



THE IPD DIFFERENCE

We understand you are in a serious business... you want lower costs and you cannot tolerate downtime, failed engines, delayed shipments, nor bad service. Read on and discover how IPD will help your business to achieve success...

SAVINGS WITHOUT RISK!

The Standard for Quality, Innovation, Service and Support Since 1955

Service Excellence

SALES/MARKETING/BUSINESS SUPPORT

- Since 1955, IPD has been successfully servicing commercial and industrial industries for over 60 years!
- Cost effective pricing and quality enable you to be more competitive (real value for customers and end users)
- Globally based regional managers help customers build their business with local sales, marketing, and technical assistance
- Website, advertising, literature (flyers, brochures, bulletins), videos, magazine articles, promotional products, newsletters, photography, and more (all designed to generate more sales)

GLOBAL OPERATIONS & DISTRIBUTION

- IPD owns & operates business offices and customer service/distribution centers throughout the Americas, Europe, and Australia for improved order response/fulfillment
- Customer service team among the most knowledgeable in the industry, and available to assist with your quotes and orders

TECHNICAL & WARRANTY SUPPORT

- On-line technical support and warranty submission systems available for questions and issues
- Reduce risk and protect your investment with IPD's industry-leading limited warranty coverage
 - **2 Years / Unlimited Miles** for on-highway diesel applications, & most spark-ignited gas application parts
 - **1 Year / 3,600 Hours** for off-highway applications

IPDNET™ ON LINE CATALOG & ORDERING

- **Save time & money** with real-time system features that you can access 24 hours a day, 7 days a week (at your convenience)
- **Extensive parts catalog** with tens of thousands of engine configurations (exclusively available for IPD customers)
- Other special features include:
 - Real-time/updated inventory availability
 - Customized part number lists creation for easy reordering
 - Interactive help screens (help is only a click away)
 - Related parts assistance (other parts you may need)
 - Customized net pricing (your specific account pricing)

Engine ID Numbers		Machine ID Numbers	
Serial# (80M1212, 7YG956, etc)	<input type="text"/>	Serial# (3EK100, 2TK526, etc)	<input type="text"/>
Arrangement# (1357810,7E9078, etc)	<input type="text"/>	Machine Model# (D10, 777C, etc)	<input type="text"/>
Engine Model# (3412, 3508 , etc)	<input type="text"/>	Part Number Search	<input type="text"/>
		Part Description Search	<input type="text" value="Select"/>



IPD Customer Service



IPD Distribution Center (Europe)



IPDNet On-Line Catalog

Business Support

EXTENSIVE PARTS & MARKET COVERAGE

- Wide range of new and remanufactured components servicing heavy-duty diesel and spark-ignited gas engines:
 - Overhaul kits
 - Out-of-frame configuration
 - In-frame configuration
 - Cylinder kits
 - Valvetrain components
 - Engine bearings
 - Gaskets sets and components
 - Engine systems components
 - Fuel
 - Lubrication
 - Cooling
 - Turbocharging
- Components for a wide variety of engine applications:
 - **Caterpillar®**
 - C-series (C7/C9/C10/C12/C13/C15/C18/C27/C32)
 - 3600/3500/3400/3300/3200/3100/3000/300 series
 - **Cummins®**
 - ISX/QSX & K19 series
 - **Detroit Diesel®**
 - 60 Series
 - **Volvo®**
 - D12 series
 - **Waukesha®**
 - VHP Series (7042/7044)
- Diverse industry experience and parts coverage:
 - On-Highway
 - Construction and Mining
 - Power Generation
 - Gas Compression
 - Drilling (on and off-shore)
 - Marine
 - Agriculture, Military, and more
- Expert kit configuration process ensures you receive all the parts needed to complete an overhaul or cylinder service



Advanced Engineering

QUALITY ASSURANCE

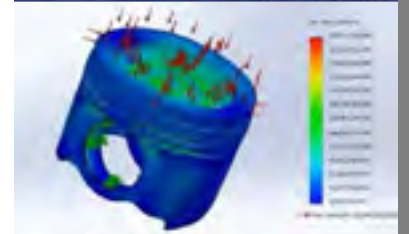
- **Latest (ISO9001:2008) quality standards** certified by Lloyd's Register Quality Assurance Ltd. (an organization dedicated to improving performance and reducing risk)
- Dedication to measurement & quality control sciences
 - Lean & Six Sigma methodology for continuous improvement
 - Documented and audited quality processes
 - Major investments in precision inspection measuring equipment
- Customized Production Parts Approval Process (PPAP)
 - Auto Industry Action Group (AIAG) standard (from Advanced Product Quality Planning) for improved design/production quality
 - Standard for OEMs & IPD (not common in aftermarket)
 - Covers part inspection, qualification, in process/final inspection
- Industry-leading warranty protection and servicing
- Performance tested heavy-duty materials
- Latest technologies for reliability, longevity, and performance

QUALITY ENGINEERING

- Quality-focused processes such as 3D modeling, finite element analysis (FEA), mechanical & hydro pulsator testing
- ISO process based phase-gate approach to ensure quality, performance, and efficiency
- Components defined by drawings & specifications derived by IPD Engineering
- Specifications based on OE parts (reverse engineering) to ensure compatibility with original engine design intent
- Stress analysis and durability tools (such as accelerated life and engine testing) to improve product life and performance
- Specifications based on 60 years of experience & industry standards from SAE (Society of Automotive Engineers) & ASME (American Society of Mechanical Engineers)

QUALITY MANUFACTURING

- High quality manufacturing methods such as investment casting, precision CNC machining, precision honing, inertia/friction welding, and specialty coatings
- State-of-the-art equipment to manufacture parts with extreme tolerances found in modern technologically advanced engines



Precision Manufacturing

- Decades of manufacturing experience and innovative processes ensure reliable parts quality and consistency
- Knowledge and expertise to comprehend, implement, and maintain strict specifications and tolerances
- Dedication to implementing lean enterprise concept principles, moving from a batch mentality to an efficient flow focus, and minimizing work-in-process to improve quality and flexibility
 - Focus on value to the customer by product family
 - Identify and eliminate steps (waste) that do not create value
 - Focus on efficient/repeatable value-creating process



IPDSteel 2 piece piston



IPDSteel friction welded piston



IPDSteel 1 piece piston



HIGH QUALITY & INNOVATIVE PARTS

Pistons

- IPD pistons include such critical/precision design features as ovality, optimized pin bores, and special coatings...benefits include improved functionality and corrosion/wear resistance
- Special focus on reliable piston/pin interaction via precision machined pin bores or aluminum bronze alloy bushings
- Design validation including 3D modeling, finite element analysis (FEA), and a variety of testing methods (such as hydro pulsator, ultrasonic, mechanical, and actual engine runtime)
- Typically over 100 key design specifications per piston
- From OE level critical specifications, to precision CAM and CNC machining, to specialty finishing and final quality sampling...**IPD pistons set a standard of excellence**
- Past innovations such as added ring (3 and 4 ring) specialty pistons to resolve field issues
- **IPDSteel™** patented and patent-pending pistons are heat treated for strength, durability, heat and wear resistance, thermal management, and dimensional stability
- **IPDSteel** series investment cast steel pistons
 - 2 piece friction welded (**patent #9216474**)
 - 1 piece (**patent-pending**)
 - 2 piece articulated (**patent #7938093**)
- **IPDSteel** friction welded pistons available for high cylinder pressure applications
- **IPDSteel** 1 piece pistons feature an exclusive one piece oil dam plate for improved reliability versus 2 piece designs



OIL RING PLATE DESIGN COMPARISON
90 DEGREE DESIGN 180 DEGREE TWO-PIECE DESIGN

Innovative Designs

Piston Rings

- Application specific ring sets and piston grooves for maximum performance and durability
- Premium materials and processes for improved hardness, friction reduction, resistance to corrosion and wear/scuffing, optimal fuel consumption, and emissions performance
- Superior IPD specifications and production processes such as PVD (physical vapor deposition) applied coatings
- Critical tests include tension analysis and gap measurement
- Designed to work synergistically with related IPD and OE components as a system
- Extensive engineering and quality processes, resulting in very high quality specifications
- Innovative **IPDStyle™** tri-fold/marked packing sleeves protect rings during shipping and handling, and indicate each ring position to minimize installation errors

Piston Pins

- Case hardened for strength and durability
- Very high quality material specifications, such as nickel chromium and molybdenum alloy steel



Cylinder Liners

- IPD pioneered induction hardening to control depth of heat treatment for maximum wear and optimum durability
- **IPDStyle** “Crevice Seal” Liners (selected applications) help reduce liner movement for improved durability
- IPD **patented** liner design with special flange for improved cooling (DD60 applications)
- **IPDStyle** packaging including special molded end caps/plugs
- **IPDSteel** liner with SAE grade material and high tensile seamless steel tube construction for selected applications
- Ideal IPD surface hardness specification for proper ring seating and engine durability (too hard = inhibits ring seating, too soft = reduces engine life & increases oil consumption)
- Variety of tests such as dimensional layout, surface finish, elemental chemistry, physical properties, flange break, and extreme magnification micro structure analysis



Precision Honed ID Surface



IPDSteel
Cylinder
Liner



Reliable Performance

Cylinder Liners (continued)

- IPD owned & operated manufacturing facility provides rigorous attention to specifications, featuring such processes as:
 - Precision-honed ID surface finishing for proper break-in, oil control, and long ring life
 - Roll burnished flanges for increased liner flange strength
 - Consistent flange thickness tolerances
 - Centrifugal casting for maximum material concentration
 - Application-specific construction such as high alloy casting
 - Attention to detail in I.D. tolerances for proper piston and ring clearances, and O.D. tolerances for proper installation

Valvetrain

- IPD quality specifications such as added thickness Stellite® valve seat facing for superior corrosion and wear resistance
- Bi-metal valves are friction welded in optimized locations to ensure superior strength by application
- Precision engineered seats analyzed for seating angle accuracy as well as various other critical dimensions
- Springs evaluated for spring rates (opening & closing) and compression force...ensuring strength, hardness, corrosion resistance, and durability
- Guides feature OE level hardness and geometric groove patterns, and such special coatings as graphite phosphate for enhanced lubricity
- Specialized test equipment utilized such as computer controlled CNC spring tester

Engine Bearings

- IPD developed "grooved" connecting rod bearings to improve cavitation resistance in selected applications
- Special construction specifications such as advanced 5 layer design with optimized copper, lead, and tin microstructure
- High quality materials such as SAE carbon steel and copper aluminum alloys for long life and reliable performance
- Special eccentricity and embedment specifications for improved cavitation resistance and crankshaft life
- Materials and coatings designed to OE and ASTM (American Society for Testing & Materials) standards
- Hardness, thickness, plating adhesion, and other critical dimensions tested to ensure quality



Expert Configuration

Engine Bearings (continued)

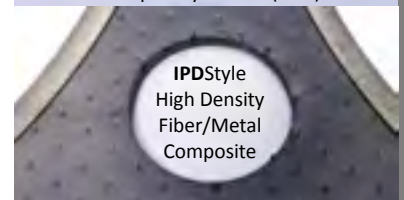
- Superior specifications in such areas as wall taper, wall thickness, alloy thickness, tang width, and oversize precision
- 100% inspected for critical crush height and wall thickness

Gaskets

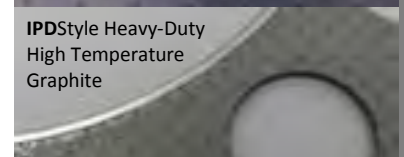
- Premium heavy-duty materials for reliability and longevity, such as head gaskets made of OE style multiple layer steel (MLS) and IPDStyle high density fiber/metal composite
- OE level performance in such major areas as tensile strength, creep relaxation, and crush resistance
- Premium packaging ensures contents are protected
- OE style & IPDStyle 1-2-3™ “complete” gasket sets available... **YOU HAVE A CHOICE!**
- IPDStyle 1-2-3 “Complete” Gasket Set features:
 - **Wide range** of kits available for (1) out-of-frame, (2) in-frame, and (3) cylinder head servicing
 - **Saves Time**...one IPD part number completes an overhaul (versus many OE part numbers)
 - **Packed & clearly marked sub-assemblies** for ease of identification and application
 - **Expert set configuration** (“IPDStyle”) to ensure you have all the components you need to complete an overhaul
 - **Full package contents listing** so that you know every component included in the assembly in advance
- IPD branded premium specification materials selected specifically for each application



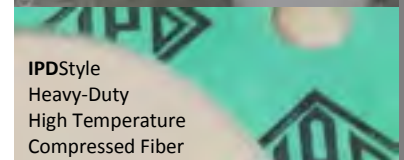
Multiple Layer Steel (MLS)



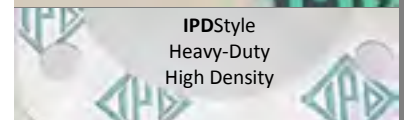
IPDStyle
High Density
Fiber/Metal
Composite



IPDStyle Heavy-Duty
High Temperature
Graphite



IPDStyle
Heavy-Duty
High Temperature
Compressed Fiber



IPDStyle
Heavy-Duty
High Density



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IPD | 23231 Normandie Ave. | Torrance, CA | 90501 | USA | www.ipdparts.com | sales@ipdparts.com