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**Technical specification for high strength bolt connections of  
steel structures**

钢结构高强度螺栓连接技术规程

**(English Translation)**

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### 1.0.1

This Specification is formulated with a view to realizing the state-of-the-art technology, economy and rationality, safety and usability, and good quality during the design, construction and quality acceptance of high strength bolt connections of steel structures.

### 1.0.2

This Specification is applicable to the design, construction and quality acceptance of high strength bolt connections in the building steel structure engineering.

### 1.0.3

During the design, construction and quality acceptance of high strength bolt connections, not only the requirements stipulated in this Specification, but also those in the current relevant ones of the nation shall be complied with.

### **2.1.1 Heavy-hex high strength bolt assembly**

It refers to the assembly of connecting fastener composed of one heavy-hex high strength bolt, one heavy-hex high strength nut and two high strength plain steel washers.

### **2.1.2 Twist-off-type high strength bolt assembly**

It refers to the assembly of connecting fastener composed of one twist-off-type high strength bolt, one heavy-hex high strength nut and one high strength plain steel washer.

### **2.1.3 Faying surface**

It refers to the contact surface between high strength bolt connection slabs.

### **2.1.4 Pretension**

It refers to the tension produced along bolt shank axis direction by tightening high strength bolt assembly and required to meet the connection design.

### **2.1.5 Friction-type joint**

It refers to the connecting mode generating frictional resistance among connected pieces by high strength bolts tightening to transfer shear force and integrate components, units or plates.

### **2.1.6 Bearing-type joint**

It refers to the connecting mode adopting screw rod shear and hole wall pressure bearing to transfer shear force and integrate components, units or plates.

### **2.1.7 Prying action**

It refers to the additional pressure generated at the edge of connecting pieces due to connecting piece deformation and joint lever action caused by tensile load and bolt shaft axis deviation in the T-type tension joints.

### **2.1.8 Mean slip coefficient**

It refers to the ratio of external slip force to normal pressure (identical to the bolt pretension) in connection during the slip of faying surface of high strength bolt connections.

### **2.1.9 Torque-pretension coefficient**

It refers to the scale coefficient between the tightening torque applied on the nut and lead-in axial pretension (tightening axial force) on the bolt in the high strength bolt connections.

#### **2.1.10 Connection of sharing on a shear load by bolts and welds**

It refers to the joint type designed considering that friction-type high strength bolt connections and fillet weld share the same shear force.

#### **2.1.11 Joint with combined bolts and welds**

It refers to the joint type that flange adopts penetration weld connection and web adopts friction-type high strength bolt connection in the splice nodes of beam, column and supporting components as well as mutual connecting nodes.

#### **2.1.12 Calibrated wrench method**

It refers to the tightening method for high strength bolt assembly by controlling the construction torque values.

#### **2.1.13 Turn-of-nut method**

It refers to the tightening method for high strength bolt assembly by controlling the relative corner values of bolt and nut.

#### **2.2.1 Action and action effect**

F--Concentrated load;

M--Bending moment;

N--Concentric force;

P--Pretension of high strength bolt;

Q--Prying force;

V--Shear force.

#### **2.2.2 Calculation indices**

f--Design values of tensile, compression and bending strength of steels;

--Design value of bearing strength of high strength bolt connecting piece;

--Design value of tensile strength of high strength bolt;

f<sub>v</sub>--Design value of shear strength of steel;

--Design value of shear strength of high strength bolt;

--Design value of compression bearing capacity of single high strength bolt;

--Design value of tensile bearing capacity of single high strength bolt;

--Design value of shear bearing capacity of single high strength bolt;

$\sigma$ --Normal stress;

$\tau$ --Shear stress.

### 2.2.3 Geometric parameters

A--Gross sectional area;

$A_{eff}$ --Effective sectional area at the thread of high strength bolts;

$A_f$ --Gross sectional area of single flange;

$A_n$ --Net sectional area;

$A_w$ --Gross sectional area of web;

$a$ --Spacing;

$d$ --Diameter;

$d_0$ --Aperture;

$e$ --Eccentricity;

$h$ --Section height;

$h_f$ --Dimension of fillet weld leg;

$I$ --Gross section inertia moment;

$l$ --Length;

$S$ --Gross section area moment.

### 2.2.4 Calculation coefficients and others

$k$ --Torque-pretension coefficient;

$n$ --Quantity of high strength bolts;

$n_i$ --Quantity of high strength bolts on the calculated section;

$n_v$ --Quantity of shear surfaces of bolts;

$n_f$ --Quantity of force transmission faying surfaces of high strength bolts;

$\mu$ --Mean slip coefficient of connection faying surfaces of high strength bolts;

$N_v$ --Shear force on single high strength bolt;

$N_t$ --Tension on single high strength bolt;