



INFORMATION SHEET IS-01 version 1.0

TYRES & RUNFLATS

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MAINTAINING TYRE PRESSURES

Tyre Inflation Pressures



Did you realise that your car is literally riding on air? The pressure of the air inside your tyres is what supports the entire weight of your car! A tyre is a ring shaped covering that fits around your wheel rim. It is in constant contact with the road and is made of absorbent materials so it can help absorb shock and provide grip. Pneumatic tyres are inflated with air, and the amount of air in a tyre can affect its performance dramatically.

The AV Program strongly recommends that you **check your vehicles tyre pressures regularly!** (including the spare). Pressures should be checked cold, as there is an increase when the tyre has warmed up after being driven.

How much should you inflate your tyres?

All car manufacturers will have guidelines for the ideal inflation of your car's tyres. This is usually expressed in terms of pressure, and most cars still have this information supplied in both metric and imperial, as do most air pumps at service stations. Your vehicle may have the correct tyre pressures displayed on a [tyre placard](#). You will typically find the tyre placard either just inside the door, the filler cap or in the glove box.

However, please note that it is quite possible that the quoted inflation levels are for the tyres as originally supplied with the vehicle. Since then, different tyres may well have been fitted. **It is very important, therefore, that you double check with the manufacturer's web site as to the recommended pressures for the tyres that are currently fitted to the vehicle.**

The vehicle manufacturer has designated the ideal tyre inflation based upon any conditions which the car is likely to face (number of passengers and load weight, for example), and maintaining this ideal pressure with regular checks will ensure you have the best ride and you will achieve the greatest longevity from your tyres.

But what happens if you over or under inflate your car's tyres?

Over inflated tyres:

- Have a smaller contact patch with the road
- Will decrease rolling resistance and could therefore improve fuel consumption
- There may be an effect on braking
- Tyre wear may be greater in the centre of the contact area
- Compromise handling, ride comfort and tyre noise

Under inflated tyres

- Under inflated tyres have a greater contact area with the road
- This can increase rolling resistance and friction (the rubbing together of two moving objects) from tyre against road.
- Increased friction is bad for overall efficiency, and increases fuel consumption
- Can also create greater tyre wear and adversely affect performance.
Increased friction causes tyres to get hotter, and the shape of under inflated tyres means that the shoulder of the tread wears faster
- Put extra stress on the casing and reduce tyre life
- Will adversely affect braking performance

Clearly checking tyre pressure and making sure it is at the recommended level is of benefit to your pocket and overall safety and driving enjoyment.

How often should you check tyre pressure?

Tyre pressures should be checked daily as stipulated in the Armoured Vehicle Maintenance Guide.

Another important tip to remember is to never bleed pressures when the [tyres](#) are warm. It is dangerous to drive on under inflated tyres, as vehicle handling may be adversely affected, and excessive flexing and heat build-up may result in tyre failure.

The advantages of a more stable tyre pressure include better grip, increased fuel economy and tyre life.

Tyre Age

Tyre Health-Check: How Old Is Too Old?

Tyres are the forgotten essentials of a car, rarely spared a thought and taken for granted until a flat occurs or a roadworthy test is failed, ruining any immediate driving plans or failing to produce sufficient grip, reminding you that it's time for replacement.

Consider that the average DFAT armoured vehicle notches up 10-20,000 kilometres annually. All that's between the vehicle and the road is the tyres. It is really important for safety reasons that you're aware of the age of the tyres. As well as ensuring the tyres are run at the correct inflation pressures and inspected frequently for excessive wear, check for embedded objects in the tread grooves and any damage.

Do tyres last indefinitely?

Tyres, whilst hard-wearing and seemingly ageless, are in fact perishable. Tyres are manufactured by combining natural & synthetic rubbers with textile fabric plies and steel cords. There is a mixture of other important ingredients contained in the various rubber compounds embedded within the tyre. These materials convert the tyre, after vulcanisation, into a strong, elastic and very durable product. Amongst these ingredients are antioxidants and antiozonants. These powerful protective agents greatly assist the tyre to resist the effects of weathering but despite technological advances in construction, tyres won't last indefinitely.

How long do I have before my spare tyre or current fitment is considered unsafe due to ageing?

Tyres can be considered too old long before their tread wears down. If you need a measure of time, most reputable tyre manufacturers advise against the use of tyres that are more than five to six years old, regardless of use.

How does a tyre break down?

Natural rubber, Styrene Butadiene (SBR) and polybutadiene (IR) rubbers are the principle elastomers contained in tyres which are produced with very long molecular chains, containing double bonds along their length. These double bonds actively react & combine with both oxygen and ozone. The chemical reactions, accelerated by heat and/or sunlight, subsequently over time either reduce the length of the molecular chains (making the rubber softer) or in the case of styrene butadiene polymers, makes the rubber harder. In either case, the performance of the rubber is adversely compromised.

The deterioration can be prevented by adding antioxidants and antiozonants to the rubber compound before vulcanization. At one time, ozone cracks were commonly seen in automobile tyre sidewalls, but are now seen rarely thanks to the use of these protective agents. A common and low cost antiozonant is a wax, which bleeds to the surface of the tyre's tread and sidewall area and forms a protective layer, but other specialist chemicals are also widely used.

How does tyre pressure influence ageing?

Tyres operated with pressures below the recommended levels, will develop greater heat build-up, which is a major contributor to tyre ageing. To increase the safety for you and other road users, as well as prolonging the tyre's life, increasing fuel efficiency and to reduce premature tyre ageing, it is wise to ensure that the inflation pressures are maintained in accordance to the tyre manufacturer's recommendations.

How can I tell if something is wrong with my tyre?

While it is certainly better to have a tyre expert assess your tyre for ageing, some quick indicators include:

- Cracking in the tyre wall, in particular the lower sidewall
- Distortion in the tread area
- Cracking at the base of the tread grooves
- Deformed tyre carcass
- Tyre tread distortion
- Excessive vibrations during operation

It should be noted also that the tyre may not show any physical signs of ageing. However if you suspect that the tyres on your vehicle are older than five to six years, then it is highly recommended to get them checked out by an expert.

Does climate have an effect on the ageing of tyres?

The warmer the climate the faster the tyres will age. Exposure to high ambient temperatures can accelerate the tyre ageing process, which could lead to tyre failures, as described previously. Environmental conditions like exposure to sunlight and coastal climates, as well as poor storage and infrequent use will hasten the ageing process

How can I quickly check the age of my tyres?

Most tyres are manufactured to include the U.S. Department of Transportation (DOT) code on the lower sidewall. This code consists of four digits, which indicate when the tyre was manufactured. For example a '0212' code means the tyre was made in the second week of 2012.

All Terrain Tyres

All Terrain (AT) tyre tread patterns give stability when travelling over rocks, sand and dirt. Wet and dry conditions can be tackled with confidence and traction benefits in light snow are a feature when compared to highway patterns. All Terrain tyres represent a mixed use solution between trail blazing and daily drives on paved surfaces given the specifically designed patterns with strategically placed voids and gravel filtering. Improving sidewall technology is showing that these tyre patterns are designed to be capable for many situations encountered off road. Research and development from the major tyre manufacturers is aimed at constructing a tyre with strong sidewalls to gain puncture resistant properties. Cut resistant tread compounds are another element, built into these tyres to reduce the likelihood of an inconvenient puncture on your four wheel drive.



Highway Terrain (HT) tyres have less aggressive tread patterns and are more concerned with fuel economy, highway handling, ride comfort and reducing cabin noise.

Tyre care including rotations, alignment and inflation are particularly important considerations to gain optimal performance and life from your all terrain tyres. Inflation should follow the tyre manufacturer's recommendations and allow for the weight of the load carried by your armoured vehicle.

Tyre Talk - What Do the Numbers Mean?

Every modern tyre has markings on the tyre wall. These markings are a series of numbers and codes, used internationally, and exist for the identification of tyre structures, dimensions and applications. The illustration (below) gives an example of the markings, as they appear on a passenger tyre:

A tyre's age can be identified from the U.S. Department of Transportation (DOT) coding located on its sidewall. The last numbers on the DOT donate the week and year of construction. The full DOT is only on one side of the tyre. In some cases, tyres will have a partial DOT on the other wall. The partial DOT will not show the tyre's age.

Service life is dependent on many variables such as driving conditions, vehicle loads, inflation pressure, and general maintenance or abuse of the tyre. There is not a specific age at which tyres to be replaced. Much can depend on how the tyre has been exposed to the elements, stored, either on or off the vehicle and in general treated. The last thought though is if you are ever in doubt of the condition of the tyre (especially if it is showing signs of weathering) replace it.

The DOT though National Highway Traffic Safety Administration's (NHTSA) also has Uniform Tyre Quality Grade Standards (UTQG)



① Tyre Width

Maximum width of the tyre measured in millimetres from mid sidewall to the same point on the opposite sidewall.

② Tyre Profile

Height of the tyre's sidewalls expressed as a percentage of the maximum section width.

③ Wheel Size

The diameter of the wheel expressed in inches.

④ Load & Speed Rating

Indicates the maximum load carrying capacity of the tyre when operating at its maximum speed capability. The maximum speed capability is indicated by a letter and the maximum load carrying capacity by a number, which is represented as an index. (refer to the Standard Load Index table below)

⑤ Brand Name

⑥ Model Type

Describes the tread pattern design.

⑦ Maximum Load

The tyre's maximum load carrying capacity

⑧ Maximum Pressure

The tyre's maximum operating inflation pressure.

⑨ USA DOT Code

A US Department of Transport federal requirement to allow the tyre to be sold and operated in North America.

⑩ UTQG Standards

Uniform Tyre Quality Grading (Applicable only to the USA).

UTQG grading is required by US law for most passenger car tyres sold in the United States (not deep treaded light truck tyres). There are three grading categories: Traction / Treadwear / Temperature. These are branded on the tyre's upper sidewall.






















Standard Load Index Table

The following table shows what the weight that each index specification is able to carry:

Load Index	Load in kg	Load Index	Load in kg	Load Index	Load in kg
62	265	84	500	106	950
63	272	85	515	107	975
64	280	86	530	108	1000
65	290	87	545	109	1030
66	300	88	560	110	1060
67	307	89	580	111	1090
68	315	90	600	112	1120
69	325	91	615	113	1150
70	335	92	630	114	1180
71	345	93	650	115	1215
72	355	94	670	116	1250
73	365	95	690	117	1285
74	375	96	710	118	1320
75	387	97	730	119	1360
76	400	98	750	120	1400
77	412	99	775	121	1450
78	425	100	800	122	1500
79	437	101	825	123	1550
80	450	102	850	124	1600
81	462	103	875	125	1650
82	475	104	900	126	1700
83	487	105	925		

Tyre Speed Ratings and Tread Life

The most common tyre speed ratings, speeds and vehicle usage are as follows:

	MAXIMUM SPEED		TYPE / VEHICLE TYPE
L	 75 mph	120 km/h	 Off-Road & Light Truck Tires
M	 81 mph	130 km/h	 Temporary Spare Tire
N	 87 mph	140km/h	 Temporary Spare Tires
Q	 99 mph	160 km/h	 Winter 4x4
R	 106 mph	170 km/h	 Heavy Duty Light Truck
S	 112 mph	180 km/h	 Family Sedans & Vans
T	 118 mph	190 km/h	 Family Sedans & Vans
U	 124 mph	200 km/h	 Sedans & Coupes
H	 130 mph	210 km/h	 Sport Sedans & Coupes
V	 149 mph	240 km/h	 Sports Cars
Z	 149+ mph	240+ km/h	 Sports Cars
W	 168 mph	270 km/h	 Exotic Sports Cars
Y	 186 mph	300 km/h	 Exotic Sports Cars
(Y)	 186+ mph	300+ km/h	 Exotic Sports Cars

The Origin of Speed Ratings

We can thank Germany's famous Autobahn for tyre speed ratings. Tyre speed ratings range from A (the lowest) to Y (the highest). But the chart is not completely in alphabetical order. For example, H is between U and V, with the common perception that H stood for "high performance" at one time. As manufacturers continue to add speed to their vehicles, tyre speed ratings evolve to match the speeds. For example, Z was the highest rated speed at 149+ until W & Y were used to match the higher speeds of exotic sports cars.

Speed Ratings Refer to More Than Just Speed

Speed ratings make a difference not only in regards to speed, but in regards to ride comfort, wear and cornering ability. Typically, the higher the speed rating, the better the grip and stopping power, but the lower the tread life. You can always increase the speed rating of the tyres on your vehicle for improved performance, but can never decrease it without reducing the vehicle top speed to that of the lower speed rating selected.

Mixing Speed Ratings

If tyres of different speed ratings are mounted on a vehicle, the lower speed-rated tyres should be placed on the front axle regardless of which axle is driven. This is to prevent a potential oversteer condition. Vehicle handling may be affected, and the vehicle's speed capacity is now limited to the lowest speed-rated tyre. For best performance, it is recommended that the same size and type of tyre be used on all four wheel positions.

The table below gives the load index and the speed symbol with their corresponding values

Load Index	Load per tyre (kg)	Load Index	Load per tyre (kg)	Load Index	Load per tyre (kg)	Load Index	Load per tyre (kg)	Load Index	Load per tyre (kg)	Speed Symbol	Speed (klm/h)
62	265	75	387	88	560	101	825	114	1180	J	100
63	272	76	400	89	580	102	850	115	1215	K	110
64	280	77	412	90	600	103	875	116	1250	L	120
65	290	78	425	91	615	104	900	117	1285	M	130
66	300	79	437	92	630	105	925	118	1320	N	140
67	307	80	450	93	650	106	950	119	1360	P	150
68	315	81	462	94	670	107	975	120	1400	Q	160
69	325	82	475	95	690	108	1000	121	1450	R	170
70	335	83	487	96	710	109	1030	122	1500	S	180
71	345	84	500	97	730	110	1060	123	1550	T	190
72	355	85	515	98	750	111	1090	124	1600	H	210
73	365	86	530	99	775	112	1120	125	1650	V	240
74	375	87	545	100	800	113	1150	126	1700	W	270
										Y	300
										VR	>210
										ZR	>240

So then, in relation to the above table, the sidewall code "P215/65 R 16 95 H" means the tyre is rated to 690kg of load (each tyre) up to a maximum speed of 210klm/h.

Drivers should be aware that these ratings exist to protect the public from the possible outcome of overloading a tyre. You should also bear in mind that these load ratings apply to a properly inflated tyre (see "Tyres - Inflation").

Overloading a tyre - either by carrying more weight than it is designed to carry, or by running at a lower than specified pressure, can cause heat build-up than can destroy the tyre. Even at low speeds a blow-out can be fatal.

Tire Speed Rating

Run Flats

All post 2005 armoured vehicles used by DFAT are fitted with run flats. These are thick heavy duty plastic rings that surround the wheel rim before the tyre is fitted.

The run flat works by providing a solid surface for the vehicle to continue to be able to be driven after the tyre has deflated i.e. flat tyre.

Note that the run flat is only good for about 30-50 kms at a speed up to 50kph. Faster speeds or longer distances will degrade the runflat and cause significant damage to the wheel rim and vehicle's suspension.

Once the vehicle suffers from a tyre blow out or puncture, you should endeavour to find a safe area within this 30-50km range where the tyre can be changed for the inflated spare tyre provided with the vehicle.

Further technical data on the typical runflat provided with the vehicle can be found by double clicking the pdf icon below.