

HEAVY DUTY DIESEL EMISSION REGULATIONS AND TECHNOLOGY SOLUTIONS

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Emissions regulations for 2007 and beyond are driving diesel engines to have near-zero emissions. Reaching these goals demands rapid development of many new technologies. Fuel injection systems are progressing to provide high injection pressure and multiple injection capability with complete timing and quantity flexibility. New combustion bowl concepts are evolving to match the injection capability and significantly reduce emissions. Air system design has already evolved to VG, and dual turbochargers in production and assisted turbochargers are considered for the future. Camless valve technology is developing, which will offer command and control of not only the air-fuel ratio but also swirl. New exhaust gas recirculation (EGR) mapping and sourcing strategies are being explored along with a differentiation between internal and external EGR. Aftertreatment technologies, such as particulate filters and NO_x adsorbers, are showing much promise. All these technologies also require their own sophisticated control strategies as well as their integration as a system. The task is quite challenging. However, progress to date is impressive and showing the potential feasibility of being solved.