



# MERLIN III/MERLIN X ENGINE BLOCKS

## Iron & Aluminum BBC Specifications and Instructions

Technical data and specifications for IRON MERLIN III block part numbers:

Part #	Series	Type	Deck	Bore	Lifters	Main Caps	Max Stroke
085006	Street	Bare	9.800"	4.490"	.8437"	Straight 4-bolt	4.375"
081100	Sportsman	Bare	9.800"	4.240"	.8437"	Nodular splayed 4-bolt	4.375"
081100-4250	Sportsman	Prepped	9.800"	4.250"	.8437"	Nodular splayed 4-bolt	4.375"
081100-4280	Sportsman	Prepped	9.800"	4.280"	.8437"	Nodular splayed 4-bolt	4.375"
081101	Sportsman	Bare	9.800"	4.490"	.8437"	Nodular splayed 4-bolt	4.375"
081101-4500	Sportsman	Prepped	9.800"	4.500"	.8437"	Nodular splayed 4-bolt	4.375"
081101-4530	Sportsman	Prepped	9.800"	4.530"	.8437"	Nodular splayed 4-bolt	4.375"
081102	Sportsman	Bare	9.800"	4.590"	.8437"	Nodular splayed 4-bolt	4.375"
081102-4600	Sportsman	Prepped	9.800"	4.600"	.8437"	Nodular splayed 4-bolt	4.375"
081110	Sportsman	Bare	10.200"	4.240"	.8437"	Nodular splayed 4-bolt	4.750"
081110-4250	Sportsman	Prepped	10.200"	4.250"	.8437"	Nodular splayed 4-bolt	4.750"
081110-4280	Sportsman	Prepped	10.200"	4.280"	.8437"	Nodular splayed 4-bolt	4.750"
081111	Sportsman	Bare	10.200"	4.490"	.8437"	Nodular splayed 4-bolt	4.750"
081111-4500	Sportsman	Prepped	10.200"	4.500"	.8437"	Nodular splayed 4-bolt	4.750"
081111-4530	Sportsman	Prepped	10.200"	4.530"	.8437"	Nodular splayed 4-bolt	4.750"
081112	Sportsman	Bare	10.200"	4.590"	.8437"	Nodular splayed 4-bolt	4.750"
081112-4600	Sportsman	Prepped	10.200"	4.600"	.8437"	Nodular splayed 4-bolt	4.750"
085000	Race	Bare	9.800"	4.240"	.8437"	1045 billet splayed 4-bolt	4.375"
085000-4250	Race	Prepped	9.800"	4.250"	.8437"	1045 billet splayed 4-bolt	4.375"
085000-4280	Race	Prepped	9.800"	4.280"	.8437"	1045 billet splayed 4-bolt	4.375"
085010	Race	Bare	9.800"	4.490"	.8437"	1045 billet splayed 4-bolt	4.375"
085010-4500	Race	Prepped	9.800"	4.500"	.8437"	1045 billet splayed 4-bolt	4.375"
085010-4530	Race	Prepped	9.800"	4.530"	.8437"	1045 billet splayed 4-bolt	4.375"
085012	Race	Bare	9.800"	4.590"	.8437"	1045 billet splayed 4-bolt	4.375"
085012-4600	Race	Prepped	9.800"	4.600"	.8437"	1045 billet splayed 4-bolt	4.375"
085100	Race	Bare	10.200"	4.240"	.8437"	1045 billet splayed 4-bolt	4.750"
085100-4250	Race	Prepped	10.200"	4.250"	.8437"	1045 billet splayed 4-bolt	4.750"
085100-4280	Race	Prepped	10.200"	4.280"	.8437"	1045 billet splayed 4-bolt	4.750"
085110	Race	Bare	10.200"	4.490"	.8437"	1045 billet splayed 4-bolt	4.750"
085110-4500	Race	Prepped	10.200"	4.500"	.8437"	1045 billet splayed 4-bolt	4.750"
085110-4530	Race	Prepped	10.200"	4.530"	.8437"	1045 billet splayed 4-bolt	4.750"
085112	Race	Bare	10.200"	4.590"	.8437"	1045 billet splayed 4-bolt	4.750"
085112-4600	Race	Prepped	10.200"	4.600"	.8437"	1045 billet splayed 4-bolt	4.750"

Technical data and specifications for ALUMINUM MERLIN X block part numbers:

085500	Race	Bare	9.800"	4.240"	.8437"	1045 billet splayed 4-bolt	4.375"
085500-4250	Race	Prepped	9.800"	4.250"	.8437"	1045 billet splayed 4-bolt	4.375"
085500-4280	Race	Prepped	9.800"	4.280"	.8437"	1045 billet splayed 4-bolt	4.375"
085501	Race	Bare	9.800"	4.490"	.8437"	1045 billet splayed 4-bolt	4.375"
085501-4500	Race	Prepped	9.800"	4.500"	.8437"	1045 billet splayed 4-bolt	4.375"
085501-4530	Race	Prepped	9.800"	4.530"	.8437"	1045 billet splayed 4-bolt	4.375"
085510	Race	Bare	10.200"	4.240"	.8437"	1045 billet splayed 4-bolt	4.750"
085510-4250	Race	Prepped	10.200"	4.250"	.8437"	1045 billet splayed 4-bolt	4.750"
085510-4280	Race	Prepped	10.200"	4.280"	.8437"	1045 billet splayed 4-bolt	4.750"
085511	Race	Bare	10.200"	4.490"	.8437"	1045 billet splayed 4-bolt	4.750"
085511-4500	Race	Prepped	10.200"	4.500"	.8437"	1045 billet splayed 4-bolt	4.750"
085511-4530	Race	Prepped	10.200"	4.530"	.8437"	1045 billet splayed 4-bolt	4.750"

**Block Applications:** Both MERLIN III and MERLIN X blocks are designed to be a replacement for the Mark IV Big Block Chevy. In applications where the combination is making 1000+ hp normally aspirated or the block is being used in a nitrous or blower application, it is HIGHLY RECOMMENDED to use billet splayed main caps.

**Block Material:** MERLIN III: High density Cast iron. MERLIN X: High density 357-T6 aluminum alloy.

**Deck Height:** 9.800 or 10.200 (depending on part number)

**Deck Thickness:** Approximately .600 minimum

**Cam Bearings:** Standard Big Block Chevy Cam bearings. NOTE: When installing cam bearings MAKE SURE the oil hole in the bearings is inline with the oil hole feed hole to the main bearings. For MERLIN X: If the use of a larger base circle cam is needed, the block may be machined for the larger 460 Ford cam bearings. Rear cam plug is special to this block available under part # 832506. This part is furnished with the block.

**Main Bearings:** Utilizes Big Block Chevrolet style main bearings. A two-piece rear main seal, Fel Pro # P29182 is used.

**Main Caps:** MERLIN III Blocks: Come with nodular iron main caps with all five caps being standard four bolt style. All the main caps use a 1/2 thread bolt. Torque spec on main bolts both inner and outer is 110 ft. lbs. with oil. MERLIN III and MERLIN X Blocks are available with billet main caps with all five being four bolt. The two end caps are of the standard four bolt design, while the center three caps are splayed style. All the main caps use a 1/2 thread bolt. Torque spec on main bolts both inner and outer is 110 ft. lbs. with oil.

**Main Bearing Journals:** MERLIN X main bearing saddles are machined for a 2.750 diameter crank journal (standard Big Block Chevy). As installed, the main caps have had the bolt pattern spread to accommodate a 3.00 main size. To convert to a 3.00 main, 455 Olds main bearings will need to be used. Along with align boring the block, the rear main cap must also be modified to accept the Olds thrust bearing. The thrust area of the block will have to be machined to a 4.00 diameter and the thrust surface will need to be recessed .045 deep (this must be done on both sides). To complete the conversion, a larger rear main seal from a 460 Ford will need to be used. To convert to the Ford seal, a 3.720 diameter receiver groove must be machined using a .210 wide (top) to a .180 wide (bottom) taper.

**Lifter Bores:** Indexed. (Lifter bore size is standard Chevy diameter .8437) Lifter valley is drilled and tapped (5/16 fine thread) to accept a lifter valley windage tray.

**Maximum Bore:** All IRON blocks can be bored to a maximum of 4.625. All ALUMINUM blocks: sleeves as supplied, can be bored up to 4.600. At this bore size, sleeve thickness is .065. Use discretion based on your application.

**Cylinder Bores:** Are a siamese design. MERLIN X sleeves are replaceable, pressed-in liners with .0015 press fit and have a rubber O-ring near the bottom of the sleeve to keep oil from between the sleeve and block.

**Cylinder Wall Thickness:** MERLIN III: @ 4.625 bore cylinder wall thickness will be approximately .250. MERLIN X: .115 @ 4.500 bore

**Water Jackets:** Expanded for better cooling. On MERLIN X: One O-ringed freeze plug per side, screw-in style, World part # 832500. (Furnished)

**Freeze plugs:** Iron block #EPC 41B-1 5/8"

**Intake Manifolds:** When using 10.200 deck height block, an intake manifold designed for a "Tall Deck" must be used or spacers can be made or bought to adapt a standard deck intake (9.800) to the 10.200 deck height block.

**Distributors:** When using a 10.200 deck height block, a distributor designed for a "Tall Deck" must be used unless using a manifold already cut.

**Gear Drives & Belt Drives:** To prevent contact between oil galley plugs and belt drive or gear drive covers, it may be necessary to tap the oil galley holes in the block deeper so the oil galley plugs will sit flush with the block, or you can use shorter plugs.

**Lubrication:** Priority main oiling system. We recommend oils designated SM/SL/SJ, 15W-40 or 20W-50.

**Oil System Features:** As is, block is set up for OE style internal oil pump. Block may be converted to a dry sump oiling system. Oil pressure can be drawn from rear of block, at the top of the bellhousing.

**Oil Restrictors:** MERLIN III blocks use oil restrictor part # 832660-2. MERLIN X blocks use restrictor part # 832665-2.

Filtration: Integral mount for spin on filter. The oil filter mounting boss has been relocated to clear kickout style oil pans. If use of a remote oil filter is desired, Use World Products by-pass plate part # 832535.

Oil Pan Rails: Solid (stock width) can be clearanced for strokers. Oil pan rail is dual drilled for stock oil pans and aftermarket race oil pans.

Clearance: MERLIN III and MERLIN X blocks with a 9.800 deck height can handle up to a 4.375 inch stroke without block relieving. Blocks with a 10.200 deck height can handle up to a 4.750 inch stroke (with steel or titanium connecting rods and a stock base circle cam) with minor clearance. For more piston wall there is .100 inch of material left for those running less stroke. Sleeves are left long due to varying needs of engine builders. Sleeves may be clearanced depending on counterweight size.

Camshaft: Stock location.

Fuel Pump: Uses stock style fuel pump and stock length fuel pump pushrod.

Starter: Starter mounting pad is drilled for both straight across and stagger bolt patterns.

Motor Mounts: Drilled and tapped for side and front mounts in OEM locations.

Cylinder Head Bolt Holes: Threads 7/16. Head bolt holes are blind tapped and do not extend into the water jackets. MERLIN III and MERLIN X blocks incorporate an extra row of four head bolt bosses in the lifter valley area. This allows certain race heads that have 18-20 head bolts to be installed on the block without modification.

**SPECIAL NOTE: THE TORQUE VALUE USED ON THE FASTENERS FOR THESE BOSSES IS NOT TO EXCEED 35 LB-FT. DO NOT IGNORE THIS SPECIFICATION.**

Standard Big Block heads with 16 head bolts can be used by not employing the extra 4 head bolt bosses.

MERLIN X head studs are the ONLY fasteners recommended for use with the aluminum block. The head studs to be used are special to the aluminum block as the threaded portion that goes into the block needs to be approximately 1.5 inches long.

The following World Product part numbers are the recommended heads stud kits to be used with the block:

#832545: Head stud kit for BBC Merlin III Aluminum Head

#832550: Head stud kit for Big Chief Head

IT IS THE BUILDER'S RESPONSIBILITY TO DETERMINE THAT BOLTS OR STUDS USED HAVE THE PROPER ENGAGEMENT TO PREVENT STRIPPING THE THREADS.

#### DEFINITIONS AND DIMENSIONS:

Bare Block

Due to a vast difference of opinion among professional builders regarding specifications and procedures, all blocks, when purchased bare, are finished within GM +/- tolerances. Merlin blocks are supplied with the following specs:

Block Weights: Merlin 9.8 deck Aluminum: 140 lbs (caps and sleeves)

Deck Height: 9.805 or 10.205 +/- .005.

Cylinder Bore: 4.240, 4.490 or 4.590 +/- .005.

Main Journals: 2.9375

Lifter Bores: .8437

Stroke Notch: 9.800 deck, 4.375, 10.200 deck, 4.750.

It is the responsibility of the engine builder to finish the block to his or the end users preferences. If a 3.000 main journal bore is desired, it can be finished as such. MERLIN III:

Freeze plugs, dowel pins, oil galley plugs and cam bearings are not included or installed. MERLIN X: Freeze plugs, dowel pins, oil galley plugs and cam bearings are included or installed. Stock Chevrolet hardware can be used.

Prepped Block

MERLIN III blocks when purchased prepped, will be sized to the above specs with the following exception: Cylinder Bores: 4.250, 4.500 or 4.600. All prepped blocks will be painted and have dowel pins, freeze plugs, cam bearings and oil galley plugs installed. The block will just need a final cleaning and be ready for assembly.

Before Final Assembly:

1. Before any machine or assembly begins, thoroughly inspect the block for any defects. Remember you are the final inspector. Once machine work has begun, the block is NON-RETURNABLE.
2. Due to the nature of aluminum blocks with ductile iron sleeves we highly recommend that the sleeves be pressed down to ensure that they are bottomed in the block prior to decking. You may find that after decking and cleaning the block that the sleeves may rise .001" to .002" above the deck. You can proceed with assembly as this will not affect the operation of the block. This condition will be corrected by the torquing of the cylinder heads.
3. Make sure block is free of debris. Clean block thoroughly.
4. Lifter bores are machined to the factory spec of .8437. Lifter diameters vary by manufacturer. Slight honing of the lifter bores may be needed for proper lifter to lifter bore clearance.
5. Long rod and stroker applications need to be dry assembled and checked for connecting rod to block interference. Grinding of the oil pan rail may be necessary. Clearance needs to be kept at a .050 minimum
6. MERLIN III and MERLIN X blocks come with a deck height of 9.800 (standard deck) or a 10.200 deck height (tall deck). If a lower deck height is desired, PLEASE measure the deck before any cutting is done. REMEMBER: MEASURE TWICE AND CUT ONCE.

#### WARRANTY TERMS:

World Products Inc. (World) manufactures parts to meet QS 9000 specifications. In addition, all parts go through several inspection procedures before shipping. However, YOU ARE THE FINAL INSPECTOR. Please note: Inspect all parts before doing any machine work or assembly. Remember the saying "measure twice and cut once." If any defects are found or suspected, call World before proceeding. World will replace or repair at its option any defective part which has not been modified or misused within one year of INVOICE purchase date. Any modification or marine use of parts will void all warranties.

WORLD MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, REGARDING PARTS. THIS WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY MADE IN LIEU OF, AND WORLD HEREBY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

World's sole and exclusive obligation and liability with respect to parts sold is expressly limited to repair or replacement, at World's option, of parts. In no event will World be liable for any claim of any kind for direct or indirect incidental, consequential or special damages, whether known or unknown, including without limitation, cost of labor, installation, disassembly, lost revenues and profits, loss of property, production, or injury to persons and/or property. The maximum liability of World for any and all damages with respect to any part is limited to an amount not to exceed the original purchase price of the part. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. DO NOT CALL THE DEALER FROM WHICH YOU PURCHASED YOUR PARTS. If you have any questions, please contact Customer Service, World Products 631-981-1918 (Fax 631-734-0467).

#### WARRANTY CLAIMS:

Contact Customer Service to obtain a Return Material Authorization number directly from World Products for any warranty return. DO NOT CONTACT YOUR DEALER. DO NOT RETURN PARTS WITHOUT AUTHORIZATION. Returned product must be shipped prepaid. Collect shipments will be refused. Returned parts must have RMA number on the outside of the package, a copy of original bill of sale inside and a written explanation of the suspected defect. If the item is found defective, World Products will repair or replace it at its discretion and return it freight prepaid. No additional labor claims will be paid. There will be no exceptions to this rule.

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#### SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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