



NATIONAL PETROCHEMICAL COMPANY STANDARDS

CONSTRUCTION STANDARD FOR ERECTION OF STORAGE TANKS

NPCS-CS-PV-02

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1 SCOPE

This standard as minimum directives , applies to above-ground vertical, cylindrical, closed and open-top (with or without floating roof), welded, Steel storage tanks, with pressures from 6 mbar vacuum to 170 mbar above atmospheric pressure for oil industries.

2 STANDARDS AND CODES

The latest edition of the following codes and standards are undetachable parts of this standard and shall be used with this standard, as minimum.

- API 650 Welded Steel Tanks for Oil Storage.
- API 2000 Venting Atmospheric and Low Pressure Storage Tanks.
- API 2001 Fire Protection in Refineries.
- API 2003 Recommended Practice for Protection Against Ignition Out of Static , Lightning & Stray Currents.
- API 2015 Cleaning Petroleum Storage Tanks.
- API 2550 Method for Measurement & Calibration of Upright Cylindrical Tanks.
- NFPA Vol's. 1 and 8 Fire Protection Codes.
- AWWA D100 Welded Steel Tanks for Water Storage.
- NPCS-ES-PV-03 Engineering Standard for Storage Tanks.
- NPCS-MS-PV-04 Material Standard for Storage Tanks.



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3 DESIGN

- 3.1 Tanks shall meet the requirements of the applicable codes as minimum. The tanks shall have an API monogrammed nameplate.
- 3.2 Storage tank specification data sheets shall be filled out by the manufacturer. The inspector shall fill out the appropriate blanks in this standard data sheet.
- 3.3 The design requirements shall be ascertained to be satisfied before commencing any construction job. These requirements are set forth in NPCES-ES-PV-03.

4 FABRICATION, ERECTION AND CONSTRUCTION

Fabrication and erection shall be accomplished according to the applicable code. Following paragraphs are supplementary.

4.1 WELDING

4.1.1 Welding Programme

4.1.1.1 The following information in form of WPS, PQR & WPQ shall be provided in a welding programme to be drawn up by the tank manufacturer:

- a) Materials, welding materials, filler materials and auxiliary media, welding process, welding positions and shape of joints and welding sequence.
- b) Pre-heating, heat treatment, protection of welds against climatic conditions.
- c) Utilization of the permissible design stresses in the weld, destructive and non-destructive tests.

Other data required in the above mentioned forms, shall also be supplied.

4.1.1.2 To avoid unevenness in the plates due to welding processes, the welding sequence shall be such that it will provide minimum shrinkage.



4.1.2 Filler Metal

- 4.1.2.1 The filler metal shall meet the requirements of AWS Code.
- 4.1.2.2 Electrodes classified as E6012, E7014, E7020, and E7024 are not acceptable for making shell or bottom welds. E6012 and E7024 electrodes may only be used for making roof welds with client approval.
- 4.1.2.3 No restraint of bottom plates by weights during welding is permitted.
- 4.1.2.4 A minimum of 70% of the unwelded plate tensile strength is required for fillet welds on all tanks containing lap bottom plates.
- 4.1.2.5 Tack welds shall be made with the same type of the electrodes that is used for depositing the root pass.

4.1.3 Weld Joint Preparation

- 4.1.3.1 The parts to be joint by fillet welds shall be brought together as closely as practicable. The gap between faying surfaces of lap joints should not exceed 1.5 mm. If the separation is greater than 1.5 mm after straightening and assembly, the leg of the fillet weld shall be increased by the amount of separation but shall not exceed 4.5 mm gap. The use of filler materials is prohibited

4.1.4 Welding Requirements

- 4.1.4.1 Low alloy high strength or heat treated materials with special condition of heat input may require higher temperatures than the code minimum.
- 4.1.4.2 Weld with defective areas shall have:
- a) The defect removed.
 - b) Confirmation of defect removal by magnetic particle or liquid penetrant examination.
 - c) Repair welding using qualified welding procedures.
 - d) Re-post weld heat treatment if originally required.

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