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Gas fuel

1. Natural gas – CH4

2. *Propane-butane* – *C*3H8 + *C*4H10

3. Associated petroleum gas – CH4 + CmHn

4. Biogas – CH4 + CO2

5. Syngas– CO + H2 + N2 + CO2 + CmHn





Methods of conversion of diesel engines to gas engines

1. Conversion to gas-diesel engines

- 15...20% diesel fuel + 80...85% gas fuel
- preservation of engine power
- possibility of automatic switching between diesel and gas-diesel modes under load

2. Conversion to gas engines (Otto cycle operation)

- 100% gas fuel
- Loss of 15...30% power compared to diesel engines
- Change of engine design





Gas-diesel engine diagram









Gas-diesel engines (gas fuel - associated petroleum gas CH4 > 80%)





Dual fuel gensets with a standby power of 100 kW and 200 kW Installed at the oil and gas extraction platforms of the State Oil company of Azerbaijan. (SOCAR, 1997)

24 stations have been manufactured.

Gas fuel – associated petroleum gas. Speed control - Heinzmann. Engines – D6, D12





Gas-diesel engines

(gas fuel - methane with a high content of heavy hydrocarbons)





Dual fuel gensets with a standby power of 500 kW

Installed at the oil and gas drilling platform in the East China Sea (Vietman 1992-1997)

44 stations have been modernized. Gas fuel – associated petroleum gas. Engines –Pervomayskdizelmash, Ukraine.





Gas-diesel engines (gas fuel - methane with a high content of heavy hydrocarbons)



Dual fuel gensets with a standby power of 100 kW and 200 kW Installed at the oil and gas drilling platforms of the Black Sea shelf (2001-2012) 20 stations have been manufactured.

Gas fuel – natural gas. Speed control – Heinzmann. Engines – YaMZ-238

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Gas engines (gas fuel - natural gas)



16 kW, natural gas



100 kW natural gas



30 kW, natural gas



150 kW natural gas





Gas engines (gas fuel – LPG, syngas)





3x370 kW, syngas





50 kW, propane-butane.



Transport gas diesel engines



1947 5 78

Dual-fuel BelAZ - 540, capacity - 27 ton (1985-1986) Engine - YAMZ-240, 360 h.p., without turbocharger Speed governor – hydraulic-mechanical Operational replacement of diesel fuel -50 -60 %. Produced 2 trucks Ingulets Mining and Processing Plant. Ukraine.

Dual-fuel BelAZ - 547, capacity - 40 ton (1985-1986)

Engine YAMZ-240H , 500 h.p. , turbocharged Speed governor – hydraulic-mechanical Operational replacement of diesel fuel 50...60%. Produced 2 trucks

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Ingulets Mining and Processing Plant. Ukraine.



Transport gas diesel engines



Dual-fuel tractor T-150K (2001-2002)

Engine YAMZ-238, 240 h.p. , without turbocharger Speed governor – HEINZMANN. Produced 2 tractors. Ukraine



Dual-fuel IKARUS (1995-2001)

Engine RABA-MAN., without turbocharger Speed governor – hydraulic-mechanical Operational replacement of diesel fuel - 50%. Produced - 10 buses. Ukraine.





Advantages of converting diesel engines to gas fuel

- **1. Significant reduction in operating costs**
- **2. Reduction of harmful emissions in exhaust gases**
- **3. Increase in engine resource by 20...30%**
- 4. Use of local gas fuels (Synthesis gas, biogas, mine gas, associated petroleum gas)

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Thank you for your attention!

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