

## SCHEDULE F<sup>©</sup>

# NEW ZEALAND FORMULA FORD TECHNICAL REGULATIONS 2020-2021

### PREAMBLE

Since its introduction to New Zealand in 1972 Formula Ford racing has proven to be a popular and highly successful single seater race series (having out lasted many other more sophisticated classes) proving that the simplistic design of the cars and the cost effectiveness of competing within the class, has been a winning formula.

This success can clearly be attributed to the car's technical simplicity; which was the original intention (since the first race was run at Brands Hatch in July 1967) and is as relevant today as it was then. A relatively simple space-frame chassis, tube A arm suspension on all four corners with a rear mounted series production 1600cc push-rod engine coupled to a transaxle and gearbox driving the rear wheels. No aerodynamic aids, no wings and no sophisticated slick tyres here.

The technical regulations detailed hereinafter have evolved from the international regulations and have been tailored to the racing requirements of New Zealand, but in essence have not changed the philosophy of the class – additional safety features have been added over the years together with sleeker bodywork and repositioned radiators. The Ford Kent 1600GT cross-flow engine has been the mainstay of the class and despite its age and humble origins has proven its worth. The tyres are a special 'control' racing tyre specifically made by AVON for the class.

The spirit of Formula Ford Racing and these Regulations expects all Competitors and constructors to keep costs of running and maintaining a car within reasonable bounds.

These regulations govern the technical requirements for both the MSNZ Formula Ford Championship and the South Island Formula 1600 (SIFF) Series. **Any variations to a regulation for South Island Formula Ford will be noted on the rule and boxed to clearly identify the different rules.**

### COMPETITOR RECORD OF SERIES

Use this table to keep a record of all official 'Manual / Series Amendments' issued during the season relative to this Schedule;

Amendment Number	Effective Date	Article Reference	Subject

## 1.0 CLASS STRUCTURE and GENERAL INFORMATION

### 1.1 Class structure as follows:

- 1.1 MotorSport NZ (referenced hereinafter as MSNZ) has sole responsibility for the control of the Formula Ford Series Technical Regulations and their interpretations. All enquiries relative to these regulations shall be directed (at Events) to the appointed Technical Officer or Series Scrutineer or (away from Events) to the MSNZ Office. Contact details on cover page of this Schedule.
- 1.1.1 Where any doubt may exist in understanding any regulation contained within this it is the Competitors obligation to enquire as to the correct interpretation. All enquiries shall be submitted in writing to the Series Scrutineer or to MSNZ office, detailing the Article in question and the specific subject matter. A written reply will always be given to a written enquiry. Contact details on cover page of this schedule.
- 1.2 On matters of technical eligibility or safety compliance, a verbal statement or agreement will have no validity.
- 1.3 This Schedule shall be read in its entirety and shall take precedence over Appendix Two, Schedule A excepting where an item is not specifically covered, in which case Appendix Two, Schedule A as detailed in the current edition of the MotorSport Manual will apply.
- 1.4 All text changes from the previous issue of this Schedule are highlighted such. Text changes for grammatical and/or formatting reasons are not highlighted.
- 1.5 All competing cars subject to these regulations shall have a valid MSNZ vehicle logbook, or for visiting cars they shall have a valid logbook / passport from their ASN
- 1.6 Telemetry devices are strictly prohibited, excepting devices whose sole function is to provide lap timing and those authorised within this Schedule F.
- 1.7 The use of titanium material is specifically prohibited. Additionally, the use of ceramic material in the transmission, driveline and wheel bearings is specifically prohibited.
- 1.8 Damaged threads may be reclaimed by the use of heli-coils
- 1.9 All chassis / body dimensions are referenced in ADDENDUM 1 to this schedule.
- 1.10 Any form of launch control, including supplementary brake systems, is strictly prohibited.

## 2.0 DEFINITIONS

- 2.1 Definition of terms used within this Schedule shall be referenced from the National Sporting Code, Appendix Two Schedule A and as detailed below:

**'Aftermarket' (engine part)** means a catalogued, off the shelf component sourced from another manufacturer to that of the subject engine which may be fitted without making any additional modification to the engine or the part.

**'Class One Car'** means models first manufactured after 31 December 1999 in compliance with the current Schedule F technical regulations for Class One cars.

**'Class Two Car' - MSNZ Formula Ford Championship only** - means models first manufactured prior to 1 January 2000, in compliance with the current Schedule F technical regulations specific for Class Two cars, including any Class 3 car only where that car does not meet the Class 3 regulations.

**'Class Two Car' - SIFF Formula 1600 Series only** - means models first manufactured after 31 December 1989 and prior to 1 January 2000, in compliance with the current Schedule F technical regulations specific for Class Two cars with the exception of non-compliant Gearbox cars as referenced in Article 18.1.1.

**'Class Three Car'** means models manufactured prior to 1 January 1990 in compliance with the current Schedule F technical regulations specific for Class Three cars.

**'Control part'** means parts that are fully controlled in respect to their specification and application. If a modification is authorised to a 'control part' it will be clearly detailed in the applicable Article. All 'control parts' shall be supplied by the MSNZ appointed 'control part supplier', nominated agent or through the MSNZ Technical Department.

**'Composite'** means a material formed from several distinct components the association of which provides the whole with properties which none of the components separately possess.

**'Direct replacement' (engine part)** means a component sourced from another manufacturer, to that of the original manufacturer, which is a 'direct' replacement in level of duty, function and design to the component it replaces, and can be fitted without making any additional modifications.

**'Flywheel / Clutch Assembly' (relative to Articles 17.4.1 and 17.4.2)** means 'all the rotating components affixed to the rear of the engine crankshaft excepting the spigot bush'.

**'Ford Kent 1600GT crossflow engine'** means the Ford 'Kent Series' 1600GT crossflow engine produced by the Ford Motor Company with nominal bore of 81mm and stroke of 77.6mm and as fitted to Ford series production vehicles from 1971.

**'Ford Motor Company'** means the Ford Motor Company Limited (also abbreviated to FoMoCo).

**'Formula Ford'** means a 'single-seater' race car built to the specifications of Schedule F.

**'Free' (part)** means that the original part as well as its function may be removed or replaced with a new part on condition that the new part has no additional function relative to the original part.

**'MSNZ'** means MotorSport New Zealand Incorporated.

**'Protective clothing'** means overalls, underwear, balaclava, socks, shoes and gloves.

**'Race trim'** means the condition the car competes in and includes the driver, all safety items, all vehicle fluids and any ballast necessary to maintain weight compliance.

**'Reclaimed'** means returned to the manufacturer's original specification.

**'Skid block'** means a sacrificial material attached to the lower portion of the car to prevent damage to the sprung elements of the car.

**'Standard' (engine part)** means as supplied and/or manufactured by Ford Motor Company (FoMoCo) for the Kent engine.

**'Stress bearing panels'** means sheet metal affixed to the frame by welding, bonding or rivets or bolts or screws, which have centres closer than 152.4mm.

### 3.0 MSNZ IDENTIFICATION / OFFICIAL SEALS and SEALING REQUIREMENTS

**3.1 Official Seals** shall be referred to hereinafter as 'C' (Series Category Seals). The definitive text is detailed in Appendix Two, Schedule A of the current MotorSport NZ Manual.

**3.1.1 Reference Series Articles - Article 2.4: MSNZ Formula Ford Championship only** it is the Competitors responsibility to ensure that a metal engine ID tag (Type "C" Seal) is fitted to the engine/s (maximum of two(2) at any one time) used during the Series. Provision for attaching 'engine ID tags' to the engine block in an accessible location is the Competitors responsibility. The engine ID tags shall not be removed without the express permission of the Series Scrutineer.

**3.2 Additionally, official seals may be applied as follows;**

**All cars;** may have 'C' seals applied to the following components, and/or any additional assemblies of components, at any time during the Series, at the sole discretion of the Series Scrutineer or MSNZ Technical Officers.

- Two adjacent **cylinder head** bolts or cylinder head bolt to head casting flange
- Two adjacent **engine to bell-housing** adaptor bolts
- Two adjacent **inlet manifold to cylinder head** bolts or bolt to casting flange
- Two adjacent carburettor to inlet manifold bolts / studs
- Two adjacent transaxle **differential cover** bolts / studs or cover flange
- The rear section of the Inlet manifold adjacent to the Cylinder Head face
- The engine block through the web below number 4 exhaust, near the bell housing bolt
- The sump rail and through the timing cover on the exhaust side, and the sump rail through the block /face on the inlet manifold side rearward of the oil pump.

**3.3** All the components/locations detailed in Article 3.2 above must be pre-drilled with 3mm holes ready for sealing prior to the first Round of the Championship. It is the Competitor's responsibility to ensure that the above assemblies have bolts / studs / flanges pre-drilled to enable wire seals to be affixed as & when required.

**3.4** It is the Competitors' responsibility to ensure that all applied seals, as detailed in the MSNZ vehicle logbook, remain intact for the duration of their application period. A category 'C' seal remains valid from date of application to 30 days after the last Round of the Series.

**3.5** Should a Competitor require permission to remove a category 'C' seal for maintenance purposes, it is essential that prior authorisation be sought, and the request is put in writing with written approval granted prior to the seal being removed.

- 3.6** All requests to be submitted in writing to the Series Scrutineer or MSNZ Technical Department (preferably by e-mail) – Contact details on cover page of this schedule. Upon approval, written confirmation of 'PERMISSION GRANTED' to remove the specified seal will always be given by the Series Scrutineer or on their behalf by the MSNZ Technical Department. This record must be kept by the Competitor and produced upon request of a Series Official.
- 3.7** Where a request to remove a category 'C' seal is received away from a Round of the Series (and it is deemed necessary to perform a technical inspection), MotorSport NZ reserves the right to apply a surcharge for such requests to cover any expenses incurred by its volunteer officials.

#### **4.0 SAFETY EQUIPMENT / SAFETY ITEMS**

- 4.1** A **Protective Helmet** in combination with a **Forward Head Restraint device (FHR)** shall be worn by all competitors. The helmet shall comply and be labelled with one of the following standards; FIA 8860-2018, FIA8860-2010, FIA8860-2004, FIA8859-2015, SA2015, SAH2010, SA2010, SA2005, or BS6658-85 Type A/FR and the FHR device shall comply and be labelled with the FIA8858-2002 or FIA8858-2010 standard or SFI 38.1 Spec. (38.1 spec recertification every 5 years applies).
- 4.2** **Protective Clothing** shall be worn in compliance with Schedule A for National status Championship events, although it is highly recommended that all protective clothing is compliant with the current FIA8856-2018 or FIA8856-2000 standard. Gloves must be of a colour which contrasts with the predominant colour of the car, so that the driver can clearly draw the attention of the race starter in case of difficulties.
- 4.3** **Roll protection;** shall comply with the provisions of FIA Appendix J. Two rollbars shall be incorporated, the first being positioned in front (front rollbar) of the steering wheel, not more than 250mm forward of, and at least as high as the top of the steering wheel rim. The second (rear rollbar) shall be at least 500mm behind the first and **high enough for a line extended from the top of this bar to the top of the front rollbar to pass 50mm over the driver's helmet (normally seated position)**. The rear rollbar shall have a minimum height of 920mm measured from the base of the seat and a minimum width of 330mm (measured between the two vertical bars at a height of 600mm above the seat base). There shall be at least one rearward brace (same diameter as the rollbar) extending from the top of the rear rollbar at an angle not exceeding 60° with the horizontal. If two rear braces are fitted the tube diameter may be reduced to a minimum of 20mm. Schedule A homologation for the rollbar is not mandatory when competing under this Schedule.
- 4.4** Front and side crash structures. Any chassis originally manufactured with front and side crash structures shall retain those structures.
- 4.5** **Safety harness:**
- 4.5.1** **MSNZ Formula Ford National Championship only:** An FIA8853-98 (5-year validity), FIA8853-2016 (5-year validity) six strap harness shall be installed in full compliance with Schedule A. The validity dates shall be respected.

**4.5.2** **South Island Formula 1600 Series only:** An FIA8853-98 (5-year validity), FIA8853-2016 (5-year validity) may be used with an extension of up to an additional 5 years as per Schedule A. SFI 16.1 (2-year validity) six strap harness are also permitted. All shall be installed in full compliance with Schedule A.

- 4.6 Any head restraints / padding fitted along the top inner edge of the cockpit opening shall be removable (without the use of tools).
- 4.7 **Rain / rear light:** A red LED light (with a minimum of 40cm<sup>2</sup> of lighting surface, or a minimum of fifteen(15) high intensity LEDs) shall be mounted (as high as possible) facing rearwards on the car's centre-line with operation from the cockpit. The operation of the rain light is mandatory when the session and/or race are declared 'WET'.
- 4.8 **Circuit breaker:** An operational electrical switch, easily reached from inside as well as outside the car capable of breaking all circuits that keep the engine running shall be fitted. The location of the switch shall be indicated by a 'blue triangle / spark symbol' situated on the outside of the car.
- 4.9 **Fire extinguisher;** shall be installed in compliance with Schedule A.
- 4.10 **Service fluids;** (fuel, oil, coolant, and brake) running through the cockpit shall be carried in metal tubing or metal braided hoses with any connections of a threaded (industry quality) type. Engine oil and water pipes shall not run through the cockpit of Class One cars.
- 4.11 **Driver egress:** All drivers shall be able to egress their vehicle from a fully belted in condition in full race equipment in less than seven(7) seconds. This test may be conducted at any time during a meeting.

## 5.0 FUEL

- 5.1 **Fuel type:** Shall be commercially available fuel from a New Zealand Service Station forecourt pump on current sale being either;
- Unleaded 95 Octane (RON) regular grade petrol, or
  - Unleaded 98 Octane (RON) premium grade petrol.
- 5.2 Additives of any kind, specification, chemical description or composition shall not be added to the fuel, nor may a blend of two or more fuels be used.

## 6.0 RACING WEIGHT

- 6.1 The minimum racing weight is:
- 6.1.1 For **MSNZ Formula Ford National Championship - 500kg.**

### 6.1.2 For **South Island Formula 1600 Series – 495kg**

- 6.2 The racing weight is the complete weight of the car in 'race trim' which may be measured at any time during the competition, on the official weigh scales of the meeting.
- 6.3 Ballast may be used to achieve the racing weight. All ballast shall be securely bolted in a secure position using at a minimum one M8 ISO 8.8 per 5KG of ballast, and that provides access to and provision for, the application of official seals. These seals may be applied at any time by the appointed Series Scrutineer or MSNZ Technical Officers.

## 7.0 CHASSIS

- 7.1 All applicable chassis dimensions are referenced in ADDENDUM 1 to this schedule.
- 7.2 The chassis shall be of tubular construction with no stress bearing panels except bulkheads and the undertray. The curvature of the undertray shall not exceed 25.4mm. The engine cannot be utilised in any way as a stress-bearing panel. Monocoque construction is specifically prohibited.
- 7.3 The use of stabilised materials and composite materials incorporating carbon and/or Kevlar material are prohibited except in the area of the cockpit provided it is original specification bodywork as supplied by the original vehicle manufacturer.
- 7.3.1 The cockpit opening dimensions shall respect the following dimensions:
- Minimum overall opening length = 600mm.
  - Minimum parallel opening length = 300mm.
  - Minimum cockpit opening width for pre 31-12-95 chassis = 380mm.
  - Minimum cockpit opening width for post 31-12-95 chassis = 450mm.
  - For chassis' constructed between 01/01/87 and 01/01/95 the internal cross sectional area of the cockpit (from the sole of the driver's feet to behind their seat) shall nowhere be less than 700sq/cm with a minimum width of 250mm maintained for the whole length of the cockpit. The only intrusion permitted into the cross-sectional area shall be the steering column.
- 7.4 The driver's feet (normal seated position - pedal not depressed) shall be located behind an (imaginary) line drawn through the front wheel axis. Class Three cars are exempt from this Article.
- 7.5 No fluids may pass through the chassis members / tubes.

## 8.0 BODYWORK

- 8.1 All applicable bodywork dimensions are referenced in ADDENDUM 1 to this schedule.
- 8.1.1 **Class One and Class Two cars:** The maximum height of the bodywork (excluding rollbar) shall be measured / checked in 'race trim'.
- 8.1.2 **Class Three cars:** no part of the bodywork / engine cover shall extend more than 600 mm behind the centreline of the rear axles. The maximum height of the bodywork (excluding rollbar) shall not exceed 800 mm (at any point) above the lowest point of the entirely sprung structure of the car except for air-boxes solely supplying air to the carburettor which shall not exceed 1100 mm.



**8.1.3** No part of the car, except for the tyres may be closer to the ground than 40mm. This measurement shall be checked on the 'designated measuring pad/area' for the meeting, taken with the car in 'race trim' and with the road wheels pointing straight ahead.

**Note:** *Where inadvertent failure or on-track damage can be quantifiably attributed as cause for ride height non-compliance, the Championship Scrutineer will have complete discretion as to reporting.*

**8.1.4** Indicative checking of ride height may take place prior to any official session and / or race.

**8.2** Aerofoils, nose fins, spoilers of any type, or any device designed to aerodynamically augment down-force on the vehicle are prohibited.

**8.3** **Class One and Class Two cars:** The engine cover shall not extend rearwards past the rearmost point of the gearbox casing. The shape of the engine cover shall not include any reflex curves and no flat surfaces are permitted within 15° of the horizontal. The lower rear bodywork (located below the road wheel centre line) is only permitted alongside and beneath the engine and shall only extend from behind the cockpit to a line drawn through the rear road wheel axis. Any suspension member or fairing of any kind shall not be incorporated within the lower rear bodywork.

## 9.0 KENT ENGINE - General

**Kent Engine Moratorium:** The Ford Kent engine as detailed in Schedule F will remain the power-plant for NZ Formula Ford Championship within New Zealand until the completion of the 2024 -25 season, and for the **South Island Formula 1600 Series** until the completion of the **2023-24** season.

**9.1** The 'Ford Kent 1600 GT cross-flow engine' is the only engine authorised.

**9.2** Engines shall be mounted upright and aligned fore and aft in the chassis.

**9.3** Only genuine Ford Motor Company engine parts may be used, unless specified otherwise hereinafter. Where applicable, part numbers are detailed in the relevant Article. Refer Definition 2.1.

**9.3.1** The MSNZ Technical Department may upon written application accept direct replacement parts of the specified part numbers. Where accepted these parts will be detailed in an Amendment.

**9.4** Only engine modifications and/or additions specifically prescribed by these regulations are authorised. All engine components not specified in these regulations shall remain completely standard and unmodified.

**9.5** Addition of any material, be it metal, plastic or composite, by any means, be it welding, bonding, encapsulation or encasement, to any component is prohibited.

**9.5.1** Specific **repair of castings** is authorised, providing material, weight, size, form and function is retained.

**9.6** All **engine gaskets and seals** are free, except where specified otherwise hereinafter.

**9.7** **Drive pulleys and drive belts** on the front of the engine are free.



- 9.8 A mechanical tachometer drive is authorised.
- 9.9 Fitment of an **alternator/generator** is optional.
- 9.10 The use of non-standard **replacement fasteners** (nuts, bolts, screws, studs and washers) is authorised. Bolts can be substituted for studs providing they are like for like. The use of thread locking compound is authorised.
- 9.11 The crankshaft bearing shells, conrod big end bearing shells and camshaft bearing shells may be substituted with commercially available non-genuine Ford Motor Company parts.
- 9.11.1 Where the 711M6010/16K block is used, it is authorised to use the Ford crankshaft thrust washers **Part Number 2T2167**.
- 9.12 **Balancing** of reciprocating and rotating parts is authorised, but only by the removal of metal from the locations so provided by the manufacturer, unless stated otherwise under the applicable Article.
- 9.13 Any process of **component cleaning** is permitted, provided the original surface finish is not affected in any way.
- 9.14 A liquid **cooling system** is mandatory. The water pump shall be belt driven by the crankshaft. The radiator is unrestricted, provided if housed in/or incorporating a cowl air scoop / deflector, it remains compliant with the bodywork dimensions.
- 9.15 The **lubrication system** is free, except that the oil-pump shall be a 2-stage **spur gear** pump mechanically driven as per the Standard pump. A dry sump system is authorised. The block may be drilled for lubrication of the skew gears. Oil coolers are unrestricted.
- 9.16 The **ignition distributor** make is free, providing the original drive & location is retained, the low-tension ignition circuit is triggered from within the distributor body and the high tension ignition circuit is distributed from the distributor unit. It is not permitted to fit / use any other components to trigger, time, or distribute the ignition current. The ignition timing may only be varied by mechanical means (weights & springs) from within the distributor body and a 90° firing angle shall be maintained. The electrical wiring from the distributor to the ignition coil must be separate from all other wiring.
- 9.16.1 The **distributor cap, high tension leads and spark plugs** may be freely sourced.
- 9.16.2 Only one **ignition coil** is authorised which may be freely sourced. **A second (spare) ignition coil may be mounted but only one coil shall be electrically connected at any time.**
- 9.16.3 A pointer may be mounted to the engine to facilitate ignition timing.
- 9.17 The **exhaust system** including the exhaust manifold is unrestricted, except a muffler shall be fitted and is subject to compliance with the dimension requirements of Addendum 1 and noise emission as detailed in Schedule A.
- 9.18 An operable starter motor is mandatory (either inertia or pre-engaged type) capable of starting the engine (from an on-board energy source) operated by the driver when normally seated.

## 10.0 KENT ENGINE - Cylinder Head Assembly

The following specifications of Article 10.0 herewith apply equally to all cylinder head types.

**10.1** The **cylinder head** shall be either:

- The Ford cast iron unit from a Kent 1600cc GT cross-flow engine, or
- The Ford cast iron unit from a Kent 1600cc (non GT) cross-flow engine, or
- Solely for Class One and Class Two cars; An aluminium cylinder head, as supplied by Ivey Engines, Portland, Oregon, USA is authorised. (Previously supplied by Pearce Manifolds USA)

**Note:** *A sample alloy cylinder head will be held by MotorSport NZ and used for compliance checking.*

**10.2** Washers may be installed under the cylinder head mounting bolts.

**10.3** The **cylinder head gasket** shall comply with the following dimensions:

- minimum diameter of cylinder aperture = 82.50mm
- minimum compressed thickness = 0.80mm.

**10.3.1** To allow for cylinder head gasket measurement one of the rear corners (easily accessible) of the head gasket shall have sufficient material removed to allow accurate measurement, using feeler gauges, of the head gasket thickness.

**10.4** **Valve guides** and/or **valve seats** may be 'reclaimed' to original specification.

**10.5** Aftermarket **valve springs** are authorised provided they are steel and only one spring per valve is used. Aftermarket valve spring retainers are authorised, provided they are of ferrous material. The addition of shims is authorised as is the machining of the head casting directly under the spring seat.

**10.6** The fitting of valve stem (oil control) seals is authorised.

**10.7** The rockers, tappets, pedestals and (rocker) shaft shall remain Standard.

**Note:** *Due to the unavailability of new rocker shaft pedestals the introduction of a control part pedestal is currently being investigated as an option to the standard pedestal.*

**10.7.1** The rocker (valve stem) contact pad may be re-contoured provided the maximum specified lift is not exceeded. The rocker pedestal may be shimmed to a maximum shim thickness of 2.0mm (with a parallel strip of steel) to compensate for surfacing of the cylinder head and / or block.

**10.7.2** Pushrod shall not be modified or shortened.

**10.7.3** The rocker shaft pedestal shall not be modified. The measurement from the centre of the shaft bore to the mounting face on the pedestal shall be 18.5mm minimum.

**10.8** The **maximum valve lift** (measured at the spring cap with zero tappet clearance) is **9.1mm** for both inlet and exhaust valves. The maximum cam lift at the top of the pushrod is **6.0mm** for both inlet and exhaust. These measurements shall be respected at all times irrespective of temperature.

**10.8.1** The following checking procedure shall be applied to valve lift:

- The rocker to valve stem clearance shall be eliminated using the rocker adjuster
- Measurement shall be performed on the spring cap parallel to the valve stem and on the centre line of the rocker arm.
- Where any engine valves, up to a maximum of two(2), are found to have lift in excess of that permitted, then the lift on all four(4) inlet valves or all four(4) exhaust valves is to be added together and divided by four(4). The resultant average lift figure may not exceed that permitted for the relevant valve. If more than two(2) valves are measured as having excessive lift, then the foregoing does not apply, hence the lift will be deemed ineligible.

**Note:** *An indicative valve lift check using a feeler gauge may be made at any time during the competition by the appointed Series Scrutineer or Technical Officers.*

**10.9** The cylinder head to block face of the cylinder head may be reclaimed by machining the entire gasket and chamber face parallel and in the same plane to the original face. It is not authorised to machine the cylinder head manifold (mating) faces, nor the pedestal mounting faces or rocker cover face.

**10.10** The **inlet valves** shall be either Standard marked FoMoCo or FFI, or non-standard TRW 105-34524, or Ivey 13248. No re-profiling or polishing is authorised however, re-facing of the valve seat face is permitted to the original 45° seat angle. Specifications are as follows:

- Maximum inlet valve head face diameter = 39.7mm
- Overall inlet valve length = 110.9 +/- 0.5mm
- Maximum protrusion of valve head from cylinder head face = 1.2mm.

**10.10.1** The **exhaust valves** shall be either Standard marked FoMoCo or FFI, or be non-standard TRW 105-35105, or Ivey 13249. No re-profiling or polishing is authorised however, re-facing of the valve seat face is permitted to the original 45° seat angle. Specifications are as follows:

- Maximum exhaust valve head face diameter = 34.0mm
- Overall exhaust valve length = 110.6 +/- 0.5mm
- Maximum protrusion of valve head from cylinder head face = 1.2mm.

**10.10.2** The fitted valves (both inlet and exhaust) 'distance apart at centres' are:

- Cast iron cylinder head = 39.1 mm +/- 0.5mm
- Aluminium cylinder head = 40.3 mm +/- 0.5mm



- 11.2.9** Fuel inlet pipe with a screw fitting to replace 'press fit' type pipe (highly recommended).
- 11.3** The carburettor to inlet manifold gasket and spacer shall be a total combined maximum thickness of 6.7mm. An aftermarket spacer is authorised provided it is of an open centre type. The carburettor to inlet manifold spacer shall not extend, externally beyond the carburettor base flange by more than 5mm in any direction.
- 11.4** The carburettor throttle mechanism shall remain Standard with a mechanical connection to the drivers' foot pedal. Progressive throttle action only shall be retained.
- 11.5** For Class One and Class Two cars the only **inlet manifold** that is permitted under this Schedule is the 'Control Part' FF1600 inlet manifold, complete with serial number and mounting face engraving as supplied originally by the Control Part Supplier. Class 3 cars manufactured post 1 July 1980 are also permitted to use the FF1600 inlet manifold.

The Control Part supplier for the inlet manifold is:

**Bryan Hartley Engines and Motorsport**  
**26 Domain Street**  
**Palmerston North 4410**  
**Ph: 06-355-5070**

- (1) There shall be an engraved Logo on the carburettor mounting face that shall remain recognisable at all times.
  - (2) Each inlet manifold shall be identified by a Serial Number.
  - (3) The combined internal volume of the plenum and runners shall be between 590cc and 625cc measured between the cylinder head mounting face and the carburettor mounting face and excluding gaskets and any spacers.
  - (4) It shall be the competitor's responsibility to ensure the inlet manifold complies with this requirement at all times.
- 11.5.1** It is specifically forbidden to modify, alter, change, reclaim or paint the 'inlet manifold' excepting that it is permissible to carry out localised machining of the exterior of the inlet manifold for the sole purpose of
- (1) Reclaiming the inlet manifold to cylinder head face by machining it collinear to the original face providing the internal volume remains in compliance with Article 11.5(3) and the face remains at 90 degrees to the carburettor mounting face.
  - (2) Machining and threading of the three(3) throttle linkage bracket bosses for the sole purpose of aligning the throttle linkage system and throttle position sensor bracket to the carburettor throttle shaft.
  - (3) Easing of the inlet manifold to cylinder head mounting holes to allow fitment of the manifold.
  - (4) External localised machining of the inlet manifold for the sole purpose of providing minimum clearance to chassis and other external engine related components.

- (5) Reclaiming the threads of the manifold to carburettor stud holes and throttle linkage mounting bosses.
- (6) The drilling of a 3mm hole at the rear of the inlet manifold adjacent to the cylinder head mounting face to allow fitment of MSNZ seals
- (7) At no point shall any machining penetrate the internal tract of the inlet manifold.

**Note:** Refer to Addendum 3 image of the Inlet manifold.

**11.5.2** For Class Three cars, where the FoMoCo Inlet Manifold is used, it shall remain 'standard' excepting that it is permissible to machine the carburettor mounting surface to horizontal.

**11.6** The inlet manifold to cylinder head gasket shall be singular with maximum thickness of 1.0mm.

**11.7** The Standard air cleaner assembly as fitted by the manufacturer may be replaced with an aftermarket filter and trumpets may be fitted.

**11.8** Specifically prohibited are the following;

- (1) Reduce, by any means, the intake air temperature,
- (2) Fitment of any form of water injection,
- (3) Modification of the venturi (chokes), in any way, shape or form.

## **12.0 KENT ENGINE - Camshaft**

**12.1** For Class One and Class Two cars the **camshaft** is a 'control part' and shall be fitted to the subject engine.

**12.1.1** The 'control camshaft' supplier is:

KELFORD CAMS  
11-15 Kennaway Rd, Woolston, Christchurch 8022.  
Phone: (03) 929 0725  
Fax: (03) 381 0721  
Email: team@kelford.co.nz

**12.1.2** Kelford Cams shall either supply a new camshaft or re-profile a customers' unit to the control specification (being an identical specification and coating for all camshafts supplied under this schedule). All camshafts shall be subject to a computer check of all lobes with a 'footprint' recorded identifying each individual camshaft unit. An identification number and a Kelford Cams insignia will be applied to all (certified) 'control part camshafts. It is the competitor's sole responsibility to ensure compliance with this Article.

**12.2** **Class Three cars;** may use the 'control part' camshaft as detailed above or use the series production camshaft for the 1600 GT Kent engine Part Number 771M 6250BA, or use a camshaft with identical specifications / dimensions to that of the 1600 GT Kent camshaft (refer Article 12.2.1 below). Tuftriding or Parkerising is permitted. Shot peening, shot blasting or polishing is prohibited

**12.2.1** Class Three alternative camshaft specifications;

- Inlet lobe dimension - heel to toe = 33.29 mm +/- 0.1 mm
- Exhaust lobe dimension – heel to toe = 33.32 mm +/- 0.1 mm
- Lobe base circle radius = 13.72 mm +/- 0.5 mm

**12.3** The 'direct replacement' cam timing chain and drive sprockets, Rollmaster P/N CS3140 is authorised.

**12.4** Offset dowels for the camshaft / sprocket location are authorised.

**12.5** The cam followers may be aftermarket parts provided they are ferrous material.

### **13.0 KENT ENGINE – Cylinder Block**

**13.1** The cylinder block shall be the cast iron Ford Kent 1600GT unit or the Ford Performance Parts unit from the subject engine identified by the following numbers cast into the side face: 711M-6015BA, or AX-831C6015R34, or 711M6010/16K

**13.2** Cast iron cylinder liners may be fitted as a means of repair; to standard production dimensions. The liners may be machine bored and blended to align with the base of the cylinder bore.

**13.3** Localised machining of the cylinder block is authorised to facilitate fitment of a dry sump system.

**13.4** The crankcase breather may be modified; however, all crankcase breathers shall discharge into a catch tank.

**13.5** The cylinder block (to cylinder head) face may be only machined parallel to the parting face of the main bearing caps. .

**13.6** Internal / external painting of the cylinder block is authorised.

**13.7** For Class One and Class Two cars and Class 3 cars built after 30 June 1980, the maximum bore size shall be 81.15mm and the maximum stroke shall be 77.6mm.

**13.8** For Class Three cars built prior to 1 July 1980, the cylinder block may be re-bored to a maximum of 0.040 inch oversize to accommodate oversize pistons.

### **14.0 KENT ENGINE – Pistons**

**14.1** **Pistons**, under the following part numbers are authorised;

**Note:** *MotorSport New Zealand remains committed to reducing costs in the Formula Ford Championship. To that end a full review and cost benefit analysis will be carried out on piston options before 01 March 2021.*



- CP forged pistons P/N FF-1600STD marked with batch number and logo as originally supplied by Ivey Engines, Portland, Oregon. Markings and Logo must remain visible at all times, or
- 711M-6102MB, or
- AE-20552 with casting number 7082875, or
- Part number 9096468 with casting identification AE #2791, or
- 9096466 casting number 80V87 Mahle
- Teikin with casting number 080245

Piston compression height shall be not less than 43.30mm. Refer Addendum 4.

**14.2** Pistons may be machined as follows solely for the purposes stated:

- Piston bowl & valve relief solely to achieve correct volume (refer Article 14.5)
- Gudgeon pin bosses solely to achieve balance,
- Top of and underside of piston crown solely to achieve piston weight and deck height, and
- solely applicable to 711M-6102MB, the top ring groove solely to enable ring fitment.

**Note:** *It is specifically prohibited to drill gas reliefs in the piston crown. This means to machine from the piston crown or bowl into the ring groove.*

**14.3** The minimum complete piston weight (including rings, gudgeon pin & circlips) is 520grams. The individual gudgeon pin weight shall respect a maximum of 123grams when weighed separately.

**14.4** All **piston rings** shall be fitted; pattern replacements are authorised compliant as follows:

- Compression rings shall be one piece with conventional plain gaps
- The top ring may be chromium plated or molybdenum-faced
- Oil control rings shall be either one piece or 'Apex' type 3-piece.
- Spacers are not permitted in the ring grooves

**14.5** The **minimum combustion chamber volume** in the piston crown shall be 41cc with the piston at TDC in the cylinder with no account taken for the volume down to the top ring. The equipment and method of checking the volume is as follows:

- Burette;
- Checking fluid (50/50 mix Kerosene and ATF);
- Transparent flat plate (with filling / air bleed holes) and grease (for sealing).

Measurement shall be performed at ambient temperature after a twenty (20) minute cool down period. Carbon may be removed from the top of the piston using a non-abrasive process only. . With piston at BDC apply a light smear of general-purpose grease around the cylinder wall. Raise the piston to TDC. Wipe away excess grease. Seal the flat plate to the gasket face of the cylinder block with a light smear of general-purpose grease. Fill piston chamber from burette to establish volume.

- 14.6** The pistons shall not protrude above the cylinder block (to cylinder head) face when at TDC (at ambient temperature).
- 14.7** Class Three cars built prior to **1 July** 1980 only may utilise standard size pistons as detailed in Article 14.1 or 'direct replacement' pistons to a maximum over size of 0.040 inch.

## **15.0 KENT ENGINE - Connecting Rods**

- 15.1** The **connecting rods** shall be either Standard FoMoCo units from the subject engine or SCAT connecting rods part number 2-4925-2082-812-635.
- 15.2** Machining is permitted to remove metal from the balancing bosses on the big end cap and at the little end to achieve balance and minimum weight.
- 15.3** For the sole purpose of providing clearance between the camshaft and the con-rod, it is permissible to remove metal from the SCAT con-rod adjacent to the big-end bolts on both sides to match the profile of the FoMoCo part. Metal shall be removed by milling. No polishing is permitted.
- 15.4** The minimum weight of each rod (including bolts, any washers & small end bearing) is 640grams.
- 15.5** Polishing of the connecting rods is prohibited.
- 15.6** The big end cavity may be resized, and the little end bush may be replaced providing the length between the centre axis of both bores remains standard.

## **16.0 KENT ENGINE - Crankshaft**

- 16.1** The crankshaft shall be the Standard FoMoCo unit from the subject engine or a SCAT (cast steel) crankshaft Part No. SCAT 9-F-1699. The only permitted modifications are detailed herewith in Article 16.
- 16.2** For balancing purposes only, localised machining of the outer (larger) circumference of the counterweights or the outer face of the inner (smaller) circumference of the big end surfaces only is authorised.
- 16.3** Tuftriding, shot peening and/or shot blasting of the crankshaft are authorised. Polishing of the crankshaft is strictly prohibited.
- 16.4** The crankshaft may be machined on the bearing friction surfaces in accordance with normal reconditioning procedures, provided the stroke remains Standard ( $77.6 \pm 0.1\text{mm}$ ). Oversize and undersize bearings, including brand line components of an equivalent type are authorised.

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

## **17.0 FLYWHEEL and CLUTCH**

**17.1** The 'control part' flywheel or the 'standard' flywheel from the subject engine are authorised as follows;

**17.1.1** The 'control part' flywheel shall be supplied by the MSNZ nominated agent, being;

PRECISION ENGINEERING LTD - 9B Airborne Road, Albany, Auckland.  
Phone (09) 415 3264                      precision@ihug.co.nz

The 'control part' flywheel is available in 254mm or 258mm diameter. Additionally, a 215mm diameter flywheel is available (solely) for the Spectrum chassis. The only modification authorised is spot machining for the sole purpose of balancing.

**17.1.2** The 'standard' flywheel shall be from the subject engine. Refer to ADDENDUM 2 for compliance picture. It may be machined for the following purposes:

- Re-facing of the clutch plate mating face
- Balancing
- Enabling fitment of the ring-gear
- Achieving weight requirement for combined flywheel / clutch assembly (refer Article 17.4.2).

**17.1.3** Class Three cars the flywheel from the subject engine is the only flywheel authorised for use. At no time shall the minimum diameter be less than 254mm.

**17.1.4** The ring-gear may be freely sourced provided it can be directly fitted to the flywheel and respects Article 17.4.

**17.2** An aftermarket clutch assembly (being the driven plate and pressure plate) is authorised. The clutch assembly and release bearing may be freely sourced provided Article 17.4 is respected at all times.

**17.3** Aftermarket flywheel to crankshaft mounting bolts and the fitment of a single parallel locating dowel is authorised. It is not permitted to alter the crankshaft in any way to fit these parts.

**17.4** The following flywheel and clutch assembly weights shall be respected at all times;

**17.4.1** The 'control flywheel and clutch assembly' (refer definitions) shall weigh no less than **10.50kg**.

**17.4.2** The 'standard flywheel and clutch assembly' (refer definitions) shall weigh no less than **10.50Kg**. It is strongly recommended that machining to achieve the minimum weight is only performed to the flywheel within the area defined by the diagram and photo at Addendum 2.

## 18.0 TRANSMISSION

**18.1** The **gearbox** shall contain no more than four forward gears and shall include an operable reverse gear, capable of being engaged by the driver whilst normally seated.

**18.1.1** MSNZ Formula Ford Championship only - Class Three cars; shall only use the VW based 4 speed transaxle or original Mk8 or Mk9 Hewland gearbox, with the exception of 1989 models that were manufactured to accommodate a Hewland LD200 transaxle.

**18.1.2 South Island Formula 1600 Series only** - Class three cars shall only use the VW based 4 speed transaxle or original Mk8 or Mk9 Hewland gearbox. Any car utilising a non-VW casing transaxle as at its original date of manufacture prior to 1st January 1990 will be re-classified as a class two car and shall conform to the class two rules.

**18.2** **Gear selection** shall be by mechanical means only. Automatic and/or sequential gearboxes / gear selection is specifically prohibited.

**18.3** The **gearbox ratios** are free.

**18.4** The **final drive ratio** is free.

**18.5** Torque biasing and / or limited slip and / or locked differentials are strictly prohibited. Non-ferrous differential components are prohibited, save for the Hewland plastic thrust washer part #HC8-214-5R. Differentials must be a mass-produced unit commercially available to the general market.

**18.6** Rear wheel drive configuration only is authorised.

## 19.0 SUSPENSION

**19.1** All parts of the suspension except dampers shall be of steel / ferrous material, with the exception of bell cranks, tracking or alignment arms, hubs, hub adaptors, hub carriers, bearings and bushes, spring caps, abutment nuts and anti rollbar links.

**19.1.1** Suspension members may not be fabricated or installed in a form that will produce aerodynamic downforce on the vehicle.

**19.1.2** The use of composites for load bearing components is prohibited.

**19.2** Dampers shall be from an industry recognised commercial manufacturer and be commercially available to the general market.

**19.2.1** A maximum number of four(4) individual damper units are fitted, i.e. no more than two(2) damper units for the front suspension and no more than two(2) damper units for the rear suspension or as specified below relative to Class.

**19.2.2** The same damper units shall be used for the duration of each Round of the Series. 'B' type seals may be applied under the direction of the Series Scrutineer, that prevent disassembly of the unit during the Round and the numbers recorded in the vehicle logbook and the register. Where a damper may become damaged during a Round a damper may be repaired / replaced only with the express permission of the Series Scrutineer.

**19.2.3 MSNZ Formula Ford Championship only - Class One and Class Two cars;** damper units with a maximum of two(2) external adjusters are permitted, one compression adjuster and one rebound adjuster. These adjusters are exclusive of the spring platforms and gas pressure.

**19.2.4 South Island Formula 1600 Series only - Class One and Class Two cars;** damper units must only have two(2) enabled external adjusters, one compression adjuster and one rebound adjuster. Any additional external adjuster must be disabled. These adjusters are exclusive of the spring platforms and gas pressure.

**19.2.5 Class Three cars built after 30 June 1980:** damper units with a maximum of two(2) external adjusters are permitted. These adjusters are exclusive of the spring platforms and gas pressure

**19.2.6 Class Three cars built before 1 July 1980:** single external adjuster (or non-adjustable damper units) are permitted for adjusting the internal 'valving' of the damper unit. Specifically prohibited are separate/remote reservoirs for fluid or gas.

**19.3** No driver-operated ride height or active / reactive suspension control is permitted, including sway bar controls.

## 20.0 BRAKES

**20.1 Brake components** may be freely sourced, provided that the calipers, pistons and discs are of a ferrous material.

**20.2** The use of composites for load bearing components is prohibited.

**20.3** Any form of driver operated 'park brake' is prohibited.

## 21.0 STEERING

**21.1 Steering components** may be freely sourced.

**21.2** Specifically prohibited are rear wheel and/or four-wheel steering and composites for load bearing components.

## 22.0 WHEELS

**22.1** Aluminium **alloy or steel wheels** are authorised on the following conditions;

- They are production type (produced in significant numbers), and
- They are of one(1) piece construction (aluminium wheels only), and
- They are manufactured to comply with a recognised standard (example Australian Std 1638), and
- They are modified only by the manufacturer for the sole purpose of achieving brake caliper clearance, and

- Wheels shall comply with Appendix Two Schedule A Article 4.9 in all respects.

**Notes:**

- (1) *It is recommended that wheels are crack tested at least once per season*
- (2) *It is recommended that all wheels are thoroughly inspected between events for cracks and deterioration.*

**22.2 Class One and Class Two Cars;** shall have wheels of the following dimensions (inches):

- Diameter: 13"
- Rim Width: 5.5" maximum

**22.3 Class Three Cars;** shall have wheels respecting the following dimensions (inches):

- Diameter: 13"
- Rim Width: Front 5.5" maximum  
Rear 7.0" maximum

## 23.0 TYRE REGULATIONS

**23.1 Authorised Tyres:** Only the following specified tyres are authorised:

- Avon ACB 10      Front size: 6.0 / 21.0 x 13  
Rear size: 7.0 / 22.0 x 13

**23.1.1 Alternative Tyres for Class Three cars:** Only the following specified tyres are authorised:

- Avon ACB 9      Front size: 5.0 / 22.0 x 13  
Rear size: 6.5 / 23.0 x 13
- Dunlop CR82      Front size: 135 / 545 x 13  
Rear size: 165 / 580 x 13

**23.2 Tyre condition / Depth of tread:** Following any qualifying session and/or race, the depth of tread shall be no less than 1.0mm, measured as follows:

Front tyres: The minimum of 1.0mm shall be taken at the central circumferential groove calculated from the average of three symmetrical locations. No account shall be taken of radial grooves.

Rear tyres: The minimum of 1.0mm shall be taken at either of the two circumferential grooves calculated from the average of three symmetrical locations. No account shall be taken of radial grooves.

**23.3 Tyre modification:** The following modifications / treatments are specifically prohibited:

- Hand cut tread grooves
- Filing, buffing, or any other disguising of the tyre sidewall

- Tyre warmers, chemical treatments or any means of artificially enhancing tyre performance.

## 24.0 FUEL SYSTEM

- 24.1 Fuel tank** (preferably a FIA compliant **safety fuel cell**) of maximum 41 litres capacity shall be installed within the chassis frame and isolated from the cockpit (driver's space) within a separate sealed compartment. The tank shall incorporate the following features;
- A **filler** that does not protrude beyond the bodywork with a positive locking/sealing cap, and
  - A **breather** with the vent mounted above the actual tank incorporating a one-way **rollover / breather valve** to prevent fuel spillage in a rollover situation.
- 24.2 Fuel pump:** only the standard mechanical fuel pump or a 'direct replacement' is authorised.
- 24.3 Fuel cooling** radiators are authorised provided they are mounted within the main chassis frame.
- 24.4 Fuel lines** running through the cockpit shall be metal or metal braided tubing with any connections of a threaded (industry quality) type.
- 24.5 Class One and Class Two cars;** a '**Jiffy-tite**' **3000 series quick-disconnect coupling** shall be installed in the fuel supply line between the fuel pump and carburettor (female connector pump side) for the purpose of taking fuel for compliance checking.

## 25.0 DATA LOGGING

- 25.1 Class One and Class Two cars:** Electronic dashboards and data logging equipment are permitted, however only the following data acquisition sensors are permitted to be fitted to the car:

1x – Engine speed (RPM)	1x – Lambda
1x – Oil pressure	1x - Steering angle
1x – Oil temperature	1x – G-force
1x – Water temperature	1x – GPS transducer
1x – Front wheel speed	1X – Camera
	1X - Box/ambient temperature
1x – Battery voltage	1X Brake Pressure sensor (Front)
1x – Water pressure	1X Brake Pressure sensor (Rear)
1x – infra-red (lap timing) beacon	
1x – Engine throttle position	

- 25.2 Class Three cars:** electronic dashboards and data logging equipment are prohibited.

- 25.3** Cameras may be mounted to the car provided the following is met:

- They are of an appropriate type and size.

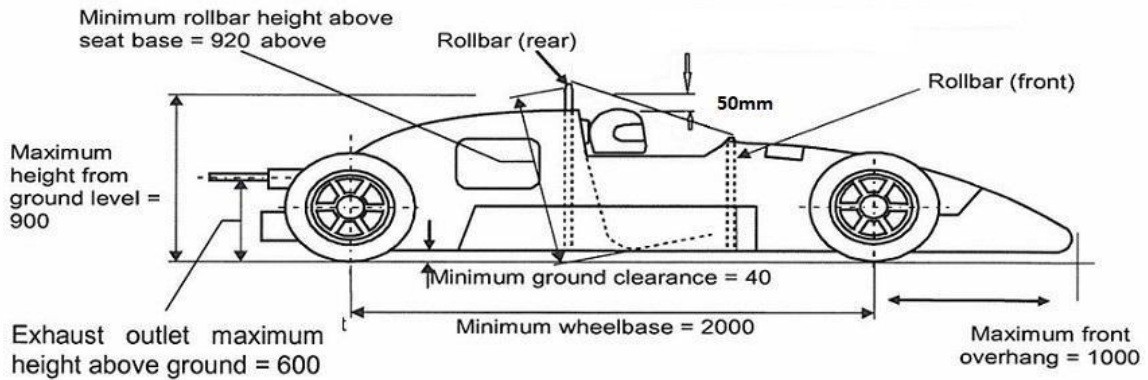
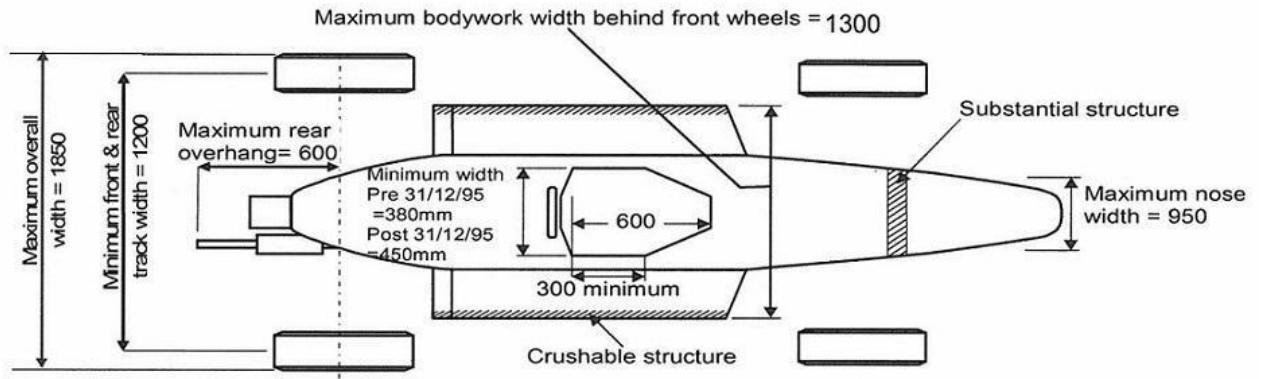


- They are securely mounted preferably using a mechanical means of attachment sufficiently robust to withstand vibration and stresses.
- Where suction mounts are used there must be a secure independent tether in addition to the suction mounts.
- Cameras and their installation are always subject to the satisfaction of the appointed scrutineer.
- Cameras are not permitted to be mounted on Helmets unless the Helmet has been homologated for camera use.

**ADDENDUM 1 - Dimensions**

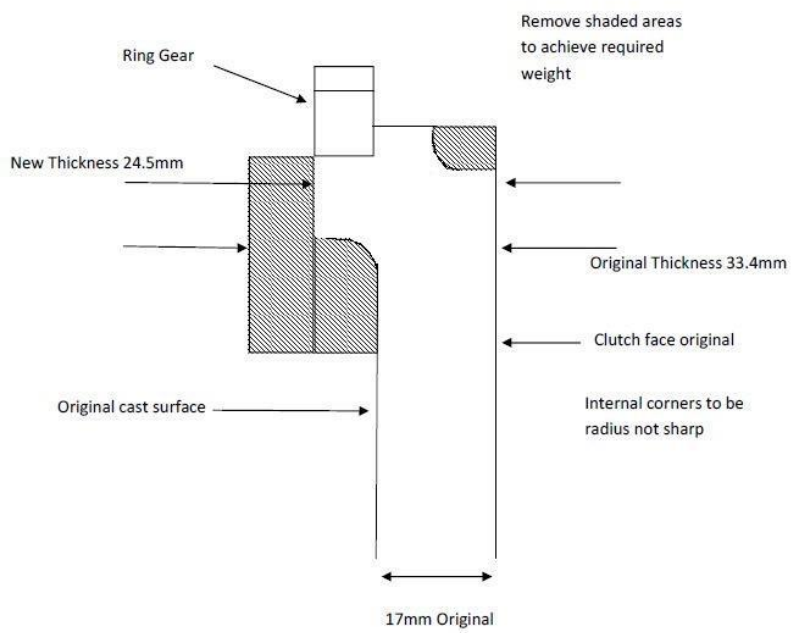
**DIMENSION LIMITS - FORMULA FORD  
All Classes**

All dimensions are in millimeters unless stated



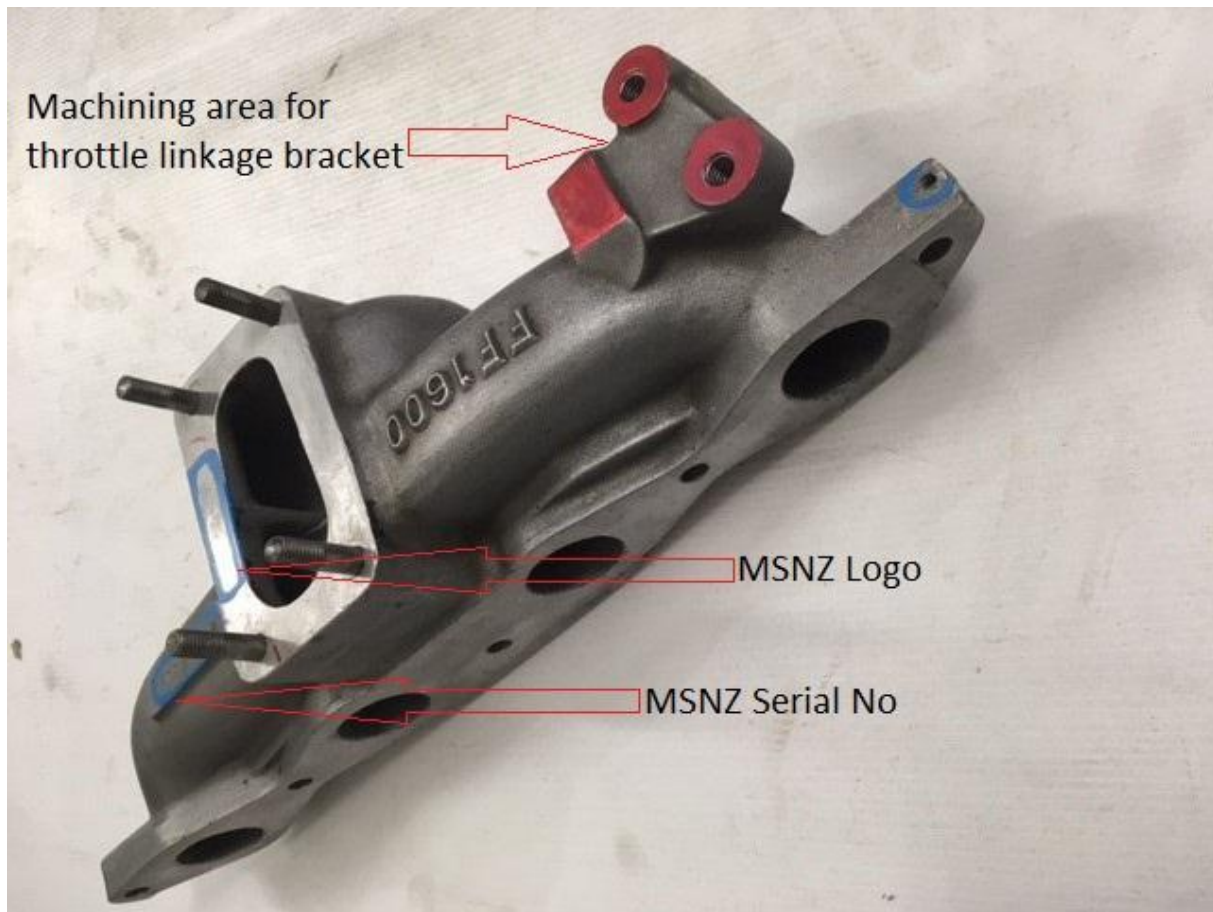
**ADDENDUM 2 - Flywheel**

**Authorised flywheel**



Amount removed will vary depending on fly wheel and cover used  
F-1600 Area to machine to achieve new proposed min weight

**ADDENDUM 3 – Inlet manifold**



**ADDENDUM 4 – Piston Compression Height**

