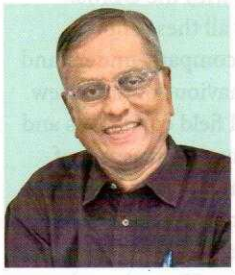
"WE HAVE THE TECHNOLOGY FOR BS-IV STAGE AND CAN GO FOR IT AS AND WHEN REQUIRED BY THE MARKET HERE."

- Dimitrov Krishnan,
Vice President and Head, Volvo CE India



"EMISSION LEGISLATION CALLS FOR NEW TECHNOLOGY LUBRICANTS."

- NC Sekharan,
Vice President - Direct Business, Raj Petro Specialities

He adds, "The process of cleaning the diesel fuel by filtering out dirt and dust particles and the total removal of suspended water, followed by treating the cleaned fuel with both lubricity improver and cetane improver additives in recommended dosage levels, is sure to improve the operating conditions of all diesel-driven machines involved in mining and construction, and greatly reduce both maintenance and operating costs."

Krishnan comments on the diesel fuel quality available in the market today, "I think there is big a difference in the fuel quality issues 10 years ago and what we have today. At the refinery level, the fuel quality is not an issue at all. The issue has been in terms of distribution. But the distribution quality has also been increased. The awareness level among users has also increased. The use of bad fuel will lead to breakdown of the machine and the cost of repair is extremely high. So the user community has also upgraded the way it handles fuel." Krishnan says that according to government agencies, for the next stage of emission compliance (2020-21), fuels with the required specifications will be made available by 2018-19, much before the implementation of the next level of emission norms.

Role of lubricants

It is the sulphur content in diesel fuel that provides its inherent lubricity which is required to keep the wear of the intricate internal parts of the fuel injection system under check. With the drastic reduction of sulphur in diesel fuel caused by the progressive legislation on engine exhaust emissions which have the control of particulate matter as the main objective, the lubricity of the diesel fuel also tends to reduce. This progressive reduction of fuel sulphur, although highly beneficial for the control of diesel particulate matter such as Respirable Suspended Particulate Matter (RSPM), unfortunately tends to severely affect the wear of the fuel injection system and the engine. Thus the need for supplementing the lubricity properties of the diesel fuel by doping it with a lubricity improver additive becomes quite important. However, Mathur says, "Lubricants have a limited role in emission compliance, as lubricants do find themselves in the combustion chamber due to the clearance between piston and piston rings. In case there is complete sealing of the rings, then the role is reduced."

"Recent studies suggest that trace metals emitted by internal combustion engines are derived mainly from combustion of lubrication oil. The organic carbon and metals present in the lubrication oil have a major role on the particle formation and the exhaust aerosol produced thus making it important for them to be emission compliant," says Khemka.

Oil companies are making better and improved quality of lubricating oils. As of now, oil in diesel engines being used is API-CI-4 type of oils (India 205-2017); however, the future is with the API-CJ-4 and API-CK-4 variants. These oils are specially blended, keeping in view the emission standards requirement of BS-V and BS-VI.

Sekharan explains, "Higher levels of emission compliance involve major modifications to the engine design and the use of new technologies, as well as the use of after-treatment devices, which are very sensitive to the chemistry of lubricants. So, new chemistry is needed. The lubricant itself is now required to demonstrate additional robustness in terms of lower volatility and improved thermo-oxidative capabilities, so higher quality base stocks are required. Emission legislation calls for new technology lubricants and they tend to play a crucial role in ensuring the emission compliance of the engine."

Emission compliance and fuel efficiency

According to Khemka, emission

compliance and fuel economy are intertwined with many associated vehicle characteristics, which include, but not limited to; drivability, performance, costs, octane number and the fuel economy/exhaust emission control technology. "While the fuel economy has increased and emissions decreased over time, it need not necessarily imply that the emission control is a causal factor in fuel economy increase, as many other factors such as the weight and engine size, type, performance and displacement, axle ratio etc. So, the net effect on fuel economy of a given emission standard depends on the combination of control techniques used by the manufacturer of the equipment to achieve the compliance. There are examples in the past where reducing the emissions increase the fuel economy but this need not always be true and depends upon other aforementioned factors as well," he comments.

Although emission compliance and fuel efficiency appear somewhat related from an emissions viewpoint, they are actually driven by very different concerns, according to Sekharan. He says, "Exhaust emission legislation deals with the permissible levels of atmospheric pollutants like particulate matter and oxides of nitrogen, which cause immense damage to human health." Fuel economy norms are normally intended to control the emission of CO_2, which tends to contribute significantly to global warming and climate change. One of the major challenges of modern engine oil technology and the target of the latest global specs is to combine these two aspects and develop new engine oil technologies that will work well in low emission engines and also help in the abatement of CO_2 emissions.

Currently the Government of India has legislated fuel economy/CO_2 emission norms for passenger cars from April 1, 2017. We should expect that in the future, commercial vehicles, followed by off-highway engines, will be subject to increasing pressure on CO_2 emissions. In response to the intensifying concerns of both clean air and CO_2 emissions, one should expect to see a conjunction of low-emission compliant (SAPS) and low-viscosity (fuel economy compliant) oils in India within the next decade.

Gearing up for the next level

Says Mathur, "It is the government agencies who are asking for the implementation of Euro-V and VI (norms). We are only keeping track, and we try our best to assist our customers for better or improved emissions. In a limited way, we are in collaboration with FilterTechnik of the UK for marketing fifth generation oil filtration systems, which are cleaning diesel up to NAS-1 or maximum NAS-3 level. Once this diesel is filtered, there is going to be enormous improvement in diesel combustion and in turn this will improve the life of fuel injection systems, diesel engines and curb emissions."

He adds, "We wish to inform that the Government of India is in the process of finalising and making it statutory to use 5 per cent bio-diesel in diesel. With the addition of bio-diesel, there is likely to be additional moisture and hence removal of moisture to avoid micro-organisms and diesel bugs will be absolutely necessary. Hence, the use of FilterTechnik products, i.e., fifth generation oil filtration systems, will become absolutely necessary in the times to come. They are already being widely used in the UK and all other European countries.

Sekharan elaborates, "We have already launched certain new products required by passenger cars to meet the fuel economy norms after April 1, 2017. On the commercial vehicles front, we have launched new 'RForce' low SAPS products and are now actively involved in commercialising a few more new products required after April, 2020. This means a major overhaul of the current product slate involving new additive technologies and new base stocks. Simultaneously we are also trying to evaluate some of these new technology low SAPS 'RForce' products both on the Indian roads and in off-highway applications in collaboration with the OEMs."

"RECENT STUDIES SUGGEST THAT TRACE METALS EMITTED BY INTERNAL COMBUSTION ENGINES ARE DERIVED MAINLY FROM COMBUSTION OF LUBRICATION OIL."

*- **Pulkit Khemka,***
Vice President, Pensol Industries

He feels that all these efforts should help the company understand the practical behaviour of these new oils under actual field conditions and also judge the important aspect of their reverse compatibility for older engines designed to meet older emission standards.

Khemka states, "Pensol products have always been compliant of all the norms and standards. Our product portfolio is already geared up for next emission norms of BS IV being implemented in India from April 2017. The company has made large investments on R&D lab facility and our expert scientists work very passionately to develop the best-in-class products that are compliant with the norms. As India is preparing for BS VI from year 2020, lubricants companies will have to move to higher grades such as CJ-4, CK-4 and FA-4; for which Pensol is already planning to launch in due course."

- SUDHEER VATHIYATH