



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

ENGINEERING STANDARD
FOR
TOWERS

NPCS-ES-PV-02

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1 SCOPE

- 1.1 This standard covers the requirements for design and materials of fusion welded towers and is intended to supplement the applicable codes.
- 1.2 This standard does not cover the requirements for fabrication, inspection and testing of fusion welded towers ; nevertheless as far as the fabrication, inspection and testing requirements do pertain to the design of the towers, they have been mentioned.
- 1.3 The compliance with this standard does not relieve the design guarantor from his own responsibilities and guarantees for the safe mechanical design of the towers.
- 1.4 This standard when accompanied by the particular tower description, tower drawings, typical details and material standard for tall towers (NPCS-MS-PV-OZ), constitute a complete set of standards outlining acceptable construction of the towers.

2 STANDARDS AND CODES (LATEST EDITION AND ADDENDA)

- ASME Boiler and Pressure Vessel Code, Section VIII. Division 1 and/or 2.
- Boiler and Pressure Vessel Code, Section II.
- Boiler and Pressure Vessel Code, Section V.
- All Codes referred to, in the above mentioned Codes such as ANSI A 58.1, ANSI B 16.25, etc.
- ANSI B 16.5 Steel Pipe Flanges.
- API 605 Large Diameter Steel Flanges.
- API 941 Steel for Hydrogen Service at Elevated Temperature and Pressures.



- ASTM American Society of Testing and Materials.
- NPCS-ES-ST-06 Engineering Standard for Anchor Bolt.
- NPCS-ES-ST-01 Engineering Standard for Concrete.
- NPCS-ES-PV-01 Engineering Standard for Pressure Vessels.
- NPCS-MS-PV-02 Material Standard for Tall Towers.

DESIGN

3.1 GENERAL

The rules in the following paragraph apply specifically to the design of towers and tower parts that are fabricated by welding and shall be used in conjunction with the general requirements for design in Subsection A of ASME Code and with the specific requirements for design in Subsection C of ASME Code that pertain to the class of material used. It should be noted that tower shall be designed taking into account the most severe coincident conditions of design temperature and design pressure.

3.2 DESIGN AND ALLOWABLE WORKING PRESSURE

3.2.1 Tower shall be designed for full vacuum, when subject to reduction of internal pressure below barometric pressure during normal and/or mal-operation.

3.2.2 For maximum operating pressure upto and including 10 barg, towers shall be designed for at least 1 bar greater than the specified maximum operating pressure.

3.2.3 For maximum operating pressure in excess of 10 barg upto and including 35 barg, towers shall be designed for a pressure at least 10% greater than the specified maximum operating pressure.

3.2.4 The maximum allowable working pressure shall be limited by shell or head; not by minor parts such as flanges, nozzle necks, reinforcing pads, cone-to-cylinder rings, etc.