Rebuilders rally to crack the code

by Ed Lee

A torque converter is like a box of chocolates. You never know what you're going to find. Until now.

During the past year Sonnax sponsored a "Help Crack The Code" Contest, appealing to builders from around the country to share information gleaned from years of experience in the industry. Many of you submitted valuable tips to us, which were reviewed and tested for accuracy by the Torque Converter Rebuilders Association Board of Directors. Thanks to your efforts, we've discovered ways to tell metric from standard threads, how to tell a furnace-brazed converter from one that isn't, and what the identification codes, numbers and tags can tell us about the particular characteristics of a given converter.

Metric vs. standard

Do you know how to tell the difference between a GM 400-style converter with metric threads in the mounting pads from one with standard threads – without checking the threads? We didn't either, but Gary Rogers at Robert T. Holt & Sons in Mount Pleasant, Texas, showed us how.

His secret (also GM's secret for many years) is this: There's an identification groove just above the welds that attach the mounting pads to the cover on all 400-style torque converters with metric threads. (*See Figure 1*.) A typical converter with standard threads will look like *Figure 2*.

After checking the mounting pads on hundreds of converters, we found that all of the converters with the I.D. groove did, in fact, have metric threads. (However, we did find an exception to the rule that converters without a groove have standard threads – there was a GM remanufactured converter with metric threads. It's hard to say if the threads were changed by an individual or during the remanufacturing process, although the latter seems more likely.)

The information Gary has gleaned about the 400-style

Figure 1
A typical 400-style converter with I.D. groove for metric threads.

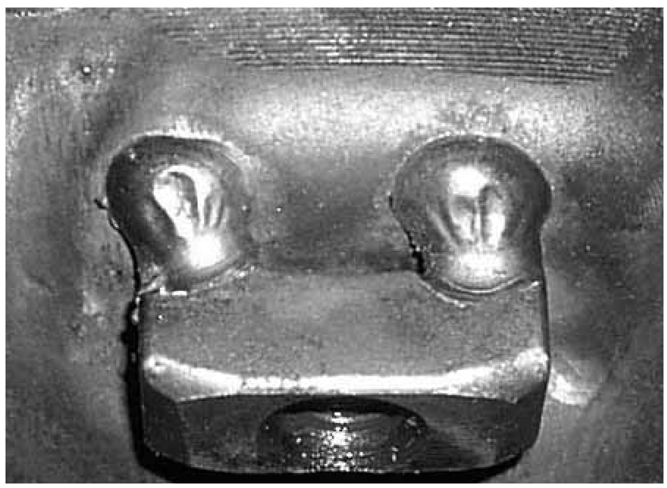


Figure 2
A typical 400-style converter with American threads in mounting pad.

converters may well apply to other converter styles since GM tends to stick with processes once developed. His tip may help someone else solve yet another piece of the puzzle.

Furnace-brazed or not?

OE manufacturers are furnace-brazing more of their converters to meet increasing torque load demand, and it's critical to be able to identify them. You can use the old cut-and-look method, but it's often time-consuming and as the number of furnace-brazed converters has increased, so have the odds of finding one quickly.

Dacco's latest catalog includes some handy furnace braze information in the 298mm section. If you can see the I.D. code on your converter, the second digit will allow you to determine both the stall of the converter and whether it is furnace-brazed. This I.D. method works well on most late-model GM 298mm converters. It's a good bet that if the second letter of the code is a C, H, K or L, your converter will have a furnace-brazed impeller. You may also notice that on the late-model 298mm converters, the majority of the I.D. stickers in a solid color will have a furnace-brazed impeller and the majority of the stickers with stripes won't. Unfortunately, neither is foolproof enough to use as an identification process.

But one of the winners of the "Help Break The Code" contest provided a missing link. Jesse Campbell from the Colorado Converter Co. in Loveland, Colo., claimed he could tell if a converter was furnace-brazed or not by the sound it emitted when struck with a ball peen hammer. He was right.

Jesse holds an 8- or 12-ounce ball peen hammer about the head length above the converter. Holding the handle loosely, he lets the hammer fall. The hammer strikes the converter between the two dimples, on the middle row of dimples, on the impeller side of the converter (*see Figure 3*). A dull muffled sound tells him the converter is not furnace-brazed. A furnace-brazed converter has a crisper, sharper ringing sound.

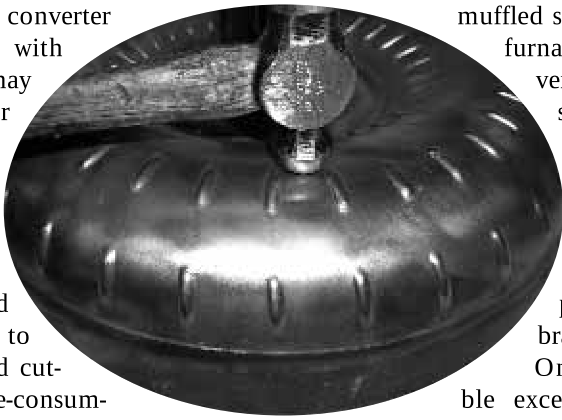


Figure 3
The noise the hammer makes as it strikes the converter tells you whether or not it is furnace-brazed.

Now, transmission shops have been using this trick for years to tell if GM 700 pump rings were hardened or not. With a little bit of practice anyone can become proficient at finding the furnace-brazed core.

One word of caution: With the possible exception of some late-model Ford AODE/4R70W converters, the Ford 12" impeller was never furnace-brazed. When you are mastering Jesse's ball peen method, you'll find some Ford C6 or AOD converters emit a sound similar to a furnace-brazed impeller. What you're hearing is not an exception to the furnace-brazed rule, but a way to tell if the vanes are tight in the 12" Ford impeller. An impeller with good tight vanes will emit a dull muffled sound, just as you would expect. What you would not expect is that the looser the vanes, the more similar the sound is to that of a furnace-brazed impeller. This is a win-win situation. Not only can you tell if an impeller is furnace-brazed or not, you can also tell how tight the vanes are.

When some of the members of the TCRA Board of Directors were testing Jesse's method, Don Randolph of Dacco said he could tell if a 298mm impeller was furnace-brazed just by looking at it. Don went on to correctly identify six out of six converters.

Don explained that the vane helps strengthen the impeller. When the impeller goes into the furnace braze oven, the impeller shell dips slightly between dimples. An impeller that has not been in an oven will be straight across between the dimples (*see Figures 4 and 5*).

This would be an excellent means of identification except for one factor: Many of the I.D. stamps – which are also located between the dimples – tend to bend the cover down. This makes it difficult to distinguish between an oven

Figure 4
An impeller hub that is not furnace-brazed will not have dips.

Figure 5
A furnace-brazed impeller dips slightly between the dimples or grooves. This is most noticeable on the inside.

GM FORD CHRYSLER IMPORTS BORG WARNER HI-PERF DETAILS TECH INFO

Figure 6 Small Dots | One Solid Dot | Solid Color | Half Solid Color | Diagonal Stripes

245 MM DACCO B21		
Part Number	**Clutch Material**	**Label Distinction**
FAFB 2420	Carbon	Yellow Stripes
FDHB 2420	Woven	Purple Stripes
FDQB 2420	Woven	Solid Purple
FDKB 2420	Woven	Purple Dot
FD9B 867	Paper	Solid Green
FGHB 2420	Woven	Solid Pea Green
FG9B 867	Paper	Green Dots
FGKB 2420	Woven	Silver Dot
FJ9B 2420	Paper	Green Stripes
FJHB 2420	Woven	Green Stripes
FJAB 865	Paper	Solid Light Green
FKEB 2420	Carbon	Solid Gray
FLHB 2420	Woven	Solid Gray
FLDB 2420	Paper	Yellow Dots
FLQB 2420	Woven	Solid Green Dot
FL9B 867	Paper	Solid Light Green
FLHB 868	Paper	Half Solid Gray
FL9B 865	?	?
FYHB 2420	Paper	Solid Light Blue
FYHB 2420	Woven	Solid Light Brown
FYHB 2420	Paper	Solid Light Blue
FY9B 865/867	Paper	Light Cream Stripes
FY9B 867	Paper	Half Solid Light Brown
FZBB 868	Paper	Green Stripes
FZEB 2420	Carbon	Light Blue Stripes
FZFB 2420	Paper	Purple Dots
FZFB 2420	Woven	Orange Dot
FZFB 2420	Woven	Yellow Dot
FZRB 2420	Paper	Yellow Dots
FZPB 2420	Paper	Light Green
FZRB 868	Paper	Green Stripes
FM8C867	Paper Viscous	Red Stripes
FM4B 865	Paper	Solid Green
FM4B 865	Paper	Solid White

Figure 7

dip and a bend from a stamp. But you can be sure that all of the converters that do not dip between the dimples will not be furnace-brazed.

A question of friction

Every converter builder knows there are three different types of friction material to choose among: paper, carbon and woven graphite. Each one of these friction materials has its own unique properties and specific uses, making it important to be able to identify the correct material needed for each application. But it hasn't been easy.

The GM converters have proven particularly problematic. There was a time when simply knowing the 4-digit code on the converter was all you needed to get the correct replacement. Those days are gone. Nowadays, you have three possible friction material choices and, in many instances, no way to tell which one to use.

Jim Currier Jr. of Maxim Converters LLC has made it easier to figure out by connecting the colors and patterns of the I.D. stickers with the I.D. codes. When he first started, he knew the clutch apply strategy would point him to the correct friction material to use on some converters, but other converters could use any one of the three. This dilemma was especially problematic when it came to the 245mm GM B21, particularly on the FLHB converter.

Jim began to notice subtle differences in the colors and patterns of the colors on the I.D. stickers of converters with the same I.D. code. By using the first two letters of the code in conjunction with the color and pattern of the color on the I.D. tag, he was able to I.D. the friction material used in nearly all converters – until he found an FJ9B converter with green diagonal stripes with a paper lining, and a FJHB converter with green diagonal stripes with a woven graphite lining. At this point, he added the third and fourth digits of the code to his I.D. decoding process. He was soon able to say with certainty that a FYHB converter with a solid pattern/light blue tag would have paper friction material on the clutch and the same FYHB code with a solid pattern/light brown tag would have woven graphite friction material on the clutch (*see Figure 6*). Jim continues to have good success with this system today, provided the I.D. tag is present.

Five of the patterns for the late model B21 converters are listed here, along with the codes and colors and the friction material that they identify (*see Figure 7*). Please note that

Figure 8

Figure 9

Figure 10

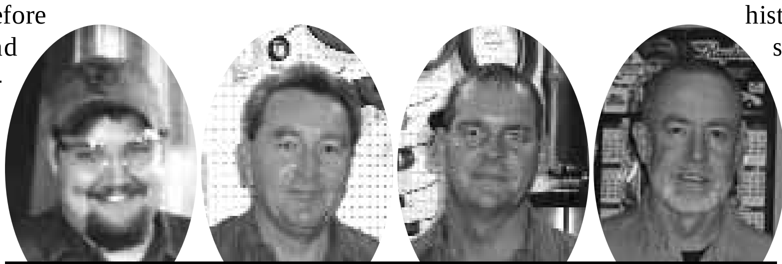
many of the early B21 patterns that were only used on the 125 lockup converters have been left out because they all had paper linings.

More deciphering

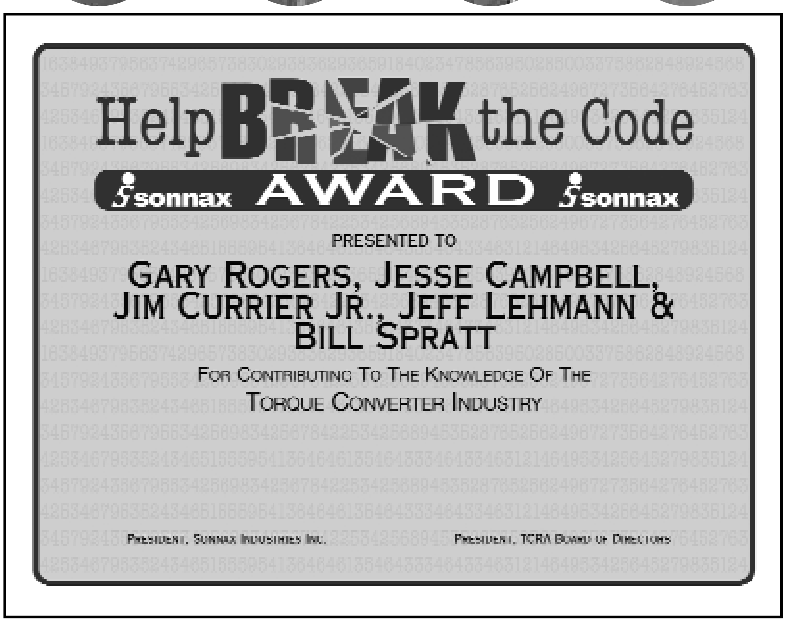
The FLHB converters were also causing headaches for Jeff Lehmann and Bill Spratt at Precision Converters of Ohio. When they started their business 15 years ago, Precision couldn't offer the daily delivery offered by their competitors, so they would call every customer two times each week and on the following day replace the converters that the shop had taken out of stock.

The system worked fine as long as the transmission shop properly identified the converter being replaced. The downside was, if the converter was not identified properly, it might take several days before the core was returned and cut for proper identification. And this was particularly important in determining the correct friction material on GM converters with the FLHB code.

They knew there was a good chance that FLHB converters with the early part numbers (the seven-digit part number that started with 86) would have paper linings (*see Figure 8*). But any identification beyond the early paper was just a guess. In 1998 Jeff and Bill started noticing that all of the FLHB converters with the large four-digit number 4741 on the I.D. tag had woven graphite friction material on the clutch (*see Figure 9*).



Jesse Campbell Bill Spratt Jeff Lehmann Gary Rogers



This heightened awareness of the large four-digit number allowed them to identify a second number that was also found exclusively on converters with woven graphite linings. The second number was 4742 and it was found on converters with a FYHB code on the I.D. tag. Soon they had expanded their I.D. system to cover as many converters as possible. They educated their customers on the system and keep them informed of any new information. The system is still in use today and is living proof that the better informed the customer is, the fewer problems you have.

Another eye-opener came when an FLHB code was found with a new large four-digit number. This new number was 9827 (*see Figure 10*). This converter was very similar to the FLHB converter with the 4741 number, except that it had a 21-vane stator. The converters with the FLHB code historically have a 14-vane stator. It's very uncharacteristic for GM to use a different stator in a converter with the same code. The good news is that this FLHB converter with the 21-vane stator has a different large four-digit number. Is it possible that the stator can also be identified by this number? This information also raises questions about the identification of other components of the converter by the large four-digit number.

After much research and long hours the TCRA Board has compiled as complete a list as possible of the information learned about the four-digit number (*see Figure 11*). The list will undoubtedly continue to grow for some time.

In the meantime, our thanks to Gary Rogers, Jesse Campbell, Jim Currier Jr., Jeff Lehmann and Bill Spratt for taking the time to do the research, and for sharing the knowledge they have learned. They wholeheartedly deserve to be the winners of the Sonnax "Help Break the Code" contest.

This information can also be accessed on the TCRA Web site at www.tcraonline.com.

245MM CONVERTER (DACCO B21)

OE LABEL INFORMATION					CONVERTER INFO		
Code	P/N	Large 4-Digit #	Label Distinction	Damper ID Code	Clutch Material	Vanes	Stall
FAFB	2420	9810	Yellow Stripes	9451/3287	Carbon	16	102
FDEB	868	5469			Paper		
FDHB	2420	9048	Purple Stripes	748/2700	Woven	14	682
FDHB	2421	1322-7470			Woven		
FDQB	2420	114	Solid Purple / Solid Pink	2219/8403	Woven	14	682
FDQB	2421	9828	Yellow Dots	8403	Woven	21	391
FDFB	2420	9048			Woven		
FDKB	2420	9890	Purple Dot	8402/2458	Woven	14	
FGHB	2420	4739	Solid Pea Green	748/0638	Woven	18	
FGKB	2420	8387	Silver Dot	1100/8402	Woven	18	082
FJHB	2420	4740-3102	Green Stripes	406/3135	Woven	18	
FJAB	865	3307	Solid Light Green	969/0049	Paper	18	082
FKEB	2420	2322	Solid Gray	326	Carbon	18	086
FLHB	2420	4741	Solid Gray	748	Woven	14	682
FLDB	2420	177	Yellow Dots	special damper	Paper 96600	14	086
FLQB	2420	8341		LUK	Woven		
FLQB	2420	8344	Solid Green Dot	8403//0978	Woven	14	682
FLHB	868	5516	Gray Stripe	911/1397	Paper/2nd Gen.	14	086
FLHB	868	936	Gray Stripes		Paper	14	
FLHB*	2421	9827	Blue Dots		Woven	21	391
		*Only FLHB application seen for the 21-blade "391" stator					
FLMB	2420	177			Paper		
FYHB	2420	4742	Solid Light Brown	748	Woven	18	380
FYHB	2420	8476			Woven		
FYHB	2420	2823			Paper/2nd Gen.		
FYHB	2420	2823	Solid Light Blue	911/2375	Paper	18	380
FYHB	2421	7467			Woven		
FYHB	2420	2823	Solid Light Blue	911	Paper	18	380
FZBB	868		Green Stripes		Paper	18	
FZEB	868	5468	Pink Stripes	939/1015	Paper	18	082
FZEB	2420	2324	Light Blue Stripes	326/2435	Carbon	18	082
FZEB	2420	2325	Solid Orange	326/2435	Carbon	18	082
FZFB	2420	9606	Purple Dots	0979/9459	Paper	18	082
FZFB			Light Yellow	921/1397	Paper	18	082
FZFB	2420	7269	Orange Dot	72026/3340	Woven	18	082
FZFB	2420	1330 or 7606	Yellow Dot /brazed	7226/2319	Woven	18	
FZFB	2420	7269	Pink Dots		Woven	18	082
FZRB	2420	1614	Yellow Dot /brazed	865/1356	Paper	18	082
FZPB	2420	6915	Light Green	921/2896	Paper	18	082
FZPB	2420	5304	Blue Stripes	305/0707	Carbon	18	082
FZRB	868	5230	Green Stripes	865/2505	Paper	18	082