

**Race Engine Challenge**  
**Max Street/Strip Engines**  
**Two Categories**  
**Canted/Hemi/Nonlinear\* or Inline Valve Heads†**

**2019 TECHNICAL RULES**

This contest WILL use a cubic inch divider in scoring to compensate for varied engine displacement. Scored test RPM range is 4000-7500 RPM at 300 RPMs/second. Dyno correction factor will be SAE J607. Scores will be determined by averaging three of the best average HP dyno pulls out of up to the ten pulls permitted. The sum of the average corrected HP quotient is multiplied by 1000 and then divided by the claimed cubic inches.

**100 – ENGINE**

Normal aspirated OEM domestic architecture cam in block passenger car V8 engine. Power adders prohibited. Any method of artificially heating and/or cooling engine fluids, fuel, and/or air prohibited (not to include thermal or friction coatings). This includes, but is not limited to, heating and cooling by mechanical device such as an external cooler or radiator/heater exchanger, pre-heating or cooling of any fluids with an oil heater or fuel heater/cooler, or the addition of a temperature-altering device designed to cool or heat the incoming air charge by mechanical means such as an intercooler, chemical means such as a chemical to cool either the incoming air/fuel charge or intake manifold, or electrical means such as an electric oil heater inside or outside the engine. Aftermarket SFI spec 18.1 harmonic balancer is mandatory.

**101 – DISPLACEMENT**

370 cubic inch minimum displacement to 510 cubic inch. Cubic inch is calculated by bore x bore x stroke x 6.2832. Cubic inches are calculated to one (1) decimal place, i.e. 450.0. Any part of a cubic inch is rounded up the next highest inch, i.e. 401.2 = 402, for the purpose of claimed cubic inch of engine as used in scoring. The cubic inch used in scoring will be a whole number; no decimal part will be used.

**102 – ENGINE BLOCK**

Any domestic OEM passenger car or commercially available aftermarket OEM replacement, cast iron or aluminum block permitted. Engine block must retain OEM cylinder bore spacing, block angle and stock lifter bores spacing. Raised deck and raised cam blocks permitted. LS/SBC hybrid blocks permitted.

**103 – CRANKSHAFT**

Any commercially available crankshaft permitted.

**104 – CYLINDER HEAD CHOICE DETERMINES CATEGORY**

Send in a question if you're not sure which category your heads could fall in.

**\*Canted/Hemi**

Any cast two valve aftermarket or OEM head permitted. No billet heads permitted. Any valves permitted. No welding/epoxy on the exterior of the heads except welding/epoxy repairing for PUSHROD CLEARANCE and welding on the heads to be able to tap threads to secure an intake manifold. Spark plug and valve guides must remain in their original as cast location. Valve angle does not have to match original OEM angle for its family of engine. Welding/epoxy within ports permitted. Ports must remain in their original as cast and manufactured location. Push rod tubes permitted. From the bottom/deck of the head to the bottom of the port is limited to 2". Because of its different architecture, the GEN III Hemi is limited to 2.300". Up to one hundred thousandths (.100) offset dowel pins permitted. No cylinder head deck plates permitted.

**†Inline Valve/Non-Canted**

Inline valves (e.g. LS engine) and OEM intake/exhaust 2 valve architecture. Valves do not have to match OEM angle. All other rules from the previous paragraph apply and all other engine rules are the same. Inline head that have more than two inches (2") from the deck to the bottom of the intake port are in the canted /hemi category.

### **105 – IGNITION**

Unlimited. ECU and ignition components may be mounted either on the front or a plate attached to the flywheel side of the engine block and/or back of heads/intake manifold.

### **106 – CARBURETION**

Unlimited. Water or any other auxiliary fluid injection systems prohibited. Must be equipped with a single point rearward pull mechanical throttle linkage compatible with the dyno actuation linkage. A bracket providing an anchor point for the dyno throttle cable and a compatible linkage ball is required at the pull point. A diagram detailing the requirement will be provided to all accepted REC participants.

All engines will utilize an electric fuel pump and regulator and supply line filter supplied by the dyno facility and each engine builder utilizing a carburetor will determine the fuel pressure. Both single and dual feed applications will be given one (1) type 8 AN connection fuel line.

### **107 – FUEL INJECTION**

Unlimited. 65 psi maximum supplied fuel pressure at dyno gauge. Water or any other auxiliary fluid injection systems prohibited. Must be equipped with a single point rearward-pull mechanical throttle linkage compatible with the dyno actuation linkage. A bracket providing an anchor point for the dyno throttle cable and a compatible linkage ball is required at the pull point. A diagram detailing the requirement will be provided to all accepted REC participants.

Fuel pressure regulation will be provided by a system consisting of an electric fuel pump, regulator and supply line filter as part of the dyno fuel system. Fuel pressure will be set at 65 PSI maximum on the dyno fuel pressure gauge. Fuel pressure will be set prior engine start up (engine off)l.. This is a Supply and Return system. A single -8 AN fitting will be required for fuel hook-up to the fuel rails. A single -8 AN fitted and return fuel line will be supplied to fuel tank.

### **108 – AIR SUPPLY**

Provided by a plenum in the ceiling with air coming in at a 45 degree angle.

### **109 – AIR FILTER**

Not permitted. Structures such as ram tubes, velocity stacks, etc. attached to the inlet portion of the carburetor/fuel injection are permitted. Velocity stacks, ram tubes or other devices attached to the throttle body/carburetor limited to six (6) inches maximum.

### **110 – CAMSHAFT**

Unlimited.

### **111 – CAMSHAFT DRIVE**

Unlimited.

### **112 – LIFTERS**

Any lifter type permitted. .905 diameter limit. Engines that were originally larger than this, permitted. Lifter bushings permitted.

### **113 – ZERO LASH VALVE LIFT LIMIT**

.775

#### **114 – CAMSHAFT JOURNAL DIAMETER**

Maximum of 55 mm. Gen III Hemi can run their original journal size.

#### **115 – IDLE**

Engine must be able to idle under 1100 RPM's.

#### **116 – INTAKE MANIFOLD**

The use of spacer/adaptor plates for intake to head attachment permitted. Welding or epoxy on interior/exterior permitted. An intake from another family of engines can be used. Eight stack†, tunnel ram, cross ram and sheet metal permitted. From the top of the china wall to the top of the intake manifold including carb or throttle body spacer is limited to 12.5 inches. The 12.5 inches does not include the carb/TB. With forward facing throttle bodies on fuel injected engines, the limit to the top of the plenum is also limited to 12.5 inches. Unlimited carb/TB spacer as long as the total height when using a carb/TB spacer is no more than the said 12.5 inches. With GEN III Hemis a line will be drawn between cylinder heads to represent a china wall. The width of the manifold is limited to a horizontal line drawn between a vertical line drawn from the two outer edges of the cylinder head's outer edges of the valve cover surface.

Front facing throttle body manifolds are limited to five (5) inches from the face of the block to the outermost portion of the manifold without the throttle body. No variable runner length mechanism permitted.

†Subject to the 12.5" rule from the point of air entry.

#### **117– CONNNECTING RODS**

Any connecting rod permitted.

#### **118 – PISTONS AND RINGS**

No smaller than .8m, .8mm, .2mm. Lateral and vertical gas ports permitted.

#### **119 – COMPRESSION RATIO LIMIT**

12.0:1

#### **120 – FUEL**

VP Racing Fuels MS109 will be used.

#### **121 – ROCKER ARMS**

Unlimited.

#### **122 – HEADERS**

Chassis-style exhaust headers that run down and back from the front of the engine required. Port matching of the header flange permitted. Any diameter primary tubes and collectors permitted. Headers and slip-on style collectors are acceptable. **Maximum collector diameter 3.5" minimum collector 3"**.

Crankcase ventilation systems that vent to any component of the exhaust system are permitted. Bungs for Lambda O2 sensors are permitted. Thermal header wraps (such as Kevlar fabric) not permitted. Adapter plates between cylinder head and header permitted. A minimum of 21 inches between collectors. Exhaust "port plates" permitted.

### **123 – OIL PAN/SCRAPER**

Oil pan does not need to be commercially available. Pan must measure no deeper than twelve (12) inches from the crank centerline. Pan restricted to maximum of two (2) inches wider on one side than widest portion of pan rail. Sump configuration may be front, center, or rear. Sump must be maximum of ten (10) inches long and six (6) inch minimum front to back and have at least a three inch (3.00”) differential from the lowest section of the pan to the balance of the pan. Dual sump pans that have a sump in the front and rear (e.g. 79-93 Mustang pans) must also have a 3” differential between the two sumps and the center section. Dry sump systems and vacuum pumps prohibited. Oil pumps with scavenging stages or used in conjunction with external tanks is prohibited. Oil system accumulators prohibited. External belt driven single stage oil pumps permitted. Electrically powered oil pumps prohibited. Temp sensor will be attached to the surface of the oil filter.

### **124 – OIL**

All engines must be shipped “dry”. Engine will be required to use at least 5 quarts of oil. Participants will use only the oil supplied for the competition. Competitors will have their choice of viscosity.

### **125 – OIL ADDITIVES**

No oil additives permitted.

### **126 – WATER PUMP**

Belt driven mechanical water pumps or electrical water pumps permitted. Use of cooling system thermostat prohibited. Water pump must be mounted in the OEM location.

Water out of the block in the front of the engine can be modified as long as it is to a single point that can be attached to the dyno cooling system. **Water in and out requires your engine to take a 20 AN female or have a 1.25” barb.**

Water lines from the back of the manifold to the front permitted.

### **127 – ELECTRICAL CONNECTIONS**

Contestants will be supplied three (3) 12 Volt 20 AMP and three (3) negative connections.

### **128 – STARTER**

Dyno will provide the starter.

### **129 – FLYWHEEL/FLEXPLATE**

Any commercially available, FI-certified domestic manual STEEL transmission flywheel is mandatory. Flex plates are prohibited.

### **130 – COATINGS**

Any commercially available performance coating permitted.