

Cushman "cc's" Tires and Tubes Engine Oils



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Tech Tips

From Your Technical Advisor

In the last issue Vol. 24 No. 1, a little of the article dealt with Scott from Benton, KS, who was trying to obtain a title for his 1959 Super Eagle. After a mandatory inspection by the Kansas Highway Patrol, the Eagle was impounded. The reason given for this was that the aluminum tag attached to the front of the engine, like most '59 Eagles contained the numbers 36M9-51. Somehow these numbers had been reported to a nationwide data bank for stolen vehicles. I explained in the article that these numbers are not serial numbers, but only model numbers for ordering parts at a later date. I also stated that this tag with identical numbers was produced at Cushman by the thousands. While I am sorry that someone had their scooter stolen, to use this number for anything other than ordering replacement parts is just a waste of time. Sometime just before Thanksgiving I received another email from Scott. He informed me that after showing that very article to the KHP, (and probably after they checked with the owner of the reported stolen vehicle) that not only did they release the scooter to him, but they also issued a clean Kansas title. WOW, sometimes things do work out. Good luck Scott.

After the question about "What serial numbers go with what years of scooters?" The next largest question would have to be: "In order to apply for a title my local DMV wants to know what cubic centimeters is my 8hp engine?" To answer the question you first need to know that cubic centimeters (CC's) refers cylinder displacement or volume, and that horsepower is a power measurement (1hp = 550 foot pounds per second). So knowing horsepower is of no value at this point. Now up until the early 70's all engines produced in the U.S. were measured by cubic inches (CI's), but after that everything seemed to

slowly get converted to the metric system. Today whenever we discuss motorcycles it's always in CCs, and we have almost forgotten that when the last Cushman's rolled out of the dealerships the old system was still in place. A minor note here is that it's my contention that sagging tools sales created the metric system. After all with the strange headed nuts and bolts associated with this, I now needed a new set of wrenches, sockets and a bigger tool box to hold them all. So we can all blame Craftsman and the others for this mess, it's my story and I'm sticking to it.

The simplest explanation of how to get CC's is to know the CI's. The easiest way to obtain the CI's is to use the numbers that Cushman gives us in most specification manuals. An example in this case would be the above mentioned 8hp motor. With a 3" bore and 2-3/4" stroke, this M9 engine has a rating of 19.4 Cubic Inches. Remember this number boys and girls, there's a test later. So what we now need is a conversion number, or in other words, one cubic inch is equal to how many cubic centimeters? With this I consulted the highest mind in the universe, "THE INTERNET" and it's never wrong. I tried this with three different sites, and all three use the same number (16.38706) so I will too. It simply works like this: **the cubic inches multiplied by 16.38706 will result in the cubic centimeters.** Now do you remember the number I told you not to forget? That's right it's 19.4, so take that number times 16.38706, or (19.4 CI's x 16.38706 = 317.908 CC's). So the next time you find yourself standing in front of that charming and delightful DMV officer, who's pleasantly asking, "What cubic centimeters is that 1958 Cushman Eagle with the 8hp engine?" Instead of that glassy eyed deer in the headlights look, you can proudly jump up and down waving your arm in the air saying "Ooh, ooh I know that one, it's 318cc ma'am." Try this sometime, trust me they move you thru the line a lot faster.

So if you find yourself mathematically challenged (probably from staring at Betty Ks tight sweater during high school math classes instead of doing the assignments), you can use the conversion tables I made, printed somewhere in this article. This should clear up any confusion you have on this matter (except where Betty K.

CHART A

Model #	Production Years	Bore	Stroke	Horse Power	Cubic Inches	Cubic Centimeters
HUSKY	1937 THRU 1942	2 3/8"	2 1/2"	1.50	11.08	182
HUSKY	1937 THRU 1942	2 5/8"	2 1/2"	2.00	13.53	222
M-6	1949 THRU 1957	2-3/8"	2-3/4"	3.00	12.3	202
M-7	1943 THRU 1957	2-5/8"	2-3/4"	4.00 AND 4.80	14.9	244
M-8	1949 THRU 1956	2-7/8"	2-3/4"	7.30	17.8	292
M-9	1956 THRU 1963	3"	2 3/4"	7.95	19.4	318
M100/109	1961 THRU 1965	3 1/2"	2 1/4"	9	21.50	354
M200/218	1961 THRU ?	3 1/2"	2 1/4"	18	43.16	707

CONVERSION TABLES FROM CUBIC INCHES TO CUBIC CENTIMETERS FOR MOST ALL CUSHMAN ENGINES

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is today). One last word on this subject is that it was pointed out to me before sending this to the editor, that if you bore your engine, you will change the cylinder volume thus changing the CC's. This is true, but even at .060 (the maximum boring done on most scooters) the cubic centimeters would only increase by about 13CC's. Hardly worth mentioning.

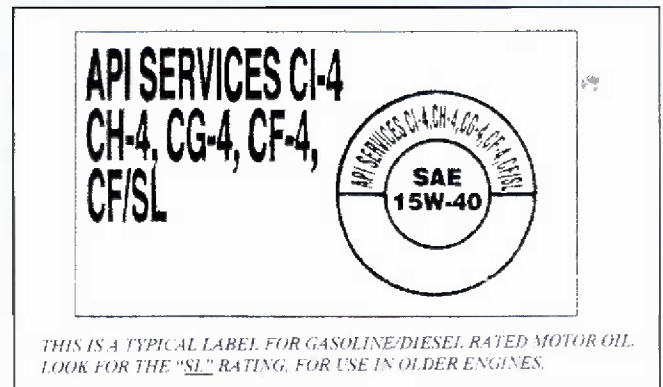
CHART A – The next thing I want to touch on is really a safety issue/warning thing, but before I realized we had a safety officer in the CCOA I already had this in print. The next time I'll defer to Wayne Stephens of Redding, California, club safety is his department. I received a call from Ray Chaik in Cincinnati, Ohio, in regards to the Coker Mfg. reproduction of the Cushman 100 tires (4.75 x 7.75). In order to receive a DOT rating on a tire, Coker is required to have an information sticker applied to each and every one of them. This sticker is approximately 3/8" x 3/8" square, and affixed somewhere on the interior of the tire. On a tubeless situation there is no problem whatsoever, but when a tube is in use the glue that holds the sticker in place tends to eat away at the tube, resulting in a slow leaking and eventually flat tire. Most of the time this is nothing more than a minor leak, without becoming serious. In a few cases it has been known to create a blowout. I have spoken to Darrin Evans at Coker Tire on this subject, and he recommends we inform our members that when installing new tires with tubes, "to remove any and all debris from the inside of the tire including all stickers". There is no recall here, nor is there any reason to contact Coker Tire. The best thing you can do is if you have any Coker tires that are using a tube, at your first opportunity dismount the tires and start over using the instructions above, with a new tube. And finally this sticker situation only affects the tube, not the tire.

Recently I spoke to Buster Tankersley of Georgia about engine oil and its ratings. Buster and I belong to a few antique car clubs, and articles have been published in their periodicals concerning the use of current issue motor oils in older engines. I have one of the articles on my desk, but do not have permission to reprint it so I'll give you the shortest version I can.

Back in the day the vast majority of engines used a flat tappet (lifter) to camshaft system, and Cushman was no exception to this. In order to provide the correct amount of protection for high pressure sliding parts like those mentioned above, a zinc additive was mixed into the oil. This additive commonly called ZDDP was mixed in at the rate of 0.14%. All automotive engines built since 1995 however have generally gone to roller lifters, which has decreased the need for the protective properties of ZDDP. When the EPA started to mandate that car manufacturers warranty the emissions systems separate from the power train/chassis warranties, it was found that the Phosphorus in the ZDDP was shortening the life of the catalytic converters. As far back as the early 90's car makers asked the oil companies to lower the levels of the additive, which they did to about 0.10%. As the EPA kept raising the

number of miles the manufacturers must warranty the emission systems, the makers keep wanting the ZDDP levels lowered even more. With the newest API SM classification (noted on the oil containers label) this reduction is now down to 0.05%. Since the SM rated oils have come onto the market, it has been reported that the "new" oils can cause premature valve train wear problems especially in the cam and lifter area of flat tappet camshafts. Reported problems generally occur during break in or initial start up after a rebuild, and are widespread enough that there is a genuine concern over the type of oil we should be using in these older engines.

The question here is, What are we to do? You could keep an eye out for older oils with an API SL rating or earlier, but most oil manufacturers agree that, even though oil does not have an expiration date its performance does become suspect after about 2 years. You can also use oil that is rated for both gasoline (SL or lower such as SF, SG, SH, etc.) and diesel (something i.e. CH-4) as these oils have higher levels of the needed ZDDP. Without endorsing any particular brand, you could try certain Shell Rotella, Chevron, and even Wal-Mart Super Tech products as well as others. If you are a loyal customer to a certain oil, check on to that companies website and find its specification sheet. It should have the amount of zinc content listed, and 0.14% is the number you want to see.



There are also a large number of specialty oils (Red Line, Royal Purple, etc.) usually labeled as "racing oils". These products are not marketed to meet new car specs, and are in reality just current production of older formulas that contain higher levels of ZDDP. Although I'm not aware of any, there may be some aftermarket additives that claim to have ZDDP in them. Check with your local auto parts store and if you find some let me know. In the mean time try to avoid oil with the SM rating, for use in these older engines.

If you would like to comment on any of this, feel free to e-mail Bulldog9654@netzero.net or (815) 472-3193 after 6 p.m. CST. As always it is my hope that someone is learning from these articles. As for me, I'm learning how to type with more than one finger. See you in Sturgis, SD.

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