Components

Bolt	Nut	Washer
F10T	F10	F35

Chemical Composition

	Chemical Composition(%)					
	C	Mn	P	S	Si	B
F10T	0.20~0.50	0.70~1.00	0.035 max.	0.035 max.	0.35 max.	0.0005 min.
F10	0.30~0.50	0.50~0.90	0.030 max.	0.035 max.	0.35 max.	— — —
F35	0.18~0.50	0.60~0.90	0.030 max.	0.035 max.	0.35 max.	— — —

Mechanical Properties

- **Test Specimen (Bolt)**

Bolt Specimen	Yield Strength kgf/mm² {N/mm²}	Tensile Strength kgf/mm² {N/mm²}	Elongation %	Reduction of Area %
F10T	91.8 min. {900 min.}	102.0~122.4 {1000~1200}	14 min.	40 min.

- **Full Size Product (Bolt)**

Bolt Grade	Minimum Strength kgf {KN}				Hardness
	Nominal Diameter				
	M16	M20	M22	M24	
F10T	16010 {157}	24983 {245}	30898 {303}	35996 {353}	27~38 HRC

• Nut

Nut Grade	Hardness	Proof load
F10	95 HRB ~ 35 HRC	Same as the minimum strength of full size bolt.

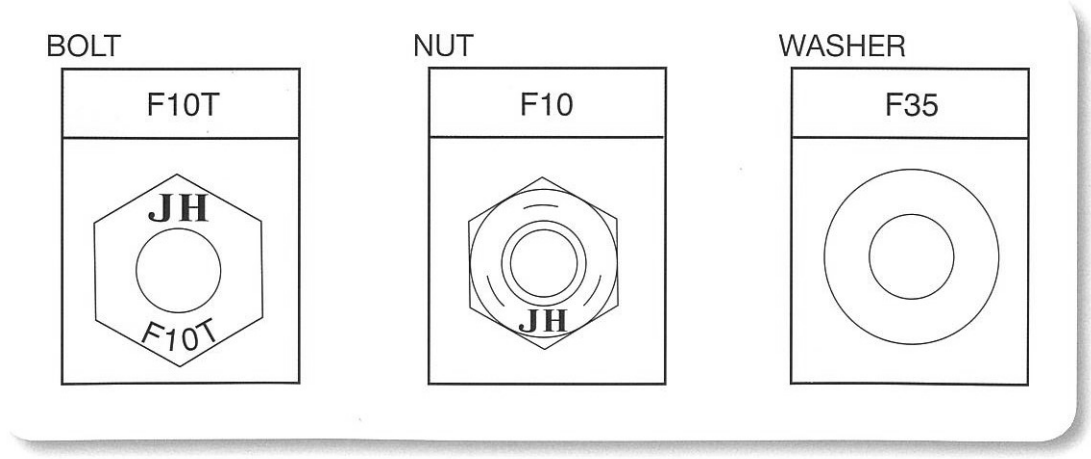
• Washer

Washer Grade	Hardness
F35	35 ~ 45 HRC

• Torque Coefficient of Set

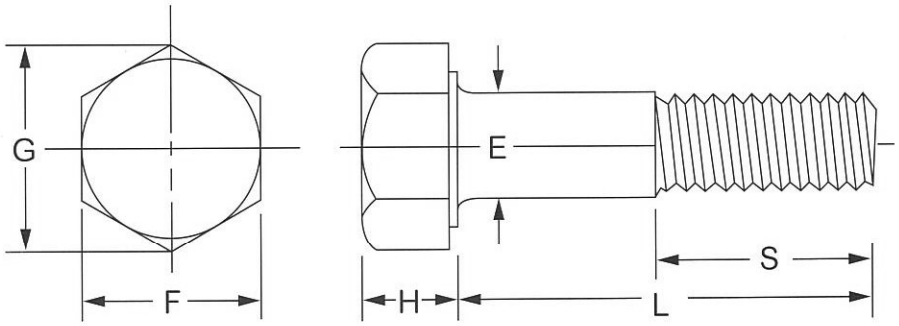
Friction Coeffcient		
	Class for Friction Coefficient	
	A	B
Average value of Friction Coefficient for one manufacturing lot	0.110~0.150	0.150~0.190
Standard deviation of Friction Coefficient for one manufacturing lot	0.010 max.	0.013 max.

Marking



Shape and Dimensions

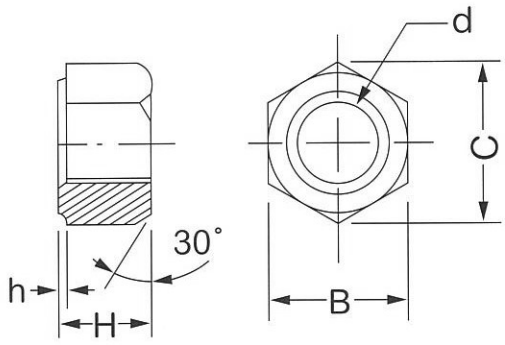
BOLT



UNIT: mm

Nominal Diameter (d)	E	H	F	G (Approx.)	S
M16	$16^{+0.7}_{-0.2}$	10±0.8	$27^{0}_{-0.8}$	31.2	30^{+5}_{0}
M20	$20^{+0.8}_{-0.4}$	13±0.9	32^{0}_{-1}	37.0	35^{+6}_{0}
M22	$22^{+0.8}_{-0.4}$	14±0.9	36^{0}_{-1}	41.6	40^{+6}_{0}
M24	$24^{+0.8}_{-0.4}$	15±0.9	41^{0}_{-1}	47.3	45^{+6}_{0}

NUT

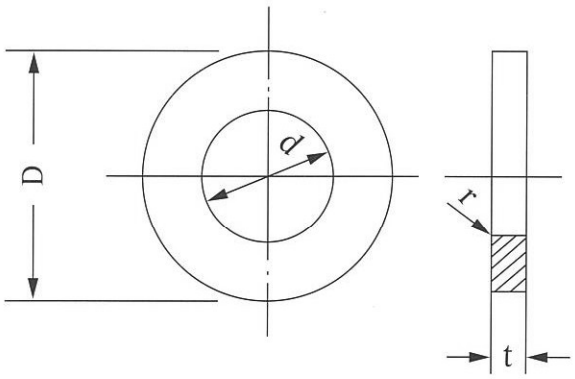


UNIT: mm

Nominal Diameter (d)	H	B	C (Approx.)	h
M16	16±0.35	$27^{0}_{-0.8}$	31.2	0.4~0.8
M20	20±0.4	32^{0}_{-1}	37.0	0.4~0.8
M22	22±0.4	36^{0}_{-1}	41.6	0.4~0.8
M24	24±0.4	41^{0}_{-1}	47.3	0.4~0.8

Washer

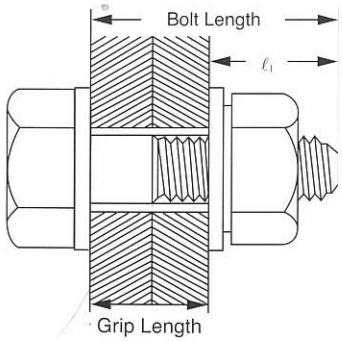
WASHER



UNIT: mm

Nominal Diameter	d	D	t
M16	$17^{+0.7}_{0}$	32^{0}_{-1}	4.5±0.5
M20	$21^{+0.8}_{0}$	40^{0}_{-1}	4.5±0.5
M22	$23^{+0.8}_{0}$	44^{0}_{-1}	6±0.7
M24	$25^{+0.8}_{0}$	48^{0}_{-1}	6±0.7

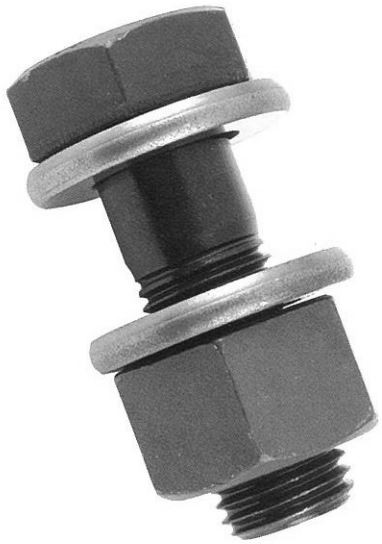
Determination of Bolt Length



Nominal Diameter	ℓ_1(mm)
M16	30
M20	35
M22	40
M24	45

*** Add ℓ_1 to Grip Length to determine Bolt Length.**

Weight Table



UNIT: gram

Nominal Diameter	M16	M20	M22	M24
Nut Weight	57	97	137	201
Washer Weight	20	32	52	62
Bolt Length	**Set Weight**	**Set Weight**	**Set Weight**	**Set Weight**
40	202	—	—	—
45	210	348	—	—
50	217	361	496	—
55	225	373	510	—
60	233	385	525	683
65	241	398	540	701
70	249	410	555	719
75	257	422	570	737
80	265	435	585	754
85	273	447	600	772
90	281	459	615	790
95	289	472	630	808
100	296	484	645	825
105	304	496	659	843
110	312	509	674	861
115	320	521	689	879
120	327	533	704	896
125	—	546	719	914
130	—	558	734	932
135	—	570	749	950
140	—	582	764	967
145	—	—	779	985
150	—	—	794	1003
160	—	—	823	1038
170	—	—	—	1074
180	—	—	—	1109

Approximate weight (1 set includes 1 Bolt, 1 Nut and 2 Washers)