

DART FORD 351 Sportsman Small Block – Technical Notes

| | | |
|-------------------------------|-------|----------------------------|
| Deck Height | | 9.500” Std Cleveland |
| Bore | | 4.00” or 4.125” unfinished |
| Main Bearing Size | | Std Cleveland 2.749” |
| Weight | | 9.500” – 195 lb |
| Maximum bore | | 4.185” |
| Camshaft Journal diameter | | Standard 351 |
| Camshaft Position | | Standard 351 |
| Cylinder wall thickness, min. | | .250” @ 4.185” bore |
| Deck thickness, min. | | .675” |
| Torque Specs – Main caps | 1 - 5 | 1/2” bolts 105 ft lbs |
| | 2 - 4 | 7/16” bolts 65 ft lbs |

Standard 351W timing chain, timing cover, gear or belt drive can be used.

Actual deck height will be .001” - .005” taller for additional machining requirements.

When initially removing main caps, the caps and block should be deburred before reinstalling. This will insure that correct main size is maintained.

Press-in 1 1/2” freeze plugs and 2 3/8” cam plug are provided.

Use 351W 1/2" head bolt and stud kits

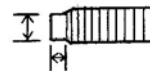
Head stud holes are blind. They do not go into the water jacket.

A sealant/antiseize *must* be used on the head studs. Loctite #620 is recommended.

Studs should *never* be torqued into the block. They should only be lightly snugged.

It is preferred that a bullet be machined on the end of the head stud where it bottoms in the block to center the stud before tightening.

.375” OD x .150” deep



CAM BEARINGS O.D. should be deburred before installation.

All our cam bearings are coated for cooler operation and more reliability.

Camshaft bearing bores are 2.200” I.D. on all 5 cam bores.

The cam bearings have 5 different I.D.s to fit the stock ford cam journals but common O.D.s.

| <u>Position</u> | <u>Brg#</u> | <u>Part#</u> | <u>Cam OD</u> |
|-----------------|-------------|--------------|---------------|
| Front #1 | B384 | 32210051 | 2.081” |
| #2 | B385 | 32210061 | 2.066” |
| #3 | B386 | 32210071 | 2.051” |
| #4 | B387 | 32210081 | 2.036” |
| Rear #5 | B388 | 32210091 | 2.021” |
| Complete Set | | 32210041 | |

Cam bearing sets for cams with common 2.081” size on all journals are available from Dart or Durabond # 351RHP.

Cam bearings sets for 2.051” common journals are available from Dart or Ford # M-6261-C351.

When using a front sump oil pan you can use Ford part# M-6059-D351 (std rotation water pump) or M-8501-B50 (reverse rotation) front cover with provision for a dipstick. The dipstick needs to be in the oil pan with a rear sump. The DART blocks do not have a provision for a dipstick.

HYDRAULIC ROLLER LIFTERS

This block is machined to accept stock Ford hydraulic roller lifters. The holes in the lifter valley for the OEM style sheet metal retainer come with 1/4-20 plugs. These need to be removed to install the retainer bolts. This block is also clearanced for the stock "dog bone" lifter guides. For standard flat tappet hydraulic, solid and roller lifters these plugs need to be installed.

OIL SYSTEM

The lifter galley is fed from the rear of the block giving it **TRUE PRIORITY MAIN OILING**.

PIPE PLUGS All front and rear oil galleys are tapped 1/4" NPT. They are a straight thread, not a tapered thread. When using a 1/4" NPT tapered pipe plug the diameter of the plug determines how deep the plug goes into the threaded hole. If the plug is too shallow it can be threaded with a 1/4" NPT tapered pipe die to the desired size. *NOTE: Sizes from various manufacturers vary to a great extent.*

Various length plugs are available from Pioneer for adjusting the depth of the plug.

| | |
|-------|----------|
| PP584 | .325" OA |
| PP625 | .333" |
| PP567 | .375" |
| PP507 | .460" |

NOTE: Due to variations in lifter sizes and clearance preference, most of our engine builder customers prefer the lifter bores sized on the small size of the specification. Sometime these bores will need to be lightly honed. The lifter bore spec is .8747"-.8757". *Most lifter manufacturers recommend .0015"-.002" clearance. ALWAYS CHECK lifter to bore clearance.*

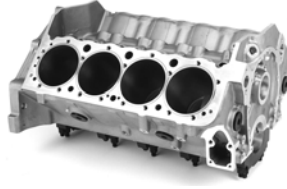
SPECIAL NOTE: With a multitude of crankshaft, rod & piston combinations available it is very important to check clearance of all moving parts, especially crankshaft counter weight and connecting rod to block. Because the cylinder barrels have been extended for more piston skirt support with stroker kits you may have to clearance the bottom of the bores for rod clearance. Be careful if you need to add counter weight clearance at the oil pump area. Be sure to leave enough material to seal the oil pump-mounting flange. All parts must be checked before any type of machining or assembly is attempted.

It is good engine building procedure to ALWAYS check the fit of the distributor before any machining or cleaning is done.

Dart  **FORD 351 Sportsman SB Iron Block**

| | |
|-------------------------------------|--|
| Part# | 31355135 / 31355235 |
| Material: | Superior iron alloy |
| Bore: | 4.00" or 4.125" unfinished |
| Bore & stroke: | 4.185" x 4.250" max recommended |
| Cam bearing bore ID: | SVO 2.203"- 2.205" |
| Cam bearings: | Special coated, grooved, w/3 oil holes (Not included) |
| Cam Bearing O.S. | + .010", +.020", +.030" |
| Cam bearing press: | .002" - .003" |
| Cam journal OD: | Standard Ford SB |
| Cam Plug: | 2.375" dia. cup plug |
| Cylinder Wall Thickness: | .250" min @ 4.185" bore |
| Cubic inch: | 468" max recommended |
| Deck Height: | 9.500" |
| Deck Thickness: | .675" min. |
| Fuel Pump: | Mechanical pump provision |
| Freeze Plugs: | Std Ford press in cup plugs 1.500" OD |
| Head bolts: | 1/2" Blind holes |
| Lifter Bores: | Std Ford .8747" - .8757" Honed to size |
| Lifters: | Stock Ford hyd rollers, Solid hyd, flat tappet or rollers |
| Main journal size: | 2.749" Std 351 Cleveland |
| Main bearing bore: | 2.9415" - 2.9425" Honed to size |
| Main thrust width: | .913" - .915" |
| Main Cap Bolts: | #1 - #5 1/2" (2) #2, #3, #4 7/16" splayed (2) |
| Main caps: | Steel - 4 bolt, center 3 |
| Main cap register: | Deep stepped register on each side (no need for dowels) |
| Oil system: | Priority Main oiling |
| Oil Filter: | Standard filter |
| Oil Pan: | Standard 351W oil pan |
| Rear Main Seal | Std 1 piece seal - FelPro# 2921 or 2942 4.500"x 3.750" SVO |
| Serial No. | Right front & main caps |
| Starter: | Standard |
| Stud & bolt holes, Head: | 1/2" std SVO with blind holes |
| Timing chain/gears | Standard components |
| Timing Cover: | Uses stock 351W cover |
| Torque Specs: | 1-5 1/2" bolts - 105 ft lbs 2-4 7/16" bolts - 65 ft lbs |
| Weight, approx: | 195 lbs |

IMPORTANT



This Block should be assembled only by experienced, professional engine builders.

INSPECTION

Upon receiving this block it should be thoroughly inspected for shipping damage.

Prior to machining and assembly please inspect the following items:
Cylinder bores - Oil passages - Deck surfaces - All threads

MEASURING & MACHINING

- ❑ All initial measuring should be done before any machining has begun.
- ❑ Decks are CNC machined to standard deck heights. If you need a particular deck height always measure before machining.
- ❑ Main journals are finish line honed to the low to middle of the specification. They should be measured for your preference. If you have need for a different diameter you must realign hone this yourself.
- ❑ Crankshaft & rod clearance should always be checked before any machining is started. You need .060" clearance for rotating counterweights and rods.
- ❑ Due to variations in OD dimensions of the numerous lifter manufacturers, lifter bores are finish honed on the tight side of the tolerance to leave room for lifters that are larger than the standard.

WASHING

- ❑ Final washing should be very thorough, paying particular attention to all oil galleys. Use hot soapy water and rinse with hot water first, followed by cold water which helps reduce rust.

2/8/2008

Honing Procedures for



- **HONING OIL** Sunnen MAN 845-55
- **SPEED & FEED** CK-10 (C&E) Pulleys
CV-616 185 rpm 50 strokes per minute
- **HONING**
 - 1) **Rough** .003" from size Sunnen C30A-25
 - 2) **220** to size Sunnen C30A-55
 - 3) **280** 3 strokes Sunnen C30J-65
 - 4) **400** 3 strokes Sunnen C30J-85
- **REHONE (deglaze)**
 - 1) **220** 3 strokes Sunnen C30A-55
 - 2) **280** 3 strokes Sunnen C30J-65
 - 3) **400** 3 strokes Sunnen C30J-85

- **RA should be 26 - 28**

- **SHOE ASSEMBLY TECHNIQUE**

Titanium or hard shoe (part# CK-3570) from Sunnen on one side of honing head.

Delrin (engineering plastic) attached to brass shoe holder & trimmed to size on other side. (Delrin bars can also be purchased from your local plastic supplier)

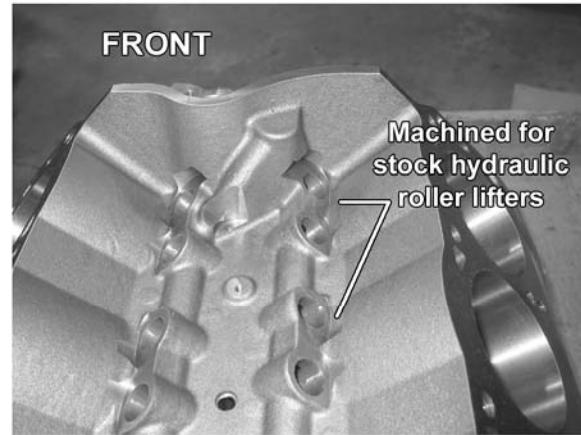
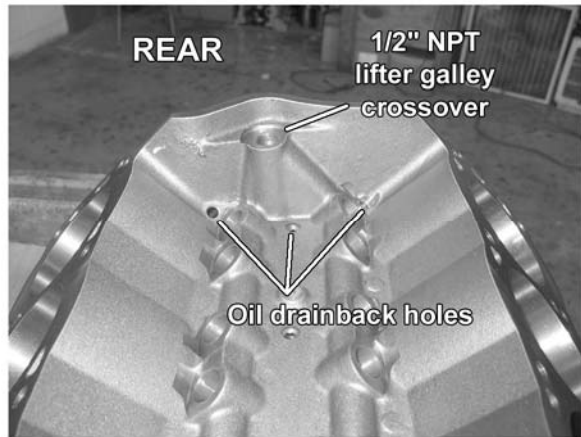
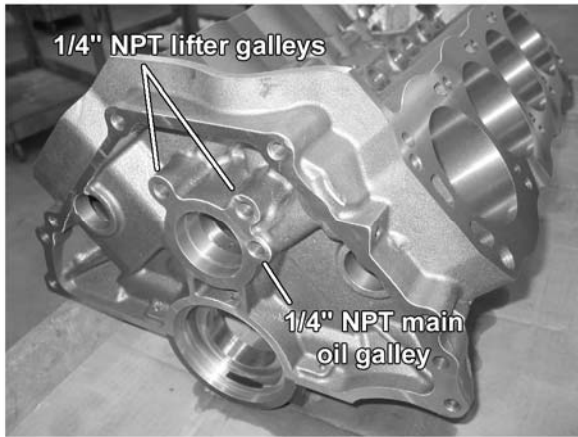
***** DO NOT use bronze shoe *****

- **FRESH OIL IS CRITICAL**

These are only recommended procedures we have developed through our Pro Stock program. Some engine builders have their own procedures for honing our blocks.

All supplies from Sunnen Products

2/8/2008



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