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Subaru FAQ

This Subaru FAQ was sourced from the Subaru Impreza Drivers Club FAQ, which you can see in full at

SIDC
Subaru Impreza Drivers Club

Topics covered in this FAQ are :

WRX/STi Cars
Speedo Accuracy
Fuel Consumption
Type of Fuel to use
Starting and Stopping the Engine
Common Problems, Symptoms and Remedies
Dump Valves
Wastegate Solenoid
Grille Badge Recognition

WRX/Sti Cars

With 276+ bhp, and 260 lb/ft of torque, mated to a shorter close ratio gearbox, the later Japanese specification Impreza's have the ability to out accelerate virtually all other cars on the road. Official figures are 0-62mph (100km/h) in about 4.9 seconds, although a Type R was timed at 4.3 seconds (0-60) by Performance Car in the UK. In standard form, these cars are limited to 112mph by Japanese law, but bypassing the speed limiter enables them to reach top speeds of about 150mph+ You certainly wouldn't want to run the cars at this speed for any period of time, as the fuel consumption would be well down into single figures!!!

The regular WRX/STi models have different (slightly shorter) gearing than the Turbo 2000 models, but with an extra 500 or 1,000 rpm to play with, the maximum speeds in gears are similar. The top speed (limiter bypassed) of these models is around 150mph at nearly 7,000 rpm.

The following table of gear ratios relates only to the WRX STi IV saloon. The ratios for the Type R and RA STi models are significantly shorter, at about 19mph per 1000rpm in 5th.

Gear	Ratio	Mph per 1000 rpm
1st	3.17	5.1
2nd	1.89	8.6
3rd	1.30	12.4
4th	0.97	16.6
5th	0.74	21.8
Final Drive Ratio	4.44:1	

Speedo Accuracy

A vehicle speedometer can never be perfectly accurate: variations in temperature, tread depth, tyre growth and a hundred other factors combine to give an indication of your speed, not a true reading. In the UK, the law requires that the indication be -0/+10%, *i.e.* it can over-read by up to 10% but must not under-read. In other words, if the big hand's pointing at 70, you are somewhere between 63mph and 70mph.

Needless to say, it helps to know how inaccurate your speedo is. One way of checking the speedo is to use a GPS receiver. Although these have their own inaccuracies and should be used with care, at higher (car) speeds the errors are typically about 1mph. Some tests by IWOC members (different GPSs, different days, different places, different cars) suggest the following:

Car	GPS		

	test 1	test 2	test 3
30	28	26	28
40	38	37	38
50	48	47	47
60	57	57	56
70	67	66	67
80	77	76	77
90	87	85	87
100	98	-	96

Fuel Consumption

Fuel consumption is always a good (but boring) topic of conversation amongst Impreza owners. Depending on how much you enjoy your driving, fuel consumption can vary between about 16 and 30 mpg. Most owners seem to average about 21 - 23 mpg, although on long motorway runs, 30 mpg and above is attainable. Acceleration most hurts economy - steady 90mph driving can easily give better mpg than a 60-70 range involving lots of speeding up and slowing down.

The 60 litre fuel tank (*50 litres before 1996*) gives a typical range of between 210 and 300 miles between fill-ups. Committed driving, for example on a track day, can see fuel consumption of 9 mpg or less!!!

For the normally aspirated 2.0 models, an average of 30 mpg seems to be the norm, with 35+ on long motorway journeys.

The UK government figures for the 2.0 Turbo models (1997 spec onwards) are:

Mode	mpg
Urban	20.5
Extra Urban	34.9
Combined	29.7

The gauge is not totally linear: "Full" and "3/4" are about right, but when the needle points to the end of the scale you can only get 45 litres in (*i.e.*, it's still got a quarter of a tank). When the needle's on the middle bar of the "E" it'll take 55 litres (bottom bar on '98 models) - and cough around left-handers :-)

Type of Fuel to Use

Many questions are often raised regarding the type of fuel needed for the Impreza. The sticker inside the petrol cap says use Super unleaded only, but this has different meanings in different countries. In the UK, the standard (or premium) unleaded fuel is rated at 95 RON, the same as the Super available in other countries such as Australia and the US. In the UK, Super Unleaded is rated at 97 RON (was 98 until 1999). In Japan, it is 100. Generally, in the UK, normal unleaded is fine. In countries where lower quality fuel is available, then the best advise would be to run on the Super (or Premium) Unleaded fuel. Beware of octane boosters, as many contain lead or lead-like substances which will damage the catalytic converter and oxygen (Lambda) sensor..

From the knowledge we have so far, it seems that the Engine Management System will react to a lower quality fuel by detecting the onset of knocking. In this case, it will retard the engine timing and reduce the maximum boost available from the turbo. It will then run on these lower settings until such time that the system is reset, though the system should eventually re-adapt to the higher quality fuel. Resetting the ECU simply speeds up this process.

Some owners report gradual improvements by simply running on the higher spec fuel, but most will find that although it is not any faster: the engine will be slightly smoother and the economy increased marginally (by about 5%). This subjective improvement can be hard to justify against the premium in fuel price.

Starting and Stopping your Engine (including Turbo Timers)

When starting the engine, do not press the throttle at the same time! The engine management system is programmed to automatically adjust the settings and if you should press the throttle during the sequence it is actually possible to cause the system to shut down with the result of a non starting car.

(A couple of owners have reported a more persistent starting problem. When the dealer connected the "select monitor" to the ECU, a fault in the crank sensor was reported: a new crank sensor cured the starting problems)

In order to prolong engine life, a few common sense rules should be followed when starting and stopping the engine of your Impreza. When starting the engine from cold, you should avoid hard acceleration or high revs (i.e. boost conditions on turbo cars) until the engine has fully warmed up. Most engine wear occurs within the first few minutes after starting when the engine oil is cold and hasn't has time to fully circulate. Most owners restrict themselves (where possible) to 3,000 rpm and light throttle until everything has warmed up nicely.

After a period of hard driving, you should let the turbocharged Impreza models idle for at least 1 minute. This allows the circulating engine oil to dissipate most of the excess heat that has built up in the turbo. Failing to do this can leads to increased thermal stress on the turbo (particularly bearings), and in severe cases can literally "fry" the now stationary engine oil, turning it into a useless sludge. Continued abuse can also lead to "coking" of internal components (carbon based deposits which are both damaging and difficult to remove). You should never switch your

engine off immediately after hard driving, no matter how much of a hurry you are in.

Of course, *hard driving* means different things to different people, but in general it's a prolonged (another subjective term!) period of driving at high boost. A 70mph motorway cruise isn't hard unless it's uphill; A 90mph cruise is hard; a second and third gear blast along a country lane is hard. Fortunately most hard drives have a period of gentle driving before parking, and this gentle driving is as good as idling. The biggest risk is forgetting to idle for a few minutes when pulling into services after a fast motorway cruise.

To help minimise the inconvenience of letting the engine idle for at least a minute after hard driving, a range of products called Turbo Timers are now generally available. These keep the engine idling for a pre-programmed (or automatically determined using fuzzy logic) period of time after the owner has switched off the ignition and removed the key (usually 1 to 4 minutes). Many owners are rightly worried about security, and it takes a certain amount of courage to walk away from your pride and joy with the engine still running.

We have been informed that with some minimal additional work, some Clifford alarms can be successfully adapted to act as a turbo timer. Obviously, this method will be inherently more cost effective and secure than independently operating devices, and indeed some models of turbo timers and alarm systems have proved to be incompatible. You should check carefully with your supplier (and possibly insurance company) before ordering. Also, local laws may prohibit leaving a vehicle unattended with the engine running.

Common problems, symptoms and remedies

Thankfully, the Impreza is one of those cars with almost no major problems, and reliability on the whole is excellent. There are however, a few relatively minor problems, which affect specific models. These are shown briefly in the table below, and discussed in more detail later on.

Fault	Symptoms	Models Affected
Blow-off valve *(Dump Valve, Air bypass valve)*	Loud noise between 2-4000 rpm which sounds like someone blowing over top of a bottle.	1997/1998 Turbo
Waste Gate	Solenoid can be noisy (clicking), and in extreme circumstances can cause sudden loss of power when accelerating hard	All Turbo
Heat Shield	Noise from engine compartment caused by cracked heat shield.	1994-6 Turbos
Interior Mirror	Interior mirror vibrates lightly, blurring rearward vision	All
Clutch	Clutch judders when moving off. Worse when cold	All Turbo
Brakes	Spongy brakes	All models
Radio resetting	Radio resets when wash/wipe or electric windows activated	All 5-door
Brake Pipes	Noise from engine compartment caused by brake pipes resonating against bulkhead	1998 Turbo
Porous 15" wheels	Loss of tyre pressure	1994-7 Turbo
ECU bug :-)	Jerk when throttling off from full boost	1994-6 Turbo
Engine	Engine splutters to a halt. Caused by driver enjoying him/herself so much they fail to notice they were running low on fuel :-)	All Imprezas
Worn anti-roll bar bushes	Clonking noise from suspension	WRXs
ABS isn't magic	Unexpected activation / long stopping distances	All ABS cars
Use of low octane fuel?	Serious engine damage (melted pistons)	STi (4 & 5?)
Piston Slap	Noisy (chattery) engine when starting from cold	1998/99 models

Dump Valves (aka Blow off Valves and By-pass Valves)

There seems to be a recognised problem with the 1997 specification car's dump valve. This does not shut properly under boost and thus vibrates giving the sound similar to someone blowing across the top of an open bottle. It has also been likened to a steam train whistle or ship fog horn in extreme circumstances!. Meanwhile the 1998 model seems to have a totally revamped and larger blow off system, but I have had reports that the problem sometimes still occurs.

Waste gate solenoid

The 1997 specification lowered the turbo boost pressure from 1.0 bar to 0.9 bar. The engine breather system vents into the air intake and it is possible for the oil and condensing, burnt oil vapours build up in this valve. This valve is a safety device for detecting overboost and will cause fuel and ignition to be cut if it senses that 1.2bar (97/98 models) has been reached. If it is bunged up, it isn't sensing correctly and will shut down the engine under high boost conditions. The solution advised by Subaru France was not to fill the oil up to maximum but to leave it at half filled only.

If your wastegate solenoid does pack up, the fix is to pull the T shaped supply hose off and fill it with brake cleaner from an aerosol. Then go for a blast before the cleaner evaporates. Tippex thinners also do the job. '98 models have a revised part, which is three port sensing and there have been no reported failures. You can get '97 cars upgraded.

Apparently the fault often occurs just after a service when the oil level may be slightly too high. The 1998 specification engine apparently has revised sensing locations, to over come the above problems but there have been some reports of failure on early '98s.

Sometimes this fault is incorrectly termed as "over boosting". The sensor is designed to detect an over boost situation and is usually so sensitive in normal operation that 1.19bar = ok and 1.20bar = fuel cut routine due to over boost. When it becomes contaminated by oil, this is lost and the sensor can cut in at much lower boost values, cutting in the routine under normal hard acceleration. The effect of this routine is quite disconcerting as all engine power is suddenly lost with some drivers reporting it feeling as if they have just driven into a brick wall!

Grille Badge Recognition

The Badge	Indicates the Following Model
Bottle green "stars"	UK model
Bottle green " i "	WRX model
Pink " i "	WRX STI model
Pink "stars"	WRX STI V-Limited, 22b or other special import model.

One thing to bear in mind, many owners change their badge to one of the Pink badges, so you cannot rely on this much nowadays.