



MAUDLE HIGH-TENSILE SCREWS

# MAUDLE HIGH-TENSILE SCREWS

Meeting the International Standard of : ANSI • DIN • JIS • BS  
Material : Stainless Steel • Alloy Steel • Mild Carbon Steel



# ABOUT US

有關茂異



茂異實業股份有限公司創立於1987年，座落於台灣的中部，專業生產合金鋼與不鏽鋼材質之內六角螺絲、半圓頭內六角螺絲、平頭內六角螺絲及各式特殊螺絲產品製造，包括德標、美標、日標、ISO等各類產品規格，範圍為：公制 M3 ~ M24 ；英制 #0 ~ 1 " ，廣泛應用於機械、電器、模具、汽機車、高速鐵路等專業用途，客戶遍佈美、日、歐、陸，品質優良，規格齊全，產品備有庫存，產量充足以供應全球外銷與國內銷售之客戶需求。



## 品質至上

成立以來秉持品質至上的經營理念，不斷提升與強化生產與服務流程，早在1994年即加入推動ISO-9001的行列，於1995年通過法商立德 (BVQI) 的ISO-9001認證，同時為了提升檢驗技術水準，於1998年成立了茂異螺絲檢測實驗室，並於1999年取得中華民國實驗室認證體系(CNLA)的實驗認證，同時採用ERP管理系統，有效管理從原料到產品倉儲的每個生產過程，每年皆投入可觀的研發費用、增購軟硬體設備、加強人員培訓以滿足客戶的要求，茂異不斷地追求進步，嚴格把關每一道流程，確實的批號管制可追溯生產源頭，以確保提供性能優良的螺絲，目的給予顧客最佳品質的承諾！

## 成長擴展

茂異每年設有營運目標追求穩定地成長，腳踏實地、實事求是的精神是公司多年來歷經多次不景氣、市場變化中得以不斷成長的主因。隨著品質與服務的提升，國內外業績不斷攀升，茂異不但在台灣設立門市有效率地服務客戶，為持續擴大產能，茂異亦於2000年在上海昆山投資設立宏茂五金(昆山)有限公司，坐落於江蘇昆山花橋鎮，毗鄰上海安亭國際汽車城。占地面積4萬多平方公尺，建築面積2萬多平方公尺，現有職工350多人，亦陸續於上海、廣州、天津、蘇州、杭州、瀋陽等各地設立據點，產品暢銷於中國大陸、歐洲、美國及東南亞地區市場，未來台灣茂異也持續與大陸宏茂分工合作，給予客戶最滿意的產品與服務。

## 企業承諾

茂異擁有完善的品質管制體系，從原材料進料檢驗、生產控制流程及成品出貨都被嚴格的控制和管理，因為這份堅持，茂異承諾以最嚴謹的品管監控著每一項生產細節與過程，給予客戶最迅速與良好的服務，因為打上「TUZ」商標的螺絲，就代表著品質的保證！





# ABOUT TUZ

Maudle (TUZ) Industrial Co., Ltd., established in 1987, is located in the central Taiwan. As a premier professional fastener manufacturer, TUZ is dedicated to supplying wide range styles of hex socket screws from high strength alloy steel, carbon steel to stainless steel. The products meet various international industrial standards including German, United States, Great Britain, Japan and ISO; Range from M2 to M24 in metric sizes and #0 to 1" in Imperial Size. Our products suit multiple industries, such as machinery, electric appliances, molds, automotive, high-tech constructions and high-speed transportation. In addition to the standard sizes, our well-trained technicians are able to produce customized unique bolts or screws to satisfy the special requirements of our valuable customers.



### Quality First

We believe that the future of TUZ depends on our commitment to quality. Since 1995, we have been certified by the BVQI (Bureau Veritas Quality International N.A. INC.) according to ISO-9001. In order to enhance product quality, we have established our own quality laboratory since 1998. One year later, the laboratory also got the approval by the CNLA. Besides, the laboratory is registered in U.S.A. for the approved laboratory of FQA as well. In terms of operating process control, TUZ has conducted ERP system since 2001 to assist division managers overseeing every single process in each department. Guaranteeing the best quality for all customers is our top priority and sincere promise.



### TUZ's Expansion

TUZ is still growing healthily in the past 3 decades. In order to provide domestic customers with efficient service, TUZ has set up two sales centers in Taiwan during 90s. In addition, TUZ set up Morgan Hardware Co., mega production center, in Kunshan, Mainland China in 2000. It occupies over 20,000 square meters and has 350 employees. We also have several sales centers in major cities such as Guangzhou, Tianjin, HangZhou and so on. TUZ fasteners have established excellent reputation and loyal customers around the world, particularly in Asia and North America market. We will continue to expand our sales channels and benefit all customers in the coming days.



### Our Promise

From raw material to finishing product, TUZ insists on supervising every single process prudently through our quality control system. Due to this persistence, every single screw with TUZ marking represents top-notch quality. We hereby sincere promise to provide our customers with premier quality products and customer service.



PRODUCTION &  
QUALITY CONTROL

**TUZ**

MAUDLE HIGH-TENSILE SCREWS



# 生產與品管

PRODUCTION AND QUALITY CONTROL

## 線材

WIRE ROD

進行線材驗收，透過品質測試確保原料品質百分百合格。  
Raw wire rods are checked prudently to assure reliability.

## 成型

FORMING

擁有多部各種尺寸、大小、類型之成型機器，產能充足。  
We have wide range of forming machines to satisfy customer's request.

## 輾牙

THREAD-ROLLING

20年經驗師傅熟練地將成型螺絲依不同需求輾牙成型。  
Our experienced technicians can make different types of thread rolling on demand.

## 巡視

TOUR OF INSPECTION

每日定時多次巡視，每次測量規格品質是否符合規範。  
Quality control colleagues make regular inspections throughout the day.

## 熱處理

HEAT TREATMENT

將成型之螺絲經高溫熱處理，增強螺絲強度與硬度。  
Heat treatment is an essential step to enhance hardness and tensile strength.

## 表面處理

FINISH

依客戶不同需求，進行專業表面處理加工。例如：電鍍、染黑、耐落等處理。  
We can do different secondary works such as Zinc coating, Nylon patch or Nickel plate based on customers' demand.

## 品管

QUALITY CONTROL

每批螺絲須經實驗室檢驗合格，透過拉力測試、硬度測試、鹽霧測試、氫脆測試...等各種機械性能測試的嚴格把關，落實品質管理。  
Every lot of fasteners will be tested by our quality control colleagues on tensile, hardness etc., to guarantee good quality.

## 倉管

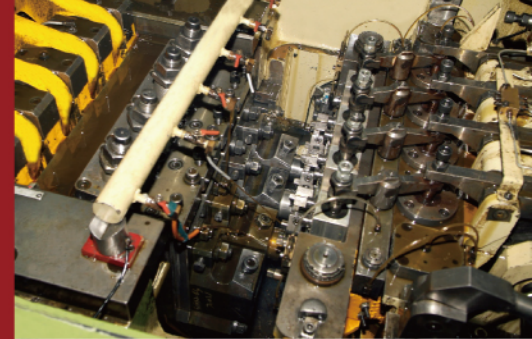
STOCK MANAGEMENT

超過2000噸的常備庫存、電腦化的倉儲管理、整潔的包裝，能立即因應客戶需求快速而正確地出貨。  
The ERP system enables us to manage our stock efficiently and handle customers' specific packing requirements.

## 流程卡

PROCESS CONTROL

清楚的標示嚴格控管每一關卡，確保品質優良。  
Process control cards are employed to ensure products are processed carefully every step of manufacturing.





MAUDLE HIGH-TENSILE SCREWS

## 品質認證 PRODUCTION & QUALITY CONTROL

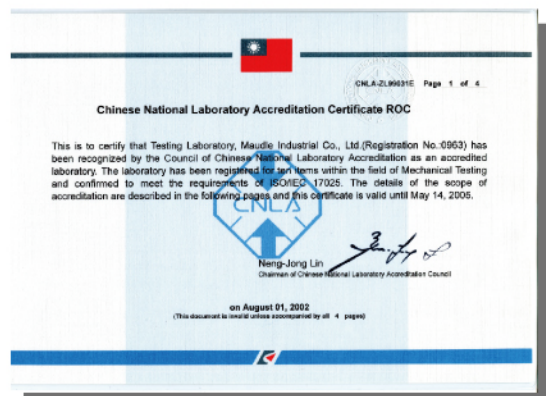
1995年即通過ISO 9001，近20年來一步一腳印，步步踏實，追求品質的精進！

Maudle has been ISO 9001 certified since 1995 and making unremitting efforts to enhance product quality.



取得實驗室證書，致力研發新產品

Our laboratory is also approved by CNLA and is engaged in new or customized product development.





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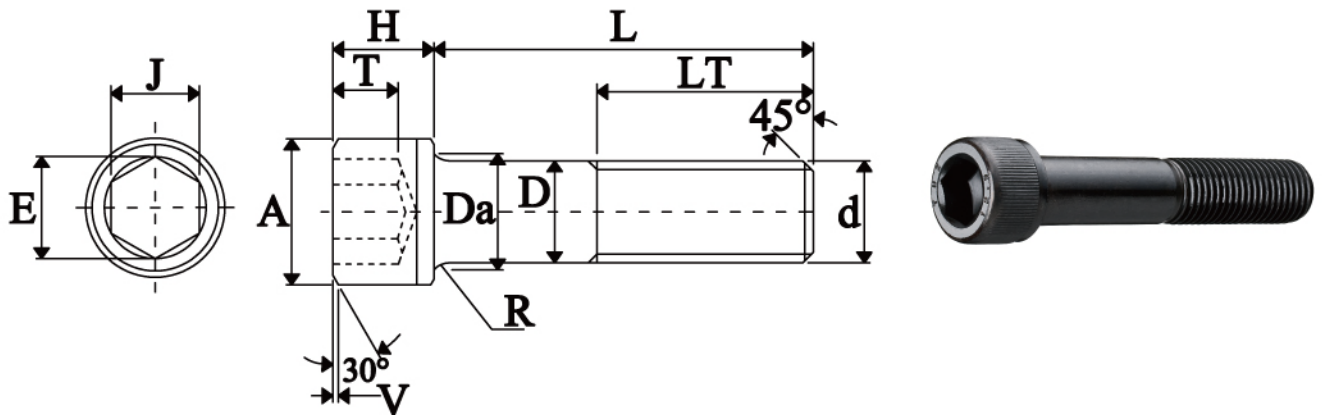


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# Metric Hexagon Socket Head Cap Screws

依據標準：DIN 912-1983 ISO 4762-1997  
 材質：合金鋼 SCM435、不鏽鋼304  
 強度區分：12.9；10.9；8.8 ( M3~M24 )  
 抗拉強度：120~140 kgf/mm<sup>2</sup>  
 硬度：HRC 39~44  
 表面處理：黑色氧化膜  
 螺紋等級：5g6g

According To : DIN 912-1983 ISO 4762-1997  
 Material : Alloy Steel SCM435、Stainless Steel304  
 Strength Grade : 12.9 ; 10.9 ; 8.8 ( M3~M24 )  
 Tensile Strength : 120~140 kgf/mm<sup>2</sup>  
 Hardness : HRC 39~44  
 Surface Treatment : Black Oxide  
 Class of Thread : 5g6g



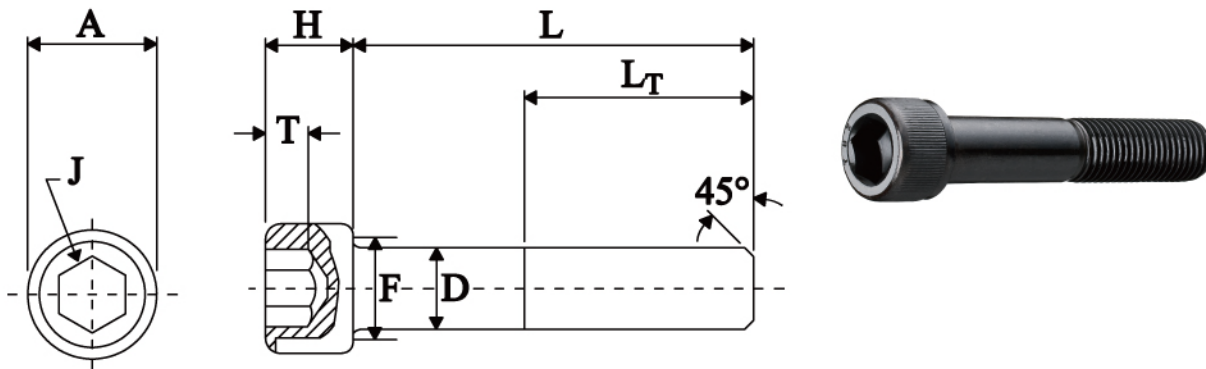
Unit : mm

Thread Size(d)	Thread Pitch	D		A		H		V	J		E	T	R	Da
		Nominal Size	Min.	Nominal Size	Min.	Nominal Size	Tolerance Min.		Nominal Size	Tolerance				
M3	0.5	3	2.86	5.5	5.32	3	2.86	0.3	2.5	+0.080 +0.020	2.87	1.3	0.10	3.6
M4	0.7	4	3.82	7.0	6.78	4	3.82	0.4	3.0	+0.080 +0.020	3.44	2.0	0.20	4.7
M5	0.8	5	4.82	8.5	8.28	5	4.82	0.5	4.0	+0.095 +0.020	4.58	2.5	0.20	5.7
M6	1.0	6	5.82	10.0	9.78	6	5.70	0.6	5.0	+0.140 +0.020	5.72	3.0	0.25	6.8
M8	1.25	8	7.78	13.0	12.73	8	7.64	0.8	6.0	+0.140 +0.020	6.86	4.0	0.40	9.2
M10	1.5	10	9.78	16.0	15.73	10	9.64	1.0	8.0	+0.175 +0.025	9.15	5.0	0.40	11.2
M12	1.75	12	11.73	18.0	17.73	12	11.57	1.2	10.0	+0.175 +0.025	11.43	6.0	0.60	13.7
M14	2.0	14	13.73	21.0	20.67	14	13.57	1.4	12.0	+0.212 +0.032	13.72	7.0	0.60	15.7
M16	2.0	16	15.73	24.0	23.67	16	15.57	1.6	14.0	+0.212 +0.032	16.00	8.0	0.60	17.7
M18	2.5	18	17.73	27.0	26.67	18	17.57	1.8	14.0	+0.212 +0.032	16.00	9.0	0.60	20.2
M20	2.5	20	19.67	30.0	29.67	20	19.48	2.0	17.0	+0.230 +0.050	19.44	10.0	0.80	22.4
M22	2.5	22	21.67	33.0	32.61	22	21.48	2.2	17.0	+0.230 +0.050	19.44	11.0	0.80	24.4
M24	3.0	24	23.67	36.0	35.61	24	23.48	2.4	19.0	+0.275 +0.065	21.73	12.0	0.80	26.4

# Hexagon Socket Head Cap Screws

依據標準：ASME B18.3-2002  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 39~45  
 表面處理：黑色氧化膜  
 螺紋種類：ANSI B1.1 UNC, UNF  
 螺紋等級：#6 至 1"(含)- -3A  
 1"以上 - -2A

According To : ASME B18.3-2002  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 39~45  
 Surface Treatment : Black Oxide  
 Screw Threads : ANSI B1.1 UNC, UNF  
 Class of Thread : #6 Through 1"- -3A  
 Over 1" - -2A



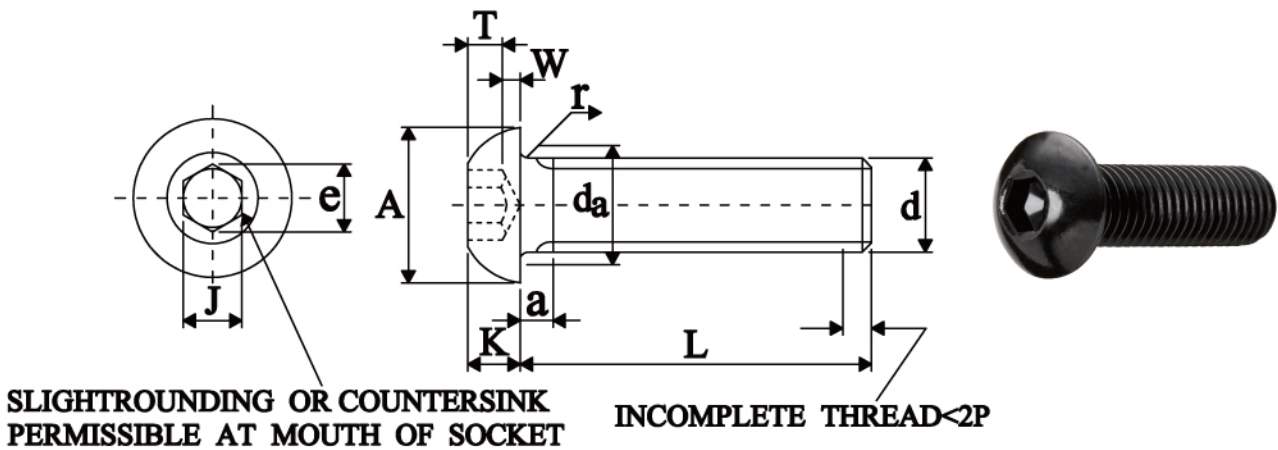
Unit : Inch

Nominal Size or Basic Screw Diameter	D		A		H		J		T	F		L <sub>T</sub> Thread Length Basic.
	Body Diameter		Head Diameter		Head Height		Hexagon Socket Size		Key Engagement	Fillet Transition Diameter		
	Max.	Min.	Max.	Min.	Max.	Min.	Nom.	Min.	Max.	Min.		
#6 0.1380	0.1380	0.1329	0.226	0.218	0.138	0.134	7/64	0.109	0.064	0.158	0.144	0.75
#8 0.1640	0.1640	0.1585	0.270	0.262	0.164	0.159	9/64	0.141	0.077	0.188	0.172	0.88
#10 0.1900	0.1900	0.1840	0.312	0.303	0.190	0.185	5/32	0.156	0.090	0.218	0.202	0.88
1/4 0.2500	0.2500	0.2435	0.375	0.365	0.250	0.244	3/16	0.188	0.120	0.278	0.261	1.00
5/16 0.3125	0.3125	0.3053	0.469	0.457	0.312	0.306	1/4	0.250	0.151	0.347	0.329	1.12
3/8 0.3750	0.3750	0.3678	0.562	0.550	0.375	0.368	5/16	0.312	0.182	0.415	0.397	1.25
7/16 0.4375	0.4375	0.4294	0.656	0.642	0.438	0.430	3/8	0.375	0.213	0.484	0.465	1.38
1/2 0.5000	0.5000	0.4919	0.750	0.735	0.500	0.492	3/8	0.375	0.245	0.552	0.531	1.50
5/8 0.6250	0.6250	0.6163	0.938	0.921	0.625	0.616	1/2	0.500	0.307	0.689	0.664	1.75
3/4 0.7500	0.7500	0.7406	1.125	1.107	0.750	0.740	5/8	0.625	0.370	0.828	0.800	2.00
7/8 0.8750	0.8750	0.8647	1.312	1.293	0.875	0.864	3/4	0.750	0.432	0.963	0.932	2.25
1 1.0000	1.0000	0.9886	1.500	1.479	1.000	0.988	3/4	0.750	0.495	1.100	1.068	2.50

# Metric Hexagon Socket Button Head Cap Screws

依據標準：ISO 7380-2004  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 39~44  
 表面處理：黑色氧化膜  
 螺紋等級：5g6g

According To : ISO 7380-2004  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 39~44  
 Surface Treatment : Black Oxide  
 Class of Thread : 5g6g



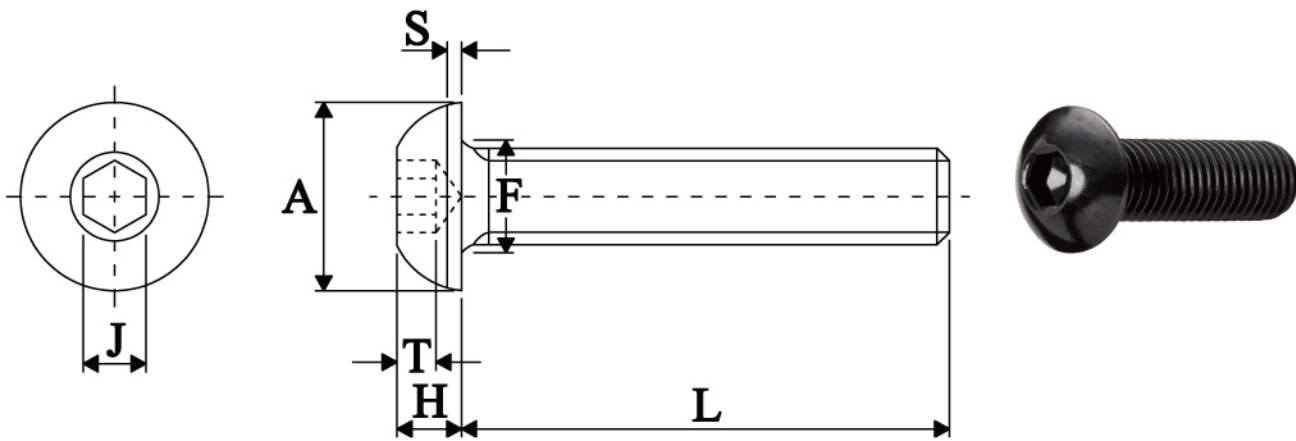
Unit : mm

Thread Size(d)	p	a		da	A		e	K		r	J		T	W	
		Max.	Min.	Max.	Max.	Min.	Ref.	Max.	Min.	Max.	Nom.	Max.	Min.	Min.	Min.
M3	0.50	1.0	0.50	3.6	5.7	5.40	2.30	1.65	1.40	0.10	2.0	2.080	2.020	1.04	0.20
M4	0.70	1.4	0.70	4.7	7.6	7.24	2.87	2.20	1.95	0.20	2.5	2.580	2.520	1.30	0.30
M5	0.80	1.6	0.80	5.7	9.5	9.14	3.44	2.75	2.50	0.20	3.0	3.080	3.020	1.56	0.38
M6	1.00	2.0	1.00	6.8	10.5	10.07	4.58	3.30	3.00	0.25	4.0	4.095	4.020	2.08	0.74
M8	1.25	2.5	1.25	9.2	14.0	13.57	5.72	4.40	4.10	0.40	5.0	5.140	5.020	2.60	1.05
M10	1.50	3.0	1.50	11.2	17.5	17.07	6.86	5.50	5.20	0.40	6.0	6.140	6.020	3.12	1.45
M12	1.75	3.5	1.75	14.2	21.0	20.48	9.15	6.60	6.24	0.60	8.0	8.175	8.025	4.16	1.63
M16	2.00	4.0	2.00	18.2	28.0	27.48	11.43	8.80	8.44	0.60	10.0	10.175	10.025	5.20	2.25

# Hexagon Socket Button Head Cap Screws

依據標準：ASME B18.3-2002  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 38~44  
 表面處理：黑色氧化膜  
 螺紋種類：ANSI B1.1 UNC,UNF  
 螺紋等級：ANSI B1.1 class 3A

According To : ASME B18.3-2002  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 38~44  
 Surface Treatment : Black Oxide  
 Screw Threads : ANSI B1.1 UNC,UNF  
 Class of Thread : ANSI B1.1 class 3A



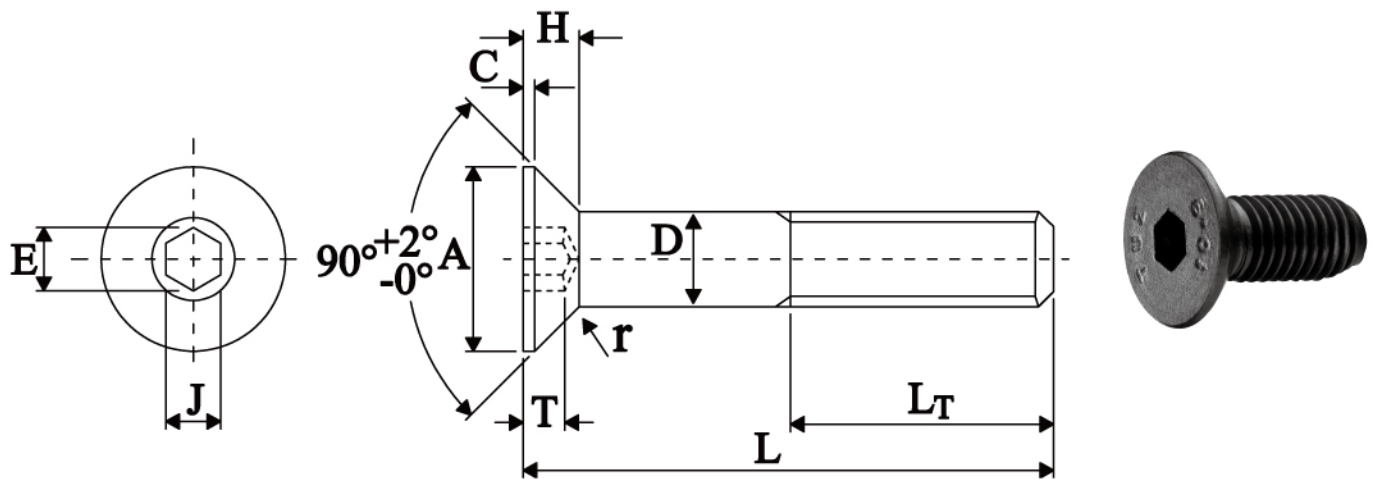
Unit : Inch

D Nominal Size or Basic Screw Diameter	A Head Diameter		H Head Height		S Head Size Height	J Hexagon Socket Size		T Key Engagement	F Fillet Transition Diameter	
	Max.	Min.	Max.	Min.	Ref.	Nom.	Min.	Max.	Min.	
	#6 0.1380	0.262	0.250	0.073	0.063	0.015	5/64 0.078	0.044	0.158	0.148
#8 0.1640	0.312	0.298	0.087	0.077	0.015	3/32 0.094	0.052	0.194	0.184	
#10 0.1900	0.361	0.347	0.101	0.091	0.020	1/8 0.125	0.070	0.220	0.210	
1/4 0.2500	0.437	0.419	0.132	0.122	0.031	5/32 0.156	0.087	0.290	0.280	
5/16 0.3125	0.547	0.527	0.166	0.152	0.031	3/16 0.188	0.105	0.353	0.343	
3/8 0.3750	0.656	0.636	0.199	0.185	0.031	7/32 0.219	0.122	0.415	0.405	
1/2 0.5000	0.875	0.851	0.265	0.245	0.046	5/16 0.312	0.175	0.560	0.540	
5/8 0.6250	1.000	0.970	0.331	0.311	0.062	3/8 0.375	0.210	0.685	0.665	

# Metric Hexagon Socket Flat Head Cap Screws

依據標準：ISO 10642-2004  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 39~44  
 表面處理：黑色氧化膜  
 螺紋等級：5g6g

According To : ISO 10642-2004  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 39~44  
 Surface Treatment : Black Oxide  
 Class of Thread : 5g6g



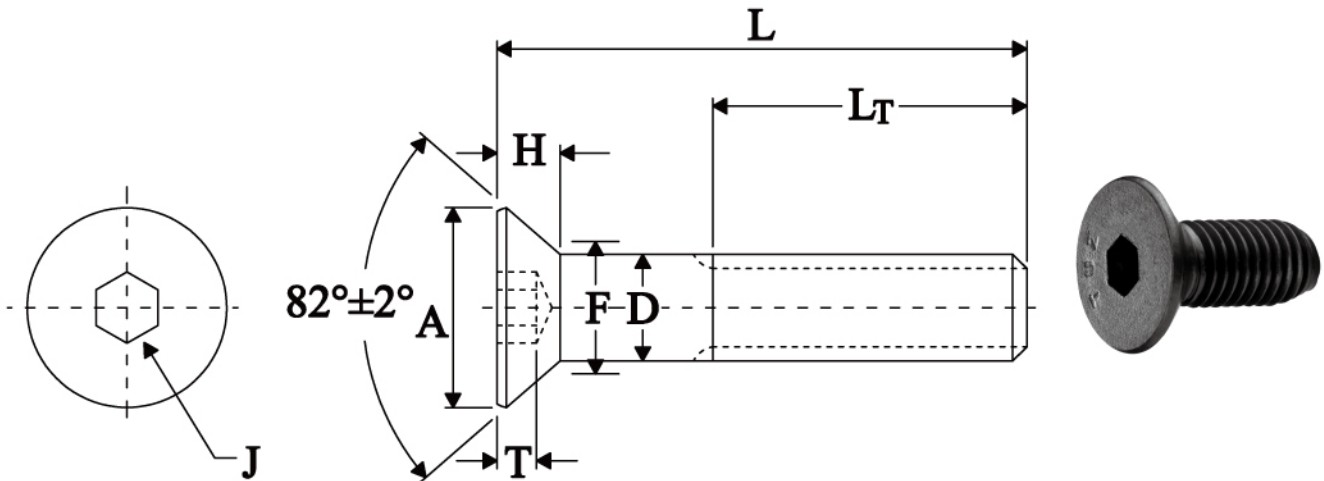
Unit : mm

Thread Size(d)	Thread Pitch	D		A		H	C	J		E	T		r
		Nominal Size		Nominal Size		Nominal Size	Reference	Nominal Size		Approx	Nominal Size		Min.
		Max.	Min.	Max.	Min.	Max.		Max.	Min.		Max.	Min.	
M3	0.50	3	2.86	6	5.70	1.86	0.2	2.0	$+0.10$ $+0.02$	2.30	1.2	0.95	0.1
M4	0.70	4	3.82	8	7.64	2.48	0.3	2.5	$+0.10$ $+0.02$	2.87	1.8	1.55	0.2
M5	0.80	5	4.82	10	9.64	3.10	0.3	3.0	$+0.10$ $+0.02$	3.44	2.3	2.05	0.2
M6	1.00	6	5.82	12	11.57	3.72	0.3	4.0	$+0.12$ $+0.02$	4.58	2.5	2.25	0.3
M8	1.25	8	7.78	16	15.57	4.96	0.4	5.0	$+0.14$ $+0.02$	5.72	3.5	3.20	0.5
M10	1.50	10	9.78	20	19.48	6.20	0.5	6.0	$+0.14$ $+0.02$	6.86	4.4	4.10	0.5
M12	1.75	12	11.73	24	23.48	7.44	0.5	8.0	$+0.175$ $+0.025$	9.15	4.6	4.30	1.0
M16	2.00	16	15.73	30	29.48	8.80	0.5	10.0	$+0.175$ $+0.025$	11.43	5.3	5.00	1.0

# Hexagon Socket Flat Head Cap Screws

依據標準：ASME B18.3-2002  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 38~44  
 表面處理：黑色氧化膜  
 螺紋種類：ANSI B1.1 UNC,UNF  
 螺紋等級：ANSI B1.1 Class 3A

According To : ASME B18.3-2002  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 38~44  
 Surface Treatment : Black Oxide  
 Screw Threads : ANSI B1.1 UNC,UNF  
 Class of Thread : ANSI B1.1 Class 3A



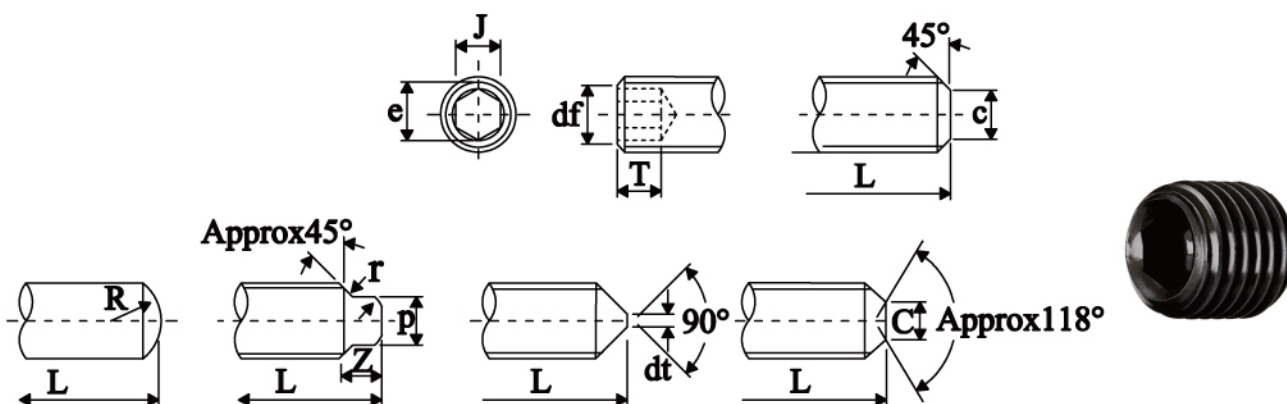
Unit : Inch

Nominal Size or Basic Screw Diameter	D		A		H	J		T	F	L <sub>T</sub>	
	Body Diameter		Head Diameter			Head Height	Hexagon Socket Size				Key Engagement
	Max.	Min.	Theoretical Sharp	Abs.	Ref.			Nom.	Min.	Max.	
			Max.	Min.							
#6	0.1380	0.1380	0.1329	0.307	0.263	0.097	5/64	0.078	0.066	0.168	0.75
#8	0.1640	0.1640	0.1585	0.359	0.311	0.112	3/32	0.094	0.076	0.194	0.88
#10	0.1900	0.1900	0.1840	0.411	0.359	0.127	1/8	0.125	0.087	0.220	0.88
1/4	0.2500	0.2500	0.2435	0.531	0.480	0.161	5/32	0.156	0.111	0.280	1.00
5/16	0.3125	0.3125	0.3053	0.656	0.600	0.198	3/16	0.188	0.135	0.343	1.12
3/8	0.3750	0.3750	0.3678	0.781	0.720	0.234	7/32	0.219	0.159	0.405	1.25
7/16	0.4375	0.4375	0.4294	0.844	0.781	0.234	1/4	0.250	0.159	0.468	1.38
1/2	0.5000	0.5000	0.4919	0.938	0.872	0.251	5/16	0.312	0.172	0.530	1.50
5/8	0.6250	0.6250	0.6163	1.188	1.112	0.324	3/8	0.375	0.220	0.655	1.75
3/4	0.7500	0.7500	0.7406	1.438	1.355	0.396	1/2	0.500	0.220	0.780	2.00

# Metric Hexagon Socket Set Screws

依據標準：DIN 913、914~1980  
 DIN 915、916~1980  
 材質：合金鋼SCM435、不鏽鋼304  
 硬度：HRC 48~53  
 表面處理：黑色氧化膜  
 螺紋等級：5g6g

According To：DIN 913、914~1980  
 DIN 915、916~1980  
 Material：Alloy Steel SCM435、Stainless Steel 304  
 Hardness：HRC 48~53  
 Surface Treatment：Black Oxide  
 Class of Thread：5g6g



Unit : mm

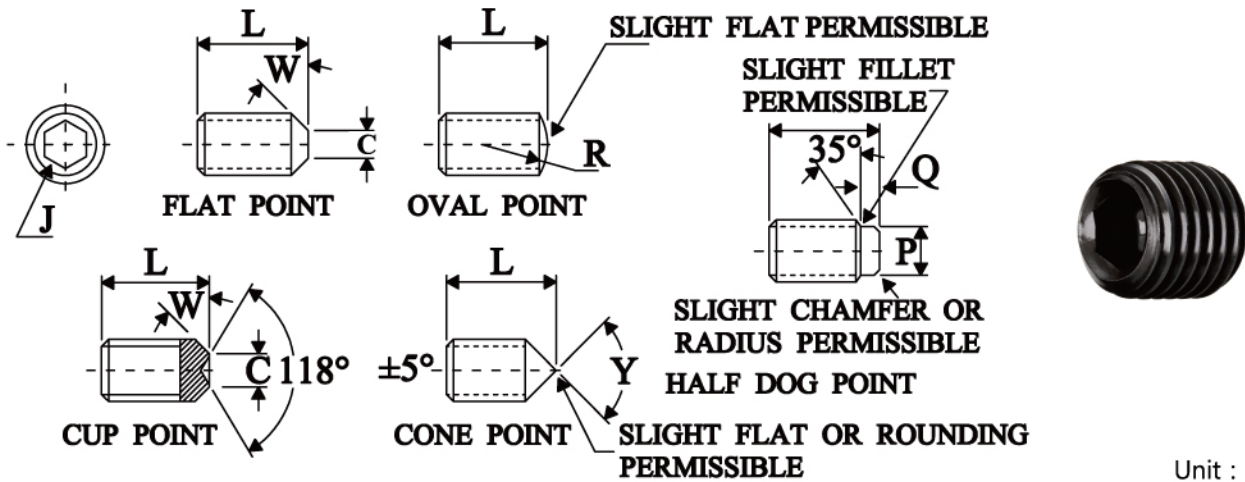
Thread Size(d)	Thread Pitch P	J			e	df	T	Flat point		Oval Point	Dog Point		Cone Point	Cup Point		
		Nominal	Min.	Max.				Min.	c	R	P	Z <sup>+0.25</sup> / <sub>+0</sub>	dt	C		
					Max.									Min.	Max. Min.	Short
M3	0.50	1.5	1.520	1.545	1.73	Minor Thread Diameter	2.0	2.0	1.75	2.5	Dimension is the same as the Flat Point	0.75	1.5	0.5	1.4	1.15
M4	0.70	2.0	2.020	2.045	2.30		2.5	2.5	2.25	3.0		1.00	2.0	0.7	2.0	1.75
M5	0.80	2.5	2.520	2.560	2.87		3.0	3.5	3.20	4.0		1.25	2.5	0.8	2.5	2.25
M6	1.00	3.0	3.020	3.080	3.44		3.5	4.0	3.70	5.0		1.50	3.0	1.5	3.0	2.75
M8	1.25	4.0	4.020	4.095	4.58		5.0	5.5	5.20	7.0		2.00	4.0	2.0	5.0	4.70
M10	1.50	5.0	5.020	5.095	5.72		6.0	7.0	6.64	9.0		2.50	5.0	2.5	6.0	5.70
M12	1.75	6.0	6.020	6.095	6.86		8.0	8.5	8.14	11.0		3.00	6.0	3.0	8.0	7.64
M14	2.00	6.0	6.020	6.095	6.86		9.0	10.0	9.64	13.0		3.50	7.0	4.0	9.0	8.64
M16	2.00	8.0	8.025	8.115	9.15		10.0	12.0	11.57	15.0		4.00	8.0	4.0	10.0	9.64



# Hexagon Socket Set Screws

依據標準：ASME B18.3-2002  
 材質：合金鋼 SCM435、不鏽鋼304  
 硬度：HRC 45~53  
 表面處理：黑色氧化膜  
 螺紋種類：ANSI B1.1 UNC  
 螺紋等級：ANSI B1.1 Class 3A

According To : ASME B18.3-2002  
 Material : Alloy Steel SCM435、Stainless Steel 304  
 Hardness : HRC 45~53  
 Surface Treatment : Black Oxide  
 Screw Threads : ANSI B1.1 UNC  
 Class of Thread : ANSI B1.1 Class 3A



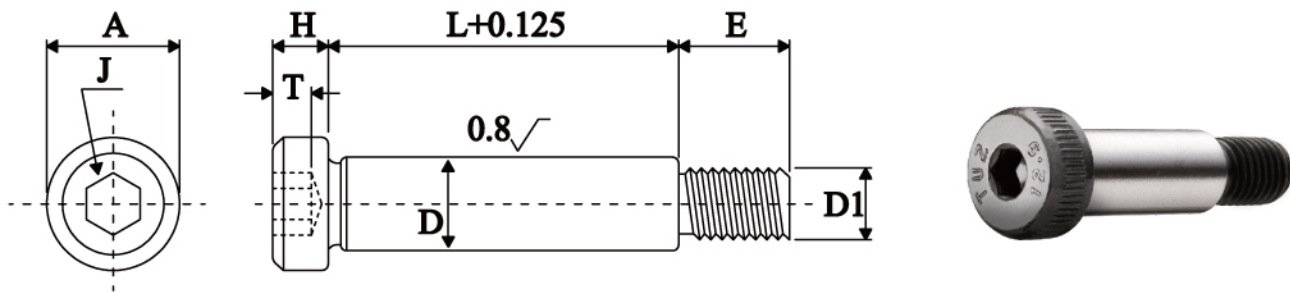
Unit : Inch

Nominal Size or Basic Screw Diameter	P		Q		J		C		R	Y
	Half Dog Point				Hexagon Socket Size		Cup and Flat Point Diameters		Oval Point Diameters	Cone Point Angle 90 deg 2 deg For These Nominal Lengths or Longers 118 deg 2 deg for shorter Nominal Lengths
	Diameter		Length							
	Max.	Min.	Max.	Min.	Nom.	Max.	Min.	Basic		
#6 0.1380	0.092	0.087	0.038	0.032	1/16 0.062	0.074	0.064	0.104	0.19	
#8 0.1640	0.109	0.103	0.043	0.037	5/64 0.078	0.087	0.076	0.123	0.25	
#10 0.1900	0.127	0.120	0.049	0.041	3/32 0.094	0.102	0.088	0.142	0.25	
1/4 0.2500	0.156	0.149	0.067	0.059	1/8 0.125	0.132	0.118	0.188	0.31	
5/16 0.3125	0.203	0.195	0.082	0.074	5/32 0.156	0.172	0.156	0.234	0.38	
3/8 0.3750	0.250	0.241	0.099	0.089	3/16 0.188	0.212	0.194	0.281	0.44	
7/16 0.4375	0.297	0.287	0.114	0.104	7/32 0.219	0.252	0.232	0.328	0.50	
1/2 0.5000	0.344	0.334	0.130	0.120	1/4 0.250	0.291	0.270	0.375	0.57	
5/8 0.6250	0.469	0.456	0.164	0.148	5/16 0.312	0.371	0.347	0.469	0.75	
3/4 0.7500	0.562	0.549	0.196	0.180	3/8 0.375	0.450	0.425	0.562	0.88	

# Metric Hexagon Socket Head Shoulder Screws

依據標準：ISO 7379-1983  
 材質：合金鋼 SCM435  
 硬度：HRC 38~44  
 表面處理：黑色氧化膜  
 螺紋等級：5g6g

According To : ISO 7379-1983  
 Material : Alloy Steel SCM435  
 Hardness : HRC 38~44  
 Surface Treatment : Black Oxide  
 Class of Thread : 5g6g



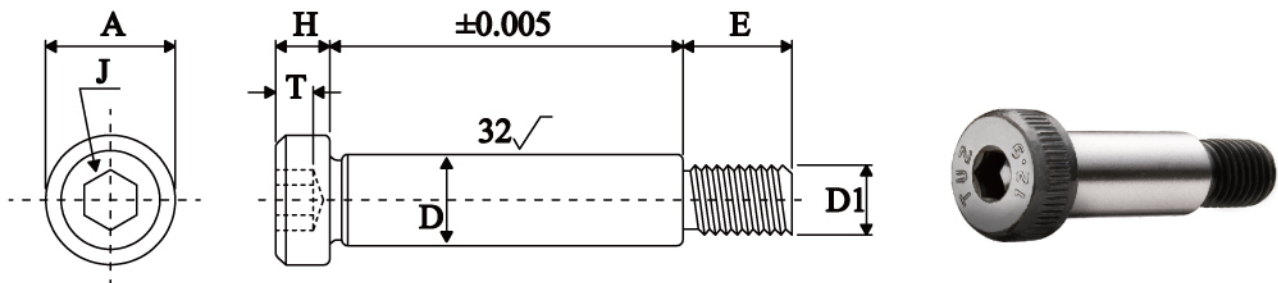
Unit : mm

Nominal Size or Basic Shoulder Diameter	D		A		H		D1		E	T	J
	Shoulder Diameter		Head Diameter		Head Height		Nominal Thread Size of Basic Thread Diameter	Threads Per Inch	Thread Length	Key Engage-ment	Hexagon Socket Size
	Max.	Min.	Max.	Min.	Max.	Min.			Max.	Min.	Nominal
6.0	5.987	5.951	10.0	9.78	4.5	4.32	5.0	0.80	9.75	2.4	3.0
6.5	6.487	6.451	10.0	9.78	4.5	4.32	5.0	0.80	9.75	2.4	3.0
8.0	7.987	7.951	13.0	12.73	5.5	5.32	6.0	1.00	11.25	3.3	4.0
10.0	9.987	9.951	16.0	15.73	7.0	6.78	8.0	1.25	13.25	4.2	5.0
12.0	11.984	11.941	18.0	17.73	9.0	8.78	10.0	1.50	16.40	4.9	6.0
13.0	12.984	12.941	18.0	17.73	9.0	8.78	10.0	1.50	16.40	4.9	6.0
16.0	15.984	15.941	24.0	23.67	11.0	10.73	12.0	1.75	18.40	6.6	8.0
20.0	19.980	19.928	30.0	29.67	14.0	13.73	16.0	2.00	22.40	8.8	10.0
24.0	23.980	23.928	36.0	35.61	16.0	15.73	20.0	2.50	27.40	10.0	12.0
25.0	24.980	24.928	36.0	35.61	16.0	15.73	20.0	2.50	27.40	10.0	12.0

# Hexagon Socket Head Shoulder Screws

依據標準：ASME B18.3- 2002  
 材質：合金鋼 SCM435  
 硬度：HRC 32~43  
 表面處理：黑色氧化膜  
 螺紋種類：ANSI B1.1 UNC  
 螺紋等級：ANSI B1.1 Class 3A

According To : ASME B18.3- 2002  
 Material : Alloy Steel SCM435  
 Hardness : HRC 32~43  
 Surface Treatment : Black Oxide  
 Screw Threads : ANSI B1.1 UNC  
 Class of Thread : ANSI B1.1 Class 3A



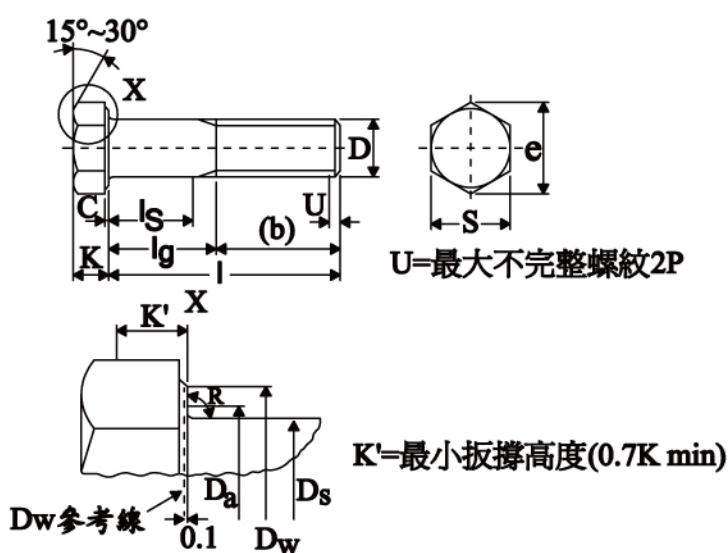
Unit : Inch

Nominal Size or Basic Shoulder Diameter	D		A		H		D1		E	T	J
	Shoulder Diameter		Head Diameter		Head Height		Nominal Thread Size of Basic Thread Diameter	Threads Per Inch	Thread Length	Key Engage-ment	Hexagon Socket Size
	Max.	Min.	Max.	Min.	Max.	Min.			Basic	Min.	Nominal
1/4	0.2480	0.2460	0.375	0.357	0.188	0.177	#10 0.1900	24	0.375	0.094	1/8 0.125
5/16	0.3105	0.3085	0.438	0.419	0.219	0.209	1/4 0.2500	20	0.438	0.117	5/32 0.156
3/8	0.3730	0.3710	0.562	0.543	0.250	0.240	5/16 0.3125	18	0.500	0.141	3/16 0.188
1/2	0.4980	0.4960	0.750	0.729	0.312	0.302	3/8 0.3750	16	0.625	0.188	1/4 0.250
5/8	0.6230	0.6210	0.875	0.853	0.375	0.365	1/2 0.5000	13	0.750	0.234	5/16 0.312
3/4	0.7480	0.7460	1.000	0.977	0.500	0.490	5/8 0.6250	11	0.875	0.281	3/8 0.375
1	0.9980	0.9960	1.312	1.287	0.625	0.610	3/4 0.7500	10	1.000	0.375	1/2 0.500

# Metric Hexagon Head Cap Screws

依據標準：	DIN 931/933		
強度等級：	12.9	8.8	
材質：	合金鋼	碳鋼	不鏽鋼
	SAE 4135	SAE 1035	304
硬度 (HRC)：	39~44	22~34	
表面處理：	黑色氧化膜		

According To：	DIN 931/933		
Strength Class：	12.9	8.8	
Material：	Alloy Steel	Carbon Steel	Stainless Steel
	SAE 4135	SAE 1035	304
Hardness (HRC)：	39~44	22~34	
Surface Treatment：	Black Oxide		



Unit : mm

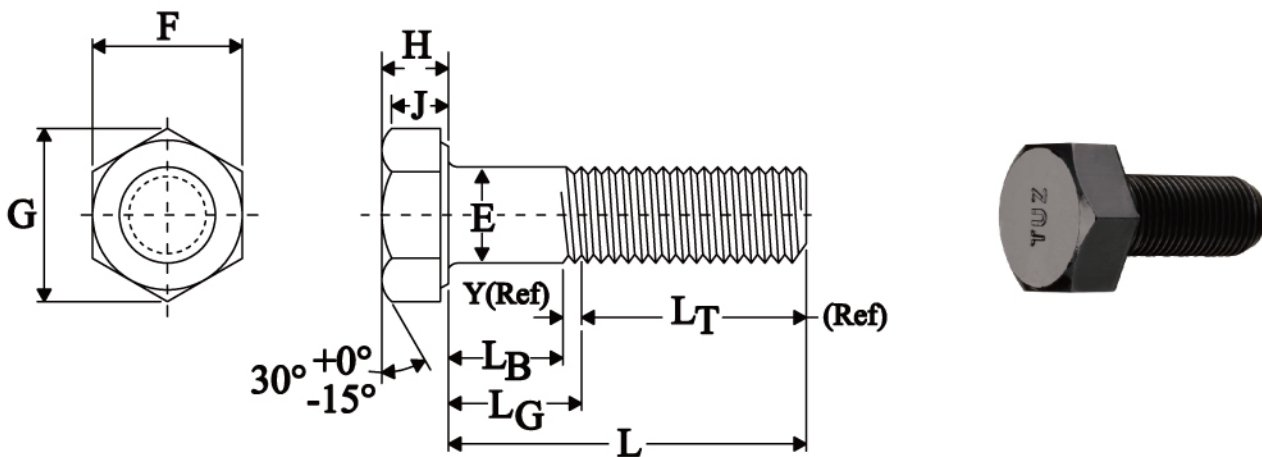
Thread Size(d)	P	D <sub>s</sub>		D <sub>a</sub>	D <sub>w</sub>	e	K		R	S	
		Max.	Min.	Max.	Min.	Min.	Nominal Size	Tolerance	Min.	Nominal Size	Min.
M3	0.50	3	2.86	3.6	4.6	6.01	2.0	-0.12 +0.12	0.10	5.5	5.32
M4	0.70	4	3.82	4.7	5.9	7.66	2.8	-0.12 +0.12	0.20	7.0	6.78
M5	0.80	5	4.82	5.7	6.9	8.79	3.5	-0.15 +0.15	0.20	8.0	7.78
M6	1.00	6	5.82	6.8	8.9	11.05	4.0	-0.15 +0.15	0.25	10.0	9.78
M8	1.25	8	7.78	9.2	11.6	14.38	5.3	-0.15 +0.15	0.40	13.0	12.73
M10	1.50	10	9.78	11.2	15.6	18.90	6.4	-0.18 +0.18	0.40	17.0	16.73
M12	1.75	12	11.73	13.7	17.4	21.10	7.5	-0.18 +0.18	0.60	19.0	18.67
M16	2.00	16	15.73	17.7	22.5	26.75	10.0	-0.18 +0.18	0.60	24.0	23.67
M20	2.50	20	19.67	22.4	28.2	33.53	12.5	-0.22 +0.22	0.80	30.0	29.67
M24	3.00	24	23.67	26.4	33.6	39.98	15.0	-0.22 +0.22	0.80	36.0	35.38



# Hexagon Head Cap Screws

依據標準：ASNI/ASME B 18.2.1-1996  
 強度等級：Grade8；Grade5  
 材質：合金鋼 SAE4135；碳鋼 SAE1035  
 不鏽鋼 304  
 硬度 (HRC)：39~44；22~34  
 表面處理：黑色氧化膜

According To：ASNI/ASME B 18.2.1-1996  
 Strength Class：Grade8；Grade5  
 Material：Alloy Steel SAE 4135；Carbon Steel SAE 1035；  
 Stainless Steel 304  
 Hardness (HRC)：39~44；22~34  
 Surface Treatment：Black Oxide



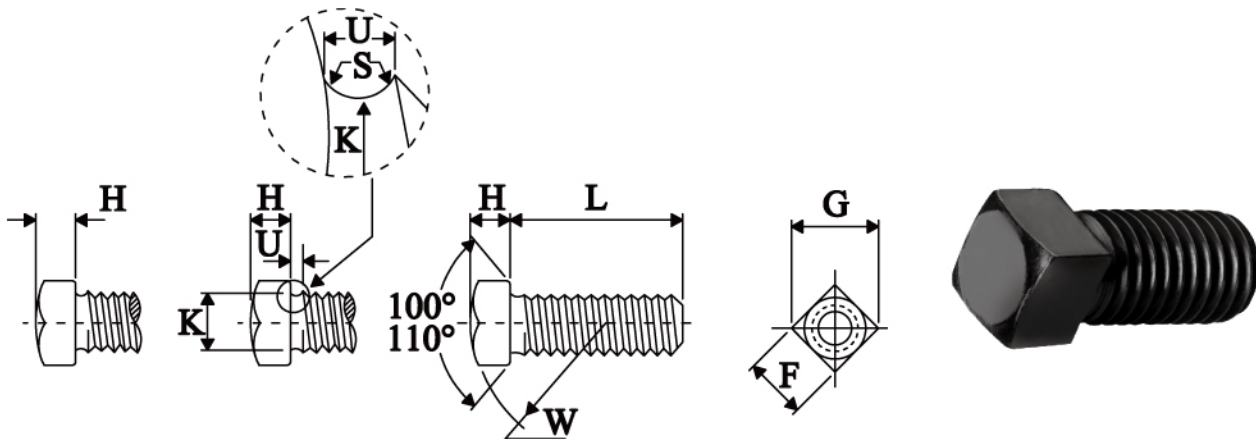
Unit : Inch

Nominal Size or Basic Product Dia	E		F			G		H			J	L <sub>T</sub>		Y	Runout of Bearing Surface FIM
	Body Dia		Width Across Flats			Width Across Corners		Height			Wrenching Height	Thread Length For Screw Length		Transition Thread Length	
	Max.	Min.	Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.		Min.	6 in. and Shorter		
1/4 0.2500	0.2500	0.2450	7/16	0.438	0.428	0.505	0.488	5/32	0.163	0.150	0.106	0.750	1.000	0.250	0.010
5/16 0.3125	0.3125	0.3065	1/2	0.500	0.489	0.577	0.557	13/64	0.211	0.195	0.140	0.875	1.125	0.278	0.011
3/8 0.3750	0.3750	0.3690	9/16	0.562	0.551	0.650	0.628	15/64	0.243	0.226	0.160	1.000	1.250	0.312	0.012
7/16 0.4375	0.4375	0.4305	5/8	0.625	0.612	0.722	0.698	9/32	0.291	0.272	0.195	1.125	1.375	0.357	0.013
1/2 0.5000	0.5000	0.4930	3/4	0.750	0.736	0.866	0.840	5/16	0.323	0.302	0.215	1.250	1.500	0.385	0.014
9/16 0.5625	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	0.417	0.015
5/8 0.6250	0.6250	0.6170	15/16	0.938	0.922	1.083	1.051	25/64	0.403	0.378	0.269	1.500	1.750	0.455	0.017
3/4 0.7500	0.7500	0.7410	1-1/8	1.125	1.100	1.299	1.254	15/32	0.483	0.455	0.324	1.750	2.000	0.500	0.020
7/8 0.8750	0.8750	0.8660	1-5/16	1.312	1.285	1.516	1.465	35/64	0.563	0.531	0.378	2.000	2.250	0.556	0.023
1 1.0000	1.0000	0.9900	1-1/2	1.500	1.469	1.732	1.675	39/64	0.627	0.591	0.416	2.250	2.500	0.625	0.026

# Square Head Cap Screws

依據標準：ANSI / ASME B18.6.2-1998  
材質：低碳鋼

According To : ANSI / ASME B18.6.2-1998  
Material : Low Carbon Steel



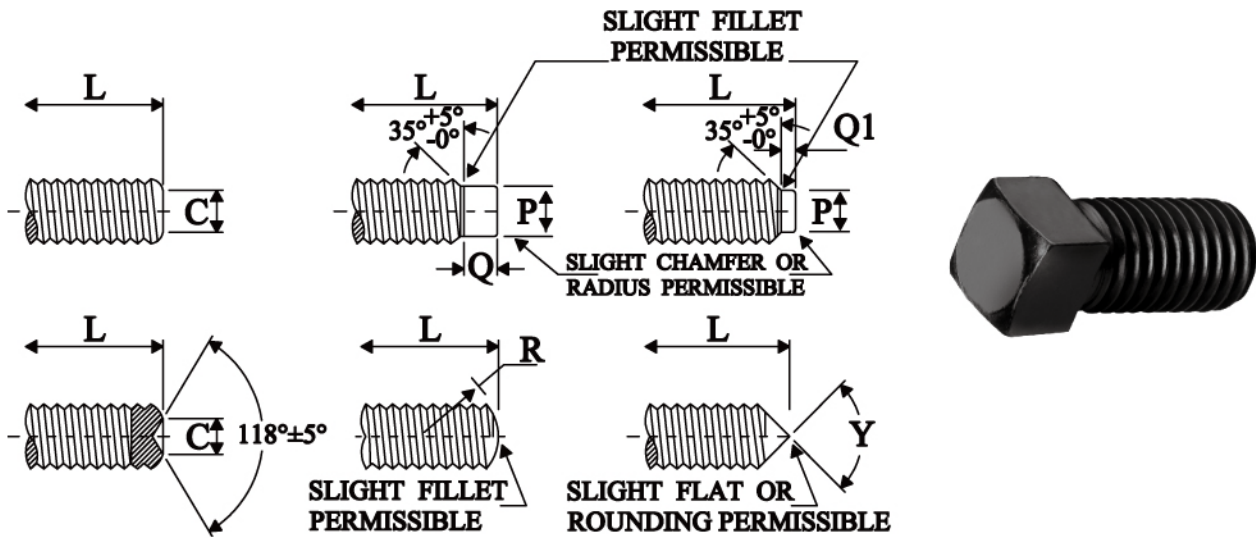
Unit : Inch

Nominal Size or Basic Screw Diameter	F		G		H		K		S	U	W
	Width Across Flats		Width Across Coners		Head Height		Neck Reliet Diameter		Neck Reliet Fillet Radius	Neck Reliet Width	Head Radius
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Min.	Min.
#10 0.1900	0.188	0.180	0.265	0.247	0.148	0.134	0.145	0.140	0.027	0.083	0.48
1/4 0.2500	0.250	0.241	0.354	0.331	0.196	0.178	0.185	0.170	0.032	0.100	0.62
5/16 0.3125	0.312	0.302	0.442	0.415	0.245	0.224	0.240	0.225	0.036	0.111	0.78
3/8 0.3750	0.375	0.362	0.530	0.497	0.293	0.270	0.294	0.279	0.041	0.125	0.94
7/16 0.4375	0.438	0.423	0.619	0.581	0.341	0.315	0.345	0.330	0.046	0.143	1.09
1/2 0.5000	0.500	0.484	0.707	0.665	0.389	0.361	0.400	0.385	0.050	0.154	1.25
9/16 0.5625	0.562	0.545	0.795	0.748	0.437	0.407	0.454	0.439	0.054	0.167	1.41
5/8 0.6250	0.625	0.606	0.884	0.833	0.485	0.452	0.507	0.492	0.059	0.182	1.56
3/4 0.7500	0.750	0.729	1.060	1.001	0.582	0.544	0.620	0.605	0.065	0.200	1.88
7/8 0.8750	0.875	0.852	1.237	1.170	0.678	0.635	0.731	0.716	0.072	0.222	2.19
1 1.0000	1.000	0.974	1.414	1.337	0.774	0.726	0.838	0.823	0.081	0.250	2.50

# Square Head Cap Screws

依據標準：ANSI / ASME B18.6.2-1998  
 材質：低碳鋼

According To : ANSI / ASME B18.6.2-1998  
 Material : Low Carbon Steel



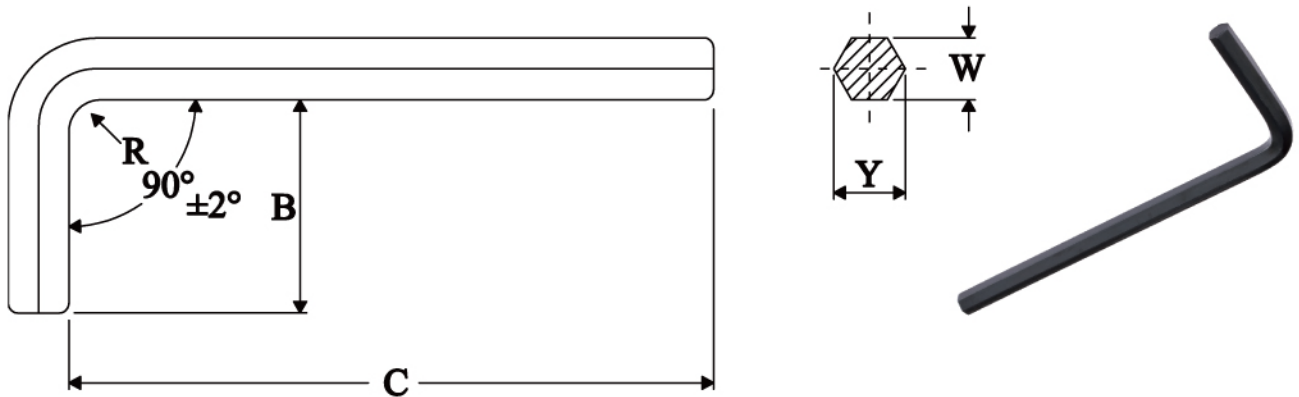
Unit : Inch

Nominal Size or Basic Screw Diameter	C		P		Q		Q1		R	Y
	Cup and Flat Point Diameters		Dog and Half Dog Point Diameters		Point Length					
	Max.	Min.	Max.	Min.	Dog		Half Dog			
#10 0.1900	0.102	0.088	0.127	0.120	0.095	0.085	0.050	0.040	0.142	1/4
1/4 0.2500	0.132	0.118	0.156	0.149	0.130	0.120	0.068	0.058	0.188	5/16
5/16 0.3125	0.172	0.156	0.203	0.195	0.161	0.151	0.083	0.073	0.234	3/8
3/8 0.3750	0.212	0.194	0.250	0.241	0.193	0.183	0.099	0.089	0.281	7/16
7/16 0.4375	0.252	0.232	0.297	0.287	0.224	0.214	0.114	0.104	0.328	1/2
1/2 0.5000	0.291	0.270	0.344	0.334	0.255	0.245	0.130	0.120	0.375	9/16
9/16 0.5625	0.332	0.309	0.391	0.379	0.287	0.275	0.146	0.134	0.422	5/8
5/8 0.6250	0.371	0.347	0.469	0.456	0.321	0.305	0.164	0.148	0.469	3/4
3/4 0.7500	0.450	0.425	0.562	0.549	0.383	0.367	0.196	0.180	0.562	7/8
7/8 0.8750	0.530	0.502	0.656	0.642	0.446	0.430	0.227	0.211	0.656	1
1 1.0000	0.609	0.579	0.750	0.734	0.510	0.490	0.260	0.240	0.750	1-1/8

# Hexagon Keys

依據標準：DIN 911  
 材質：合金鋼 CR-V6150  
 硬度：HRC 48~53

According To：DIN 911  
 Material：Alloy Steel CR-V6150  
 Hardness：HRC 48~53



Unit : mm

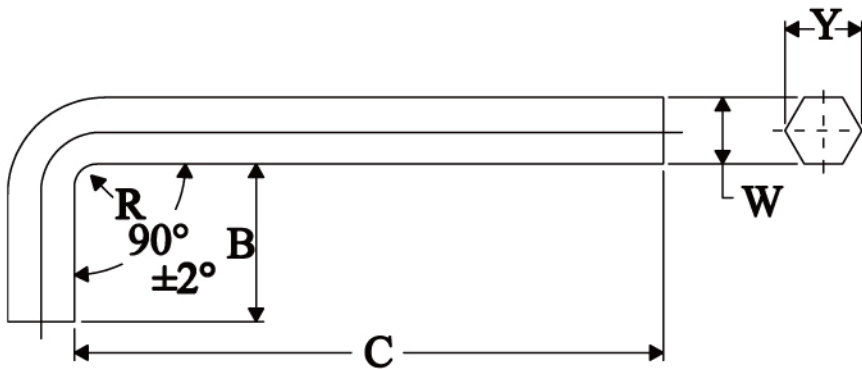
Nominal Size	W		Y	C	B	R	Proff Torque kg-cm ( N-m )
	Key Size	Tolerance	Min.	Approx.	Approx.	Approx.	
1.5	1.5	$\begin{matrix} -0 \\ -0.030 \end{matrix}$	1.62	45	14	1.5	7 ( 0.69 )
2	2.0	$\begin{matrix} -0 \\ -0.030 \end{matrix}$	2.19	50	16	2	16 ( 1.57 )
2.5	2.5	$\begin{matrix} -0 \\ -0.030 \end{matrix}$	2.76	56	18	2.5	31 ( 3.04 )
3	3.0	$\begin{matrix} -0 \\ -0.040 \end{matrix}$	3.31	63	20	3	53 ( 5.20 )
4	4.0	$\begin{matrix} -0 \\ -0.040 \end{matrix}$	4.47	70	25	4	122 ( 11.96 )
5	5.0	$\begin{matrix} -0 \\ -0.040 \end{matrix}$	5.60	80	28	5	245 ( 24.0 )
6	6.0	$\begin{matrix} -0 \\ -0.050 \end{matrix}$	6.73	90	32	6	420 ( 41.2 )
8	8.0	$\begin{matrix} -0 \\ -0.050 \end{matrix}$	8.98	100	36	8	970 ( 95.1 )
10	10.0	$\begin{matrix} -0 \\ -0.050 \end{matrix}$	11.24	112	40	10	1840 ( 180.4 )
12	12.0	$\begin{matrix} -0 \\ -0.050 \end{matrix}$	13.44	125	45	12	3100 ( 304.0 )
14	14.0	$\begin{matrix} -0 \\ -0.070 \end{matrix}$	15.70	140	56	14	4900 ( 480.5 )
17	17.0	$\begin{matrix} -0 \\ -0.070 \end{matrix}$	19.09	160	63	17	8500 ( 833.6 )
19	19.0	$\begin{matrix} -0 \\ -0.070 \end{matrix}$	21.33	180	70	19	11600 ( 1138 )



# Hexagon Keys

依據標準：ASME B18.3-2002  
 材質：合金鋼 CR-V6150  
 硬度：3/8以下(含) HRC48  
 3/8以上 HRC45

According To：ASME B18.3-2002  
 Material：Alloy Steel CR-V6150  
 Hardness：Through 3/8  
 In. Minimum 48 HRC  
 Over 3/8  
 In. Minimum 45 HRC



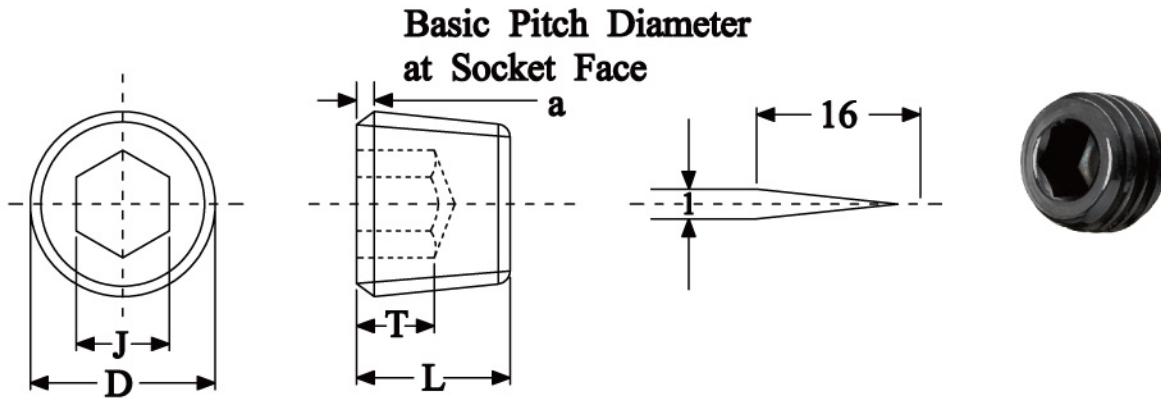
Unit : Inch

Nominal Size	W		Y		B		C				R
	Hexagon Width Across Flats		Hexagon Width Across Corners		Length of Short Arm		Length of Long Arm				
	Max.	Min.	Max.	Min.	Max.	Min.	Short Series		Long Series		
							Max.	Min.	Max.	Min.	Min.
1/16	0.0625	0.0615	0.0701	0.0680	0.656	0.469	1.844	1.656	3.094	2.906	0.062
5/64	0.0781	0.0771	0.0880	0.0859	0.703	0.516	1.969	1.781	3.281	3.094	0.078
3/32	0.0937	0.0927	0.1058	0.1035	0.750	0.562	2.094	1.906	3.469	3.281	0.094
7/64	0.1094	0.1079	0.1238	0.1210	0.797	0.609	2.219	2.031	3.656	3.469	0.109
1/8	0.1250	0.1235	0.1418	0.1390	0.844	0.656	2.344	2.156	3.844	3.656	0.125
9/64	0.1406	0.1391	0.1593	0.1566	0.891	0.703	2.469	2.281	4.301	3.844	0.141
5/32	0.1562	0.1547	0.1774	0.1745	0.938	0.750	2.594	2.406	4.219	4.031	0.156
3/16	0.1875	0.1860	0.2135	0.2105	1.031	0.844	2.844	2.656	4.594	4.406	0.188
7/32	0.2187	0.2172	0.2490	0.2460	1.125	0.938	3.094	2.906	4.969	4.781	0.219
1/4	0.2500	0.2485	0.2845	0.2815	1.219	1.031	3.344	3.156	5.344	5.156	0.250
5/16	0.3125	0.3110	0.3570	0.3531	1.344	1.156	3.844	3.656	6.094	5.906	0.312
3/8	0.3750	0.3735	0.4285	0.4238	1.469	1.281	4.344	4.156	6.844	6.656	0.375
7/16	0.4375	0.4355	0.5005	0.4944	1.594	1.406	4.844	4.656	7.594	7.406	0.438
1/2	0.5000	0.4975	0.5715	0.5650	1.719	1.531	5.344	5.156	8.344	8.156	0.500
9/16	0.5625	0.5600	0.6420	0.6356	1.844	1.656	5.844	5.656	9.094	8.906	0.562
5/8	0.6250	0.6225	0.7146	0.7080	1.969	1.781	6.344	6.156	9.844	9.656	0.625
3/4	0.7500	0.7470	0.8580	0.8512	2.219	2.031	7.344	7.156	11.344	11.156	0.750
7/8	0.8750	0.8720	1.0020	0.9931	2.469	2.281	8.344	8.156	12.844	12.656	0.875
1	1.0000	0.9970	1.1470	1.1350	2.719	2.531	9.344	9.156	14.344	14.156	1.000

# Socket Pipe Plugs

依據標準：JIS B0203  
 材質：合金鋼  
 硬度：HRC 36~43

According To : JIS B0203  
 Material : Alloy Steel  
 Hardness : HRC 36~43



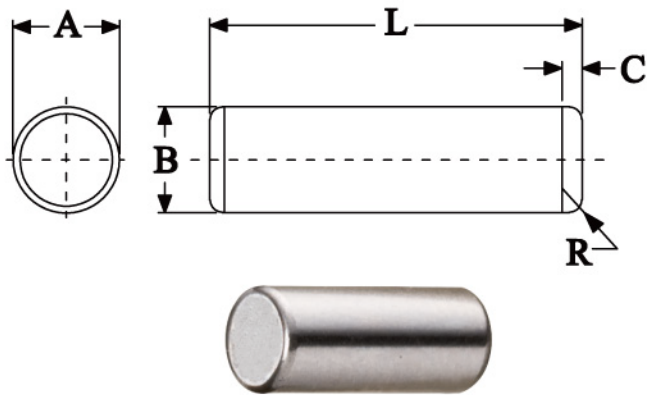
Unit : Inch

Nominal Size	D	Threads Per Inch	J		T	L		R	
	Nominal OD		Hexagon Socket Size		Key Engagement Minimum	Overall Length		Basic Pitch Diameter at Socket Face	
			Nominal	Tolerance		Nominal	Tolerance	Nominal	Tolerance
1/8	9.728	28	5	+0.10 +0.03	3.0	7.0	0.4	0.45	+1.1 +0
1/4	13.157	19	6	+0.10 +0.03	4.4	10.0	0.4	0.7	+1.5 +0
3/8	16.662	19	8	+0.13 +0.04	5.0	10.0	0.5	0.7	+1.5 +0
1/2	20.955	14	10	+0.13 +0.04	6.0	12.5	0.5	0.9	+2 +0
3/4	26.441	14	14	+0.23 +0.05	7.0	14.0	0.5	0.9	+2 +0
1	33.249	11	17	+0.23 +0.05	9.0	17.5	0.5	1.1	+2 +0

# Dowel Pins

依據標準：ISO 8734  
 表面硬度：RC 60  
 心部硬度：RC 50-58

According To : ISO 8734  
 Hardness(Surface) : RC 60  
 Hardness(Core) : RC 50-58

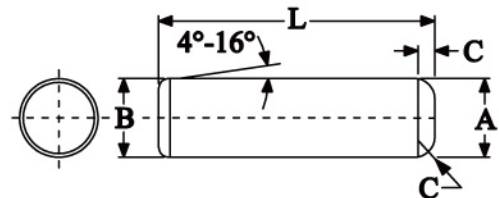


Unit : mm

Nominal Size	A		B		C	R
	Pin Diameter		Point Diameter		Crown Height	Crown Radius
	Max.	Min.	Max.	Min.	Max.	Min.
3	3.008	3.003	2.9	2.6	0.8	0.3
4	4.009	4.003	3.9	3.6	0.9	0.4
5	5.009	5.003	4.9	4.6	1.0	0.4
6	6.009	6.003	5.8	5.4	1.1	0.4
8	8.009	8.003	7.8	7.4	1.3	0.5
10	10.009	10.003	9.8	9.4	1.4	0.6
12	12.009	12.003	11.8	11.4	1.6	0.6
16	16.009	16.003	15.8	15.3	1.8	0.8
20	20.009	20.003	19.8	19.3	2.0	0.8
25	25.009	25.003	24.8	24.3	2.3	1.0

依據標準：ANSI B18.8.2  
 表面硬度：RC 60  
 心部硬度：RC 50-58

According To : ANSI B18.8.2  
 Hardness(Surface) : RC 60  
 Hardness(Core) : RC 50-58



Unit : Inch

Nominal Size or Nominal Pin Diameter	A						B		C		Double Shear Load Min, 1b Material Carbon or Alloy Steel
	Pin Diameter						Point Diameter		Crown Height or Radius		
	Standard Series Pins			Oversize Series Pins			Max.	Min.	Max.	Min.	
	Basic	Max.	Min.	Basic	Max.	Min.					
1/8 0.1250	0.1252	0.1253	0.1251	0.1260	0.1261	0.1259	0.120	0.110	0.041	0.016	3200
3/16 0.1875	0.1877	0.1878	0.1876	0.1885	0.1886	0.1884	0.180	0.170	0.062	0.023	7200
1/4 0.2500	0.2502	0.2503	0.2501	0.2510	0.2511	0.2509	0.240	0.230	0.083	0.031	12800
5/16 0.3125	0.3127	0.3128	0.3126	0.3135	0.3136	0.3134	0.302	0.290	0.104	0.039	20000
3/8 0.3750	0.3752	0.3753	0.3751	0.3760	0.3761	0.3759	0.365	0.350	0.125	0.047	28700
7/16 0.4375	0.4377	0.4378	0.4376	0.4385	0.4386	0.4384	0.424	0.409	0.146	0.055	39100
1/2 0.5000	0.5002	0.5003	0.5001	0.5010	0.5011	0.5009	0.486	0.471	0.167	0.063	51000
5/8 0.6250	0.6252	0.6253	0.6251	0.6260	0.6261	0.6259	0.611	0.595	0.208	0.078	79800
3/4 0.7500	0.7502	0.7503	0.7501	0.7510	0.7511	0.7509	0.735	0.715	0.250	0.094	114000
7/8 0.8750	0.8752	0.8753	0.8751	0.8760	0.8761	0.8759	0.860	0.840	0.293	0.109	156000
1 1.0000	1.0002	1.0003	1.0001	1.0010	1.0011	1.0009	0.980	0.960	0.333	0.125	204000



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