

DESCRIPTION AND USAGES:

Almost every lubricant used in plants today started off as just a base oil. The American Petroleum Institute (API) has categorized base oils into five categories (API 1509, Appendix E). The first three groups are refined from petroleum crude oil. Group IV base oils are full synthetic (polyalphaolefin) oils. Group V is for all other base oils not included in Groups I through IV. Before all the additives are added to the mixture, lubricating oils begin as one or more of these five API groups.

GROUP I

Group I base oils are classified as less than 90 percent saturates, greater than 0.03 percent sulfur and with a viscosity-index range of 80 to 120. The temperature range for these oils is from 32 to 150 degrees F. Group I base oils are solvent-refined, which is a simpler refining process. This is why they are the cheapest base oils on the market.

SPECIFICATION OF GROUP 1 BASE OIL.

				SN 65	SN 70	SN 150	SN 500	BS 150
SL.NO	Parameter	Method	Unit	Result	Result	Result	Result	Result
1	Flash point	ASTM D92	°C	Min 170	Min 174	Min 200	250	Min 250
2	Pour point	ASTM D97	°C	Max - 6	Max - 6	Max - 3	-3	Max - 3

3	Density at 15 °C	ASTM D1298	Kg/l	0.85	0.85	0.878	0.8947	0.901
4	Viscosity @40°C	ASTM D445	cSt	Min 8	Min 8.5	Min 29.4	110	Min 450
5	Viscosity @100°C	ASTM D445	cSt	Min 2.28	Min 2.3	Min 5	11.73	29.5
6	Viscosity Index	ASTM D2270	-	Min 90	Min 90	Min 92	94	Min 90
7	Color	ASTM D1500	-	Max 0.5	Max 1.0	Max 2	L 2.5	Max 4
8	Odor	Organoleptic	-	-	-	-	No Foul smell	-
9	Appearance	Visual	-	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright

GROUP II

Group II base oils are defined as being more than 90 percent saturates, less than 0.03 percent sulfur and with a viscosity index of 80 to 120. They are often manufactured by hydrocracking, which is a more complex process than what is used for Group I base oils. Since all the hydrocarbon molecules of these oils are saturated, Group II base oils have better antioxidation properties. They also have a clearer color and cost more in comparison to Group I base oils. Still, Group II base oils are becoming very common on the market today and are priced very close to Group I oils.

				N 150	N 500	N 600
SL.NO	Parameter	Method	Unit	Result	Result	Result
1	Flash point	ASTM D92	°C	Min 200	Min 242	Min 245
2	Pour point	ASTM D97	°C	-3	Max -12	Max - 12
3	Density at 15 °C	ASTM D1298	Kg/l	0.878	0.87	0.87
4	Viscosity @40°C	ASTM D445	cSt	Min 29.4	Min 110	Min 110.5
5	Viscosity @100°C	ASTM D445	cSt	Min 5	Min 11	Min 11.6
6	Viscosity Index	ASTM D2270	-	Min 92	Min 95	Min 95
7	Color	ASTM D1500	-	Max 2.0	L 0.5	L 0.5
8	Odor	Organoleptic	-	-	-	-
9	Appearance	Visual	-	Clear & Bright	Clear & Bright	Clear & Bright

GROUP III

Group III base oils are greater than 90 percent saturates, less than 0.03 percent sulfur and have a viscosity index above 120. These oils are refined even more than Group II base oils and generally are severely hydrocracked (higher pressure and heat). This longer process is designed to achieve a purer base oil. Although made from crude oil, Group III base oils are sometimes described as synthesized hydrocarbons. Like Group II base oils, these oils are also becoming more prevalent.

SL.NO	PARAMETER	METHOD	N 100	N 150	N 250
1	Flash point	ASTM D92	224	238	248
2	Pour point	ASTM D97	-15	-12	-12
3	Density at 15C	ASTM D1298	0.8344	0.8425	0.8454
4	Viscosity @40°C	ASTM D445	19.39	34.96	44.81
5	Viscosity @100°C	ASTM D445	4.23	6.315	7.409
6	Viscosity Index	ASTM D2270	125	132	130

7	ASTM Color	ASTM D1500	L0.5	L0.5	L0.5
8	Odor	OI Factor	Marketable	Marketable	Marketable

GROUP IV

Group IV base oils are polyalphaolefins (PAOs). These synthetic base oils are made through a process called synthesizing. They have a much broader temperature range and are great for use in extreme cold conditions and high heat applications.

BASE OIL - GROUP V

Group V base oils are classified as all other base oils, including silicone, phosphate ester, polyalkylene glycol (PAG), polyolester, biolubes, etc. These base oils are at times mixed with other base stocks to enhance the oil's properties. An example would be a PAO-based compressor oil that is mixed with a polyolester. Esters are common Group V base oils used in different lubricant formulations to improve the properties of the existing base oil. Ester oils can take more abuse at higher temperatures and will provide superior detergency compared to a PAO synthetic base oil, which in turn increases the hours of use.

Remember, whichever base oil you choose, just be sure it is appropriate for the application, temperature range and conditions in your plant.