

APPLICATION SHEET

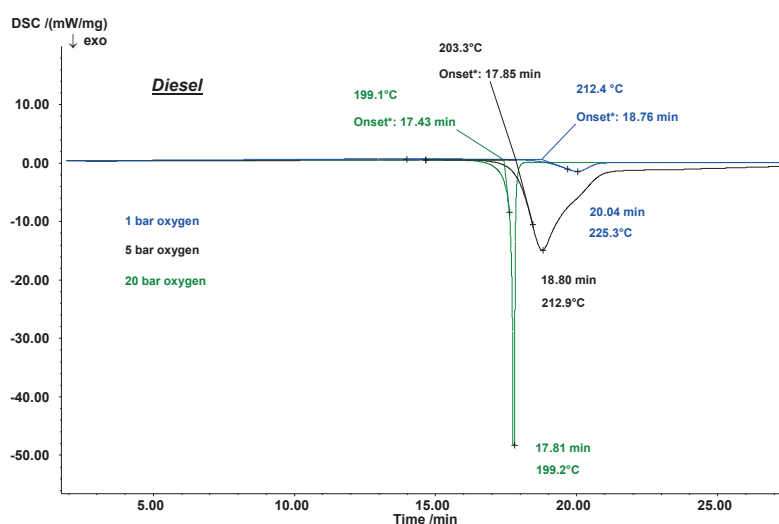
Organics · Chemical Industry
DSC 204 HP *Phoenix*®

Diesel

Introduction

Diesel or diesel fuel is a specific fractional distillate of fuel oil (mostly petroleum) that is used as a fuel in diesel engine invented by the German engineer Rudolf Diesel. Due to great improvements concerning quiet running and acceleration in recent years, diesel engines in private cars have become more and more popular. Low consumption

of diesel fuel was ever an advantage of these engines in comparison to others. In order to study the combustion behavior, it is necessary to simulate the situation inside the combustion chamber. The High-Pressure DSC 204 *Phoenix*® enables temperature-dependent measurements of the combustion reaction of fuel and oxygen at precisely controlled pressures up to 15 MPa (150 bar).



Test Conditions

Temperature range: RT ... 300°C
Heating/cooling rates: 10 K/min
Atmosphere: Oxygen at 100 ml/min
Sample mass: 15.0 ± 1 mg
Crucible: Aluminum, open
Pressure: 1, 5 and 20 bar

Test Results

Oxidation reactions such as fuel combustion can be investigated by using high-pressure scanning calorimeters

(HP-DSC). A sample droplet was placed into an open aluminum crucible and the entire DSC measuring cell was exposed to different pressures. The results obtained between ambient pressure and 20 bar are presented above. With an increasing oxygen pressure, the extrapolated onset (representing the beginning of the exothermic oxidation) and the peak temperatures are shifted to lower temperatures. Along with the significant change in peak shape, it is an indication of an increasing efficiency in the combustion reaction. 20 bar is the usual compression of the gas in diesel engines.