Oil Viscosity & Piston Rings

It has been a long journey for me to accept and appreciate the lower viscosity motor oils. The owners manual and the RockAuto.com catalog tell me to pour 0W-20 into the crankcase, but a little voice inside my head kept whispering the engine would be so happy if I gave it some nice thick 10W-30 instead. Why give my baby skim milk when I can get whole milk for the same price?

It may not help that many engine manufacturers' marketing emphasizes improved fuel economy and emissions rather than engine durability. Motor oil has new jobs such as acting like a hydraulic fluid to operate variable valve timing and cylinder deactivation systems, but were any engineers still paying attention to the engine's lubrication and heat dissipation needs? Had they simply decided to pour lower viscosity oil into the same old crankcase?

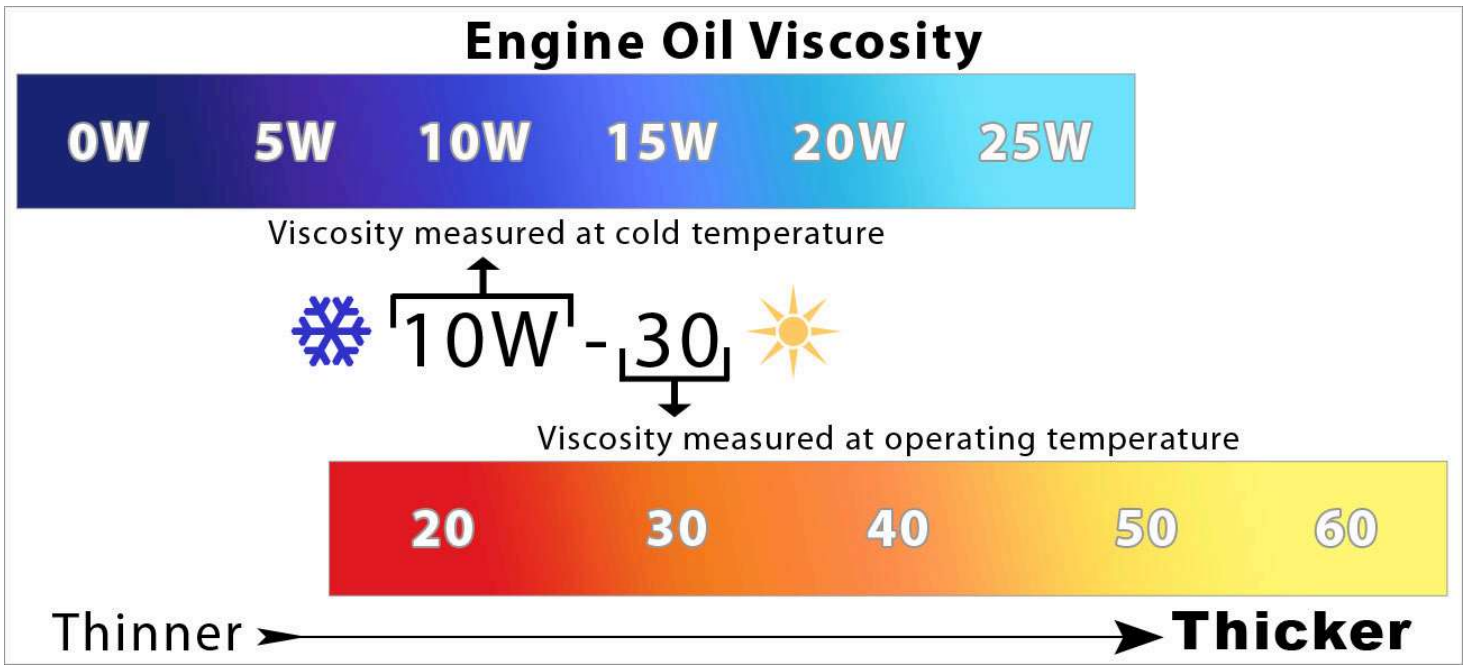
RockAuto often helped reassure me that a new oil viscosity was just one piece of a major engine redesign. The engineers actually were still paying close attention to lubrication, heat dissipation and engine durability. Simultaneously optimizing oil chemistry and engine design is amazingly complex work. For example, the RockAuto.com catalog shows that when Chevrolet switched the Silverado 1500's 5.3L V8 from 5W-30 to 0W-20 in 2014, they also changed the engine's pistons and piston rings. Chevy increased the engine's oil capacity from 5.7L to 8.0L.

The 5.3L's piston oil control rings were designed to have the correct radial width and tension to sweep 0W-20 off cylinder walls as the piston moves up and down. Control rings for 0W-20 are not designed to push around higher viscosity oils. (This is why attempting to reduce oil consumption in an old motor by using a higher viscosity oil does not usually work. If piston rings are too worn to scrape a lighter viscosity oil off the cylinder walls then they may have even less luck scraping a heavier oil off. Higher viscosity oil might actually increase oil blow-by and consumption.)

Typical piston & oil control ring

Increasing the 5.3L's oil capacity by 40% (2.3L) increased the lubrication system's ability to disperse heat and control the level of contaminates. The "W" in 0W-20 stands for winter. A lower number to the left of the "W" indicates the oil provides better (not too thick) lubrication for cold starts. A higher number to the right of the "W" means the oil retains its ability to lubricate (not too thin) and dissipate heat at higher engine temperatures. "30" should be better than "20" at high engine temperatures, but the Chevrolet engineers

figured out that 8L of 0W-20 oil keeps the oil/engine as cool or cooler than "only" 5.7L of 5W-30 in the older 5.3L engines.



I am humbled by all the hard work and brainpower that goes into designing all the systems that together make a great engine. I now feel comfortable always using the owners manual and the RockAuto.com catalog to pick the correct motor oil for my specific vehicles just like I do spark plugs, belts and nearly every other part. (Maybe babies were designed to use skim milk after all? Another reason babies should come with owners manuals and/or there needs to be a RockBaby.com catalog.)

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