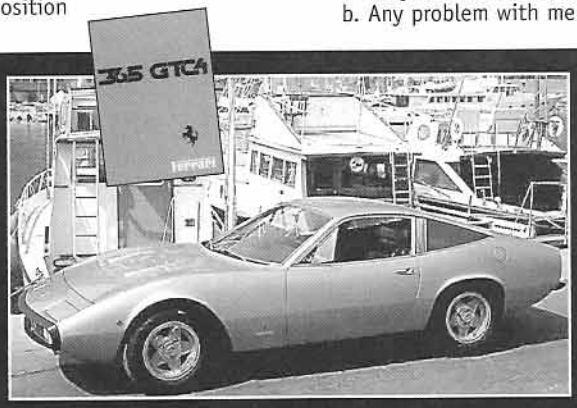
TECH Q&A with Bill Badursky

Q: I'm about to tackle valve adjustment on my '72 365 GTC/4 for the first time. Can I get any guidance on the sequence of removal to get the valve train covers off? I already have the full gasket set. Do the distributors have to come off the back of the cam, or will the covers come off without their removal? If so, is it tricky to get the distributors back on and indexed properly?

A: The distributors don't have to come off. At worst you may have to loosen the lower mounting bolts where the drive attaches to the head. Be sure to remove the upper mounting bolts that go into the cam covers though. If you do have occasion to remove the distributor drives, they have fine tooth splines that engage the back end of the cams. First manually turn the engine to #1 TDC firing position (both cam lobes away from the valves). Remove the distributor caps and mark the top of the housings exactly where the rotors point so you can get them back in the right position. The reason for starting at #1 TDC is so that as you turn the engine over for valve shim replacement, you can go back to the reference point when reinstalling the distributors. I'd recommend using new O-rings on the distributor drives if you take them off, as this is a common source of oil leaks.

Although you didn't ask, the timing chain covers do not have to come off either. It's better that you don't do this, as it's easy to crack the chain case if the chain covers are pried off at any angle other than straight up. When reinstalling the cam covers, make a thin metal shield that can be slipped up against the large O-rings that go between the chain covers and the cam covers. This prevents rolling the O-rings out of position as the cam cover is pressed back down in place.



The 365 GTC/4 took up where the 365 GT 2+2 left off and, thanks to careful interior design, Ferrari succeeded in slotting in two small rear seats, while retaining the more compact dimensions of two-seater coupé bodywork. The V12 engine was slightly detuned compared to the 365 GTB/4 and the maximum revs lowered to render it less high-strung, highlighting its torquey nature and making it more tractable at low speeds. But in true Ferrari tradition, the engine could be wrung out to over 7,000 rpm with ease. Most of the production was sold in the United States.

Q: Thanks a million... I know I'm biting off a big chore, but it seems to be mostly labor intensive, and I've got plenty of time. A few more questions please:

1) Unfortunately, I didn't read your advice about leaving the timing chain covers on until I had removed one side. However, I guess I am at a bit of a loss as to how to remove the cam without taking off the cover. I do notice that there is a circular access plate in the front of the chain cover for each cam.

2) It looks like I would have to remove the chain sprocket from the cam by opening the lock washer and removing the forward nut (this is the exhaust side now..) then remove all camshaft holddown fixtures, and carefully lift out the cam, pulling it forward to come out of the distributor drive?

If so how do I insure that the cam goes back into the distributor drive and reattaches to the drive sprocket at the correct setting for valve and ignition timing?

3) I haven't removed the intake valve covers yet, near as I can tell, there are two bolts in the rear of each which apparently are just the support for the distributor? And, if I remove the distributor cap, looks like I can get to the upper bolt?

4) The gasket set I got from T. Rutledge came as a single large gasket for each cylinder bank, covering both intake and exhaust valve covers. Clearly, there should be a break between, so I assume that the gasket just comes as a single piece to keep its shape, and that I just cut it at the appropriate places?

5) Should I use some black silicon sealant in the few places where gaskets join, such as at the forward and rear ends of the valve covers?

6) currently, I've just removed the exhaust cover on one side - wanted to get some more guidance before continuing. This engine is incredibly clean, looks like it was just assembled! (unknown history, I've had it for about 2000 miles). Most of the exhaust clearances were a good bit too loose .35-.36mm. Do you agree this is enough beyond the limits to dictate removal of the cams and correct shimming?

7) What clearances would you shoot for during an adjustment. The minimum cold clearances (my book says .10-15mm for intake .25-.30mm for exhaust), or somewhere in between?

8) I want to refinish the wrinkle paint on the valve covers, and would like to go a bit beyond the cheap spray cans at Napa. After much searching, I found one place on the 'net, a Maserati parts outfit, www.maseratinet.com, that sells supposedly restoration-quality wrinkle paint in a quart can so I can spray myself.

a. Do you know of any other or better sources?

b. Any problem with me bead blasting the covers before painting?

c. Should I use a primer? If so, any suggestions?

9) Finally, can you suggest a source for valve shims. Is it feasible for a one-time guy like myself to purchase a whole range, or should I just take my time, measure what I've got, and order what I need afterwards?

Many thanks in advance for helping this guy through a rather scary project!

A: The valve adjustment is done with the cams in place. I wouldn't remove the cams as this opens up a new batch of issues about getting back on the right way. The standard practice is to remove the cam covers (watch for the little bolts at the rear from the distributor drives and cover plates), then turn the engine over by hand in the direction of rotation (clockwise from the front) using breaker bar and 36mm socket on crank nose (easier with spark plugs loosened). As each lobe points away from the shim and bucket, record the clearances. Spec is .010" intake and .020" exhaust, with .002" tolerance either way. Any that are out of spec are removed, one at a time. The old shim thickness is measured, then do the math, and install a new shim with the correct difference in thickness. Ted Rutland has a two tool set that will help in getting the shims out. Also a blast of compressed air at the notch in the shim bucket works well to loosen them, either method done with the bucket depressed away from the cam.

The gaskets must be cut, and a few pieces of them are discarded as they are only there to keep the gasket together until used. I use a Sears heater hose cutter, looks like pliers with a razor blade in one jaw. Silicone sealer is useful at the joints in the mating corners. Clearances to shoot for are somewhat dictated by available shim sizes. When you can't hit it exactly, go for the larger end of the range as more is better than less clearance. I've used the standard auto parts store wrinkle black paint with good results. As with any paint, prep is the key. No oil, remove all the loose paint with a wire brush, and bake the freshly painted covers in an oven as directed. You can blast them, but if you've a USA car, remove the thermostatic spring assembly from the right bank inlet cover as particles will collect in it. The ultimate finish is wrinkle powder coating. I done this with the last two overhaul jobs and it looks great and lasts indefinitely.

If you don't have a collection of shims, least expensive way is to make all measurements, remove shims and measure, then put them back in temporarily and get the desired ones for final installation. This makes the job go slower as you've got to remove each one a second time though. Reason for this is that you can damage lobes by turing the engine over with no shim in the buckets. Sharp bucket edges can scrape the lobes, potentially cutting through the hardened surface. If a dealer is near, you can get them there. Used ones are OK as long as the surface doesn't show circular wear marks. Volvo used the same shim, but reports are that they're no less expensive. Again, T. Rutlands has many and will send you what you need.

Let me know if you need more help along the way.