

## Base oil blends to meet the new demands of the lubricant industry

The base oil industry has been going through fundamental changes in the last years. These changes have been marked by the rapid growth in capacity for Group II and Group III base oils, while the availability of Group I oils has decreased considerably.<sup>[1-3]</sup> By looking at base oil production statistics for the last two years, it can be appreciated how paraffinic Group I production went from being 60% of the total in 2010 down to 54% in 2012, a difference of more than 52000bpd in only two years, while Group II and Group III base oils experienced an increment of more than 41000bpd and 19000bpd respectively during the same period. Projections over the demand-supply situation of the base oil industry to 2020 reveal that new Group II, III and GTL capacity will largely exceed the global demand, which is expected to grow at an average of 0.5-1.5%. This will result in more consolidations in the base oil industry in the

future, and with higher production costs and a shrinking market, more Group I refineries will likely close to compensate for new Group II and III capacity.<sup>[4]</sup>

A consequence of these changes is that the offering of the base oil industry is no longer optimised for the industrial lubricant industry requirements. These requirements are generally defined in terms of products that have high viscosity and/or high solvency. One look at the maximum viscosity that can be obtained from a Group I, II and III refinery, shows that Group II refineries can produce products with a maximum viscosity of around 100cSt at 40°C or what is known as heavy neutrals; and that the yield on those products is much lower than that in Group I refineries (20% for Group II as opposed to 33% for Group I).<sup>[4]</sup> Moreover, neither Group II nor Group III refineries can produce Bright stocks.

Another consequence of the shift from Group I to Group II and III base stocks is a loss in solvency of the products, by reducing the aromatic content from around 10% for paraffinic Group I oils to <1% for the hydrocracked paraffinic oils (Group II and Group III), the solvency power of the oils is drastically reduced.

This has serious consequences in industrial applications where high solvency is required either because of a high additive load in the formulation, or because the lubricant is expected to keep the machinery free from deposits and to dissolve contaminants. It is important here to remember that the use of the aromatic content as an indication of solvency works only between similar oils (like in this case paraffinic based), and that naphthenic oils are available at different refining degrees and aromatic contents ranging also from around 10% to below 1%,

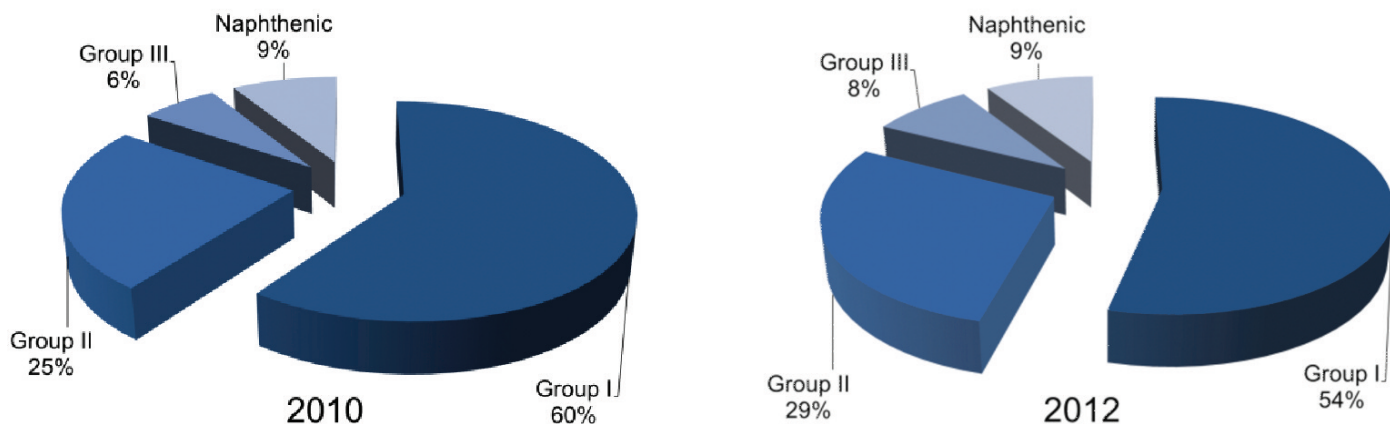


Figure 1. Base oil production 2010 -2012. (Source: Lubes'N'Greases)