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INFLUENCE OF SOME LUBRICANT OIL PROPERTIES ON DIESEL ENGINE EXHAUST EMISSIONS

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The automotive industry is striving to produce engine with improved fuel economy, both to conserve natural resources and to limit pollutants and CO₂ emissions. Increasingly stringent emission legislation together with another, globally, requirement for improved diesel engine performance, such as fuel economy, friction reduction, extended drain intervals and greater engine oil quality. However, the effect of engine oils cannot be neglected since one of the ways to reduce exhaust emissions of diesel engines is not only to economise fuel consumption but also to reduce oil consumption. Thus engine oil has become one of important design parameters. Engine oils are expected not only to have positive effect on exhaust emissions but also to minimise frictions in an engine and provide lower fuel consumption all this resulting in lower emissions.

The paper shows that engine oils considerably contribute to diesel exhaust emissions, particularly to particulate, NO_x and hydrocarbons emissions. Test of effect of some lubricant oil properties on diesel engine exhaust emission have been performed on a three cylinders DI engine (THDM 33/T-TD, 3.152 Perkins) of power/rated 40.5 kW, 2250 r.p.m. swept volume 2.5 dm³, turbocharged KKK 14 with intercooler.

Test results show that diesel engine emissions depend on lube oil properties, sulfur and polyaromatic contents above all, as well as on volatility and metal content such as calcium and zinc.

Key words: lubricant oil, exhaust emissions, diesel engine.

UTICAJ NEKIH KARAKTERISTIKA MOTORNOG ULJA NA IZDUVNE EMISIJE DIZEL MOTORA

Motorna industrija stalno teži proizvodnji motora sa što manjom potrošnjom goriva i što manjim emisijama štetnih komponenti kao i CO₂. Sve oštrij zakonski propisi o emisijama uz globalne druge zahteve kao što su manja potrošnja goriva, smanjenje trenja, viši kvalitet i produžen interval zamene, povećali su fokus pažnje na motorna ulja koja su postala važan konstrukcioni faktor. Motorno ulje, treba ne samo da doprinese smanjenju štetnih emisija, već i da smanji gubitke trenja i smanji potrošnju goriva.

U radu je prikazan doprinos ulja izduvnoj emisiji dizel motora, posebno emisiji čestica, NO_x i HC. Ispitivanje uticaja karakteristika ulja na izduvne emisije dizel motora izvedeno je na trocilindričnom DI dizel motoru (THDM 33/T) snage 40,5 kw pri 2250 min⁻¹, zapremine 2,5 dm³, sa turbokompresorom KKK K-14 i meduhladenjem.

Rezultati ispitivanja pokazuju da emisije dizel motora zavise od karakteristika ulja od kojih su, pre svega, najvažnije sadržaj sumpora i policikličnih aromata, zatim od isparljivosti i sadržaja metala kao što su kalcijum i cink.

Ključne reči: motorno ulje, izduvne emisije, dizel motor.