



2012 Technical Regulations

Formula Ford 1800 Zetec

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Technical regulations for Formula Ford with 1800cc Engine January 2012

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FORMULA FORD with 1800cc engine

GENERAL:-

As with all regulations, 'UNLESS IT SAYS YOU CAN DO IT YOU CANNOT'. Any changes to the Safety regulations by local ASN's for events held outside the U.K. must have the prior approval of the Formula Ford Technical Steering Group.

1. DESCRIPTION

Four wheel single seater racing car fitted with a Ford 1800cc, 16 Valve engine.

2. SAFETY

These regulations are based the Royal Automobile Club Motor Sports Association (MSA) current Yearbook (Blue Book) rules, and specific Ford requirements.

2.1 Safety Roll-over structure: The rollbar must be symmetrical about the lengthwise centreline of the car and of minimum height 90cm measured vertically from the base of the cockpit or 92cm measured along the line of the driver's spine from the bottom of the car seat. There must be at least one brace rearwards from the top of the rollbar at an angle not exceeding 60° with the horizontal. This brace must be the same diameter as the rollbar, if two braces are fitted to the tube the diameter may be reduced to 20-26mm the wall thickness being maintained. In addition, forward facing braces should be considered. The width inside the roll-over bar main tubes must be 38cm minimum measured 60cm above the base of the seat. It must incorporate a crossbrace to restrain the driver's head and give rearward support. The top hoop radius must not be less than 5cm measured at the centre line of the tube.

Minimum Material: Carbon steel 350N/mm
Minimum Dimensions: Cold drawn seamless
42.4mm diameter x 2.6mm wall thickness

Exceptions: The only exceptions to the requirements is as follows:

Safety cage manufacturers may submit a safety cage of their own design to the ASN of the championship organising body for approval as regards the quality of the steel used, the dimensions of the tubes, the optional reinforcing members and the mounting to the vehicle, provided that the construction is certified to withstand the forces given hereafter in any combination on top of the Safety Cage:-

- 1.5w Lateral;
- 5.5w Fore and aft;
- 7.5w Vertical

w = 525Kg (for cars built before 31.9.99) w = 600Kg
(for all 2000 and future model year cars, plus any Safety cage rework on earlier cars)

Note: Where a safety cage manufacturer submits a cage and full documentation to the ASN a 'Rollbar' certificate will be raised and issued. Duly authorized copies of this certificate containing a drawing and/or photograph of the safety cage and a declaration that the rollcage can resist the forces specified must be available to event Scrutineer's. For Roll-over protection hoops that are not an integral part of the main chassis, the roll-over protection hoop safety certificate must also include certification that the chassis mounting points are also capable of resisting the same loads without failure To obtain ASN approval, a manufacturer must have demonstrated their consistent ability to design and manufacture safety cages that comply with the specifications approved by FIA.

2.1.1 For cars built after 1.1.02

The front roll over hoop (Hoop in front of the steering wheel) must comply with the above strength requirements.

2.1.2 Manufacturers recognised by the ASN must only supply customers with products designed and manufactured to the approved standards.

2.1.3 Each ASN approved manufacturer must be able to demonstrate to the ASN:

- a) That the material used has a certificate of origin or trace ability and is kept segregated from other batches of material.
- b) That welding procedures used produce consistent and sound welds and are regularly checked by laboratory tests.
- c) That they operate and maintain auditable in-house quality standards and procedures which are updated regularly.

2.1.4 ALL Aluminium alloy roll cages are prohibited

2.1.5 Aerodynamics: The use of a rollbar to achieve or supplement aerodynamic effects is prohibited.

2.2 Safety Harness: Be fitted with a safety harness to be worn at all times by the driver during training practice and competition.

Safety Harness (seat belts): Six point, incorporating two shoulder straps, one abdominal strap and two straps between the legs, with six fixation points on the chassis of the vehicle. One either side of the driver, two to the rear of the driver's seat and two between the legs. The fixation point to the rear should be positioned so that the strap from the shoulder is as near horizontal as possible. It must not be located on the floor directly behind the driver. Seat belts once involved in a serious accident must be discarded. It is not permitted to mix parts of seat belts. Only complete sets as supplied by manufacturers must be used. Only one release mechanism is permitted on each seat belt configuration and this must be available for the wearer to operate whilst seated in the competing position. Belts subjected to oil, acid or heat must be replaced. All seat belts must conform to the minimum FIA standards.

2.3 Fire Extinguishers: A fire extinguishing system must be carried on all vehicles, the minimum requirement being that the system be discharged with one of the permitted extinguishants and be operable by the driver whilst normally seated either by manual operation or by a mechanically/electrically assisted triggering system. At all times with the driver out of the car it must be possible for appointed safety or technical scrutineering personnel officiating at the event to see, without moving or removing any item whatsoever, the Fire Extinguisher pressure gauge (if fitted) and the position occupied by a safety device used exclusively to prevent accidental discharge FIA Fire Extinguisher homologated systems are permitted as long as they conform in all respects to the installation requirements required for the homologation.

2.3.1 Capacities: Extinguishers are classified as Small, Medium or Large, and designated as Hand Held or Plumbed-In. Dry powder extinguishers are prohibited. Note: The manufacture of Halons (commonly known as 'BCF') has ceased worldwide and in certain countries, the use of Halons is illegal. Existing Halon systems remained acceptable within these regulations until 30/12/2002 in the UK. Consequently BCF must NOT now be used.

Minimum Specification = Medium Plumbed-In, for discharge into both cockpit and engine compartment. Alternative: Large, plumbed-in, for discharge into both cockpit and engine compartment.

Table of Equivalents

Size	AFFF	Zero 2000	
Medium	2.25 Kg	2.25 Kg	
Large	2.25 Kg	2.25 Kg	

All capacities are minima.

2.3.2 Plumbed in Systems. The Large unit should have two points of triggering - one for the driver and one outside the car for activation by marshals etc.

2.3.3 The triggering point from the exterior must be positioned close to the circuit breaker (or combined with it) and must be marked by the letter 'E' in red inside a white circle of at least 10cm diameter with a red edge.

2.3.4 In installing units the direction of nozzles should be carefully considered, induction, exhaust, ignition and fuel pumping systems being the most likely areas for fire to occur

2.3.5 Where possible sources of fire exist outside the engine or cockpit areas advice should be sought from the MSA, the FIA, or the National Motor Sport Authority concerning plumbed-in system installations.

2.3.6 All bottles should discharge simultaneously and must be operable in any position of the car even if inverted.

2.3.7 It is strongly recommended that plumbed-in bottles should be mounted in the fore and ah direction in the vehicle. The fitting of a pressure gauge is mandatory, except for units filled with BCF

2.3.8 Method of Operation: The preferred method of operation is electrical which should have its own source of energy for triggering, ideally with provision for checking the integrity of the system's triggering

2.3.9 Installation: Particular attention should be paid to the installation and maintenance of any system, especially if it is mechanically operated. Pull cables should be fitted in such a way that no kinks or 'S' bends are formed that could cause malfunction. Mechanically operated systems, if used, should be fitted with 'Total Discharge valves' (i.e. ones that continue to discharge even if the operating mechanism should fail after triggering).

2.3.10 Weight checking: Extinguisher systems should be capable of being dismantled for the purpose of checking the weight of the extinguishant and the integrity of the cylinder, also to enable the operating system to be serviced without discharging the contents. The tare weight of the unit must be marked on the cylinder.

2.3.11 During events:- All plumbed-in extinguisher systems must be in an 'ARMED' condition (i.e. be capable of being operated without the removal of any safety device) at all times whilst competing or practicing. N.B. The fire extinguisher cannot be disarmed in any Parc Ferme area without the specific permission of the Series scrutineer for that event

2.3.12 Any plumbed-in extinguisher system found to be incapable of being operated will be the subject of a report to the Clerk of the Course/Stewards for possible penalisation as an offence against Safety Regulations.

2.3.13 Checking for correctly 'armed' extinguisher systems should only be carried out by Scrutineer's from the National

Sporting Club, and/or Judges of Fact nominated for that purpose.

2.4 Red Warning Light: An LED, rearward facing, red warning light must be located within 10cm of the vertical centre line of the vehicle and be clearly visible from the rear. The minimum total continuous light intensity from the rear facing rain light shall be 200,000 mcd with a minimum viewing angle of 6 degrees. The complete LED light assembly must fit within a square of 11 x 11 cms. When viewed from the rear the light must not be obstructed by any part of the vehicle. The centre of the light unit must be placed not less than 30cms from the ground, and less than 30cm from the rearmost part of the car. The rear warning light must be energised when the practice or race session is declared as a 'wet' session or when instructed by the Clerk of the Course. (also see Appendix 'A')

2.5 Electrical System: To be equipped with an externally operated circuit breaker having positive ON-OFF positions clearly marked. An internal ignition switch must be operable by the driver when normally seated irrespective of whether a safety harness is worn or not.

2.5.1 External Circuit Breakers: The circuit breaker, when operated, must isolate all electrical circuits with the exception of those that operate fire extinguishers. On the cars it should be situated on the lower main hoop of the roll-over bar. The location to be identified by a Red Spark on a White-edged Blue triangle, and the 'On' and 'Off' positions clearly marked. Note: When the cut-out is operated there must be no power source capable of keeping the engine running.

2.5.2 Not have any ignition components, coils, chokes, black boxes, located in the Cockpit area which has a working voltage greater than 15 Volts, with the exception of the main engine ECU and its associated loom.

2.6 Head Restraints

2.6.1 Rear Head restraints must be fitted, capable of restraining a 17kg mass decelerating at 5g. Dimensions to be 10cm x 10cm and located such that the driver's helmet is restrained and cannot move past it under rearward forces, or be trapped between the rollbar and the head restraint. It is recommended that it be within 5cm of the driver's helmet when normally seated.

2.6.2 Side head restraints are mandatory from 2001MY cars and strongly recommended for earlier cars provided the internal gap between the ears is less than 400mm, and that the side restraints are fitted with an energy absorbing material of at least 20mm minimum thickness. Its construction must not impair the drivers ability to extricate themselves from the vehicle within the maximum time allowed. (see Art 3.2 & 4.8) The side head protection device may be detachable during this extradition, but its removal must form part of the extradition period. The energy absorbing material used must comply with a minimum F.I.A standard for this application, or be approved by the Formula Ford Technical Steering group.

2.6.3 Side Head protection shall be installed at such a height that it ensures that the drivers helmet will contact this protection in such a manner as to reduce to a minimum any possible injury in the case of contact with it.

2.7 All other personal safety equipment; Overalls, Underwear, Helmets etc. must comply with at least the minimum requirements of the ASN for the event being contested. Either goggles or a visor must be worn at all times during training

practice and competing. Minimum visor standard - BS 4110Z or equivalent standard.

2.8 All safety critical fasteners must be in high tensile ferrous material.

GENERAL SAFETY RECOMMENDATIONS

2.9 General

Owing to the widely varying nature of competitions and vehicles taking part in them, the Ford Motor Company Limited takes the view that it would not be in the best interests of the competitors to cover all aspects of safety precautions with mandatory regulations. Inevitably such regulations could not necessarily provide for the most appropriate safety precautions in all foreseeable circumstances. The Ford Motor Company Limited therefore draws attention to the following points so that the competitors can consider them and take precautions as seem appropriate to their own particular requirements.

2.9.1 An appropriate, and fitted in compliance with all FIA Safety helmet and other requirements, 'Hans device' (Head and Neck Safety device) is strongly recommended for use at all times

2.10 Electrical

2.10.1 Batteries - All batteries should be 'leak proof' design and only those with gel electrolyte are recommended.

2.10.2 Electrical System - all wiring should be secured and well protected to reduce the risk of fire from electrical short circuit.

2.11 Fuel

2.11.1 Fuel Tanks and Pipes - every effort should be made to isolate fuel tanks and pipes from the driver's compartment. The risk of fuel spillage from accident damage can be reduced by use of bag-type tanks or by coating metal tanks with GRP. It is strongly recommended that fuel tanks are of the rubber bladder type, constructed from FT3 or better material. (see Art 12.4) Tanks should be located so that they are given maximum protection by the structure of the vehicle. Vents must be designed to avoid spillage if the vehicle becomes inverted.

2.11.2 Fuel Fillers:- These should be designed and located to reduce risk of damage. Filler caps should not be liable to open in the case of an accident. Simple screw caps are effective. The positive locking of the fuel filler caps is recommended. The filler pipe to the tank should be of minimum possible length and not protrude beyond the bodywork.

2.12 Coolant

2.12.1 Radiator Caps. These caps should be located or shielded in such a way that hot water or steam cannot scald the driver of the vehicle if they become opened or broken in an accident.

2.13 Cockpit side protection. The recommended side protection built into the bodywork alongside the driver; at a minimum, Double layer, 141.75 g/m² (5oz), bi directional, laminated Kevlar (Aramide) material incorporated into this area of the body only.

3 CHASSIS

Cars must conform to the following:

3.1 The chassis must be of tubular steel construction with no stress bearing panels except bulkhead and undertray, curvature

of the undertray must not exceed 2.54cm. The undertray/floor (Art 4) extends from the bulkhead forward of the pedals to the bulkhead between the fuel tank and the engine. Monocoque chassis construction is prohibited. Stress bearing panels are defined as, sheet metal affixed to the frame by welding or bonding or by rivets or by bolts or screws that have centres closer than 15.25cm. The maximum length of weld attaching the panels to the chassis shall be 25.4mm. The gap between the end of the each weld shall be a minimum of 15.25cms. Bodywork must not be used as stress bearing panels. The use of stabilised materials, composite materials using carbon and/or Kevlar reinforcement is prohibited (unless specifically permitted in these regulations). In the case of a vehicle with the fuel tank placed immediately behind the driver, a Bulkhead (a non-flammable, solid closing panel, attached to the main frame of the chassis with its fixation points less than 15.25cms apart around the full extremity of the panel), must be placed between the engine and the fuel tank. In addition another closing panel must be fitted between the fuel tank and the driver to prevent any fuel spillage, however caused, from reaching the driver whilst seated in the car.

3.1.1 The cars must incorporate a Lateral Protection structure (Art 3.6)

3.2 Cars built after 1.1.95

The free internal cross section of the cockpit from the soles of the driver's feet to behind his seat shall at no point be less than 700cm². The only thing that may encroach on this area is the steering column. A free vertical section of minimum 25cm width maintained to a minimum height of 25cm with corners of maximum 5cm radius must be maintained over the whole length of the cockpit with the steering wheel removed. The driver normally seated in his driving position with the seat belts fastened and the steering wheel removed must be able to raise both legs together such that his knees reach the plane of the steering wheel in the rearwards direction; this action must not be obstructed by any part of the car. The cockpit must be so conceived that the maximum time necessary for the driver to get out from his normal driving position does not exceed 5 seconds with all driving equipment being worn, the safety belts fastened, and the steering wheel in place in the most inconvenient position.

3.3 The soles of the feet of the driver, seated in the normal driving position and with his feet on the pedals in the inoperative position, shall not be situated to the fore of the vertical plane passing through the centre line of the front wheels.

3.4 No engine oil or water tubes are permitted within the cockpit.

3.5 Cars built after 1.1.95

The chassis must include an impact-absorbing structure fitted ahead of the front bulkhead of the tubular steel frame. This structure must be independent of the main bodywork and must be solidly fixed to the extremities of the bulkhead (i.e. with bolts requiring tools for removal). It must constitute a box of 30cm minimum length, 15cm minimum height in any vertical section and 400cm² minimum total cross section. It must be metallic using honeycomb sandwich construction with a panel thickness of 13.9mm minimum. The main bodywork is defined as the external covering of the chassis frame from the foremost steel bulkhead to the centreline of the rear wheels.

3.5.1 For cars built after 1.1.99.

The impact-absorbing structure shall be fixed to the chassis with a minimum of 4 fasteners, in high quality steel using a core

diameter of 6mm minimum. Irrespective of the size of the impact absorbing structure (safety foot box), the maximum total area of access holes allowed in the walls of this structure shall be 150cm². The basic structure is defined as a unit with 5 closed sides, and 1 open side. The access hole dimensions quoted apply to any modification to the 5 closed sides. (Minimum clearance holes for the passage of steering rack / rods are not included in the calculation of this area.

3.5.2 For cars built after 1.1.02

Cockpit side protection. Above the level of the Lateral Protection Structure, and up to the level of the upper chassis tube, stretching from the rear roll hoop to the front roll hoop there must be an anti-intrusion panel. This anti-intrusion panel shall be either built into the removable bodywork, or keyed into the main chassis but cannot be rigidly attached to the chassis. It can be made from Glass reinforced plastic, Kevlar or Aluminium skin added to the inner face of the removable body panel. Any material added must considerably improve the anti-penetration capability of the structure in the area of the driver. (see Art 2.13)

3.5.3 The model year of the chassis must be clearly, and indelibly, stamped into a structural member of the main chassis, (or on a steel plate attached by welding on at least 3 sides to the chassis), in an area visible to scrutineer's without bodywork or other component removal. All chassis's for a particular model year will be stamped in the same position.

3.6 Lateral Protection Structure

Continuous panels whose projection on a vertical plane parallel to the longitudinal axis of the car shall be at least 15cm high, shall extend on either side of the car, at a minimum distance of 55cm from the car's longitudinal centre line between at least the transverse planes passing through the fuel tank rear face and the frontal extremity of the minimum cockpit opening, and at a minimum distance of 35cm from the car's longitudinal centre line between at least the transversal planes passing through the above extremity and the front rollover bar hoop. These panels shall be made from a composite material of 30cm² minimum cross section with a honeycomb core in metal or Nomex giving adequate resistance to compression. The external skins shall be of aluminium alloy, plastic, or carbon fibre of a minimum thickness of 0.5mm or made up of another assembly of materials of equivalent efficiency. The panels must be securely attached to the flat bottom and their upper extremity to the main structure of the car in such a manner as to ensure absorption of a lateral impact. The radiators may play the role of protective panels or of transversal struts. The periphery of the bodywork covering the Lateral Protection Structure, when viewed from below, must be curved upwards with a minimum radius of 5cm, and a maximum radius of 7cm with the exception of air entry and exit openings into the Lateral Protection Structure.

For cars built after 1.1.02 the tolerance on the variation in flatness of the under surface of the car between the furthest forward bulkhead, and the rear bulkhead (at the position of the Roll Over protection hoop) will be 5mm. The Lateral Protection structure base (Side pod base) can be up to 25mm above the floor defined above, but must be parallel to it, and subject to the similar 5mm flatness tolerance. The floor of the side pod must reflect the plan of the upper surface. (For pre-2002 cars:-The floor is to be in the same plane as the undertray in both directions, i.e. transverse and longitudinal, subject to all points being within 2.54cm of any flat plane situated under the car) (see Art 3.1).

3.6.1 Ducting to the radiators, or other items requiring cooling, inside the Lateral protection structure is free. Slots and other

openings may be inserted into the top surface of the Lateral Protection structure, but these must not be connected to the radiator directly by separate ductwork. Only factory sanctioned changes to the shape of the Lateral protection structure are authorised

3.7 Crushable Structures: All oil tanks mounted outside the main chassis structure must be surrounded by crushable structure of minimum thickness 10mm.

3.8 *The longitudinal centre line of the chassis must correspond with the longitudinal centre line of the vehicle. Suspension components must be the same effective length on both sides of the vehicle, and their mounting points must be equal distance from the chassis centre line.*

4. BODYWORK

4.1 See table of single seater dimensions. (Appendix 'B'). The use of composite materials using carbon and/or Kevlar reinforcement is prohibited. (unless expressly permitted) Bodywork is not required behind the vertical plane taken through the front of the top most portion of the roll over structure. If Bodywork is used it must conform with the following regulations:

4.2 Any device designed to aerodynamically augment the downthrust on the vehicle is prohibited, as are aerofoils, nose fins or spoilers of any type.

4.3 The engine cover must not extend rearwards past the rearmost point of the gearbox housing (no gearbox extensions permitted). The shape of the cover must not include any reflex curves and no flat surfaces are permitted within 15° of the horizontal.

4.3.1 For cars built after 1.1.02.

The rear bodywork above a horizontal plane that sits on the top of the engine intake plenum must be symmetrical side to side around the vehicle longitudinal centreline. The size and position of openings for the passage of air in this area are free.

4.4 The bodywork can be shaped to fit over chassis or suspension components, without contravening the regulation that prohibits reverse curves. However, any such body shape that can be deemed, or even thought, to produce an aerodynamic effect that could result in increased down force will be prohibited.

4.5 The lower rear bodywork (located below the wheel centre line) is only permitted alongside and beneath the engine and can only extend from behind the cockpit to a line drawn through the rear axis. The incorporation of suspension or other fairings in this bodywork or separately is prohibited.

4.6 All cars must have at least two mirrors mounted so that the driver has visibility on both sides of the car (minimum surface area of each one: 55cm)

4.7 Cockpit opening. The opening giving access to the cockpit must allow a designated horizontal template to be inserted vertically into the cockpit (not considering the steering wheel, the removable seat, or any side head support) down to 250mm lower than the lowest point of the cockpit opening. This template is defined by dimensions J, K, L in Appendix 'B'. Implementation:- For cars built after 1.1.99. (was 25mm for cars built before 1. 1.99) **The cockpit must be so conceived that the**

maximum time necessary for the driver to get out from his normal driving position does not exceed 7 seconds with all driving equipment being worn and starting with the safety belts fastened.

4.8 See also Lateral Protection Structures (Art 3.6)

4.9 Be fitted with Bodywork with a driver's compartment isolated from the engine, wet batteries, gearbox, transmission shafts, brakes, road wheels, their operating linkages and attachments, petrol tanks, oil tanks, water header tanks and catch tanks. Have a Protective Bulkhead of non-inflammable material between the engine and the driver's compartment capable of preventing the passage of fluid or flame. Gaps must be sealed with GRP or Intumescent Putty. Magnesium is prohibited for bulkheads. Where a fuel tank constitutes part of the bulkhead, an additional bulkhead must be fitted.

4.10 Have a complete Floor of adequate strength rigidly supported within the driver compartment

4.11 Have any undertray provided with drainage holes to prevent accumulation of liquids

4.12 The forward extremity of the nose of the car shall be less than 200mm from the ground:- Implementation:-For cars built after 1.1.98, all cars from 1.1.99.

4.13 Bodywork may only be mounted directly to the chassis, undertray, or suspension mounting points. Suspension mounting points may be covered by bodywork, but only if this is an integral part of the bodywork, and not an addition to the main bodywork.

4.14 (applicable to ALL cars from 1.1.2000)
Any bodywork in front of the front bulkhead shall have no external concave surfaces.

4.15 (Applicable to ALL cars from 1.1.2000)
Any extension of the flat floor rearward of the Main rear bulkhead (under the engine) must conform to the same reference plane and tolerances as the floor.

4.16 Only original factory specification parts can be used in front of the forward bulkhead. No additional material can be added

5 ENGINE

5.1 GENERAL

5.1.1 Engines will be mounted upright, and aligned fore and aft in the chassis, *additionally the engine crankshaft centre line must be on the longitudinal centre line of the vehicle.*

5.1.2 The addition of any material be it metal, plastic, or composite etc. by any means be it welding, bonding, encapsulation or encasement to any component is prohibited. However, specific repair of the mounting points of the cylinder block to the transmission or chassis is allowed, whilst other casting repairs may be allowed with prior written approval of the Technical Commissioner responsible for the Formula.

5.1.3 Balancing of reciprocating and rotating parts is permitted only by removal of metal from locations so provided by the manufacturer as detailed in the appendix to these rules.

5.1.4 Water pump, fan and alternator drive pulleys and their retention bolts, washers and belts are free.

5.1.5 Mechanical tachometer drives may be fitted.

5.1.6 The use of non-standard replacement fasteners, nuts, bolts, screws, studs and washers which are not connected with, or which do not support, any moving parts of the engine or its compulsorily retained accessories is permitted. Freedom granted to any fastener does not allow for freedom to move items relative to each other. For components that are granted the freedom for the fitment of a key or dowel, then material may be removed to allow the fitting of the key or dowel. Only one hole or keyway per component is allowed.

5.1.7 The use of thread locking compounds is permitted.

5.1.8 Gaskets are free except for the cylinder head, all intake and exhaust system gaskets which must be standard Ford manufacture for the engine.

5.1.9 Any process of cleaning may be used on any component providing the surface finish, which must remain standard, is not affected.

5.1.10 Forced induction is prohibited. Ram Air generated by the forward motion of the car is not considered as forced induction.

5.1.11 The expression 'Standard', 'Standard production', or similar expression is deemed to imply that the part has been manufactured by Ford, or a Ford Motor Company Ltd. authorised sub contractor, for specific use on a specific model of the vehicle or engine. Consequently for these championship rules only parts manufactured specifically for the Ford 1800cc, 16 Valve engine in its 130PS production form may be used. Any machining marks on cast components resulting from manufacturing procedures will not cause disqualification. Only machining and component preparation carried out by Ford Motor Company Ltd., or by a Ford Motor Company Ltd. authorised sub-contractor is allowed unless otherwise specified. Any production deburring or imperfection removal during initial manufacture may not be modified or extended. The scrutineer's decision will be final (based on advice from Ford Manufacturing) if a dispute arises regarding the amount of tool, or other marks that are evident in any particular component. N.B. Care must be exercised in the choice of replacement parts as many variations of this engine now exist!

5.1.12 The exterior surfaces only (of the complete engine assembly) of ferrous parts and the exterior surface of the aluminium cam cover may be protected by paint or similar means. No internal component or surface may be coated by any protective finish. Other Ford produced aluminium components may be protected only on their external surfaces by a transparent clear varnish, or similar.

5.1.13 This paragraph confirms previous and future statements that no rework may be carried out on any component unless specifically authorised by the regulations. The engine and associated parts must remain exactly as produced by the Ford Motor Company unless expressly detailed in these regulations. If the regulation allows a change, then that authorization would allow the change to be carried out. However any statement defining minimum weight or dimensions does not grant permission for rework to obtain these minimum values, unless carried out in accordance with these regulations. Only Ford standard parts (Parts manufactured by Ford or a Ford Motor Company authorised sub contractor) specifically for the 1800cc, 130PS version of the engine can be used in this series. No treatment that alters in any way the surface finish, hardness, or other property of the original production component is allowed. The only exception to this is any deposit derived from the

lubrication and combustion processes naturally occurring during the running of the engine. Ford reserve the right to prohibit the use of specific components introduced as production changes, if in the opinion of the Ford Motor Company Limited, they are deemed to have a performance advantage. If in doubt contact Ford Racing or the series scrutineer.

5.1.14 Engine/transmission mounts attaching to standard Ford components must retain the standard dimensions of the boss or other attachment point without modification.

5.2 PERMITTED ENGINE

5.2 The only permitted engine is the Ford 1800cc, 16 Valve engine in its 130PS form (code RQC or RQB) with nominal bore 80.6mm and stroke 88.0mm.

Production tolerances are permitted providing the total swept volume does not exceed 1800cc.

5.3.1 Induction

5.3.1.1 Air Flow Meter: The Air Flow meter shall be mounted at the forward end of the intake pipe (opposite end of the pipe to the restrictor). The air intake pipe shall be such that it permits an airtight seal to the Restrictor and the Air Flow meter. The air flow meter shall also be mounted in such a manner that the sensor is positioned at the top of the airflow unit (see diagram, Appendix 'E'). All the air entering the engine must pass through the prescribed filtering device prior to the air flow meter. No pipe extension or air horn is allowed in front of, or inside, the air filter unit. The air filter must be fitted to the air flow meter without any intermediary device. The induction air filter unit may be placed in a cold air chamber. The engine Induction air shall not pass through any form of tube or pipe, however manufactured, prior to the air filter element in the cold air chamber. The whole of the cold air chamber must fit inside the bodywork, with no body panels specifically designed to accommodate an extended cold air chamber. With the exception of the intake pipe, which may be shortened from its production length of 525mm (measured on the pipe centre line) down to a minimum length of 465mm in order to allow the freedom to position the Air Flow sensor as indicated in Appendix 'E', unmodified Ford procured parts will be mandatory for the air restrictor, intake pipe (except as above) and the air filter. The air inlet hose from the air flow meter to the Formula Ford restrictor may be installed partly or totally inside the cold air induction chamber, and/or may be wrapped with heat reflective tape. This tape must be removable on demand

5.3.1.2 Inlet Manifold: Standard Ford production Aluminium alloy inlet manifold for 130PS, 1800cc engine built to code RQB or RQC. The adaptor plate that carries the fuel injectors between the cylinder head and the intake manifold cannot be reworked in any way.

5.3.1.3 Unused air passages into, or out of the manifold can only be sealed by the addition of a internal or external closing device. The standard connector cannot be removed. The entrance to the passage for recirculation of the blow-by gases in the intake manifold intermediate flange must be sealed with an airtight plug.

5.3.1.4 It is not permissible to reshape the manifold internally, except very limited cleaning up of the individual ports for a maximum length of 30mm (measured along, and perpendicular to, the lower face of the manifold tract) just in front of the fuel injection manifold. The maximum port dimensions are quoted in Appendix "E". The manifold may be machined externally to clear the throttle mechanism

5.3.1.5 Throttle Body: The throttle Body housing shall not be modified internally in any way, other than for the fitting of the obligatory restrictor of 30.00mm maximum internal diameter and as detailed (see note in Appendix 'E'). The external throttle linkage, including the throttle return spring, may not be reworked. The throttle body must be modified to allow sealing of the restrictor to the unit but not at the expense of admitting air. No other modifications are permitted No polishing or re-profiling is permitted.

5.3.1.6 Restrictor: Except for the vibration damping 'O' ring, the unmodified Ford procured restrictor, which is mandatory, (appendix 'E', Drg. No MS92FF 6683 AC indicating its required installation position). All the air for the engine must pass through this restrictor.

5.3.1.7 Any means of reducing intake air temperature is prohibited. Any form of water injection is prohibited.

5.3.2 Fuel Injection and Engine management system.

5.3.2.1 All standard production engine sensors which have any influence whatsoever on the engine management system must be retained in the correct position and in working order. It is not permitted to reposition positional sensors. The main engine 'electronic Control Unit' (ECU) shall not be modified in any way. It is not permitted to change the strength or form of any of the sensor signals to, or the outputs from, the ECU or the ignition amplifier unit. The only ECU allowed is MS97FF 12A650 AA (or its current production derivative); plus any other ECU specifically defined and notified to competitors by the championship organiser's. The Sporting Regulations for the event has the right to specify which, or all, of the ECU calibrations may be used. *Only Ford Motor Company sourced Wiring looms are permitted for the engine management system (see also 5.16.5)*

5.3.2.2 The ECU diagnostic connector must be positioned in an accessible position, allowing scrutineer's free access to it at all times. The free access must allow for the condition of the driver seated in the car and fully prepared to take part in the competition.

5.3.2.3 The engine high pressure fuel pump(s), and any low pressure pump(s) must be activated through a relay (Minimum 15 Amp capacity) triggered from the 'Fuel pump relay', pin on the main engine ECU. For MS97FF series ECU's this is pin 4.

5.3.2.4 It is not permissible to fit a crankshaft speed sensor.

5.3.2.5 The engine ECU and/or ignition amplifier may be exchanged, or electronically interrogated at any time (including the time allocated for practice) upon the request of a designated official from the organizing ASN.

5.3.2.6 The event scrutineer's reserve the right to require a competitor to carry a Ford supplied data logger on the car at any time during the event. The unit to be placed close to the existing diagnostic connector.

5.3.2.7 The Water temperature sensor may be positioned in the standard position relative to the cylinder head, or the standard position relative to the standard Thermostat housing (which must be retained, although with the option of an altered location:- Art 5.1 4.2)

5.3.2.8 For cars using the MS97FF 12A650 AA (or its current production derivative) ECU, both the Data logging and the Data over-write must be "Enabled" during competition, and the

logging rates must ensure that the scrutineer's can access data from the whole of the practice and race sessions. Unless officially requested by the series scrutineer the ECU must be set-up to record the following parameters, and associated maximum data logging rate.

At 10Hz Maximum. LR_RPM, LR_TPS, LR_MAF

At 1Hz Maximum. LR_VBAT, LR_ECT, LR_ACT,
LR_BAP, LR_ECUT, LR_HEGO.

5.3.2.9 A simple extension from the Ford diagnostic lead to a 5 Pin, 180° female DIN type connector may be added by the competitor. This new connector must be solidly attached to the chassis in the area of the drivers head and must be accessible without removing any object. The full length of the extension must be visible to the scrutineer.

5.3.2.10 Only side feed, single spray injectors can be used.

5.4 EXHAUST SYSTEM

5.4.1 The exhaust manifold may not be modified, other than for fitting air tight plugs into the 4 bosses used for pulse air on the production car, and minor rework for the fixation of the fabricated exhaust pipes to the cast manifold. This includes the addition of a screw thread in the manifold to allow the standard stud and spring assembly to be replaced by a solid bolted construction in the same position. For new exhaust manifolds bought from Ford it is permitted to weld in the missing separator that is not now supplied with the manifold. Only flat plates, as per original supply are allowed. The tubular exhaust pipes from the exhaust manifold to the catalyst may be reworked or replaced, Their lengths and internal diameters shall remain unaltered, as must the position of the exhaust gas sensor (Hego Sensor). The dimensions of the exhaust pipes are given in Appendix "E". The production catalyst must be retained and in working order at all times. After the catalyst, the exhaust system is free as regards length, but its diameter is controlled as per Appendix "E"

5.4.2 Immediately prior to, and after the catalyst, bosses must be fitted as detailed in Appendix "E", for the scrutineering of the catalyst. No rear catalyst testing boss is required if the Exhaust tail pipe length is less than 300mm.

5.4.3 Not have Exhaust Pipes extending more than 60cm beyond the rear wheel axis

5.4.4 At all times the car must conform with the noise requirements of the circuit, the series regulations, and any ASN specific vehicle regulations as regards position of the exhaust outlet. The exhaust must exit to the rear of the car. The complete exhaust system up to the end of the final pipe shall remain air tight at all times. The end of the exhaust pipe must be cut square to the pipe centre line.

5.4.5 The reason for Silencing (Noise Control) is not to inconvenience competitors, it is to reduce inconvenience to others and keep motor sport running. Noise and the Control of Pollution Acts have far reaching implications and sources of complaint can be subject to immediate suppression by Environmental Health Authorities. Motorsport Noise is not welcomed by many people and is often classified as unsociable. Our system of control is acceptable to most Environmental Bodies and must be considered as part of Eligibility to Compete in events. If specific sporting or technical regulations specify a MANDATORY SILENCER it must be used irrespective of the EXHAUST NOISE generated without it. A maximum noise level of **108 dB(A)**, measured at 0.5m from the tail pipe exit, and at 45° to the pipe centre line. The engine speed for measurement purposes will be 5100 rpm. The point at

which the sound measurement is taken shall be at a distance of 50cm from the exhaust pipe exit, at an angle of 45° to the centre -line of the pipe. The microphone shall be placed at a height of 0.5 ± 0.1 m above the ground.

5.5 CYLINDER BLOCK

5.5.1 It is permitted, as means of repair, to replace cylinder bores with cast iron cylinder liners, in standard material and to standard dimensions. The liners must remain dry liners. The centre line of the cylinder bores must remain within Ford production tolerance. No offsetting of the cylinder bores is allowed.

5.5.2 Localised machining of the cylinder block is permitted to allow fitting of the dry sump system.

5.5.3 The crankcase breather may be modified, including removal, as long as no air and/or oil escape from this area other than through pipe-work to a catch tank.

5.5.4 May be machined to maintain deck height.

5.5.5 Standard oil dipstick tube must be removed, and the hole sealed.

5.6 CYLINDER HEAD (INCLUDING VALVES AND VALVE GEAR)

5.6.1 It is permitted, as means of repair, to replace damaged valve guides and valve seats by replacement valve guides and valve seat inserts all to standard dimensions.

5.6.2 No work that removes, adds, replaces, or transfers material is allowed on the cylinder head with the following exceptions.

- Simple cleaning which does not alter in any way the shape of the component.
- Minimal material removal from the head face to correct combustion chamber volume and/or reclaim head flatness. No internal rework of any combustion chamber is permitted
- Fitting of replacement valve seat insert to a position that replicates the standard closed valve position.

5.6.3 The cam cover assembly cannot be modified or replaced, except a removable bracket can be added to facilitate the mounting of the Air Flow Sensor unit. The oil filler cap shall be permanently sealed by lock wire or similar.

5.6.4 All valve train components, other than simple shims under valve springs, may not be modified or replaced. The hydraulic tappets cannot be modified in any way. It is not permitted to "lock up" the hydraulics within the tappets.

5.6.5 Valves must remain standard, no reprofiling or polishing is permitted. The original 45° (90° included) seat angle must be maintained.

Distance apart at centres (inlet)	35.20 ± 0.5mm
Distance apart at centres (exhaust)	35.20 ± 0.5mm
Maximum face diameter (inlet)	32.13mm
Maximum face diameter (exhaust)	28.13mm
Overall length (inlet)	97.10 ± 0.5mm
Overall length (exhaust)	96.70 ± 0.5mm
Standard valve stem seals must be retained.	

5.6.6 Valve seat dimensions are shown in Appendix "E".

5.7 COMPRESSION RATIO

5.7 The maximum compression ratio will be controlled as follows:

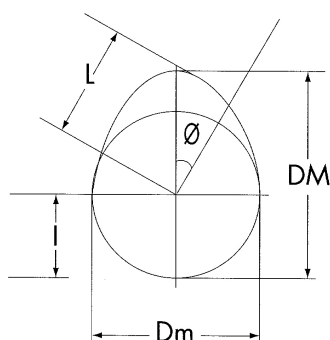
- Minimum combustion volume in the cylinder head (with the race spark plug fitted) = **42.4cc**.
- Standard Ford cylinder head gasket with a minimum compressed thickness of **1.54mm**, and a minimum diameter of cylinder aperture of **81.4mm**. The piston will protrude a maximum of **0.65mm** out of the cylinder block when the piston is at TDC. The cylinder block head face surface may be machined.

5.8 CAMSHAFT

5.8.1 The only permitted camshaft is the standard production camshaft (Part No's:- Inlet 928M 6A266 GK, or 958M 6A266 CA; & Exhaust 928M 6A269 GD, or 938M 6A269 CB - or subsequent production camshafts conforming to the Lift tables indicated below). The camshaft must remain entirely unmodified. It must be fully manufactured and ground by the Ford Motor Company. It is prohibited to grind from blanks, regrind or reprofile. Only the production surface finish is permitted. Shot peening, shot blasting or polishing are prohibited. The cam drive pulley may be keyed to the camshaft by woodruff key or dowel.

5.8.3 The cam profile is defined by determination of lift (L minus l) against a flat footed follower at various angles (θ). Standard Ford tolerances apply to camshaft drawing below.

5.8.4 The angular setting of the camshafts is free.



INTAKE CAM

	DM(max)	45.31mm	45.41mm	
	Dm	36.00mm	36.00mm	
	Primary		Secondary	
	Open	Close	Open	Close
Lift at 0°	9.31mm	9.31mm	9.41mm	9.41mm
Lift at 5°	9.22mm	9.22mm	9.32mm	9.32mm
Lift at 10°	8.94mm	8.94mm	9.05mm	9.05mm
Lift at 15°	8.48mm	8.48mm	8.61mm	8.61mm
Lift at 20°	7.85mm	7.85mm	7.99mm	7.99mm
Lift at 25°	7.05mm	7.06mm	7.22mm	7.23mm
Lift at 30°	6.11mm	6.12mm	6.30mm	6.31mm
Lift at 35°	5.06mm	5.07mm	5.26mm	5.27mm
Lift at 40°	3.95mm	3.98mm	4.16mm	4.18mm
Lift at 45°	2.85mm	2.88mm	3.06mm	3.08mm
Lift at 50°	1.75mm	1.79mm	1.95mm	1.99mm
Lift at 60°	0.17mm	0.22mm	0.24mm	0.29mm
Lift at 70°	0.00mm	0.04mm	0.01mm	0.05mm

EXHAUST CAM

	DM(max)	44.61mm	44.71mm	
	Dm	36.00mm	36.00mm	
	Primary		Secondary	
	Open	Close	Open	Close
Lift at 0°	8.61mm	8.61mm	8.70mm	8.70mm
Lift at 5°	8.52mm	8.52mm	8.62mm	8.62mm
Lift at 10°	8.26mm	8.26mm	8.36mm	8.36mm
Lift at 15°	7.83mm	7.83mm	7.95mm	7.95mm
Lift at 20°	7.25mm	7.25mm	7.37mm	7.37mm
Lift at 25°	6.51mm	6.51mm	6.65mm	6.66mm
Lift at 30°	5.65mm	5.65mm	5.81mm	5.82mm
Lift at 35°	4.67mm	4.68mm	4.85mm	4.86mm
Lift at 40°	3.62mm	3.64mm	3.81mm	3.83mm
Lift at 45°	2.52mm	2.55mm	2.72mm	2.75mm
Lift at 50°	1.46mm	1.50mm	1.65mm	1.69mm
Lift at 60°	0.16mm	0.21mm	0.22mm	0.27mm
Lift at 70°	0.11mm	0.06mm	0.02mm	0.07mm

5.9 PISTONS

5.9.1 Pistons must be standard production pistons (Part No. 928M 6110 EK or 958M 6110 EL or 23984 for reference only) unmodified in any way except for balancing as detailed.

5.9.2 All three piston rings must be fitted, piston rings must be standard production.

5.9.3 The combustion chamber face of the piston cannot be modified, other than a machining cut at 90° to the stroke in order to obtain correct piston to top of block dimensions. The minimum piston weight shall still be observed. The minimum weight of the connecting-rod and piston assembly shall be **1004gm**. (Complete piston with rings and pin, and connecting-rod with bolts but excluding crankshaft bearings). Area for balancing defined in Appendix "E".

5.9.4 The piston cooling oil squirt jets, and the oil feed lines to them, must be retained. It is permitted to strengthen the fixing of the nozzle to the body of the piston cooling jet provided the original function is maintained and unaltered.

5.10 CONNECTING RODS

5.10.1 Connecting rods must be standard (Ford Part No. 928M 6200 AIJ for reference). Machining is permitted to remove metal from the big-end cap to achieve balance only. (Area for balancing defined in Appendix "E"). Polishing is prohibited. The minimum weight of the connecting rod and piston assembly shall be **1004gm**. (Complete piston with rings and pin, and complete connecting-rod with bolts but excluding crankshaft bearings).

5.10.2 Connecting rod bolts are free subject to them remaining in ferrous material, and the minimum weights respected.

5.11 CRANKSHAFT

5.11.1 A standard crankshaft must be used. Spot machining (by radial drilling or milling) to achieve balance is permitted. (Area for balancing defined in Appendix "E"). Polishing is prohibited. Crankshaft minimum weight is **13.6Kg** (including gearbox spigot bearing). Crankshaft journals must remain within Ford positional tolerances if a repair regrind is carried out.

5.11.2 Crankshaft pulley and damper must be retained. Additional drives to oil pump, alternator etc. may use this pulley, or extra pulleys mounted in front of the crankshaft damper.

5.11.3 It is not permitted to alter the number of bearings or fit bearings of less than standard production width.

5.11.4 The crank journals may be reground for reclaim, as long as the minimum crank weight is respected. Standard oversize and undersize bearings are permitted.

5.11.5 A marker must be fitted which accurately aligns the crankshaft to the cylinder block at No.1 piston TDC. This marker must be visible and fully accessible to the scrutineer's without removing any component other than external body panels, and without removing the engine from the car.

5.12 FLYWHEEL AND CLUTCH

5.12.1 The flywheel assembly must be a standard component. The unit may be reduced in weight according to Drawing MS92FF 6K390 AB (Appendix "E"). No other machining is allowed. To achieve minimum weight and balance, material may be removed from the area indicated on the drawing. For rectification the clutch mating face may be resurfaced, provided the minimum weight is respected. It is permitted to use a similar pattern replacement clutch (i.e. conventional single diaphragm spring) and driven plate with shock absorber springs (four or more spring assemblies). Organic friction material only is permitted. It is permitted to alter the clutch spline to suit the gearbox. Racing clutches are prohibited. The position of the ignition timing mark on the flywheel relative to the crankshaft must remain within Ford design limits at all times. No part of these regulations allows this to be altered. Also the electronics regulations specifically ban any change that could in any way alter the ignition timing as defined by the standard calibration within the engine electronics.

5.12.2 Flywheel bolts must remain standard production components and locating dowels are permitted.

5.12.3 It is permitted to secure the starter ring to the flywheel.

5.12.4 It is permitted to fit an inertia or pre-engage starter motor ring gear to drawing No. MS92FF 6K390 AB. Flywheel minimum permitted weight = **7.25kg** [excluding all flywheel and crankshaft mounting bolts]. Flywheel and Clutch Cover minimum permitted weight = **11.3kg** (clutch cover bolts and dowel not included).

5.13 LUBRICATION SYSTEM

5.13.1 The lubrication system, external to the engine, is free. Existing standard production oil ways, linings or oil grooves may be enlarged, but no additional ones are permitted. Addition of material to facilitate an increase in oil way size is not permitted, with the exception that the oil lines to the standard oil pump may be modified by the addition of material to allow its use with the free concept dry sump system. Standard bearings (production or production reclaim sizes) must be retained and cannot be modified. Only bearings made specifically for the engine, and marketed by companies that supply Ford with original equipment bearings are allowed. Chamfering of the entry/exit holes of oil ways is permitted. Dry sump is permitted, oil coolers are free. No part of the free concept dry sump equipment may protrude inside the engine cylinder block. The standard production baffle (windage tray) may be modified, removed, or replaced by another. Any replaced baffle shall have no other function and be no larger than the replaced production part.

5.13.2 The internal engine pressure oil pump may be modified or removed. Removal of the following parts only is allowed:- Steel Oil pump cover, oil pump rotor assembly, the standard oil suction pipe and strainer, Oil pressure control valve, and the mounting flange for the standard oil suction pipe may also be removed, but only up to the body of the original oil pump. The front cover assembly, within which the oil pressure pump is housed, is not free. Other than adding any bosses for the dry sump oil system the external surface of the Front cover / Oil pump assembly, when viewed on an assembled engine, cannot be modified in any way.

5.13.3 No line containing lubricating oil may pass through the cockpit. All lubricating oil lines, which carry oil at a nominal working pressure of 1 bar or above, must have a minimum burst pressure of 70 bar (1,000psi) and a minimum operating temperature of 135°C (250°F). When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion). All other oil containing lines must be made from hose material and fittings that meet the minimum operating temperatures stated above, and have adequate burst strength.

5.14 COOLING SYSTEM

5.14.1 A water based liquid cooling system is mandatory. The standard production water pump must be retained, although through freedom on the drive to the pump, its rotational speed may be changed. The radiator and associated pipes are free. No other pump may be used to circulate or assist circulation of the coolant liquid.

5.14.2 The water thermostat housing must be retained and unmodified, except unused car heater connections must be blanked off. It may however be repositioned by the fitment of an extension pipe from the original cylinder head location to the revised location, subject to it remaining the highest part of the water system. The thermostat is free, If the thermostat is removed then the water re-circulation pipe should also be blanked off. However if one is fitted it must conform to the following:- The standard production thermostat, or another twin seat thermostat unit working in the same manner as the standard part, but which controls the hot engine water coolant temperature above 70° C only are permitted. The main water off take from the Thermostat housing is free, but must contain the bleed pipe and be interchangeable with the standard Ford part as regards attachment to the housing. The car water circulation concept must be retained, and NO water bypass pipes or air bleed pipes are allowed which interfere with the design principle of the production thermostat. See basic car race system in Appendix 'E'. It is strongly recommended that the thermostat is retained when racing in cool conditions.

5.14.3 The radiator, if housed in or incorporating a cool air scoop or deflector, must comply with bodywork regulations.

5.15 FUEL SYSTEM

5.15.1 Fuel Pressure: With an engine at correct operating temperature, and the engine idling, the pressure in the fuel rail shall be:

- i) With manifold vacuum applied to pressure regulator, fuel pressure = 2.1 bar \pm 0.2 bar
- ii) With the manifold vacuum pipe NOT connected to the pressure regulator, fuel pressure = 2.7 bar \pm 0.2 bar

5.16 ELECTRICAL

5.16.1 Sparking plugs are free, provided they fit the engine without any modification to the cylinder head or the sparking plug and that the sparking plugs place the spark gap in the same position as the production sparking plug within the combustion chamber.

5.16.2 The coil unit may be repositioned, but the existing HT leads to the sparking plugs must be retained without modification

5.16.3 It is prohibited to use any other method or component to trigger, distribute or time the ignition or injection.

5.16.4 It is permitted to mount a simple indicating pointer to the engine to facilitate engine timing and camshaft position.

5.16.5 A standard engine management wiring loom is mandatory. A Ford Motorsport loom made specifically for this formula would be defined as a standard engine management loom, but no rework is permitted, with the exception of replacing faulty connectors (like for like), and employing a replacement "Ford" extension to the crank position sensor should this part of the loom become damaged.

The 8 way electrical connector used to feed power and activate fuel pumps etc into the Ford supplied engine loom may be replaced by another proprietary electrical connector. (A 6 way connector is acceptable if Pin number 7, the Spare analogue input, is not required). Connectors must be low cost components.

If this is used then the length of the existing Ford lead must only be reduced by the absolute minimum. High specification Military connectors are not allowed. Also the following wiring detail is advised.

Pin	Designation	Wire Colour	Wire Size mm
1	Coil Power	Black	1.5
2	Lambda Heater power	Black / Red	1.5
3	Power	Black / Green	1.5
4	Ground	Brown	1.5
5	Tachometer	Green	0.75
6	Fuel Pump Relay	Blue / Green	0.75
7	Spare Analogue Input	Blue / Yellow	0.75

5.16.6 A 12 Volt (nominal) alternator must be fitted. The alternator may be driven from either the engine or transmission. The minimum output of the alternator shall be **240 Watts**, and the installation shall ensure that this output is available at all times whilst the car is circulating on the race track. Only high volume automotive alternators may be used.

5.17 ENGINE COVERS

5.17 The cam belt cover cannot be modified or deleted, except to allow the passage of a support, in which case the gap between the cover and the support shall not exceed 5mm.

6 SUSPENSION

6.1 Be fitted with Sprung Suspension between the wheels and the chassis. Suspension must be controlled to avoid fouling of wheels on chassis or bodywork. The springing median must not consist solely of bolts located through flexible bushes or mountings

6.2 The following parts must be of Steel or other Ferrous material; wishbones, and push / pull rods. All other suspension

members must be made from a homogeneous metallic material with no composite materials allowed. It is permitted to incorporate suspension mounting points on the engine and transmission assembly. In excess of 80% of the static sprung weight of the car must be supported through springs made predominately of Ferrous material.

6.2.1 In order to prevent intrusion of suspension parts into the chassis cell during a side impact, each member of every front suspension component with two inboard mountings must be joined by a link as close to the chassis cell as practical. The anti-intrusion bars must have a minimum outside diameter of 11mm, and a wall thickness of 1mm. Any slip joints in their construction must be effectively locked during competition.

6.2.2 Active suspensions are prohibited, as is any system that allows control of the flexibility of the suspension springs, shock absorption and trim height when the car is moving.

6.2.3 Anti-roll bars for front and/or rear suspension may be capable of manual, mechanical adjustment by the driver when seated in the car.

6.2.4 Chromium plating of any steel suspension components is forbidden

6.2.5 There must be movement of the wheels to give suspension travel in excess of any flexibility in the attachments.

6.2.6 It is not permitted to construct any suspension member in the form of an aerofoil or to incorporate a spoiler in the construction of any suspension member. A symmetrical oval tube is not considered an aerofoil. The push/pull rod from the wheel uprights to the damper mechanism may use a modified oval tube, but the bottom surface must be a mirror image of the top surface, and the long axis must be parallel to the ground.

7. BRAKES

7.1 Be fitted with brakes that are operative and capable of stopping the vehicle as required. Only brake discs made predominantly from Ferrous material are permitted. Calipers may be ferrous or aluminium alloy castings with a maximum of two working cylinders per caliper. Brake pad materials, including carbon metallic are free

7.2 Be equipped with two independent brake circuits, so that, in event of failure of one system, braking is maintained on at least two wheels. Vehicles must have brakes on all wheels.

7.3 Not to be fitted with an Anti-Lock braking system

7.4 Brake cooling ducts are not permitted.

8. SHOCK ABSORBERS

8.1 The shock absorber casing is free. They can be ferrous or light alloy units and separate reservoirs for fluid and/or gas are permitted. The shock absorber casing is defined as the item which contains the piston, fluid/gas, and moving parts which control the damping action. Any form of active damping is prohibited. Any method of altering the damper performance by the driver whilst seated in the car is prohibited

9. STEERING

9.1 The steering must consist of a mechanical link between the driver and the wheels. Rear wheel steering prohibited, otherwise free

9.2 Have a Steering Wheel, with a continuous rim. No reflex curves are permitted in the basic shape of the outer rim of the steering wheel.

9.3 Have Steering Movement controlled to avoid fouling of wheels on chassis or bodywork

10. WHEELS & TYRES

10.1.1 13 inch diameter wheels with a maximum rim width of 6 inch for the front and 7 inch for the rear are the only wheels permitted. The material of the complete wheel assembly (Rim and mounting flange) shall be ferrous material or aluminium alloy. Magnesium alloy is not permitted. All road wheels, steel or aluminium (one or three piece) must be of substantial construction, and the decision of the event scrutineer as to their suitability will be final. All wheels must be retained onto the hub by a minimum of four equally spaced stud and nut (or bolt) fixing.

10.1.2 No pressure limiting device of any kind is allowed in the wheel/tyre assembly.

10.2 The only tyres permitted are those listed in Appendix 'D'. NB. The Slick and Wet tyres detailed in Appendix 'D' are the ONLY tyres that are permitted on these wheels. See Sporting Regulations for the number of tyres permitted per event

10.2.1 It is not permitted to pre-heat the tyres by any means. This includes tyre warmers; hot soak cabinets etc. It is not permitted to chemically change the composition of the tyre material from the 'as sold' condition.

10.3 Not be fitted with any Wheel Spacer exceeding 2.5cm in thickness or of less than hub diameter. Multiple or laminated spacers prohibited.

10.3.1 Have all Hub Nave Plates and Wheel Embellishers removed.

10.4 Have all Nuts securing Road Wheels of steel and in thread contact over a minimum length of 1.5x bolt/stud diameters. Extended or composite wheel bolts/studs are prohibited.

11. TRANSMISSION

11.1 The gearbox must contain not more than four forward gears and include an operable reverse gear, capable of being engaged by the driver whilst normally seated. The ratios are free.

11.2 Rear wheel drive only is permitted.

11.3 Final drive ratio is free.

11.4 Torque biasing, limited slip and locked differentials are prohibited. Non ferrous differential components prohibited, with the exception that unmodified OEM supplied, non ferrous, bearings are permitted provided that, at any temperature, they do not provide any form of Torque biasing etc.

11.5 Gear change must be manual in operation, and no signal transmitted to, or connection may be made in any form between the gearbox, or any part of the gearchange system, and any

part of the engine or engine control systems (mechanical, electrical, or electronic)

11.6 i) The only position for the main gear cluster will be wholly behind the rear axle output shaft center line, and in line with the crankshaft centre line. Transverse, vertical, or other non in-line configuration are not permitted.

ii) A gearbox change mechanism that only allows sequential selection of the gears is not permitted.

12. FUEL SYSTEM

12.1 Tanks outside the chassis frame must comply with FIA. - FT3 as a minimum specification.

12.1.2 Inboard tanks, covered externally with a fireproof coating, are acceptable for events of less than 70km.

12.1.3 Protection must at all times comply with Art 4. A metal tank coated with GRP does not comply.

12.1.4 Maximum capacity 41 litres unless carried in FIA. -FT3 as a minimum specification.

12.1.5 No fuel can be used which exceeds BS En 228: (Unleaded) or equivalent National specification when the event is held in that specific country. Event regulations are allowed to specify a single source fuel that meets the minimum standard of BS En 228, but does not exceed it. N.B. This is 95 Octane Unleaded and not Super Unleaded.

12.1.6 At the end of practice and the race at least 3 litres of fuel from the tank of the competing car must be available to the scrutineers for analysis. Compliance with minimum weight for the car will be taken before the fuel is removed.

12.1.7 For cars built after 1.1.2003; FIA - FT3 fuel tanks are mandatory.

12.2 Use Pump Fuel only, or as expressly defined in Sporting regulations (see definition)

12.3 Be equipped with an effective method of stopping Fuel Supply operable by the driver when normally seated.

12.4 Safety Fuel Cells. The FIA approved standard for Safety Fuel Cells is FIA Spec. FT3. These fuel cells are only manufactured by authorised companies and bear the name of the company, specification, code and date of manufacture stenciled on each cell. No other cells are approved. Cells of over five years old are deemed obsolete.

12.5 A high pressure fuel pump and fuel filter assembly (maximum volume 0.5 litre) must be mounted within the area defined by the chassis rails and not directly in the cockpit area. The maximum capacity of the fuel pump shall be 120 litres/hr. at a pressure of 3.1 bar.

12.6 It is permitted to fit a low pressure fuel pump and fuel collector (maximum volume 1 litre) prior to the high pressure fuel pump. This must be mounted within the area defined by the chassis rails and not directly in the cockpit area.

12.7 All lines containing petroleum spirit must be fitted in such a way that any leakage cannot result in the accumulation of fluid in the cockpit. When flexible, all lines must have threaded connectors and an outer braid that is resistant to abrasion and flame. All fuel lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135 degrees centigrade. To facilitate the repeated fitting of screwed connectors for the aluminium fuel rail it will be permitted to have

short adaptor hoses (to the same specification) between the engine and chassis system. The production fuel pressure measuring valve must be retained. Fuel cooling radiators are permitted, within safety regulations, but must be mounted within the main chassis frame. Fuel cooling may only employ air at ambient temperature as the cooling medium, and fan assistance is not allowed

12.8 Tank Fillers, Vents, and Caps: Tank fillers and caps must not protrude beyond the bodywork or be situated within the driver/passenger compartment. The caps must have an efficient locking action to reduce the risk of opening during an accident and ensure closing after refueling. Air vents must be at least 25cm to the rear of the cockpit.

13. STARTING / BATTERY

13.1 Compulsory electric starter with electrical source of energy carried on board the car, and able to be controlled by the driver when normally in their seat.

13.1.2 A supplementary external source of energy temporarily connected to the car may be used to start the engine whilst in the pit area, but cannot be used whilst checking. Art. 13.3

13.2 Have any wet Batteries in driver's compartment enclosed in a securely located leak-proof container. Have all Batteries duly protected to exclude leakage of acid and to protect all terminals from short circuiting and producing sparks. Have the Battery Earth Lead, if not readily distinguishable, identified by a yellow marking.

13.3 The battery must be capable of demonstrating at least 5 engine starts without external recharge, or assistance, at any time during practice, the race, or in Parc-Ferme.

14. WEIGHT

14.1 Minimum weight of car, at any time during the competition = **450Kg**

Minimum weight of car plus driver, at any time during the competition = **525Kg**

15. ENGINE SEALING

15.1 A hole must be available in the bell housing to allow the clutch to be sealed to the flywheel without removal of the engine from the car

15.2 Tamper proof paint seals will be used for all cases when sealing of any component is required, unless specifically notified in the Sporting regulations for that championship. In this case only, all engines should have provision for scrutineer's wire seals. 1/16 inch diameter holes pre-drilled in readily accessible locations on installed engines must be available. Failure to comply renders the entrant liable to a fine.

a) Sump - two holes through the cylinder block/ sump joint flange, one either side of the engine.

b) Cam Cover - at least two retaining screw heads must be cross drilled.

c) Inlet Manifold - at least two retaining bolt heads to the cylinder head must be cross drilled.

d) The inlet tract complete, and the throttle body and air restrictor must be so arranged as to permit sealing by wire. The exhaust manifold and exhaust pipe containing the catalyst must be capable of sealing with wire seals.

15.3 Scrutineer's are empowered to undertake any form of verification procedure necessary and may order the removal of

parts from the car, incurred costs to be borne by the competitor. The right is reserved for a competitor's vehicle to be sealed for later inspection and to be removed to a Ford nominated location for examination. The competitor, or his agent, will be invited to witness this inspection and will be required to provide all the labour required to perform the vehicle or component strip. The scrutineer's job is to observe and report; it is the entrant's responsibility to present any component requested by the scrutineer for inspection.

16. MISCELLANEOUS

16.1 Use of titanium, high strength composites, and similar materials is prohibited.

16.1.2 Electronic dashboards and data logging equipment are allowed subject to them having no influence whatsoever on the behaviour of the car during competition. All information obtained from any data logging or storage equipment shall be made freely available to the Scrutineer on request.

16.1.3 Competitors are reminded that only modifications or additions specifically covered by these regulations are permitted. Engine components not covered by these regulations must remain completely standard and unmodified. In cases of dispute on engines, reference will be made to Ford Motor Company Limited drawings.

16.2 Be of Sound Construction and Mechanical Condition and be well maintained.

16.3 Have positive Fastenings for all hinged or detachable parts of the bodywork.

16.4 Have no Temporary Parts incorporated in their construction.

16.5 Be prohibited from carrying Cameras unless authorised by the Chief Scrutineer and Event Organiser.

16.6 Not have Skirts, bridging devices or any form of aerodynamic device between the chassis and the ground/track. Any specific part of the car influencing its aerodynamic performance must:

- i) comply with rules relating to coachwork.
- ii) be rigidly secured to the entirely sprung part of the vehicle.
- iii) remain immobile in relation to the vehicle.

16.7 Not carry or pass any liquids in or through any tubes comprising part of the chassis structure, or safety roll-over bar.

16.8 Be presented at Scrutineering with all Steering Mechanism, Suspension Linkages and Flexible Brake Lines in clean condition.

Appendix A

DEFINITIONS AND SPECIAL EQUIPMENT

DEFINITION.

1) Ground Clearance

The clearance between the ground and the lowest part of the bodywork, and/or of the suspended part of the car, in normal trim with the driver aboard.

2) Pump Fuel

Fuel conforming to BS EN 228; or equivalent specification for fuel of the country authorising the competition.

3) Minimum weight

The Minimum weight must be the weight of the car in the condition in which it crosses the finishing line, or at any time during the competition and/or practice. The Minimum car plus driver weight, will include the driver dressed for the competition with all required personnel safety items.

4) Date of car build

Cars built before 1 Jan xxxx (or 1.1.xx) is interpreted to indicate cars built for the season indicated as shown by the year code. Consequently cars built to the new or revised specification, but finished before that date will still be defined as new season cars.

5) LED Rain light

A LED Rain light must conform to the following as a minimum Minimum number of LED lights = 24, of which at least 85% must be in working order at the start of any competition. The light must show visually continuous illumination when alive. The light must be visible up to 15 degrees from the car centre line.

6) Data logging

The ECU must be setup to record the following parameters, and associated maximum data logging rate, to enable efficient scrutineering of the cars at all events.

At 10Hz Maximum. LR_RPM, LR_TPS, LR_MAF

At 1Hz Maximum. LR_VBAT, LR_ECT, LR_ACT, LR_BAP, LR_ECUT, LR_HEGO.

Special Tools

1) Vacuum tightness control of the exhaust system: The control equipment is the same as that used for F3 intake control. The control apparatus described hereafter represents the ultimate method of verification of the vacuum tightness of the exhaust system, without the possibility of appeal. All event organiser's will have to put such an apparatus at the disposal of the scrutineer's for verification purposes, both before and after the race. The apparatus aims to create artificially a vacuum in the exhaust system and includes: A membrane suction pump, with a nominal output of 25 to 28 litres/minute, and capable of obtaining a vacuum of 55 to 65cm/ Hg for zero A rubber tubular stop, adjustable to seal onto the exhaust pipe. A vacuum gauge connected to the piping between the interior of the exhaust pipe and the pump. The procedure to be respected for the checking is the following:

- i) Rotate the engine into such a position that, in each cylinder, at least one of the valves is closed.
- ii) Check on the vacuum gauge that the suction pump creates in the exhaust system a depression superior or equal to 1 5cm Hg. If one or several valves have been damaged during the event, the entrant may repair them under the Scrutineer's control before undergoing the testing procedure. In this last case, the minimum vacuum to be obtained shall be 20cm Hg instead of 1 5cm Hg. HC and CO sampling of the exhaust gas using a commercially available instrument is permitted to check the function of the catalyst. Maximum CO level = 1% and maximum HC level of 3%, measured with the catalyst at working temperature. Additionally the exhaust pipe immediately prior to and following the catalyst must be fitted with an exhaust gas sampling union. See Appendix 'E' for details of union.

2) Noise measuring equipment

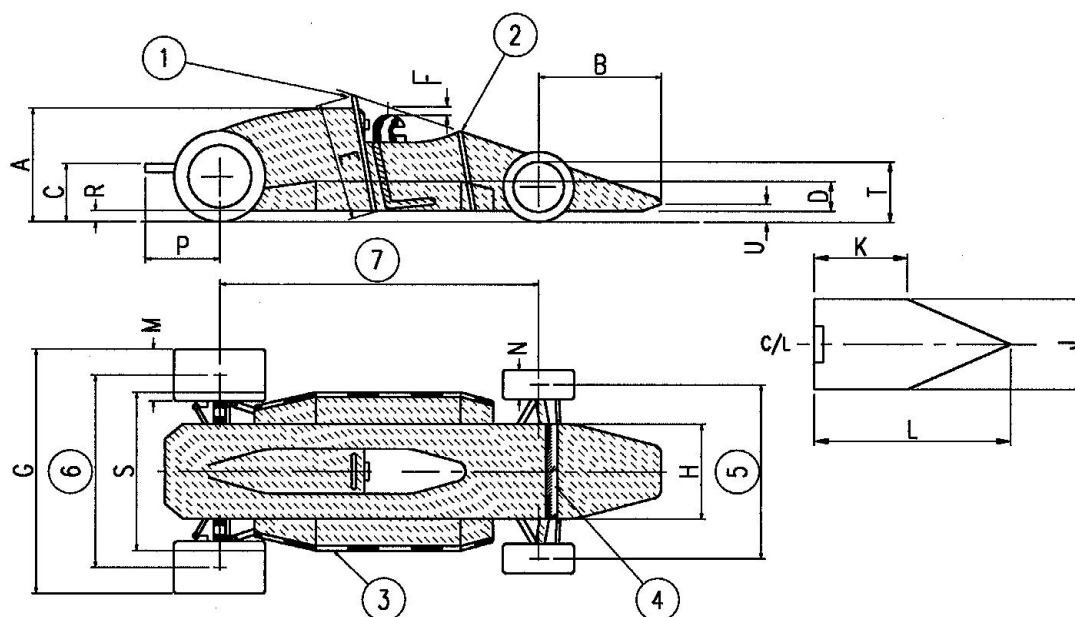
- a) A high quality sound meter shall be used. The measurements shall be taken using an averaging system and a time constant, conforming respectively to curve A and to the fast response' time as described in publication 179 11965) ~precision sound meter' of the International Electro-technical commission (IEC) concerning the characteristics of instruments for measuring sound levels. The instrument shall be calibrated frequently, if possible, before each measuring session. The engine will be at operating temperature for the measurement.
- b) Interpretation of the results The measurement shall be considered as valid if the difference between two consecutive measurements does not exceed 2dB(A) The value to be retained shall be the one corresponding to the higher sound level. Should this value exceed the maximum authorised level by more than 1 dB(A), a second series of measurements shall be conducted. Three of the four results thus obtained must be within the prescribed limits. To take into account the inaccuracy of the measuring instrument, the values read on the instrument during the measurement must be reduced by one dB(A).

3) Fuel testing

For events that specify a single source fuel, an industry recognised fuel comparison testing machine is authorised. In this case, and on condition that the test is conducted by a qualified technician to the manufacturers instructions, then this test procedure will become the definitive test of compliance for that event.

Appendix B

Table of Single Seater dimensions



- | | |
|---------------------------------|----------------------------------|
| 1. Safety roll over bar | 2. Substantial support structure |
| 3. Lateral Protection structure | 4. Substantial structure |
| 5. Front track | 6. Rear track |
| 7. Wheelbase | |

Notes

Maximum height is measured with the driver aboard.

Maximum height excludes safety roll-over bar on which there is no maximum height.

Single seater dimensions – refer to drawing

(A)	Maximum body height measured from ground	90
(B)	Maximum front overhang from front wheel axis	100
(C)	Exhaust height measured from the ground	60 Max
(D)	Minimum height of Lateral Protection Structure	15
(E)	Minimum safety roll-over bar length in line with drivers spine	92
(F)	Minimum allowed helmet clearance	5
(G)	Maximum width	185
(H)	Maximum body width behind front wheels	95
(J)	Minimum cockpit opening	45
(K)	Minimum cockpit parallel opening length	30
(L)	Minimum cockpit overall opening length	60
(M)	Maximum rear wheel width	7 inch
(N)	Maximum front wheel width	6 inch
(P)	Maximum exhaust length from rear wheel axis	60
(R)	Minimum ground clearance	4
(S)	Maximum width including lateral protection structure	130
(T)	The maximum height of any part wider than 110cm ahead of the front wheels is not to exceed the front rim height	
(U)	Maximum height of nose (see Art 4.13 for implementation date)	20
	Minimum wheelbase	200
	Minimum track	120
	Wheel diameters	13 inch

ALL dimensions in **cm** unless specifically stated

Appendix C

STABILITY EXCEPTIONS FOR 2005

5. ENGINE

The size of the air restrictor used on the 1800cc, 16V engine is subject to change following written notice displayed at a championship meeting at 6 weeks plus 2 days notice.

5.1 Ford reserve the right to impose cost restraint on free concept connecting rod bolts used.

6. SUSPENSION

Ford reserves the right to impose wheel retention straps, or other safety feature, to prevent the separation of the wheel/suspension units from the chassis in the event of an accident.

We strongly recommend that new car design incorporates wheel retention straps, as defined by the FIA for F3 usage.

10. WHEELS

Ford reserves the right to impose a minimum wheel/tyre weight.

Proposal for 2006

Art. 2.6 Specify dimensions and materials for a side head restraint feature. The present FIA, F3 rule is a possibility.

2.6.2 Headrest :

All cars must be equipped with headrests made from a material specified by the MSA / FIA.

The headrests must consist of one at least 75mm thick over an area of 40000mm² behind the driver's helmet and one at least 75mm thick over an area of 40000mm² along each side of the driver's helmet.

The headrests must be so installed that if movement of the driver's head was to fully compress the foam at any point over their area, his helmet would not make contact with any structural part of the car.

They must be so positioned as to be the first point of contact for the driver's helmet in the event of an impact projecting his head backwards or sideways when he is seated normally.

Appendix D

TYRES

The only approved tyres for Formula Ford cars are:

Dunlop

	Pattern	Size	Specification N°
Front Tyre	Slick	160/535R13	S09-392
Rear Tyre	Slick	170/575R13	S09-392
Front Tyre	Wet	160/535R13	S09W-226 CR9000
Rear Tyre	Wet	170/575R13	S09W-226 CR9000

The specification number will be moulded on one sidewall of the tyre, as will a unique serial number for that tyre. No mechanical (other than rubber removal by normal wear), heat or chemical treatments are permitted to the "as sold" tyres.

Tyres Supplied by:
Dunlop Motorsport Europe,
Fort Dunlop,
Birmingham,
B24 9QT
England.

Tel: 0044 (0) 121 306 6000

Fax: 0044 (0) 121 306 7000

Teams Contact:

Paul Dyas

Mr Tyre (Motorsport) Ltd

Unit B, 33 Pitsford Street,

Hockley,

Birmingham,

B18 6LJ.

Tel: 0121 551 2131

Fax: 0121 551 2133

Mob: 07713 684194

E-mail: paul@mrtymotorsport.co.uk

See sporting regulations for the number of tyres that can be used at any race meeting

OR

Cooper Tire (Avon)

With reference

	Size	Specification N°
Front Tyre	Slick	6.0/21.0-13 8810
Rear Tyre	Slick	7.0/22.0-13 8811
Front Tyre	Wet	6.0/21.0-13 7414
Rear Tyre	Wet	7.0/22.0-13 7415

NB. The Slick and Wet tyres are unchanged from 1999.

The specification number will be moulded on one sidewall of the tyre, as will a unique serial number for that tyre. No mechanical (other than rubber removal by normal wear), heat or chemical treatments are permitted to the "as sold" tyres (See also sporting regulations 1.11.1)

Supplied by

Avon Tyres Motorsport

Cooper - Avon Tyres Ltd;

Bath Road;

Melksham;

Wiltshire;

SN12 8AA;

U.K.

Tel: 0044 (0) 1225 703101

Fax: 0044 (0) 1225 707443

Enquiries:

Sales

Brian Davies

Trevor Swettenham

Technical

Paul Coates

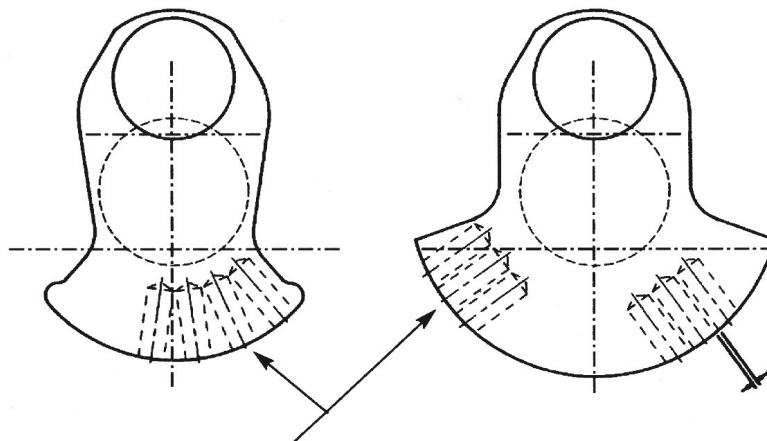
See sporting regulations for the make, type and number of tyres that can be used at any race meeting.

Appendix E

Revised drawings on the following pages for:

- | | | |
|--|------------------------------------|----------------------------|
| 1. Crank balance | 2. Rod balance | 3. Piston balance |
| 4. Flywheel weight reduction and balance | 5. Valve seat rework | 6. Air restrictor position |
| 7. Water cooling system layout | 8. Exhaust system basic dimensions | |

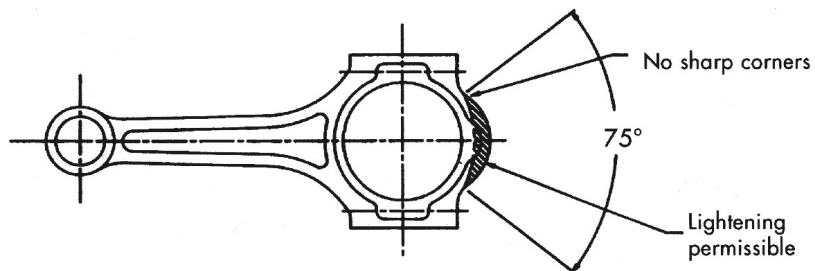
1. Crank balance



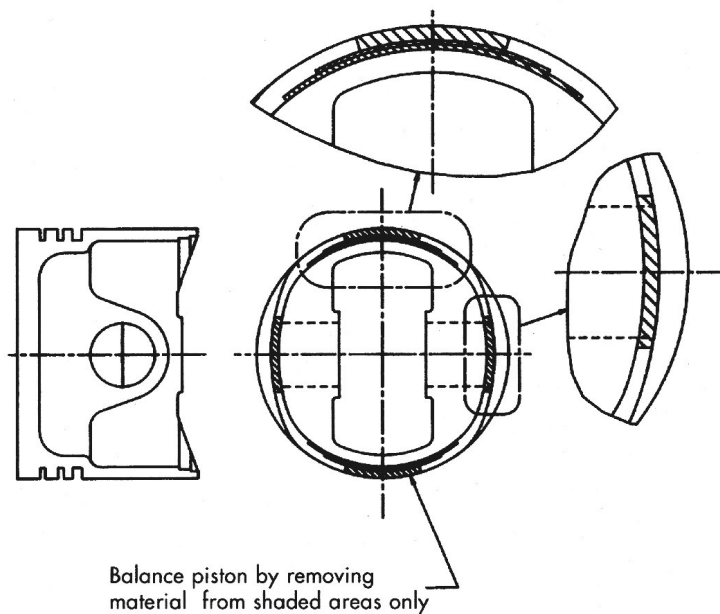
Lightening and balancing holes permissible in all webs 30 max depth. Radially machined. Must not break through.

Minimum weight of crankshaft must be respected. Excessive drilling will be deemed to be lightening.

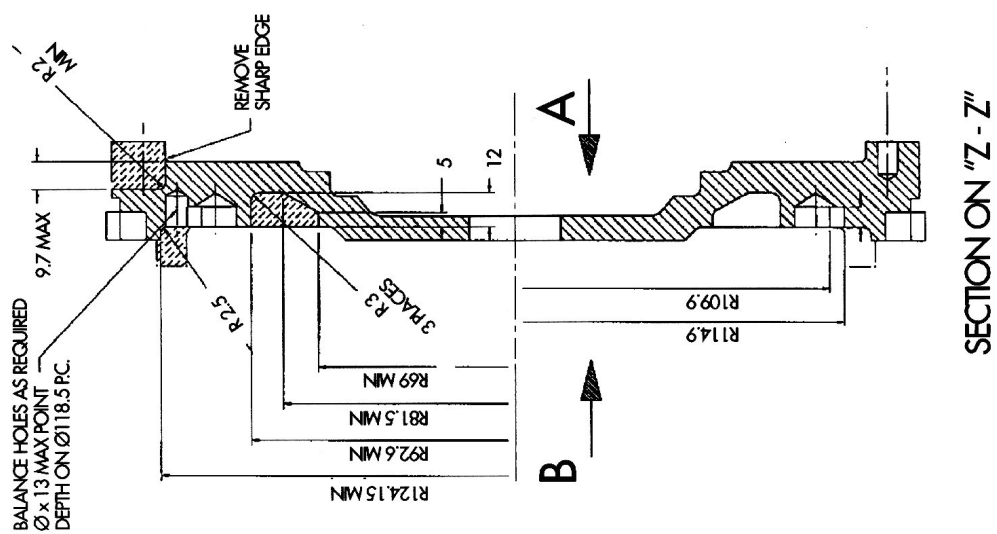
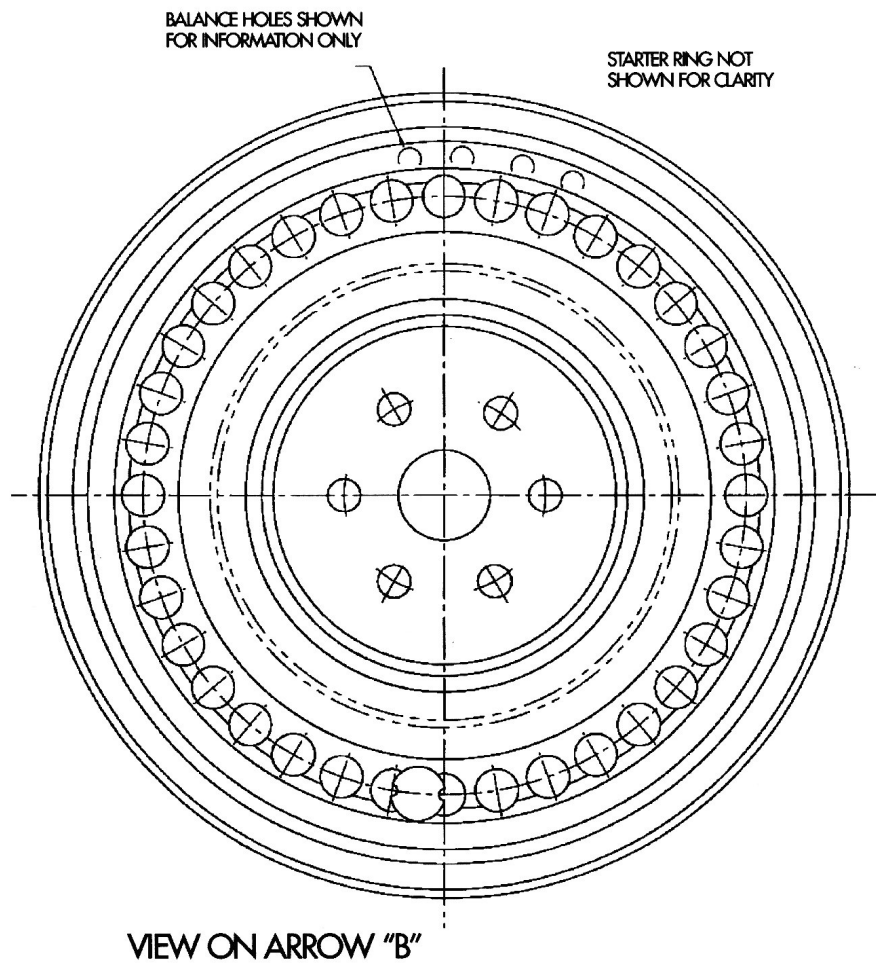
2. Rod balance



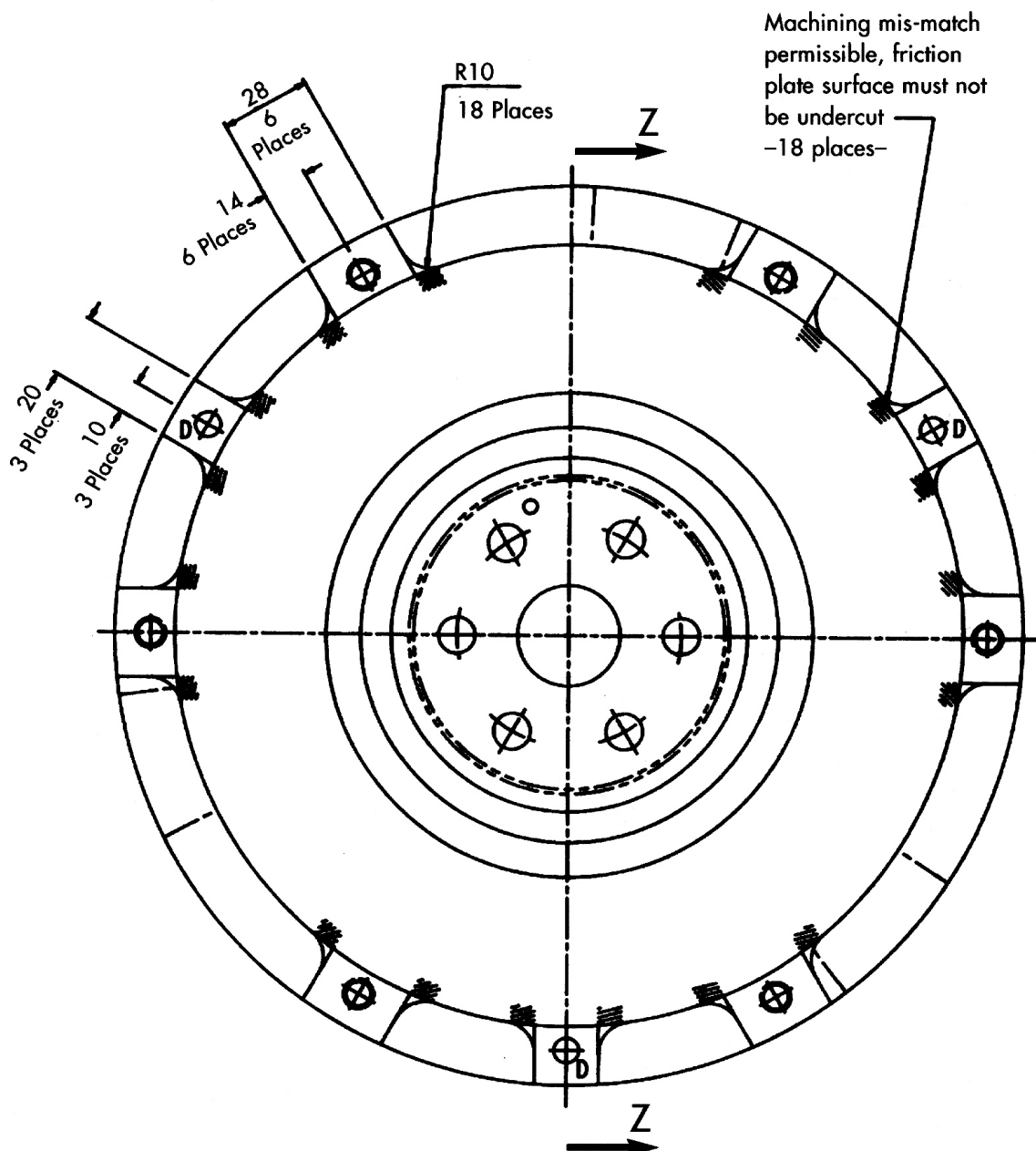
3. Piston balance



4. Flywheel weight reduction and balance



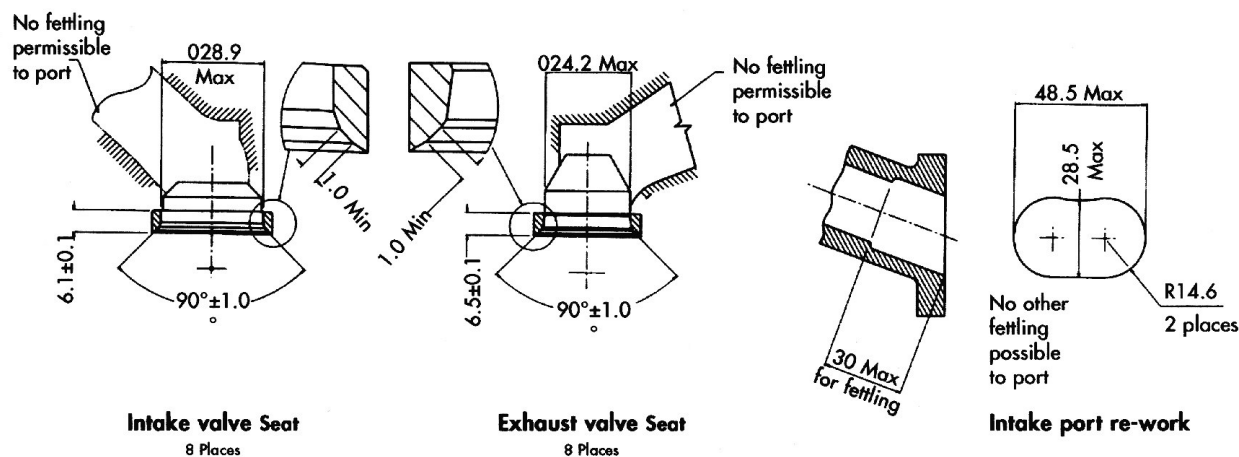
4. Flywheel weight reduction and balance



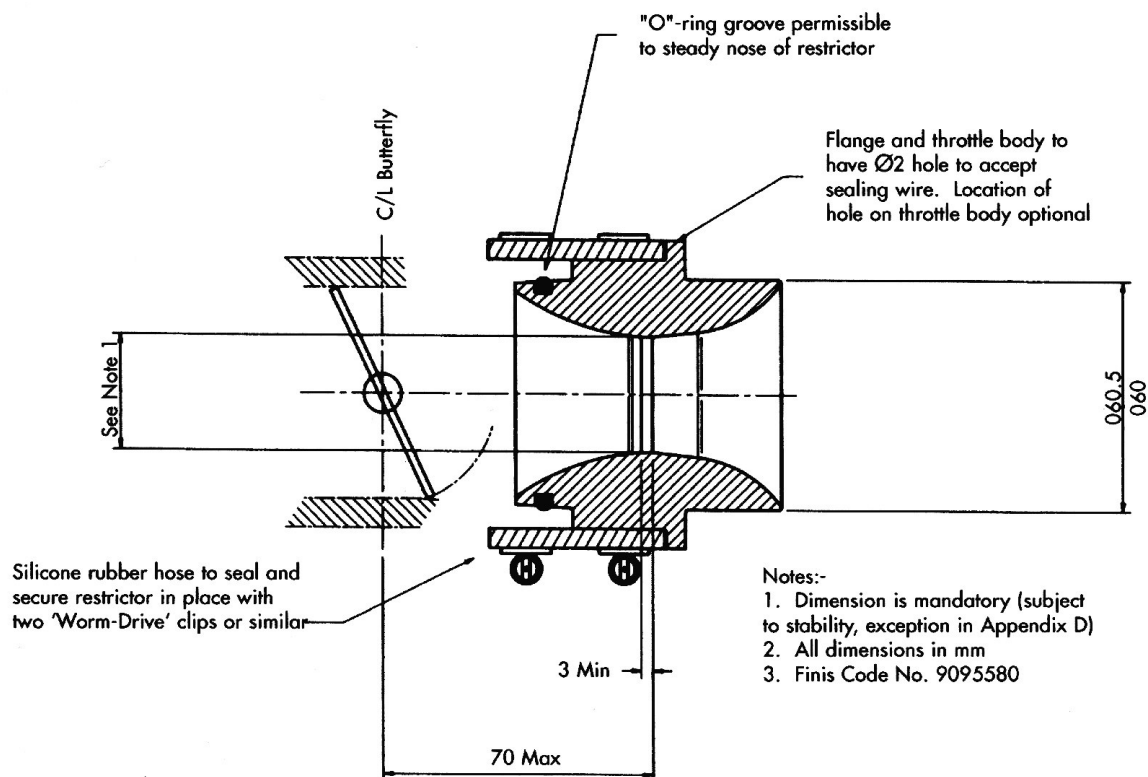
5. Valve seat and cylinder head port rework

All valve seat dimensions to be as production.

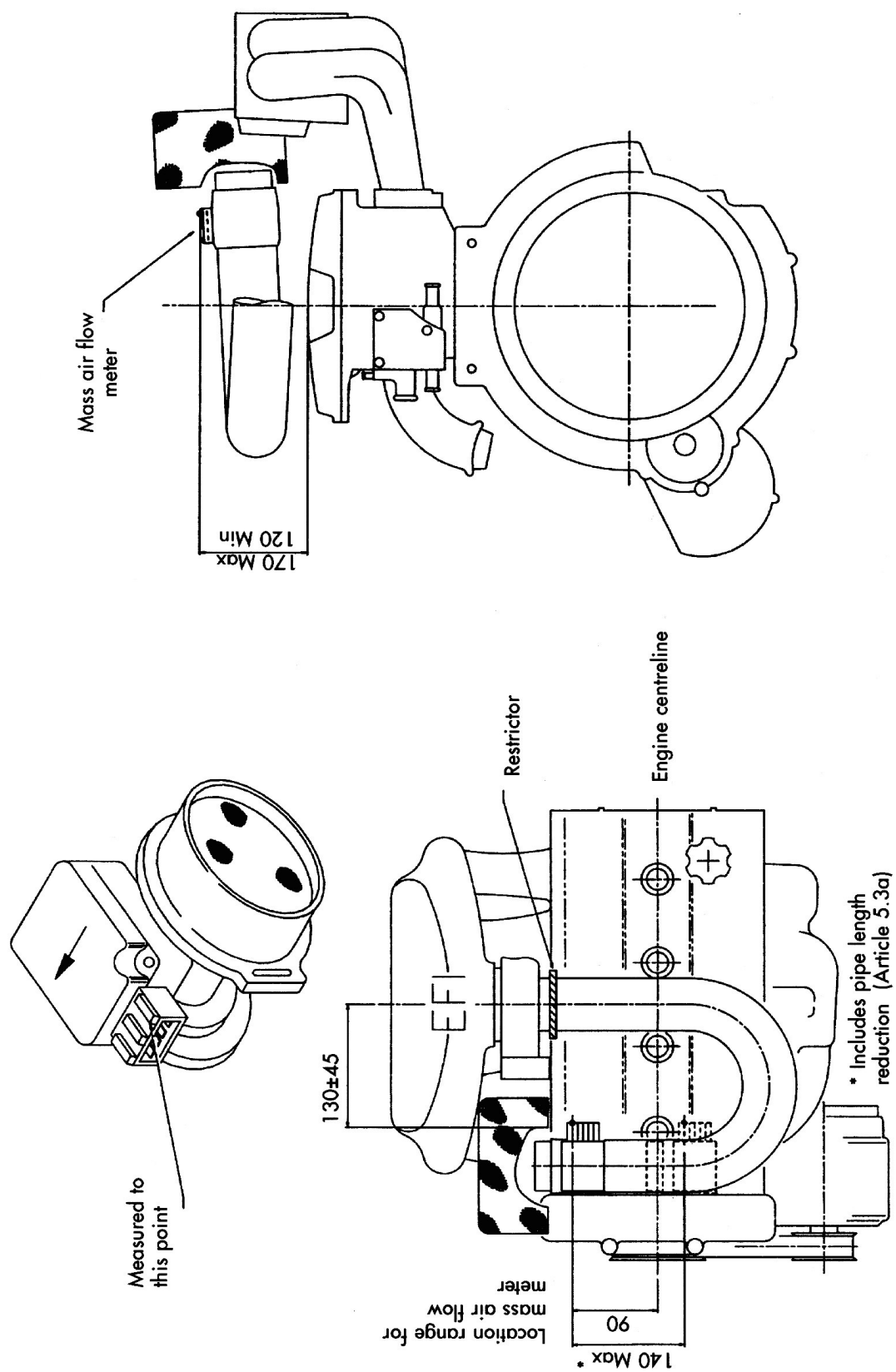
Quoted dimensions are for **valve seat inserts only**, and do not allow other rework of the ports.



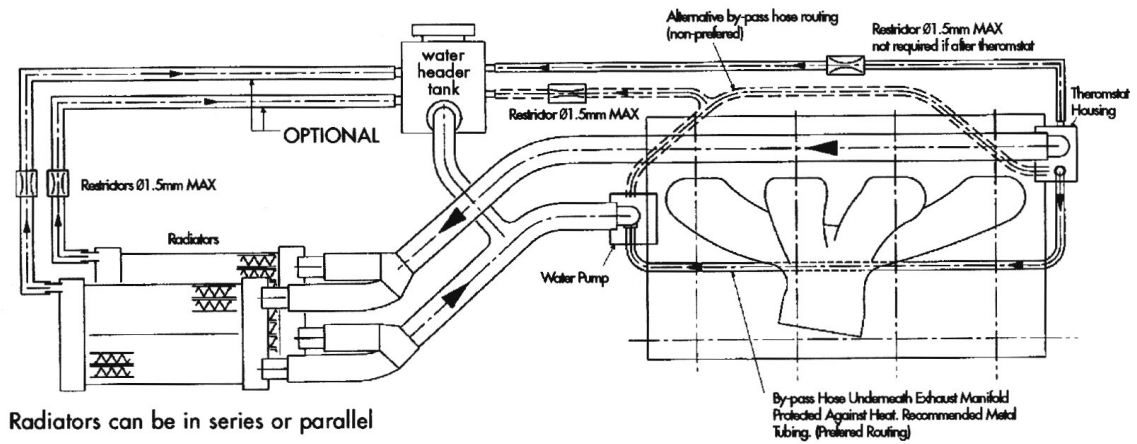
6. Air restrictor position



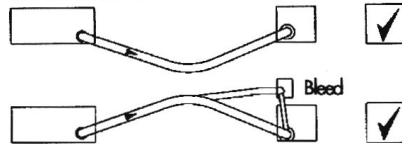
6. Air restrictor position



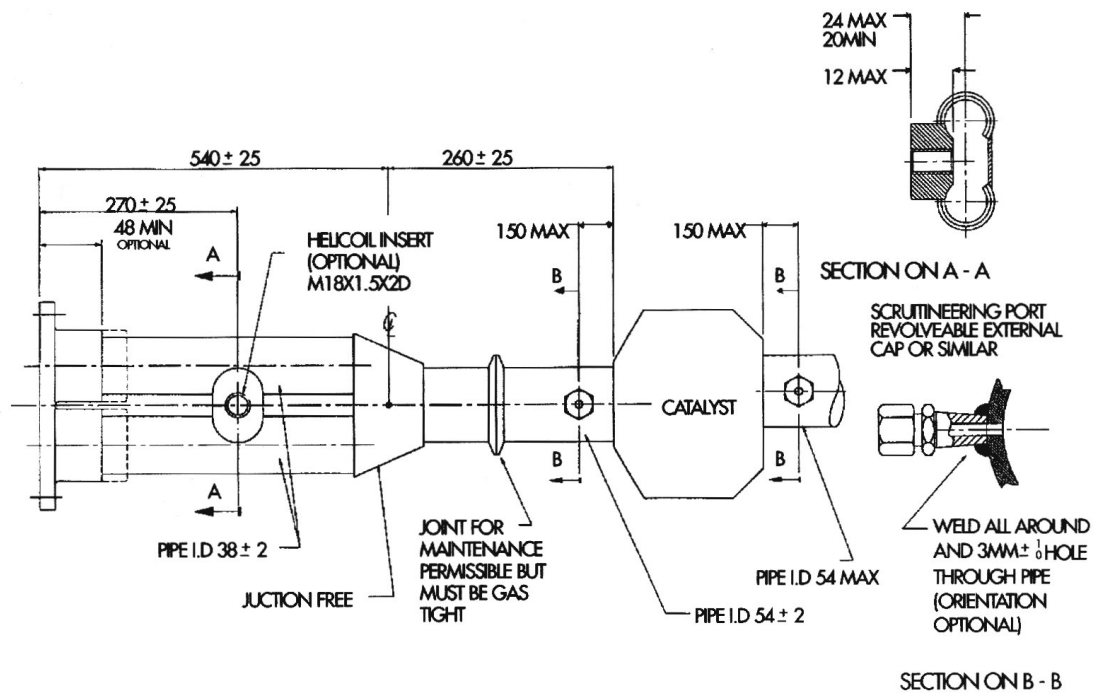
7. Recommended water cooling system



Good Practice



8. Exhaust system basic dimensions



APPENDIX F

This appendix is for **information only** and does not form part of the regulations. However, it is available to the scrutineer as guidance to normal dealer rework procedures.

General Engine Details

Engine – General		1.8 litre DOHC 16V
Emission standard		83 US
Identification code		RQB/RQC
Firing order		1 3 4 2
Bore		80.6mm
Stroke		88.0mm
Cubic capacity effective		1796cc
Compression ratio		10:1
Max. engine speed		continuous 5950 rev/min intermittent 6175 rev/min
Power output (DIN)		96 kw 130(PS) at 6250 rev/min
Torque (DIN)		162Nm 4500 rev/min

Engine Identification Code/Engine serial Number

Key to engine code:

1st code letter:	cubic capacity	R = 1.8 litres	
2nd code letter:	power output	D = 77 kW/105 PS at 5500 rev/min	Q=96kW/130PS
3rd code letter:	model and emission standard	A = Escort/Orion, 83 US (77 kW/105 PS)	

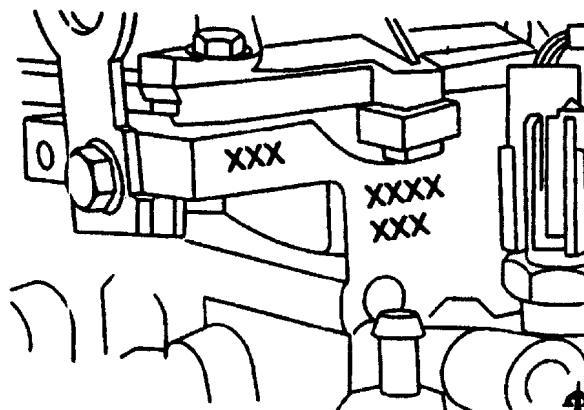
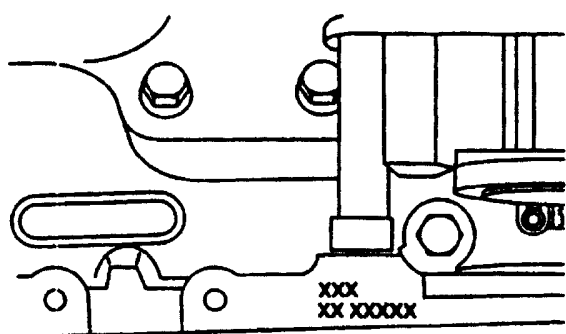


Fig A. Engine code/serial number, on exhaust manifold side near pulse air system filter housing

Crankshaft

Main bearing clearances	0.011 - 0.058mm
End float	0.090 - 0.260mm

Camshaft

Number of camshaft bearings	5
Drive	by means of toothed belt
Camshaft end float	0.080 - 0.220mm
Bearing clearances	0.020 - 0.070mm

Coolant

Type	Motorcraft Super Plus 4 anti-freeze
Specification	ESD-M97B-49-A
Fill capacity	7.0 litres

Engine Lubrication

Oil Type	"FORD SUPER ENGINE OIL"
Viscosity	from -20°C to +30°C SAE 10W-30 from -15°C to over +40°C SAE 15W-40 from -10°C to over +40°C SAE 20W-50
Oil Type	"FORD XR+ HIGH-PERFORMANCE ENGINE OIL"
Viscosity	from -25°C to over +40°C SAE 10W-40
Oil Type	"FOR FORMULA S SYNTHETIC ENGINE OIL"
Viscosity	from -30°C to over +40°C SAE 5W-50
Ford specification	WSD-M2C-904-A

Initial fill capacity (engine dry)	Incl. filter 4.75 litres
Oil change	excl. filter 3.75 litres
	incl. filter 4.25 litres

Note: SAE 15W-40 "FORD SUPER ENGINE OIL" can be used as a universal oil for all times of the year and operating conditions.

SAE 10W-30 or SAE 20W-50 "FORD SUPER ENGINE OIL" can also be used depending on the predominant ambient temperatures.

SAE 10W-40 "FORD XR+ HIGH-PERFORMANCE ENGINE OIL" and SAE 5W-50 "FORD FORMULA S SYNTHETIC ENGINE OIL" offer optimum performance, fuel economy and engine protection over a particularly wide temperature range.

A - "FORD FORMULA S SYNTHETIC ENGINE OIL"

B - "FORD XR+ HIGH-PERFORMANCE ENGINE OIL"

C - "FORD SUPER ENGINE OIL"

If an oil other than FORD engine oil is used, this must conform to international specification API SG/CD.

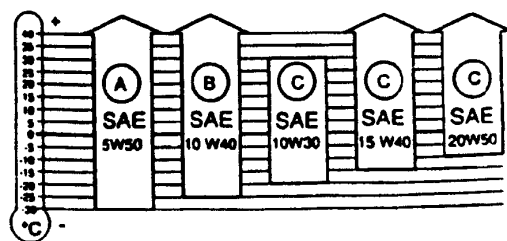


Fig C. Engine oil viscosity in relation to ambient temperature.

Transmission Fluid

Specification

SQM-2C-9008-A

Lubricant

Splines of transmission input shaft
and clutch release bearing guide sleeve

Specification: ESD-M1C-220-A
Finis code: 5 021 559 for Scandinavia only
5 021 439 for all other territories

Sealer

Hylosi 102

Spacer Sleeves Between Sump and Clutch Housing

Range of Adjustment

0.1 mm sump projection
0.25mm cylinder block projection
0.26 to 0.50mm cylinder block projection
0.51 to 0.75mm cylinder block projection

Available Spacer Sleeves

no adjustment
no adjustment
0.25mm (yellow)
0.50mm (black)

Tightening Torques

Main bearing cap bolts and studs	
Big-end bearing caps	
Crankshaft rear oil seal carrier	
Camshaft bearing caps	Stage 1
	Stage 2
Flywheel	
Clutch pressure plate	
Engine speed/crankshaft position sensor (CPS) to bracket	
CPS bracket to cylinder block	
Timing belt guide pulleys	
Crankshaft vibration damper/belt pulley	
Water pump	
Water pump belt pulley	
Engine lifting eyes	
Timing belt tensioner bracket, tension spring retaining pin	
Sump	
Timing belt tensioner	
Timing belt cover to cylinder block/head	
Timing belt cover studs	
Oil filter	
Oil pump intake to oil pump	
Oil pump	
Oil baffle	

Nm

70 to 90
15 to 20+ rotate extra 90°
14 to 18
10
17 to 20
107 to 117
25 to 34
6 to 9
18 to 23
35 to 40
100 to 115
16 to 20
8 to 12
23 to 28
8 to 11
20 to 24
35 to 40
6 to 8
8 to 11
12 to 18
8 to 11
8 to 11.5
17 to 21

Oil pressure switch		25 to 29	
Oil filter adaptor to block (inlet-union screw)		18 to 25	
Oil drain plug		21 to 28	
Cylinder head bolts	Stage 1	20 to 30	
	Stage 2	40 to 50	
THE BOLTS MUST NOT BE RETORQUED	Stage 3	Turn 90° to 120° more	
Camshaft timing pulley		64 to 72	
Cylinder head cover	Stage 1	1 to 3	
	Stage 2	6 to 8	
Exhaust manifold studs in cylinder head		0 to 10	
Exhaust manifold nuts		14 to 17	
Inlet manifold studs in cylinder head		0 to 10	
Fuel rail to inlet manifold		16 to 20	
Thermostat housing		18 to 22	
Thermostat housing connector		8 to 11	
Upper timing belt cover to centre nut		3 to 5	
Intermediate manifold		16 to 20	
Inlet manifold bolts		16 to 20	
Temperature gauge sender unit		6 to 10	
Engine coolant temperature sensor (ECT)		12 to 18	
Bracket of DIS ignition coil to cylinder head		18 to 23	
Air charge temperature sensor		12 to 18	
M6 x 10 oil splash gallery blanking plug		8 to 11	
M10 x 11.5 cylinder block oil gallery blanking plug		20 to 27	
1/4 RTF. cylinder block oil gallery blanking plug		22 to 28	
Idle speed control valve to inlet manifold		5 to 8	
Throttle assembly to inlet manifold		8 to 11	
Spark plugs		14 to 20	
Crankcase breather valve/oil separator to cylinder block		8 to 11	
Crankcase breather valve pipe to cylinder head		20 to 25	
Camshaft position sensor to cylinder head		18 to 23	
Clutch pressure plate to flywheel		25 to 34	
Right-hand engine mounting, support bracket to cylinder block, 3 bolts			76 to 104
Right-hand engine mounting to bracket on suspension strut top mounting, 2 bolts			70 to 97
Right-hand engine mounting, engine mounting brace, 3 bolts			58 to 79
Front engine mounting to body, 2 bolts		58 to 79	
Rear upper engine mounting to support bracket, 2 bolts.		102 to 138	
Rear lower engine mounting to body, 2 bolts		102 to 138	
Transmission flange bolts to engine		35 to 45	
Ball joint to spindle carrier (1 clamp bolt)		70 to 90	
Track rod ball joint (1 nut and split pin)		25 to 30	
Gearshift stabiliser to transmission (1 bolt)		20 to 26	
Shift rod to transmission selector shaft (1 clamp bolt)		14 to 17	
Transmission oil filler/oil level check plug		30 to 40	

Cylinder Bore Grades

Piston Grade 1	80.570 - 80.580mm
Bore	80.600 - 80.610mm
Piston Grade 2	80.580 - 80.590mm
Bore	80.610 - 80.620mm
Piston Grade 3	80.590 - 80.600mm
Bore	80.620 - 80.630mm

Note to Scrutineers.

For all components that have a minimum weight specified.

The minimum weights quoted are to ensure that only the correct level Ford parts are used. It is possible that over time re-specification of Ford components for production or the repair market will introduce changes that would have no detrimental affect for the repair trade, yet would put the component outside the Formula Ford intent. Components that weigh in excess of the minimum are expected to remain as delivered, with only minor re-balancing allowed.

It is not permissible in our opinion to reduce the weight of a component close to the minimum and then re-balance, as this will contravene the general statement at the start of the regulations which states . , 'UNLESS IT SAYS YOU CAN DO IT YOU CANNOT'.

FORMULA FORD 1800

Current Parts availability - **For information Only**

Formula Ford Engine Parts. Parts with Finis number starting with 909 can only be purchased through 'Formula Ford International' (Sky Ford Hemel Hempstead).

44(0) 1442 220344 or 44(0) 7889 607998 Don Hilton
44(0) 1442 220344 or 44(0) 7887 984066 Paul Revel

All other parts may also be obtained from 'Formula Ford International' or any authorized Ford dealer.

<u>Finis Code</u>	<u>Description</u>
9095471	Engine Assembly:- Complete with Std Intake & throttle body, Exhaust manifold, unmodified flywheel, but not dry sump equipment.
9095526	Piston Ring Pack, early piston (pre 95), single piston
9095528	Connecting rod
9095529	Flywheel
9095577	Exhaust kit (includes Catalyst)
9095580	Restrictor
9095581	Hose, Restrictor/Flow meter
9095589	Hose, Throttle/Restrictor
9096038	Air Filter element
9096273	Clutch disc
9096799	Piston Ring pack (post 95) (single piston)
9096800	Piston and pin assy. (No piston rings) replaced by piston & pin assy 9096801
9096801	Piston and pin assy with rings replaces 9096800
9096824	ECU (1997 model) now replaced by 9097729
9097729	ECU (1999 model)
9097839	Fuel Rail (with Schrader valve)
9096887	Loom (for 1997+ ECU) - Short
9097731	Loom (for 1997+ ECU) - Long
9096888	Loom Ex 1997 alternative loom. To special order only!
9096894	Kit, Electrical connector repair pack.
9096971	Adaptor, Hego boss.
9096889	Diagnostic loom, Computer to Pectel ECU.
6580527	Air Flow meter
6701093	Exhaust clip
6789153	Exhaust gasket
6847908	Hego sensor

The Exhaust sampling union can be obtained from these and other companies.

R S Components: Compression gland (for K type Thermocouples) Pt No 158 – 610

Farnell Electrical components: Compression gland (for K type Thermocouples) Pt No 254 – 642

The parts crossed out above are, unfortunately, no longer available.

History

2001/2 regulations, Issue 2 **December 2001**

All references to single gender for operator altered to any person.

5.3.2 All reference to the original Ford ECU removed. For championships that permit the use of the earlier Ford ECU should refer to earlier editions of the Formula Ford regulations.

2.10 & 13.2 Leak proof design batteries strongly recommended. (Maybe compulsory in 2003)

3.5 Clarification of Bodywork

5.14.1 Clarification of water pump

5.15 Chassis specific parts moved to section 12

11.4 repeated text deleted

2003 regulations, Issue 1 **October 2002**

Title. Zetec name removed from regulations, as the name given to this family of engines has been changed within Ford Motor Company. All engine details remain the same as previous years.

Bob Bassett post code changed.

2 6.3 Side Head protection. Side Head protection shall be installed at such a height that it ensures that the drivers helmet will contact this protection in such a manner as to reduce to a minimum any possible injury in the case of contact with it.

4.6 is moved to Art. 6 as this is suspension, all subsequent Art numbers in 4 reduced by one. No text alteration.

New 4.16 Only original factory specification parts can be used in front of the forward bulkhead. No additional material can be added

12.1.7 inserted, making FT3 tanks mandatory for new build cars (from 1.1.2003) was specified in 2002 Appendix "C"
 Appendix "B" clarified for clearance to drivers helmet when seated in car.
 Appendix "C" Stability options updated

2003 regulations, Issue 2 **December 2002**

2.3.1 BCF, which is now illegal, was left in regulations as Fire extinguishant in error
 Appendix F Note to Scrutineers ref Minimum weight added.,

2004 regulations, issue 1 **January 2004**

2.3 FIA homologated Fire extinguisher models permitted.
 2.3.1 BCF specifically banned. Viro3 deleted from table, but may be used via FIA homologated system list.
 6.2.6 Suspension pull/push rods clarified.

2004 regulations, issue 2 **March 2004**

Page 2 Ford contact address changed

2005 regulations, issue 1 **October 2004**

Logo changed from Ford Racing to Ford TeamRS

2.9.1 (new addition)

An appropriate, and only as sanctioned by the FIA, 'Hans device' (Head and Neck Safety device) is strongly recommended for use at all times.

3.8 (New addition)

The longitudinal centerline of the chassis must correspond with the longitudinal centre line of the vehicle, also the suspension must be symmetrical about the fore / aft centerline.

5.1.1 (add to existing regulation)

The engine crankshaft centre line must be on the longitudinal centre line of the vehicle

Appendix 'C' Art 6 added:- We strongly recommend that new car design incorporates wheel retention straps, as defined by the FIA for F3 usage.

5.3.2.1 (clarification of existing regulation) Only Ford Motor Company sourced wiring looms are permitted for the engine management system

2005 regulations, issue 2 **January 2005**

5.16.5 Engine wiring loom. Serious supply problems necessitate the change from the originally specified loom interface connector with a proprietary and freely available connector.

A recommended 6 way connector is a Sure-Seal type from Farnell Electrical components, Farnell numbers are 146-337 and 146-342. Sure-Seal numbers are:- Plug, 307 5291; socket, 307 5357 with pin 307 5394 and 307 5400.

Any connector used must be a low cost unit with an IP rating of 65 or better.

2006 regulations, issue 1 **March 2006**

Page 2, Contact details updated

Page 27, Parts availability and contacts updated

Page 27, Piston and pin update:

9096800 Piston and pin assy. (No piston rings) replaced by piston & pin assy 9096801

9096801 Piston and pin assy with rings replaces 9096800

Page 10, Pistons 5.9.1 Piston assy 23984 added and also authorized for use.

Notes

General note that any underweight / undersized standard Ford production part obtained from the dealer network should be notified to the Formula Ford Technical scrutineer for checking and possible correction to the technical regulations. This is to be done BEFORE fitting to the race car.