BRSCC Mazda MX-5 SuperCup – 2025 Supplementary Technical File

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1. General Engine

The only permitted engine is the 2.0 litre (MZR LF) as fitted original equipment to the Mazda MX-5 Mk3 (NC) range.

Note : There are two versions of the MX-5 Mk3 (NC) range (due to a Mazda 'facelift'), normally called Mk3 (or NC1) for 2006 to 2008 and Mk3.5 (or NC2) for 2009 onwards (dates are approximate).

The engine must be run on normal unleaded or super unleaded petrol. Only pump fuel as defined in NCR Ch.1 App.1 Definitions and Nomenclature (see Permitted Fuel) may be used. The use of power boosting or octane boosting additives in any fuel is prohibited. A minimum of 3 litres of fuel must remain in the fuel tank at the end of qualifying or race.

No modification of any engine component from standard is permitted unless explicitly stated in these supplementary regulations.

The engine location and orientation must remain as per the Mazda manufacturing location.

Engine mounts must be original Mazda. Aftermarket or solid engine mounts are prohibited.

2. Seals

Three adjacent sump/block bolts must have their heads crossed drilled (minimum 3mm diameter) to allow fitment of scrutineer's wire seals.

Two adjacent bell housing to block bolts must have their heads crossed drilled to allow fitment of scrutineer's wire seals.

Three adjacent cam cover bolts must be cross drilled (minimum 3mm diameter) to accept Motorsport UK wire seals. The 3 bolts to be drilled must be the bolts highlighted in Image 1.

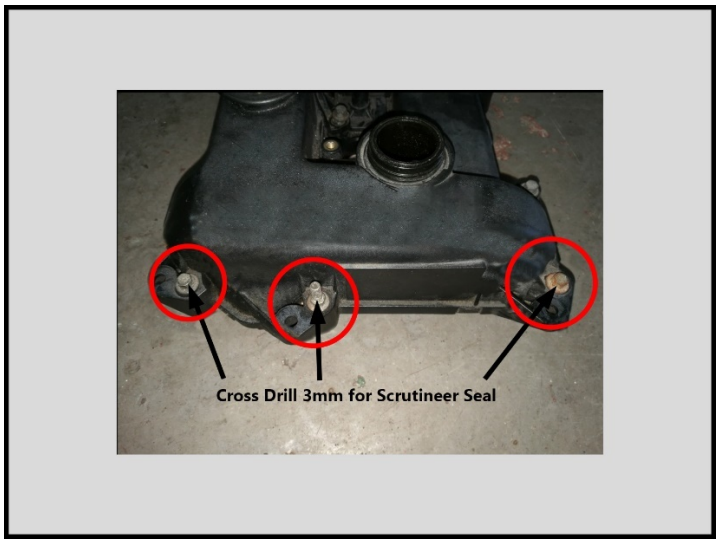


Image 1

3. Cylinder Head

It is permitted to use the cylinder head from the Mk3 or the Mk3.5 vehicle.

Porting or polishing of the inlet or exhaust ports of the cylinder head is prohibited. Sample images of inlet and exhaust ports are shown in Images 2 and 3.

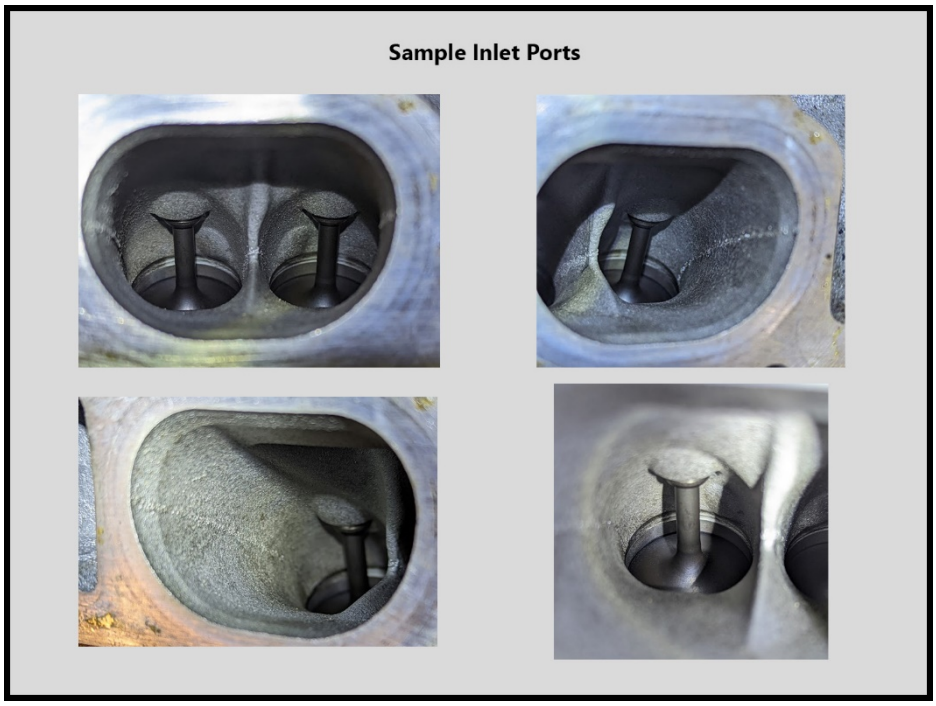


Image 2

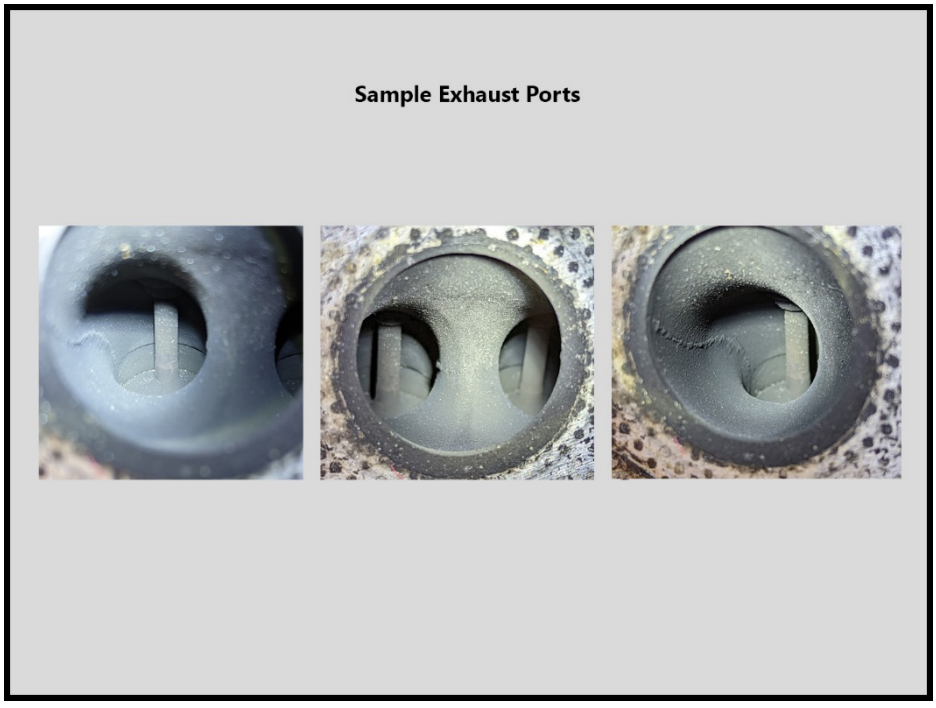


Image 3

Head bolts must be standard Mazda or of the same form and dimension. It is permitted to use Ford manufactured head bolts. 'Stud and bolt' head kits (e.g. ARP) are not permitted.

Head bolt specification is shown in Image 4.

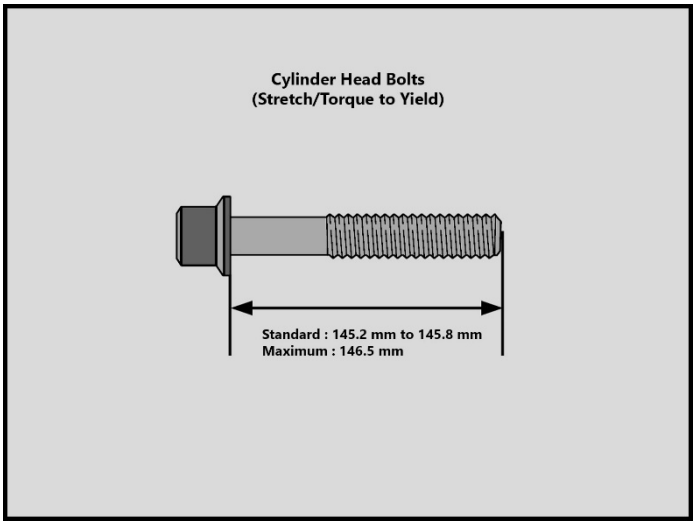


Image 4

Cylinder head gaskets (between the block and the head) are free. It is permitted to use a multi layer steel head gasket (e.g. Cometic). Cylinder head gasket thickness is free.

3.1 Head skim

Head skimming is free

3.2 Valves and Valve Seats

Valve specifications (all dimensions are millimetres unless otherwise stated) :

Valve head diameter	Inlet	35
	Exhaust	30
Valve face angle	Inlet	45°
	Exhaust	45°
Valve length	Inlet	102.99 – 103.79
	Exhaust	104.25 – 105.05
Valve stem diameter	Inlet	5.440 – 5.485
	Exhaust	5.435 – 5.480
Valve guide inner diameter		5.509 – 5.539

Valve seat (the seat is in the part in the cylinder head) angles are as follows :

Inlet	30°, 45°, 70°
Exhaust	45°,65°

It is permitted to use standard pattern inlet and exhaust valves provided that they meet the original form and dimensions.

3.3 Valve Springs

Current available part number :- **LF9G-12-125A (Pink colour code)**

Free length	Inlet	Standard	48.0
		Minimum	47.0
	Exhaust	Standard	48.3
		Minimum	47.3
Setting Load/Height (Mk 3)	Inlet		30.20 mm @ 388.7 N
	Exhaust		30.20 mm @ 388.7 N
Setting Load/Height (Mk 3.5)	Inlet		28.68 mm @ 390.0 N
	Exhaust		28.68 mm @ 390.0 N

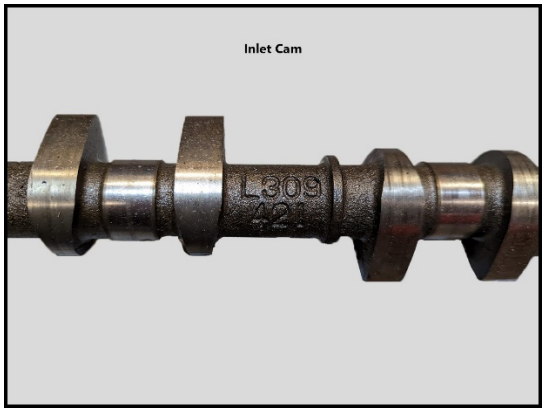
It is permitted to use either valve spring specification, however, all sixteen valves must be of the same specification.

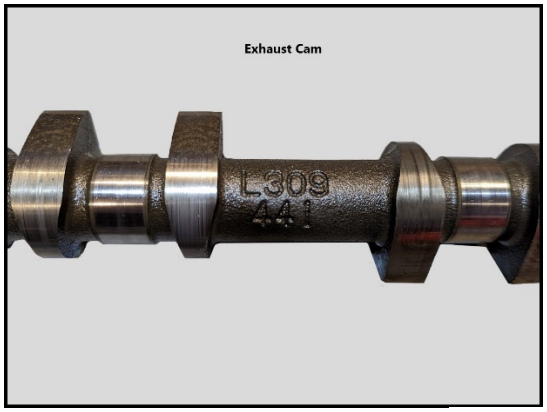
3.4 Valve Guides

It is permitted to replace the valve guides with items of the same form and dimension. No other repair is permitted.

3.5 Cams

It is only permitted to use standard Mazda camshafts. The part numbers are : Inlet L3E3-12-420 and Exhaust L309-12-441A. The casting numbers on the camshafts are indicated in Images 5 and 6.





Image

Image 6

It is not permitted to regrind, re-profile or modify the cams in anyway.

The permitted cam measurements across the cam lobe are shown in Image 7.

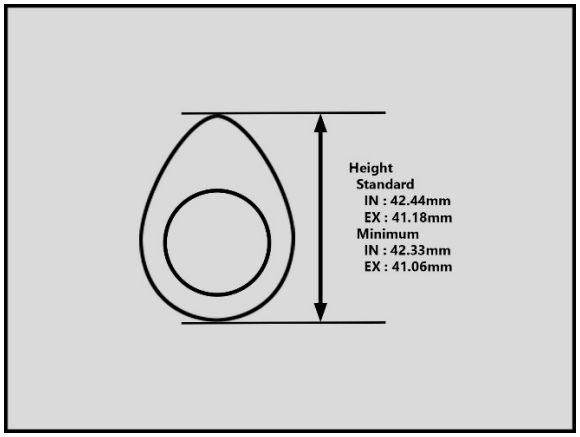


Image 7

3.6 Cam Pulleys/Variable Valve Timing (VVT) Pulley

The use of vernier cam pulley wheels is prohibited.

A standard Mazda exhaust pulley (part number LF01-12-425) must be used.

A standard Mazda inlet VVT pulley/mechanism (part number LF94-12-4X0C) must be used and not modified in any way.

It is permitted to fit 'anti slip' ('diamond coated') washers between the cam/VVT pulleys and the camshafts. Mazda part number is L3K9-12-429. It is also permitted to use the Ford/Cosworth washer of the same form and dimension. See Image 8.

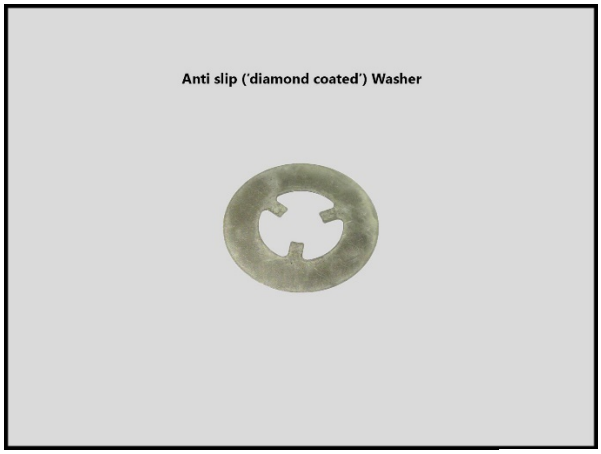


Image 8

4. Engine Timing (Cam and Ignition Timing)

Mazda standard cam and ignition timing must be maintained. Any method that alters the manufacturers standard cam or ignition timing is prohibited.

Please note that on engines that have done many miles (either as a previous road car, or as a race car), the timing chain may have 'stretched' meaning the manufacturers standard cam and/or ignition timing is no longer correctly adjusted. It is up to the competitor to check and reset the cam and ignition timing to standard Mazda before the engine is used in the Supercup.

4.1 Cam Timing

Special Tools are required to set standard cam timing. These tools are readily available from places like Amazon or eBay. See Image 9 for an example of the Special Tool kit.

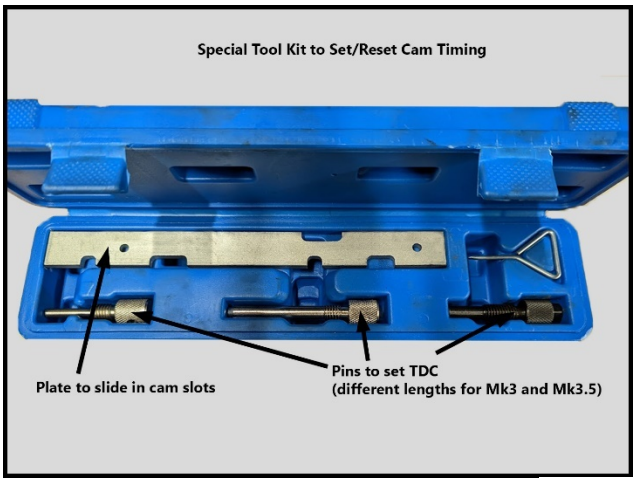


Image 9

Standard cam timing is set with the number one piston (closest to the front of the engine) set to Top Dead Centre (TDC). This can be achieved either using a dial gauge to the top of

the piston (recommended), or by using a Special Tool pin that fits in the cylinder block lower blind plug (see Image 10).

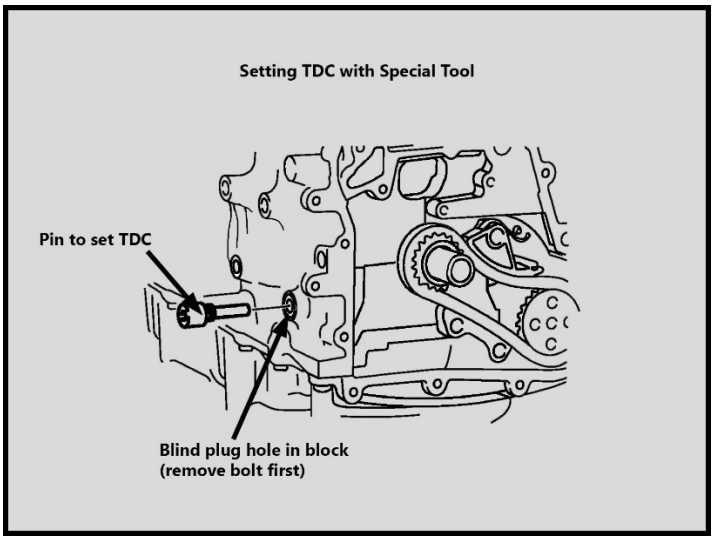


Image 10

With the number one piston (closest to the front of the car) set at Top Dead Centre (TDC), the plate from the Special Tool kit must be able to slide into the slots in the back of the cams (see Images 11 and 12). It the plate does not seem to fit, then rotate the cams 180° and re-try (ensuring Number one piston is back to TDC) as the slots in the back of the cams are offset slightly.

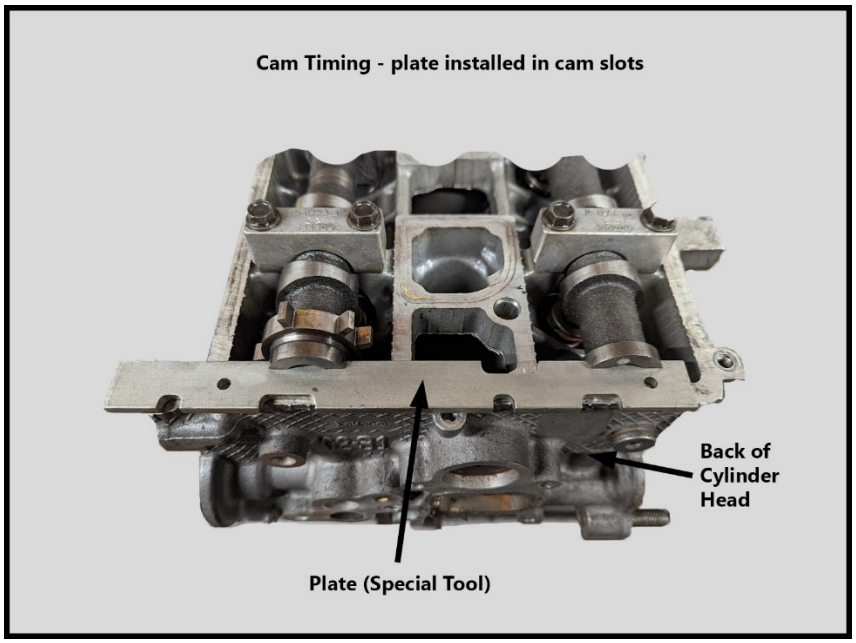


Image 11

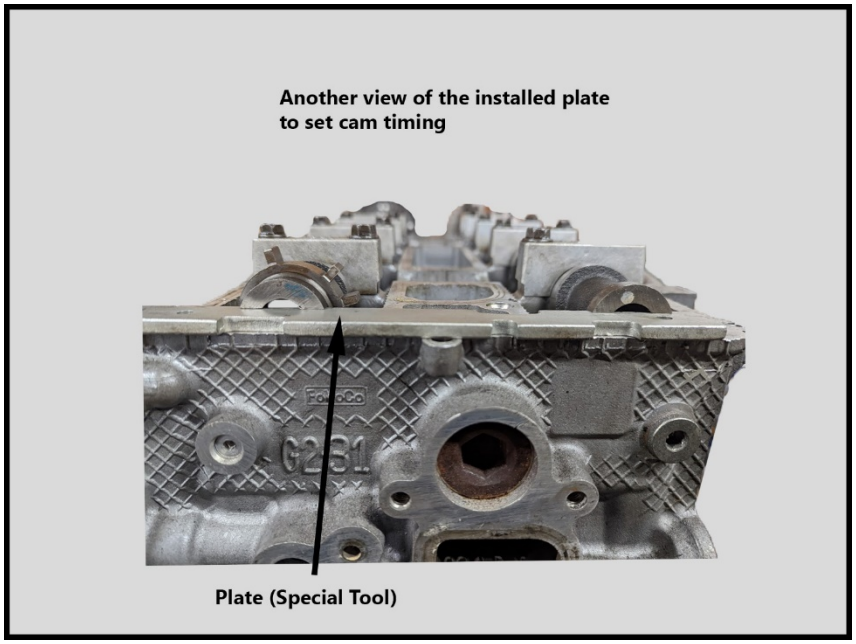


Image 12

4.2 Ignition Timing

With the cam timing plate is fitted (as in section 4.1), an M6x1 bolt must be able to be installed through the spoke in the front crankshaft pulley (Image 13) into the engine front cover plate (Image 14).

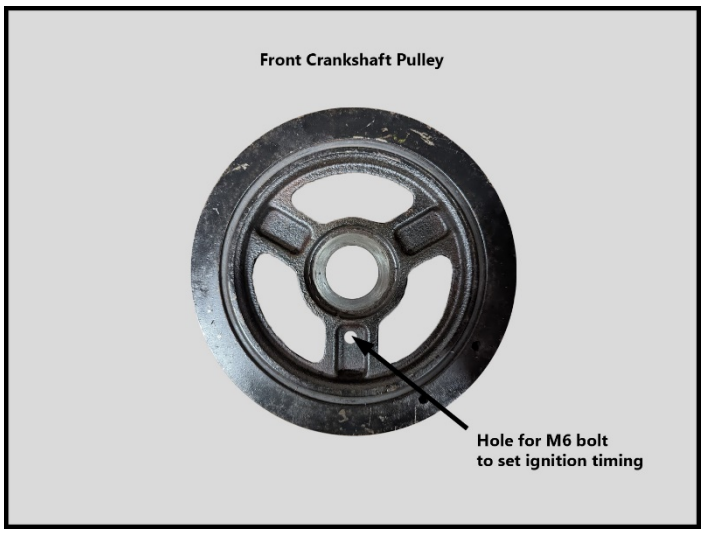


Image 13

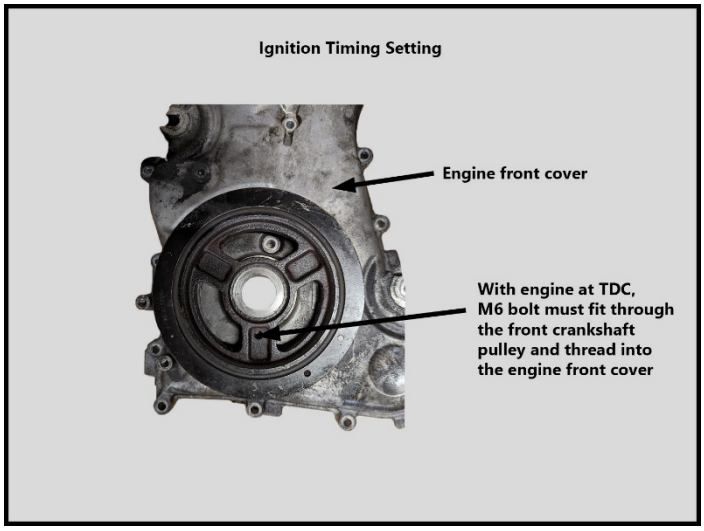


Image 14

The eligibility scrutineer reserves the option of allowing camshaft timing to be minimally out from the manufacturers settings where they believe natural chain stretching has caused the situation. In any other case, a non-compliance report will be issued.

5. Spark Plugs and Coil Packs

The type and grade of spark plug is free provided that they are a direct replacement for the standard plug. A standard plug is listed as Mazda part number L3G2-18-110 or L3Y1-18-110.

It is permitted to use aftermarket coil packs as long as they are the same form, dimension and specification as standard Mazda.

6. Induction (Intake and Intake Manifold)

6.1 Air Filter

An air filter must be fitted and may be of the free flow type.

It is permitted to replace the standard induction system cold air pipe, air filter housing and air filter with the Pipercross Venom Universal VM7100 aftermarket induction kit or Pipercross Viper Induction Kit Part No. PK364 from MX5 Parts (www.mx5parts.co.uk)

6.2 Air intake pipe

Induction kit air inlet piping may be routed from the front radiator grille only. An air intake ‘flange’ or trumpet may be fitted behind the grill. For the avoidance of doubt, there must be no hole through the grill and the mesh must remain intact. A grill that fills the entirety of the front radiator aperture must be fitted but it may be non-standard. Non-standard grills may not have additional openings/fittings to increase air flow into the induction kit inlet.

6.3 Mass Air Flow (MAF) Sensor and Inlet Air Temperature Sensor

The MAF and Inlet Air Temperature sensors are a combined unit mounted in the inlet pipe after the air filter and before the throttle body. This unit will be referred to as the MAF Unit.

The standard Mazda MAF Unit or a pattern part of the same form, dimension and specification must be fitted and remain mounted in its original location and orientation.

All air entering the engine must travel through the MAF Unit.

With the engine switched off and a time period of thirty seconds elapsed after switch off, a measurement of the MAF sensor voltage can be obtained using the ECUTEK software through a laptop plugged into the cars OBD-II port. This MAF sensor voltage specification is 0.68 V.

The inlet air temperature sensor in the MAF Unit has the following specification :

Resistance	At 20° C	2.21 – 2.69 kΩ
	At 60° C	0.493 – 0.667 kΩ

It is not permitted to alter any of the electronic components in the MAF Unit.

6.4 Throttle Body

The standard Mazda throttle body must be used and not modified in any way. The internal diameter of the standard throttle body is 65mm.

The resistance across the two designated pins (see Image 13) at around 20° C is specified as 0.3 – 100 Ω

It is not permitted to alter the coolant routing through the throttle body. Coolant from the main engine coolant system must flow through the throttle body (Image 15).

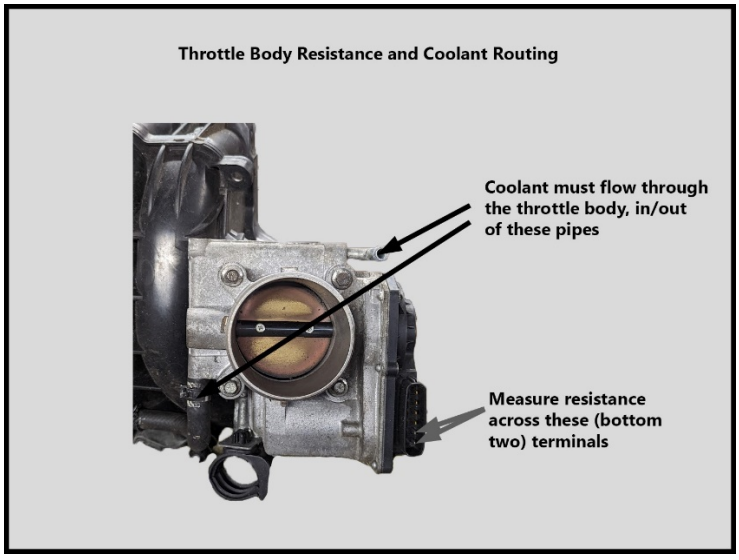


Image 15

6.5 Variable Intake Runner Length

The Variable Intake mechanism in the plastic part of the inlet manifold must be operational. Control is via a solenoid mounted on top of the inlet manifold which is controlled by the Electronic Control Unit (ECU). The solenoid connects to a vacuum mechanism ('dynamic chamber') mounted on the side of the inlet manifold.

6.6 Swirl Flaps

The swirl flaps in the metal part of the inlet manifold must be operational. Control is via a solenoid mounted on top of the inlet manifold which is controlled by the Electronic Control Unit (ECU). The solenoid connects to a vacuum mechanism ('dynamic chamber') mounted on the side of the metal inlet manifold. See Image 16.

It is not permitted to remove the swirl flaps or associated hardware.

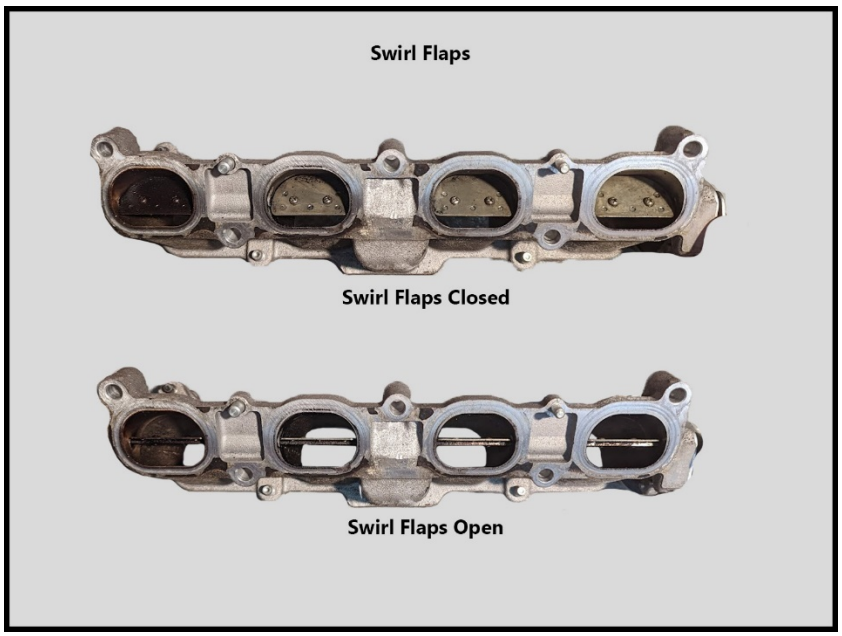


Image 16

6.7 Exhaust Gas Recirculation (EGR) Valve and Piping

It is not permitted to remove the EGR valve at the back of the cylinder head. The EGR valve must remain connected electronically. Seem Image 17 (note – the wiring loom for the electronic connection is not shown)

It is not permitted to alter or block off any part of the EGR valve.

It is not permitted to remove or block off the pipe connecting the cylinder head EGR port to the plastic part of the inlet manifold.

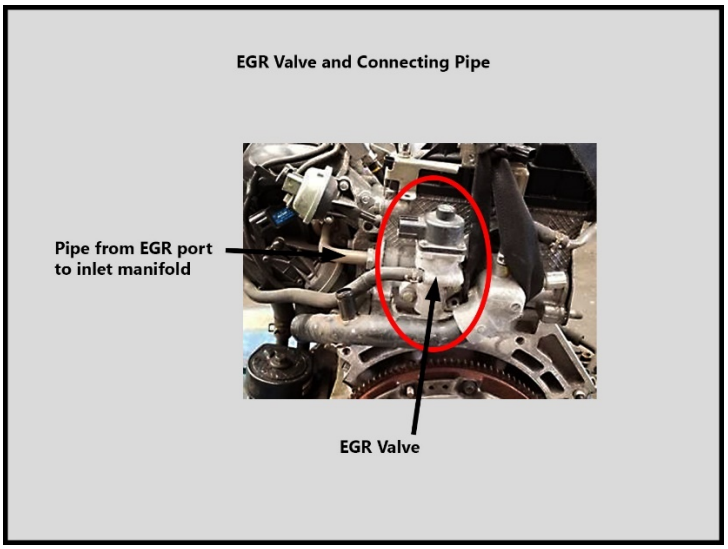


Image 17

6.8 Positive Crankcase Ventilation (PCV) and Evaporative Emission Control (EVAP) System

It is permitted to remove the charcoal canister, leak detection pump, purge solenoid valve and associated EVAP piping and block off the EVAP piping port in the plastic inlet manifold (Image 18).

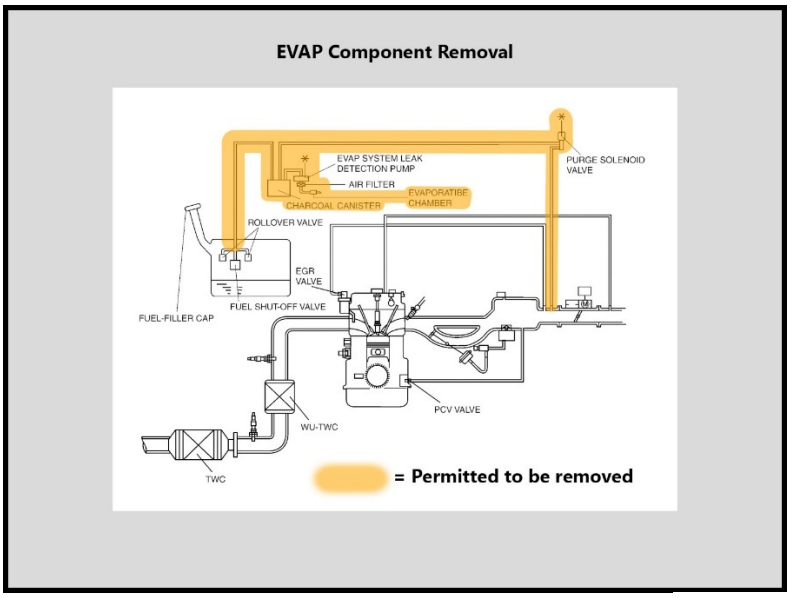


Image 18

6.9 Fuel injectors, fuel pump, fuel pressure regulator and fuel lines

The fuel injectors, fuel rail and fuel regulator (integrated into the fuel pump unit in the fuel tank) must be standard or standard pattern parts. The fuel pressure regulator operation must be as original.

Nominal flow rate for the standard injectors at 3.50 bar (50.8 psi) is 204 – 216 cc/minute.

Resistance of standard injectors is 11.4 – 12.6 Ω at around 20° C.

The fuel pressure permitted at the injectors is 3.50 – 4.09 bar (50.8 – 59.4 psi)

It is permitted to fit a fuel take off valve and associated piping and a switch to enable draining of the fuel tank.

It is permitted to replace the standard fuel piping as long as the replacement piping/tubing is rated for 85psi or more and is made for the transit of unleaded or super unleaded fuel.

7. Block/Pistons/Crank

7.1 Block

The standard Mazda MZR 2.0 litre cast aluminium cylinder block with 'cast in' cylinder liners must be used. Due to the block being developed in conjunction with the Ford Motor Company, it is also permitted to use a Ford Duratec 2.0 litre block providing it is of exactly the same form, dimension and specification.

It is permitted to recondition the cylinder walls by reboring and/or honing, but standard size pistons must be used.

It is permitted to skim the top face of the block to a maximum of 0.20 mm.

No other machining of the block is permitted.

It is permitted to re-line the block with new cylinder liners subject to standard sized pistons being used.

7.2 Pistons, Piston Rings and Connecting Rods

There are two type of piston and connecting rod setups depending on whether the engine is from a Mk3 or a Mk3.5. See Image 19. It is permitted to use either setup as long as they are installed as a set of four of the same type.

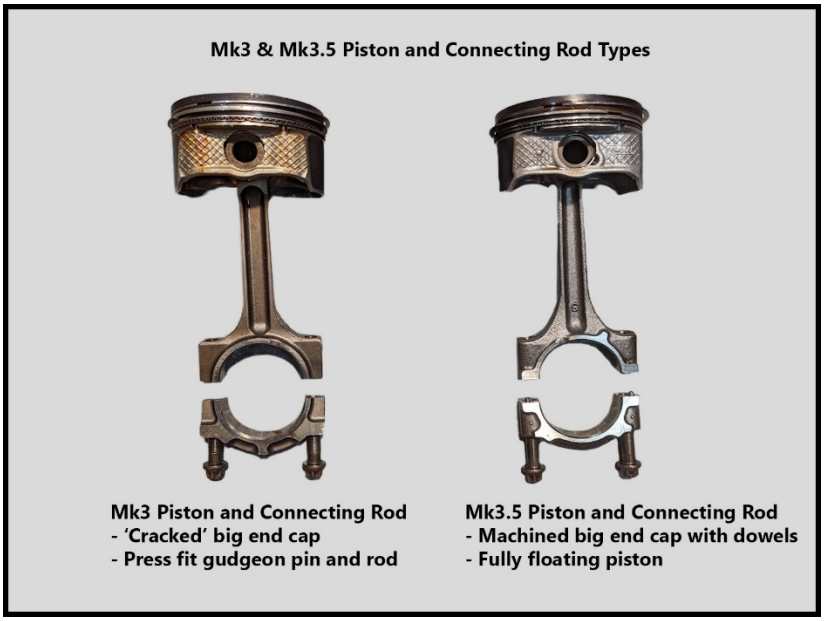


Image 19

It is permitted to use standard pattern replacement pistons and rings provided that they meet the original form and dimensions. Image 20 shows the form of the top of the piston (flat except for recesses for the inlet valves).

Image 20

It is not permitted to use oversize pistons. Piston dimensions for both Mk3 and Mk3.5 are shown in Image 21.

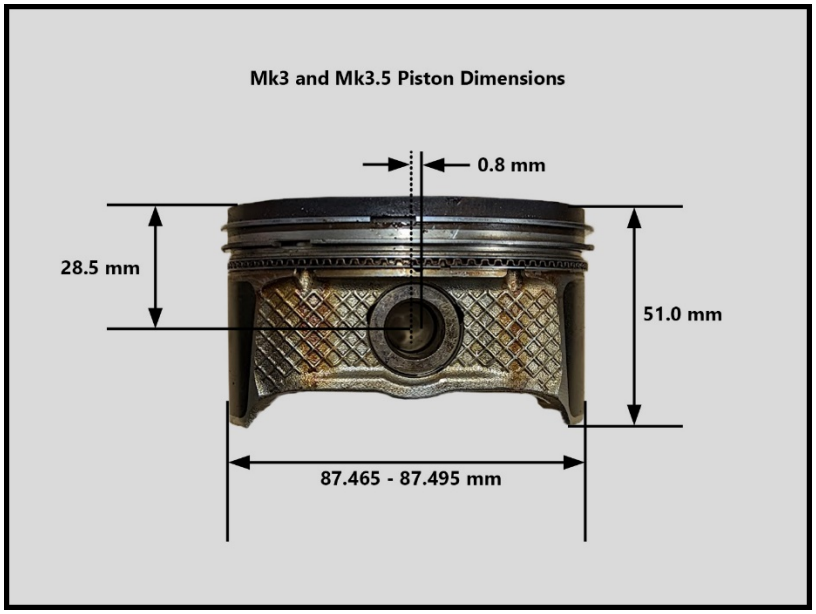


Image 21

Piston rings are free but must be of the same form and dimension as standard Mazda rings. It is not permitted to use 'Total Seal' or 'gapless' rings.

Gudgeon/wrist pins are free but must be of the same form and dimension as standard Mazda. No machining of the gudgeon/wrist pin is allowed.

It is permitted to 'balance' a set of pistons and/or connecting rods by machining or grinding. However one piston and/or connecting rod must remain unmarked and in its original, unmodified form (i.e. only three of the four pistons and/or connecting rods may be machined).

All piston rings must be installed – there must be a top ring, a second ring and 2 oil scraper rings sandwiching an oil scraper (Image 22).

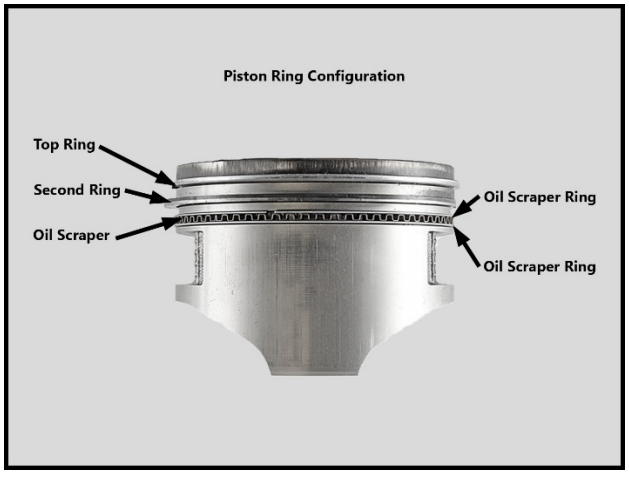


Image 22

It is not permitted to machine or grind the top surface of the piston, including the valve pockets already present from the original manufacturer. If there has been any contact

between valves and pistons (e.g. during an 'over-rev'), then any damage caused to the top of the piston should be left alone and not further machined or ground and the piston should be replaced at the earliest opportunity.

With the piston at Top Dead Centre (TDC), the top surface of the piston should sit below the top face of the block. The top face of the pistons are very slightly 'dished'. The measurement and measuring point of the top face of the piston below the block face are given in Image 23.

Standard piston to block measurement is 0.85 mm. If the top of the block has been skimmed (maximum 0.02 mm as stated above), then the minimum piston to block measurement will be 0.65 mm.

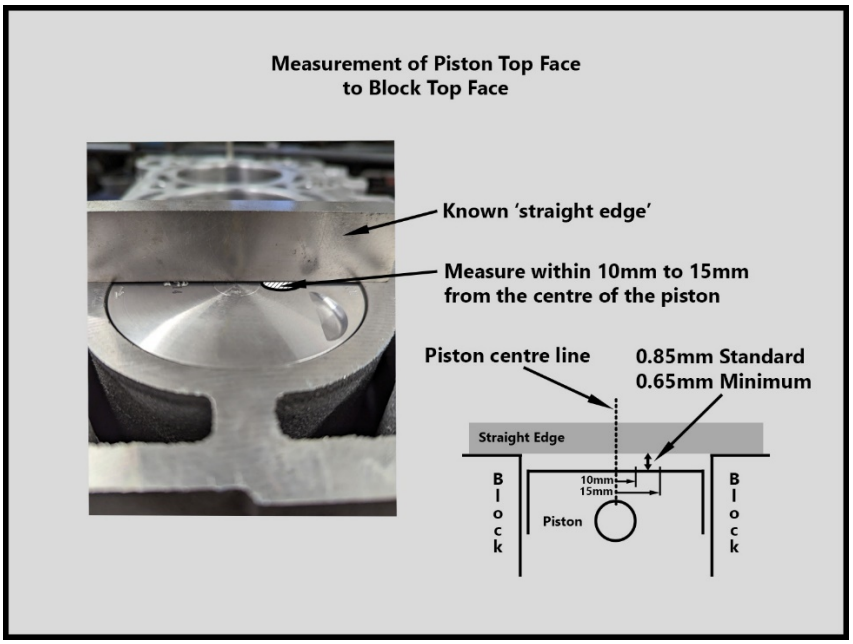


Image 23

7.3 Crankshaft

A Mazda crankshaft must be used. It is permitted to use the crankshaft from a Mk3 or a Mk3.5.

The stroke of the crankshaft must be 83.1 mm.

It is not permitted to lighten the crank by machining or grinding away from standard form and dimension, unless the lightening is specifically for balancing the crankshaft with minimal material removed.

It is permitted to balance the crankshaft by minimal localised drilling and/or grinding. It is permitted to add 'heavy metal' to the crankshaft to assist balancing.

It is permitted to grind the crankshaft main and/or big end bearings to accept undersize bearings up to 0.50 mm undersize. It is not permitted to change the stroke length if the crankshaft is reground to accept undersize bearings.

It is permitted to fit 'anti slip' ('diamond coated') washers between the front crank pulley and the cam chain/oil pump gear pulley and also between the cam chain/oil pump gear pulley and the face of the crankshaft. Mazda part number is L3K9-11-407. It is also permitted to use the Ford/Cosworth washer of the same form and dimension. See Image 24.

Image 24

7.4 Bearings

Main bearings and connecting rod ('big end' and 'little end') bearings are free.

Thrust bearings are free.

It is permitted to use 'Race' designated bearings. It is permitted to mix and/or match different makes and/or types of bearings between the main bearings and connecting rod bearings.

Undersize bearings are permitted to a size of 0.50 mm.

7.5 Sump

It is not permitted to modify the Mazda standard sump.

It is not permitted to add any extra baffles to the sump.

7.6 Oil Pump

Standard Mazda or pattern parts with the same form and dimension must be used.

It is not permitted to modify the oil pump in any way.

7.7 Water Pump

The water pump impeller is free as long as the main water pump housing is standard Mazda or a pattern part of the same form and dimension. This is to allow different impeller configurations from different manufacturers.

7.8 Flywheel

A standard Mazda flywheel must be used (part number LF9G-11-500).

It is permitted to reface the clutch friction plate contact area of the flywheel, but no other machining or grinding is permitted.

The minimum flywheel weight excluding the bolts and washers that secure the clutch) is 7.3 Kg.

7.9 Clutch

Clutch disk and pressure plate are free, providing they mount in the standard locations on the standard flywheel.

8. Thermostat and Cooling

8.1 Radiator

Radiators are free as long as the original mounting points are used. It is permitted to fit an aftermarket, high capacity, metal type radiator as long as the original mounting points are used.

8.2 Thermostat

Thermostats are free.

It is permitted to remove the thermostat.

8.3 Coolant Temperature Sensor (for the Electronic Control Unit (ECU))

The water thermosensor must be standard and have the following specification :

Resistance	At 20°C	35.48 – 39.20 kΩ
	At 80°C	3.65 – 4.02 kΩ

9. Exhaust

Any part of the exhaust system (from the manifold back) may be wrapped in heat barrier tape.

It is not permitted to have any parts of the exhaust manifold coated or wrapped internally or externally in any type of materials and manifolds must remain as manufactured externally and internally.

The exhaust system be mounted in the standard Mazda location and must exit in the standard position.

The exhaust system must comply with Motorsport UK noise regulations (NCR Ch.7 App.8).

9.1 Exhaust Manifold

It is permitted to replace the standard exhaust manifold but only with the Racing Beat manifold (from Racing Beat Europe (www.racingbeateurope.com) listed as 'Mazda MX5 NC (2006-15) Racing Beat Exhaust Manifold *Super Cup series Manifold* 2.0 & 1.8') or the IL Motorsport (www.ilmotorsport.de) manifold (Part Number NC0-0352).

9.2 Exhaust System (from the manifold back)

The only allowed exhaust system is that produced by Advanced Automotive Systems Ltd (AAS), 0191 267 3718 (contact Stuart), Part Number AAS/SC1. This includes the catalytic converter which must be the AAS supplied part AAS/SC2a.

Please note: Early versions of the AAS/SC1 system may have been supplied with a different catalytic convertor. This MUST be removed and replaced with the AAS/SC2a part.

The catalytic converter must be present and operational and may not be modified. All exhaust gases must pass through the catalytic convertor.

The AAS exhaust system and components is shown in Image 25.

Some 'older' versions of the exhaust system or components may not have the Part Number labels/tags installed. These may still be acceptable (at the scrutineers discretion) as long as they have been purchased from AAS and can be directly compared to be the same form and dimension as a 'known good' example. The only exception to this is that the Catalytic Convertor, which must have the correct label/tag showing the AAS/SC2a part number.

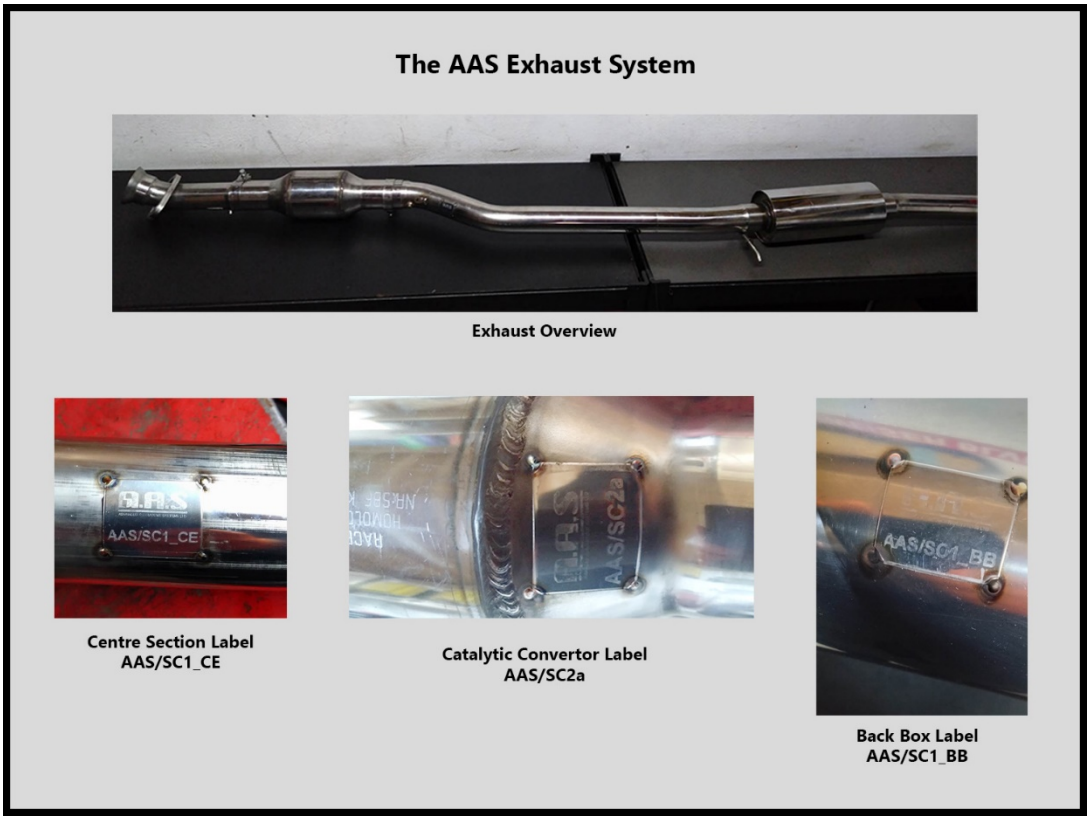


Image 25

9.3 Air Fuel Ratio (Lambda) Sensor

A fully functioning lambda sensor must be installed in the exhaust manifold. The lambda sensor must be of the wideband variety and either a Mazda genuine part (Part Number LFN1-18-8G1A) or an aftermarket, pattern equivalent that provides the same electronic signals to the Engine Control Unit (ECU) as the standard Mazda sensor.

It is permitted to install a wiring extension to allow the lambda sensor to be installed into the exhaust manifold. It is also permitted to wrap the wire to the lambda sensor in heat resistant wrap.

10. Engine Electronics

10.1 Engine Control Unit (ECU)

Only one ECU that controls the engine can be fitted to the car. The ECU must be located in the standard position and must be the only system controlling the engine operation. It is not permitted to modify the operation of the ECU by the fitment of components or software either internally or externally. The original Mazda bracket covering the ECU must be removed.

The only permitted ECU must be taken from the standard Mazda range with firmware code numbers LFH9EA to LFH9EF or LFJ1EC to LFJ1EF, no other type of engine ECU may be used.

Cars entering the BRSCC Mazda MX-5 Supercup must have the engine ECU remapped, at the owners expense, to Championship specification.

Remapping can be carried out by Sanspeed, 1-17 Standard Road, Bexleyheath, Kent DA6 8DP. Tel: 020 8301 4676.

The licence holder for the current ECU software map is Sanspeed, 1-17 Standard Road, Bexleyheath, Kent, DA6 8DP. Tel: 020 8301 4676. Remapping of the ECU can only be carried out using equipment approved by the licence holder. Remapping may be carried by officials out at any point during an event.

The Championship holds a number of ECU's containing the current map. Competitors can be asked to replace their ECU with a championship unit at any time during an event. Failure to comply will be deemed as a non-compliance and reported as such to the Clerk of the Course.

10.2 Engine Sensors

It is permitted to fit standard or standard pattern replacement sensors but the replacement sensor must not modify the strength or form of the signal from that given by of the original manufacturers sensor.

10.3 OBD-II (Data Link Connector) Port

The OBD-II connector port must be installed in the vehicle and accessible at all times for scrutineering purposes.

10.4 Alternator

The charging system must remain completely as standard, and the car must remain fitted with a standard or standard pattern fully operational alternator. It is not permitted to alter the alternator belt pulley size from standard.

A fully working standard alternator must be fitted and electrically connected so that the standard battery charging function is providing to the onboard battery at all times when the engine is running.

10.5 Wiring Harness

The vehicle wiring harness is free provided that it maintains the function of all of the required electrical systems and maintains them within the manufacturer's parameters.

11. Power Steering

The standard, unmodified power steering system must be fitted and must remain fully operative at all times whilst the car is taking part in any qualifying session or race.