

FIRING TESTS OF CONTINUOUS-DETONATION ROCKET ENGINE OPERATING ON NATURAL GAS AND OXYGEN

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Abstract: A high sea-level specific impulse of 270 s at low mean pressure in the combustor (32 atm) has been obtained experimentally for the first time in the rocket engine demonstrator of the new type — continuous-detonation rocket engine (CDRE) operating on natural gas and gaseous oxygen. Comparison of this result with the known liquid-propellant rocket engine RD 170-A operating on the deflagrative combustion of kerosene and oxygen (263 s and 61 atm) indicates that the CDRE possesses a similar specific impulse at a twice lower pressure in the combustor. This means that detonative combustion is more energy efficient than the deflagrative combustion and there is the possibility of improving the weight and dimensions of the turbopump unit in the CDRE.

Keywords: detonation rocket engine; natural gas; oxygen; firing tests; thrust; specific impulse

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