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TECHNICAL DESCRIPTION

SUBARU TECNICA INTERNATIONAL

SUBARU
ALL-WHEEL DRIVE

IMPREZA

IMPREZA WRX STI
TECHNICAL DESCRIPTION

CONTENTS

NB: This publication contains description and specification for the Impreza WRX STi that is different to the standard Impreza WRX. For all other features that are common to both models see the publication "Impreza Technical Description " Update for MY02.

Introduction

The new Impreza WRX STi is a sophisticated technology package which draws directly on engineering skills gained in Subaru's All-Wheel Drive World Rally Championship programme, producing a car with outstanding sports performance, handling and ride.

The Impreza WRX STi is much more than a performance upgrade to the standard Impreza WRX, it is a complete engineering re design in all mechanical areas to not only enhance performance but also durability and reliability.

The engine not only provides an output of 195kW @ 6000 rpm with 343 Nm of torque @ 4000 rpm but is also significantly strengthened to cope with the increased thermal loads. It also features an Active Valve Control System (variable valve timing) for improved torque delivery and engine breathing.

The transmission is a six speed constant mesh, multiple synchromesh unit with significantly larger gears for added strength and durability.

Similarly the suspension has also been upgraded to match the improved engine performance along with larger 'Brembo' brakes for increased stopping power.

Key Mechanical changes in the Impreza WRX STi are: -

- Engine power & torque increase with strengthened components:-
    - * Semi closed deck cylinder block.
    - * Forged pistons.
    - * Stronger con-rods & big ends.
    - * Revised camshaft timing and lift.
    - * Hollow stem intake valve with sodium filled exhaust valves.
    - * Variable valve timing.
    - * Larger more efficient IHI turbo charger.
    - * Larger inter cooler.
- Stronger close ratio six speed All-Wheel Drive transmission with centre viscous LSD differential and high performance clutch.
- Front & rear axle "Suretrac" limited slip differentials.
- Strengthened & inverted front & rear suspension struts.
- Brembo Brakes with super sports ABS and Electronic Brake force Distribution (EBD).
- Dual stage PIN operated six-way immobilisation supplementary security alarm system.
- Minimum Fuel Requirement for this vehicle is 98 RON Fuel. Customers should be advised that there may be limited availability of this fuel in some areas of Australia.

Engine

Construction

The phase II engine used in the new Impreza WRX STi is a strengthened variant of the traditional Subaru horizontally opposed boxer engine featuring a semi closed deck cylinder block and variable valve timing. The cylinder heads feature more aggressive camshafts with increased valve lift and duration with lower weight valve mechanism for reduced valve inertia. This provides for more accurate tracking of the cam profile particularly at high engine speeds. The low emission cylinder heads continue to feature 'tumble swirl' intake ports for improved combustion efficiency.

In the unique configuration of the boxer engine, the pistons move in the horizontal plane from left to right with low levels of noise, vibration and lower power loss. This is due in part to the cancellation of the inertia forces created by the downward force of the pistons that act in opposite directions. With an in-line engine all four pistons are moving in the same direction and therefore a larger and heavier crankshaft is required to counteract this inherent imbalance.

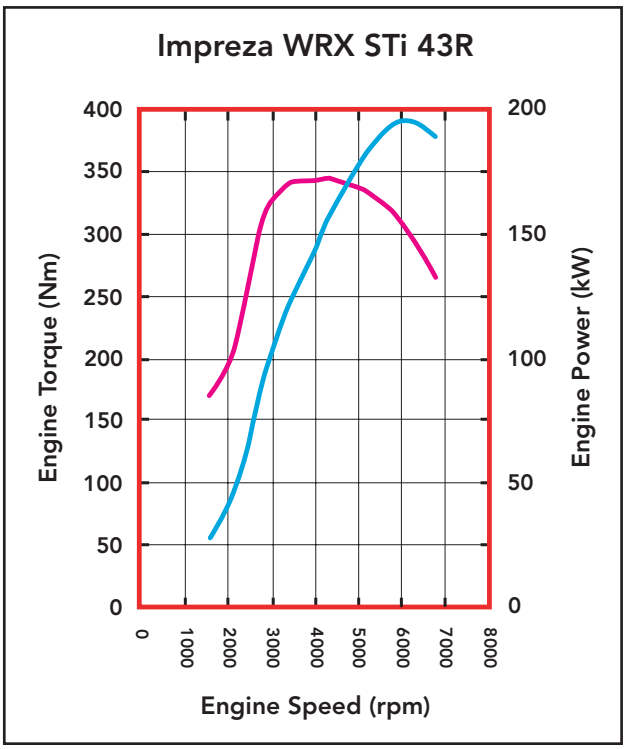
Structurally the horizontal design also yields a more rigid cylinder block because the crankshaft is sandwiched between the left and right hand crankcases and supported by five main bearings. This provides for long life with little wear and tear. The Phase II engine also features the relocation of the crankshaft thrust bearing to the rear of the crankshaft. This provides for a reduction in the transfer of natural engine frequencies to the transmission and driveline thereby improving N.V.H. levels in the passenger compartment.

The natural balance of the horizontally opposed engine along with the lightweight crankshaft provides for excellent rotational balance, rotating smoothly all the way up to high engine speeds without the use of balancer shafts that are necessary with in-line engines. This feature along with the aluminium construction achieves a lightweight compact engine that allows for a great deal of freedom in positioning the engine in the vehicle.

Its low height also makes a low centre of gravity possible with a more balanced left/right and front/rear weight distribution for improved vehicle handling.

ENGINE

PERFORMANCE



Engine EJ20B 43R STi

Max power = 195 kW @ 6000 rpm

Max torque = 343 Nm @ 4000 rpm

Bore x stroke = 92 x 75 mm

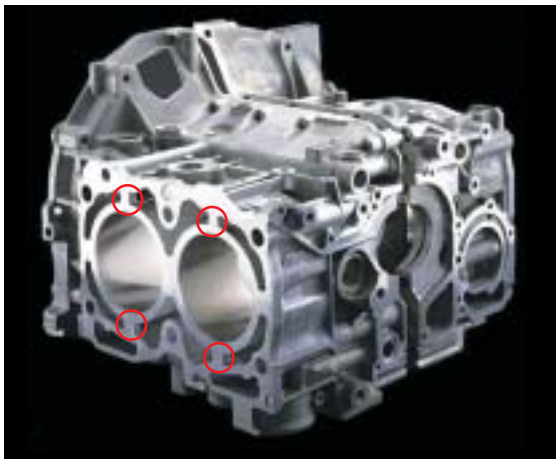
Compression ratio = 8:1

Power to weight ratio = 7.54 kg/kW

The increased power output of the STi engine is achieved through a combination of a larger turbo charger with increased air charge pressure and volume plus the adoption of variable valve timing. This provides for a wider and flatter torque band with less turbo lag as the turbocharger can be tuned for better low speed response. Maximum power output of 195kW is the result of the engine management ECU being tuned for operation on 98 RON fuel compared to the 206kW output of the Japanese version which is tuned on 100 RON fuel. The result is a better all round power delivery because the ECU is specifically tuned for the available fuel. Similarly maximum torque output is 343Nm at 4000rpm with torque delivery in excess of 300 Nm commencing with 308Nm @ 2800 rpm and still maintaining 310Nm @ 6000 rpm.

Engine

Cylinder Block



The cylinder block used in the STi is what is known as a semi-closed deck design. This design provides for the cooling efficiency of a completely open deck design with the strength of a closed deck. By providing additional reinforcement at the top of the cylinder liner the bore is less susceptible to bore distortion under the increased pressures generated by the increased power output of the STi MY02 engine over a wider engine speed operating range.

Additional reinforcement ribs have also been provided in the crankcase housing to further strengthen the block.

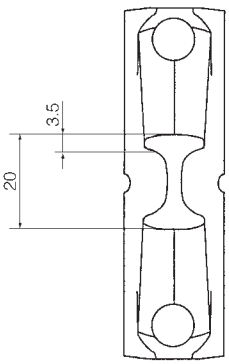
Pistons

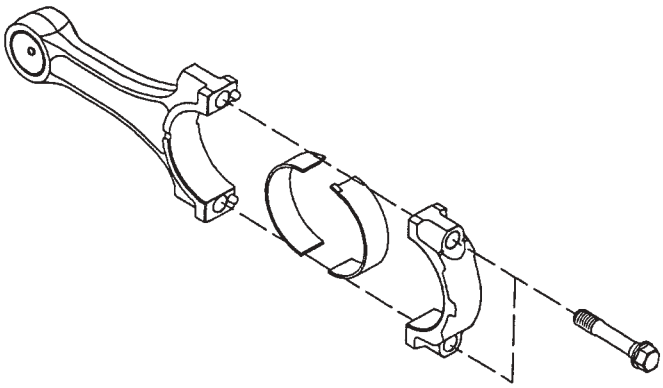
High strength lightweight forged aluminium alloy pistons with high heat resistance and low thermal expansion. The piston crown thickness has been increased again to cope with the increased thermal loadings created by higher combustion temperatures and pressures. A solid slipper-type skirt with molybdenum coating is used to minimise friction.

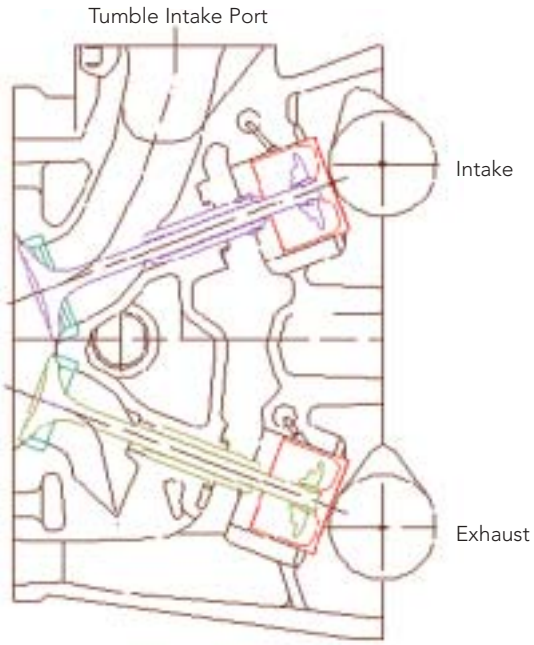
Engine

Connecting Rods

The connecting rods are made from forged high carbon steel with increased shaft cross sectional area, along with big end cap dowel pins and set screws to improve mating accuracy, to meet the demands of a high performance engine.



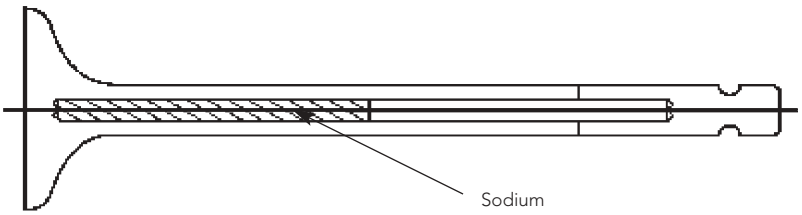




Valve Operation

Valve operation is via direct acting twin camshafts per cylinder head using hollow valve stems to reduce valve mass and as a consequence valve inertia. Similarly shim less cam followers are used to further reduce the mass of the moving valve mechanism. As a result improved conformity of the cam profile is obtained particularly at high engine speeds. Graded size cam followers are used to obtain adjustment of valve clearance.

The exhaust valve stem is sodium filled to assist heat transfer away from the valve head into the cylinder head where it is dispersed by the coolant. Use of sodium filled valves is an essential requirement to prevent valve stem and or follower damage due to the higher thermal loadings as a result of the higher power output.

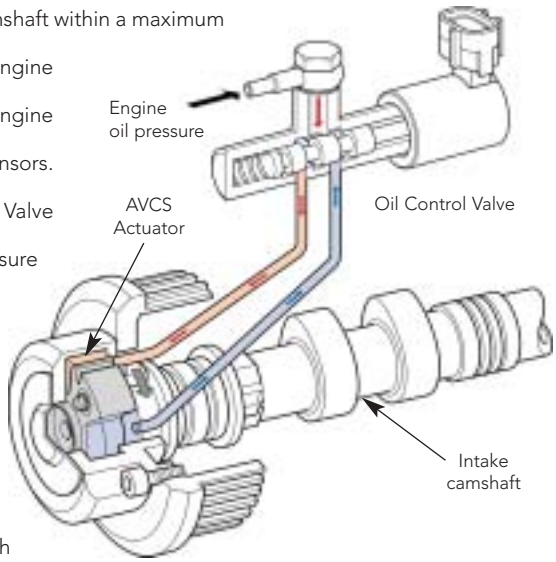


Engine

Active Valve Control System

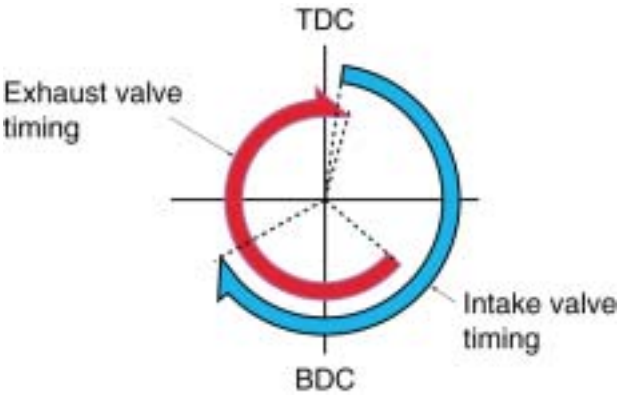
The purpose of Active Valve Control System is to increase engine power and torque output while at the same time gaining improvements in fuel consumption, exhaust emissions and idling stability. By controlling the intake valve timing to suit the engine load and speed conditions this system optimises the engine volumetric efficiency and combustion process.

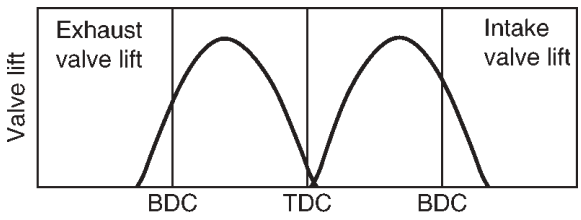
This is achieved by rotating the camshaft sprocket relative to the intake camshaft within a maximum range of 35 crankshaft degrees. This movement is controlled by the engine management computer (ECM) based on input signals from the air flow sensor, engine coolant temperature sensor, throttle position sensor and camshaft position sensors. The ECM then generates a duty ratio electrical output signal to an Oil Control Valve (OCV) positioned at each intake camshaft sprocket to control engine oil pressure which is supplied to advance and retard chambers within the AVCS actuator.



Valve timing is continuously and infinitely variable within the 35 crank degree range and controlled according to engine speed and load conditions. There are three computer maps that are used depending on the conditions to provide for optimum valve timing for stable idling, improved fuel consumption in the medium speed range and maximum power at high engine speed and load.

Idle stability control



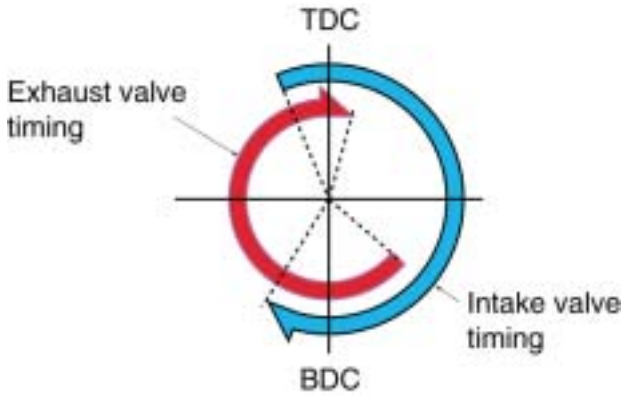


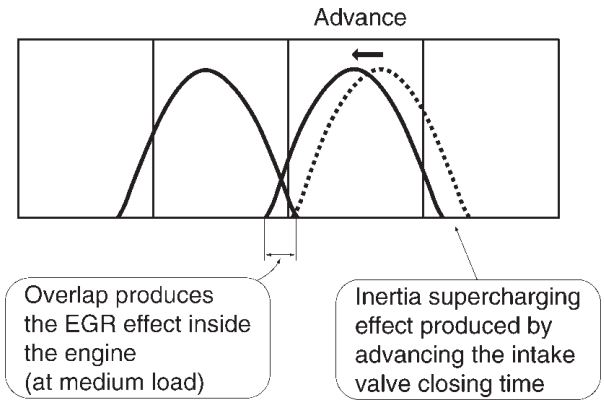
Small overlap improves idling stability.

ENGINE

Medium Speed range

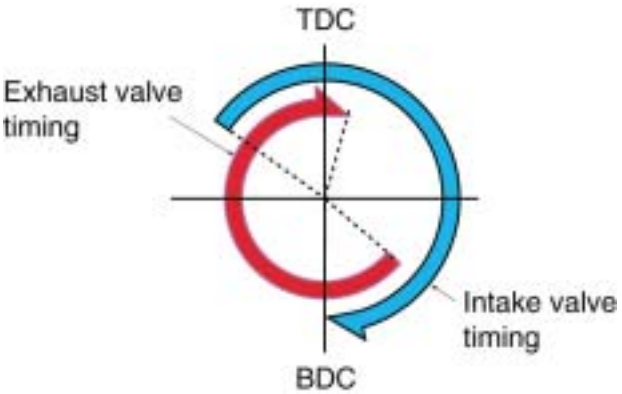
When the engine is running in the medium speed range and the engine load is small advancing the intake valve timing reduces intake air blow back thereby improving fuel consumption. Increasing the intake and exhaust valve overlap also promotes exhaust gas recirculation (EGR) reducing NOx exhaust gas emissions. When the engine load increases, advancing the intake closing time takes advantage of the intake air inertia to create a supercharge effect on the incoming intake air.

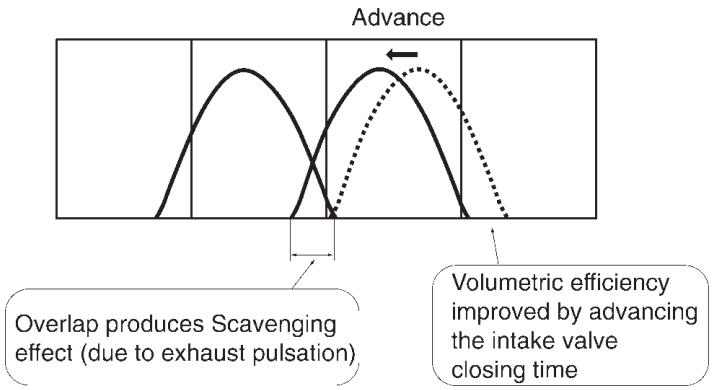




High Speed and Load range

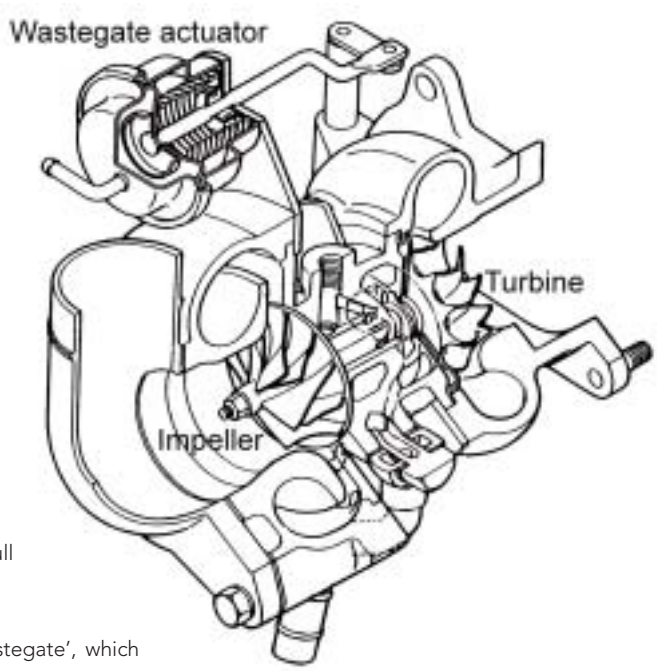
At high engine speed and load conditions intake and exhaust valve overlap utilises the scavenging effect produced by the exhaust gas pulsation to draw intake air into the cylinder. Since the intake valve is closed at the end of the intake stroke, air intake efficiency is improved and engine power output is boosted.





ENGINE

TURBOCHARGER



The turbocharger unit consists of two sections, an exhaust side and an induction side. On the exhaust side is a turbine wheel with vanes that are shaped to harness the exhaust gas energy causing the turbine wheel and centre shaft to rotate. On the induction side there is an impeller wheel attached to the common shaft which also has vanes but shaped in the opposite direction so as to compress the induction air. With increasing engine speed and load the level of kinetic energy in the exhaust gas also increases and as a consequence the turbine rotates faster.

This causes the impeller to also rotate faster causing greater compression of the induction air. Rotational speeds of the turbine are in the region of 20,000 rpm. at idle to approx. 165,000 rpm. at full engine load.

The limiting of boost pressure is achieved by the use of a 'wastegate', which bypasses the exhaust gas around the turbine wheel when the desired level of boost is reached. The wastegate is a simple flap valve, which is opened by diaphragm to which boost pressure is applied.

Turbine shaft

ENGINE

TURBOCHARGER CHARACTERISTICS

A turbocharger uses exhaust gas energy to rotate the turbine wheel and as a consequence rotate the impeller which compresses the intake air. Exhaust gas pressure however is low at low engine speeds and as a result the turbine does not respond immediately when the throttle is opened. This phenomenon is referred to as 'Turbo Lag'. In an attempt to overcome this phenomenon, design characteristics of the turbocharger are matched to the prospective use of the vehicle. Two important design criteria are size and the A/R ratio.

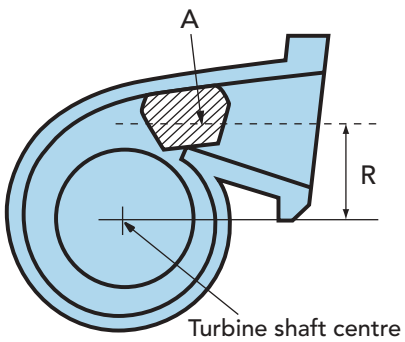
Size.

Smaller turbocharger's require less rotating energy (exhaust pressure) to rotate due to the smaller mass of the turbine and impeller, and therefore provide improved throttle response at lower engine speeds. The use of a small turbocharger however will result in a lower power output at high engine speeds due to the smaller volume of compressed air that is generated by the smaller impeller.

A large turbocharger is capable of supplying a larger volume of compressed air, and is therefore more suitable in providing maximum power output. The increase in turbocharger size however will result in a large amount of turbo lag, as more exhaust energy that is dependent on engine speed is required to rotate the bigger turbine and impeller.

A/R Ratio.

A/R Ratio



A: area of narrowest opening

R: distance from shaft centre

The A/R ratio of the turbocharger determines the characteristics of boost pressure production. 'A' represents the smallest area of the inlet of the turbine housing, and 'R' represents the distance from the centre of the turbine shaft to the centre of the turbine-housing inlet.

By reducing the area 'A', exhaust velocity is increased. With higher exhaust velocity acting upon the turbine, response time is reduced because the turbine spins faster at lower engine speeds. If the area is too small, flow is restricted at higher engine speeds thereby limiting power output. An increase in dimension 'R' will improve turbine startup response but will diminish maximum turbine speed.

Small A/R ratios are suitable for low speed applications where fast startup response is required at the expense of high speed power. Large A/R ratios are suitable for high speed applications where low speed response is not a priority.

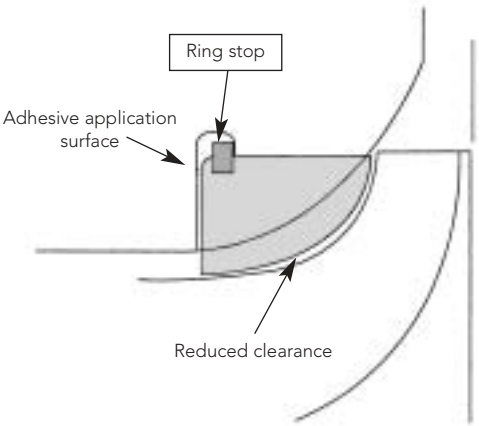
In the Impreza WRX STi due to the use of variable valve timing it has been possible to tune the turbocharger to perform better at low speed and hence reduce turbo lag while still retaining high top end power output. This is due to the improved breathing performance of the active valve control system engine as described earlier.

Engine

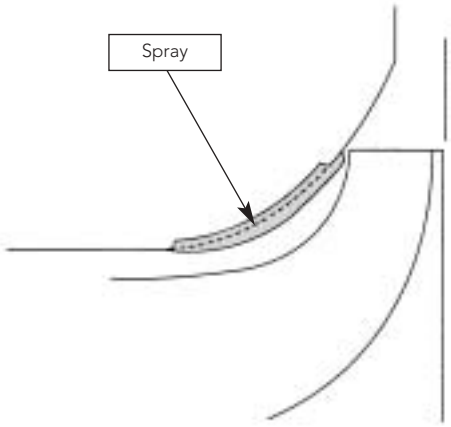
Turbocharger Characteristics

The compressor wheel to housing seal has also been improved to increase turbocharger efficiency. This new seal reduces the clearance by 66% compared to the previous Impreza WRX STi and therefore pumping losses are reduced meaning a better boost pressure response time.

Compressor Seal MY02 STi



Compressor Seal MY00 STi



Turbocharger Specifications

MANUFACTURER	IHI
Turbocharger Type	RHF55
Turbine Blade no.	11
Compressor Blade no.	6 + 6
Turbine Rotor Size	53mm / 48mm
Compressor Rotor Size	60mm / 46.5mm
Max. Turbine Speed	165000 rpm
Wastegate Open Press.	78 kPa
A/R Ratio	15
Compressor seal material	Synthetic mica + Teflon
Max Target boost	113kPa (16.4psi)
Bearing Type	Floating Metal Bearing

Engine

Intercooler

The temperature of the intake air is increased as it is compressed by the turbocharger. This rise in temperature causes a corresponding expansion of the air, leading to a reduction in air density. The intercooler is designed to transfer the heat of the compressed intake air to the external air flowing through the intercooler as the vehicle is in motion.

There are two positive by-products of decreased air temperature and increased air density, one; a reduction in combustion chamber temperature allowing for more advanced ignition timing, and two; improved volumetric efficiency due to the increase in air mass for a given air volume. With a denser air charge in the combustion chamber, more fuel can be injected leading to greater power output.

The STi intercooler due to the increased boost pressure and power output has a significantly bigger cooling capacity than the standard WRX to cope with additional heat load. It is also equipped with a manually operated water spray which can be operated by the driver in 2 second bursts to provide additional cooling under high engine load or high ambient temperatures.

Intercooler Specifications

	IMPREZA WRX STI	IMPREZA WRX
Manufacturer	Sanden	Sanden
Effective Cooler Depth	64mm	64mm
Effective Cooler Width	470mm	414mm
Effective Cooler Length	185mm	151mm
Number of Tubes	33	29
Heat Transfer Capacity	14.1Kw	13.2Kw

Engine

Immobiliser and Security System

The factory immobiliser system interfaces directly with the engine management computer (ECU). This system is a transponder type that utilises a rolling code for additional security. Once the key is inserted in the ignition lock and the ignition turned on an antenna amplifier positioned around the ignition lock reads the transponder code and transmits it to the engine management and immobiliser computer (ECU). The ECU then compares the transmitted code for the correct sequence and, if correct, allows the engine to start. Remote central locking transmitter is now incorporated as one unit into the key along with the immobiliser transponder.

If a duplicate key is required, the transponder code needs to be registered with the ECU. This teaching operation can only be performed with special equipment and the software is only available to authorised personnel.

In addition to the factory immobiliser system the STi is fitted as standard with a Subaru Australia designed 'Dual Stage Security System'. This system provides two separate security systems. The remote locking transmitter operates one system and the other by a PIN operated keypad.

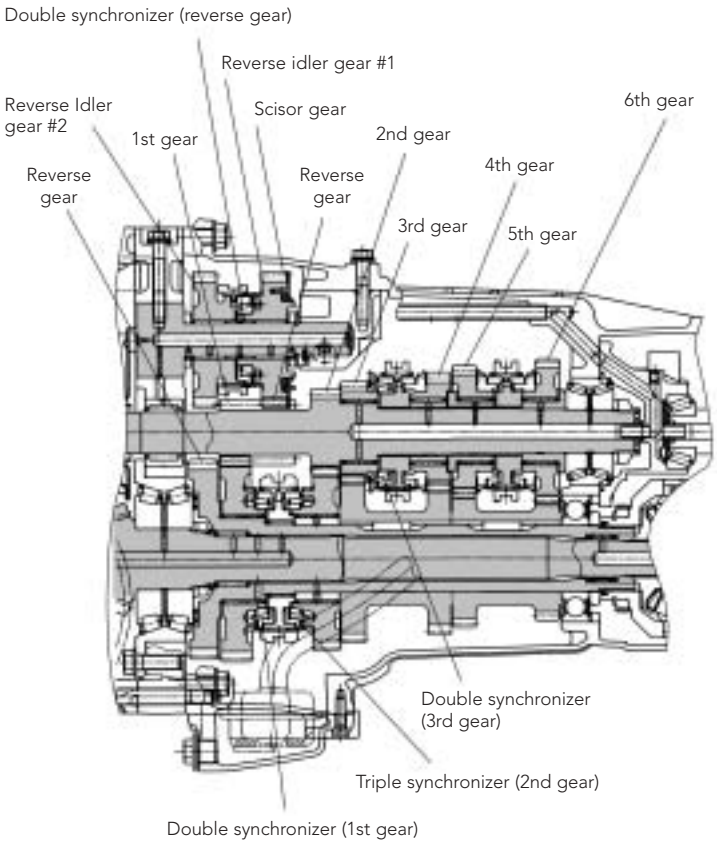
This provides for additional six points of immobilisation, anti hijack mode, automatic re-arm, Intrusion Alert, False Alarm Prevention, Internal Screamer, Infrasonic sensor, valet mode and also features anti cross pollination software for additional theft protection.

Transmission

Six Speed Manual Transmission

The new six speed STi manual transmission has been specially developed to meet the needs of a high performance vehicle in terms of improved durability, closer ratio gear set and a shorter and smoother shift mechanism.

The six speed gear set plus the reverse gear are constant mesh type with the main shaft and drive pinion shaft in a parallel arrangement similar to the five speed transmission. The transmission case however is no longer of the split half arrangement but now of a single unit construction. The gear set is mounted on a cast steel adaptor plate that is bolted to the front differential casing and supported at the rear by the transmission main casing.



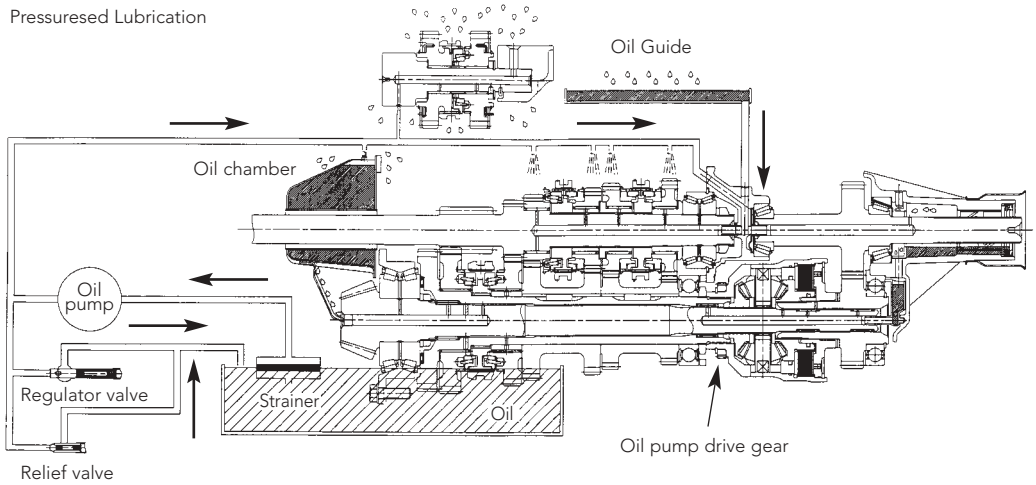
To meet the demands of the high power and torque output engine all gears are helical and gear strength has been optimised by increasing the gear diameter and thickness. Bearing size has also been increased to accommodate the high power output.

Gear shift strength and smoothness has been enhanced through the use of double cone synchromesh mechanisms on 1st, 3rd and reverse gears and a triple cone synchroniser on 2nd gear.

A new parallel link gear select mechanism is used to shorten the gear shift and sliding bearings are used on the shift fork rods to reduce operating friction.

TRANSMISSION

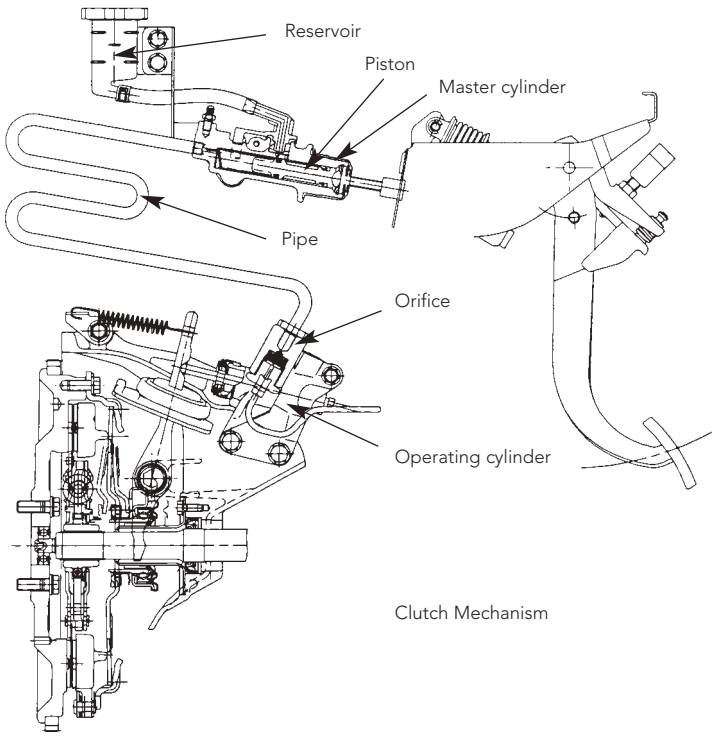
SIX SPEED MANUAL TRANSMISSION (CONT.)



A trochoidal oil pump mounted in the rear of the transmission case pressurises and feeds lubricating oil to the mainshaft, pinion shaft and transfer gears and a regulator and pressure relief valve maintain oil pressure. While driving oil is accumulated in an oil chamber mounted on the front of the drive pinion shaft thereby reducing the oil level in the oil pan. This reduces the agitation resistance and foaming of the oil caused by the gear rotation.

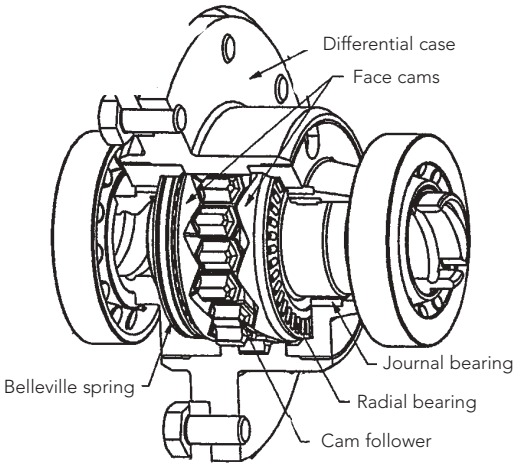
The constant AWD centre differential uses the same bevel gear arrangement as the previous model with a viscous LSD, however to accommodate this unit in the six speed transmission housing the overall length was reduced and bearing structure modified.

The clutch is a single plate diaphragm with increased clamping load of 930 Kg compared to the 830 Kg of the standard Impreza WRX. The clutch operating system is also equipped with a temperature compensating hydraulic damper mechanism to prevent sudden clutch engagement thereby ensuring smooth drive-away performance.



TRANSMISSION

SURETRAC LSD FRONT & REAR



The New Impreza WRX STi also comes equipped with front & rear "Suretrac" limited slip differentials. These LSDs respond to a torque differential between left and right wheels transferring the torque from the slip wheel to the non-slip wheel.

The benefit is that they only activate under drive and do not respond to differences in left & right wheel cornering speed when coasting. This means that at the limit of adhesion torque is transferred from the inside wheel that is losing traction as a result of weight transfer to the outside that has traction. The effect is to noticeably reduce understeer under hard cornering under engine power.

The 'Suretrac' LSD function, differs from a conventional differential in that it does not have pinion gears and side gears. In their place are two opposing face cams and nineteen cam followers.

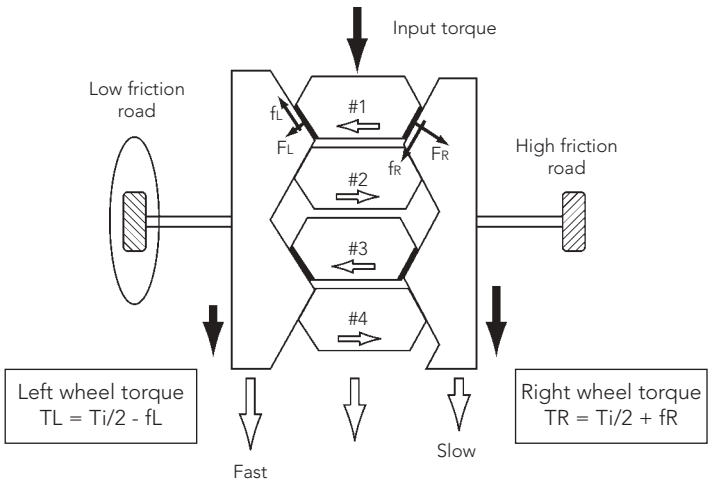
The face cams are formed with a series of inclined ramps resembling sharp teeth. One face cam has nine 'teeth' the other has ten 'teeth'. The cam followers have special asymmetrically shaped profiles to match the face cams, and they are splined to the differential case. This means that drive through the differential is via the cam followers to the face cams, and then to the axles.

When moving in a straight line, there is no relative speed difference between the face cams, which are splined to the front axles.

When cornering with no load, each of the face cams is free to rotate independently from the other. Under this condition, the cam followers oscillate freely from left to right. When torque is applied, the cam followers are forced against the face cams, transmitting driving force to the wheels. If a wheel begins to slip, the relative movement between the two face cams, combined with the angular forces of the cam teeth causes torque to be transmitted to the slower turning wheel.

Input torque Ti is imparted to cam followers #1 and #3

Receiving a strong reaction force from the road, cam followers #1 and #3 move to the left along the inclined surfaces of the right face cam.



The Suretrac differential is lubricated by normal gear oil, with flutes on the side of the differential case used to direct oil into the cam followers and plates.

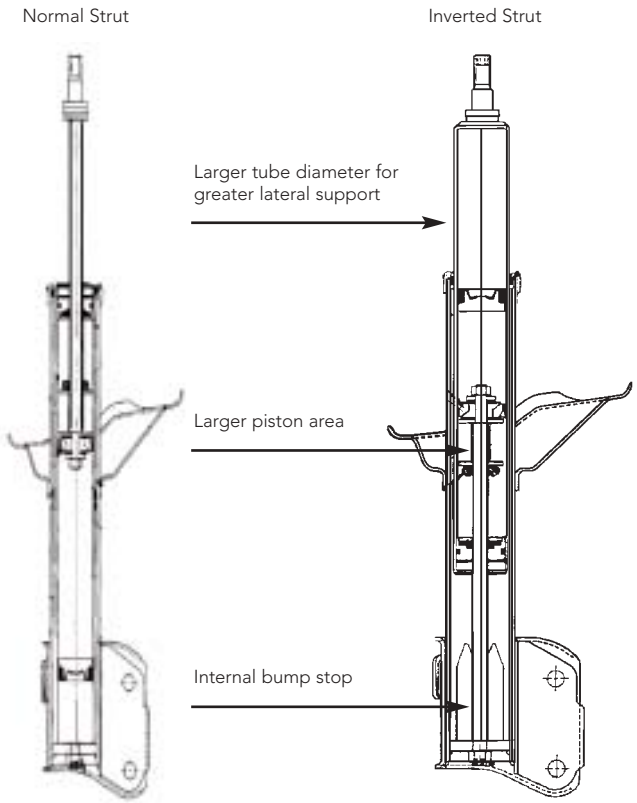
Suspension

The STi suspension is a lightweight strut independent system that has proven its durability during the World Rally Championship (WRC). The front lower transverse link suspension arm, is made of cast aluminium to reduce the unsprung weight. Coil springs are offset, so that the centre line of the spring coincides with the pivot axis, thereby minimising the friction generated by the up and down movement of the strut. The effect is to lessen vibration and reduce the feeling of thrust transmitted from the road thereby providing good ride comfort with good road tracking.

Inverted struts provide for higher bending rigidity due to a larger damping tube and provide superior damping characteristics with less damping fade as a result of the increased piston size.

Front

Rear

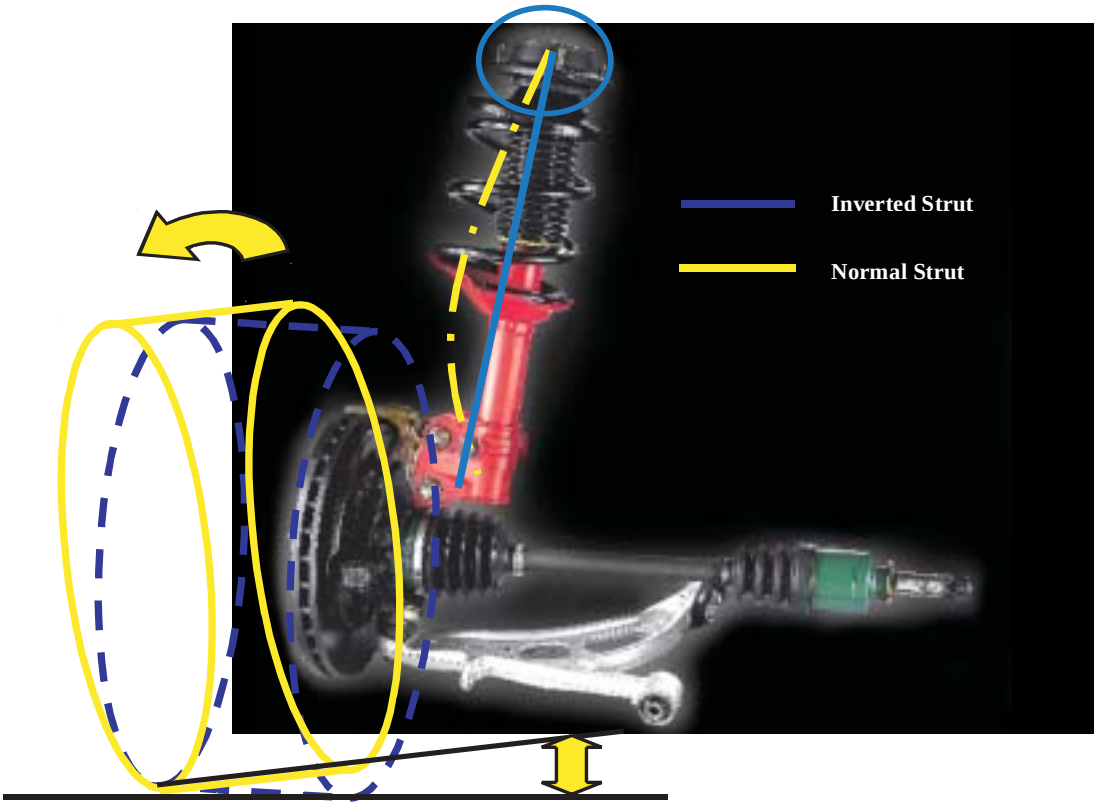


Suspension

Inverted Strut Bending Resistance

The benefit of an increase in strut bending resistance as a result of increased lateral strength is that under hard cornering there is less change to the dynamic suspension geometry. This means that the ideal tyre to road surface contact pattern is maintained and increased cornering power is achieved due to increased tyre traction.

Body strength and crossmember stiffness is also a key factor and very significant improvements in the new Impreza body in these two areas has also significantly contributed to improved vehicle stability and handling. This has meant that rubber suspension bushes could be retuned for improved NVH (noise vibration and harshness) and comfort levels without compromising vehicle stability and handling due to the extremely rigid platform.

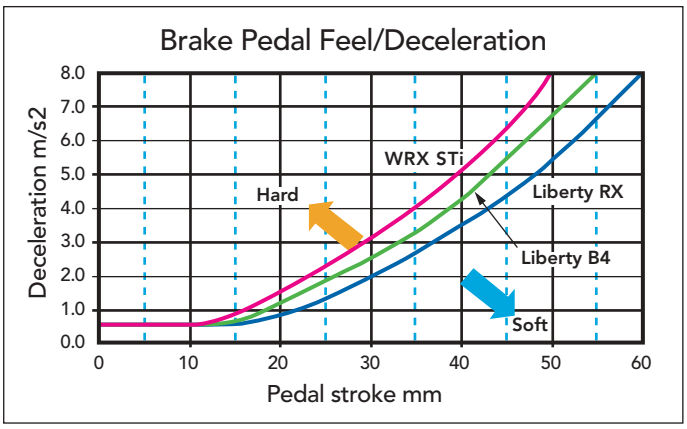


BRAKES

Large capacity 'Brembo' ventilated disc brakes are used to match the high performance engine output to ensure that stopping power is consistent with pulling power.

The front brakes feature 326mm diameter by 30mm thick ventilated discs with four piston calipers. The caliper features a 'large' (46mm) and 'small' (40mm) diameter piston on each side of the disc, with the smaller diameter being on the 'leading' edge to ensure that brake pad wear is consistent across the length of the brake pad. The rear brakes have 316mm diameter by 20mm thick ventilated discs with two piston calipers (2x36mm).

Braking feel is a harder firmer pedal stroke than the Liberty B4 and consistant with the 'Sports Performance' image of the Impreza WRX STi.



BRAKES

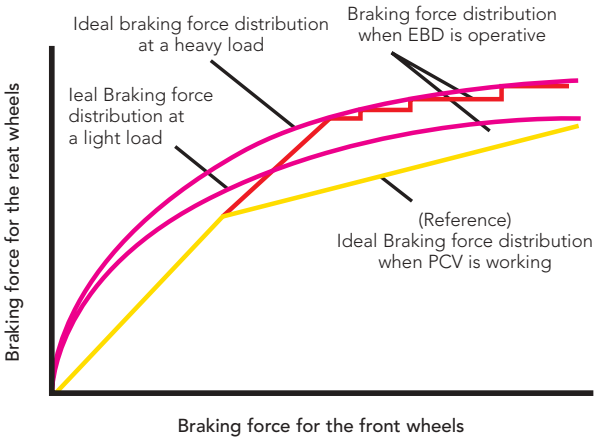
SUPER SPORTS ABS WITH EBD

The 'Brembo' braking system also comes equipped with Super Sports ABS with Electronic Brake force Distribution (EBD). This improves ABS performance during cornering and reduces stopping distances with greater stability under heavy braking.

Super Sports ABS uses input from a lateral 'G' sensor to individually control brake pressures more accurately when ABS operates during hard cornering under brakes, leading to reduced understeer.

	STi	WRX
Stopping Distance (m)	46.4	52.7
Slide Distance (m)	1.5	3.5

Normally ABS would jointly control both rear brakes to the same braking force when the inside wheel loses traction, with a resultant increase in stopping distance and cornering understeer. Under these same conditions Super Sports ABS controls rear braking force individually leading to a reduction in stopping distance and cornering understeer.



EBD due to electronic control more accurately regulates brake force distribution between front & rear wheels to the ideal level, thus improving stopping distances and stability.

Conventional braking systems rely on a mechanical proportioning valve to limit the braking force at the rear wheels, to reduce the possibility of rear wheel lock under heavy braking due to weight transfer. A mechanical proportioning valve however restricts rear-braking force to a level well below the ideal limit, requiring the front brakes to take more of the braking load. This leads to increased understeer and under utilisation of the rear brakes.

PERFORMANCE

Location : - Eastern Creek Raceway drag strip west to east

Date: - 13th November 2001

Driver : - Cody Crocker

Time Measurement : - NRMA Correvit Datatron M3 Microwave Sensor

	STi MY'02	STi MY'99	WRX MY'02	WRX MY'99
Ambient temperature	20°c	23°c	25°c	20°c
Humidity	38%	30%	26%	39%
0-100 km/h	5.45s	5.16s	6.55s	5.99s
0-400 metres time	13.64s	13.4s	14.67s	14.42s
0-400 terminal speed	160.1 km/h	167.7 km/h	151.6 km/h	155.6 km/h
2nd gear 40-80 km/h	2.78s	2.75s	2.95s	3.08s
3rd gear 60-100 km/h	3.23s	3.73s	4.12s	4.55s
4th gear 80-140 km/h	6.99s	7.28s	8.96s	9.74s
Braking distance 100-0 km/h	3.25s	3.39s	3.31s	3.39s

Impreza WRX STi Specifications

DESCRIPTION		IMPREZA WRX STi
BODY		**SEDAN**
Overall Lenght	mm	4405
Overall Width	mm	1730
Overall Height @ UM	mm	1440
Wheelbase	mm	2525
Front Track	mm	1490
Rear Track	mm	1480
Min Road clearance @ UM	mm	155
Approach Angle	deg.	18
Departure Angle	deg.	19
Breakover Angle	deg.	16
Unladen mass (UM) Manual	Kgs	1470
Gross Vehicle mass Manual	Kgs	1880
Payload (inc passengers) Manual	Kgs	410
Coefficient of drag (CD-value)		0.33
CdA		0.7095
Internal noise level (100km/hr : 140km/hr)	Dba	67.9 : 73.0
Torsional rigidity	$10^6 Nm^2/rad$	4.48
Flexural rigidity	$10^6 Nm^2$	5.48
Percentage of galvanised body sheet metal		67%
ENGINE		
Type		Horizontal 4 cylinder DOHC
Capacity	cc	1994
Bore x Stroke	mm	92 x 75
Comp. Ratio		8 : 1
Max output	Kw/rpm	195/6000
Max Torque	Nm/rpm	343/4000
Max target turbo boost pressure mm Hg (kPa,lb/in^2) @	rpm	848 (113, 16.4) @ 4000
Turbo A/R ratio		15
Max allowable Turbo turbine speed	rpm	165000
Power to weight ratio Manual @ UM	kg/Kw	7.54
Power/litre	Kw/Litre	97.8
Fuel system		Multipoint sequential injection
Minimum Fuel Requirement RON (research octane number)		98
Alternator		12V - 75A
Battery		12V - 27 AH
TRANSMISSION		
Type		6 speed manual full time All-Wheel drive
Gear ratio	1st	3.636
Gear ratio	2nd	2.375
Gear ratio	3rd	1.761
Gear ratio	4th	1.346
Gear ratio	5th	1.062
Gear ratio	6th	0.842
Gear ratio	Rev	3.545
Axle ratio		3.900
STEERING		
Type		Power assisted engine speed sensitive
Turning circle curb to curb	metres	11.00
Tyre size		225/45R17 90W
Manufacturer		Bridgestone
Model		Potenza RE040
Space saver tyre		T135/70 D17 120M

Rim size		17 x 7 1/2 JJ
Rim offset	mm	53
SUSPENSION		
Front		Independent McPherson inverted strut coil springs, gas charged dampers
Damping rate, Bump (compression)/rebound(tension)	N @ 0.3 m/s	807/2552
Suspension Travel. Bump (compression)/rebound (tension)	mm	85/85
Spring rate	N/mm	33
Stabiliser bar diameter	mm	20
Rear		Dual link inverted strut coils springs, gas charged dampers.
Damping rate, Bump (compression)/rebound(tension)	N @ 0.3 m/s	612/1641
Suspension Travel. Bump (compression)/rebound (tension)	mm	110/90
Spring rate	N/mm	30.4
Stabiliser bar diameter	mm	20
BRAKES		
System		Brembo diagonally linked with electronic brake force distribution
Front ventilated disc thickness/outer diameter	mm	30/326
Front brake caliper (pot size)	mm	4 piston (2 x 40, 2 x 46)
Front brake pad dimension	mm	129.8 x 60.5 x 9.2
Rear ventilated disc thickness/outer diameter	mm	20/316
Rear brake caliper (pot size)	mm	2 piston (2 x 36)
Rear Brake pad dimension	mm	74.8 x 45 x 9
Brake Booster vacuum suspended type	mm	205 + 230
Antilock Brake system		Super sports ABS
CAPACITIES		
Fuel tank	litres	60
Fuel range Km @ AS2877 combined cycle	km	531
Engine Oil	Litres	5.0
Engine Coolant	Litres	7.7
TOWING WEIGHTS		
Unbraked trailer	Kgs	500
Braked trailer	Kgs	900
Maximum roof load	Kgs	80
FUEL CONSUMPTION		
AS2877 Litre/100 Km	City	13
	Highway	9.2
	Combined	11.3
PERFORMANCE		
Max. Speed limited	Km/hr	235
0-100 Km/hr	secs	5.45
0 - 400 m	secs	13.64
INTERIOR SIZE (measured by VDA/SAE)		
Boot volume SAE	Litres	311
Boot volume, VDA	Litres	395
Effective head room (front) SAE H61	mm	985
Effective head room (rear) SAE H63	mm	932
Min cargo (boot) width (between wheel housing)	mm	939
Max cargo (boot) width at the floor	mm	1215
Boot height	mm	498
Boot length	mm	936
Effective leg room (front) SAE L34	mm	1090
Effective leg room (rear) or Leg space (rear)	mm	855