shall state the date of the edition of the RP and any revision to that edition to which the tank has been designed and constructed. Each edition, revision, or addendum to this RP may be used beginning with the date of issuance shown on the cover page for that edition, revision, or addendum. Each edition, revision, or addendum to this RP becomes effective six months after the date of issuance for equipment that is certified as being constructed, and tested per this RP. During the six-month time between the date of issuance of the edition, revision, or addendum and the effective date, the purchaser and the manufacturer shall specify to which edition, revision, or addendum the equipment is to be constructed and tested. 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.

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



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# Recommended Practice for Lightning Protection of Aboveground Storage Tanks for Flammable or Combustible Liquids

## 1 Scope

API RP 545, First Edition, *Recommended Practice for Lightning Protection of Aboveground Storage Tanks for Flammable or Combustible Liquids*, replaces the requirements of API 2003 regarding lightning protection for preventing fires in storage tanks with flammable or combustible contents. This recommended practice (RP) provides guidance and information to assist owners/operators with lightning protection for tanks. This RP does not provide complete protection for all possible lightning stroke occurrences.

### 1.1 Applicability

This RP is applicable to tanks as described in API 650.

### 1.2 Application of Requirements to New and Existing Tanks

The requirements of this RP shall apply to new or reconstructed tanks. The requirements may be applied to existing tanks at the discretion of the owner/operator.

## 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 referenced document (including any amendments) applies.

API/EI Technical Report 545-A, *Verification of lightning protection requirements for above ground hydrocarbon storage tanks*

API Standard 650, *Welded Tanks for Oil Storage*

API Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

API Standard 2003, *Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*

ASTM D3453 <sup>1</sup>, *Standard Specification for Flexible Cellular Materials*

BS EN 14015 <sup>2</sup>, *Specification for the design and manufacture of site built, vertical, cylindrical, flat-bottomed, above ground, welded, steel tanks for the storage of liquids at ambient temperature and above*

EMMUA 159 <sup>3</sup>, *Users' Guide to the Inspection, Maintenance and Repair of Aboveground Vertical Cylindrical Steel Storage Tanks*

NFPA 780 <sup>4</sup>, *Standard for the Installation of Lightning Protection Systems*

SAE ARP 5412 <sup>5</sup>, *Aircraft Lightning Environment and Related Test Waveforms*

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<sup>1</sup> ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, [www.astm.org](http://www.astm.org).

<sup>2</sup> European Committee for Standardization, Avenue Marnix 17, B-1000, Brussels, Belgium, [www.cen.eu](http://www.cen.eu).

<sup>3</sup> The Engineering Equipment and Material Users' Association, 10-12 Lovat Lane, London, EC3R 8DN, United Kingdom, [www.eemua.org](http://www.eemua.org).

<sup>4</sup> National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02169-7471, [www.nfpa.org](http://www.nfpa.org).

<sup>5</sup> Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania 15096-0001, [www.sae.org](http://www.sae.org).