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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Replacing JGJ 138-2001

**Code for design of composite structures
(English Translation)**

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1 General

1.0.1

for the rational use of steel and concrete in the construction of composite structure, so security Full application, advanced technology, economic and reasonable, easy construction, the development of this specification.

1.0.2

This specification applies to non-seismic zones and seismic fortification intensity of 6 degrees to 9 degrees Seismic area of high - rise buildings, multi - storey buildings and general structures of steel and concrete composite structure design.

1.0.3

The design of the composite structure shall comply with the requirements of this specification the relevant provisions of the relevant national standards.

2.1.1 Composite structure members composite structure members

By the steel, steel or steel and steel reinforced concrete combination of the overall force of the structural components.

Composite structure

The structure consists of a composite structural member, as well as a combination of structural members and steel structures Pieces, reinforced concrete components of the

structure.

Steel reinforced concrete frame beam Frame beam of reinforced concrete section.

Reinforced concrete beam Supporting the upper floor of the wall or column, to achieve the upper floor to the lower floor structure of the form of turn Variable or structural arrangement of steel reinforced concrete beams; part of the frame shear wall structure conversion Beam also called frame beam.

Reinforced concrete frame Columns the frame of the steel frame in the reinforced concrete section.

2.1.6 Rectangular concrete-filled steel tubular column concrete-filled rectangular steel

Tube frame columns

Rectangular steel pipe filled with concrete to form steel frame and concrete common force frame column.

2.1.7 Circular concrete filled steel frame concrete column concrete-filled circular steel

Tube frame columns

The concrete columns are filled with concrete filled with steel and concrete.

2.1.8 Conversion column transfer columns

Supporting the upper floor of the wall or column, to achieve the upper floor to the lower floor structure of the form of turn Change or structure to change the column.

Steel concrete shear wall Reinforced concrete shear wall in the edge of the structure is equipped with solid steel shear wall.

2.1.10 Steel plate concrete shear wall steel plate infinity ncrete composite walls

Reinforced concrete sections are arranged in shear wall of steel plate and end section steel.

2.1.11 Steel oblique concrete shear wall steel concealed bracing concrete

Composite shear walls Shear Walls with Steel Bent and End Steel in Reinforced Concrete Section.

Steel and concrete composite beams the concrete wings and the steel girders are formed by the combination of shear joints to the force.

2.1.13 Composite slabs

The cast - in - place concrete is made of pressure - type steel plate and concrete.

3.1.1 Composite structure of steel components should be used Q345, Q390, Q420 low alloy

High-strength structural steel and Q235 carbon structural steel, the quality level should not be lower than the B level, and should be in line with the existing national standard "low - alloy high - strength structural steel)) GB/T 1591 and "carbon structural steel") GB/T 700. When thicker steel plates are used, Selection of materials, material in line with the current national standard "building structure with steel)) GB/T 19879 of the grades of steel, the quality level should not be lower than the B level. When using other cards when the steel, should still meet the relevant provisions of the current national standards.

3.1.2 steel should have yield strength, tensile strength, elongation, impact toughness and Sulfur, phosphorus content of the qualified guarantee, the welding structure should still have a carbon content of the qualified guarantee and the cold bend test of the qualified guarantee.

3.1.3 steel should be used to calm steel.

3.1.4 steel plate thickness greater than or equal to 40mm, and bear the direction of the thickness of the pull Welding connection plate, steel plate thickness direction cross section shrinkage, should not be less than the current national standard Quasi "thickness direction of the performance of steel)) GB/T 5313 Z15 level of the allowable value.

3.1.5 Considering the seismic action of the composite structure of the steel components should be consistent with national standards Code for seismic design of buildings) GB 50011 -.2010.

3.1.6 steel strength indicators should be used in Table 3.1.6-1, Table 3.1.6-2.

Table 3.1.6-1 Steel Strength Index CN/mnn

3.1.8 The quality of steel plate should be consistent with the current national standard "building pressure plate" GB/T 12755 of the provisions of the plate should be used to set the hot plate galvanized steel plate, not should choose aluminum plate. Plating layer should be consistent with the current national standard "continuous hot-dip galvanized steel Plate and strip)) GB/T 2518.

3.1.9 pressure plate should be used in line with the existing national standard "continuous hot plate bowl steel plate and steel)) GB/T 2518 of the S250 grades of structural steel, the strength of the standard value, the design values shall be used in accordance with Table 3.1.9.

Table 3.1.9 Standard value of pressure-type copper plate, design value (N/rnm2)

3.1.10 The welding material of steel shall meet the following requirements.

1 manual welding electrode should be compatible with the main metal mechanical properties, and should be consistent the current national standard "non-alloy steel and fine grain steel electrode)) GB/T 5117," heat Strong steel electrode)) GB/T 5118 regulations.

2 automatic welding or semi-automatic welding using the welding wire and flux, should be with the main body of gold is suitable for mechanical properties, and should meet the current national standard "submerged arc welding carbon steel wire and flux)) GB/T 5293, "Low alloy steel welding wire and flux for submerged arc welding)) GB/T 12470, "gas shielded arc welding with steel, low alloy steel wire)) GB/T 8110 requirements.

3.1.11 weld quality level should be consistent with the current national standard "steel structure construction quality Quantity acceptance specification)) GB 50205, the weld strength design value should be in accordance with Table 3.1.11 the provisions of the adoption.

Table 3.1.11 weld strength design (N/mm²)

3.1.12 Bolts and bolts used for connection of steel components shall comply with the following provisions.

1 ordinary bolts should comply with the current national standard "hex head bolts)) GB JT 5782 and "hex head bolts-c grade)) GB JT 5780 requirements; A, B-class bolts Hole accuracy and hole wall surface roughness, c-class bolt hole allowable deviation and hole wall surface Roughness, should meet the current national standard "steel structure construction quality acceptance rules Fan)) GB 50205 requirements.

2 high strength bolts should be consistent with the current national standard "steel structure with high strength six Corner jaws)) GB JT 1228, "High strength hexagon nuts for steel construction") GB JT 1229, "High strength gaskets for steel construction)) GB JT 1230," High strength for steel construction Hexagon head bolts, large hex nuts, washers Technical conditions > > GB/T 1231 or "steel Structure with torsional shear type high strength bolts connected deputy > > GB/T 3632 requirements.

3 The strength of the design of the common bolts should be calculated according to Table 3.1.12-1;

The value of the anti-slip coefficient of the friction surface of the bolted steel shall be used in accordance with Table 3.1.12-2;

The design of the high strength bolted connection preload should be used in accordance with Table 3.1.12-3.

4 anchor bolt can be used in line with the current national standard "carbon structural steel > > GB/T 700, "low-alloy high-strength structural steel") GB/T 1591 provides Q235 steel, Q345 steel.