

**New from Griggs Racing! First Time Ever Offered by Anyone:**

## **GR40 Mustang 4on4 Brake Systems**

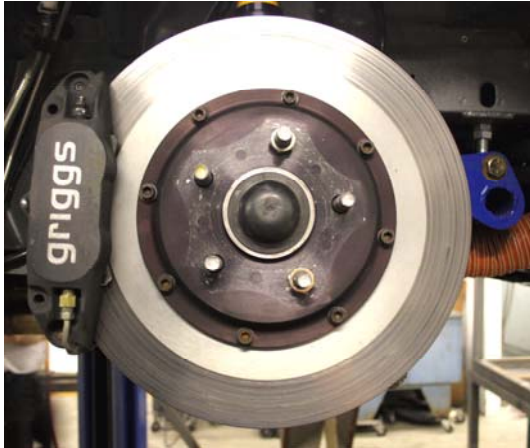
**4 Piston on all 4 Wheels**

**Optional ABS Compatible & Emergency Brake**

**Dyno Tested and Race Proven**

*Starting Under \$2999.00 Plus Hoses and Pads.*

During the course of the 2004, 2005 and 2006 race seasons we did some serious testing of brake systems and components. We came up with some very affordable yet superior performing brake system combinations that we are now offering in kits to radically improve your cars braking ability.



We maintain these kits will offer more features and performance, and longevity on par with anything on the market from anywhere in the world with at a very reasonable cost.

### **The testing procedures included:**

1) Hot (250F) static pressure testing of applicable calipers from all available sources for bridge flex (side to side expansion due to hydraulic forces) which affects pedal firmness and modulation (finite control).

2) Dynamic Torque vs. line pressure vs. Rotor temperature. This was performed on a Brake Dynamometer at full range of operating temperatures and rotor speeds (70F to 1500F)

as applicable to the pad compound being tested, with varying and fixed line pressures and using performance pads from most major manufactures. Some tests were performed on the same machine that tests brakes for most of the major NASCAR Teams. We looked for:

- The highest measured friction to line pressure ratios over the broadest possible rotor temperature range (maximum available brake torque)
- The most consistent coefficient of friction ( $\mu$ ) characteristics over varying temperature ranges
- The most linear relationship between line pressure and braking torque (modulation)
- The best rotor wear (disc finish and rotor life)
- Initial grip characteristics. (lock up control and modulation)
- Release characteristics (this affects both modulation and rolling resistance)

3) Hot static torsional flex. Torsional flex is the tendency for the unanchored side of the caliper to rotate with the rotor under load, which affects pedal firmness and modulation, as well as life expectancy of the caliper, pads and rotor. This process was a comparison of many calipers that were first cycled to a 500F rotor temp and then stopped using a Performance Friction 01 pad. 500psi was then applied to the line and a static torque of 500ft-lbs was applied to the brake rotor. A dial indicator was employed to measure torsional flex of the caliper as the brake torque was applied.



4) Track testing on a 3100 lb, 600 HP, GR40 Mustang AV8SS car, and a 3800LB 660 rwhp '98 Mustang Cobra Convertible street/open track/autocross car. Testing

included both subjective and empirical data gathering, as well as competition. Real world data was gathered on fade, effective temperature range, rotor wear, pedal feel and release. Once the effective brake component and pad combinations were determined, modulation and precise control during threshold braking on corner entry were evaluated for each pad. Subjective evaluation of driver confidence was also recorded.

**The primary thing we learned** was you can put together a staggering amount of braking power with incredible control and reliability for very little money relative to the megabuck European and well known American brake systems. We have run American short track oval systems on our cars for years, but we found we can often use even less expensive components than we had been using. And Nextel Cup teams, being the most demanding on brakes, have generated a lot of newer pad compounds which our test data showed some do wonders in allowing us to competitively run a Mustang with lower cost calipers and rotors due to the lower pressures required to maintain adequate and consistent brake torque with incredible feel, control and wear characteristics. And from the same basic system, just a change of pad compounds and the car will run on the street with little complaint of noise.

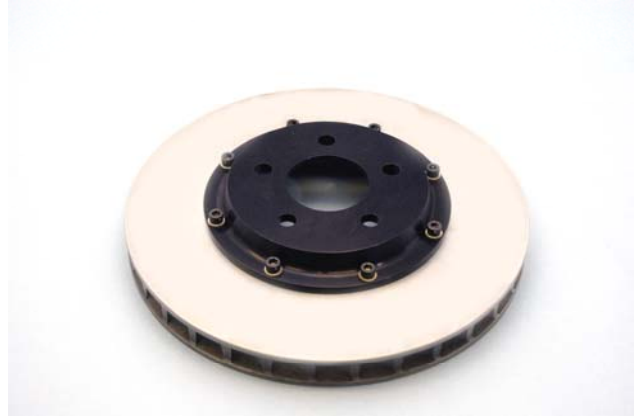
**As in the tradition of Griggs Racing Products**, we have taken all of this data, and put together what we believe to be the very best value in a complete and tested ABS compatible performance braking package ever to be offered to the Mustang aftermarket, with all the detailed information required to fully enjoy the balanced braking power these systems provide. There is far too much information to publish here regarding all the testing results so we have made it simple by choosing each component in each system for you. Various existing vendors supply these components to us; we have simply taken the guess work out of the selection equation for the customer.

#### **Features of all systems are:**

- **Low operational cost.** A big factor in pad shape selected is due to replacement cost, which to the performance brake user becomes a big issue over time. It is to us. All Griggs brake systems use one of three pads, universal shape designation of 100,101, and 102. You may find a less expensive brake system, but economies of scale in motorsport compounds usually make the replacement cost of pads much higher and therefore the cost benefit is lost after a few pad changes. As an example, 2005 retail price of Hawk HT14 compound pad for the front of a Baer/PBR/Cobra caliper is about \$204. For the Griggs system, the pads in the same compound cost only about \$142.00 and will last at least 3-4 times as long, just due to their size while providing much more brake torque. That equates to about **\$180-\$240 saved each time you put pads in our system**. Price spreads can be even greater for Alcon, Brembo or Stop-Tech. Performance may improve and pad life may be longer by buying the better caliper, but an even more expensive European caliper won't cut the cost of pads due to high prices for pads fitting them. Also, many of the superior performing pad compounds are not available in all of the pads shapes used in all other calipers sold to the Mustang aftermarket, so we also selected the pad shapes available in all the needed compounds.
- **Caliper design was selected based on weight and rigidity** from the static tests for pedal feel and constancy on the dyno, as well as experience on the track and street. Calipers are made to Griggs Racing design specifications by the company that founded the racing disc brake industry. Caliper weight is unsurpassed, and these calipers are some of the lightest and inexpensive on the market, yet we determined to be of the most rigid in both static and dynamic tests of all available calipers of similar size.



- **Lug mount designs proved superior** to more expensive radial mount design, exhibiting less torsional flex and distortion.
- **Rotor material and design is well proven** over the years and the metallurgy comes from millions of dollars in R&D invested jointly by Daimler Benz and Greyhound in an American foundry. They are machined to Griggs Racing specifications by a noted circle track brake manufacturer.
- **Hats, brackets and adaptors are made by Griggs Racing.**
- **All Griggs Racing components are quality made in the USA with American materials;** calipers, rotors and hats, as are the brake pads.
- **Offered for the Mustang for the first time a four piston four wheel brake system that is ABS compatible** without the ABS controller confusion caused by the high fluid displacement that large calipers usually create. This makes the original ABS system truly usable and for the first time with big brakes, and therefore a great asset to track driving.



- The system can be ordered **with or without an internal drum emergency brake** that works. (ala Corvette and Porsche)



- **Compare prices with comparable systems** from the other makers. This system offers more braking performance, more durability, better modulation and release for the investment than anything out there. **Complete systems start at \$2860.00 less hoses and pads, with 13.5" front rotor and 12.19" rear rotor.**

**Applications:** (Note, all systems are designed to fit 1995 17" Cobra R wheels, or larger. The systems will also fit most 16" 3 piece wheels as well).

**High performance street applications, autocross and moderate open track**

**GR40 4on4 Sport Brake** Starting at \$2860.00 Plus Hoses and Pads.

	<u>Front</u>	<u>Rear</u>
Rotor Dia.	13.5"	12.19"
Caliper	Cast*, Anodized Four Piston	Cast Anodized Four piston
Hat	Billet Aluminum	Integral iron w/ E-brake
ABS	Standard SN-95	Optional
Fitment:	SN-95 or Griggs spindles	8.8 or 9 inch Torino. Includes Griggs Hybrid
M/Cyl	Stock Cobra	

\*All calipers are Flat Black anodized finish to diminish brake dust appearance. The nature of the Cast caliper when anodized sometimes leaves a speckled finish.

**Pad compounds to use:**

<u>Usage</u>	<u>Street/AutoX</u>	<u>Open Track</u>	<u>Street/AutoX</u>	<u>Open Track</u>
Pads	101HP-Plus	101 F1 or HT14	100 HP-Plus	100 F4

Options:

- 1) NASCAR derived F1, F2 and F4 compounds can be ordered pre-bedded which eliminates cost of using vehicle to bed new pads.
- 2) Floating rotors.
- 3) E Brake
- 4) ABS Compatibility



**This 700 hp open track '04 GR40 Cobra stops repeatedly all day everyday with the Basic ABS compatible GRB 4/4 (wheel 4 piston) brake system. The car is a multi time class winner in**



**NASA TTU in NorCal.**

**Rotors are due replacement after 5 full weekends of serious stopping. Pads are still good to go.**

### ***Dedicated Trailered Track Toys And Road Racing:***

**GR40 American Iron Race Brake System:** *What most people need for serious open track and road racing under 3200 lbs, and 500+ hp. Works with OEM Master cylinders.*

	<u>Front</u>	<u>Rear</u>
Rotor Dia.	13.5"	12.19"
Caliper	Cast, Anodized Four Piston	Cast, Anodized Four Piston
Hat	Billet Aluminum	Billet Aluminum, or integral iron w/ E-brake
ABS	Standard SN-95	Optional
Fitment:	SN-95 or Griggs spindles	8.8 or 9 inch Torino. Includes Griggs Hybrid
M/Cyl	Stock Cobra	

#### ***Pad compounds to use:***

Op Temp*	800-1200F	400-700F	Over 600F
Pads	101 F1	100 F4,	100 F1

*\*Temperature read at rotor surface within 30 seconds of last hard application.*

- Options:
- 1) F2 pads for sustained high temp above 1000F.
  - 2) NASCAR derived F1, F2 and F4 compounds can be ordered pre-bedded which eliminates cost of using vehicle to bed new pads.
  - 2) Floating rotors.
  - 3) E Brake
  - 4) ABS Compatibility
  - 5) Dual .75 dia master cylinders with balance bar
  - 6) Floating rotors.



**Patrick Lindsey finished second at '06 NASA AIX National Championship Race at mid Ohio driving a lesser classed AI car. His Braking power as provided by the GR40 American Iron Race Brake System. He has subsequently won races as well.**

# GR40 World Challenge Brake System: *What really fast people need for serious road racing, and/or serious 3200lbs+ or 600hp+ open tracking. Super Durable Large Billet Calipers. (Not suitable for OEM ABS use).*

	<u>Front</u>	<u>Rear</u>
Rotor Dia.	13.5"	12.19"
Caliper	Billet Four Piston (1.75" & 2.00")	Cast or Billet Four Pistons (1.375")
Hat	Billet Aluminum	Billet Aluminum
Fitment:	SN-95 or Griggs Alum Spindles	8.8 or 9 inch Torino. Includes Griggs Hybrid
M/Cyl	0.88 inch dia.	1.0 inch dia.

*Above are Recommended sizes for dual master cylinders and balance bar with 5.5: pedal ratio.*

## Pad compounds to use:

Op Temp*	<u>600-1200F</u>	<u>Sustained Over 1000F</u>	<u>600-1200F</u>	<u>Sustained Over 1000F</u>
Pads	102 F1	102 F2	101 F1	102 F2

*\*Temperature read at rotor surface within 30 seconds of last hard application.*

## Options:

- 1) Brake fluid Recirculator.
- 2) Floating rotors.
- 3) NASCAR derived F1, F2 and F4 compounds can be ordered pre-bedded which eliminates high cost of using vehicle to bed new pads.



Front



Rear

**These are the Brakes used by Champions like Gary Umphenour, and Bruce Griggs.**

**Extreme Winner**

**Griggs Racing's Old Blue is arguably the single-most victorious road-racing Mustang in history—we drive it and try to keep up**

Text and Photos by Tom Wilson

**A**s incentive but unorganized auto without, we often dream up ideas that more motivated people implement and share success from. One of our best concepts yet to be capitalized on is a line of customized model Mustangs. These display models would be configured and painted to represent either the model purchaser's own car, or one of the most famous and visually compelling Mustangs, such as the Boss or Mike Matarlo's old "Big" Super Street Custom drag car.

Another near-to-be candidate on our short list of significant Mustangs in the car showmen being Bruce Griggs' Old Blue. While not necessarily well known on the East Coast, the 40 car, as it is also known, is an institution in West Coast road racing. It's a multiple NASA American Iron Extreme champion, a dominating performer that amassed 20 race wins in a row to claim an undefeated AIX season in 2003, and it has also been the spoiler in SCCA American Section and IH classes. For more on Old Blue's impressive record, see the 40 History sidebar.

Long ago the sector in more races than many cars can ever remember in, the 40 car is still going strong. An engineering legend for Griggs Racing (7507 1979-2244; www.griggsracing.com), Old Blue is still in its prime, typically parked, hauled and hauled in the Griggs banner at numerous events. The car has been cut and steel bent, bent on chisel, full of holes, crimped and welded, coated and rebuilt, and hammered and managed. It's no beauty queen, but it's always fast and spells something new and trick each time we see it.

When we visited Inlorn Raceway in Seconia, California, the latest trick part was represented by Griggs Racing's newest project, a Street King Aero (A-200) front suspension. The SIA details are in The Short and Long of it sidebar, but suffice it to say it completely eliminates the strut front end and provides unprecedented, previously possible front-end grip.

Being around the 40 car, you soon realize that the number of stock, unaltered Ford parts on the car can be counted on the fingers of one hand. The body is made nearly redundant by the Griggs roll-over and through-door subframe connectors, while in back a Griggs 9-inch rear axle hangs off Griggs control arms, king pins, and Watts link. Coilovers are used all-around, of course, as are huge Sierra disc brakes.

The 40 is an artifact of Old Blue's proper effort and just as about by the sides with an 11.5-inch center and 9-inch outer sections. Also interesting is the lack of a rear main bar and Griggs' preference for relatively soft spring rates. The attempt

Assembly test runs can make an adrenaline-fueled impression that's impossible to convey in print. Strap a satellite on a great white shark and ride it through an aquarium if you want to know what it was like to drive Old Blue on a track chock-a-bloke with tons of blower.

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