

wilwood

Engineered Brake Applications

OEM Disc Brakes

Global Original Equipment Partner

A Division of Wilwood Engineering

Maximum Performance Original Equipment Disc Brake Systems

Severe Environment



Mission Critical



Extreme Duty



Tight Tolerance



Aerospace Agriculture Automotive Industrial Logging Military Mining Oil & Gas Power Utilities Sport Recreation Theme Parks

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About Wilwood Disc Brakes

Global Original Equipment Partner

- Wilwood has decades of experience in analysis, design, engineering, production, standards compliance, and rigorous quality control in disc and drum brake systems.
- We deliver specialized OE brake solutions throughout 11 major industries worldwide, and provide high-performance off-the-shelf products to 16 automotive markets.
Drag Racing, Street Rods, Street Performance, NASCAR Sprint Cup, Nationwide, Craftsman Truck, Late Model Asphalt, Late Model Dirt, Northeast Modified, Off-Road, Road Race, Sprint-Midget-Champ, Truck & SUV, Performance Karts, V-Twin Motorcycles, Production Vehicles.
- Our OE partners gain cost-effective acquired parts for project integration from a reliable outsourcing partner, while master distributors and dealers enjoy resale profitability.
- We are committed to a distinctive competence in original equipment brake-related systems resulting in engineering expertise and exceptional production efficiencies.

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About Wilwood Disc Brakes

High-Performance Disc Brake Systems and Components

- Brake-Related Components
 - Hydraulic And Mechanical Calipers
 - Master Cylinders
 - Pedals
 - Drum Brakes
 - Rotors
 - Proportioning & Combination Valves
- Suspension-Related Components
 - Hubs
 - Spindles
 - Custom Support Bracketry



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About Wilwood Disc Brakes

OEM is a Key Segment of Wilwood Engineering, Inc.

- Three decades in high-performance brake design
- Passion for race-winning engineering excellence
- Highly established and respected brand
- 125,000 sq. ft. manufacturing and production facility
- 20,000 sq. ft. R&D and prototyping facility
- Substantial matrix of brake components and engineering techniques
- Large investment in proprietary tooling
- Proven business acumen and longstanding market durability



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Doing Business with Wilwood

Establishing an OE Business Partnership with Wilwood is Simple

- We understand the complexities of your outsourcing decision.
- As an experienced and reliable OE partner, Wilwood delivers you:
 - Accurate costings and lead times
 - Well stocked off-the-shelf inventory to draw from
 - Short lead-times on custom OE parts production and delivery
 - Short-term design, engineering, and rapid prototyping solutions
 - Significant cost reductions provided by deep experience in brake solutions design
 - Substantial economies of scale consistent with our high-volume production



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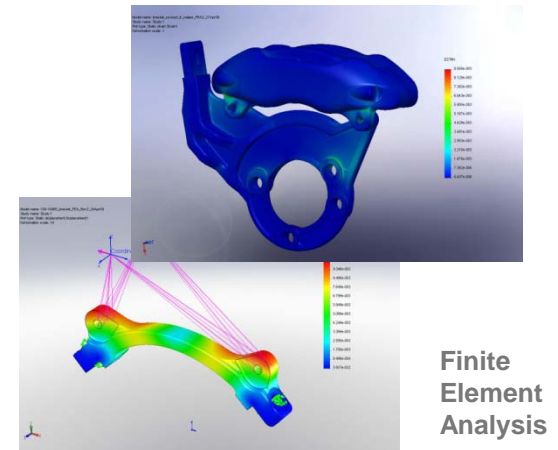


Maximum Performance Original Equipment Disc Brake Systems

Engineering Your Brake Application

Wilwood Technology and Engineering Methodology

- **Engineering Analysis of Your Supplied Requirements:**
 - Customer 3D data retrieval and transfer
 - Highly accessible staff engineers
 - Deep understanding of rotational energy, friction, and management of resulting heat with both ferrous and non-ferrous materials.
 - 3D modeling, including finite element analysis
 - 3D machining in producing functional production-intent parts



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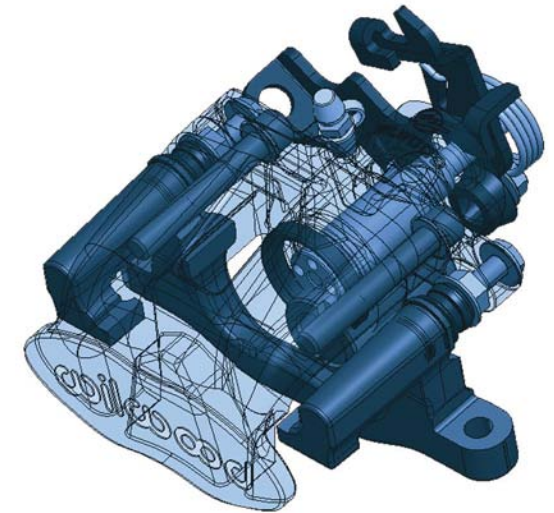
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Engineering Your Brake Application

Wilwood Technology and Engineering Methodology

- Wilwood OEM Can Develop Requirements and Specifications for You:

- We have the capacity to design to a matrix of requirements
 - **Mechanical Engineering Requirements**
 - Computational analysis of vehicle statics and dynamics
 - Virtual vehicle suspension and wheel modeling
 - Digital coordinates measuring and 3D mapping
 - Comprehensive data provided on solution performance
 - **Standards Compliance**
 - Compliance with SAE, FMVSS, and European vehicle braking standards
 - **Quality control standards**
 - Two environmentally controlled inspection areas
 - Outgoing product 100% tested and qualified.
 - In-house dynamometer, dynamic testing, and cycle testing equipment
 - Wilwood is ISO 9000 Compliant



$$E_{rotation} = \frac{1}{2} I \omega^2$$

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Maximum Performance Original Equipment Disc Brake Systems

Engineering Your Brake Application

Wilwood Technology and Engineering Methodology

- Wilwood OEM Can Develop Requirements and Specifications for You:
 - We have experience tailoring varied end-to-end applications in:
 - **Severe Environment**
 - **Extreme Duty**
 - **Tight Tolerance**
 - **Mission Critical Application**

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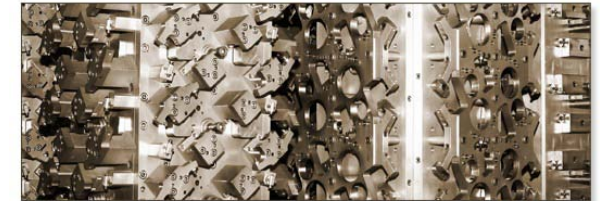


Maximum Performance Original Equipment Disc Brake Systems

Supporting Your Business Case

Wilwood Provides Support for Outsourcing Justification

- **Wilwood OEM Will Work to Minimize Your Landed Cost:**
 - We First Seek to Provide Combined or Entirely Off-the-shelf OE Solutions
 - Wilwood Disc Brakes carry a large inventory to draw from
 - 20,000 engineered and produced parts
 - 4,000 parts in ongoing production and inventory
 - **Wilwood Has Highly Efficient Tooling and Proprietary Production Techniques**
 - A substantial investment in proprietary tooling
 - Three decades experience in refining brake application production techniques
 - The result is short lead times and consistent quality



OEM Volume Production Proprietary Tooling



Large Inventory to Draw From

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Supporting Your Business Needs

Wilwood Simplifies the Outsourcing Process

- **Wilwood OEM Will Provide Everything Necessary To Order Product**
 - We provide assistance with your purchasing requirements
 - Qualified costing
 - Formal quotations
 - Supporting engineering documentation
 - Committed milestone and lead time schedules
 - **Support is constant from the outset**
 - You will have an assigned account contact
 - Our highly accessible engineers are available around the clock

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Case Study: Mission Critical

AM General Corporation – Military HUMVEE Vehicle

In January 2000, AM General - a major military ground-support vehicle manufacturer contracted Wilwood Engineering's OEM Disc Brakes group to develop a new brake system for its flagship vehicle.

The extreme environment of South West Asia and remarkably increased payload requirements – due to armor plating – mandated the need for a powerful brake system which was absolutely reliable in battlefield conditions and offered speed and ease in field maintenance.

Wilwood responded to AM General's unique requirements, was awarded the contract, and continues on as an exclusive project vendor for brake systems. Wilwood OEM engineers utilized a special brake rotor iron formulated to handle the harsh performance and durability requirements and was proven to outperform and outlast typical materials - all with a rotor weight reduction of over 25% from previous product. Despite the nearly 50% payload increase, brake pad and rotor service life increased more than 30% with the Wilwood brake system.

Our durable and lightweight aluminum caliper design offers AM General a significant weight reduction from the previous product. The unique caliper design included Wilwood's Quick Pad Removal feature reduced brake pad change time in a battlefield environment from 90 minutes per axle to less than 3 minutes.

