Is it Metric, UNC or UNF

Probably one of the harder things for the amateur hobbyist to determine is the actual diameter and thread type of an existing bolt. Lets face it. It is easy if you have a new bolt with the packet and description that come with it, but in most cases we may want to replace an existing bolt we have but we have nothing to compare it to. Even if we have a nut that fits, it is easy to confuse a UNC with a metric bolt until you get used to the look of them.

The following bolt drilling chart clearly demonstrates the differences for you to learn and double check yourself. It is easy to measure the diameter of the bolt thread with a rule or venire but is it definitely metric or maybe it is imperial. The key things to look at here are the number of threads per inch or the pitch of the threads.

Wouldn't it be nice if the metric and imperial sizes both looked at the number of threads per same length? Yes it would and well, they don't and I cannot answer why but that's just the way it is and has been for years right around the world, so why bother whining just accept it.

NOM. SIZE	THREADS PER INCH & TAPPING DRILL SIZE								NOM. SIZE	TAPPING DRILL	ISO METRIC PITCH		WIDTH ACROSS FLATS		
	BSW	TAPPING DRILL	BSF	TAPPING DRILL	UNC	TAPPING DRILL MM	UNF	TAPPING DRILL			COARSE	FINE	BSW & BSF	UNC & UNF	ISO METRIC
3/16	24	3.7mm	32	5/32	24	3.9mm	32	4.1mm	M5	4.2mm	0.80	0.50	0.324	0.312	8mm
1/4	20	5.1mm	26	5.4mm	20	13/64	28	7/32	M6	5.1mm	1.00	0.75	0.445	0.437	10mm
5/16	18	6.5mm	22	6.8mm	18	6.6mm	24	7.0mm	M8	6.8mm	1.25	1.00	0.525	0.500	13mm
3/8	16	5/16	20	21/64	16	8.0mm	24	8.5mm	M10	8.6mm	1.50	1.25	0.600	0.562	16mm
7/16	14	9.3mm	18	9.7mm	14	9.4mm	20	25/64	M12	10.4mm	1.75	1.25	0.710	0.625	18mm
1/2	12	27/64	16	7/16	13	10.9mm	20	29.64	M14	12.1mm	2.00	1.50	0.820	0.750	21mm
9/16	12	31/64	16	1/2	12	31/64	18	13.0mm	M16	14.0mm	2.00	1.50	0.920	0.812	24mm
5/8	11	17/32	14	14mm	11	35/64	18	14.5mm	M18	15.5mm	2.50	1.50	1.010	0.937	27mm
3/4	10	16.5mm	12	43/64	10	21/32	16	17.5mm	M20	17.5mm	2.50	1.50	1.200	1.125	30mm
7/8	9	49/64	11	20mm	9	49/64	14	20.5mm	M22	19.5mm	2.50	1.50	1.300	1.312	32mm
1	8	7/8	10	29/32	8	57/64	12	59/64	M24	21.0mm	3.00	2.00	1.480	1.500	36mm
1.1/8	7	63/64	9	1.1/64	7	63/64	12	1.3/64	M27	24.0mm	3.00		1.670	1.687	41mm
1.1/4	7	1.7/6.4	9	1.9/64	7	1.7/64	12	1.11/64	M30	26.5mm	3.50		1.860	1.875	46mm
1.3/8	6	1.13/64	8	1.1/4	6	1.7/32	12	33.0mm	M36	32.0mm	4.00		2.050	2.062	55mm
1.1/2	6	1.21/64	8	1.3/8	6	1.11/32	12	1.27/64	M39		4.00		2.220	2.250	60mm
1.3/4	5	1.35/64	7	1.39/64	5	1.9/16			M42		4.50		2.580	2.625	65mm
2	4.5	45mm	7	1.55/64	4.5	1.51/64			M48		5.00		2.760	3.000	75mm

The easiest to look at first is to determine if it is BSW, UNC or UNF. This is mainly because you can count the threads per inch quite easily by placing a rule or venire next to the bolt.

If the bolt is not long enough, count the threads per half inch and then double your result. If you do this you will soon notice that if it is not BSW, UNC or UNF it has to be metric and your done.

Sounds simple and it is, that's all there is to it, now lets get practical.

Look it does not really matter whether you count the peaks or the valleys of the threads because even if you are out by one thread the differences between the various types of bolts is bigger than one thread.

However just take your time and double check your count.

The top bolt is 5/8 inch diameter with 18 threads per inch so it will be UNF.

The bottom bolt looks ½ inch but is actually right on 12mm diameter with 13 ½ threads per inch so it could be confused as being a UNC but in actual fact it has 10.9 raised letters on the top of it so it has to be metric. This is a good example where you can get mixed up and order the wrong bolts, so pay attention and never assume.

Practical Examples

Lets get down in the shed and look at some of those buckets of bolts we have layin' about.

We have a typical assortment of bolts here dragged from those buckets in those earlier photos. We will try to determine what grade they are from their markings, we may need the wire brush to clean up the heads a bit to make the markings more clear on the older bolts.

The photo below shows a standard home hardware available type bolt. As you can see there are no stamped in markings as such. The 51 you see would have been written on there during a stock take at the store at some stage.

While the photo of the bolt on the right almost looks like an automotive bolt because of it's recessed area on top, but as it has no markings so we can only deduct it is a standard home hardware available, Grade 4 bolt. Most probably witworth [BSW British Standard Witworth] thread also.

Good for our house but no good for our cars.

This bolt above is an interesting one. It has the 'M' symbol but no numbers. The 'M' indicates this is definitely a metric bolt, however because it has no number markings we have to assume it is a low grade general purpose bolt. Other low grade metric bolts may not have the M but display their 4.8 grade rating instead.

While this bolt below is big and because of it's size it has considerable inherent strength, its only markings are the manufacturers brand name, so again we have to assume it is a low grade general purpose bolt and not fit for use in our vehicles.

This is bolt below is looking better, typical Grade 5 bolt markings on the top face of the head of the bolt, so it should be either a UNC or UNF bolt and much stronger than the first two shown.

This bolt below is referred to as a black bolt. The Grade 5 markings are clearly visible on this bolt.

This bolt on the left is small but incredibly strong. It's markings are clear even after some years of operation in a car. It is also has a fine thread making it a UNF Grade 8 bolt. I actually know for a fact what this bolt is, due to having regularly replaced many of the components it holds in a car over the last 20 or more years.

Three of these bolts locate the lower ball joint in the suspension arm on all Ford Falcons and the like from about 1969 to 1989. Another two larger grade 8 bolts assist them and attach the front radius rod to this lower suspension arm. Obviously a suspension arm is a highly loaded area, so the Original Equipment Manufacturer [OEM] replacement part has opted for the strongest bolts they can put in and opted for a fine threaded bolt to minimize the chance of the bolt working it's way loose.

Here is a larger fine threaded bolt [UNF] with the grade 8 markings. This bolt is strong, as it should, because it has to hold the harmonic balancer onto the end of a Ford Cleveland V8 crankshaft. Fine thread helps to prevent it vibrating loose.

Before this one goes back it will get some assistance in the form of some 'Lock Tite' solution on the threads to ensure it never comes loose again until I want it to. It is common for Grade 8 UNF bolts to also be referred to as a 'high tensile bolt'.

Now this bolt belwo I am pretty sure came from a car at the motor wreckers where I stripped out some suspension components so it should be a strong bolt. However its marking indicate it's strength is 10 or more yet most high strength metric bolts in this country are marked as 10.9 so I have some doubts.

If these were placed in a hot rod or modified car that had to be certified by an engineer I am sure it would be an issue.

Now at the risk of being shot down by some bolt expert here, this bolt below is a good example of having definite markings that don't mean much me.

I am sure it is a strong bolt because it came out of a suspension part but really you would need the manufacturers listing to work out what it is. My uneducated guess is that it was a purpose intended bolt, supplied directly to the OEM in large traceable quantities and not for general over the counter sales.

To clarify things here, if this bolt stays in the car and on the part it was intended to hold in that car it is fine, there is nothing wrong with it. However you can not assume that it is a grade 8 or a 10.9 bolt just because it came from a suspension part out of another car. An assumption like this can bring you undone if you install it in something else.

If you think that's good look at this one. It also came out of a suspension trailing arm I stripped out of an old Japanese car wreck. It has only some sort of trade mark squiggle of the company that made it on it's head, yet it appears to be a fine thread metric bolt.

"I'd like to see ya get this one past ye old engineer matey."

Now this is more like it, clearly marked as a 10.9 strength metric bolt. This bolt is a bolt that is offered to bolt the tow ball coupling casting to front draw bar on a trailer.

Two of these bolts hold a cast tow ball coupling that is rated to 2000kg towing capacity to the trailer.

Here are two different bolts that are used to hold body panels on a late 1960s Ford Mustang or Galaxie. No significant markings at all yet I know other Fords of the same era are marked as a grade 5 bolt of 5/16 UNC.