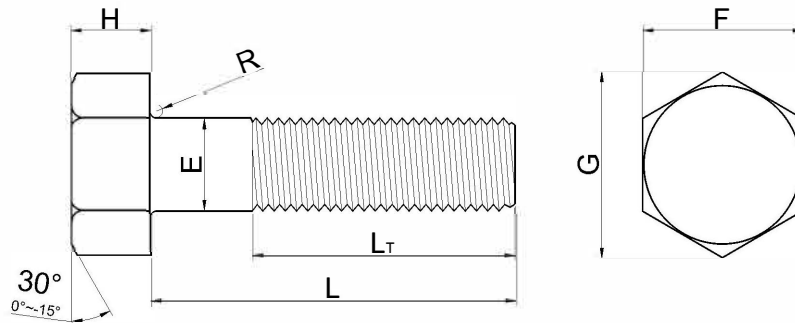


# HEX BOLT



## METRIC (KS B1002, JIS B1180)

(UNIT : mm)

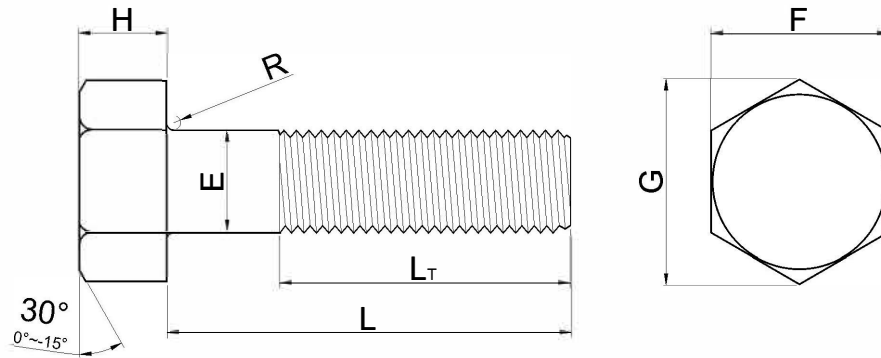
Diameter		E		H		F		G	R	L <sub>T</sub>			
Coarse	Fine	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App	Min	1≤125	125≤200	200≤400	
M12	1.75	1.25	12	0-0.25	8	±0.30	19	0-0.8	21.9	0.6	30	36	-
M14	2	1.5	14	0-0.25	9	±0.30	22	0-0.8	25.4	0.6	34	40	-
M16	2	1.5	16	0-0.25	10	±0.30	24	0-0.8	27.7	0.6	38	44	-
M18	2.5	1.5	18	0-0.25	12	±0.35	27	0-0.8	31.2	0.6	42	48	-
M20	2.5	1.5	20	0-0.35	13	±0.35	30	0-0.8	34.6	0.8	46	52	-
M22	2.5	1.5	22	0-0.35	14	±0.35	32	0-1.0	37.0	0.8	50	56	-
M24	3	2	24	0-0.35	15	±0.35	36	0-1.0	41.6	0.8	54	60	-
M27	3	2	27	0-0.35	17	±0.35	41	0-1.0	47.3	1.0	60	66	79
M30	3.5	2	30	0-0.35	19	±0.40	46	0-1.0	53.1	1.0	66	72	85
M33	3.5	2	33	0-0.40	21	±0.40	50	0-1.0	57.7	1.0	72	78	91
M36	4	3	36	0-0.40	23	±0.40	55	0-1.2	63.5	1.0	78	84	97
M39	4	3	39	0-0.40	25	±0.40	60	0-1.2	69.3	1.0	84	90	103
M42	4.5	-	42	0-0.40	26	±0.40	65	0-1.2	75.0	1.2	90	96	109
M45	4.5	-	45	0-0.40	28	±0.40	70	0-1.2	80.8	1.2	96	102	115
M48	5	-	48	0-0.40	30	±0.40	75	0-1.2	86.5	1.6	102	108	121
M52	5	-	52	0-0.45	33	±0.50	80	0-1.2	92.4	1.6	-	116	129
M56	5.5	-	56	0-0.45	35	±0.50	85	0-1.4	98.1	2.0	-	124	137
M60	5.5	-	60	0-0.45	38	±0.50	90	0-1.4	104.0	2.0	-	132	145
M64	6	-	64	0-0.45	40	±0.50	95	0-1.4	110.0	2.0	-	140	153
M68	6	-	68	0-0.45	43	±0.50	100	0-1.4	115.0	2.0	-	148	161
M72	-	6	72	0-0.45	45	±0.50	105	0-1.4	121.0	2.0	-	156	169
M76	-	6	76	0-0.45	48	±0.50	110	0-1.4	127.0	2.0	-	164	177
M80	-	6	80	0-0.45	50	±0.50	115	0-1.4	133.0	2.0	-	172	185

## UNIFIED (ANSI B18.2.1)

(UNIT : Inch)

Nominal Size or Basic Bolt Diameter		E	F				G		H			R		L <sub>T</sub>	
		Body Dia	Width Across Flats				Width Across Corners		Height			Radius of Fillet		Thread Length	
			Max	Basic	Max	Min	Max	Min	Basic	Max	Min	Max	Min	Basic	Basic
1/2	0.500	0.515	3/4	0.750	0.725	0.866	0.826	11/32	0.364	0.302	0.03	0.01	1.250	1.500	
5/8	0.625	0.642	15/16	0.938	0.906	1.083	1.033	27/64	0.444	0.378	0.06	0.02	1.500	1.750	
3/4	0.750	0.768	1.1/8	1.125	1.088	1.299	1.240	1/2	0.524	0.455	0.06	0.02	1.750	2.000	
7/8	0.875	0.895	1.5/16	1.312	1.269	1.516	1.477	37/64	0.604	0.531	0.06	0.02	2.000	2.250	
1	1.000	1.022	1.1/2	1.500	1.450	1.732	1.653	43/64	0.700	0.591	0.09	0.03	2.250	2.500	
1.1/8	1.125	1.149	1.11/16	1.688	1.631	1.949	1.859	3/4	0.780	0.658	0.09	0.03	2.500	2.750	
1.1/4	1.250	1.277	1.7/8	1.875	1.812	2.165	2.066	27/32	0.876	0.749	0.09	0.03	2.750	3.000	
1.3/8	1.375	1.404	2.1/16	2.062	1.994	2.382	2.273	29/32	0.940	0.810	0.09	0.03	3.000	3.250	
1.1/2	1.500	1.531	2.1/4	2.250	2.175	2.598	2.480	1	1.036	0.902	0.09	0.03	3.250	3.500	
1.3/4	1.750	1.785	2.5/8	2.625	2.538	3.031	2.893	1.5/32	1.196	1.054	0.12	0.04	3.750	4.000	
2	2.000	2.039	3	3.000	2.900	3.464	3.306	1.11/32	1.388	1.175	0.12	0.04	4.250	4.500	
2.1/4	2.250	2.305	3.3/8	3.375	3.262	3.897	3.719	1.1/2	1.548	1.327	0.19	0.06	4.750	5.000	
2.1/2	2.500	2.559	3.3/4	3.750	3.625	4.330	4.133	1.21/32	1.708	1.479	0.19	0.06	5.250	5.500	
2.3/4	2.750	2.827	4.1/8	4.125	3.988	4.763	4.546	1.13/16	1.869	1.632	0.19	0.06	5.750	6.000	
3	3.000	3.081	4.1/2	4.500	4.350	5.196	4.959	2	2.060	1.815	0.19	0.06	6.250	6.500	
3.1/4	3.250	3.335	4.7/8	4.875	4.712	5.629	5.372	2.3/16	2.251	1.936	0.19	0.06	6.750	7.000	
3.1/2	3.500	3.589	5.1/4	5.250	5.075	6.062	5.786	2.5/16	2.380	2.057	0.19	0.06	7.250	7.500	
3.3/4	3.750	3.858	5.5/8	5.625	5.437	6.495	6.198	2.1/2	2.572	2.241	0.19	0.06	7.750	8.000	
4	4.000	4.111	6	6.000	5.800	6.928	6.612	2.11/16	2.764	2.424	0.19	0.06	8.250	8.500	

# HEAVY HEX BOLT



METRIC (ANSI B18.2.3.6M)

(UNIT : mm)

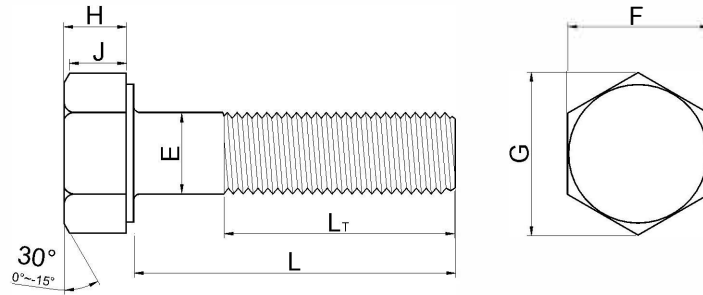
Nominal Bolt Size & Thread Pitch	E		F		G		H		R	L <sub>T</sub>		
	Body Diameter		Width Across Flats		Width Across Corners		Head Height		Radius of Fillet	Thread Length		
	Max	Min	Max	Min	Max	Min	Max	Min		Min	L ≤ 125	125 < L ≤ 200
M12X1.75	12.70	11.30	21.00	20.16	24.25	22.78	7.95	7.24	0.6	30	36	49
M14x2	14.70	13.30	24.00	23.16	27.71	26.17	9.25	8.51	0.6	34	40	53
M16x2	16.70	15.30	27.00	26.16	31.18	29.56	10.75	9.68	0.6	38	44	57
M20x2.5	20.84	19.16	34.00	33.00	39.26	37.29	13.40	12.12	0.8	46	52	65
M24x3	24.84	23.16	41.00	40.00	47.34	45.20	15.90	14.56	0.8	54	60	73
M30x3.5	30.84	29.16	50.00	49.00	57.74	55.37	19.75	17.92	1.0	66	72	85
M36x4	37.00	35.00	60.00	58.80	69.28	66.44	23.55	21.72	2.0	78	84	97

UNIFIED (ANSI B18.2.1)

(UNIT : Inch)

Nominal Size or Basic Bolt Diameter	E		F		G		H			R		L <sub>T</sub>		
	Body Dia		Width Across Flats		Width Across Corners		Height			Radius of Fillet		Thread Length		
	Max	Basic	Max	Min	Max	Min	Basic	Max	Min	Max	Min	Basic	Basic	
1/2	0.500	0.515	7/8	0.875	0.850	1.010	0.969	11/32	0.364	0.302	0.03	0.01	1.250	1.500
5/8	0.625	0.642	1.1/16	1.062	1.031	1.227	1.175	27/64	0.444	0.378	0.06	0.02	1.500	1.750
3/4	0.750	0.768	1.1/4	1.250	1.212	1.443	1.383	1/2	0.524	0.455	0.06	0.02	1.750	2.000
7/8	0.875	0.895	1.7/16	1.438	1.394	1.660	1.589	37/64	0.604	0.531	0.06	0.02	2.000	2.250
1	1.000	1.022	1.5/8	1.625	1.575	1.876	1.796	43/64	0.700	0.591	0.09	0.03	2.250	2.500
1.1/8	1.125	1.149	1.13/16	1.812	1.756	2.093	2.002	3/4	0.780	0.658	0.09	0.03	2.500	2.750
1.1/4	1.250	1.277	2	2.000	1.938	2.309	2.209	27/32	0.876	0.749	0.09	0.03	2.750	3.000
1.3/8	1.375	1.404	2.3/16	2.188	2.119	2.562	2.416	29/32	0.940	0.810	0.09	0.03	3.000	3.250
1.1/2	1.500	1.531	2.3/8	2.375	2.300	2.742	2.622	1	1.036	0.902	0.09	0.03	3.250	3.500
1.3/4	1.750	1.785	2.3/4	2.750	2.662	3.175	3.035	1.5/32	1.196	1.054	0.12	0.04	3.750	4.000
2	2.000	2.039	3.1/8	3.125	3.025	3.608	3.449	1.11/32	1.388	1.175	0.12	0.04	4.250	4.500
2.1/4	2.250	2.305	3.1/2	3.500	3.388	4.041	3.862	1.1/2	1.548	1.327	0.19	0.06	4.750	5.000
2.1/2	2.500	2.559	3.7/8	3.875	3.750	4.474	4.275	1.21/32	1.708	1.479	0.19	0.06	5.250	5.500
2.3/4	2.750	2.827	4.1/4	4.250	4.112	4.907	4.688	1.13/16	1.869	1.632	0.19	0.06	5.750	6.000
3	3.000	3.081	4.5/8	4.625	4.475	5.340	5.102	2	2.060	1.815	0.19	0.06	6.250	6.500

# HEX CAP SCREW | HEAVY HEX CAP SCREW



HEX CAP SCREW (ANSI B18.2.1)

(UNIT : Inch)

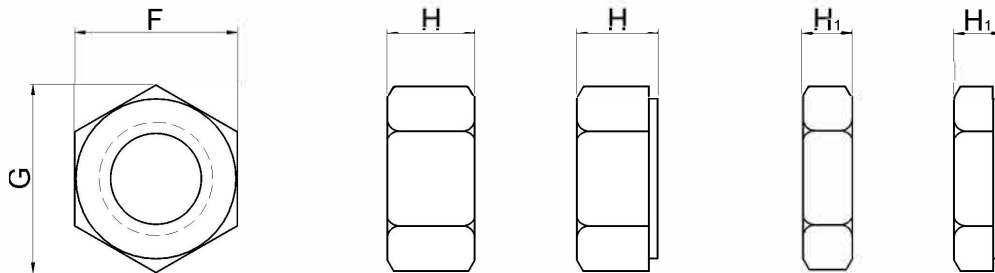
Nominal Size or Basic Product Diameter	E		F			G		H			J	L <sub>T</sub>	
	Body Diameter		Width Across Flats			Width Across Corners		Height			Wrenching Height	Thread Length	
	Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min		Min	Basic
1/2	0.500	0.493	3/4	0.750	0.736	0.866	0.840	5/16	0.323	0.302	0.215	1.25	1.50
9/16	0.5625	0.5545	13/16	0.812	0.798	0.938	0.910	23/64	0.371	0.348	0.250	1.375	1.625
5/8	0.625	0.617	15/16	0.938	0.922	1.083	1.051	25/64	0.403	0.378	0.269	1.50	1.75
3/4	0.750	0.741	1.1/8	1.125	1.100	1.299	1.254	15/32	0.483	0.455	0.324	1.75	2.00
7/8	0.875	0.866	1.5/16	1.312	1.285	1.516	1.465	35/64	0.563	0.531	0.378	2.00	2.25
1	1.000	0.990	1.1/2	1.500	1.469	1.732	1.675	39/64	0.627	0.591	0.416	2.25	2.50
1.1/8	1.125	1.114	1.11/16	1.688	1.631	1.949	1.859	11/16	0.718	0.658	0.461	2.50	2.75
1.1/4	1.250	1.239	1.7/8	1.875	1.812	2.165	2.066	25/32	0.813	0.749	0.530	2.75	3.00
1.3/8	1.375	1.363	2.1/16	2.062	1.994	2.382	2.273	27/32	0.878	0.810	0.569	3.00	3.25
1.1/2	1.500	1.488	2.1/4	2.250	2.175	2.598	2.480	1.5/16	0.974	0.902	0.640	3.25	3.50
1.3/4	1.750	1.738	2.5/8	2.625	2.538	3.031	2.893	1.3/32	1.134	1.054	0.748	3.75	4.00
2	2.000	1.988	3	3.000	2.900	3.464	3.306	1.7/32	1.263	1.175	0.825	4.25	4.50
2.1/4	2.250	2.238	3.3/8	3.375	3.262	3.897	3.719	1.3/8	1.423	1.327	0.933	4.75	5.00
2.1/2	2.500	2.488	3.3/4	3.750	3.625	4.330	4.133	1.17/32	1.583	1.479	1.042	5.25	5.50
2.3/4	2.750	2.738	4.1/8	4.125	3.988	4.763	4.546	1.11/16	1.744	1.632	1.151	5.75	6.00
3	3.000	2.988	4.1/2	4.500	4.350	5.196	4.956	1.7/8	1.935	1.815	1.290	6.25	6.50

HEAVY HEX SCREW (ANSI B18.2.1)

(UNIT : Inch)

Nominal Size or Basic Product Diameter	E		F			G		H			J	L <sub>T</sub>	
	Body Diameter		Width Across Flats			Width Across Corners		Height			Wrenching Height	Thread Length	
	Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min		Min	Basic
1/2	0.500	0.482	7/8	0.875	0.850	1.010	0.969	5/16	0.323	0.302	0.215	1.25	1.50
5/8	0.625	0.605	1.1/16	1.062	1.031	1.227	1.175	25/64	0.403	0.378	0.269	1.50	1.75
3/4	0.750	0.729	1.1/4	1.250	1.212	1.443	1.383	15/32	0.483	0.455	0.324	1.75	2.00
7/8	0.875	0.852	1.7/16	1.438	1.394	1.660	1.589	35/64	0.563	0.531	0.378	2.00	2.25
1	1.000	0.976	1.5/8	1.625	1.575	1.876	1.796	39/64	0.627	0.591	0.416	2.25	2.50
1.1/8	1.125	1.098	1.13/16	1.812	1.756	2.093	2.002	11/16	0.718	0.658	0.461	2.50	2.75
1.1/4	1.250	1.223	2	2.000	1.938	2.309	2.209	25/32	0.813	0.749	0.530	2.75	3.00
1.3/8	1.375	1.345	2.3/16	2.188	2.119	2.526	2.416	27/32	0.878	0.810	0.569	3.00	3.25
1.1/2	1.500	1.470	2.3/8	2.375	2.300	2.742	2.622	15/16	0.974	0.902	0.640	3.25	3.50
1.3/4	1.750	1.716	2.3/4	2.750	2.662	3.175	3.035	1.3/32	1.134	1.054	0.748	3.75	4.00
2	2.000	1.964	3.1/8	3.125	3.025	3.608	3.449	1.7/32	1.263	1.175	0.825	4.25	4.50
2.1/4	2.250	2.214	3.1/2	3.500	3.388	4.041	3.862	1.3/8	1.423	1.327	0.933	4.75	5.00
2.1/2	2.500	2.461	3.7/8	3.875	3.750	4.474	4.275	1.17/32	1.583	1.479	1.042	5.25	5.50
2.3/4	2.750	2.711	4.1/4	4.250	4.112	4.907	4.688	1.11/16	1.744	1.632	1.151	5.75	6.00
3	3.000	2.961	4.5/8	4.625	4.475	5.340	5.102	1.7/8	1.935	1.815	1.290	6.25	6.50

# HEX NUT & HEX JAM NUT



METRIC (KS B1012, JIS B1181)

(UNIT : mm)

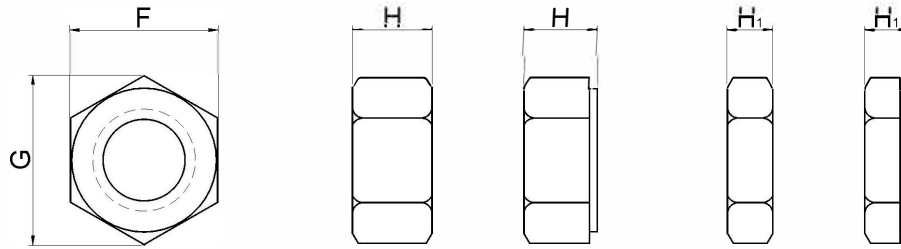
Diameter		F		H		H <sub>1</sub>		G	
Coarse	Fine	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App.	
M12	1.75	1.25	19	0 -0.8	10	-0.58	7	-0.58	21.9
M14	2	1.5	22		11	-0.7	8		25.4
M16	2	1.5	24		13		10	27.7	
M18	2.5	1.5	27		15		11	31.2	
M20	2.5	1.5	30	16	12		34.6		
M22	2.5	1.5	32	0 -1.0	18	-0.84	13	-0.7	37
M24	3	2	36		19		14		41.6
M27	3	2	41		22		16	47.3	
M30	3.5	2	46		24		18	53.1	
M33	3.5	2	50	0 -1.2	26	-1.0	20	-0.84	57.7
M36	4	3	55		29		21		63.5
M39	4	3	60		31		23	69.3	
M42	4.5	-	65		34		25	75	
M45	4.5	-	70	0 -1.4	36	-1.2	27	-1.0	80.8
M48	5	-	75		38		29		86.5
M52	5	-	80		42		31	92.4	
M56	5.5	-	85		45		34	98.1	
M60	5.5	-	90	0 -1.4	48	-1.2	36	-1.0	104
M64	6	-	95		51		38		110
M68	6	-	100		54		40	115	
M72	-	6	105		58		42	121	
M76	-	6	110	0 -1.4	61	-1.2	46	-1.0	127
M80	-	6	115		64		48		133

UNIFIED (ANSI B18.2.2)

(UNIT : Inch)

Diameter		F		G		H		H <sub>1</sub>	
		Max	Min	Max	Min	Max	Min	Max	Min
1/2	0.5000	0.750	0.736	0.866	0.840	0.448	0.427	0.323	0.302
5/8	0.6250	0.938	0.922	1.083	1.051	0.559	0.535	0.387	0.363
3/4	0.7500	1.125	1.088	1.299	1.240	0.665	0.617	0.446	0.398
7/8	0.8750	1.312	1.269	1.516	1.447	0.776	0.724	0.510	0.458
1	1.0000	1.500	1.450	1.732	1.653	0.887	0.831	0.757	0.519
1.1/8	1.1250	1.688	1.631	1.949	1.859	0.999	0.939	0.639	0.579
1.1/4	1.2500	1.875	1.812	2.165	2.066	1.094	1.030	0.751	0.687
1.3/8	1.3750	2.062	1.994	2.382	2.273	1.206	1.138	0.815	0.747
1.1/2	1.5000	2.250	2.175	2.598	2.480	1.317	1.245	0.880	0.808

# HEAVY HEX NUT & HEAVY HEX JAM NUT



## METRIC (ANSI B18.2.4.6M)

(UNIT : mm)

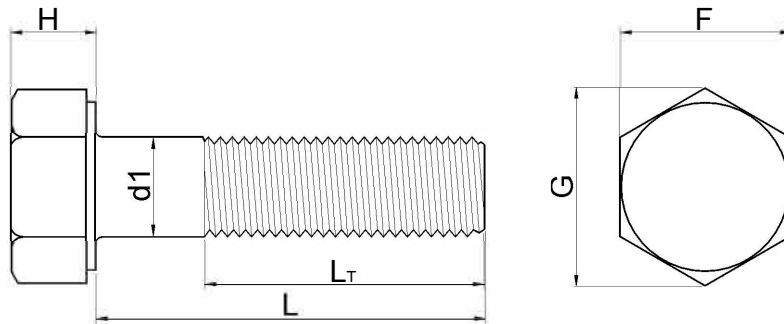
Diameter	F		G		H	
	Max	Min	Max	Min	Max	Min
M12	21.00	20.16	24.25	22.78	12.3	11.9
M14	24.00	23.16	27.71	26.17	14.3	13.6
M16	27.00	26.16	31.18	29.56	17.1	16.4
M20	34.00	33.00	39.26	37.29	20.7	19.4
M22	36.00	35.00	41.57	39.55	23.6	22.3
M24	41.00	40.00	47.34	45.20	24.2	22.9
M27	46.00	45.00	53.12	50.85	27.6	26.3
M30	50.00	49.00	57.74	55.37	30.7	29.1
M36	60.00	58.80	69.28	66.44	36.6	35.0
M42	70.00	67.90	80.83	77.41	42.0	40.4
M48	80.00	77.60	92.38	88.46	48.0	46.4
M56	90.00	87.20	103.92	99.41	56.0	54.1
M64	100.00	96.80	115.47	110.35	64.0	62.1
M72	110.00	106.40	127.02	121.30	72.0	70.1
M80	120.00	116.00	138.56	132.24	80.0	78.1
M90	135.00	130.50	155.88	148.77	90.0	87.8
M100	150.00	145.00	173.21	165.30	100.0	97.8

## UNIFIED (ANSI B18.2.2)

(UNIT : Inch)

Diameter	F		G		H		H <sub>1</sub>	
	Max	Min	Max	Min	Max	Min	Max	Min
1/2	0.875	0.850	1.010	0.969	0.504	0.464	0.317	0.277
5/8	1.062	1.031	1.227	1.175	0.631	0.587	0.381	0.337
3/4	1.250	1.212	1.443	1.382	0.758	0.710	0.446	0.398
7/8	1.438	1.394	1.660	1.589	0.885	0.833	0.510	0.458
1	1.625	1.575	1.876	1.796	1.012	0.956	0.575	0.519
1.1/8	1.812	1.756	2.093	2.002	1.139	1.079	0.639	0.579
1.1/4	2.000	1.938	2.309	2.209	1.251	1.187	0.751	0.687
1.3/8	2.188	2.119	2.526	2.416	1.378	1.310	0.815	0.747
1.1/2	2.375	2.300	2.742	2.622	1.505	1.433	0.880	0.808
1.5/8	2.562	2.481	2.959	2.828	1.632	1.556	0.944	0.868
1.3/4	2.750	2.662	3.175	3.035	1.759	1.679	1.009	0.929
1.7/8	2.938	2.844	3.392	3.242	1.886	1.802	1.073	0.989
2	3.125	3.025	3.608	3.449	2.013	1.925	1.138	1.050
2.1/4	3.500	3.388	4.041	3.862	2.251	2.155	1.251	1.155
2.1/2	3.875	3.750	4.474	4.275	2.505	2.401	1.505	1.401
2.3/4	4.250	4.112	4.907	4.688	2.759	2.647	1.634	1.522
3	4.625	4.475	5.340	5.102	3.013	2.893	1.763	1.643
3.1/4	5.000	4.838	5.774	5.515	3.252	3.124	1.876	1.748
3.1/2	5.375	5.200	6.207	5.928	3.506	3.370	2.006	1.870
3.3/4	5.750	5.562	6.640	6.341	3.760	3.616	2.134	1.990
4	6.125	5.925	7.073	6.775	4.014	3.862	2.264	2.112

# HIGH STRENGTH HEX BOLT



HIGH STRENGTH HEX. BOLT (KS B1010, JIS B1186)

(UNIT : mm)

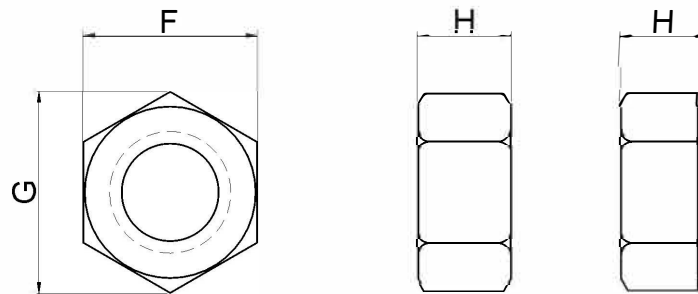
Designation of Screw Threads(d)	d1		H		F		G		L <sub>T</sub>	
	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App.	Basic	Basic	Tolerance
M12	12	+0.7 -0.2	8	±0.8	22	0 -0.8	25.4	25	+5 0	
M16	16		10		27		31.2	30		
M20	20	+0.8 -0.4	13	±0.9	32	0 -1.0	37	35	+6 0	
M22	22		14		36		41.6	40		
M24	24		15		41		47.3	45		
M27	27		17		46		53.1	50		
M30	30		19	±1.0	50		57.7	55		

HEAVY HEX. STRUCTURAL BOLT (ANSI B18.2.2)

(UNIT : Inch)

Diameter	F		G		H		L <sub>T</sub>
	Max.	Min.	Max.	Min.	Max.	Min.	Basic
1/2"	0.875	0.850	1.010	0.969	0.323	0.302	1.00
5/8"	1.062	1.031	1.227	1.175	0.403	0.378	1.25
3/4"	1.250	1.212	1.443	1.383	0.483	0.455	1.38
7/8"	1.438	1.394	1.660	1.589	0.563	0.531	1.50
1"	1.625	1.575	1.876	1.796	0.627	0.591	1.75
1.1/8"	1.812	1.756	2.093	2.002	0.718	0.658	2.00
1.1/4"	2.000	1.938	2.309	2.209	0.813	0.749	2.00
1.3/8"	2.188	2.119	2.526	2.416	0.878	0.810	2.25
1.1/2"	2.375	2.300	2.742	2.622	0.974	0.902	2.25

# HIGH STRENGTH HEX NUT



METRIC (KS B1010, JIS B1186)

(UNIT : mm)

Designation of Screw Threads(d)	Outside Diameter of External Threads	H		F		G
		Basic	Tolerance	Basic	Tolerance	App.
M12	12	12	±0.35	22	0 -0.8	25.4
M16	16	16		27		31.2
M20	20	20	±0.4	32	0 -1	37
M22	22	22		36		41.6
M24	24	24		41		47.3
M27	27	27		46		53.1
M30	30	30		50		57.7

HEAVY HEX. NUT (ANSI B18.2.2)

(UNIT : Inch)

Diameter	F		G		H	
	Max.	Min.	Max.	Min.	Max.	Min.
1/2"	0.875	0.850	1.010	0.969	0.504	0.464
5/8"	1.062	1.031	1.227	1.175	0.631	0.587
3/4"	1.250	1.212	1.443	1.382	0.758	0.710
7/8"	1.438	1.394	1.660	1.589	0.885	0.833
1"	1.625	1.575	1.876	1.796	1.012	0.956
1.1/8"	1.812	1.756	2.093	2.002	1.139	1.079
1.1/4"	2.000	1.938	2.309	2.209	1.251	1.187
1.3/8"	2.188	2.119	2.526	2.416	1.378	1.310
1.1/2"	2.375	2.300	2.742	2.622	1.505	1.433