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For those of you just entering 1:8 scale racing. Just a little story about shock-fluids.

In the beginning of the 80's cars were equipped with small shock absorbers 1/4 of the current size. The shock fluid used was normally a kind of transmission oil. These oils always changed in viscosity (thickness) during use and temperature and a stable shock oil was not there. Therefore all kinds of products were tried. Even STP oil was used, you then had to warm up your shocks before racing with a hair dryer before you could use them. Fortunately silicone oil was introduced in the mid 80's. This type of oil has a better constant viscosity over a wider temperature range than other fluids but still is not complete temperature stable!

The thickness of the oil is officially rated in Centi Stokes "Cts".

An other known and used American rating is WEIGHT "WT".

This WT or W rating is a non world standard and is introduced by Associated and not comparable between brands using this W or WT rating.

Thanks to Casper who found this remark on the net about SAE WT:

"Correct measures of viscosity are centi-stokes, N/m², or poises, depending on how you define it.

SAE WT is not really a measure of viscosity. The SAE scale was designed for classifying motor oils. For example SAE 30/40 means that the viscosity is one value (30) at one temperature and an equivalent (40) at the engine running temperature. When the number has WT after it this means "winter" so that the oil will have a particular value at I think 0 degrees Celsius.

The main problem with using the SAE scale oil is that each SAE band can encompass a large variation in viscosity. For example one manufacturer's SAE 5 can be another's SAE 10 and both are within limits. Using the SAE scale oil is best only to compare one manufacturer.

An other story about WT thanks to [Frédéric De Behr](#) who found this on Wikipedia.

"Single-grade, or monograde motor oil

For single-grade oils, the kinematic viscosity is measured at a reference temperature of 100°C (212°F) in units of mm²/s or the equivalent older non-SI units, [centistokes](#) (abbreviated **cSt**). Based on the range of viscosity the oil falls in at that temperature, the oil is graded as an SAE number 0, 5, 10, 20, 30, 40, 50, 60 or 70. The higher the viscosity, the higher the SAE grade number is. These numbers are often referred to as the **weight** of a motor oil. The reference temperature is meant to approximate the operating temperature to which motor oil is exposed in an engine"

So, clearly, "weight" is not a measure, just a chart, and the measure is the ISO cP viscosity or cST dynamic viscosity (at specific temperatures !), then you compare it to the SAE table. Some charts are referenced by Wikipedia.

Concerning Cts the thinner the oil (fluid) the lower the number, the thicker the oil the higher the number.

For normal shock absorber use, this rate may vary between 100 Cts until 900 Cts.

Nowadays we use O-ring sealed differentials, so we can use silicone oil in the differentials instead of thick grease.

For differentials the rate may vary between 1.000 Cts (loose) up to even 500.000 Cts (very, very, stiff).

Some USA based companies are still using the "WT" weight rating, where Japanese and European companies use the better linear industry standard Centi Stokes rating. A lot of people think that the ratings between the "WT" and "Cts" ratings are linear but this isn't the case.

If there is a factory that can provide oil for testing we can arrange this to see if the product reaches the specification claimed or convert to Cts!

Which manufacturer use which rating?

Which manufacturers you can use same rating oil?

Only manufacturers using Cts as rating are using a world standard and can be mixed used.

Other ratings like W and WT differ from brand from brand as WT or W is not a world standard!

Brand	shock oil		
	bottle values	label rating	linear values in Cts
Kyosho	100 - 900	numbers	yes
Mugen	100 - 900	numbers	yes
Associated	10 - 80	WT	no
Losi	10 - 100	WT	no
Orion	10/100 - 80/800	numbers	no
Xray	100 - 900	numbers	yes
GS-Racing USA	20 - 60	WT	no
GS-Racing Europe	200 - 900	Cts	yes
Crono	?	?	?
Serpent	20 - 50	W	no
Thunder Tiger	?	?	?
Trinity	?	?	?

Brand	differential oil		
	bottle values	label rating	linear values in Cts
Kyosho	1.000 - 60.000	numbers	yes
Mugen	1.000 - 60.000	numbers	yes
Associated	not available	not available	not available
Losi	not available	not available	not available

Silicone shock and differential oil and ...

Orion	not available	not available	not available
Xray	1.000 - 60.000	numbers	yes
GS-Racing USA	1.000 - 50.000	Centipoise Cts	yes
GS-Racing Europe	1.000 - 50.000	Centipoise Cts	yes
Crono	?	?	?
Serpent	not available	not available	not available
Thunder Tiger	?	?	?
Trinity	not available	not available	not available

If you have better information let us know

For shock absorber use, this is the comparison table when using LOSI, ASSOCIATED and SERPENT some others silicone oil rated in "WT" "W" or are not labeled with a rating but just a number like 30/300

unofficial conversion values provided by Gene Hickerson USA		
Cts	Losi WT	Associated WT
100	10	7.5
150	15	12.5
200	20	17.5
275	25	22.5
300	27.5	25
350	30	27.5
400	32.5	30
425	35	32.5
450	37.5	35
500	40	37.5

The 50 Cts steps between "Cts" rating are linear, where the 5 "WT" steps used in the "WT" rating are progressive compared to the real thickness of the oil.

No one can tell TEAM TWF8 how "WT" OR "W" rating is measured!!!! **If you know it let us know! info@twf8.ws**



Serpent oil (04-01-2005)	
rating W	Cts
20	107
25	207
30	370
35	626
40	1070
45	1449
50	2250

We tested this oil supplied by [Serpent Benelux](#) on 04-01-2005 in our laboratory and compared them with a calibration oil of 100 Cts.

Conclusion:

[Serpent](#) oil is way of linear with Cts rating



Xray silicone oil with Rheometer 09-10-2005	
Rating	Cts
100	106
150	179
200	248
250	292
300	354
350	381
400	441
450	475
500	542
600	625
700	702
800	799
900	913
1.000	1020
Differential usage	
2.000	2490
3.000	4270
5.000	9000
7.000	10500
10.000	13000
20.000	30000
30.000	39600
60.000	65000

Use the values above for your benefit and as a guideline.
Xray oil provided by [TEAM Xray](#) Slovakia



Kyosho	
rating	Cts
250	244
300	302
350	351
400	411
500	506

Use the values above for your benefit and as a guideline.

Associated silicone oil measured with Rheometer 09-10-2005	
rating WT	Cts
10	108
15	...*
20	208
25	286
30	373
35	454
40	525
50	707
60	725
70	960
80	1040

Use the values above for your benefit and as a guideline.

* The value 15 Weights we measured was like water thickness and is probably a filling fault at the factory. Although the contents was silicone oil it was too thin for the 15 WT specs and can not be used for the shocks. Associated oils were provided by Kendall Bennet from [A-manhobbies](#) and Tony Penzacka from [Tony Screws](#)

Trinity silicone oil measured with Rheometer 09-10-2005	
rating	Cts
30	337
35	376
40	505
45	497
50	658
55	568
60	799
70	757
90	974

Use the values above for your benefit and as a guideline.

Trinity oils were provided by Kendall Bennet from [A-manhobbies](#) and Tony Penzacka from [Tony Screws](#)

Losi silicone oil measured with Rheometer 15-12-2005	
rating	Cts
15	110
17.5	158
20	243
22.5	243
25	294
27.5	345
30	381
32.5	397
35	459
37.5	477
40	546
45	657
50	886
60	844
70	970

Use the values above for your benefit and as a guideline.

Losi oils were provided by Volker Gerdes from [BUGGY-SPORT.INFO](#)

The only and correct way to measure fluid thickness or to say viscosity is to measure the flow of fluid itself in certain time trough a hole. Simple!

So we do not weigh the weight of the oil as this is a standard value that does not change when the viscosity changes!





A special calibrated measuring device called "Ubbelohde" is a U-tube that contains a certain amount of fluid (in our case the silicone oil). The diameter of the tube and the diameter of the hole where fluid goes through is always constant and calibrated. The thicker the fluid the longer it takes to get a certain amount through. The time the passing of the fluid takes and the known diameter of the hole can produce the figures we need called viscosity.

How does the measurement works?

A vacuum sucks the oil that is in the bottom of the tube up into the front tube. As soon as the top fluid level of the fluid has passed the top (HIGH) sensor the vacuum drops automatically and the oil starts to flow back. A timer is started automatically. As soon as the the fluid level passes the other sensor (LOW) the time counting is stopped! The time it takes for the level to go from the high to the low sensor is the time we need to calculate the viscosity of the fluid.

As we know the amount of oil, the time it takes and the diameter of the calibrated hole we can calculate the viscosity in mm^2/s . Then we have the viscosity in Centistokes value.

Centi Poise (nowadays called Pascal per second) is the result of the Centistokes value magnified with the density of the oil.

Normally for silicone oil this value is 0.9875 = almost 1.0

To perform the whole measurement accurate and constant we have to calibrate the whole system first. Normally this is done when the tube is placed in a water bath that is keeping the whole measurement set up on same temperature @ 22 degrees Celsius for the whole measurement. A calibration fluid is used to check if the reading is correct or need to be adjusted before the real measurement takes place.

Then the tested oil is placed into the tube and the test is performed. As not all oils are the same in viscosity, there are different tubes with a calibrated hole to get the appropriate and corresponding readings.

From September 2006 we measure all oils with a RHEOMETER.

SILICONE SHOCK OIL AND TEMPERATURE

Although everybody thinks silicone oil is not affected by temperature, we can wake you up out of that dream.

When the same test is done @ 12 or @ 32 degrees Celsius we get other values!

Test result from our laboratory provid us with the following fist rule:

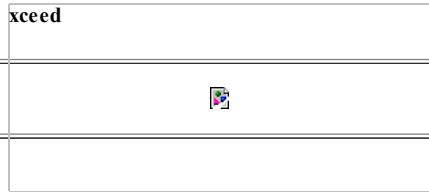
When temperature is 10 degrees Celsius lower or higher the viscosity decreases or increases by 5%. Example:

200Cts @ 12 degrees Celsius is 210 Cts

200Cts @ 22 degrees Celsius is 200 Cts

200Cts @ 32 degrees Celsius is 190 Cts

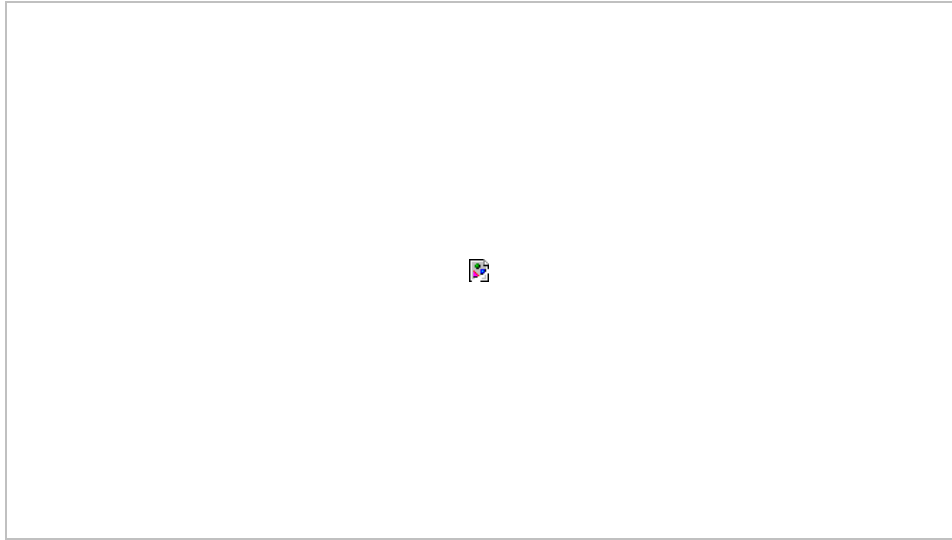
Silicone shock oil measured in Centistokes at various temprature in Degrees Celsius			
Shock oil temperature	Losi 40	Trinity 40	Associated 40
5	754	688	747
10	677	622	685
15	605	555	598
20	539	492	536
25	501	467	502
30	455	420	456
35	409	377	410
40	373	345	375
45	345	320	346
50	319	294	319



Xceed RC just released a full range of silicone oils for use in geardiffs and shocks.

High quality lab-checked and verified silicone oil. Packed in 50ml easy squeezable bottles, with special top for precision filling of shocks and diffs.

Available now, range 300cst up to 200.000cst in total 13 grades.



TWF8 inhouse chemical analist, Jacco Koch, tested the consistency of the total range.

value	cSt
300	332
350	385
400	445
450	488
500	565
550	610
600	675
700	765
800	872
900	974
1000	1090
1200	1330
1500	1700
2000	2290
3000	3290
5000	6000
7000	8370
10000	11400
12000	13900
20000	24000
30000	35000
40000	41500

50000 49900
 60000 57300
 80000 79000
 10000099300
 200000192000

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Ultimate rc shock oil

Ultimate Racing brand was created in 1999 by Modelix Racing with the main goal in mind of offering high quality alternatives and solutions to the 1/8th nitro racers, with the advantage that has been designed by experienced racers. After a few years, Ultimate Racing has become a brand synonymous with racing in the 1/8th scale nitro market.

The distinctive feature of the Ultimate Racing products is that have been designed with both professional racers and beginners in mind, so the result is a wide range of high competition products that can also be easily used by beginners.

value	cSt
10	108
15	159
20	230
25	286
30	352
35	388

40 436

50	536
55	673
60	710
65	845
70	818
75	825
80	870
85	928
90	975
95	1100
1000	1130
2000	2270
3000	2790
4000	4250
5000	5660
6000	7140
7000	8500
8000	9660
9000	10500
10000	12000
12500	14000
15000	16000
20000	23100
30000	31700
40000	43400
50000	55300
60000	63300
100000	97300

Team TWF8 special thanks goes to Jacco Koch our Chemicals specialist from The Netherlands for testing the fluids and the pictures.

[Click here and see how to mix your silicone shock and diff oils in the right percentages.](#)