# 2019 Rules Early Iron Engine Masters Challenge



# **Early Iron**

# TECHNICAL RULES – Section 300

(NOTE: This class will use a cubic inch divider in scoring to compensate for varied engine displacement. Scoring test range will be competitor selected 3000 RPM window with scoring pull beginning 200 rpm before and ending 100 rpm above selected values. Scoring window chosen must be between 3200 and 7200 RPM. RPM window selection may not changed once affirmed before starting engine. Engines claimed under 250 cubic inches will receive a 10% deduction, in final score, to assure fair competition.

Dyno Thermostat is set at 150-165 degrees.

Each Team and Team leader will be responsible for carting their own engines. EMC staff will assist with installation on the dyno.

If you are not familiar with the carting of Superflow 902 Dyno with super Flow Pro Bellhousing it is highly suggest you get familiar.

#### 300 - ENGINE

Normally Aspirated US domestic OEM production passenger car pushrod V8 engine introduced in 1968 or earlier. Competitor must claim specific OEM engine and year model being used for this competition.

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/or cooling by mechanical device such as an external cooler or radiator/heat 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 specs 18.1 harmonic balancer mandatory.

# 301 - DISPLACEMENT

Displacement is limited to .065" overbore for 1968 and earlier engine being claimed. Cubic inch is calculated by bore x bore x stroke x 6.2832. Bore is measured at top of cylinder where ring wear is not evident. Bore and stroke are measured to the third decimal place, i.e. 0.001. Cubic inches are calculated to one (1) decimal place i.e. 350.0. Any part of a cubic inch is rounded up to the next highest inch (i.e. 301.2 = 302) 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.

#### 302 - ENGINE BLOCK

Any 1968 and earlier domestic OEM passenger car, or OEM direct replacement, cast iron block, having OEM deck height and main bore diameter. Matching later model blocks allowed when approved in writing by EMC Tech Committee. Aftermarket blocks PROHIBITED. Engine block must retain OEM cylinder bore spacing, and OEM block angle. Overbore is limited to no larger than .065" for the 1968 or earlier engine being claimed. Lifter bores may be bushed. The responsibility for adapting to the SUPERFLOW dyno cart is that of the participant.

#### 303 - MOTOR PLATES

Front style "motor plates" are "required" for installation on the Superflow Dyno. Motorplate must be between 26" and 29" width as measured across the camshaft center line. 1/4" Aluminum or steel plate is acceptable.

# 304 - CRANKSHAFT

Any commercially available forged or cast steel or cast iron crankshaft permitted. Any journal diameter permitted. Maximum .015 thousands stroke change for engine being claimed is permitted. Billet crankshaft prohibited.

#### 305- CYLINDER HEADS

OEM mass produced cast iron passenger car cylinder heads are the only type of heads that can be used. Heads must be originally manufactured for the engine application in which it is being used. Any welding and / or brazing other than allowed repair, prohibited. Maximum valve size 2.25". Any commercially available stainless steel valve permitted. Titanium valves and/or springs prohibited. Titanium retainers permitted. Up to one intake and / or one exhaust runner may be repaired by brazing, welding or epoxy. Flow and / or directional changes by use of said epoxy is strictly prohibited. The stock OEM intake bolt flange must be used and maintained. Head gaskets must be conventional style, embossed steel or composition with a MAX compressed thickness of .120". No part of the mating surface of the head/head gasket may extend or protrude into the cylinder of the block.

Engine must use 1968 and earlier OEM. 1968 and earlier NHRA Stock
eliminator accepted, mass produced cast iron passenger car cylinder heads.
OEM factory high output or high performance "Limited" production cylinder heads will not be accepted. Entrant must submit head part number for preapproval by EMC Rules committee prior to acceptance. Absolutley NO CHANGES in engine or head claim will be accepted onsite at EMC competition.

Cylinder head must match engine type and family of engine claimed. Porting permitted. Pushrod tube or sleeve modification prohibited. Minimum valve stem diameter 5/16". Ti valve springs prohibited. Guide plates permitted. Valve angle must remain as per manufacture's specifications, +1/-1 degree. Any retainer permitted. Flange adapters that connect the exhaust ports to the header prohibited.

#### 306- IGNITION

# Engine must use Distributor ONLY. Crank trigger prohibited

Other ignition trigger devices prohibited. Spark advance functions must be by conventional mechanical systems within or on the distributor only. Distributor and

single coil ignition only. Programmable ignitions and/or ignition boxes/devices are prohibited. Hook up of computer or remote programming device of any kind to ignition system prohibited. Spark plug wires must be commercially available.

Ignition components must be mounted on a plate attached to the flywheel side of the engine block or back of the heads / intake right hand side. OEM size coil may be mounted in stock location if the intake provides the mounting provisions. For front mounted distributor, coil may use stock coil mount or be mounted on the front motor plate adjacent to proximity location of distributor.

#### 307- CARBURETION

Single 4150-style carburetor only with 1.780 -inch maximum throttle plate diameter. Minimum throttle shaft - .085" measured at thinnest point; minimum throttle plate thickness - .038" measured at thinnest point. Cutting and reassembling carburetor prohibited. No split or stretched style base plates permitted. Slide valve carburetor prohibited. Carburetor must have four individual venturi and four individual throttle blades. Water or any other auxiliary fluid injection systems prohibited. Engines 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 EMC participants.

All engines will utilize a pre-pump fuel filter, 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 application will be given one (1) type 8 AN connection fuel line located on the SUPERFLOW dyno chassis approximately 46 inches from your carburetor, so design your system accordingly. Knock (detonation) sensors prohibited.

#### 308- FUEL INJECTION

The use of commercially available bolt on, stand alone 4150 EFI throttle body unit is permitted. (Example FiTech, Sniper.) Any ignition control is prohibited from EFI. 1.780" throttle bore MAX.

Knock (detonation) sensors prohibited. Water or any other auxiliary fluid injection systems prohibited. The throttle body 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 EMC participants.

Fuel pressure regulation will be provided by a system consisting of pre-pump filter, 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). This is a Supply and Return system. A single -8 AN fitting will be required for fuel hook-up and will be provided approximately 46 inches from center of engine as locked down on SUPERFLOW dyno. A single -8 AN supply and return fuel line will be supplied to fuel tank.

#### 310 - AIR SUPPLY

Dyno cell(Room) supplied/Fresh air.

# 311 - AIR FILTER

Heat shields or plates between the intake manifold and carburetor prohibited. This includes any structure deemed by the event personnel as designed to take advantage of airflow in dyno installation. Structure such as ram tubes, velocity stacks, etc. attached to the inlet portion of the carburetor are prohibited.

# 312 - CAMSHAFT/LIFTERS/VALVE LIFT

# 312 A – CAMSHAFT

Any solid lift camshaft permitted unless otherwise noted below. Camshaft must maintain OEM journal diameters as originally manufactured in production for engine claimed. Roller cam bearings prohibited. Welded camshaft cores prohibited. Nitride cores permitted. Cam bearing O.D. is limited to a max of 1mm oversize for engine claimed. Maximum valve lift at ZERO lash is .600.

#### 312B - LIFTERS

Engine must retain OEM lifter bore size for engine selected. Lifter bore bushings permitted for purpose of blueprinting permitted. Relocation of lifter bore or lifter bore bushing prohibited.

#### 313 - CAMSHAFT DRIVE

A commercially available three piece timing chain set or pre 1968 OEM drive system required. Limited production and/or marine application systems prohibited. Belt drives, exposed or hidden under covers prohibited.

#### 314- INTAKE MANIFOLD

Engine must use a mass produced commercially available cast aluminum or OEM single four barrel intake manifold with centrally located carburetor / throttle body flange required. Intake manifold INCLUDING all additional gaskets and spacers may not be taller than 8 inches measured at the carb / throttle body mounting flange. The measurement of carb flange is the average between the front and rear dimensions taken from the engine china rail to a straight edge across the carb / throttle body mounting surface. Pontiac engines will be measured using a line drawn at deck between both sides, front and rear.

Using an intake manifold that is designed for a different make or family of engine prohibited. Pre 1958 engines are exempt from manifold crossbreeding rule stated above. Maximum thickness between intake manifold & cylinder head 0.100" measured with a "go-no go" gauge with engine assembled as to be run. External bypass coolant lines prohibited. All carburetors must mount to the intake manifold flange. Porting interior surfaces of the intake permitted. Welding and/or epoxy filler prohibited on any part of cast manifold.

#### 315 - CONNECTING RODS

Any commercially available steel connecting rods permitted. Aluminum, titanium, or any other exotic materials prohibited.

#### 316 - PISTONS AND RINGS

Any commercially available pistons permitted. Custom-made, modified, and/or coated pistons permitted. Vertical gas ports prohibited. Pistons may have horizontal gas ports. The ring package must consist of two compression rings and a single oil ring assembly. Compression rings must be 1mm" or larger rings. Minimum oil ring assembly width is 2-mm.

# 317 - COMPRESSION RATIO

Compression ratio limited to 10:5:1

#### 318 - ROCKER ARMS

Must be OEM rocker arm or NHRA Stock Eliminator accepted bolt on assemblies using factory mounting provisions for engine claimed. Basic drill and tap style work is permitted. No excessive machining of pedestals permitted. Fabricated mounting plates prohibited. Super Stock rocker systems prohibited.

#### 319 - HEADERS

Passenger car chassis style headers required. Header must be manufactured and cataloged to fit a specific passenger car application OEM equipped with the engine type claimed. Manufacturer's part number must be stamped into the header. Header's identifying part number and application must match current printed manufacturer's catalog for verification. Competitor is required to present printed catalog showing header part number and application. Maximum collector diameter 4". Minimum collector diameter 3.500". Collector must be smooth (Round) with no flange. Crankcase ventilation systems that vent to any component of the exhaust system are prohibited. Bungs for Lambda 02 sensors permitted. Thermal header wraps (such as Kevlar fabric) prohibited. Exhaust systems must be properly sealed from the header flange to the muffler inlet. Adaptor plates between cylinder head & header prohibited

#### 320 - MUFFLERS

H-pipes, X-pipes, or any such connection between the left and right headers and/or the exhaust system prohibited. A diagram of the requirements for exhaust hook-up to the dyno facility will be provided to all participants. Mufflers will NOT be utilized in the dyno cell.

321- OIL PAN/SCRAPER

Oil pan must be passenger car chassis style. Stamped steel / welded construction only. Oil pan must be manufactured and cataloged to fit a specific passenger car application. Oil Pan identifying part number and application (1968 and earlier) must match current printed manufacturer's catalog for verification. Competitor is required to present printed catalog showing oil pan part number and application. Oil pan must fit the block without alteration. If using an approved OEM engine block later than 1968, the oil pan must match the 1968 bolt pattern bolt for bolt. Modification and/or alteration of the as-manufactured oil pan prohibited. Crank scrapers and/or windage trays permitted. Pan may be no deeper than 12 inches measured from crankshaft centerline. Box style pans prohibited.

Commercially available cast or billet replacement style oil pump allowed. Oil pump must mount in factory location using OEM style provision for the engine type. Dry sump systems and vacuum pumps prohibited. Oil system accumulators prohibited. External oil feed lines prohibited. Belt-driven external oil pumps prohibited. Electrically powered oil pumps prohibited. Drain plug must be ½-20 thread.

#### 322- OIL

All engines must be shipped "dry". Engine will be required to use at least 5 quarts of oil. Participants will only use supplied oil for competition. Propylene Oxide or other oxidizing agents/substances prohibited. Oil is provided at the event. Oil filter must be dry and will be removed for inspection prior to running.

#### 323- OIL ADDITIVES

No oil additives permitted.

#### 324 - WATER PUMP

Water pump must be belt driven by crankshaft. Mechanical water pump required. Water pumps must be mounted in the OEM location. Water flow in and out of the water pump must be provided by the OEM block provisions only. Use of a cooling system thermostat prohibited. Water "feed" connections are limited to a set diameter of 1.5 inch O.D. and water "return" connections are limited to a set diameter of 1.5 inch O.D. Additional plumbing required to adapt engine to these sizes is participant's responsibility. If the connections you have do not match the sizes listed above you could be required to forfeit your position in the run order.

# 320 - MUFFLERS

H-pipes, X-pipes, or any such connection between the left and right headers and/or the exhaust system prohibited. A diagram of the requirements for exhaust hook-up to the dyno facility will be provided to all participants. Mufflers will NOT be utilized in the dyno cell.

#### 325 - ELECTRICAL CONNECTIONS

BE PREPARED! Participants should arrive at the event fully prepared (tools & supplies) to alter or change the electrical connections on their engine during the Pre Dyno Tech to fit the required connections on the dyno. Failure to comply with Rule (section 325) could result in loss of, or forfeiture of run position.

It is the participant's responsibility to assure the electrical equipment on the engine will work with the SUPERFLOW dyno connectors at location.

#### 326 - STARTER

Not required. Starter is built into the Superflow dyno system.

#### 327 - FLYWHEEL/FLEXPLATE

Any commercially available, unmodified SFI-certified domestic manual STEEL transmission flywheel mandatory. Flexplates prohibited. Special order flywheels prohibited. Installation and torque of the flywheel bolts will be done by the Team Leader and observed by an EMC Tech official. Starter ring may be removed from the flywheel (recommended).

#### 328 - BELLHOUSING

Each Engine entered in EMC "MUST" fit the SuperFlow Pro Bell housing. The Bellhousing is part of the SuperFlow system at the JE pistons R&D Dyno that is being used in the EMC competition. (It is the responsibility of each participant to make sure his engine will fit a Super Flow Pro bellhousing)

#### 329 - COATINGS

Any commercially available performance coating permitted. The application of thermal and/or friction coatings can be performed at any time prior to the competition on any part. Coating a part is not considered a modification, and parts that cannot be legally modified, may be coated.

# 330 - FUEL

Gasoline supplied at the event will be Sunoco. Exact fuel TBD.

# SIGNATURE AND ACCEPTANCE OF 2019 ENGINE MASTERS RULES SIGN AND RETURN WITH ENTRY FEE NO LATER THAN APRIL 24, 2019

The undersigned Team Leader, on behalf of all members of their Team's Accepted Entry Application into the 2019 Engine Masters Challenge, hereby confirms that they have read, understand, agrees to, and will adhere to the Rules of the 2019 Engine Masters Challenge.

Additionally, the undersigned acknowledges that these Rules are effective upon date of release and publication of the Rules. It is also further understood that the Rules may be amended or modified by Motor Trend Group and the Engine Masters Challenge Event Management at its sole discretion at any time in accordance with the provisions in this document, wherein such Amendments and/or Addendums are effective upon their date of publication on <a href="www.enginemasters.com">www.enginemasters.com</a>, and/or by email communication to all Entrants, and/or by written memorandum to all Entrants, and/or by a pre-event participant's meeting.

It is expressly understood that it is the responsibility of the entrant to monitor the website and/or email or mail notification for any Rules Amendments, Addendums, Modifications, or Special Provisions. Entrant agrees to adhere to and abide by any such Rules Modifications that may be made subsequent to this document.

TEAM NAME:	
Signature of Team Leader: _	
Printed Name:	
Date:	

If after reading the Rulebook you still have questions please correspond via email to <a href="mailto:questions@enginemasters.com">questions@enginemasters.com</a>. Please make sure your questions are specific and well prepared in advance.