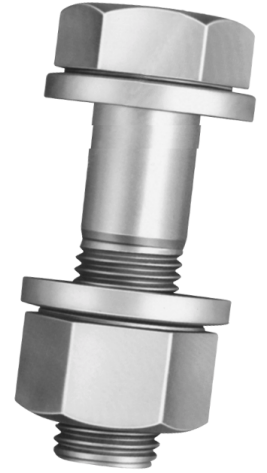


F8T Hot Dip Gal. Bolt

Hot Dip Galvanized High Strength Bolts

Characteristics

- The weight of zinc coating is over 550g/m² and boasts of long-term anti-corrosive effects.
- Strength and toughness of bolts are maintained before and after zinc coating.
- Nuts are lubricated after zinc coating. Torque coefficient of set is low and stable. Method of nut rotation degree is superior for fastening.
- These bolts, nut and washers have passed the Minister of Construction's general approval.



Classes and Grades

Type of set		Grade		
Type by mechanical properties	Type by torque coefficient	Bolt	Nut	Washer
Grade 1	A	F 8 T	F 10	F 35

Hot Dip Zinc Coating

JIS H 8641 Grade 2 HDZ55
Zinc Coating 550g/m² ≤

Mechanical Properties

Machined Test Pieces

Grade of bolt according to mechanical properties	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation (%)	Reduction of area (%)
F 8 T	640 min.	800 ~ 1000 min.	16 min.	45 min.

Full Size Bolts

Grade of bolt according to mechanical properties	Tensile load (min.) (KN)						Hardness
	Nominal size of thread						
	M16	M20	M22	M24	M27	M30	
F 8 T	126	196	242	282	367	449	H _R C 18 ~ 31

Nuts

Grade of nut according to mechanical properties	Hardness		Proof load
	Min.	Max.	
F 10	H _R B 95	H _R C 35	Same as tensile load (min.) of bolt

Hardness of Washers

Grade of washer according to mechanical properties	Hardness
F 35	H _R C 25 ~ 45

Torque Coefficient of Set

Type according to torque coefficient	Mean torque coefficient	Standard deviation of torque coefficient
A	0.110 ~ 0.150	0.010 or less

Design (Architecture)

Allowable shearing force of high strength bolts

Type of high strength bolt	Nominal diameter of bolt	Diameter of bolt shank (mm)	Bolt hole diameter (mm)	Sectional area of shank diameter (cm ²)	Effective sectional area (cm ²)	Tensile force of bolt design (KN)
F 8 T	M16	16	17.5	2.01	1.57	85.2
	M20	20	22.0	3.14	2.45	133.0
	M22	22	24.0	3.80	3.03	165.0
	M24	24	26.0	4.52	3.53	192.0
	M27	27	29.0	5.72	4.59	250.0
	M30	30	32.5	7.06	5.61	305.0

Type of high strength bolt	Nominal diameter of bolt	Tensile force of bolt design (KN)	Allowable shearing force (KN)				Allowable tensile force (KN)	
			Long-term		Short-term		Long-term	Short-term
			Single friction	Double friction	Single friction	Double friction		
F 8 T	M16	85.2	22.7	45.4	34.0	68	50.3	75.4
	M20	133.0	35.4	70.8	53.2	106	78.5	118.0
	M22	165.0	44.0	88.0	66.0	132	95.0	143.0
	M24	192.0	51.2	102.0	76.8	154	113.0	170.0
	M27	250.0	66.7	133.0	100.0	200	143.0	215.0
	M30	305.0	81.3	163.0	122.0	244	177.0	266.0

The allowable shearing force is calculated in accordance with the following equation in which slip factor is regarded as a constant of 0.4. The allowable tensile force observes the "Standard Design of Rigid Structures" indicated by the Japan Architectural Society.

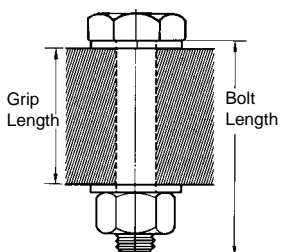
Allowable shearing force = $0.4 \times B_0$ (Tensile force of bolt design)

Determination of Bolt Hole Diameter

Nominal bolt diameter	Nominal bolt shank diameter	Bolt hole diameter
M16	16	17.5
M20	20	22.0
M22	22	24.0
M24	24	26.0
M27	27	29.0
M30	30	32.5

Unit: mm

Determination of Bolt Length



Nominal size of threads	To determine required bolt length add to grip
M16	30
M20	35
M22	40
M24	45
M27	50
M30	55

Unit: mm

F8T Hot Dip Gal. Bolt

Execution Works

Fastening the high strength bolt

Primary Fastening : Primary fastening includes tightening the temporary fastening bolt, checking the contact with the parts and then turning the nut according to the torque value indicated below, for all bolts.

Marking : Mark the bolt, nut, washer and parts after primary fastening to check the degree of primary fastening, measure the tightness of the nut, check to see all bolts are tightened and to discover any bolts, nuts and washers turning together.

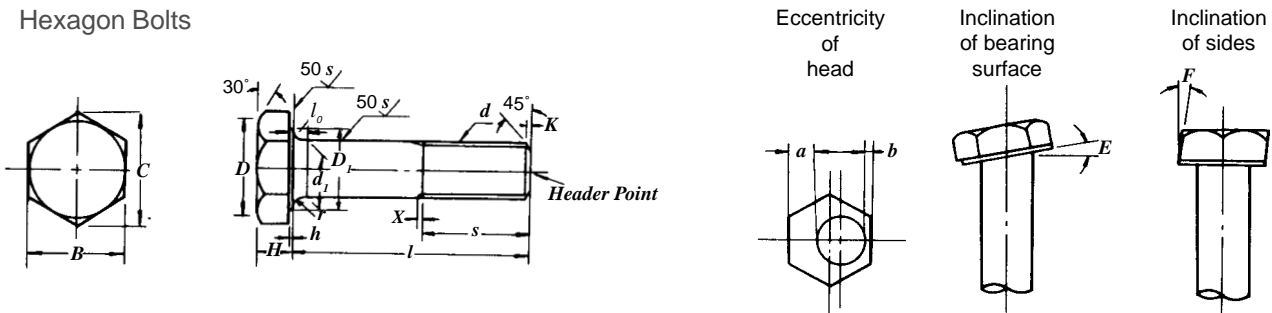
Final Fastening: Final fastening is conducted by turning the nut 120° , after Primary fastening and marking a group unit. Determine how many times the nut should be turned if the bolt length is over 5 times larger than the diameter of the bolt.

Inspection After Fastening: Visually examine the nut to confirm that it is within a $-30^\circ \sim +30^\circ$ range of the specific nut rotation degree.

Nominal Bolt Diameter	Primary fastening torque (N.M)
M16	approx. 100
M20 & M22	approx. 150
M24 & M27	approx. 200
M30	approx. 250

Shape and Dimensions

Hexagon Bolts



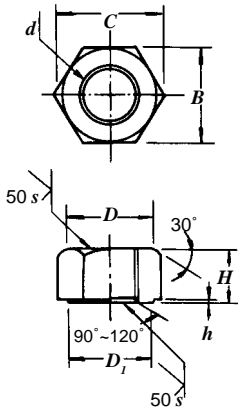
Nominal size of threads (d)	d_1		H		B		C	D	D_1	r	K	a - b	E	F	h	s	
	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.		Approx.	Max.	Max.	Max.		Basic dimension	Tolerance
M16	16	+0.7 ~ -0.2	10	± 0.8	27	0 ~ -0.8	31.2	25	25	1.2 ~ 2.0	2	0.8	1°	2°	0.4 ~ 0.8	30	+5 ~ 0
M20	20	+0.8 ~ -0.4	13	± 0.9	32	0 ~ -1	37	30	29		2.5	0.9				35	+6 ~ 0
M22	22		14		36		41.6	34	33	1.1	40						
M24	24		15		41		47.3	39	38	1.2	45						
M27	27	17	46	53.1	44	43	1.3	50									
M30	30	19	± 1.0	50	57.7	48	47	2.0 ~ 2.8	3.5	1.5	55						

Unit: mm

Nominal length (l)	Tolerance
less than 55	± 1.0
over 55 and under 125	± 1.4
over 125	± 1.8

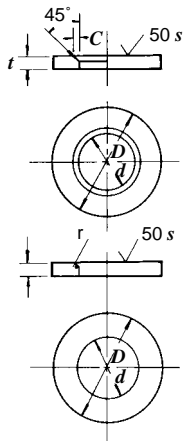
Unit: mm

Hexagon Nuts



Nominal size of threads (d)	Outside diameter external thread	H		B		C	D	D ₁	a-b	E	F	h
		Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Max.	Max.	
M16	16	16	± 0.35	27	0 ~ -0.8	31.2	25	25	0.8			0.4 ~ 0.8
M20	20	20	± 0.4	32	0 ~ -1	37.0	30	29	0.9	1°	2°	
M22	22	22		36		41.6	34	33	1.1			
M24	24	24		41		47.3	39	38	1.2			
M27	27	27		46		53.1	44	43	1.3			
M30	30	30		50		57.7	48	47	1.5			

Unit: mm



Plain Washers

Nominal size of washers	d		D		t		C or r
	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.
M16	17	+0.7 ~ 0	32	0 ~ -1	4.5	± 0.5	1.5
M20	21	+0.8 ~ 0	40		6		± 0.7
M22	23		44		6	2.4	
M24	25		48				
M27	28	+1.0 ~ 0	56	0 ~ -1.2	8	± 0.7	2.8
M30	31		60				

Unit: mm