

MALFUNCTIONS MAIN ENGINE

Malfunctions Main Engine

Injection	Fuel injector needle jamming	Later start of combustion Exhaust gas temperature rises Pressure in cylinder sinks	Intake and exhaust valves	Leaky exhaust valve	Compression pressure sinks Ignition delay rises Rough engine running, esp. under part-load Exhaust gas temperature rises
	Valve spring fatigue	Early start of combustion Exhaust gas temperature sinks Cylinder pressure rises		Leaky intake valve	Compression pressure sinks Ignition delay rises Rough engine running, esp. under part-load Exhaust gas temperature rises Intake passage coked
	Wear on injection pipe	Flow resistance increases Smaller amount of fuel injected Power output sinks Exhaust gas temperature sinks Pressure in cylinder sinks		Lift clearance of exhaust valve too large	Overflow sinks Exhaust gas temperature rises Pressure in cylinder rises
	Wear on fuel injection pump	Pressure in fuel pipe sinks Leakage increases Amount of fuel injected sinks Power output sinks Exhaust gas temperature sinks Pressure in cylinder sinks		Lift clearance of intake valve too large	Amount of fresh charge sinks Rough engine running, esp. under part-load Pressure in cylinder sinks Exhaust gas temperature rises
	Coking on fuel injector needle	Flow resistance increases Power output sinks Soot formation increases Exhaust gas temperature almost constant	Piston rings	Leaky piston rings	Oil temperature rises Increase in oil vapour at engine venting outlet Compression pressure sinks Ignition delay increases Rough engine running, esp. under part-load Exhaust gas opacity increases
	Malfunction in fuel supply	Pump pre-pressure too low Pressure fluctuations Large variance in exhaust temperatures at full load	Exhaust gas turbocharger	Nozzle ring worn	Turbocharger speed sinks Charging pressure sinks Turbine exhaust temperature difference sinks Exhaust temperature of all cylinder rises Compression pressure of all cylinder sinks Rough engine running at all loads Exhaust gas opacity increases
	Water in fuel	Pressure fluctuations in feed and back flow Large variance in exhaust temperatures, even at part-load		Nozzle ring fouled	Turbocharger speed rises Charging pressure rises Exhaust gas temperature before turbine rises Turbine exhaust gas temperature difference rises Exhaust temperature of all cylinder rises Compression pressure of all cylinder rises Exhaust gas opacity increases, compressor surging
	Preheating in temperature too low	Flow resistance rises Amount of fuel injected sinks Power output sinks Exhaust gas temperature sinks Pressure in cylinder sinks		Compressor fouled	Charging pressure sinks Exhaust gas temperature before turbine rises Exhaust gas temperature of all cylinders rises Compression pressure of all cylinder sinks Exhaust gas opacity increases Compressor surging Fuel consumption rises
	Wear on fuel injector	Flow resistance sinks Power output sinks Exhaust gas opacity rises Exhaust gas temperature almost constant		charge-air cooler fouled	Turbocharger speed rises Charging pressure rises Charge air temperature rises Exhaust temperature of all cylinders rises Compressor surging

Source: Meier-Peter, Hansheirich, Bernhardt, Frank (Eds.), Compendium Marine Engineering: Operation – Monitoring – Maintenance, 2009, by courtesy of PMC Media House GmbH: www.pmcmedia.com