



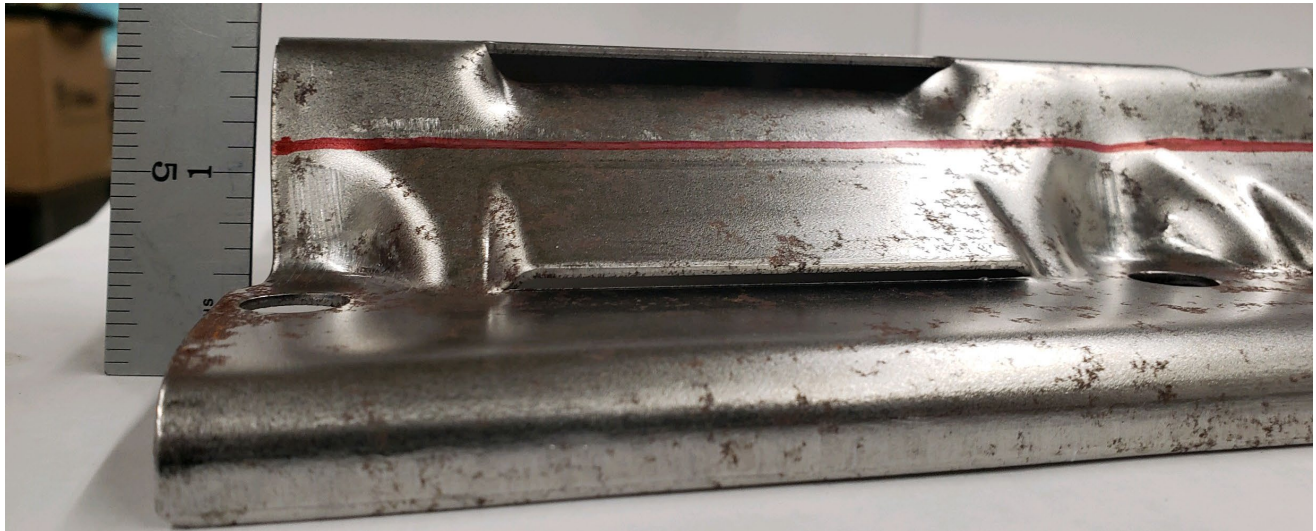
INSTALLATION INSTRUCTIONS P/N 21172

In order for this oil pan to fit with a stock GM LS Tray (Part # 12558189), the tray must be modified. Below are the instructions to follow for the tray to fit with this application

1. Scribe a line at 8.00" from the front edge of the tray.



2. Scribe a line 1.125" from the bottom of the tray on both sides.



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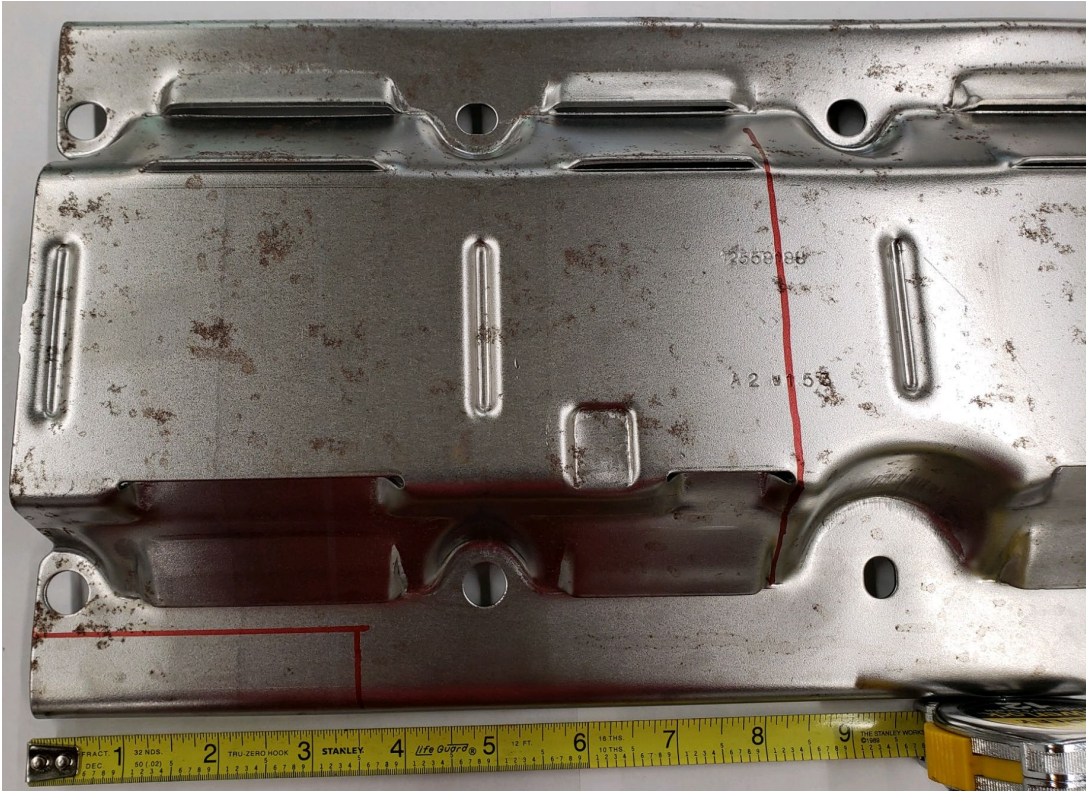
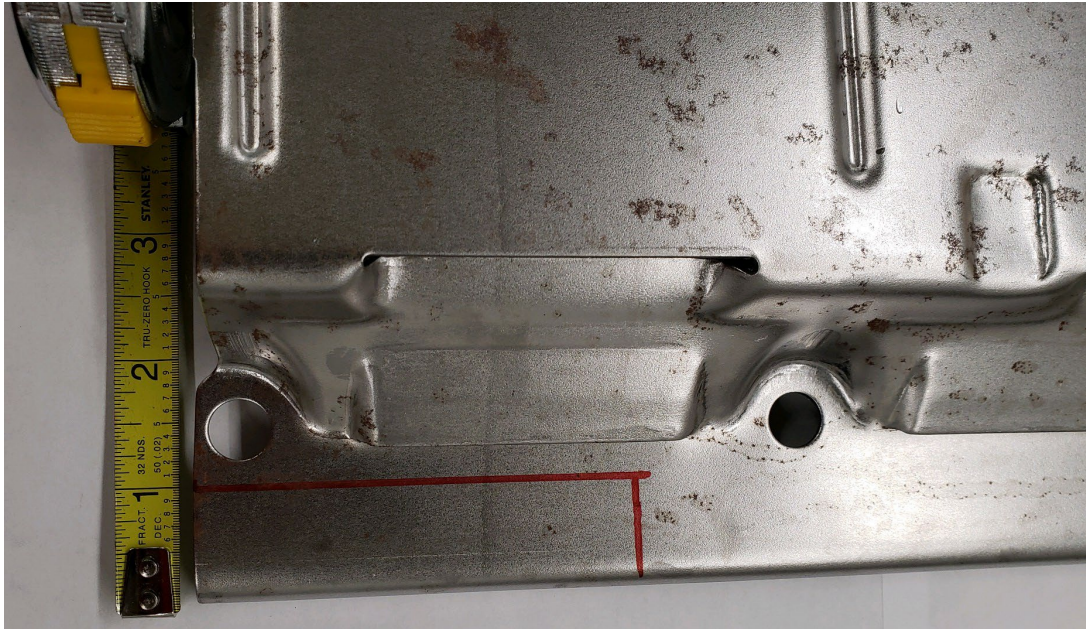
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3. Scribe a 3.50" x 1.00" rectangle from the front corner of the tray. This is for clearance with the pickup.



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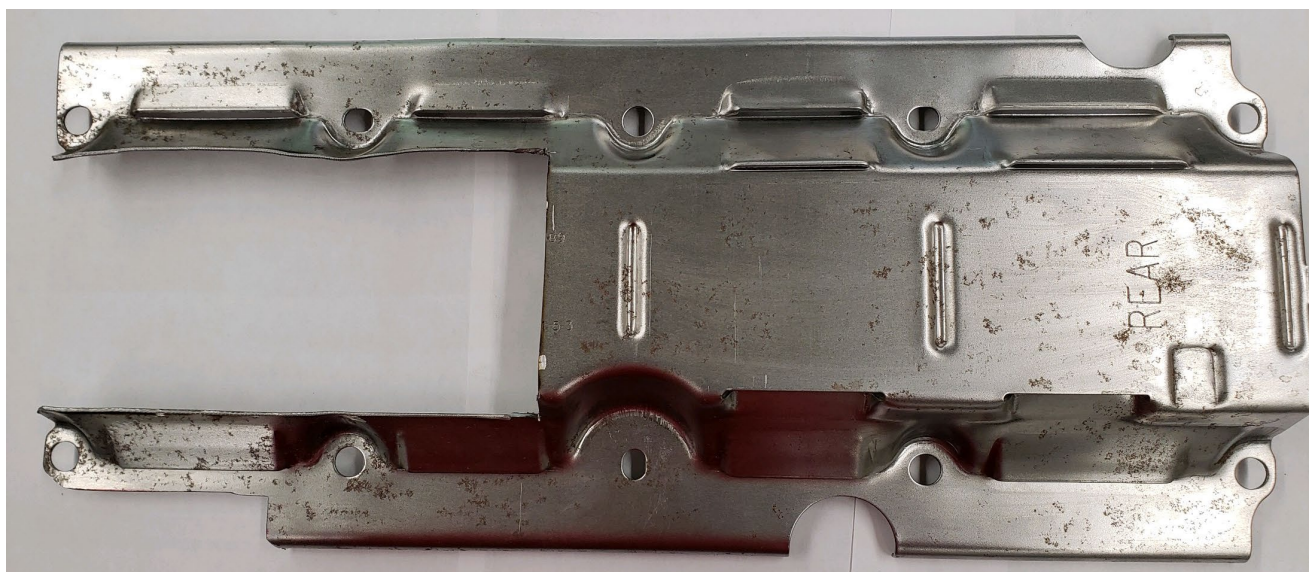
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- Using an angle grinder cut out the scribed area and deburr any sharp edges as shown below. Test fit the tray, pickup, and pan to make sure the pan sits flush on the block surface when the tray is installed. Trim more if necessary.



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INSTALLATION INSTRUCTIONS - OIL PANS

GASKETS

Be sure to use OEM quality gaskets or equivalent. Moroso Performance Products offers a full line of one-piece reusable silicone gaskets for MOST OEM APPLICATIONS (see catalog & website). These gaskets do not require any RTV on the rails, but a small amount at the radius corners will help ensure a good seal. Many off-brand multiple piece gaskets are especially poor in the rubber end seal area and our experience is that many leaks are directly traceable to poor gasket quality. After you have installed the gaskets we recommend using a dab of RTV silicone sealer at each corner where the rubber seal meets the rail gaskets. If you use silicone sealer on the rail gaskets, remember only use a thin film on the block side, and allow it to cure completely before installing the oil pan. Failure to do so may cause the gasket to slide and push out from between the pan and block. Moroso Performance Products highly recommends replacing multi-piece oil pan gasket each time the oil pan is removed. This will guarantee the integrity of the oil pan gasket. Remember many leaks can be traced to poor gasket seal.

While oil leaks are a concern and are the first indication of a poor seal between the block and pan, crankcase vacuum leaks will often occur from improper gasket installation and poor preparation at the front or rear radius gaskets, causing them to be sucked inward. This will cause poor performance with crankcase vacuum systems.

To avoid another potential leak, be careful not to over-tighten the drain plug, this may crack the washer and resulting in leakage.

OIL PUMP PICKUPS

Be sure you are using the correct pickup with your Moroso oil pan. Check our catalog for the correct part number. If you are using one of our press-in type extended oil pump pickups with this pan, it is highly recommended that you have it brazed to the pump housing.

Although not mandatory, this step eliminates the possibility of the pickup coming out of the pump due to vibration. Ideally, the oil pump bypass assembly and end plate should be disassembled when applying high amounts of heat. The pickup should be positioned 3/16" to 1/2" off the bottom of the pan. With variation in paper rail gaskets and 1-piece silicon gaskets available, there will be a variation in pick-up to sump clearance.

WINDAGE TRAYS

Refer to the catalog for the correct windage tray to be used with this oil pan, if applicable.

CLEANLINESS

Before final assembly, make sure all parts are thoroughly cleaned. Also, if this oil pan contains hinged trap door style baffles, it is advisable to install the pan with the engine upright to insure no trap doors will be stuck open. Use Loctite® or equivalent thread locking compound on all internal fasteners to prevent loosening.

PAN FIT

Due to the welding done on these pans, there is always a chance of slight warping. While our specially designed fixtures greatly reduce the warping factor, you may encounter a slight "rocking" effect when laying the pan down. Once the pan is drawn down securely by the bolts and the engine is run, you will find the pan will take a "set" in the straightened position. We have found that an initial "rock" of up to a 1/4" on a new pan is completely acceptable. Moroso Performance Products strongly recommends bolting down the oil pan with the oil pan gasket you will be using, with out any sealants or adhesives, and with all the fasteners. Then turn the rotating assembly to check for any interference with the oil pan or windage tray. While stroke sizes are calculated to fit in our application guide, the actual

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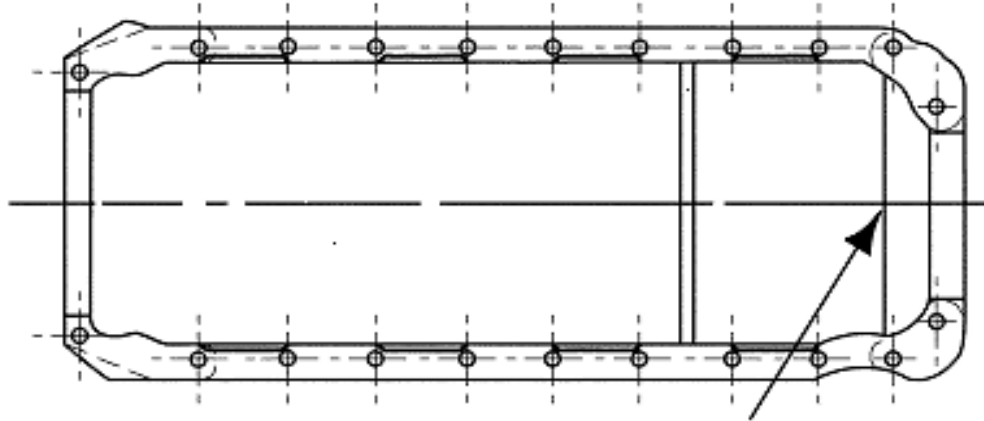


size of the components (connecting rod big-end, counter-weight) can differ and may require some clearance modification. This should also be done when checking oil pump pick-up to oil pan sump clearance.

If the oil pan you have purchased is designed with an internal windage tray or screen, and the engine includes a factory installed sump tray, it will need to be removed and the tray support bolts must be replaced with standard length factory main cap bolts and torque to the correct specifications for your engine.

OIL PANS WITH REAR SLOSH BAFFLES

When using a high-volume oil pump with these oil pans, the rear slosh baffle may have to be notched out for clearance. This is due to the production tolerances between the block, pump and the pan assemblies.



May have to be notched for clearance when pan is used with high volume pump.

“Oil Pan capacities DO NOT include the oil filter”

WET SUMP OIL PANS

CORE BASED OIL PANS:

Core based oil pans are based off the same oil pan that came from the factory and are made of a drawn steel stamping. Moroso has taken the time and engineering to produce the best cores to fit the most applications available. In many cases, OEM cores that came in many cars and trucks are often a “typical” core that fit a variety vehicle and engine combinations. But some manufactures had “special” core combinations that are rare and have certain irregularities that are not common. It is the responsibility of the end user to be aware of these applications and understand that all aspects of the oil pan may not be OEM compatible on the engine or in the vehicle.

Moroso Performance core based oil pans are designed for both OEM and aftermarket blocks and engine combinations. This fact makes the addition of stroker notches, larger sumps, and power kick-outs a necessary design aspect. **Certain oil pans will have OEM located bolt holes omitted to accommodate stroker notches. This has been intentionally designed this way, and with proper attention to sealing the area, will work in any application.** These features will make the assembly of the oil pan more complex than OEM replacements.

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As described in the "Pan Fit" section, core based oil pans are also subject to a certain amount of warping from the welding of fabricated components to a steel core. Core based pans often have tighter clearances to splayed main caps, rotating assemblies, and billet aluminum wet sump oil pumps. Mock-up fitments are more critical in these situations. Once a core based oil pan is fastened to the engine in its final assembly, knowing the oil pump clearance, and rotating assembly clearance will ensure ideal performance and longevity for your Moroso Oil Pan.

FABRICATED OIL PANS:

The advantage of a fully fabricated oil pan is that the pan has been engineered and built with both fitment and performance in mind. Thicker pan rails with integral stroker notches built in, and often billet end caps are available to make the fitment and clearance characteristics ideal for high performance engines. If a fully fabricated oil pan has interference issues it is often an issue that falls outside the parameters of what the advertised application was. In most cases, block clearance occurs before oil pan clearance is required. Contact the Moroso Custom Department to speak about an application that will require a specific design revision.

Fully fabricated oil pans are less likely to have dipstick provisions, OEM chassis clearance notches, and the use of all OEM bolt hole locations for mounting. These features will be stated in the description of the oil pan, or can be modified by contacting the Moroso Sales Department when ordering.

Because aftermarket blocks have a variety of bolt patterns that vary from OEM, and have much wider main caps combined with the large kick outs found in performance oil pans, external access bungs allow access to the pan rail mounting hardware, but does require a blind assembly of the fastener to the block. Moroso offers a magnetic T-Handle that will aid in the assembly. A 7/16" socket T-Handle (#62256) or a 1/2" socket T-Handle (#62255) will simplify this process with the use of the many Moroso oil pan fastener kits available (**see catalog & website**).

DRY SUMP OIL PANS

Make sure that all parts are thoroughly cleaned before installation. Be sure that the fasteners holding the scraper and windage tray in place are securely tightened. Use Loctite® on all fasteners to prevent loosening. Checking the rotating assembly for proper clearance is important on dry sump pans because the shorter design depth that is common.

Moroso Dry Sump Oil Pans are designed with Billet Aluminum front and rear end seals. This allows the use of an oil pan gasket. In some cases, gaskets may not be available, so a moderate bead of high temp RTV can be used all the way around to seal the oil pan. Siliconing the oil pan should only be used in crankcase vacuum applications, or if no gasket is available for your application.

Use -AN style lines and fittings to connect pickup outlets (on side of pan) to scavenge stages of pump. For a #12 -AN pick-up, Moroso P/N 23961 screened fitting, and for a #16 -AN pick-up, Moroso P/N 23962 screened fitting can be used. Never use NPT (Pipe) Thread fittings. Be sure to block off the rear main cap oil gallery passage with our No. 23790 Oil Pump Block-Off Plate on SBC, BBC, and 90° V6 Chevy applications only. To clean pickup tubes, run a bottlebrush through the tubes, such as supplied with Moroso Engine Cleaning Brush Kit No. 61820.

MOROSO LS OIL PANS

All Moroso LS Oil Pans that include an oil filter adapter require the use of a 22 x 1.5 mm threaded oil filter. (See the Moroso catalog for applicable filters)

MARINE OIL PANS

On most marine Oil Pans there are two 1/2" inlets on the sides of the pan for oil drain lines from the turbocharger. If a turbocharger is not used, these fittings should be plugged with 1/2" NPT pipe plugs

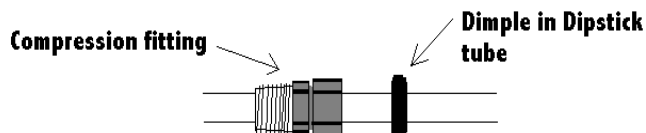
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(Moroso Chrome Pipe Plugs #39153). The two 1/2" NPT fittings at the front of the pan are for oil drainage and an oil temperature-sending unit.

DIPSTICKS

If your Moroso Oil Pan came equipped with a 1/4" NPT Pipe Coupling welded to the side of the oil pan's sump, we recommend you use a Moroso Universal Dipstick (**see catalog & website**). Most Dipsticks utilizing a compression fitting will allow you to set the dipstick to the correct height for a particular oil level. The dipstick tube may need to be bent or modified in order to bolt up correctly and gain header clearance. Regardless of your engine combination or application we recommend checking the dipstick to rotating assembly clearance as well.



Begin the installation by adding the amount of oil the system calls for based on the oil pan you have purchased. Install a new oil filter and the additional amount of oil to fill the filter. Install the dipstick with the compression fitting before the dimple on the stick. Do not tighten the compression fitting at this time. Leave it loose, but snug so the dipstick will move up and down within the compression fitting and pipe coupling.

Proceed to start the engine and let run for 30 seconds to allow the oil to circulate through the engine. Shut off the engine. The oil will now be at a level that is indicative of the real condition while the engine is running. Adjust the dipstick tube up or down in the compression fitting until the dipstick reads at the full mark, then tighten the compression fitting to lock it in place.

Note: the bead on the dipstick does not get inserted up against the compression fitting for all applications. If your oil pan did not come equipped with a pipe coupling welded to the sump, you can have one welded on by either Moroso or a certified welder or fabricator.

HARDWARE

Although the factory hardware may be retained in some cases, Moroso offers a wide selection of fasteners that are engineered and fitted to the specific oil pan. Some oil pans will work better with bolts, while others are better suited for studs and nuts, particularly aluminum oil pans. A stud kit will protect the threaded oil pan boltholes in a block and simplify removal and replacement of the oil pan. Moroso has several stud kits for various applications.

Oil pan designs may require fewer bolts, or reduced head size fasteners for proper clearance based on stroke notches and kick-out sizes. It is recommended that you fasten your pan down before final assembly to ensure proper fastener engagement and tool selection for completing the final assembly.

Note: Remember to re-install and tighten the access plugs and tighten the oil drain plugs prior to adding oil. If oil pan is equipped with npt plugs/fittings that are not used in your application, be sure to remove and apply Teflon to plugs and tighten. These plugs are not tightened from factory.

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