

# Using a Coolant Refractometer to measure coolant system dilution

## What is a Refractometer used for?

A coolant refractometer is used to measure the freeze point of ethylene or propylene glycol based coolants including Delo<sup>®</sup> XLC.

## Refractometer Key Components

- 1 - Daylight Plate (also known as Prism Cover)
- 2 - Prism
- 3 - Zero Adjustment Screw
- 4 - Mirror Tube
- 5 - Eyepiece

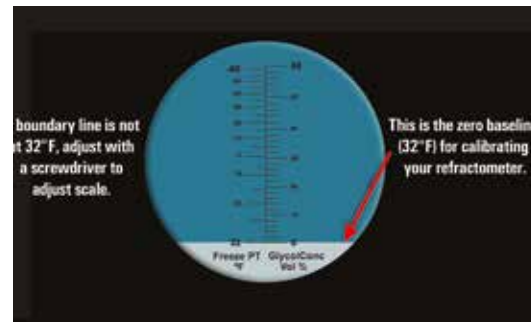


## How to Calibrate a Refractometer

Step 1 - Place 2 to 3 drops of distilled water on prism surface and press cover down lightly.

Step 2 - Aim refractometer in direction of light and look through the unit eyepiece. Adjust eyepiece ring until the correct focus is obtained. Observe the light/dark boundary and ensure it coincides with the zero baseline (32°F/0°C for distilled water).

Step 3 - If not at zero baseline, use the screwdriver supplied in the kit to adjust. Turn the scale adjustment screw until the light/dark boundary coincides with zero baseline (32°F/0°C).



# How to measure Delo® XLC

Step 1 - Take coolant sample from truck radiator.

Step 2 - Place 2 to 3 drops of coolant to be tested onto prism surface and press cover down lightly.

Step 3 - Aim refractometer in direction of light and look through the unit eyepiece. Record the reading.  
For Delo® XLC read the scale directly for either glycol vol% or freezing point °F/ °C.



If coolant is outside the freeze point range of -20°F (-29°C) to -60°F (-51°C) utilize the conversion charts below to take corrective action based on whether the system is **OVER** concentrated with coolant or **UNDER** concentrated with coolant.

OVER CONCENTRATED

FREEZE POINT ADJUSTMENT CHART FOR OVER CONCENTRATED SYSTEMS

(Use this chart to adjust your freeze point up to -35°F)

FREEZE PROTECTION OF SAMPLE MIXED 50/50 WITH WATER (°F)	%AF IN COOLANT	TOTAL COOLANT SYSTEM VOLUME									
		26-L	30-L	34-L	38-L	42-L	45-L	49-L	53-L	57-L	61-L
VOLUME TO DRAIN AND REPLACE WITH DEIONIZED WATER											
+10	50	0	0	0	0	0	0	0	0	0	0
+7	55	3	3	3	4	4	5	5	5	6	6
+5	60	5	5	6	7	7	8	9	9	9	9
0	65	7	7	9	9	9	10	11	12	13	13
-5	70	8	9	10	10	12	13	14	15	16	16
-6	75	9	10	11	12	14	15	16	18	19	19
-12	80	10	11	13	14	16	17	19	20	22	22
-18	85	11	12	14	16	17	19	21	22	24	24
-23	90	11	13	15	17	19	20	22	24	26	26
-29	95	12	14	16	18	20	22	24	26	27	27
-35	100	13	15	17	19	21	23	25	26	29	29

If refractometer reading is off scale or shows a freeze point for the sample lower than -62°F, use the chart above to adjust the freeze point to -35°F. To do this, take the coolant sample and dilute it 50/50 with water. Take a new refractometer reading, and match this value to the reading under the "Freeze protection of sample mixed 50/50 with water" column. Determine your cooling system volume, and based on the chart above, drain the recommended amount of coolant and replace that volume with water. Recheck freeze point.

USE REFRACTOMETER TO CHECK FREEZE PROTECTION
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**Add deionized water for OVER Concentrated coolant systems**  
- see chart above

UNDER CONCENTRATED

FREEZE POINT ADJUSTMENT CHART FOR UNDER CONCENTRATED SYSTEMS

(Use this chart to adjust your freeze point down to -35°F) For use with ethylene glycol based fluids.

TESTED FREEZE PROTECTION (°F)	%AF IN COOLANT	TOTAL COOLANT SYSTEM VOLUME									
		26-L	30-L	34-L	38-L	42-L	45-L	49-L	53-L	57-L	61-L
VOLUME LISTED SHOULD BE DRAINED AND REPLACED WITH DELO® XLC Premixed 50/50											
25	10	23	26	30	34	38	40	43	47	51	51
20	16	21	25	28	30	34	36	40	43	45	45
15	21	19	23	25	28	30	34	36	40	42	42
10	25	17	21	23	25	28	30	32	36	38	38
5	29	15	17	21	23	25	26	28	32	34	34
0	33	13	15	17	19	21	23	25	26	28	28
-5	36	11	13	15	17	19	21	21	23	25	25
-10	39	9	11	11	13	15	17	17	19	21	21
-15	42	8	8	9	11	11	13	13	15	15	15
-20	44	6	6	8	8	9	9	11	11	11	11
-25	46	4	4	6	6	6	6	8	8	8	8
-30	48	2	2	2	4	4	4	4	4	4	4

Using a refractometer, measure freeze point of coolant, match reading with a value under the "Tested Freeze Protection" column. Determine cooling system volume, and using chart, determine volume of coolant to drain from cooling system. Replace drained volume with Delo® XLC Premixed 50/50.

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**Add Delo® XLC Concentrate\* for UNDER Concentrated coolants systems**  
- see chart above