

“Oil the News That’s Fit to Print!”

More About The Oil Report!

We had a great response to our first newsletter! Thanks to everyone who passed it along to a friend. One thing we neglected to mention is that there are different versions of this newsletter -- one each for gas/diesel engines, one for aircraft engines, and one for industrial machines. So, if you pass this along to someone who wants to be included on our distribution list, they need to let us know which version they'd like to receive.



In future issues, we are hoping to fill this space with interesting facts about oil or good websites we can recommend. If you have a favorite, please let us know so we can pass the word along.



Spotlight on... Viscosity

by Jim Stark

As a young man growing up, I was part of a large family with parents who tolerated funny business at the dinner table about as well as they tolerated nonsense in church. We kids all had a generous sense of humor, so it was hard to keep a straight face when someone would ask that the butter be passed at dinner. The asker knew to keep his or her thumb out of the way, because the passer would inevitably try to jam the butter into it. This would be done silently, of course, and the resulting contagious giggle soon turned to muffled hilarity that was shared by everyone except by parents. Eyes cast downward, we kids would suffer silently as we were about to burst with laughter.

It can be just as hard to suppress hilarity now that I'm an adult. Reading the information manual for a new single-engine airplane made by a domestic aircraft manufacturer, I was seriously tickled by this statement: "Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to 'break loose' or 'limber' the oil, thus conserving battery energy."

Limber up the oil?

Aircraft oil tends to have so much tradition and folklore surrounding it that it's almost endearing. One of the most misunderstood oil topics is viscosity.

Technically, viscosity is defined as resistance to flow. Commonly, though, we think of it as oil's thickness. To be more specific, it is the thickness of oil at a given temperature. The plot thickens (pun intended!).

The viscosity of an oil could be reported at any temperature, but to standardize things, most laboratories report either a low temp (100F or 40C) or a high temp (212F or 100C) and stick with either Fahrenheit or Celsius. The standardized temperature reading allows us to compare apples to apples for judging the thickness of the oil. At Blackstone we report the viscosity at 210F.

An apple is an apple, no matter what language you use to describe it. In the same respect, there are many ways to describe viscosity: SAE Engine, SUS (Seybolt Universal Seconds), cSt (Centistokes), ISO grade, etc. We use SUS. No matter what you call it, the number given defines the thickness of the oil at the standard high temperature.

Straight Weight vs. Multi-Grade

Engine oil can be either straight weight or a multi-grade viscosity. Originally, all oils were straight weights. Relatively few straight weights are

Elements in Parts Per Million	ALUMINUM	30	10	10	6	3	3	5
	CHROMIUM	180	50	60	4	3	2	4
	IRON	59	37	56	23	25	22	26
	COPPER	3	3	3	3	2	3	5
	LEAD	6691	5499	5841	5513	5092	4382	4490
	TIN1	0	0	0	1	0	1	0
	MOLYBDENUM	0	1	0	1	0	0	0
	NICKEL	3	3	3	3	2	2	2
	POTASSIUM	0	0	0	0	0	0	0
	BORON	0	0	1	1	0	0	0
	SILICON	7	5	4	4	4	4	5
	SODIUM	1	0	0	0	0	0	1
	CALCIUM	1	1	1	1	1	1	4
	MAGNESIUM	0	0	0	0	0	0	0
	PHOSPHORUS	228	215	196	205	215	230	529
	ZINC	2	2	2	2	2	2	6
BARIUM	0	0	0	0	0	0	0	

Properties	TEST	cST VISCOSITY @ 40 C	SUS VISCOSITY@ 100 C	cST VISCOSITY@ 100 C	SUS VISCOSITY @ 210 F	FLASHPOINT IN F	FUEL %	ANTI-FREEZE %	WATER %	INSOLUBLES %
	VALUES SHOULD BE				86-105	>460	<1.0	-	<0.0	0.6
	TESTED VALUES WERE				99.8	515	<0.5	-	0.0	0.8

The high iron and aluminum are from a broken ring (note chromium) that was gouging the cylinder wall and piston. The increased blow-by showed up in the high insolubles and lead. The owner was notified of the problem after the 3/31 sample. In between that sample and the most recent one in June, the engine lost compression in one cylinder. When we called the owner after seeing the 6/3 sample, he already knew of the problem.

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We have three different versions of this newsletter: aircraft, industrial, and gas/diesel engine. Please let us know which one you'd like.

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