

SECTION 23B

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Metrics

INTRODUCTION

Most threaded fasteners are covered by specifications that define required mechanical properties, such as tensile strength, yield strength, proof load and hardness. These specifications are carefully considered in initial selection of fasteners for a given application. To ensure continued satisfactory vehicle performance, replacement fasteners used should be of the correct strength, as well as the correct nominal diameter, thread pitch, length, and finish.

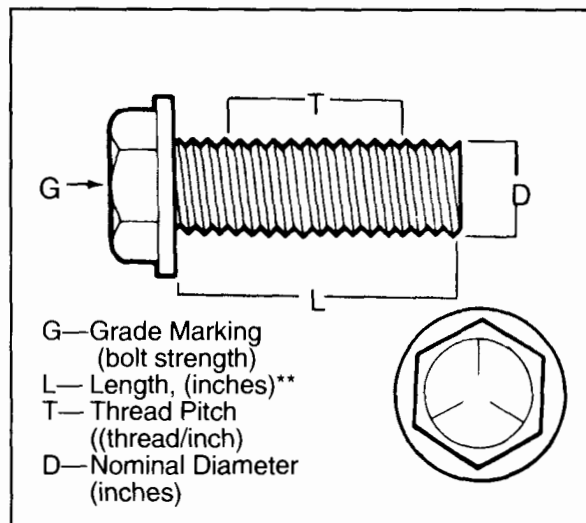
Most original equipment fasteners (English or Metric system) are identified with markings or numbers indicating the strength of the fastener. These markings are described in the pages that follow. Attention to these markings is important to ensure that the proper replacement fasteners are used.

Further, some metric fasteners, especially nuts, are colored blue. This metric blue identification is in most cases a temporary aid for production start-up, and color will generally revert to normal black or bright after start-up.

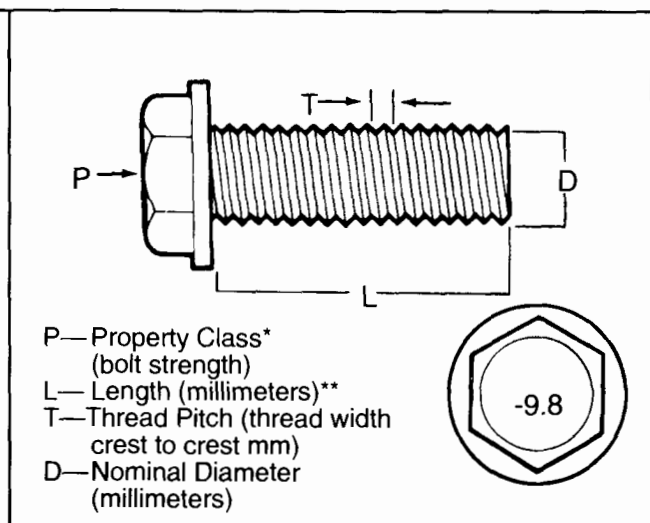
English and Metric system fasteners are available through your Ford Parts and Service operation.

NOMENCLATURE FOR BOLTS

ENGLISH SYSTEM Bolt, 1/2-13x1



METRIC SYSTEM Bolt, M12-1.75x25



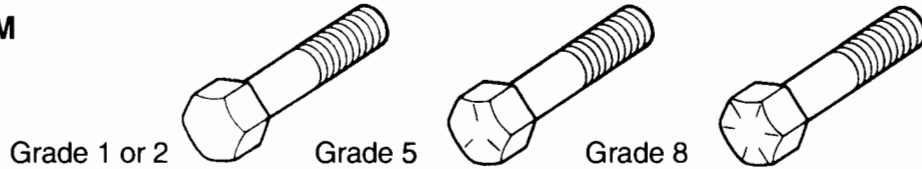
*The property class is an Arabic numeral distinguishable from the slash SAE English grade system.

**The length of all bolts is measured from the underside of the head to the end.

Metrics

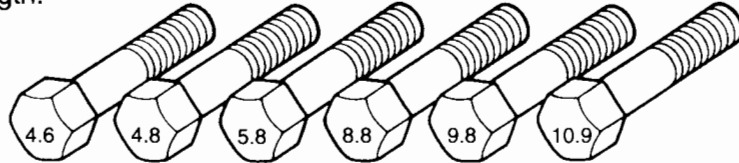
BOLT STRENGTH IDENTIFICATION

ENGLISH SYSTEM



English (Inch) bolts: Identification marks correspond to bolt strength, increasing number of slashes represent increasing strength.

METRIC SYSTEM




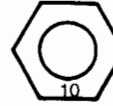


Metric bolts: Identification class numbers correspond to bolt strength, increasing numbers represent increasing strength. Common metric fastener bolt strength property are 9.8 and 10.9 with the class identification embossed on the bolt head.

HEX NUT STRENGTH IDENTIFICATION

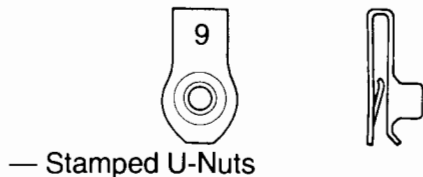
ENGLISH SYSTEM

METRIC SYSTEM

Grade	Hex Nut Grade 5	Hex Nut Grade 8	Class	Hex Nut Property Class 9	Hex Nut Property Class 10
Identification			Identification		
	3 Dots	6 Dots		Arabic 9	Arabic 10
Increasing dots represent increasing strength.			May also have blue finish or paint daub on hex flat. Increasing numbers represent increasing strength.		

OTHER TYPES OF PARTS

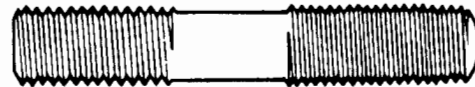
Metric identification schemes vary by type of part, most often a variation of that used of bolts and nuts. Note that many types of English and Metric fasteners carry no special identification if they are otherwise unique.



— Stamped U-Nuts



— Tapping, thread forming and certain other case hardened screws



CLASS
10.9



CLASS
9.8



CLASS
8.8

— Studs, Large studs may carry the property class number. Smaller studs use a geometric code on the end.

Metrics

ENGLISH/METRIC CONVERSION

DESCRIPTION	MULTIPLY	BY	FOR METRIC EQUIVALENT
Acceleration	ft/s ²	0.3048	m/s ²
	in/s ²	0.0254	m/s ²
Torque	lb-in	0.11298	N·m
	lb-ft	1.3558	N·m
Power	horsepower	0.746	kW
Pressure or Stress	inches of water	0.2491	kPa
	psi	6.895	kPa
	psi	0.069	bar
Energy or Work	BTU	1 055.0	Joules (J)
	lb-ft	1.3558	Joules (J)
	kiloWatt-hour	3,600,000. or 3.6 x 10 ⁶	Joules (J)
Light	foot candle	10.764	lumens/square meter (lm/m ²)
Fuel Performance	miles/gal	0.4251	kilometers/liter (km/L)
	gal/mile	2.3527	liters/kilometer (L/km)
Velocity	mph	1.6093	km/h
Length	inch	25.4	mm
	foot	0.3048	m
	yard	0.9144	m
	mile	1.609	km
Area	square inch (in ²)	645.2	mm ²
		6.45	cm ²
	square ft (ft ²)	0.0929	m ²
	square yard	0.8361	m ²
Volume	cubic inch (in ³)	16 387.0	mm ³
		16.387	cm ³
		0.0164	liters (L)
	quart	0.9464	liters (L)
	gallon	3.7854	liters (L)
	cubic yard	0.7646	m ³
Mass	pound	0.4536	kg
	ton	907.18	kg
	ton	0.9078	tonne (t)
Force	kilogram	9.807	N
	ounce	0.2780	N
	pound	4.448	N
Temperature	degree Farenheit (°F)	(°F -32) 0.556	degree Celsius (°C)

Metrics

DECIMAL AND METRIC EQUIVALENTS

FRACTIONS	DECIMAL INCH	METRIC MM
1/64	.015625	.397
1/32	.03125	.794
3/64	.046875	1.191
1/16	.0625	1.588
5/64	.078125	1.984
3/32	.09375	2.381
7/64	.109375	2.778
1/8	.125	3.175
9/64	.140625	3.572
5/32	.15625	3.969
11/64	.171875	4.366
3/16	.1875	4.763
13/64	.203125	5.159
7/32	.21875	5.556
15/64	.234375	5.953
1/4	.250	6.35
17/64	.265625	6.747
9/32	.28125	7.144
19/64	.296875	7.54
5/16	.3125	7.938
21/64	.328125	8.334
11/32	.34375	8.731
23/64	.359375	9.128
3/8	.375	9.525
25/64	.390625	9.922
13/32	.40625	10.319
27/64	.421875	10.716
7/16	.4375	11.113
29/64	.453125	11.509
15/32	.46875	11.906
31/64	.484375	12.303
1/2	.500	12.7

FRACTIONS	DECIMAL INCH	METRIC MM
33/64	.515625	13.097
17/32	.53125	13.494
35/64	.546875	13.891
9/16	.5625	14.288
37/64	.578125	14.684
19/32	.59375	15.081
39/64	.609375	15.478
5/8	.625	15.875
41/64	.640625	16.272
21/32	.65625	16.669
43/64	.671875	17.066
11/16	.6875	17.463
45/64	.703125	17.859
23/32	.71875	18.256
47/64	.734375	18.653
3/4	.750	19.05
49/64	.765625	19.447
25/32	.78125	19.844
51/64	.796875	20.241
13/16	.8125	20.638
53/64	.828125	21.034
27/32	.84375	21.431
55/64	.859375	21.828
7/8	.875	22.225
57/64	.890625	22.622
29/32	.90625	23.019
59/64	.921875	23.416
15/16	.9375	23.813
61/64	.953125	24.209
31/32	.96875	24.606
63/64	.984375	25.003
1	1.00	25.4

Metrics

TORQUE CONVERSION

NEWTON METRES (N•m)	POUND-FEET (LB-FT)
1	0.7376
2	1.5
3	2.2
4	3.0
5	3.7
6	4.4
7	5.2
8	5.9
9	6.6
10	7.4
15	11.1
20	14.8
25	18.4
30	22.1
35	25.8
40	29.5
50	36.9
60	44.3
70	51.6
80	59.0
90	66.4
100	73.8
110	81.1
120	88.5
130	95.9
140	103.3
150	110.6
160	118.0
170	125.4
180	132.8
190	140.1
200	147.5
225	166.0
250	184.4

POUND-FEET (LB-FT)	NEWTON METRES (N•m)
1	1.356
2	2.7
3	4.0
4	5.4
5	6.8
6	8.1
7	9.5
8	10.8
9	12.2
10	13.6
15	20.3
20	27.1
25	33.9
30	40.7
35	47.5
40	54.2
45	61.0
50	67.8
55	74.6
60	81.4
65	88.1
70	94.9
75	101.7
80	108.5
90	122.0
100	135.6
110	149.1
120	162.7
130	176.3
140	189.8
150	203.4
160	216.9
170	230.5
180	244.0

J1930 Terminology List

NOTE: Certain Ford Component names have been changed in this Service Manual to conform to Society of Automotive Engineers (SAE) directive J1930.

SAE J1930 standardizes automotive component names for all vehicle manufacturers.

New Term	New Acronyms/ Abbreviations	Old Acronyms/ Term
Accelerator Pedal	AP	- Accelerator
Air Cleaner	ACL	- Air Cleaner
Air Conditioning	A/C	- A/C - Air Conditioning
Barometric Pressure	BARO	- BP - Barometric Pressure
Battery Positive Voltage	B+	- BATT+ - Battery Positive
Camshaft Position	CMP	- Camshaft Sensor
Carburetor	CARB	- CARB Carburetor
Continuous Fuel Injection	CFI	- Continuous Fuel Injection
Charge Air Cooler	CAC	- After Cooler - Intercooler
Closed Loop	CL	- EEC
Closed Throttle Position	CTP	- CTP - Closed Throttle Position
Clutch Pedal Position	CPP	- CES - CIS - Clutch Engage Switch - Clutch Interlock Switch
Continuous Trap Oxidizer	CTOX	- CTO
Crankshaft Position	CKP	- CPS - VRS - Variable Reluctance Sensor
Data Link Connector	DLC	- Self-Test Connector
Diagnostic Test Mode	DTM	- Self-Test Mode
Diagnostic Trouble Code	DTC	- Self-Test Code
Distributor Ignition	DI	- CBD - DS - TFI - Closed Bowl Distributor - Duraspark Ignition - Thick Film Ignition
Early Fuel Evaporation	EFE	- EFE - Early Fuel Evaporation

J1930 Terminology List

New Term	New Acronyms/ Abbreviations	Old Acronyms/ Term
Electrically Erasable Programmable Read Only Memory	EEPROM	- E2PROM
Electronic Ignition	EI	- DIS - EDIS - Distributorless Ignition System - Electronic Distributorless Ignition System
Engine Coolant Level	ECL	- Engine Coolant Level
Engine Coolant Temperature	ECT	- ECT - Engine Coolant Temperature
Engine Control Module	ECM	- ECM - Engine Control Module
Engine Speed	RPM	- RPM - Revolutions Per Minute
Erasable Programmable Read Only Memory	EPROM	- EPROM - Erasable Programmable Read Only Memory
Evaporative Emission	EVAP	- EVP Sensor - EVR Solenoid
Exhaust Gas Recirculation	EGR	- EGR - Exhaust Gas Recirculation
Fan Control	FC	- EDF - Electro-Drive Fan
Flash Electrically Erasable Programmable Read Only Memory	FEEPROM	- FEEPROM - Flash Electrically Erasable Programmable Read Only Memory
Flash Erasable Programmable Read Only Memory	FEPROM	- FEPROM - Flash Erasable Programmable Read Only Memory
Flexible Fuel	FF	- FCS - FFS - FFV - Fuel Compensation Sensor - Flex Fuel Sensor
Fourth Gear	4GR	- Fourth Gear
Fuel Pump	FP	- FP - Fuel Pump
Generator	GEN	- ALT - Alternator
Ground	GND	- GND - Ground
Heated Oxygen Sensor	HO2S	- HEGO - Heated Exhaust Gas Oxygen Sensor
Idle Air Control	IAC	- IAC - Idle Air Bypass Control

J1930 Terminology List

New Term	New Acronyms/ Abbreviations	Old Acronyms/ Term
Idle Speed Control	ISC	- Idle Speed Control
Ignition Control Module	ICM	- DIS Module - EDIS Module - TFI Module
Indirect Fuel Injection	IFI	- IDFI - Indirect Fuel Injection
Inertia Fuel Shutoff	IFS	- Inertia Switch
Intake Air Temperature	IAT	- ACT - Air Charge Temperature
Knock Sensor	KS	- KS - Knock Sensor
Malfunction Indicator Lamp	MIL	- CEL - "CHECK ENGINE" Light - "SERVICE ENGINE SOON" Light
Manifold Absolute Pressure	MAP	- MAP - Manifold Absolute Pressure
Manifold Differential Pressure	MDP	- MDP - Manifold Differential Pressure
Manifold Surface Temperature	MST	- MST - Manifold Surface Temperature
Manifold Vacuum Zone	MVZ	- MVZ - Manifold Vacuum Zone
Mass Air Flow	MAF	- MAF - Mass Air Flow
Mixture Control	MC	- Mixture Control
Multipoint Fuel Injection	MFI	- EFI - Electronic Fuel Injection
Non-Volatile Random Access Memory	NVRAM	- NVM - Non-Volatile Memory
On-Board Diagnostic	OBD	- Self-Test - On-Board Diagnostic
Open Loop	OL	- OL - Open Loop
Oxidation Catalytic Converter	OC	- COC - Conventional Oxidation Catalyst
Oxygen Sensor	O2S	- EGO
Park/Neutral Position	PNP	- NDS - NGS - TSN - Neutral Drive Switch - Neutral Gear Switch - Transmission Select Neutral
Periodic Trap Oxidizer	PTOX	- PTOX - Periodic Trap Oxidizer

J1930 Terminology List

New Term	New Acronyms/ Abbreviations	Old Acronyms/ Term
Power Steering Pressure	PSP	- PSPS - Power Steering Pressure Switch
Powertrain Control Module	PCM	- ECA - ECM - ECU - EEC Processor - Engine Control Assembly - Engine Control Module - Engine Control Unit
Programmable Read Only Memory	PROM	- PROM - Programmable Read Only Memory
Pulsed Secondary Air Injection	PAIR	- MPA - PA - Thermactor II - Managed Pulse Air - Pulse Air
Random Access Memory	RAM	- RAM - Random Access Memory
Read Only Memory	ROM	- ROM - Read Only Memory
Relay Module	RM	- RM - Relay Module RM
Scan Tool	ST	- GST - NGS - Generic Scan Tool - New Generation STAR Tester - Enhanced Scan Tool OBD II ST
Secondary Air Injection	AIR	- AM - CT - MTA - Air Management - Conventional Thermactor - Managed Thermactor Air - Thermactor
Sequential Multiport Fuel Injection	SFI	- SEFI - Sequential Electronic Fuel Injection
Service Reminder Indicator	SRI	- SRI - Service Reminder Indicator
Smoke Puff Limiter	SPL	- SPL - Smoke Puff Limiter
Supercharger	SC	- SC - Supercharger
Supercharger Bypass	SCB	- SCB - Supercharger Bypass
System Readiness Test ¹	SRT ¹	— —

J1930 Terminology List

New Term	New Acronyms/ Abbreviations	Old Acronyms/ Term
Thermal Vacuum Valve	TVV	- Thermal Vacuum Switch
Third Gear	3GR	- Third Gear
Three Way Catalytic Converter	TWC	- TWC - Three Way Catalytic Converter
Three Way + Oxidation Catalytic Converter	TWC+OC	- TWC & COC - Dual Bed - Three Way Catalyst and Conventional Oxidation Catalyst
Throttle Body	TB	- TB - Throttle Body
Throttle Body Fuel Injection	TBI	- CFI - Central Fuel Injection - EFI
Throttle Position	TP	- TP - Throttle Position
Torque Converter Clutch	TCC	- CCC - CCO - MCCC - Converter Clutch Control - Converter Clutch Override - Modulated Converter Clutch Control
Transmission Control Module	TCM	- 4EAT Module
Transmission Range	TR	- PRNDL
Turbocharger	TC	- TC - Turbocharger
Vehicle Speed Sensor	VSS	- VSS - Vehicle Speed Sensor
Voltage Regulator	VR	- VR - Voltage Regulator
Volume Air Flow	VAF	- VAF - Volume Air Flow
Warm-Up Oxidation Catalytic Converter	WU-OC	- WV-OC - Warm-up Oxidation Catalytic Converter
Warm-Up Three Way Catalytic Converter	WU-TWC	- WU-TWC - Warm-up Three Way Catalytic Converter
Wide Open Throttle	WOT	- Full Throttle - WOT - Wide Open Throttle