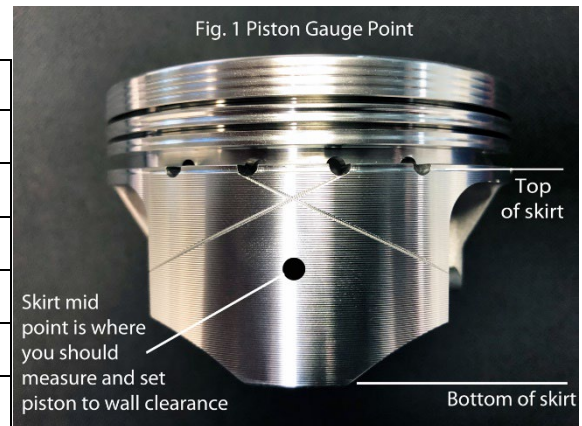


Before Installing, inspect for correct sizing and application by verifying that the part numbers on bottom of piston match your order. If incorrect you must obtain return authorization. Contact D.S.S. customer service, before returning parts. Only parts that are unmodified and in their original packaging will be accepted (no balancing, fly cutting, clearance, modifying, etc.). Non-stocking, special order, or obsolete pistons are non-returnable. Parts will be inspected by D.S.S. tech staff and appropriate action will be taken (Returned for credit parts will be charged a 20% restocking inspection & re-boxing fee).

Base Piston to Wall Clearance Range		
Bore Range	4032 Alloy	2618 Alloy
3.500-3.750	.0025-.0035	.0035-.0045
3.750-4.000	.0035-.0045	.0045-.0055
4.000-4.250	.0040-.0050	.0050-.0060
4.250-4.500	.0045-.0055	.0055-.0065
4.500-4.750	.0050-.0060	.0060-.0070



**NOTE:** Marine - Open loop cooling, High Boost and or NOS engines may require .001" to .003" additional clearance.

**Measuring Piston to Wall Clearance:** Boring and honing the cylinder block to the nominal oversize will typically yield the results above. When checking and setting piston to wall clearance measure the piston at the center of the skirt perpendicular to the piston pin (See fig. 1).

**Piston to Valve Clearance:** D.S.S. Forged pistons typically allow the use of aftermarket heads with larger valves and high-lift cams. However, we recommend you mock assemble and check your combination of parts. There are too many variables to assure piston to valve clearance will not be a problem on your combination. (Excessive valve margins, excessive milling of the heads or decks of the block, very aggressive ramp profile on the cam etc.). Your engine builder should check and correct piston to valve clearance as a matter of sound engine building practice. We recommend a minimum valve clearance of .100" for depth and .050" radially.

**Running Clearances:** Engine components have varying features (crankshaft counter weights, blocks deck heights, crankcase features, cylinder head combustion chambers, valve and spark plug locations) It's the engine builder's responsibility to check and correct all critical clearances. Checking for interference throughout the entire engine assembly is an important part of blueprinting.

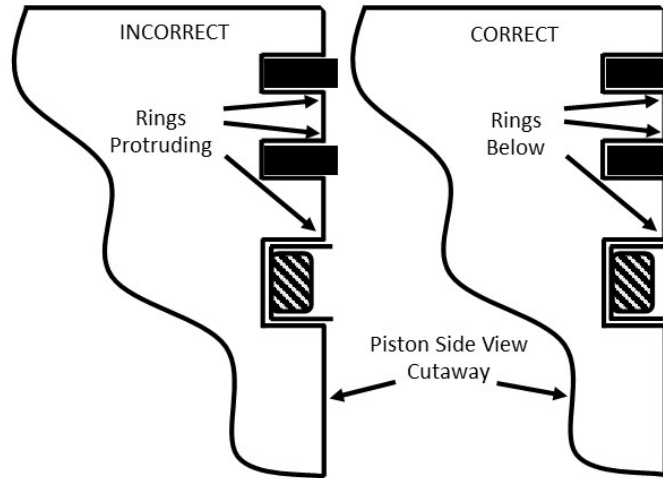
**Dome Pistons:** Most Dome pistons have adequate clearance, however due to head production and chamber casting variances you must check and correct any interference issues. An easy way of checking is to rotate the engine with a cylinder head installed without the head gasket. If it rotates without interference it has at least the thickness of the gasket as clearance. Most applications work well with .040 to .050 min. clearance. Don't overlook Spark Plug electrode clearance, it must also be checked. Indexing plugs or modifying the top of the piston may be required to gain adequate clearance.

**Piston to Cylinder Bore Orientation:** Check your cylinder head valve layout and orient the piston valve reliefs accordingly. Most inline, pushrod V-8's positions the valve reliefs closest to the lifter valley, for Ford Modular 2 Valve engines (4.6 - 5.4) the opposite is true. For 4 valve Modular and Coyote engines the intake notch is the one that goes straight off the edge of the piston and the exhaust notch is the round notch. Checking piston to valve clearance is a good way to verify that orientation is correct.

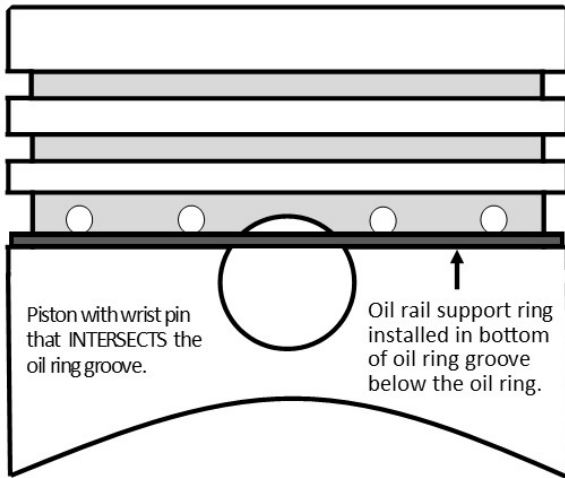
**Reluctor Wheel Clearance:** Some engines feature crank mounted reluctor wheels. Due to production variations it is necessary to check the clearance between the reluctor wheel and the lower piston skirt and pin boss area. In some instances, minor modification of the piston may be required.

**Piston Ring Back Clearance:** Verify that your rings have back clearance. With the piston held horizontally and the rings sitting in the bottom of the grooves verify that the rings are below the outer ring land of the piston (see fig. 2). **WARNING:** Severe engine damage will occur if engine is assembled with rings protruding.

**Fig 2 Ring Back Clearance**



**Fig 3 Oil Rail Support**



**Oil Rail Support Ring:** On some piston applications the piston pin bore intersects the oil ring groove (see fig.3). This design requires the use of an oil rail support ring. This ring bridges the gap of the pin bore and supports the oil rings. This style of piston is common on Stroker combinations that require a shorter overall piston design. Some oil rail supports feature an anti-rotation dimple that keeps the support ring from rotating on the piston (locate the dimple in the pin bore area). Others rely on gripping the root diameter of the ring land to restrict rotation. Never orient the gap of the support rail over the piston pin bore. On either design make sure the support ring lays flat in the bottom of the oil ring groove. Verify that the oil rings float freely when installed.

**Pin Boss to Rod Eye Side Clearance: (crank guided rod)** Some OEM and aftermarket connecting rods have a larger width pin eye. This can cause interference with the pistons pin boss. The engine builder must check and correct this clearance. We recommend a minimum of .040 rod eye to piston pin boss side clearance. With the engine mock assembled, the rods must be able to contact the crankshaft rod journal side cheeks without the rod's pin eye contacting the piston. Most rods can be narrowed easily using a belt sander or surface grinder. This also lightens the rod for an added HP benefit. Some rods do not provide the necessary clearance to accommodate the pistons pin boss to crown fillet. The stock (unmodified) LS7 rod on the right shows what can be required to achieve proper clearance in this instance.



**Piston to Pin Clearance:** Our pistons typically ship with pin clearance between .0005" and .0008". Based on your application we recommend having your engine builder hone the pin bores to add the appropriate clearance. Your engine builder is responsible for checking and setting this clearance based on your application.

**Rod Bushing to Pin Clearance “Full Floating Rods”:** **WARNING!** Most of the popular aftermarket connecting rods do **NOT** come with adequate Pin Bushing Clearance. We recommend opening up this clearance to a minimum of .0008” to .0012” based on application. Failure to do this could result in piston skirt damage.

**Press Fit Connecting Rod Applications:** When using press fit connecting rods, verification of proper pin to rod eye interference is required. Typically .0015 interference fit is adequate. See your engine service manual for the OEM spec. Pin bores must be lubed with a high-quality assembly lube to prevent galling. **WARNING! Do not use supplied retaining rings when using press fit rods.**

**Full Floating Connecting Rod Applications:** Most full floating applications use double lock rings. Seating the first two lock rings in the piston is helpful in getting the remaining two installed. Seat them by installing the first two locks on one side of the piston, and then insert the pin (without rod). Using the pin like a slide hammer, tap the pin against the two installed locks seating them against the outside wall of the groove. This will free up room to install the remaining 2 clips. Make sure the lock rings are seated completely against the O.D. of the lock ring groove. Once installed, they should not be loose. **MAKE SURE TO INSTALL 4 LOCKS PER PISTON!** Most D.S.S. Racing pistons are engineered to use either type of pin retention clips (Tru Arc or Spiro Lock). This feature gives the engine builder a choice. We include Tru Arc type pin retention clips with most of our pistons. Properly installed these clips provide excellent pin retention. Many engine builders prefer this retention method for its ease of installation and removal. If you or your engine builder prefers a Spiro Lock type retention system it is available as an option.

**Note: Round Wire Locks** only require 2 locks per piston.

**PIN BORES MUST BE LUBED** with a high-quality assembly lube to prevent galling.

**TIP:** When installing Spiro Locks, pull ends apart and stretch the lock so it looks like a spring, do not exceed ½”. This makes it easier to carefully spiral the lock into the groove.

**Tip:** Visually check that your clips are installed correctly by verifying that approximately half of the clips radial thickness is exposed.



**Tru Arc Type**



**Spiro Lock Type**



**Round Wire Lock Type**



**Required Groove Type**



**Required Groove Type**



**Required Groove Type**

**Chevy LS Stock Rod Press Fit / Full Floating:** The majority of OEM LS connecting rods are full floating (bronze bushing in rod .943 pin Dia.). If you have a press fit connecting rod (no bushing in the rod .945 pin Dia.) you will need a Part # P945 pin upgrade. Pistons will also need to be pin fit (honed) for the larger pin.

**Piston Rings:** Check and correct (file fit) ring end gaps before installing on pistons (see ring instructions). Improper ring end gaps will cause piston and cylinder damage.

**Deburring, Cleaning and Lubrication:** Before final assembly remove any undesirable burrs and debris from the pistons and pins. Wash the pistons with a mild soap and water mixture. Rinse with clean water and thoroughly blow off with compressed air. The engine block should also be properly prepared with freshly honed cylinders and thoroughly cleaned bores etc. Rings, cylinders and piston skirts should be oiled with 10W40 conventional non-synthetic motor oil. Wrist pin bores must be lubed with a high-quality assembly lube to prevent galling. To avoid damaging pistons and rings, we recommend the use of a tapered bore ring compressor for piston and ring installation into the block.

### DETONATION KILLS PISTONS!



This piston was detonated after 7000 miles due to a plugged fuel injector. The injector only flowed 55% of rated capacity (naturally aspirated 12-second street car).



This piston came out of a 10-second street car with 14 PSI. of boost. After several seasons the owner got a little too aggressive with fuel and timing.

**There is no such thing as a detonation-proof piston**

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