

**MAHLE**

# Great Parts for Great Engines

Replacement parts for Cummins ISX / QSX

**MAHLE** 

## MONOTHERM® piston

MAHLE is the benchmark for steel pistons and the MAHLE MONOTHERM® piston offered for the ISX and QSX series of engines are no exception. They feature the following:

- + High strength steel for endurance
- + Closed skirt design to reduces piston scuffing
- + Reduced crown diameter and low ring pack placement compatible with anti-polishing ring liners
- + Manganese phosphate coated for improved break-in and reduced wear

## Piston types

MAHLE Aftermarket supplies only the later design closed skirt, low ring pack, and reduced crown pistons.

If purchasing a complete engine kit the identification of the piston is not a concern. The properly matched components will be supplied. In the case where less than all piston are being replaced, they must be all the same design. Open skirt and closed skirt pistons can't be intermixed in an engine. Open skirts pistons include a gap or window under the crown. The closed skirt pistons are solid with the exception of the oiler relief.

## Pre-packed engine kits

The MAHLE pre-packed heavy duty engine kit program consists of the most popular engine kits. MAHLE pre-packed engine kits, otherwise specified, contain:

- + Cylinder kits
- + Full gasket sets (overhaul)
- + Head gasket sets (in-frame)
- + Oil pan gaskets (in-frame)
- + Standard size main and rod bearings

These pre-packed engine kits, shipped the same day as ordered (when ordered by 2 pm central time), are complete with all the parts needed in one box. They are stocked in both the Olive Branch and Bell, California service centers to ensure even faster delivery.

## Engine kit suffixes:

The OE has assigned part numbers to their engine kits. MAHLE Aftermarket uses variants of these numbers with suffixes. Numbers without suffixes match the OE offering.

Suffix	Description
IF	In-frame
OH	Overhaul
150	Contains 150mm barrel liner
152	Contains 152mm barrel liner
NPR	No anti-polishing ring
APR	With anti-polishing ring

## Picking the Right Parts:

The ISX engine has been in the market for 20 years and there have been design changes that impact part selection. To ensure the correct parts are supplied, please collect the following details:

- + Engine serial number, CPL number or OE piston number
- + Rod bearing type
- + Liner design - there are five (5) different liner designs

There are three different rod bearing designs. The early bearing was only used for a short time for FERROTHERM® non-drilled rods and is not supported by MAHLE Aftermarket. The second and third designs are related to the two different rod types, machined, or sometimes call sawed rod, and fractured rods. The two rods have a visual difference. The fractured rod includes an indexing hole in the cap next to the rod bolt holes that is absent on the machined rod.

An engine's serial number may indicate that engine was built with sawed rod but may have been updated since original release to fractured rod.

## Liner Designs

MAHLE#	Barrel Diameter	Shim Type	Anti-Polishing Ring	Note
226-4596	150mm	None	No	Can Upgrade to 226-4635 or 226-4641 dependent on piston design
226-4635	150mm	Captive	No	Can Upgrade to 226-4641 for low ring pack, reduced crown pistons
226-4638	152mm	Loose	No	Can Upgrade to 226-4643 for low ring pack, reduced crown pistons design
226-4641	150mm	Captive	Yes	
226-4643	152mm	Loose	Yes	

Additional notes: 150mm liners use a mauve (pink) liner seal and 152mm liners use a blue liner seal. To determine barrel size, measure the liner immediately below the liner o-ring groove.

For more information, visit [catalog.mahle-aftermarket.com/na](http://catalog.mahle-aftermarket.com/na)

## Cylinder Components

MAHLE #	Description	Notes	OE Ref #
223-1968	Wrist Pin	OD 63.5MM, Length 85MM, ID 28MM	3689296
223-4007	Piston Oiler	1 Piece Piston (Liner Located Type)	3687058
223-5540	Lock Ring	Two Per Pack	3064305
223-7216	O Ring Kit	Mauve, 150MM Barrel Liners	3678738
223-7226	O Ring Kit	Blue, 152MM Barrel Liners	3685234
223-8027	Cylinder Block Shims	0.813MM (0.032"), Loose	5298565
MH-4311637	Cylinder Block Shims	0.813MM (0.032"), Captive	4311637
223-8148	Anti-Polishing Ring	For 3690561 / 4376168 Liner	3689871
S42150	Single Cylinder Ring Set	FERROTHERM®, Late	4309442
S42153	Single Cylinder Ring Set	For MONOTHERM®	4309441
S42416	Single Cylinder Ring Set	For MONOTHERM® HPCR	4376565
225-3969	Piston with Rings		4376243
225-3971	Piston with Rings		4376241
225-3973	Piston with Rings		4376244
225-3976	Piston with Rings		4376242
225-3978	Piston with Rings		4376245
225-3979	Piston with Rings		4376246
225-3980	Piston with Rings		4376566
225-3981	Piston with Rings		2881758
225-3982	Piston with Rings		4298548
226-4596	Cylinder Liner	5.906" Barrel, SS** To 226-4635 (No Anti-Polishing Ring) or 226-4641 (With Anti-Polishing Ring)	
226-4635	Cylinder Liner	150MM / 5.906" Barrel, Captive Shim	4309389
226-4638	Cylinder Liner	152MM / 5.984" Barrel, Loose Shim	4376392
226-4641	Cylinder Liner	150MM / 5.906" Barrel, Captive Shim, With Anti-Polishing Ring	4376168
226-4643	Cylinder Liner	152MM / 5.984" Barrel, Loose Shim, With Anti-Polishing Ring	5473000

## Engine Bearings

MAHLE #	Description	Notes	OE Ref #
CB-1908P	Bearing, Connecting Rod Pair	For Machined Rod MONOTHERM®	4089405
CB-1908P-.25MM	Bearing, Connecting Rod Pair	For Machined Rod MONOTHERM®	4090016
CB-1908P-.50MM	Bearing, Connecting Rod Pair	For Machined Rod MONOTHERM®	4090017
CB-1994P	Bearing, Connecting Rod Pair	For Fracture Rod	2882087
CB-1994P-.25MM	Bearing, Connecting Rod Pair	For Fracture Rod	4376360
CB-1994P-.50MM	Bearing, Connecting Rod Pair	For Fracture Rod	4376361
MS-2297P	Bearing, Main Set	Includes Thrusts	3800298
MS-2297P-.25MM	Bearing, Main Set	Includes Thrusts	4089845
MS-2297P-.50MM	Bearing, Main Set	Includes Thrusts	4089846
SH-2136	Camshaft Bearing, Individual	4 required, Left Bank (Injection Cam), Twin Cam	4319031
SH-2137	Camshaft Bearing, Individual	3 required, Left Bank (Injection Cam), Twin Cam	4319032
SH-2138	Camshaft Bearing, Individual	7 required, Right Bank (Valve Cam) Twin and Single Cam	3685690
SH-2237S	Camshaft Bearing Set	3685690(7)+4319031(4)+4319032(3)	4309097
TW-691S	Thrust Washer Sets	Included in Main Set, 4 Per Package	3680202
223-3735	Bushing, Piston Pin	For Drilled Connecting Rod	4059448
223-3738	Bushing, Piston Pin	Fractured Rod	2882581

## Cylinder Head and Ancillary

MAHLE #	Description	Notes	OE Ref #
211-4311	Valve, Exhaust	Head Diameter 1.790", Length 8.810", 45°, Stellite Face, Twin Cam	4101454
211-4312	Valve, Intake	Head Diameter 1.870", Length 8.502", 20°, Twin Cam	4965868
216-1209	Injector Tube Kit		3412352
217-4126	Guide, Valve	05/15/2000 Up, Both Twin Cam, ISX2010 HPCR, Use Seal 4026791 [SS46106]	4026657
228-2328	Pump, Coolant	ISX1 & ISX2 10 Groove Pulley, 3 Bolt Mounting, 1 Piece	4089908
228-2329	Pump, Coolant	ISX2 12 Groove Pulley, 3 Bolt Mounting	4089910
229-2454	Camshaft, Injector	Injector CPL 1835, 2629, 3774, 8225,8246, 8257	4101476
229-2455	Camshaft, Valve	Valve, CPL 1835, 8244, 8246, 8257, Non-EGR, Low Horsepower, Before Update See TSB12005, 20MM Wide Lobe	4298627
247-5240	Crankshaft, Assembly	Includes Gear, Tone Wheel, Hub And Dowel Pins, Parts Are Not Installed On Crank	3691444
247-5241	Crankshaft, Assembly	Includes Gear, Tone Wheel, Hub and Dowel Pins, Parts Are Installed On Crank, For Crank That Includes Gear, Tone Wheel, Hub and Dowel Pins Uninstalled Use 2475240	3691444
601-8151	Plunger, Oil Cooler		3820320
286 TS 21201 000	Turbocharger Service Kit	HE551VE, For Turbocharger 286 TC 21201 000	See Note
THD10 82	Thermostat, Coolant	82°C / 180°F	4952204
WFC 15	Filter, Coolant		3318319

## Gaskets

MAHLE #	Description	Notes	OE Ref #
54775	Gasket, Cylinder Head	For Flat Top Liner, Engines Built After 8/27/01, S/N 14022615, Graphite	3685834
67881	Seal, Crankshaft Rear	With Spacer	4965569
67882	Seal, Crankshaft Front	With 3 Bolts And 3 Washers	4955383
B32477	Gasket, Oil Cooler Gasket		3689755
B32486	Gasket, Cam Cover, Rear	Injector Cam	4985661
B32487	Gasket, Cam Cover, Front	Valve Cam	4299125
B32488	Gasket, Cam Cover, Rear	Valve Cam	4985660
B32489	Gasket, Cam Cover, Front	Injector Cam	4299124
B32490	Seal, Camshaft, Front	Valve Cam	3679932
B32491	Seal, Camshaft, Front	Injector Cam	3679931
B32656	Seal, Turbo Inlet	Outer Seal	3066211
CS54775-1	Gasket Set, Lower	Early, Non EGR	4955590
CS54775-2	Gasket Set, Lower	Late EGR	4955591
CS54775-3	Gasket Set, Lower	HPCR Engines	2881766
G32492	Gasket, EGR Valve		3104230
G32485	Gasket, EGR Inlet		3104229
GS33571A	Injector Cup O-Ring Set	Injector Tube OD, For Standard Injector Bore	3007759
GS33609	Injector O-Ring Set	For One Injector , Black 3347939(1) + Royal Blue 3330537(1) + Yellow 3330538(1) + Green 3347937(1)	See Note
GS33613	Gasket Set, EGR Cooler	Kit to Remove And Replace EGR Cooler	See Note
GS33617	Kit, Turbo Mounting	Kit to Remove And Replace Turbocharger	See Note
HS54775-1	Gasket Set, Cylinder Head	Early Non-EGR, Valve Cover Not Included	4955595
HS54775-2	Gasket Set, Cylinder Head	EGR Engine	4955596
HS54775-3	Gasket Set, Cylinder Head	HPCR	4376104
MS19737	Gasket Set, Exhaust Manifold	Turbo Mounted Horizontal, Mid Manifold From Crank, MLS	See Note
MS19740	Gasket Set, Exhaust Manifold	Turbo Mounted Vertical, Mid Manifold From Crank	See Note
MS19750	Gasket Set, Intake Manifold		3678770(1) / 3682177(1)
OS32376	Gasket Set, Oil Pan	Includes Oil Suction Pick-up Tube O-Ring 3678756	4026684
SS46021	Seal, Valve Stem	Contains 12, Use 40226971 For Intake, After 05/15/2000 or S/N 14010274, ISX570	4026660
SS46022	Seal, Valve Stem	Contains 12, Exhaust Only After 05/15/2000 or S/N 14010274, After 05/2002 Both Intake and Exhaust	4026791
SS46106	Seal, Valve Stem	Contains 4, Integrated Seal Spring Seat Combination, Exhaust, Intake, After 05/15/200 or S/N 14010274, SS to 4356366	4356366
VS50625	Gasket Set, Valve Cover	Includes Noise Isolators, Early Design, For Rocker Cover 4026509	4026507

## Engine Kits by CPL

CPL	OE Piston	MAHLE Piston Kit	150MM		152MM	
			In-frame OE #	Kit #*	In-frame OE #	Kit #*
1732, 3087, 3088, 4262, 8760, 8761, 8762, 8764	4357149	225-3978	4376176	459-5532† 459-1532	MAHLE Exclusive	459-5541† 459-1541
1771, 2440, 2627, 2628, 2629, 2631, 2632, 2803, 2803, 2814, 2933, 2934, 8046, 8047, 8048, 8083, 8242, 8243, 8244, 8255, 8257, 8258	4357150	225-3971	4376171	459-5527† 459-1527	4376429	459-5513† 459-1513
2442, 2483, 2630, 2633, 2801, 2816, 2834, 2836, 2837, 2900, 8246, 8247	4367126	225-3976	4376172	459-5528† 459-1528	MAHLE Exclusive	459-5539† 459-1539
2825, 2835, 8081, 8142, 8469, 8571, 8587, 8588	4367132	225-3979	4376173	459-5529† 459-1529	MAHLE Exclusive	459-5540† 459-1540
1437, 2732, 3229, 3459, 3775, 8287, 8288, 8520, 8523, 8550	4367161	225-3969	4376175	459-5531† 459-1531	5405988	459-5519† 459-1519
927, 1434, 2733, 2734, 2919, 2965, 3167, 3458, 3774, 8125, 8281, 8282, 8283, 8284, 8285, 8286, 8517, 8518, 8519, 8521, 8522, 8660	4367173	225-3973	4376174	459-5530† 459-1530	4376428	459-5517† 459-1517

\*459-55XX designates in-frame kits | 459-15XX designates overhaul kits

†In-frame kits are available in pre-packed engine kits with standard mains and rod bearings

## Engine Kits by Part Number

MAHLE #	Description	Notes	OE Ref #
459-1495	Pistonless Overhaul Kit	Early, Non-EGR, Includes Pins And Locks	See Note
459-1496	Pistonless Overhaul Kit	Late EGR, Includes Pins And Locks, CPL 8520	See Note
459-1497‡	Pistonless Overhaul Kit	Early, Non-EGR, Without Pins Or Locks	See Note
459-1500	Pistonless Overhaul Kit	Early, Non-EGR, Includes Pins, Locks And Early Valve Cover	See Note
459-1501‡	Pistonless Overhaul Kit	Early, Non-EGR, Without Pins Or Locks And Early Valve Cover	See Note
459-1512	Overhaul Kit	Piston #4357150 / Liner #5468973	4376171OH
459-1513	Overhaul Kit	Piston #4357150 / Liner #5468985	4376429OH
459-1514	Overhaul Kit	Piston #4367126 / Liner #5468973	4376172OH
459-1515	Overhaul Kit	Piston #4367132 / Liner #5468973	4376173OH
459-1516	Overhaul Kit	Piston #4367173 / Liner #5468973	4376174OH
459-1517	Overhaul Kit	Piston #4367173 / Liner #5468985	4376428OH
459-1518	Overhaul Kit	Piston #4367161 / Liner #5468973	4376175OH
459-1519	Overhaul Kit	Piston #4367161 / Liner #5468985	5405988OH
459-1520	Overhaul Kit	Piston #4357149 / Liner #5468973	4376176OH
459-1521	Overhaul Kit	Piston #3688099 / Liner #5468973	4376177OH
459-1522	Overhaul Kit	Piston #3688099 / Liner #5468985	4376427OH
459-1523	Overhaul Kit	Piston #3688100 / Liner #5468973	4376178OH
459-1524	Overhaul Kit	Piston #3688100 / Liner #5468985	5405987OH
459-1525	Overhaul Kit	Piston #3687897 / Liner #5468973	5473074OH
459-1526	Overhaul Kit	Piston #3687897 / Liner #5468985	5405986OH
459-1527	Overhaul Kit	Piston #4357150 / Liner #4568991 SS** To 459-1512	4376171-OH150NPR
459-1528	Overhaul Kit	Piston #4367126 / Liner #4568991 SS** To 459-1514	4376172-OH150NPR

## Engine Kits by Part Number cont'd.

MAHLE #	Description	Notes	OE Ref #
459-1529	Overhaul Kit	Piston #4367132 / Liner #4568991 SS** To 459-1515	4376173-OH150NPR
459-1530	Overhaul Kit	Piston #4367173 / Liner #4568991 SS** To 459-1516	4376174-OH150NPR
459-1531	Overhaul Kit	Piston #4367161 / Liner #4568991 SS** To 459-1518	4376175-OH150NPR
459-1532	Overhaul Kit	Piston #4357149 / Liner #4568991 SS** To 459-1520	4376176-OH150NPR
459-1539	Overhaul Kit	Piston #4367126 / Liner #5468985	4376172-OH152WPR
459-1540	Overhaul Kit	Piston #4367132 / Liner #5468985	4376173-OH152WPR
459-1541	Overhaul Kit	Piston #4357149 / Liner #5468985	4376176-OH152WPR
459-5495	Pistonless In-frame Kit	Early, Non-EGR, With Pins And Locks	See Notes
459-5496	Pistonless In-frame Kit	Late EGR, With Pins And Locks	See Notes
459-5497‡	Pistonless In-frame Kit	Early, Non-EGR, No Pins Or Locks	See Notes
459-5498‡	Pistonless In-frame Kit	Late EGR, No Pins Or Locks	See Notes
459-5512‡	In-frame Kit	Piston #4357150 / Liner #5468973	4376171
459-5513‡	In-frame Kit	Piston #4357150 / Liner #5468985	4376429
459-5514‡	In-frame Kit	Piston #4367126 / Liner #5468973	4376172
459-5515‡	In-frame Kit	Piston #4367132 / Liner #5468973	4376173
459-5516‡	In-frame Kit	Piston #4367173 / Liner #5468973	4376174
459-5517‡	In-frame Kit	Piston #4367173 / Liner #5468985	4376428
459-5518‡	In-frame Kit	Piston #4367161 / Liner #5468973	4376175
459-5519‡	In-frame Kit	Piston #4367161 / Liner #5468985	5405988
459-5520‡	In-frame Kit	Piston #4357149 / Liner #5468973	4376176
459-5521‡	In-frame Kit	Piston #3688099 / Liner #5468973	4376177
459-5522‡	In-frame Kit	Piston #3688099 / Liner #5468985	4376427
459-5523‡	In-frame Kit	Piston #3688100 / Liner #5468973	4376178
459-5524‡	In-frame Kit	Piston #3688100 / Liner #5468985	5405987
459-5526‡	In-frame Kit	Piston #3687897 / Liner #5468985	5405986
459-5527‡	In-frame Kit	Piston #4357150 / Liner #4568991 SS** To 459-5512	4376171-IF150NPR
459-5528‡	In-frame Kit	Piston #4367126 / Liner #4568991 SS** To 459-5514	4376172-IF150NPR
459-5529‡	In-frame Kit	Piston #4367132 / Liner #4568991 SS** To 459-5515	4376173-IF150NPR
459-5530‡	In-frame Kit	Piston #4367173 / Liner #4568991 SS** To 459-5516	4376174-IF150NPR
459-5531‡	In-frame Kit	Piston #4367161 / Liner #4568991 SS** To 459-5518	4376175-IF150NPR
459-5532‡	In-frame Kit	Piston #4357149 / Liner #4568991 SS** To 459-5520	4376176-IF150NPR
459-5533	In-frame Kit	Piston #4357150 / Liner #5469002 SS** To 459-5513	4376429-IF152NPR
459-5534	In-frame Kit	Piston #4367126 / Liner #5469002 SS** To 459-5539	4376172-IF152NPR
459-5535	In-frame Kit	Piston #4367132 / Liner #5469002 SS** To 459-5540	4376173-IF152NPR
459-5536	In-frame Kit	Piston #4367173 / Liner #5469002 SS** To 459-5517	4376428-IF152NPR
459-5537	In-frame Kit	Piston #4367161 / Liner #5469002 SS** To 459-5519	5405988-IF152NPR
459-5538	In-frame Kit	Piston #4357149 / Liner #5469002 SS** To 459-5541	4376176-IF152NPR
459-5539‡	In-frame Kit	Piston #4367126 / Liner #5468985	4376172-IF-152APR
459-5540‡	In-frame Kit	Piston #4367132 / Liner #5468985	4376173-IF-APR152
459-5541‡	In-frame Kit	Piston #4357149 / Liner #5468985	4376176-IF-APR152

‡Available In Prepack Kit With Standard Rods and Mains

SS\*\* Superseded when out of stock

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