



**IPD Products for Caterpillar®  
3508/3512/3516/3524  
DIESEL AND NATURAL GAS ENGINES**



# IPD, A SAFE AND SECURE INVESTMENT

Since 1955, IPD has lowered owner's of Caterpillar® engines costs without sacrificing quality, engine life or performance by providing a cost effective quality product line alternative. Our robust product line covers a wide range of products for the 3114 up to 3524 series diesel and gas engines.

IPD also recognizes the importance of repairing engines with quality products as these pieces of equipment or machines are an investment and source of revenue for their owners, and we do not take that lightly. We use only quality materials and with over 55 plus years of manufacturing experience we have in place an excellent and extensive QC process to ensure our products pass our high quality assurance standards before being shipped to customers. Additionally, our comprehensive and clearly stated warranties give our customers the needed peace of mind when purchasing IPD products because they know they are covered and protected.

IPD is ISO9001:2008 certification by Lloyd's Register®, who is recognized and respected worldwide for high standards of technical competence, impartiality and independence. Being ISO9001:2008 certified provides our customers the assurance of a consistent experience with our compliance to the ISO controls and processes. The extent to which IPD has developed it's ISO process and made it a part of virtually every aspect of IPD is uncommon practice in most companies in the aftermarket parts industry.

You can read more about IPD quality and our differentiations at [www.ipdparts.com](http://www.ipdparts.com). Thank you for taking the time to view this document and we appreciate the opportunity to prove to you what truly sets IPD apart from our competition.



# IPD 3500 SERIES PRODUCT LINE

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IPD has been producing high quality products for the 3500 series of engines since the early 1990's. With a complete range of products including gallery cooled pistons for diesel and natural gas applications as well as both induction hardened cylinder liners, heavy-duty copper alloy engine bearings and quality valve train components. Our robust product line makes IPD a leader in providing the most complete range of products available in the aftermarket for these popular engines. Additionally, we carry a variety of miscellaneous internal bushings for rocker arms, accessory drive and oil pump bushings and other parts and components as outlined below and listed on the quick reference guide.

We also are aware of the many changes in specifications and metallurgies that are required between natural gas and other fuels such as landfill and other waste gas applications. Changes in valve and valve seat materials which are critical to maintaining the risk free alternative that IPD can offer. At IPD we only utilize the latest in materials and designs. Some of the items below are featured in this document with more detail and as our coverage expands often, please check with IPD for any updates.



Items available from IPD for 3500 series engines vary between applications and serial ranges but will generally include products such as:

- **Pistons (aluminum and IPDSteel™ one piece)**
- **Cylinder liners (induction heat treated!)**
- **Rings (specific to applications such as diesel or natural gas)**
- **Pins & retainers**
- **Liner o-rings**
- **Intake and exhaust valves**
- **Valve springs**
- **Valve seat inserts**
- **Valve guides**
- **Valve bridges**
- **OEM style gasket sets**
- **IPD Style 123™ complete gasket sets**
- **Oil pump parts**
- **Water pump parts**

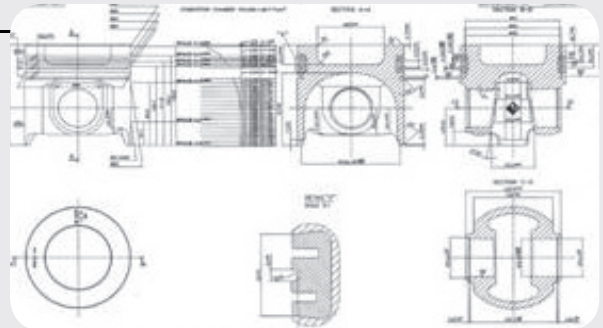


# TESTED AND PROVEN

IPD is known industry-wide for our quality parts and excellent service. Our goal is to create consistent and positive interactions with our distributors and their customers from start to finish as well as offering reliable support after the sale. This starts by manufacturing IPD brand parts from high quality materials, ensuring that each part has the correct specification and tolerances and has gone through a rigorous quality control process. Our attention to detail and quality truly makes IPD stand out from our competition. Listed below are just a few examples of how IPD ensures quality control and takes the necessary steps to produce top of the line product.

## HOW OUR QC PROCESS WORKS

We produce our products from concept to execution. Our process begins with a drawing which ensures the verification of exact specifications and tolerances. As shown in a sample drawing of an inspection of a natural gas application piston.



Quality control of all IPD aluminum diesel and natural gas pistons includes ultrasonic bond checks and critical dimension checks through the use of CMM and hand measuring equipment.



Cylinder liner dimensional control includes dozens of critical specifications, including inside and outside dimensions, flange specifications and oring groove size checks, which is accomplished through tools such as a CMM, height gauge, hardness testor and surface analyzer.



Valve guides, seats and springs are all critical items in heavy duty engines that require extra care. Our valve inspection program includes checking vital measurements such as valve angles not to mention the critical metallurgies used today.



Shown here is our in-house tangential piston ring tension tester.

# FROM CONCEPT, DESIGN TO MANUFACTURING

## IPDSTEEL™

Piston technology has evolved significantly over the years in order to keep up with increased cylinder pressures, performance and emissions requirements. IPD has kept in sync with these evolutions as seen in our offering from our earlier aluminum pistons to our articulated two-piece designs and in our latest technology of IPDSteel™ one piece steel pistons. In both natural gas and diesel applications materials, specifications and designs are increasingly critical for proper engine life and performance. Since 2003, IPD has manufactured steel pistons in various versions and provided product for thousands of engines in many vocations, applications and markets worldwide.

IPD began in the late 1990's working with world-class casting experts as well as independent metallurgy specialists to continue to evolve our IPDSteel™ technology and apply it to the one piece steel applications. After the concept and designs were run through a variety of casting experts including independent metallurgical evaluations, IPD also subcontracted an independent company specialized in testing cylinder power components as well as utilizing extensive field testing, both with exceptional results creating the IPDSteel™ patent pending technology that is used today.



IPD QUALITY

How it works: Utilizing modern casting processes when controlled properly along with the correct metallurgy and heat treating, offers increased performance over previous designs and methods.

➤ Our patent pending process begins with a base metallurgy which includes a 4130 high strength alloy steel to control the carbon content of the material. This steel when heated properly has high strength qualities and controls brittleness assuring our rigid quality standards are adhered to.

➤ Our patent pending process continues with a high quality investment casting using the lost wax process. The process is tightly controlled throughout to assure a high integrity casting.

➤ X-ray diagnosis was utilized in the development process to assure casting integrity and ongoing sampling of castings assures our rigid quality standards are adhered to.

# FEATURED PRODUCTS

Our product line for the 3500 series diesel and gas engines have many unique attributes that truly distinguishes us from our competition. Our patent pending one piece steel pistons, valve train and gasket sets program play an important role in our product offering, and showcase IPD's commitment to innovation and quality. The following section will discuss in further detail some of the distinct IPD product customization, value and quality.

## IPD, INNOVATION, NOT IMITATION

IPD is proud to feature our one piece steel piston, which utilizes our IPDSteel™ patent pending technology for our 3500 series product line. Each piston is manufactured from the high strength alloy and heat treated steel casting process which has been extensively tested and successfully proven in the 3500 series applications.

These one piece steel pistons also showcase another way that IPD truly sets the bar for innovation. In comparison to most aftermarket companies, who solely reengineer products from the originating company, IPD stands apart. In partnering with our customers worldwide, IPD has enhanced upon the original design in efforts to create a better product.

### Oil Gallery Retention Plate

The IPDSteel™ one piece piston features new design enhancements made possible by IPD's patent pending one piece oil gallery retention plate. In order to prevent the piston from experiencing extreme thermal loading as seen in other products in the market place, this innovative one piece design limits plate movement and secures the oil gallery retention plate firmly in place as seen in example below.



**IPD ONE PIECE DAM PLATE**



**TRADITIONAL TWO PIECE DAM PLATE**





# FEATURED PRODUCTS

## VALVE TRAIN

At IPD, our valve train products offer customers a safe and cost effective alternative. Our valve train product is developed from materials specifically designed for diesel and natural gas applications and not from automotive grade materials, a common aftermarket industry practice. IPD puts quality above our cost savings which gives our customers the assurance that they aren't exposing their equipment to risk that could potentially decrease cylinder head life expectancy. Our valve guides maintain uniformed dimensions, knurling and tight tolerances to achieve maximum valve cooling and oil control, as well as valve springs made from the highest quality steel, correct tensions and shot-penned for strength and long service life.



## IPD GASKET MATERIALS AND TECHNOLOGY



The quality of our materials at IPD defines our gasket program. Many aftermarket gasket manufacturers compromised the quality of their gaskets by using materials not intended to work under the extreme conditions that most diesel and natural gas engines are subject to. These lighter duty materials will lead to reduced sealing capability or in more extreme cases, lower engine performance and engine life.

IPD use the latest materials and verify through our rigorous QC process that each part number receives the correct material specification for the application. Critical tests and measurements are applied to all of our gasket materials to assure that there are not performance issues within our program. Some of these include:

### Creep Relaxation



This indicates the ability of the material to retain its original bolt torque specification after exposure to stress.

### Crush Resistance Density



Crushing or extrusion can occur when compressive forces exceed the point where the gasket materials pore volume is zero, resulting in leakage.

### Tensile Strength



This is a measurement of the materials resistance to blow out when used in high pressure or high torque applications.

# FEATURED PRODUCTS

## IPD GASKET PROGRAM

We realize that demands can differ between markets or applications so we offer two distinct gasket systems:

### Modular Original Style Multiple Sets

These sets are based on the same multiple groups that you might be accustomed to from the OEM. They are specific to an engine arrangement or a close grouping of arrangements and serial numbers. Many times when ordering the Modular Original style multiple sets, you must order multiple part numbers (possibly up to 8 or 9 or more sets) to rebuild your engine as they can lack the items that are commonly replaced or needed to reinstall a component. IPD offers a unique and custom gasket set to alleviate these issues.

### IPDStyle 123™ Consolidated Sets



For years IPD customers complained of the difficulty of ordering, shipping and inventorying the original style multiple sets. In the late 1980's IPD developed and customized our special sets to:

- Reduce IPD distributor's and rebuilder's inventory by consolidating a wider range of serial and arrangements than was possible with the original style multiple sets.
- Reduce the time to order and stock many different multiple style sets in order to cover a wider range of equipment and engines.
- Packaging IPDStyle 123™ with individual groupings based on the engine component or the location of the gaskets on the engines in easy to identify bags.
- Marking all gaskets and orings clearly with the part numbers for easy identification reducing engine technician's time to find the proper part.
- IPDStyle 123™ sets are designed from ground up with help from our customers that rebuild these engines. Do not confuse these with other companies that simply put all the multiple sets into one box and call it consolidated, still lacking critical items or duplicating pieces.



## QUICK REFERENCE GUIDE FOR IPD 3500 SERIES PRODUCTS

DESCRIPTION	IPD PART NUMBER	DIESEL OR GAS	NOTES
<b>CYLINDER COMPONENTS</b>			
Cylinder Kit-IPDSteel	PLG2995204	Diesel	Includes IPDSteel™ piston, Heat Treated Liner, Rings, Pin, Retainers & Liner seals
Cylinder Kit-IPDSteel	PLG3145005	Diesel	Includes IPDSteel™ piston, Heat Treated Liner, Rings, Pin, Retainers & Liner seals
Cylinder Kit-13.0:1 Compression Ratio	PLG7C2431	Diesel	Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit-13.5:1 Compression Ratio	PLG9Y2100HD	Diesel	Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit-13.0:1 Comp. Ratio/ Thick Flange Liner	PLG9Y4124HD	Diesel	Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit- 13.0:1 Comp. Ratio/Narrow Flange Liner	PLG9Y4124HD/ NF	Diesel	Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit-8.0:1 Compression Ratio	PLG1014140	Gas	Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit-11.0:1 Compression Ratio	PLG6I4609	Gas	"Dual Ni-Ring Insert" - Includes Piston, Liner, Rings, Pin, Retainers & Liner Seals, Induction Heat Treated Liner
Cylinder Kit-11.0:1 Compression Ratio	PLG1973765	Gas	"Single Ni-Ring insert"- Available mid 2010, For select engine operating at or above 1500 RPM"
Piston - IPDSteel™ ONE Piece Steel Piston	2995204	Diesel	Available in PLG Cylinder Kits only
Piston - IPDSteel™ ONE Piece Steel Piston	3145005	Diesel	Available in PLG Cylinder Kits only
Piston 13.0:1 Compression Ratio	7C2431	Diesel	
Piston 13.5:1 Compression Ratio	9Y2100HD	Diesel	
Piston 13.0:1 Compression Ratio	9Y4124HD	Diesel	
Piston 8.0:1 Compression Ratio	1014140	Gas	
Piston 11.0:1 Compression Ratio	6I4609	Gas	
Piston 11.0:1 Compression Ratio	1973765	Gas	Available mid 2010
Liner, Cyl. 6.69 Bore	1106993	Diesel/Gas	Thick Flange, Induction Heat Treated
Liner, Cyl. 6.69 Bore	1238206	Diesel/Gas	Narrow Flange, Induction Heat Treated
Ring Set	RS3500D	Diesel	
Ring Set	7E2899	Gas	
Ring Set	3500RS1	Diesel	
Piston Pin	1388506	Diesel/Gas	
Piston Pin	2638955	Diesel	( 1 pc. Steel pistons only )
Piston Pin Retainer	8N7296	Diesel/Gas	
Piston Pin Retainer	2531238	Diesel	( 1 pc. Steel pistons only )
Liner Seal Set	6V3774	Diesel/Gas	Includes 3 liner seals and 1 band seal

## QUICK REFERENCE GUIDE FOR IPD 3500 SERIES PRODUCTS

DESCRIPTION	IPD PART NUMBER	DIESEL OR GAS	NOTES
<b>VALVE TRAIN &amp; CYLINDER HEAD COMPONENTS</b>			
Lifter	2636679	Diesel/Gas	Lifter Assembly
Lifter, Repair Kit	2636679RK	Diesel/Gas	Lifter Repair Kit, Includes Pin and Roller
Bridge, Valve	2657538	Diesel/Gas	Exhaust
Bridge, Valve	2657537	Diesel/Gas	Intake
Button, Rocker Arm	8F8858	Diesel/Gas	
Ring, Rocker Arm	9F7707	Diesel/Gas	
Screw, Rocker Arm Adjusting	2002003	Diesel/Gas	
Bushing, Rocker Arm	1W4594	Diesel/Gas	
Bushing, Rocker Arm	2302620	Diesel	Late style
Valve, Intake and Exhaust	7E4609	Diesel	30°, Intake and Exhaust in early engines
Valve, Exhaust	1219839	Diesel	30° Exhaust valve w/tapered stem-Later engines
Valve, Exhaust	1219835	Diesel	45° Exhaust valve
Valve, Exhaust	1944897	Diesel	1/2" valve stem. Updated from the 1219835
Valve, Intake and Exhaust	1047184	Diesel/Gas	20° valve with Chrome Stem for use as Intake and Exhaust
Guide, Valve	1339306	Diesel	3/8" Intake and Exhaust/Non-counter bored
Guide, Valve	9Y1847	Diesel/Gas	3/8" Intake/Counter bored for extra oiling
Guide, Valve	1976995	Diesel	1/2" Exhaust- used with 1944897 valve
Guide, Valve	1491982	Diesel	3/8", .005 Oversized
Guide, Valve	1665944	Diesel	3/8", .020 Oversized
Guide, Valve	2763875	Diesel	Exhaust, .127 mm O.S./O.D.
Guide, Valve	2763876	Diesel	
Guide, Valve	9Y1846	Gas	Exhaust (non landfill)
Guide, Valve	9Y1847	Gas	Intake (non landfill)
Guide, Valve	1845494	Gas	Exhaust (non landfill)
Guide, Valve	1845495	Gas	Intake (landfill)
Spring, Valve	1011177	Diesel	Inner
Spring, Valve	1011180	Diesel	Outer
Lock, Valve	2A4429	Diesel/Gas	Intake/Exhaust ( 3/8" valves )
Lock, Valve	1977055	Diesel	Exhaust ( 1/2" exhaust valve only )
Rotocoil	1976999	Diesel/Gas	Intake/Exhaust-without shield
Rotocoil	1977062	Diesel/Gas	Intake
Rotocoil	1977063	Diesel/Gas	Exhaust
Insert, Valve Seat	1302607	Diesel	20° Intake
Insert, Valve Seat	1302608	Diesel	45° Exhaust
Insert, Valve Seat	611713	Gas	20° Intake/Exhaust with 2.367" O.D. and .460" Depth
Insert, Valve Seat	1225963	Gas	20° Intake with swirl plate

## QUICK REFERENCE GUIDE FOR IPD 3500 SERIES PRODUCTS

DESCRIPTION	IPD PART NUMBER	DIESEL OR GAS	NOTES
<b>BEARINGS</b>			
Connecting Rod Bearing	1077330	Diesel/Gas	Standard
Connecting Rod Bearing	1077331	Diesel/Gas	0.025"
Main Bearing	1496031	Diesel/Gas	Standard
Main Bearing	1496032	Diesel/Gas	0.025"
Thrust Plate	7C6209	Diesel/Gas	
Cam Bearing	7N2048	Diesel/Gas	Early Style
Cam Bearing	1161359	Diesel/Gas	Late "B" Block with an "A" cam
Cam Bearing	1011198	Diesel/Gas	Late "B" Block with a "B" cam
Bushing, Connecting Rod	1181655	Diesel/Gas	
<b>COOLING AND LUBRICATION SYSTEM</b>			
Cooler Core, Oil	1245142	Diesel/Gas	
NEW Water Pump	2128177	Diesel/Gas	3512 & 3516 select applications
Water Pump Rebuild Kit	2225152	Diesel/Gas	Kit includes shaft and impeller. Covers 2128172, 2128177, 0R9673, 0R9671, 10R1671 and 10R1669 pumps
Water Pump Rebuild Kit	2225153	Diesel/Gas	Kit includes shaft and impeller. Covers 1664380, 1664377, 2128175, 2128176, 0R9670, 0R9672, 10R1668 and 10R1670 pumps
Water Pump Rebuild Kit	2219278	Diesel/Gas	Kit includes shaft and impeller. Covers 6I3520, 7E9781, 7E9782, 2128168, 2128169, 2128166, 0R3192 and 0R4570 pumps
Regulator	6I4954	Diesel/Gas	170° F
Regulator	2477133	Gas	190° F ( OLD # 7C3095 )
<b>MISCELLANEOUS ITEMS AVAILABLE FROM IPD</b>			
STEEL Spacer Plate	2603904	Diesel/Gas	Can replace aluminum spacer plates
NEW Cartridge, Turbo	1182988	Diesel/Gas	
NEW Cartridge, Turbo	7W3570	Diesel/Gas	
IPDStyle 123 Gasket Sets	This exclusive, IPD Innovation offers the engine rebuilder a variety of engine gasket kits specifically designed to perform a function such as head replacement, in-frame or out of frame overhauls by providing the required gaskets and seals to perform the job		
OE Style Multiple Gasket Groups	IPD offers a full range of the "OE" style multiple groups such as upper, lower, front, rear etc.		



# IPD ENGINE MODEL SUMMARY

## CATERPILLAR®

D3508 / D3512 / D3516 / D3524  
G3508 / G3512 / G3516/ G3520  
D3406 / D3408 / D3412  
D3406E /D3408E/ D3412E  
G3406 / G3408 / G3412  
D3304 / D3306 / D3303  
G3304 / G3306 / G333  
3204 / 3208

3114 / 3116 / 3126  
D379 / D398 / D399  
G379 / G398 / G399  
D353 / G353  
D339 / D342 / G342  
D343 / D346 / D348  
C15  
C12

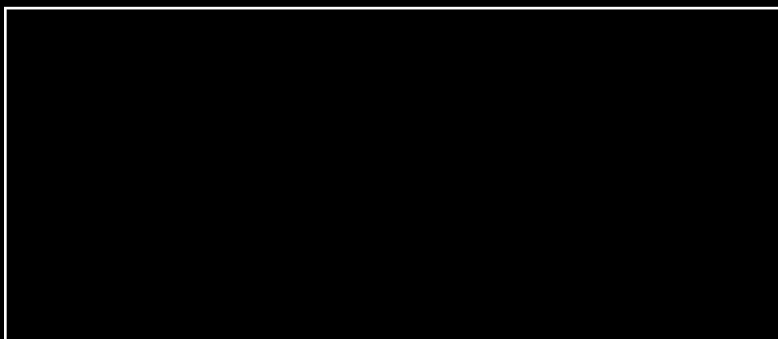
## DETROIT DIESEL®

60 Series

## CUMMINS®

ISX/QSX

IPD brand quality products distributed by:



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