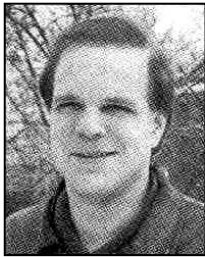


PUMPING POINTS

Avoid one of the most common restoration errors with our complete guide to Mopar brake master cylinders 1967-1974.

About the Author

Brad Schroeder is a long time Mopar guy. His personal preference leans towards Challengers, with a '70 ragtop, and a T/A (that he's owned since 1978) currently filling his Midwest garage. Brad is a Senior Product Engineer for one of



the largest brake outfits in the world: Brake Parts, Inc, who we best know as the manufacturer of Raybestos and NAPA's United brands. Brad has long been frustrated

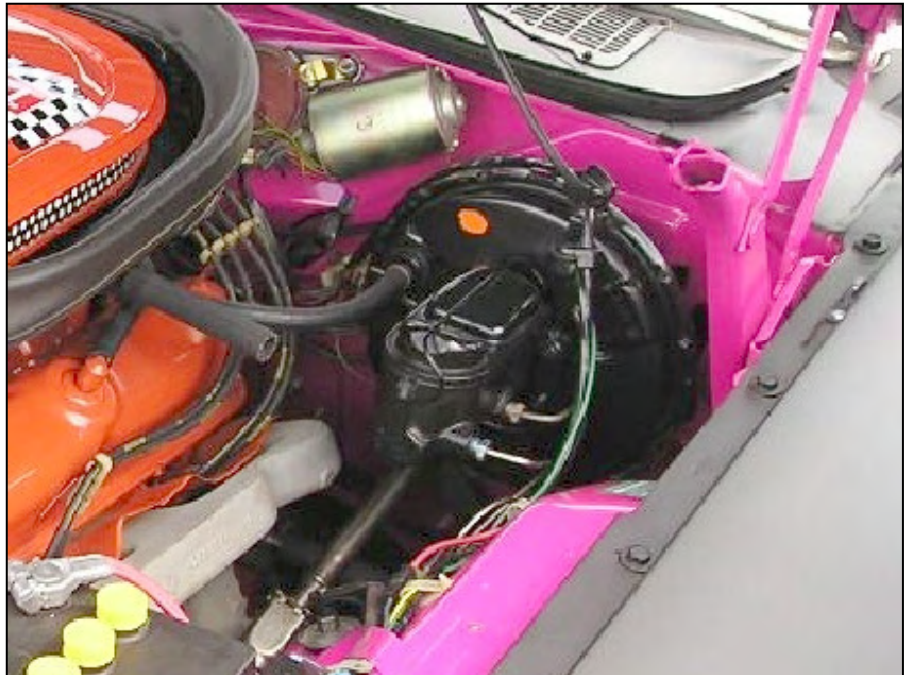
by the eyesores that pass as "correct" master cylinders in muscle era Mopars, so, after years of research, he graciously hooked us up with this article, which will be the reference for decades to come.

-R.E.

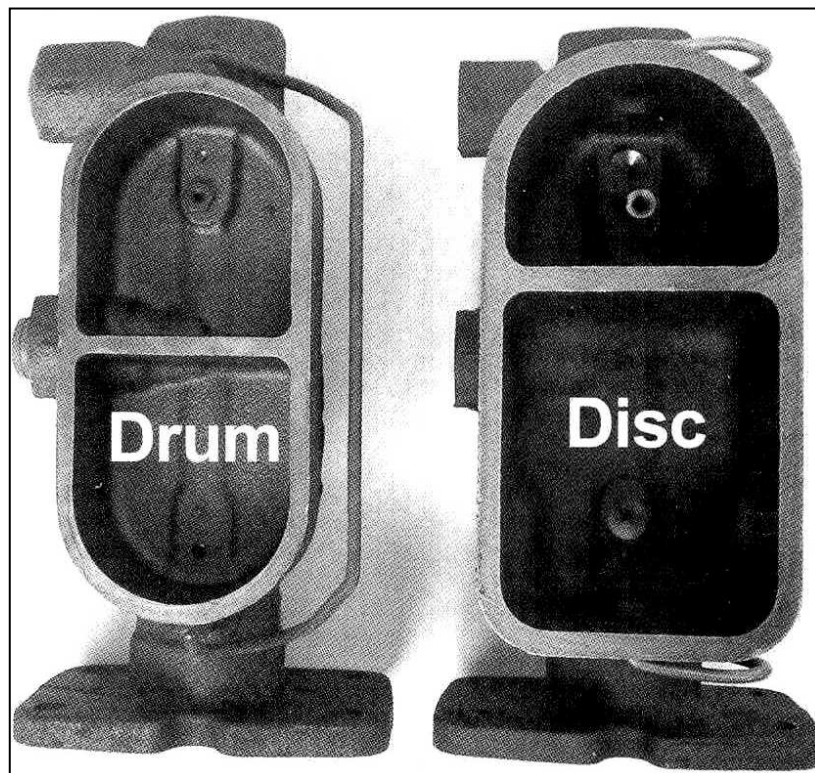
Story and Photos By Brad Schroeder

As the Mopar muscle car restoration hobby has evolved over the years it seems as though almost every part, nut and bolt of the cars of the era has been thoroughly studied and documented, with one glaring exception: brake master cylinders. As a result, when admiring show cars and restored cars featured in magazine articles you'll no doubt see a hodge-podge of different master cylinders on otherwise similar cars.

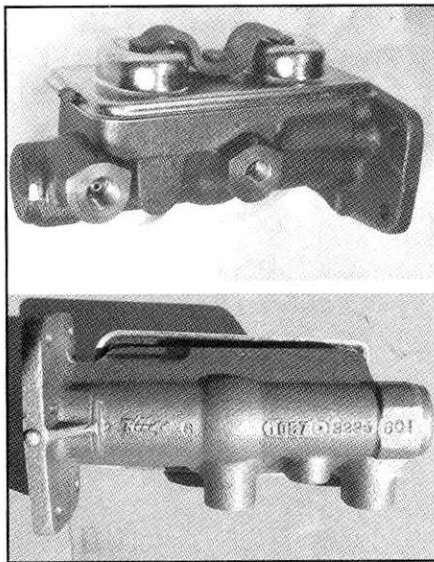
Unrestored cars, typically the most invaluable source of reference data, are also often not accurate in this area. Standard non-mineral based brake fluid is hygroscopic



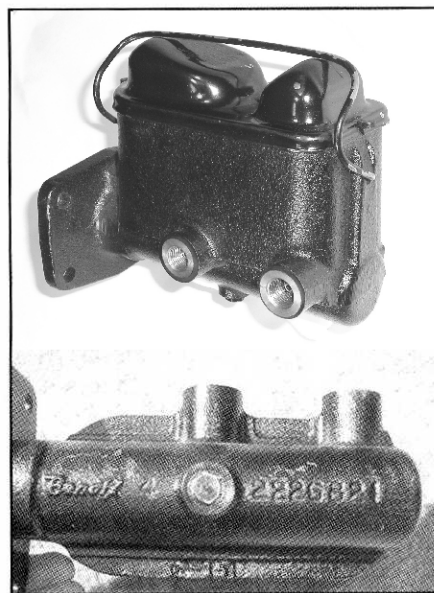
With the brake master cylinder occupying a prominent spot under hood, it's clearly necessary to have the right one on any well restored Mopar. How to know? Relax, we'll educate you.



1. Drum brake master cylinders can be identified by their equal size front/rear reservoir areas (left). Disc brake master cylinder (right) has one reservoir much larger than the other. This assures ample fluid even as pads wear and caliper pistons move out.

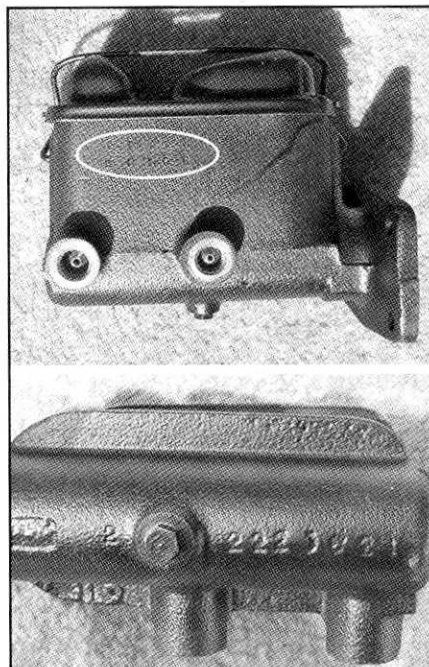


2. The most common master cylinder seen on muscle-era Mopars is the 2808577 (same as 2808599), which was installed on hundreds of thousands of cars and light trucks with 4-wheel drum brakes from 1967 through 1970. Note that the cover is held in place by a bolt-on retainer. There's no bail wire.



3. Disc brake-equipped B-bodies from 1967 through 1969 had one of two styles of master cylinders. PIN 2883058, shown here, has outlet ports on the engine side of the casting. PIN 2944477 for 1970 B Body (except Hemi) is the same except for some minor internal (piston stroke) differences. Note overall narrowness, the Bendix logo, casting number (2226821), and piston retainer screw visible on the bottom.

meaning it absorbs water, and over time enough water can be absorbed to cause rust in internal brake system components. Even a low-mileage unrestored car that has been stored for 30 years may have had its master cylinder fail and then replaced with a non-correct part. The purpose of this article is to help to identify correct original



4. The second style of '67-'69 B-body disc brake master cylinder is the 2881868 (same as 2944376). This unit has outlets located on the fender side of the casting. Note date code and manufacturing info metal-stamped into the casting (circled, see photo 7 also). Casting number (bottom) on these is 2225621.



5. Disc brake master cylinders manufactured prior to mid-1969 have a bail wire tag which contains date code information. This example, reading "9043", was manufactured on the 43rd day of 1969.

equipment master cylinders from the '67-'74 Mopar muscle car era.

Mopar musclecars of this era had one of two types of braking system: either 4-wheel drum brakes, or front disc brakes and drum brakes in the rear. These two types of brake systems use different master cylinder designs.

Four-wheel drum systems use a master cylinder with equal-sized front and rear fluid chambers. They usually also have internal residual check valves in the two outlets where the brake lines thread in, in order to maintain a small amount of pressure in the system when the brakes are not applied. This residual pressure keep the lip seals of the wheel cylinders' internal cups in position to prevent brake fluid from leaking past the

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cups and air from being drawn back into the wheel cylinders when pedal pressure is relaxed. (Residual pressure valves were discontinued soon after this period, rendered superfluous by a wheel cylinder redesign.)

Chrysler drum brake master cylinders from this era were manufactured by the Bendix Corporation. The Chrysler part numbers and casting numbers for drum brake master cylinders are shown in Table 1. The casting numbers can be found on the bottom of the casting. Through 1970, drum brake cylinder bodies were bare metal, lightly coated with a rust preventative, and had a yellow zinc dichromate plated cap. In most cases this was the same for '71-'72 drum brake cylinders, though some NOS examples of these have a dull dark gray phosphate coating on the body and filler caps.

A disc brake master cylinder can be identified by the size of the fluid reservoir chambers. The chamber that supplies the fluid to the front brake circuit is much larger than that of the other chamber. This is because the pistons in the disc brake caliper displace further out of their housing as the brake pads wear, and more fluid is displaced from the cylinder during this process than is needed to displace the pistons of the wheel cylinder and prevent the compensating port (in the master) from sucking air.

This is why it is very important to never use a drum brake master cylinder on a car with disc brakes. As the brake pads wear, the fluid level can lower in the reservoir to the point where air is ingested into the system, resulting in a very soft pedal or even brake failure. Having a drum brake cylinder on a disc brake car looks bad to someone with a trained eye, sure, but seeing someone's beautiful Mopar rear end another car at a traffic light because of this error looks bad to everyone.

The original equipment manufacturer for all disc brake master cylinders during this era was also Bendix. Bendix painted most of their disc brake master cylinders gloss black well in to the '70s. The filter caps and bail wires had been installed prior to this painting process. That's right, those shiny gold filler caps may look nice, but they are never correct for a '67-'74 Mopar with disc brakes. Like in the case of drum brake master cylinders, a few NOS examples from the early '70s have been observed with the dark gray phosphate coating. The Chrysler part numbers and casting numbers for disc brake applications are shown in Table 2. (page 84)

Identifying master cylinders not in their original Chrysler boxes can be a challenge as the Chrysler part number was not cast or stamped on the part. Starting sometime in 1971, many master cylinders included a stamped metal tag attached to the filler cap



6. Filler caps on disc brake master cylinders manufactured prior to the introduction of the 1970 models in 1969 were stamped "USE ONLY SAE-70 R3 BRAKE FLUID" (right). Starting with the 1970 model line the brake fluid information stamped on disc brake caps was changed to "USE ONLY SAE J1703 BRAKE FLUID" (left). In 1972 information pertaining to brake fluid was removed altogether.

Table 1-4-Wheel Drum Brake Master Cylinders

Chrysler Part No.	Bore Diameter	Casting No.	Applications
2808577	1"	2225601	'67 - '70 A Body-all
2808599		2660809	'67-'70 B Body all except
3420961		none-or AANF	'68-'69 Wagon w/power '67-'70 C Body '70 E Body '67-'69 A-100 D100 Truck
2830251	1-1/8"	2225771	'67-'69 Dodge Truck (2 hole flange)
2830269	1-1/4"	2226291	'67 -'71 Dodge Truck (2 hole flange)
2944269 (note 1)	1 1/8"	2226821	'68- '69 8 Body station with power brakes
3461182	1 1/32"	3461182 or 3580006	'71-'72 B,E Body power brakes '72W, w/PB, '72 P. D w/PB
3461184	1-1/32"	3461189 or 3580006	'71-'72 A Body power and manual brakes w/10" & 11" '71-'72 B, E Body with manual or power brakes.
3580027	15/16"	3580006	'71-'72 A Body with 9" Brakes
(1) This is a disc brake style master cylinder design. Same assembly as Chrysler part no. 2883058 and equivalent to 2944477 (see figure 2)			

bail wire which included the last 4 numbers of the Chrysler part number. For those parts that do not have such a tag the Bendix casting number located on the bottom of the casting is the best guide in identification.

Sometimes, the same casting number was used in more than one master cylinder. In the examples covered here, there could

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(Continued from page 32)

be minor differences in the internal pistons. In some cases, there was no apparent difference and there would appear to have been several Chrysler part numbers assigned to the same part.

For those doing factory-correct restorations, there is an alternative to the fun and financial hardship that comes from trying to track down NOS master cylinders. Don't throwaway those old original equipment cores. Used original master cylinders can usually be rebuilt and restored. Aftermarket kits are available to rebuild original master cylinders. These provide new internal components such as rubber cups and seals to replace those that have worn out.

If the cylinder bore is not badly pitted from rust, it can be lightly honed. Cylinders that have pitted bores, that won't clean up at a few thousandths oversize, can be professionally resleeved with stainless steel or brass and no show judge will ever see this repair-100% stock external appearance will be retained.



7. Starting sometime in 1969, date code and manufacturing information was stamped into the fender side of disc brake castings. This master cylinder coded "O 100" was assembled on the 100th day of 1970.

We found two companies able to perform this operation, both with good reputations-see sources. It is best to deal directly with these specialty companies. Sad stories exist of people sending rare original parts in through local auto parts stores for resleeving, only to receive back a different equivalent rebuilt aftermarket cylinder. Companies such as the

Table 2-Front Disc Brake Master Cylinders

Chrysler Part No.	Bore Diameter.	Casting No.	Applications
2808600	1"	2225541	'67-'70 A Body Power and Manual
2881870	1-1/8"	2226811	'67-'69 C Body
2881868 2944376	1-1/8"	2225621	'67 B Body All '68-'69 B Body with 426 Hemi
2883058	1-1/8"	2226821	'68-'69 B Body except 426 Hem!
2883089	1-1/8"	2225621	'70 C Body
2944453	1"	2229171	'70 E Body except 426 Hemi
2944476	1-1/8"	2229191	70-71 B Body with 426 Hemi '70-'71 E Body with 426 Hemi
2944477	1-1/8"	2226821	'70 B Body except 426 Hemi
2944479 (note 2)	1-1/8"	2225621	'70 8 Body Taxi (manual)
3461176	1-1/32"	3461187	'71-'75 B Body except 426 Hemi or manual brakes 71-75 C Body '71-'74 E Body except 426 Hemi or manual brakes '71-'7201000150 truck
3461178 (note 1)	1-1/32"	3461187	71-'74 A Body except manual
3580184	1"	2229271	71-'75 B Body manual brakes '71-'74 E Body manual brakes

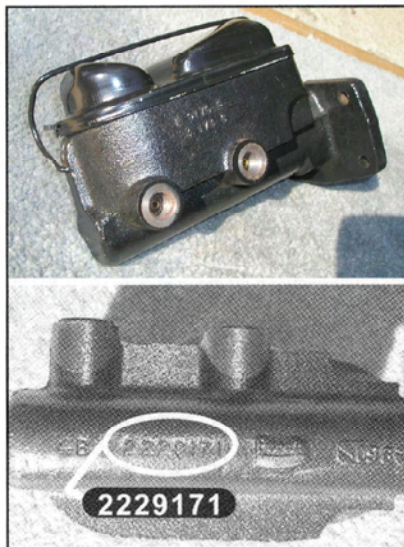
Note: Master cylinders with casting number 2225621 have outlets on fender side.

Master cylinders with casting number 2226821 have outlets on engine side.

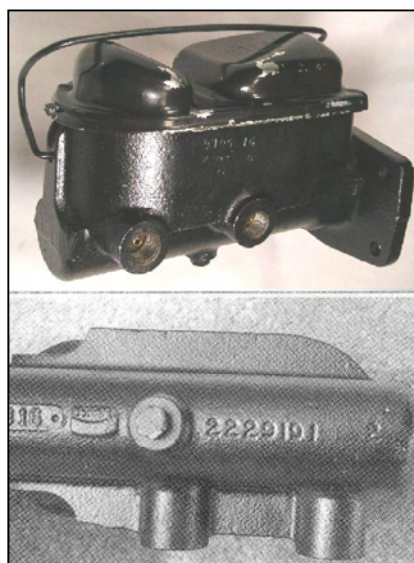
All master cylinder numbers with the same casting number are the same externally and have same bore diameter. There are minor differences internally with pistons or in some cases no internal differences. They should be interchangeable except (2).

(1) Identical to Chrysler 3461176 except has minor stroke (piston) travel difference.

(2) Has 4 dog point mounting studs pressed in flange.



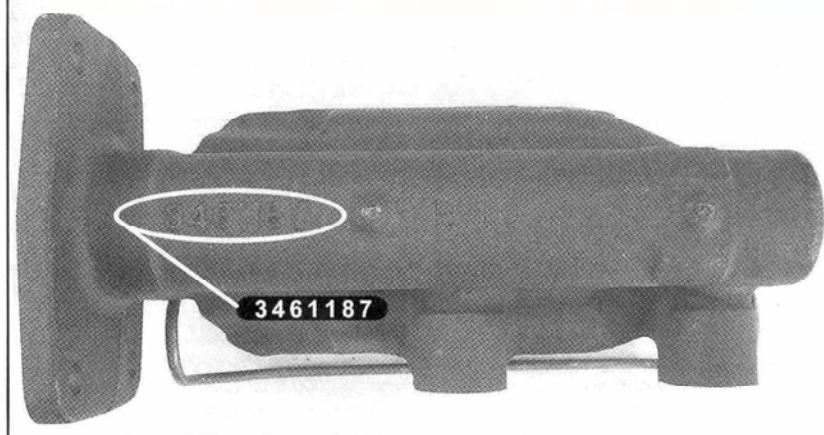
8. In 1970 disc-brake Challengers and Barracudas (except Hemi) used Chrysler part number 2944453. Casting number was 2229171.



9. Installed originally on the less than 1000 Hemi B- and E-bodies in '70 and '71 equipped with disc brakes, the rarest Mopar master cylinder is the 2944476. It is very similar to the 2944453 but can be identified by the raised boss and retaining screw on the bottom of the casting, and also by the casting number (2229191). If you need one of these, expect to pay big bucks.

ones listed on page 85 will repair and return the part that you sent them, not give you an "equivalent" part out of their inventory.

Rare brake components installed on vehicles can be maintained in several ways. Many people use silicone (DOT 5) brake fluid in their classic cars because silicone brake fluid does not absorb water. However, water can still get into the system, and since it cannot be absorbed by the silicone fluid, it can collect in pockets where it can cause corrosion,



10. The most common disc brake master cylinder is the 3461176, which was installed on B-, C-, and E-body cars from 1971 through 1975. 3461178, which was installed on many A-bodies, uses the same casting and is identical other than minor internal piston stroke differences. Note that there's no piston retainer screw or boss. '75-up masters were similar to this, but a tad larger-until the changeover to aluminum 2-bolt units that began in 1979.



11. The 3461184 was installed on 1971-1972 B- and E-bodies with 4-wheel drums. Thankfully, starting in 1971, many master cylinders came with a tag on the bail wire which included the last 4 digits of the Chrysler part number. This style master cylinder was used as a semi universal drum replacement by the aftermarket, so it's a common (and obvious) goof to see it installed on earlier cars.

although the advantages of silicone still outweigh the disadvantages by a wide margin. An alternative preventive measure is to use conventional DOT 3 or 4 brake fluid and change it at regular intervals. This is something that should be done in a car whether it is your daily driver or a never driven trailer queen. Performing this simple maintenance task can dramatically increase the life of hydraulic brake components. *

SOURCES:

Brake & Equipment Warehouse, Inc.
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