



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

ENGINEERING STANDARD

FOR
STEEL STRUCTURES

NPCS-ES-ST-02

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1 GENERAL

1.1 SCOPE

This standard covers the minimum requirements for the design, material of steel framing for buildings, steel structures supporting equipment, steel yard supports and miscellaneous structural steel, such as steel platforms, stairs, ladders, grating, walkways, stanchions, trolley beams, crane rails, railing, etc., but excluding steel piling and fence posts.

1.2 REGULATIONS

1.2.1 The work shall be done in accordance with the national and local laws and regulations.

1.2.2 For subjects not covered by regulations or specifications, the design and material shall be based on good engineering and working practice and shall be subject to approval by client.

1.3 CODES AND STANDARDS

The latest edition of the following codes and standards shall constitute minimum requirements for this standard, where applicable.

a) Iranian Standards

Iranian National Building Code part:5, Building Materials and Products.

ISIRI NO.519, Minimum Design Loads in Buildings and Other Structures.

b) American Institute of Steel Construction (AISC)

Manual of Steel Construction.

Specification for Structural Steel Buildings.

Code of Standard Practice for Steel Buildings and Bridges.

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- Specification for
Structural Joints Using
ASTM A325 or A490 Bolts.
- c) (AWS) American Welding Society
D1.1 Structural Welding Code
with the exceptions taken
by the AISC Specification.
- d) (ANSI) American National
Standards Institute
A58.1 Building Code Requirements
for Minimum Design Loads
in Buildings and Other
structures
- e) (API) American Petroleum
Institute
API spec. 5L line Pipe.
- f) (ASTM) American society for
Testing and Materials ,
ASTM A6 Standard Specification for
General Requirements for
Rolled Steel Plates,
Shapes, Sheet Piling and
Bars for Structural Use.
ASTM A36 Standard Specification for
Structural Steel.
ASTM A53 Standard Specification for
Pipe, Steel, Black and Hot
Dipped, Zinc Coated Welded
and Seamless.
ASTM A153 Standard Specification for
Zinc Coating (Hot Dip) on
Iron and Steel Hardware.
ASTM A276 Standard Specification for
Stainless and Heat
Resisting Steel Bars and
Shapes.
ASTM A307 Standard Specification for
Carbon Steel Bolts and
Studs.



ASTM A325

Standard Specification for
High Strength Bolts for
Structural Steel Joints.

g)

UBC Uniform Building Code

1.4

UNITS

Units shall be in accordance with, NPCS-ES-GN-03:

- Length Meter (m) and millimeter(mm)
- Force Kilogram force (kg) & Tons(T)
- Weight Kilogram (kg)
- Moment Ton-Meter (T-M)
- Stress and Pressure Kg/Cm².
- Loadings Kg/m².

2

MATERIALS

2.1

STRUCTURAL STEEL AND PIPE

2.1.1

All material shall be new stock and cut from a single rolled unit. No substitution of materials shall be allowed without written approval from the client.

2.1.2

Unless otherwise specified, all structural plate, shapes and bars shall conform to ASTM A36.

2.1.3

All Structural pipe shall conform to ASTM A36, ASTM A53/grade B or API spec. 5L/grade B and shall be either seamless or mill welded. Spiral welded pipe is not acceptable.

2.2

BOLTS, NUTS AND WASHERS

2.2.1

Common (machine) bolts, preferably be 20 mm in diameter, shall be used for secondary steel-to-steel connections, conforming to ASTM A307/grade A.

Bolts with square heads and/or square nuts shall not be used. Washers are not required with common bolts.

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- 2.2.2 High strength bolts, preferably be 20 mm in diameter, shall be used for structural steel-to-steel connections, conforming to ASTM A325 specification. One high strength bolt assembly shall consist of one heavy semifinished hexagon structural bolt, one heavy semifinished hexagon nut and one hardened washer. Hardened washers are required to provide adequate bearing area. Where the surfaces of bolted parts in contact with the bolt head or nut have a slope of more than 1:20 with respect to a plane normal to the bolt axis, a smooth beveled washer shall be used to compensate for the lack of parallelism.
- 2.2.3 For dissimilar metal connections, fastener? shall be corrosion resistant steel, complying with applicable requirements of ASTM A276, Type 321 or other type corrosion resistant steel of the "18-8" category, suitable for the intended purpose.
- 2.3 WELDING MATERIALS
- Welding materials shall comply with the requirements of AWS D1.1, chapter 4:
- Part B Arc welding - metal arc welding with covered electrodes only.
 - Part C Submerged arc welding to be used only for complete penetration groove welds or fillet welds.
- 2.4 CERTIFICATES
- Certified mill test reports of all ASTM materials used, shall be kept on file by the steel fabricator for inspection by client. The test reports shall be the property of the client and shall be transferred to the client upon completion of fabrication. Steel shall be marked per ASTM A6, "Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet piling and Bars for Structural Use".