



**IMSA COMPETITION MEMO #14-09**

To: All TUDOR United SportsCar Championship Participants

From: Scot E Elkins, VP Competition and Technical Regulations

Date: 28 October 2013

Re: 2014 DP Technical Regulations Update

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Please find an updated version of the 2014 DP-based Prototype Technical Regulations.

This version is based on extensive competitor feedback and analysis.

Items changed from the previous version are in blue text. The comment bubbles also provide more detail to these changes.

Items listed to be updated after the November tests (noted and in italics) will be finalized after these tests. All other items are deemed final and competitors may begin preparing based off of this version of the Regulations.

## DAYTONA PROTOTYPE-based Technical Regulations

### SECTION 1 - INTRODUCTION

- 1-1 **Classifications** – IMSA has developed these specifications for competition automobiles based on the Daytona Prototype (DP-based).
- 1-1.1 DP cars are closed-cockpit, mid-engine automobiles, with a complete frame (non-stressed engine).
- 1-2 **Competition** -
- 1-2.1 DP cars compete in the Prototype classification of the TUDOR United SportsCar Championship.
- 1-3 **Eligibility** –
- 1-3.1 Generation 3 (Gen3) cars are the only eligible cars permitted to compete. The only approved constructors of DP-based chassis for the 2014 season are:

Riley –Bill Riley  
704-526-8758  
[Bill.riley@rileytech.com](mailto:Bill.riley@rileytech.com)

Dallara – Luca Bergianti  
003-938-07075496  
[L.Bergianti@dallara.it](mailto:L.Bergianti@dallara.it)

Coyote – Eddie Cheever  
317-713-3191  
[eddie@cheevergroup.com](mailto:eddie@cheevergroup.com)

#### 1-4 Daytona Prototype-

- 1-4.1 Effective at the beginning of the 2014 racing season, all DP-based cars are subject to a homologation process, which will require the specifications to be fully defined.

### SECTION 2 - BODYWORK

#### 2-1 Bodywork -

- 2-1.1 **UPDATED DIFFUSER REGS HERE-TBD after November Test Dates**
- 2-1.2 The underside of the flat bottom shall serve as the reference plane for all subsequent measurements unless otherwise specified.
- 2-1.3 No sprung part of the car is permitted below the reference plane, except the rub blocks, which may protrude below the minimum ground clearance requirement of 1.5".
- 2-1.4 Bodywork must fully cover the circumference of all of the wheels and tires above the axle centerlines, as viewed from above, and all other mechanical components, except the radiator.
- 2-1.5 Bodywork shall not be modified in any way. A maximum 60 sq. in hole is permitted in the bodywork below each tail light and directly behind the frontal projection of the rear tire.
- 2-1.6 No ducts or openings are permitted from the front wheel well/arch to the engine/main roll hoop bulkhead along the vertical side of the car and below a longitudinal plane of 20" above the flat floor reference plane. **A single duct sized 6 inches by 12 inches is permitted in a location behind the engine/main roll hoop bulkhead below the 20 inch reference. This duct is permitted on either side of the car.**
- 2-1.7 The only air permitted to pass through the inside of the car from the dash bulkhead to the engine/main roll hoop bulkhead must pass in an area above the side pod structure(s) or via the approved side exit duct, if present.
- 2-1.8 The rear engine bulkhead separating the driver compartment from the engine compartment must be maintained with no holes or openings of any kind. Material specification needed
- 2-1.9 Wheel wells/arches must be complete and remain open as viewed from the side. Wheel well covers/doors are prohibited. No modifications of any kind may be made to the wheel opening design, as delivered by the constructor.
- 2-1.10 Mirrors. Cars must be equipped with two functional outside/A-pillar/front fender rear view mirrors that are of a minimum dimension of 2 5/8" X 5 5/8". An open unobstructed area measuring 7" X 11" (with a 1" chamfer on each corner) must be maintained from the mirror to the rear of the car. **Add language for mirror adjustability by driver.**
- 2-1.11 Cars must have a transparent polycarbonate rear window above the engine compartment with a minimum size of 700 sq. in. **A maximum of two flush NACA ducts may be installed in the rear window. They must be transparent if required to achieve the minimum visible area rule but may be opaque if**

other sufficient area is available to achieve the requirement. These may be used to duct intake air in or out of the engine compartment. The maximum size of each duct is 10.5" wide x 19.0" long if a single duct is present and 9.0" wide x 12.0" long if two ducts are present.

2-1.12 Rear Spoiler. An adjustable rear lip spoiler may be added to the rear of the approved bodywork provided it complies with the dimensional requirements and with rearview mirror visibility. The leading edge of the spoiler must not extend forward of the leading edge of the rear wing. Air must not pass under the bottom side of the spoiler. Rear spoilers, or any added rear spoiler wickers, must not be slotted to accommodate interference with the rear wing end plates. (Note) The regulation permitting the wing end plate to be trimmed and the mirror visibility limitations define the maximum size wicker/spoiler angle combination. *MAY BE MODIFIED AFTER Nov Test*

2-1.13 Each registered DP car may utilize the complete original approved bodywork or the complete approved 2012 bodywork. Once a team declares the bodywork they will utilize in a season they must not change from the declared bodywork.

2-2 Headlights and tail/brake lights are required and must be operational at all times.

2-2.1 Additional driving lights are permitted.

2-2.2 A high intensity red rear rain light (minimum 21 watt) must be mounted in the center rear of the car.

2-2.3 Headlamp and tail lamp changes must be approved in writing by IMSA.

### 2-3 Aerodynamic Devices – Ducts – Vents - Louvers

2-3.1 Any air intake ducts/openings in the exterior bodywork must duct all air directly to the brakes, through a cooler, or directly into the engine compartment intake or cockpit. These ducts may also exhaust air from the cockpit except as specifically approved for Gen3 DP cars. Additional ducting may be added to the door windows for driver cooling, subject to IMSA approval.

2-3.2 The engine water radiator must be mounted forward of the front bulkhead, and must exhaust the hot air out of the bodywork forward of the windshield. The radiator may be visible when viewed from above. The radiator exhaust duct area may be adjustable in length but must not extend beyond the original body contour or be visible in side profile. A 0.500" gurney may be added to the radiator exhaust duct area. Any added material must be painted to match the bodywork color.

2-3.3 Engine air intakes must only be located rearward of the side door window and located below the plane of the roof. The intake may also extend outwards from the vertical bodywork plane no more than 3" and be an integral part of the bodywork. Inlet air may also be ducted through clear NACA ducts in the rear window as described in Section 2-1.11.

2-3.4 Roof air inlets, or snorkel scoops, are prohibited. A maximum of two vents, each a maximum size of 11 square inches, may be installed in the roof for exhausting air from the cockpit.

*2-3.5 Rear Wing. NEW REAR WING SPECS HERE-TBD after November Test Dates*

2-3.6 Louvers. Louvers above the front wheels/tires are required, with a minimum of 30 sq. in. of opening. The louvers must not protrude more than 1" above the bodywork and mechanical components (including the tires) must not be visible when viewed from above (or perpendicular to the radius, if on a curved surface).

*2-3.7 Front Spoilers. UPDATED FRONT AERO SPECS HERE-TBD after November Test Dates*

*2-3.8 Wheel Wickers. . UPDATED FRONT AERO SPECS HERE-TBD after November Test Dates*

*2-3.9 A single add-on dive plane. UPDATED FRONT AERO SPECS HERE-TBD after November Test Dates*

*2-3.10 Rear Dive Planes. . UPDATED FRONT AERO SPECS HERE-TBD after November Test Dates*

## SECTION 3 - WEIGHT

3-1 Minimum Weight - Minimum car weight, per engine displacement, less fuel and driver race ready.

Minimum weight for all cars: *2285 lbs TBD after November Test Dates*

3-1.1 The use of titanium is prohibited

3-1.2 The use of magnesium is prohibited.

## SECTION 4 - ENGINE ELIGIBILITY AND MODIFICATIONS

4-1 Eligibility - IMSA regulates engines as follows -

4-1.1 Eligible engines must be homologated by IMSA. A Homologation Form must be completed by the Manufacturer and validated after the inspection carried out by IMSA. The

Manufacturer must pay all the expenses for the homologation of the engine.

4-1.2 Engines must be production-based.

4-1.3 All engine details/specifications shall be specified in the homologation document. .

4-1.4 Engine Specifications:

Engine	Type	Max Cyl Capacity	Comp ratio	Max.Bore
a/Normally Aspirated Petrol		5.5L 8 cyl	11:1	4"
b/Turbo/Supercharged Petrol		3.5L 6 cyl	11:1	4"
c/Turbo/Supercharged Diesel		2.5L 6 cyl	11:1	4"

#### 4-2 General Engine Requirements

4-2.2 Cylinder heads must retain the same number and location of intake and exhaust ports, valves, spark plugs, and camshafts (if used) as the production engine. Valve location, valve size and angles must remain stock as on the homologated production heads. Intake/exhaust porting and polishing is permitted.

4-2.3 The stock production block and cylinder heads must be used. A maximum of .030" overbore is permitted.

4-2.4 The use of titanium or ceramic engine components is prohibited except for titanium valves and titanium valve spring retainers.

4-2.5 The following items may be replaced with the specified material for aftermarket components - steel crankshaft, steel rods, aluminum pistons, titanium or steel valves, steel valve springs, camshafts, cam followers, timing chain/cam drive and dry sump oil pump and system. Replacement items must be readily available to all Competitors.

4-2.7 The exhaust is free except - Exhaust system must be of round or oval tubing.

Exhaust system must exit aft the middle of the wheelbase and shall remain within the perimeter of the bodywork when viewed from above. Variable exhaust systems are prohibited. *EXHAUST LOCATIONS WILL BE DEFINED IN A LATER BULLETIN*

4-2.9 Teams, with the assistance and coordination of the engine builder(s) or manufacturer, must ensure that there is at least one shipping crate available at each Event capable of transporting their engine, exhaust headers and engine air inlet system to a testing facility of IMSA's choosing.

4-2.10 Throttle: Free.

4-3.11 Air boxes:

Inlet manifolds must be fitted with air restrictors made of metal or metal alloy the diameter of which must be a minimum 3mm (Appendix 1 below)

Air tightness must be total in all circumstances: no pipe containing air is permitted to intrude into or to exit from the air box(es);

Closing the intake system at restrictor(s) level must stall the engine immediately. The depression measured in the air box when the engine stops (engine rev= 0) must be

- equal to the atmospheric pressure at the place where the test is carried out – 150 millibar during the first half second;
- equal to the atmospheric pressure at the place where the test is carried out – 100 millibar during the second half second;
- equal to the atmospheric pressure at the place where the test is carried out – 50 millibar during the third half second;

A standard connection "Dash 3 male" is mandatory on the air box of a normally aspirated engine for the possible connection of measuring equipment

The diameter of the air outlet must be 2.4 mm (3/32") minimum. This connection must be:

- easily accessible;
- outside the air flow above the induction trumpets, preferably facing the air intake(s);
- sealed when the measuring equipment is disconnected.

If the air box(es) is(are) made of several parts, they must be put together in an efficient way so as to ensure a total air tightness;

Any faulty functioning is the Competitor's responsibility.

Turbocharged engines:

Air restrictor location: a one-piece and airtight cone must be fitted between the restrictor(s) and the inlet diameter of the charging device.

The cone must have a mandatory opening of seven (7) degrees minimum.

To each base of the cone, over 10mm in length, a round shape is permitted within the diameter of the restrictor and the charging device inlet.

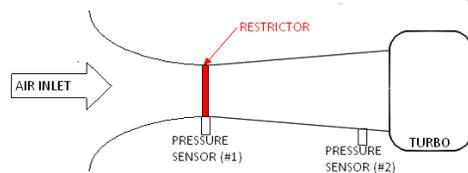
Charging devices incorporating ceramic components apart from the bearings, variable diameter inlets and adjustable internal vanes are prohibited.

Boost pressure: see Appendix 1.

For turbo-charged engines the air box pressure sensor delivered with the IMSA data logger kit must be fitted after the restrictor and before the turbo (see drawing below).

For cars with two turbos, the sensor is mandatory on only one turbo.

In order to assist with engine mapping, it is permitted to add a pressure sensor in the restrictor area (pressure sensor #1). In all cases (pressure sensor #1 and #2) the maximum opening diameter is 1mm.



Temperature of the charge:

Apart from the intercoolers, any device, system, procedure, construction or design, the purpose and/or effect of which is any decrease whatsoever of the temperature of the intake air and/or of the charge (air and/or fuel) of the engine is prohibited.

The pipes between the supercharging device, the intercooler and the manifold are free, but their only function must be to channel air.

Internal and/or exterior spraying or injection of water or any substance whatsoever is prohibited other than fuel for the normal purpose of combustion in the engine.

Intake System: Free.

Variable length manifolds are prohibited.

Variable valve timing: Any device that permits the modification of the valve opening timing and/or lift is considered variable valve timing and is not permitted.

## SECTION 5 - DRIVETRAIN

5-1 Approved Models – The transaxle must be approved by IMSA and be incorporated in the Constructor's

Homologation document for the car.  
5-1.1 **Differential** - The differential must be homologated by IMSA.

Mechanical limited slip differentials working without the help of a hydraulic or electric systems are the only units permitted. The following group are of this type: non-ramp type, limited slip, clutch plate differential or a ramp type

Ramp Angles and friction materials are free

**Comment [WU1]:** Viscous Diff no longer permitted.

Suspension mounting points on/to the transaxle case(s) are prohibited.

5-2 **Clutch/Flywheel** – Flywheel must be steel. Clutch must be a heavy-duty multiple-disc type, using three or more discs with a minimum diameter of 5.5". Disc material is free.

5-3 **Maximum forward gears** - A maximum of six (6) forward gears are permitted.

5-4 **Reverse Gear** – Mandatory: It must be possible for the driver seated and belted in a normal position to select the reverse gear while the engine is running.

5-4 **Sequential gear change** - Electronic or electric management and selection devices, and semi-automatic or automatic transmissions are prohibited.

Any system that permits more than one gear pair to be engaged to the drivetrain at any one time is prohibited.

Gear change: gearshifts must be distinct sequential actions, where the extraction of the actual gear engagement is subsequently followed by an insertion of the target gear engagement.

5-5 **Gear ratios**- are free

**Comment [WU2]:** Removed 3 gear set limit

5-6 **Bell housing/Adapter Plate** - The IMSA mandated engine to transaxle adapter plate must be made of steel or aluminum.

5-7 **Axle Retention** - The transaxle must be fitted with a complete approved axle retention system, including the output flanges, tripod joints, axles and hub drive. The approved axle retention systems are:

EMCO Gears, Inc.	Pankl Racing Systems	XTrac
703 South Girlschool Rd.	16615 Edwards Road	6183 West 80th Street
Indianapolis, IN 46231	Cerritos, CA 90703	Indianapolis IN 46278
317 243 3838	562-677-7254	317 472 2454

5-8 **Attenuator** – Each transaxle must be fitted with the Riley Technologies rear transaxle attenuator mounted per the manufacturer's specifications.

## SECTION 6 - WHEELS

6-1 **Wheels** -

6-1.1 Wheels must be 18" diameter and permanently marked on the wheel centers with the corresponding number of the car.

6-1.2 Complete wheel/tire measured horizontally at the hub level:

Maximum width is 14".

Maximum diameter 28"

6-1.3 Material: Aluminum cast or forged only.

6-1.4 Wheel offset is free.

6-1.5 Front Wheels must be of an approved 1, or 3-piece design. Rear Wheels must be of an approved 3-piece design only.

**Comment [WU3]:** 1 piece wheels only permitted for Front wheels to fit larger brake disc

6-1.6 Single wheel minimum weight (tire removed):

Front – 22.5 lbs. or 10.21 kg.

Rear – 23.5 lbs. or 10.66 kg.

**Comment [WU4]:** Changed to the lower DP wheel weight

6-1.7 **Sensors:** Sensors for the pressure and the temperature of the tires when the car is in motion are strongly recommended. Pressure control valves are prohibited.

If these sensors are used, there must be at least one warning light to notify the driver of a possible failure.

## SECTION 7 - SUSPENSION

7-1 **Design** - Suspension must be of four-wheel independent design, with only one spring and one shock absorber per wheel permitted. The spring must be on the shock absorber (coil-over style). 3rd spring technology is

prohibited. Bump rubbers or packers are permitted. All suspension components must be used as they were delivered or updated by the constructor.

**7-2 Rear Suspension** - All rear suspension and coil-over mounting/pickup points must be to the main chassis framework, the engine bell housing/adaptor plate and/or the transaxle/suspension mounting plate.

**7-3 Active Suspension** is prohibited.

**7-4 Shock Absorbers** –

7-4.1 Approved brands and models:

Dynamic Suspension DSSV or Penske 8760 or Penske 8780

IMSA will maintain checking components in order to verify compliance and identical configuration; it is the Competitor's responsibility to verify that their units are exactly the same as the IMSA checking pieces in all regards. Approved Part listings will be posted on IMSA website

Competitor modifications to or fabrications of complete damper components that are not produced by approved damper manufacturers are prohibited. The following exceptions apply:

1. Oil bleeding vacuum machine port addition to shaft bearings (Penske)
2. Machining of piston ID from .500 to .625 (to accept Penske decoupled top-out plate assembly AS-DCP454 or Digressive Blow-Off Components P-DIG-A and PI-DIG-B).

**7-4.2 Maximum 4-way adjustment with one remote canister is permitted.**

7-4.3 Cross-connected shocks are prohibited.

7-4.4 Spring and shock absorber adjustment from inside the cockpit is prohibited.

7-4.5 Hydraulic ride height adjustment of any kind is prohibited. Any form of driver controlled ride height adjustment is prohibited.

7-4.6 Driver adjustable front and rear anti-roll bars are permitted. The adjustment mechanism must only consist of mechanically operated levers acting on "blade" type adjusters or connector links moving on the length of the anti-roll bar "leg" or "arm". When used, Anti-roll bars must be connected to the suspension by a solid link. Links may be adjustable in length but must be a fixed length during on-track operation. The use of heim joints is permitted.

**Comment [WU5]:** Same damper rules as 2013 with exception of permitting Penske 8780 damper

**Comment [WU6]:** 4 way adjustment permitted

## SECTION 8 - CHASSIS/BODY Dimensions

**8-1 Basic Dimensions** -

8-1.1 Overall length – 175" to 180". +/- .2"

8-1.2 Overall width – 77" to 79". - .4"

8-1.3 Overhangs - Front; maximum 36" total, including a maximum of 4" of splitter length. Rear; 32" to 34", measured from the axle centerlines. +/- .4"

8-1.4 Overall height - Minimum roof height 41", measured from the reference plane.

8-1.5 Minimum ground clearance - 1.5".

**8-1.6 Wheelbase add language here**

8-1.7 Additional chassis structure or reinforcement may be added to the approved chassis design.

8-1.8 The #2 floor section (center engine compartment) may have up to 400 sq. in total of flush opening (no protrusions on the inner or outer surface of the floor panel) symmetrical around the centerline of the car.

8-1.9 It is recommended that the driver's compartment foot well have an additional metal floor above the "reference plane" floor to protect the driver's feet and legs in the event of damage to the original floor.

8-1.10 The front floor must not project forward of the front bulkhead section. Riley cars may use L09-100C-REP for front floor repair.

## SECTION 9 - BRAKES

9-1 Free except as below:

9-2 Separate Circuits: At least two separate circuits operated by the same pedal are compulsory.

The only connection permitted between the two circuits is a mechanical system for adjusting the brake force balance between the front and rear axles. No device or system is permitted between the master-cylinders and the calipers. Sensors to collect information stop light switches or mechanical brake pressure controls adjustable by means of tools are not considered as "systems" and they must be fitted at the very exit of the master-cylinders.

**9-3 Disc Brakes and Brake Pads:** Material is free. One Disc per wheel maximum. Maximum diameter of the front discs: 380 mm , Maximum diameter of the rear discs: 355 mm

**9-4 Calipers-** Only one caliper with six pistons maximum is permitted per front wheel. The section of each caliper piston must be circular. The caliper body must be made from aluminium alloy with a modulus of elasticity no greater than 80 Gpa.

Titanium pistons are permitted in brake calipers.

Cars utilizing Carbon brake materials are subject to a +25 lb weight penalty

**Comment [WU7]:** Controls on disc sizes

**Comment [WU8]:** Same as 2013

**Comment [WU9]:** BOP w steel brakes-team choice as to use carbon or steel

Note: All front and rear brake rotors must be of the same manufacturer. Any combination of rotors and calipers are permitted.

## SECTION 10 - FUEL SYSTEM

**10-1 Specification** - DP must use a safety fuel cell meeting FIA FT 3.5 or FIA FT-5 specifications. Fuel cells must be approved by IMSA.

10-1.1 Rubber bladders must have a printed code naming the manufacturer, the specifications to which the bladder has been manufactured and the date of manufacture.

10-1.2 The fill tube from the cover plate must extend no farther than six inches into the enclosed volume of the top of the fuel cell bladder. The fill tube cannot enter the fuel cell below a point 13 inches above the bottom of the fuel cell. The fill tube must be straight and must not have any swirl pots, diffusers or any other augmentation. The fuel cell fill/cover plate must be removable for inspection.

**10-2 Location** -

10-2.1 The fuel cell and lines must be sealed from the engine and cockpit compartments.

10-2.2. Cars must be fitted with a self-sealing connector which can be used by IMSA to take a sample of fuel from the tank. This connector must be :  
approved type;  
fitted immediately before the injector nozzles

**10-3 Fueling** - A twin-probe dry break fueling/vent system capable of changing from the right to the left side of the car must be installed on a metal plate firmly attached to the main roll bar.

**10-4 Fuel Capacity** -Maximum onboard fuel capacity is 75 L or 19.81 U.S. gallons.

## SECTION 11 - ELECTRONICS/DATA LOGGERS

**11-1 Data Recorder** – The car must have installed the IMSA-specified data recording system. IMSA reserves the right to view any/all data collected by a team/entrant at any time. The spec ECU/Data logger must always have a 128 Mb or larger memory card installed during all on track sessions. Data cards must not be removed from the car without permission from an IMSA Official.

## SECTION 12 - IDENTIFICATION

**12-1 Car Identification** - Cars registered with IMSA are identified first by the name of the engine manufacturer and then by the Constructor. Gen3 cars may have a specific name issued by the OEM and the chassis Constructor's name is not required.

**12-2 Engine Identification** - If the engine manufacturer is approved for the Manufacturer's Championship, the name of the engine manufacturer, or the term "powered by" (the name of the engine manufacturer) must be displayed across the upper portion of the windscreen with the manufacturer's name in letters at least six inches high. Additionally, the same term (name) or manufacturer's logo must be displayed in a prominent location on the centerline of the car at the front and on each side of the engine cover rearward of the side window openings. Minimum size: 32 sq. inches. If the engine manufacturer is NOT approved for the Manufacturer's Championship, the car must display an IMSA supplied windshield banner on front windscreen.

## SECTION 13 - SAFETY EQUIPMENT

**13-1 Fire extinguishers** –

Cars must utilize an IMSA approved dual fire extinguisher system. The system must consist of separate fire bottles for the engine/fuel compartment and for the cockpit. The cockpit system must consist of a 2 ½ lbs.

minimum capacity FE-36 bottle. The actuator for this bottle must be mounted within reach of the driver when seated normally and belted. Triggering is by means of a PULL actuator. The engine compartment system consists of 10 lbs. minimum capacity bottle of 1211 or FE36 with a remotely mounted, 286 degree Fahrenheit, fast response, thermal sensor and optional cable-mounted manual override. The thermal sensor and nozzle must be mounted to the firewall above the fuel cell per the supplier's recommendations. The optional manual override cable must be PULL actuated and mounted within easy reach of the driver seated normally and belted. Only IMSA approved supplier components are permitted. All system components must be used and serviced per their supplier's specifications. Other systems or extinguishing agents are prohibited. The fire system must be mounted so the mandatory gauge is visible at all times.

Approved Suppliers are:

Firefox Industries  
3243 Old Frankstown Rd.  
Pittsburg PA 15239  
724.733.3936 James Zwergel

and Safecraft Inc.  
5165-C Commercial Circle  
Concord ,CA 94520  
925.405.0307 Steven Baker

### 13-2 Wheel Tethers-

Cars must have the front and rear uprights linked to the frame using Vectran HS V-12 fiber cables (tethers) available from CV Products. On the chassis end, the tether must either loop around a chassis tube or be otherwise securely retained. On the upright end, the tether may be looped through openings in the upright or captured by a substantial bolt-on structure or a dedicated mounting loop attached to the upright. These attachments must be as designed by the Constructor and approved by IMSA. Tether attachment points must not be common with any other suspension mounting points. Attachment must be secured such that it exceeds the tensile strength of the tether. Each Constructor must have available an IMSA approved all-inclusive kit containing all of the components and installation instructions. The approved kit must be used.

## Appendix 1

B.1. - Restrictors for Petrol Normally Aspirated Engines (Diameter in mm)

Comment [WU10]: Restrictor Tables will be defined at a later date.

B.2. - Restrictors (Diameter in mm) and absolute Supercharging Pressure (mbar) for Petrol/Diesel Supercharged Engines