Air Compressor Oils

Volume I, Issue I

OTHERS :

Soot control additives

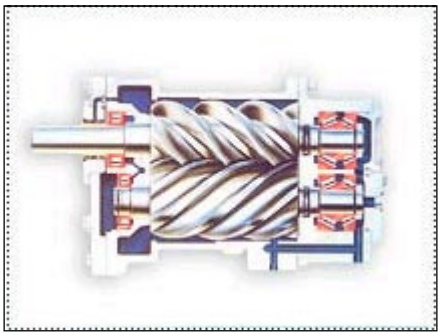
Fuel Oil Additives

Metal stamping oils

Degreasers

All air and gas compressors use lubricants to reduce metal abrasion and frictional heat. A high (15,000) rpm and high pressure (200 Bar) compressor will have to rely on better lubricant to prevent it from failing than ordinary low pressure centrifugal fan. In the market place, there are 3 major classes of air compressor lubricant , Mineral, Semi-synthetic and Full-synthetic. Mineral based air compressor lubricants are made from petroleum with the addition of anti-oxidants and EP (Extreme Pressure) additives to prevent oil degradation due to oxidation and high pressure. These are the cheapest type of lubricant that needs higher frequency of oil change. Mineral based oils are of high carbon content that can be carbonized very rapidly. In air compressor these type of oil have working life-span of only 500 hrs. Air compressor synthetic oils are manufactured from PAO (Poly-alpha-olefins), PAG (Poly-glycol), Ester or Silicone. These synthetic lubricants are capable of withstanding high temperature and high shear environment of air compressor operations. PAO based lubricant is the commonest among the synthetic. It has the advantage of mineral oil miscibility to reduce cost when the end-users are cost-conscious. In general a full-synthetic PAO-based lubricant can out-last the working hours of a mineral oil by 3 to 4 times. PAG based oil is more expensive but can out-perform mineral oil by 8 to 10 times before it is degraded. Its disadvantage is that it cannot be mixed with mineral oil to reduce cost. Screw compressors rely on PAG based synthetic lubricants to operate for longer hours. Ester based oils can with stand high temperature and pressure before its degradation, therefore it can be found in HP piston-type air compressors which can go as high as 500 Bar.

Other than thermal and pyro stability of lubricants, another feature of importance in compressor lubricants is its Viscosity. As most machines are designed with specific clearances and tolerance on moving parts, the viscosity of oil used can affect its performance. Viscosity Index (V.I.) is the unit that measure



changes of viscosity with increase in temperature. A high V.I. oil is more stable in its viscosity changes when the ambient temperature goes up. One other parameter which is often neglected is Total Acidity Number (TAN) which measures the corrosiveness of oil. When mineral lubricants made from hydro-carbons are in contact with oxygen from the air it compressed, the hydrocarbons can be oxidized to give acids. As acids are metal corrosive, it is critical that the lubricant is discarded once its TAN value has reached the threshold of 1.0 ppm.

Compressors are sometimes used to compress gases other than air, like compressors in refrigerators compress ammonia and Hydrogen is been compressed for use to harden margarine oil in food industry. When this happens, an appropriate lubricant other than their manufacturer specified lubricants have to be evaluated. One should never use min-

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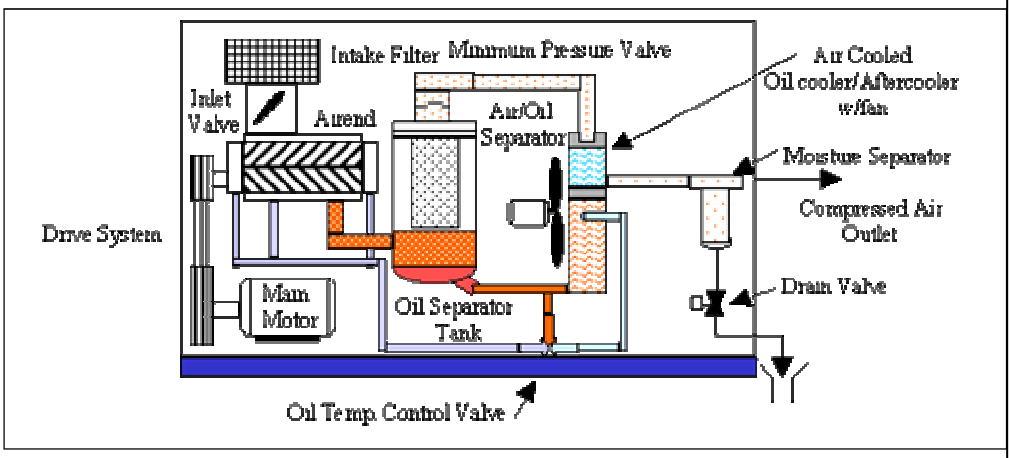
eral based oil in either hydrogen or ammonia gas compression, as it can harden the lubricating oil to cause machine failure. Some food manufacturing company also demand special food grade (FG) lubricant which complies with food safety regulations.



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