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REF: Suspension

Fork Oil

HD Recommendations

- The MoCo specifies HD Type B or E (and respective equivalents) fork oil depending on year model. Below is some general information gathered by XLForum members. However, the actual data on HD forks oils has never been published or verified by HD.
- HD doesn't divulge the highly classified weight of their fork oil. Some say type E is equivalent to 10W, some say it's equivalent to 15W oil or more from other manufacturers. Just keep in mind when changing fork oil, you don't want to mix different used oils together with new oil. Drain and clean all previous oil before installing new oil especially if previous oil is not known.
- HD has, however, confirmed that type B (0-10W) fork oil is lighter than Type E (5-20).¹⁾ That being said, if you want to stay with HD oils, you can mix B and E for an "X" weight of your choice to tune your forks. All HD fork oils are petroleum based, non-synthetic oils.
- Also, the kinematic viscosity (at 40°C [mm²/s = cSt]) was mentioned on the HD site for Type E.^{2) 3)} Mid-point -46, minimum- 41.4, maximum- 50.6 (ISO 3448 Viscosity class ISO VG 46, ISO VG 46 = SAE 15)
- Additional information provided by Tomcatt of the XLForum (through conversation with tech guys at Red Line Oils)
 - Harley Davidson type "B" = 34.3cSt@40°C
 - Harley Davidson type "E" = 39.2cSt@40°C

Aftermarket Fork Oil

- If you want to use aftermarket fork oil besides the HD brand, it's best to start with an oil weight that has been proven to work in most general situations. The general preferred weight of fork oil is 15(W) on the XLFORUM in whatever flavor you like. So, start by using 15(W) oil as noted and test it yourself. Depending on your weight, the bike's weight including add-ons and baggage, shocks and etc., you might swap to a lower weight fork oil for softer or a heavier weight fork oil for stiffer fork action.
- Generally, it's recommended to start with stock oil height. Test ride, if bottoming out, then add oil.

Generally, long forks can add up to 2 oz, short fork 1 oz extra oil.

Anything more than that tends to cause hydro locking, so it is best to add just enough oil to control bottoming, which may be less than 1 or 2 oz.

Generally, if adding more oil than above to control bottoming, (and assuming preload and oil viscosity is correct),

The main spring is too light and needs replacing. ⁴⁾

- It's not recommended to use any less than stock oil levels in the forks.

The less oil, the quicker it will get contaminated and/or break down.

(as well as less resistance to heat build up and more likely to have foaming and cavitation problems)

The minimum oil level that won't start sucking air in to the damper tube is not known. ⁵⁾

- A lubricant's viscosity varies with temperature.

In some areas, the fork oil is already heated up past 100°F by the sun before you start to ride which lowers viscosity and softens the fork action.

Likewise, in the winter months, your forks may never reach up to the low end of the viscosity chart below.

(which keeps the viscosity high thus stiffening fork action)

- Below is a sample list of alternative fork oils and their published viscosities.

Some aftermarket brands include the words "Type E" or "Type B" on their label.

Some may say that's to make you feel like your getting the same quality or "Spec" as HD fork oil. (especially since there are 26 letters in the alphabet and they chose the same two as HD)

After reading through their TDS sheets,

It's obvious that different fork oil manufacturers have a different idea of "exactly" what viscosity that HD "B" or "E" actually is.

Most brands have their own special additives to condition seals, control foaming, oxidation, rust, corrosion and etc.

These additives play their own role in viscosity at certain temperature levels.

- Most of the data came from SDS or TDS as noted but that can be misleading also.

SDS says one viscosity, TDS says something different.

SDS viscosity weights obviously reversed (typo) on some.

Some TDS sheets look to be a cross or makeshift average between a brand's petro and synth weights.

There is incomplete or missing viscosity SDS data....it's enough to make you realize just how tough the oil business' competition is.

It is the intent of this article to fill in all the blanks on the fork oil chart, but what is missing was never written by the company(s) that made the product(s).

- Somewhere in some of the oil SDS data you'll find phrases like:

"The data presented herein is based upon tests and information, which we believe to be reliable." ⁶⁾

"No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet." ⁷⁾

- So viscosity really is a 'buyer beware' subject.

And it's trial and error to fine tune to your specific needs/ wants/ riding style.

The figures on the chart below are subject to change by the respective manufacturers.

And they are meant as a learning tool of what you are actually buying as opposed to what you are being told you are getting.

Check the labels and current SDS/ TDS data before relying on the fact that "this works for the other guy".

Rely on what works best for you regardless of what the data sheets say.

- Many aftermarket companies will publish their data version of Harley Davidson fork oil. Although there may be some truth in their data, there also be a lot of embellishment. Be aware that some of their data is simply tossed around from one site to another (much like rumors go in sewing circles).

The only way for you to actually know the specs on Harley fork oil is for you to have it tested at a reputable lab.

Don't depend on "They" for historical data for your bike.

Fork Oil Viscosity Charts

Viscosity Comparisons

This chart was compiled as an example of different fork oil data as published by the respective manufacturers.

These figures came from the actual respective company's SDS / TDS sheets and are subject to change by them.

See the updated SDS / TDS information from each manuf. before trusting any charts on the internet.

You can also go to the [Widman Calculators online](#) and input your own information to print out a chart.

This helps with missing information not listed in the chart below.

Fork Oil	Nominal	Viscosity cSt	Viscosity cSt	Viscosity	Visual
Brand	Viscosity	@ 40°C (104°F)	@ 100°C (212°F)	Index	Color
Harley Davidson	Type E ⁸⁾	41.14	7.72	160	
Maxima ⁹⁾ (petro)	5wt	16.2	4.41	202	Clear
	10wt	37.4	7.72	182	Clear
	15wt	47.1	8.49	151	Clear
	20wt	71.1	11.28	151	Clear
Lucas Oil (synth)	5wt	25.34	5.5	148	Blue- Green
10) 11) 12) 13)	10wt	42	7.6	153	Blue- Green
	15wt	49.2	8.6	154	Blue- Green
	20wt	77.5	12.4	161	Blue- Green
Red Line ¹⁴⁾ (synth)	"Like Water"	6.24	2.51	365	Clear
	2.5wt	8.96	4.16	507	Light Blue
	5wt	15.87	7.35	512	Yellow tint
	10wt	31.66	13.42	438	Light Red
	30wt	69	17.5	275	Orange tint
Belray ¹⁵⁾	5wt	17.4	4.2		
	7wt	29.3	5.5		
	10wt	36	6.6		
	15wt	52.9	8		

Fork Oil	Nominal	Viscosity cSt	Viscosity cSt	Viscosity	Visual
Brand	Viscosity	@ 40°C (104°F)	@ 100°C (212°F)	Index	Color
	20wt	77.1	10		
	30wt	115.3	13.1		
Amsoil Susp. Fluid ¹⁶⁾ ¹⁷⁾ (synth)	Light #5	15.9	4.4	209	Green
	Med #10	31.8	7.3	206	Blue
Motul ¹⁸⁾ (synth)	5wt	18.1	4	119	Amber
	10wt	36.2	6.1	115	
	15wt	57.2	8.4	119	
	20wt	79.5	10.1	106	
Motorex Racing Fork Oil ¹⁹⁾ ²⁰⁾ (synth)	2.5wt	15.10	4.2	201	Red
	5wt	22.6	5.6	205	
	7.5wt	35.9	7.7	192	
	10wt				
Motorex FORK Oil ²¹⁾ (petro)	SAE 10W/30	68			Yellowish
Castrol Fork Oil (petro) ²²⁾	5wt	15	3.8		Clear & Bright
	10wt	32	6.3	150	Red
	15wt	46			Red
	20wt	68	8.6		Red
	32	32	5.6		Light Yellow
Castrol Fork Oil (synth) ²³⁾	2.5wt	16.5	4		Red
	5wt	28.1	5.7		Red
	10wt	42	7.5	150	Red
Spectro fork oil ²⁴⁾ (petrol)	5wt	21.7			
	10wt	33.3			
	15wt	47.2			
	20wt	72.7			
Spectro Golden Cartridge ²⁵⁾ (synth)	5wt	16.2	3.5	150	
	7.5wt	26	4.5	150	
Spectro Platinum SX400 ²⁶⁾ (synth)	2.5wt	9.2			Clear

PJ1 Fork Oil (petrol) ²⁷⁾ (Highly refined mineral oil (C15-C50) is 70-99% weight) Synthetic anti-seal swell additive added. Says they are all of High Viscosity Index and Light Red in color. No viscosity weights are published however even in SDS. As a matter of fact PJ1 has the same SDS data sheet (for and that includes) 6 different weights although they publish that they have 8 different weights. Meets or exceeds OEM is published

HD Compared to Redline

Independent testing (not affiliated with Harley Davidson) was done on HD Type E fork oil. ²⁸⁾

Based on the data from that testing, the chart below was created using the [Widman "Graph your oils"](#) web page.

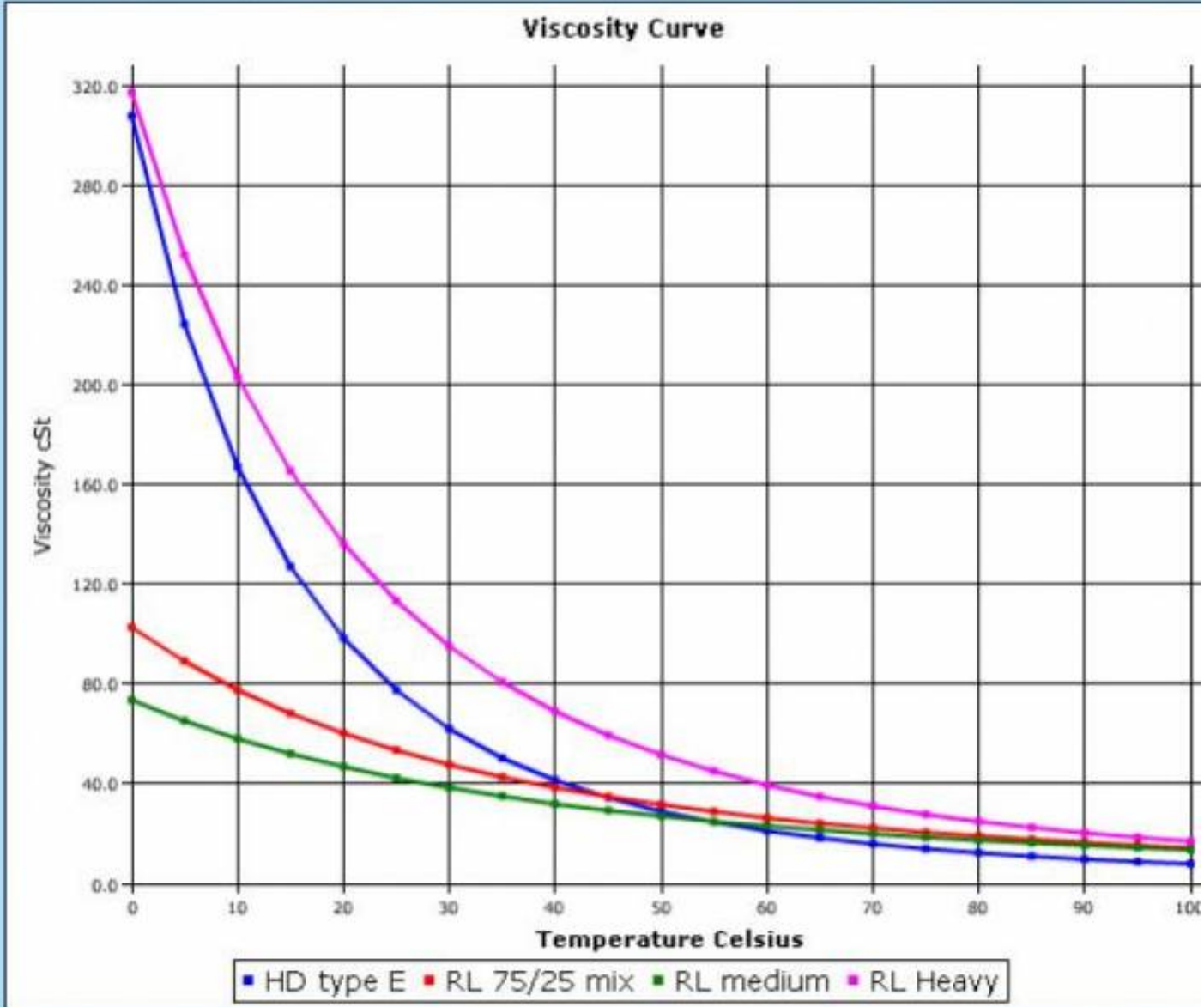
The chart is a comparison of HD Type E, Red Line Medium, Red Line Heavy and the 75% RL Medium / 25% Red Line Heavy fork oils.

Temperatures from 0C / 32F to ~ 50C / 122F (the data on the web page goes up to 80C).

You can see clearly how the higher (442) viscosity Index of the Red Line Medium fork oil changes viscosity less at colder temp.

This should give a more consistent suspension at lower temps. Again, trust your own results / testing.

	Oil 1	Oil 2	Oil 3	Oil 4	Temperature
Product Name	HD type E	RL 75/25 mix	RL medium	RL Heavy	Minimum (Celsius)
Viscosity cSt at 40°C	41.4	38.5	32.0	69.0	0
Viscosity cSt at 100°C	8.0	14.4	13.6	16.9	



Temperature	0	5	10	15	20	25	30	35	40	45	50	55
HD type E	307.6	224.2	167.0	127.0	98.4	77.5	62.0	50.4	41.4	34.4	29.0	24.6
RL 75/25 mix	102.8	89.1	77.7	68.2	60.2	53.4	47.7	42.7	38.5	34.8	31.6	28.8
RL medium	73.5	65.2	58.1	52.1	46.8	42.3	38.4	35.0	32.0	29.4	27.0	24.9
RL Heavy	317.0	252.0	202.9	165.3	136.2	113.3	95.2	80.7	69.0	59.4	51.6	45.0

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1)

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-suspension-frame-forks-handlebars-fuel-tank-oil-tank-fenders/173599-2014-xl1200t-suspension/page8?t=1863121&page=8>

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independent testing not affiliated with Harley Davidson - shanneba of the XLFORUM

<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-suspension-frame-forks-handlebars-fuel-tank-oil-tank-fenders/196462-what-is-harley-type-e-fork-oil?postcount=1#post5740911>

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17)

Amsoil med 10 <https://www.amsoil.com/msds/stm.pdf>

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chart by shanneba of the XLFORUM

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