

Advanced Engineering

Testing Solutions

Heavy Duty AC Chassis Dynamometers



Smarter By
Design

 **MAE**TM
MUSTANG
ADVANCED ENGINEERING

Heavy-Duty AC Motor Chassis Dynamometers

Globally, there is a constant and growing demand for meaningful reductions of diesel emissions from heavy-duty trucks and buses. Significant research and development is taking place continuously around the world by leading corporations, universities and other public and private researchers. Their goals are to improve the efficiency of heavy-duty powertrain systems and develop the next generation of advanced hybrid engines and transmissions for heavy-duty diesel vehicles. These efforts require highly sophisticated and technically advanced heavy-duty vehicle test systems using AC Motor Chassis Dynamometers that are capable of testing a wide range of commercial trucks, buses, agricultural, industrial, military and multi-axle heavy-duty vehicles.

Heavy-duty applications have long been a specialty and area of technical expertise for the team of testing and applications engineers of Mustang Advanced Engineering. Whether your application involves emissions, powertrain or NVH challenges, MAE has an equipment and system solutions to meet your needs as well as your budget. MAE offers Heavy-Duty AC Motor Chassis Dynamometers with roll diameters ranging from 20" to 120" (508mm - 3,048mm) with multi-axle and adjustable wheelbase configurations to handle virtually any application you can imagine. Regardless of the unique challenges of your application, MAE has a cost effective solution to meet your heavy-duty vehicle testing needs.

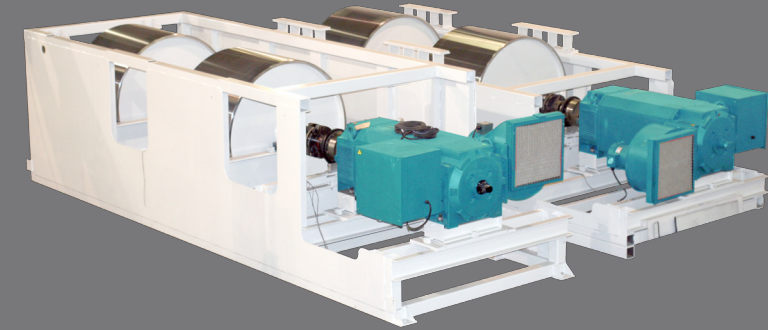
MAE is widely regarded as a leading global provider of chassis dynamometer systems for a wide range of applications that require accurate and repeatable road load simulation, inertia simulation, speed control, force control or acceleration control. Mustang's line-up of Heavy-Duty AC Motor Chassis Dynamometer systems offer standard features only found in "high accuracy" emissions development systems.

The latest AC Heavy-Duty systems developed by MAE provide significant benefits including:

- Highly responsive inertia simulation capability
- Accurate and responsive roll speed synchronization
- Independent wheel control
- Emission standard road simulation accuracy
- Phase lock (relative position control) of the rolls
- "Acoustically dead" roll design and construction

Additional Options and Services

- Throttle actuator or robot driver
- Complete facilities planning and installation services
- Vibration analysis
- Enhanced data acquisition packages
- Emission system integration



48" Dual Axle AC Dyne with adjustable wheelbase.



International Truck Chassis Dynamometer



AC/EC Dyne for Force Protection



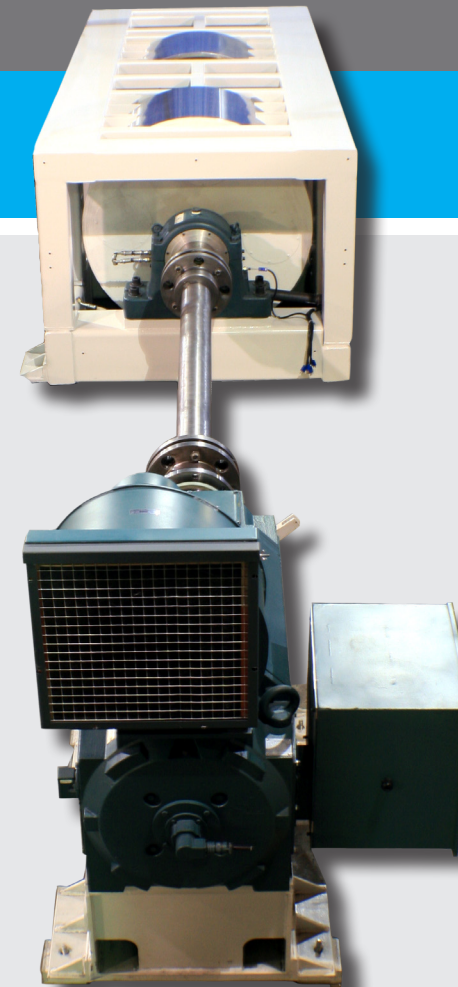
Komatsu America Corp. Multi-Function Tester



48" (1,219mm) Dual Axle AC Dyne at Univ. of California Riverside Emissions Lab



48" Roll Chassis Dynamometer for Ohio State University



Single Axle 48" AC Dyne. The extended shaft allows the AC Motor to be housed outside of the test chamber for an NVH application. This dyne also has specialized hydrostatic bearings and chrome finished rollers to virtually eliminate every possible source of noise from the machine.

MAE offers a wide range of Heavy-Duty AC Motor Chassis Dynamometer systems and designs, from 4x2, 4x4 to a number of multiple axle configurations. MAE has developed and installed some of the largest and most advanced systems for large class 8 trucks, military vehicles and even 8x8 "independent roll" commercial vehicles. MAE has systems installed in virtually every corner of the globe and continuously provides technical support and service to a global install base of thousands of dynamometer systems.

AC Chassis Dynamometers for Emissions Research & Development

The science of measuring emissions from mobile and other sources has evolved significantly over the past several years. The most important changes in the nature of emissions measurement science has been a shift to examining emissions from diesel sources and better understanding emissions under in-use driving conditions.

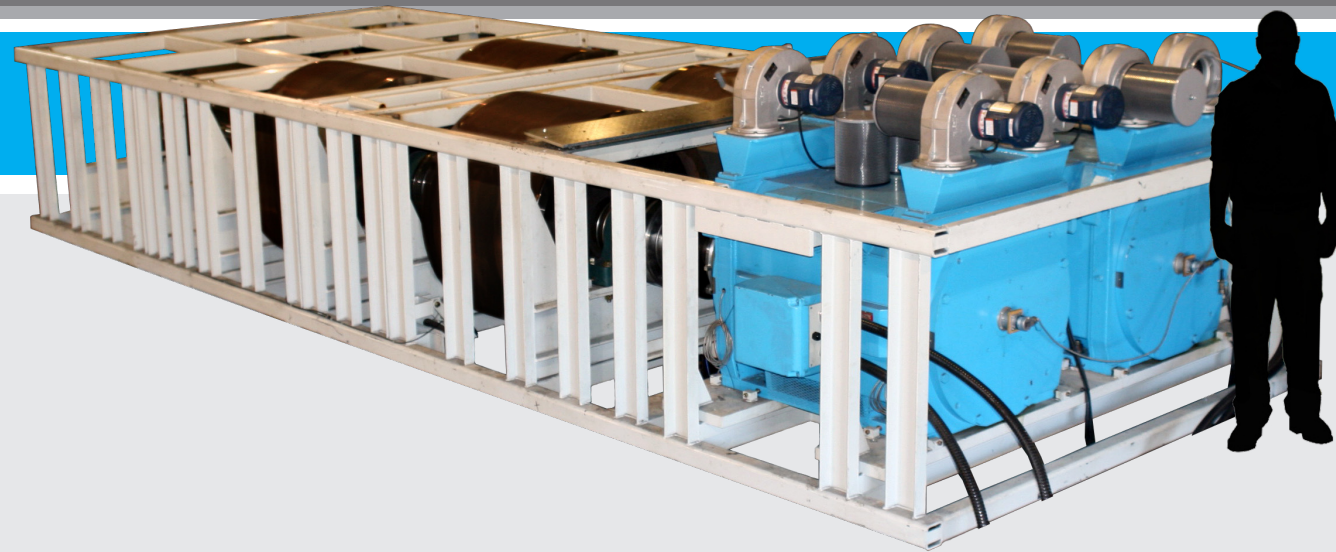
For researchers, like the ones at The Bourns College of Engineering – Center for Environmental Research and Technology (CE-CERT) at The University of California Riverside, understanding emissions under in-use driving conditions calls for a sophisticated heavy-duty chassis dynamometer capable of simulating on-road driving conditions for a wide range of vehicles. To meet this challenge they turned to MAE.

Mustang has developed a cost effective series of diesel, petroleum and hybrid certification grade dynamometer systems to address the needs of the global emissions and R&D market. There is a clear and present demand for full-performance, cost-effective dynamometer systems that offer all of the capabilities and confidence of a certification system at a price point that makes it no longer cost-prohibitive for organizations to perform critical emissions studies, hybrid system calibration development, performance evaluation and other cutting edge research technologies. Researchers are in need of dynamometer systems to develop the next generation technologies which mimic the capabilities of the certification requirements, but at a fraction of the cost of a true certification system. That is exactly what MAE has developed with our Heavy-Duty AC Motor Chassis Dynamometer Series.

MAE's advanced Heavy-Duty AC Motor Chassis Dynamometers allow the testing of a variety of heavy vehicles under loaded and transient in-use conditions with corresponding emissions measurements. The dynamometer as configured in this instance for Riverside is capable of meeting the inertia simulation range requirements of 10,000 to 80,000 lb (44,482 to 355,856 N) for each of the cycles listed below. This includes acceleration rates up-to 6 mph/sec (9.66 kph/sec), as found in the UDDS Section D Drive Schedule and deceleration rates of up to 7 mph/sec (11.27 kph/sec) as required for the WHM Refuse Drive Schedule. The dynamometer can also provide a load in excess of 600 HP @ 70 mph (447.6kW @ 112.7 kph) and intermediate loads of 900-hp (671.4kW). The dynamometer also has the ability to continuously handle 200 Hp @ 15 mph (149.2kW @ 24.15 kph) for applications such as yard tractors.

The UC-Riverside dynamometer system was designed to meet the Heavy Duty Drive Schedules for diesel trucks in the weight range of 10,000 to 80,000 lb (44,482 to 355,856 N) with acceleration rates for the following cycles:

- CARB HHDDT Cruise Mode Drive Schedule
- UDDS (Urban Dynamometer Drive Schedule)
- CARB 50 mph HHDDT Cruise Cycle
- HHDDT Transient Mode Drive Schedule
- WHM Refuse Drive Schedule
- Bus cycles such as, the CBD, OC Bus cycle, NY bus cycle
- In-use cycles for applications such as yard tractors



Heavy Duty AC dynamometers, like the one pictured here that was delivered to The University of California at Riverside, can simulate on-road driving conditions for any medium-duty or heavy-duty vehicle using its 48" precision rollers with dual, direct connected, 300-hp (223.8kW) motors attached to each roll set (900-hp or 671.4kW combined peak). The dynamometer can apply precise loading to a vehicle to simulate factors such as the friction of the roadway and wind resistance that it would experience under typical driving conditions. Additional large inertia weights can be incorporated into the dynamometer to increase the base mechanical inertia and enable the dynamometer to provide precise on-road simulation for an even wider range of vehicle weights.

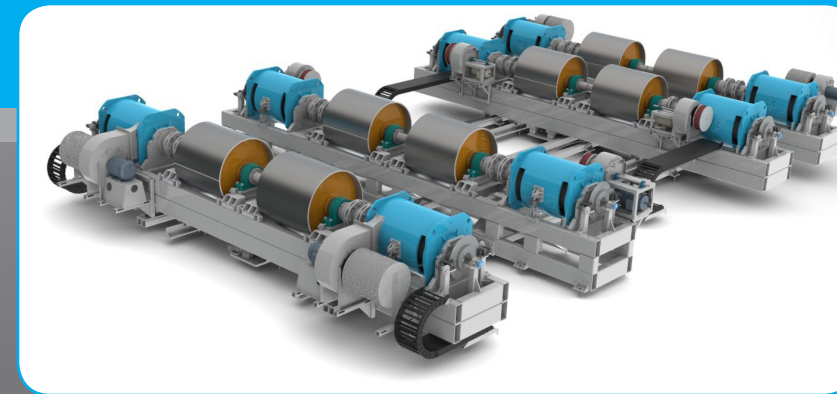
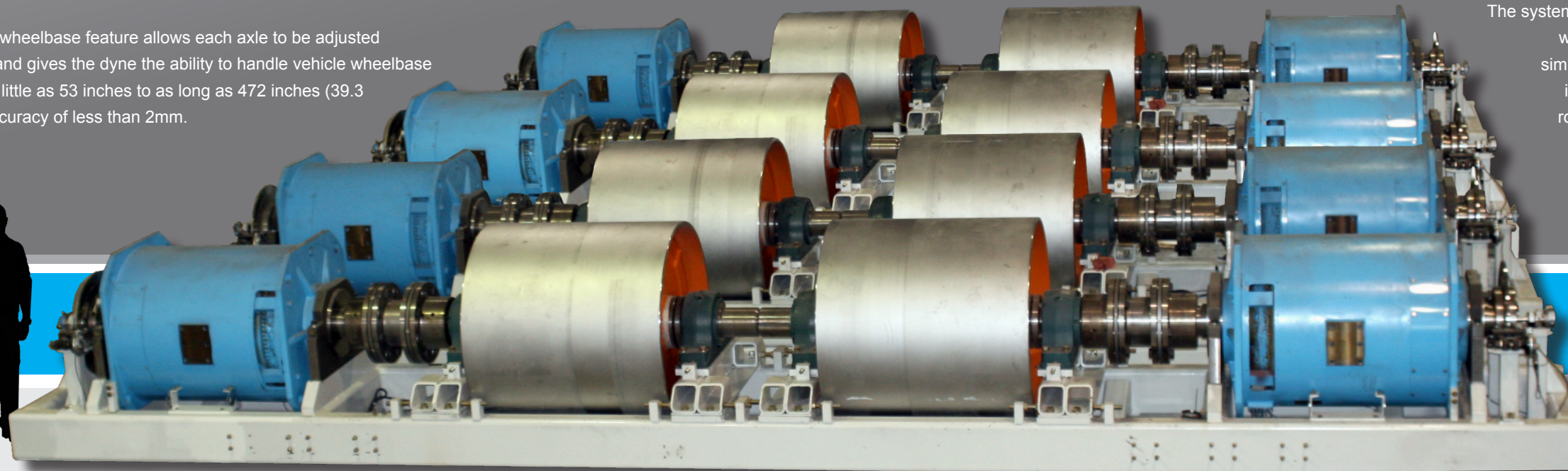


8x8 Independent Wheel AC Motor Chassis Dynamometer & Multi-Function Performance Tester

MAE recently completed the design and manufacture of one of the world's largest Heavy-Duty AC Motor Chassis Dynamometers and Multi-Performance Testers for The Beijing Institute of Technology. The massive dynamometer is designed to carry out testing for medium-duty and heavy-duty vehicles with drive axles ranging from one to four, including 8x8, 8x6, 8x4, 6x6, 6x4, 6x2 and 4x4.

The four axle system features eight chrome-plated 48" rollers that can all be operated independent of one another, cross-coupled, and configured to follow the feedback or command of any roll in the system. The dyne's combined peak full load capacity is 1,600-hp (1,200kW), combined wheel force is 58,500 lbs (260,000 Newtons) and the maximum wheel speed is an impressive 81 mph (130kph).

The adjustable wheelbase feature allows each axle to be adjusted independently and gives the dyne the ability to handle vehicle wheelbase ranges from as little as 53 inches to as long as 472 inches (39.3 feet) with an accuracy of less than 2mm.



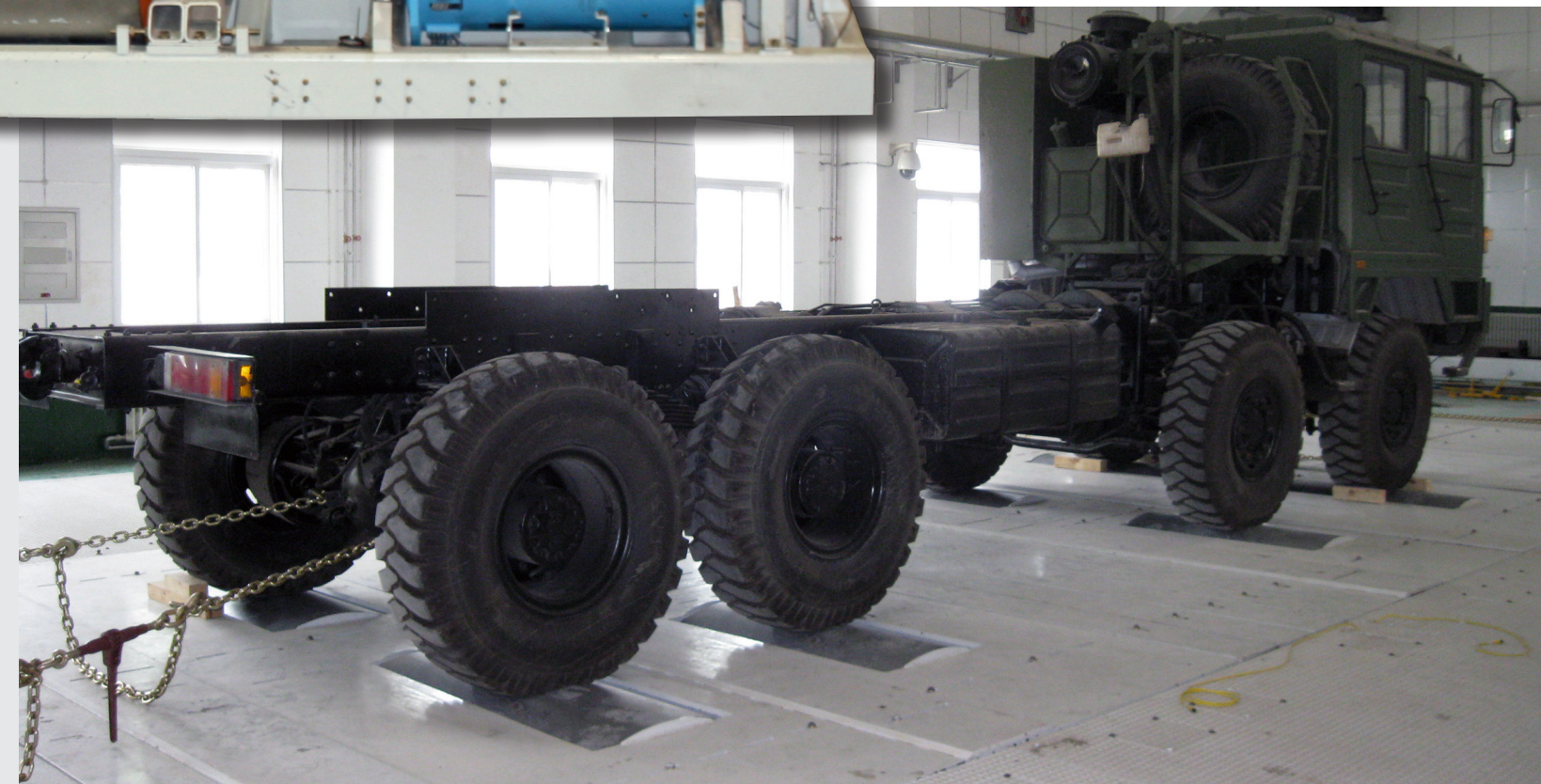
← The innovative design of the dynamometer allows each axle set to be shipped separately in an overseas container for assembly on site anywhere in the world.

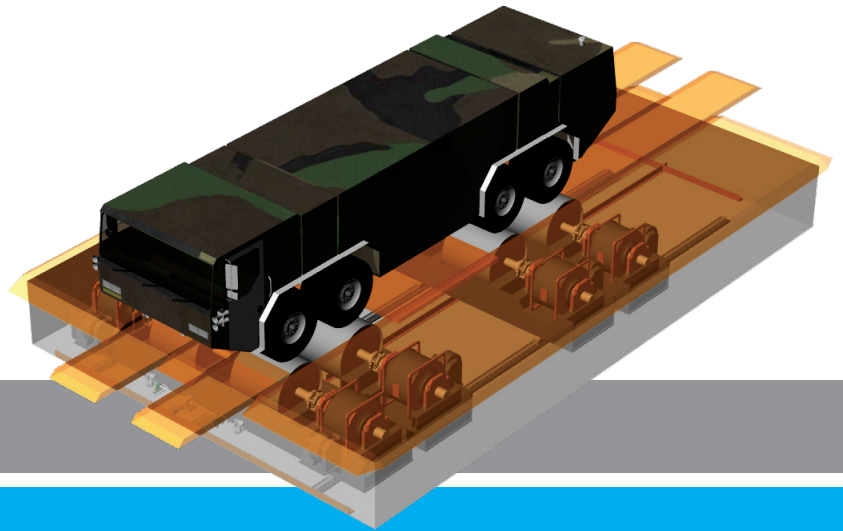
The system incorporates an integrated vehicle cooling fan that can simulate wind speeds up to 81 mph (130kph) for accurate wind and air flow simulations. Data acquisition included with the dynamometer system integrated a fuel measurement, delivery and conditioning system, robot driver, engine RPM measurement, weather station, pressure transducers, thermocouples, an integrated vehicle scale system, vehicle CAN communication and brake and ABS interface.

Tests that the system can perform include, but are not limited to hybrid calibration, dynamic performance test, fuel economy performance test, ABS braking performance test, emissions performance test, creeper gear performance test, constant speed, constant force, constant torque, constant power, controlled acceleration and vehicle simulation road load testing.

MAE has multiple generations of knowledge and experience in the specialized area of Heavy-Duty AC Motor Chassis Dynamometers. Our experience dates back to 1975 and our applications range from small, high-speed to extremely large, high-torque systems. When it comes to advanced dynamometer technology, precise and repeatable road load simulation, accurate speed and/or force control and sophisticated data acquisition packages, the engineers at Mustang Advanced Engineering are hard to match.

To learn more about how MAE can help solve your most demanding testing challenges contact one of our sales engineers or visit www.mustangae.com.





Smarter By Design

About MAE

Mustang Advanced Engineering is a leading provider of comprehensive testing solutions for the development and testing of engines, powertrain systems and complete vehicles. Founded in 1975, Mustang has long been a trusted source of expertise in measurement and testing technologies for the global industrial market. World-class product offerings, custom design support and technical assistance, backed by a dedicated factory service team, has positioned MAE among the global leaders in providing advanced testing solutions.

As a full service supplier/partner, MAE offers a wide array of services to customers all over the world. Working with your staff, our experienced team of engineers uses the latest solid modeling CAD and CAE software and offers a comprehensive resource for your testing design and development needs. Our engineers specialize in finding the most practical and economical solutions for new or unusual testing applications. Whether your application is fully conceived or you need a design partner, the engineers at Mustang Advanced Engineering invite you to tap into their decades of experience in testing and measurement systems development.

Our mission is to achieve the highest possible level of customer satisfaction by providing innovative technical solutions and product designs and by striving to achieve perfection in product quality, delivery and service. At MAE, our customers are our highest priority - we do everything in our power to satisfy our customers. Our entire organization understands that the customer comes first and nothing else is more important.

ISO 9001:2008 Certified

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