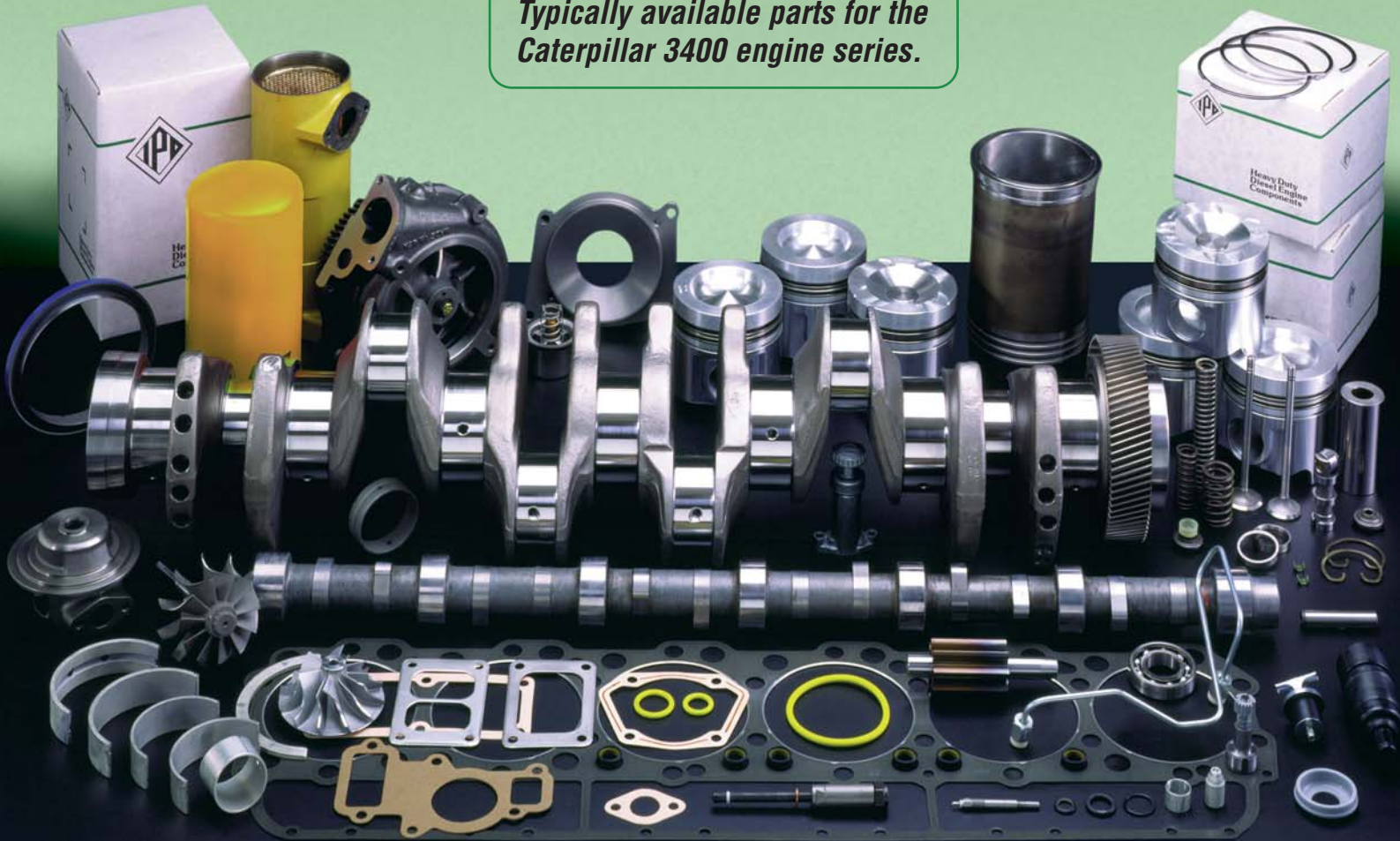




IPD Products for CATERPILLAR® 3406/3408/3412 ENGINES



*Typically available parts for the
Caterpillar 3400 engine series.*



Extensive Coverage, Innovative Ideas, Quality Products and Aggressive Product Development describe IPD's 3406, 3408 and 3412 Caterpillar Diesel and Natural Gas engine parts program. On the next few pages we will give you a brief explanation of why we feel IPD is your best choice when it comes to rebuilding these engines.

Owners of these engines worldwide have come to rely on IPD parts to not only lower operating cost but also in some cases to actually improve service life on certain components.

Add to the above reasons, knowledgeable inside and outside staff, unequalled service, worldwide distribution centers and IPD is your best alternative for diesel or natural gas engine parts.

IPD GROOVED CONNECTING ROD BEARING IS A PROVEN DESIGN FOR CATERPILLAR® 3400 SERIES ENGINES

ENGINE: Caterpillar® 3406, 3408, 3412 B, C & E Model diesel & natural gas applications.

PROBLEM: Users complain of connecting rod bearing cavitation.

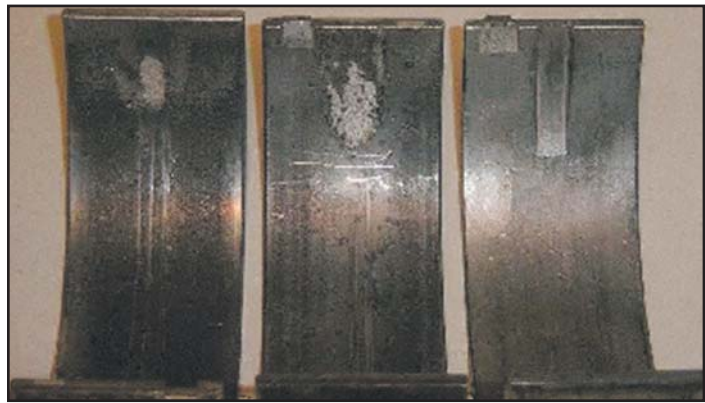
SYMPTOM: Connecting rod bearing shows cavitation erosion of bearing surface.

OPTIONS:

A) Close monitoring of oil analysis, allowing replacement.

B) Install IPD grooved connecting rod bearings with high fatigue strength material to reduce risk of surface cavitation and with proper maintenance, possibly increase engine bearing life. Bearings were first put into IPD production in 1993!

RECOMMENDED ACTION: Contact your IPD



Pictured are three bearing shells that were placed new in a rebuilt engine and removed after 300,000 miles. Note erosion damage on the two non-relieved bearings on left compared to the IPD bearing on the right with the pressure relief pocket.

Distributor or Distribution Center and order the following applicable part numbers as needed: 3406A,B engines with narrow connecting rod bearing

(Std.)9Y9497G (.010)9Y9497G-10
(.025)4W5702G

3406 Late B & C engines with wide connecting rod bearing

(Std.)9Y7735G

Brief History of 3400 Series Liner and O-Rings: Please note that dates and verbiage may not be exact. (Known history since 1982).

<u>Date</u>	<u>Old Part No.</u>	<u>New Part No.</u>	<u>Product Desc.</u>	<u>Reason for Change</u>
1/82	7N0843	1W6280	Liner	O-ring grooves narrower in liner.
1/82	2N6210	6V5121(black)	O-rings	Larger I.D. but smaller x-section on o-ring for lower tension.
2/86	1W6280	7W3550	Liner	Decreases liner to block clearance from .012+/- .004 down to .006+/- .004 to help prevent o-ring fretting.
10/92	7W3550	2W6000	Liner	O-ring locations lowered on liner to help prevent rolling and cutting of o-ring.
10/92	6V5121	3E6777(brown)	O-rings	New material, Viton, better resistance to oil. At some point a blue Teflon coating added to ease installation.
3/95	3E6777	1102220(orange)	O-rings	New material, HSN, offers improved resistance to o-ring deterioration.
4/98	OEM announced that three separate o-rings are to be used on new production 3400 (5.4" bore) engines as follows:			Top: 1427072 EPDM Mid: 1102220 HSN Bot: 1426217 Viton

Note that on C-16 (5.5" bore) engines, OEM uses a "D-ring" to replace the upper o-ring on 600HP engines.



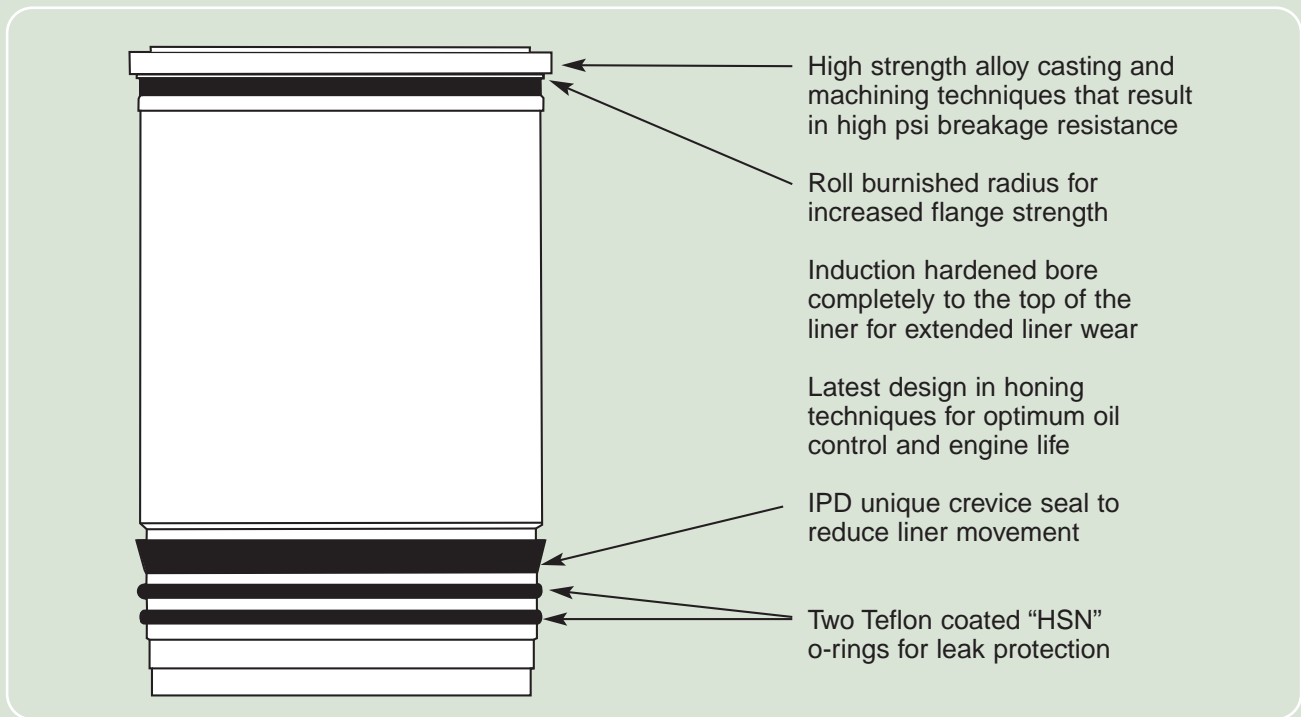
IPD'S CREVICE SEAL CYLINDER LINER DESIGN HAS PROVEN ITSELF SINCE 1996! BEWARE OF IMITATIONS!

Suggestions from our customers have led to another innovative idea from IPD. For years our engine-rebuilding customers have complained that the Caterpillar 3400 series engines appear to experience excessive cylinder liner movement in certain applications as engines age and are subject to conditions such as lugging or high horsepower.

Use of a crevice seal on the lower half o-ring areas is not a new idea - it has been used for years in other engine models and from other manufacturers. IPD has taken the initiative to apply this design for use in Caterpillar 3406, 3408 and 3412 engines. Below is a drawing that shows some of the features that IPD has included in this product.

IPD feels that by replacing the top o-ring on the bottom half of the liners with a crevice type seal and a tapered groove, the stability of the cylinder liner is improved.

Also listed on the next page is brief history of the liner and o-ring changes on these engines.



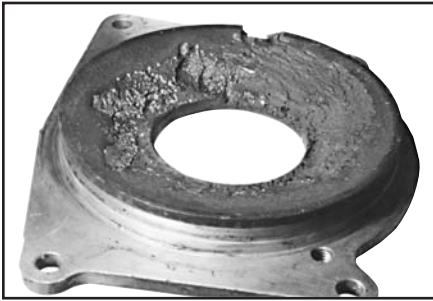
IPD2W6000CSWS CREVICE SEAL LINER

IPD has also incorporated our crevice seal design with the 1599778CSWS "controlled size" Oversize ID liner for extreme duty applications where engines are subject to elevated air inlet temperatures and or prone to piston seizure. At right are some of the 3406, 3408 & 3412 applications where it may be used.

Please contact your IPD Regional, Area Manager or your IPD Distribution Center for more details.

D8N	9TC1-5065, 5067, 1XJ1-159
824C	85X1-1514
825C	86X1-993
826C	87X1-1247
3406B	4TB1-3044
3408B	DI 99U
3412	DI 60M Marine engines

FROM THE BEGINNING....IRON INSTEAD OF ALUMINUM



IPD began offering water pump backing plates for Caterpillar 3406, 3408 and 3412 engines a decade ago from iron as opposed to aluminum. This was done based on request from our customers that the aluminum plates corroded and have a tendency to break when trying to remove them.

Listed below are the part numbers and applications that IPD offers:

3406 engines:	7C9222
3408 and 3412 engines:	1012749

IPD offers a complete line of cooling system components including water pumps, water pump repair kits, gasket sets and thermostats/regulators.

IPD Engineering

IPD CONTROLS PROCESSES FROM POURING CASTING TO FINISH MACHINING

IPD's decades of manufacturing expertise assures that product manufactured either by or for IPD meets the requirements that IPD customers have been accustomed to. IPD controls all processes from raw materials, casting, heat treatment, machining and quality assurance with consistency world wide to assure our customers satisfaction.

Our strength has been our engineering ability to work with our customers to not only provide the quality required in tough applications but to innovate where it may be possible to improve engine life such as our

Crevice Seal Liners (see page3), our Grooved Connecting rod bearing (see page 2) or our 4-ring pistons for certain 3400 series engines (see page 5).

The variety of pistons that we offer include styles such as one piece aluminum, one piece aluminum with gallery cooling and articulated pistons for certain applications.



IPD Pistons

OPTIONS AND QUALITY

IPD not only offers interchangeable products for your Caterpillar 3400 series engine, we also offer a few options to help extend engine life as well as overall quality in manufacturing.

- **High strength alloy pistons** that can help resist crater cracking along with reinforced skirts.
- **CNC, diamond turned pistons** for accuracy in dimensions and consistent quality.

- **All pistons 100% Ultrasonically checked** for ring insert bond integrity.

- **Over 20-piston part numbers** to cover most 3406, 3408 and 3412 applications.

Please contact your IPD Regional or Area Manager for more details on IPD pistons.

IPD PRODUCTS FOR CATERPILLAR® 3406E ENGINES

IPD is proud to announce our first offerings for this popular engine. Our current product line includes the following items. Please consult the IPD Parts Database or your IPD Distribution Center for exact application information.

Camshaft Bushing (std)	1345251	3406E,C15,C16
Head Replacement Gasket Set	406463	3406E Truck Engines
Multiple Head Gasket Set	406463	5EK,6TS,1LW,5DS,2WS
In-Frame Gasket Set	406462	5EK,6TS,1LW,5DS,2WS
Multiple Head Gasket Set	406473	575HP/600HP 1MM
In-Frame Gasket Set	406472	575HP/600HP 1MM
Valve, Intake	1537023	3406E,C15,C16
Valve, Exhaust	1537024	3406E,C15,C16
Spring, Valve, Inner	1757523	3406E,C15,C16
Spring, Valve, Outer	1757526	3406E,C15,C16
Rotocoil	1862001	3406E,C15,C16
Valve Guide, Int/Exh	1227375	3406E,C15,C16
Seal, O-Ring	1662903	Inj. Tube O-Ring
Seal, O-Ring	1662904	Inj. Tube O-Ring
Seal, O-Ring	9X7430	Inj. Tube O-Ring
"NEW" Piston Skirt	1300241	use with crown part numbers: 1352837, 7C2888,1495566
"NEW" Ring Set	1343761RS	use with above listed piston crowns.



Please contact IPD with any of your 3406E needs as we are continually adding product to this engine range.

IPD Kits

IPD "CROWN-LESS" IN-FRAME OVERHAUL KITS FOR CATERPILLAR® 3406E TRUCK ENGINES

Our recent introduction of IPD piston skirts (part no. 1300241) has made these new kits possible. These skirts and IF kits are to be used with the following piston crowns: 1352837, 7C2888, 1495566

IPD In-Frame Overhaul Kit Part Number IF0241/462 is applicable for most 3406E Truck Engines with above crowns & serial number prefix 5EK & 6TS but please check with IPD with exact serial & arrangement number. Kits will include:



- 6-IPD Piston Skirts, Pins & Retainers
- 6-IPD 3406E Ring Sets
- 1-IPD 1-2-3™ Style In-Frame Gasket Set
- 6-IPD Rod Bearings (specify std, .025, .050)
- 7-IPD Main Bearings & thrust (specify std, .025, .050)
- 6-IPD Induction Heat Treated Cylinder Liners

Also, Kits are available with our optional IPD Exclusive "Crevice Seal" Type liner. Order Part Number IF0214/462/CS

IPD piston crowns for these applications will be available in the near future so please check with us often.

IPD OFFERS THE MOST COMPREHENSIVE COVERAGE OF 3400 SERIES PARTS IN THE AFTERMARKET

CYLINDER COMPONENTS:

Piston/Rings
Liners/Pins/Retainers
Block Inserts and Repair
Sleeves

GASKETS SETS:

Head Replacement Sets
In-Frame Sets
Out-of-Frame Sets
Fuel Pump Sets
Water Pump Sets
Multiple Style Sets
Fuel Pump Installation Sets

CYLINDER HEAD COMPONENTS:

Valves/Springs/Guides/
Seats
Rotators
Lifters and Lifter Repair
Kits
Camshafts and Camshaft
Kits
Cylinder Head Bolts

ENGINE BEARINGS:

Rod and Main Bearings
including
IPD Grooved Connecting
Rod Bearing
Piston Ring Bushings
Camshaft Bearings
Miscellaneous Engine
Bearings

COOLING SYSTEM:

New Water Pumps
IPD Water Pump Rebuild
Kits
Shafts/Bearings
Cast Iron Impellers
Steel Backing Plates
Thermostats/Regulators

LUBE OIL SYSTEM:

New QC'd Oil Pumps
Shafts/Bearings
Gears
New Oil Coolers

FUEL SYSTEM:

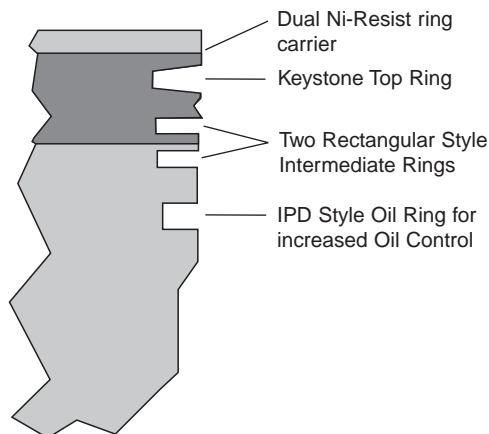
Reman Injectors
Plunger and Barrels
Gasket Sets
Zinc Plated Fuel Lines

MISCELLANEOUS:

New QC'd Crankshafts
Glow Plugs/Pre-chambers
Truck Engine Overhaul Kits
Manifold Studs/Nuts
Vibration Dampers

IPD "4-RING" STYLE PISTON FOR CERTAIN CATERPILLAR 3400 SERIES DIESEL ENGINES

Several years ago IPD developed a 4-ring piston for the Caterpillar 3400 series. This was in response to customers who sought reduction of blow-by in enclosed engine room applications. Over time this design has also been used in engines working in underground mines and other applications. These pistons incorporate a keystone top ring, rectangular for the 2nd and 3rd compression rings. The oil ring is the same one used on the three-ring piston. This piston is not recommended for on-highway truck engines. Please contact IPD for specific application information.



IPD Part Number 34156MR4 can be used to replace 9Y7212. Call IPD for application.

IPD REMANUFACTURED PRODUCTS!

IPD's experience in remanufactured products started at the very beginning of IPD in 1955. At our own facility in Torrance IPD was rebuilding heavy equipment and engines for the local California market. As IPD progressed to become a leading manufacturer of Diesel and Natural Gas Engine products, our focus has been to determine which products IPD can remanufacture with quality, and to continue to service our Distributors and their customers.

Our Fuel Injection program has been enhanced over the years with a high quality remanufactured pencil and 7000 series fuel nozzle for the 3200, 3300 and 3400 Caterpillar engines.

Some of the features you will find in every IPD Remanufactured Fuel Injection Nozzle are as follows:

1. *Lift Controlled*
 - a. Improved fuel flow and performance
 - b. Avoid secondary injection
2. *New USA made nozzle spring*
 - a. Consistent performance
 - b. Long injector life
3. *New Seal*
 - a. Positive sealing eliminates leakage
 - b. Allows accurate torque

7000 Series
Type Nozzle



4. *IPD reground needle*
 - a. Atomization equal to new injector
 - b. Positive seal with tip
5. *IPD reground injector tip*
 - a. Correct orifice size and angle
 - b. Proper flow and spray angle
 - c. Positive seal with needle
6. *Covered by IPD's comprehensive warranty*
 - a. On highway 1 year / 100,000 miles
 - b. Off highway 1 year / 3600 hours
 - c. See IPD written warranty for details. Also available at www.ipdparts.com
 - d. All units pressure tested at High PSI to assure tip retention

IPD GASKET PROGRAM LEADS AFTERMARKET IN QUALITY AND COVERAGE!

One of our key points is that we offer gaskets made from the highest quality materials available. Other aftermarket companies have tried to duplicate our style of gaskets but fall short on the quality of many critical items as well as contents and complete product coverage. IPD has over 49 years experience in our industry and has built this knowledge into our gasket program. We continually refine our sets by working with our knowledgeable customers to develop the most efficient and complete sets possible while still maintaining good value.

Our IPD 1-2-3™ Style Gasket Sets (see page 8 for detail) have gained popularity for their ease of use, reduction of inventory and high quality gasket materials. Our broad coverage includes:

D342	G342	D343	D353
G353	D346	D348	D379
G379	D398	G398	D399
G399	3204/3208	3116	3304/3306

3406/3408/3412 (including HEUI applications)

3508/3512/3516 (including B applications)

IPD 1-2-3™ Style Gasket Sets cover many vehicular applications for the above engines.

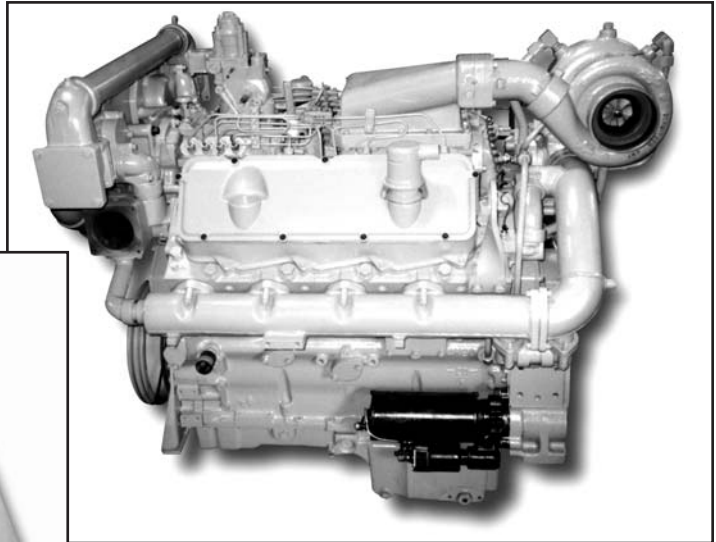
We also of course offer OEM style sets as well. Please contact IPD for more information.



Please contact your IPD Distribution Center or your IPD Regional or Area Manager for more details, or please see our web site at www.ipdparts.com.

IPD Style 1-2-3 Gasket Sets

IPD STYLE GASKET SETS INNOVATION AND OPTIONS



IPD offers you a choice, multiple gaskets sets for Caterpillar Engines (pictured on left), or the exclusive IPD "1-2-3" complete style gasket sets (pictured on right). Sample given is a Caterpillar 3408.

MULTIPLE STYLE OR IPD STYLE

- \$ One box instead of 11 boxes and a bag containing over 20 more gaskets
- \$ Less shipping costs
- \$ Less warehouse space
- \$ Faster inventory turn over
- \$ More machine coverage with lower investment in inventory
- \$ Simplified part number system
- ☺ Happy Mechanics!

IPD 1-2-3 style sets are available as follows: (Example used: 3408 Marine 99U585-4588)

- Out-of-Frame Overhaul Sets =1 Suffix at end of part Number, example 408041
- In-frame Overhaul Set =2 Suffix at end of part number, example 408042
- Multiple Cylinder Head Sets =3 Suffix at end of part number, example 408043
(This set will replace all cylinder heads on the engine with one gasket set!)

Other options may include:

- Single Cylinder Head Sets =4 Suffix at end of part number, example 408044
(This set will replace only one cylinder head on the engine)

Add "NLS" to receive gasket set without cylinder liner seals example: 408041NLS
(This is to be used when you have purchased Cylinder kits that include liner seals)



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<http://www.ipdparts.com> (Internet Page)

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