Action code: WHEN CONVENIENT

Guiding Overhaul Intervals

Updated Tables

Replaces SL2017-643/SRJ

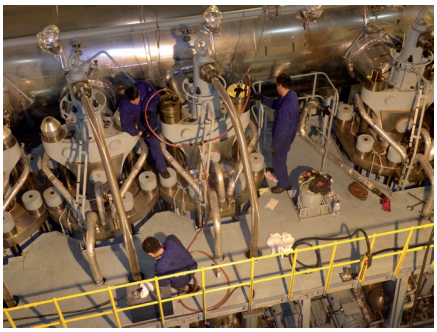
SL2017-650/SRJ
August 2017

Concerns

Owners and operators of MAN B&W two-stroke marine diesel engines. Type: ME-GI, ME/ME-C, ME-B and MC/MC-C.

Summary

Overhaul intervals and expected service life of engine components on two-stroke low speed engines. This Service Letter replaces SL2017-643/SRJ



Dear Sirs

Based on the latest service experience and engine development we are pleased to issue a revised version of the Guiding Overhaul Intervals tables. The guiding overhaul intervals apply to electronically controlled ME type engines, dual fuel ME-GI type engines, and mechanically controlled MC type engines.

Longer overhaul intervals can be obtained with a condition-based overhaul strategy. The means to obtain and document this are described in SL07-483/HRR.

In addition, it must be noted that the application of, for example, WHR, EGB, EGR and SCR will affect the heat load on the combustion chamber components. The above factors as well as fuel qualities and slow steaming may have an impact on the overhaul intervals of especially, but not exclusively, the exhaust valve parts.

All stated overhaul intervals are total engine running hours regardless of fuel type (HFO, MGO or gas).

Please direct any inquiries and questions regarding the overhaul tables and condition-based overhaul to our:

Operation Department at: *leo@mandiesel.com,* or
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Yours faithfully

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ME-GI Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Cylinder liner	Bore sizes 95-80 24,000 70-45 16,000	Bore sizes 95-80 80,000 70-65 70,000 60-45 60,000	Check the overall cylinder condition through the scavenge ports at least once a month.
Piston rings	Bore sizes 95-80 24,000 70-45 16,000	Bore sizes 95-80 24,000 70-45 16,000	
Piston crown	Bore sizes 95-80 24,000 70-45 16,000	Bore sizes 95-80 72,000 70-45 48,000	Pressure test at every 2nd piston overhaul, recondition/rechrome when required (typically every 24-32,000 hours). Piston crown can be reconditioned by welding-up twice.
Stuffing box	Bore sizes 95-80 24,000 70-45 16,000 check lamellas	Bore sizes 95-80 48,000 70-45 32,000 renew lamellas	Overhaul follows the piston rings overhaul but can be extended based on observations.
Exhaust valve spindle and bottom piece	Bore sizes 95-60 First inspection[1] 6,000 Subsequent inspections[2] 24,000 Bore sizes 50-45 First inspection[1] 6,000 Subsequent inspections[2] 16,000	Bore sizes 95-60 96,000 50-45 64,000 DuraSpindle or Nimonic spindle.	[1] First inspection Condition check of air spring according to the instruction manual. Inspection of spindles and seats. Maximum burn-off rate of spindle disc underside to be estimated and calculated for lifetime of spindle. [2] Subsequent inspections Condition check and complete overhaul of exhaust valve. For Dura-/Nimonic spindles: rewelding is possible up to three times during lifetime. For bottom piece seats: only light grinding is usually required at subsequent inspections.
Exhaust actuator	24,000	64,000	Lifetime can deviate due to cavitation.
Exhaust valve high-pressure pipe	24,000	64,000	Lifetime can deviate due to cavitation.
Main hydraulic pump	32,000	96,000	Check and replace hydrostatic bearings during overhaul. Check and replace cylinder set and piston if required.
Proportional valve for main hydraulic pump		20,000	Replace valve after 20,000 hours.
Pressure relief valve for main hydraulic pumps	40,000	96,000	Replace sealings during overhaul.

ME-GI Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
FIVA	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
ELVA	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
ELFI valve	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
Standard fuel oil valves	4,000 depending on fuel quality	Valve nozzle 8,000 Spindle guide 8,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Holder 32,000 Head 32,000	Check components and replace if required. Change O-rings. For fuel oil valves tightened by torque (without spring packs): Clean threads on studs and ensure smooth operation of nut – otherwise replace nut and/or fuel oil valve stud.
Fuel oil valves of latest design (engines with updated fuel oil valve design with guide rings)	4,000 depending on fuel quality	Valve nozzle 8,000 Spindle guide 8,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Guide rings 16,000 Back-up ring 16,000 Holder 48,000 Head 48,000	Check components and replace if required. Change O-rings, back-up ring and guide rings.
Fuel oil pressure booster	32,000 based on engine observations	Replace or recondition 64,000	Change sealing rings on hydraulic piston and suction valve at overhaul.
Fuel oil booster throttle valve	Inspection of seat and spring 16,000	32,000	
Suction valve	8,000	16,000	Check for wear on seat and conical ring.
LDCL pump seals		32,000	Change seals if required.
Cylinder cover		96,000	Check for burned grooves at fuel oil valve nozzle holes. Weld-up if required, up to 2-3 times during service life.
Starting valve	12,000	96,000	
Cylinder lubricator	24,000	96,000	Check timing and adjustment.
Crosshead bearings Main bearings Crank bearings Thrust bearings	Check clearances and crankshaft deflection once a year. Check bearing edges by wire gauges once a year	64,000 96,000 96,000 96,000	Do not open bearings unless bearing material fragments fall out or other bearing inspection measures indicate so.
Stay bolts including bracing screws	Tighten bolts and screws: First inspection 500 Second inspection 1,000 Third inspection 1,500 Subsequent inspections 32,000	Engine lifetime	Typically done at 5-year docking.

ME-GI Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Holding down bolts	Tighten bolts: First inspection 500 Second inspection 1,000 Third inspection 2,000 Fourth inspection 4,000 Fifth inspection 8,000 Subsequent inspections 16,000	Engine lifetime	
Turbocharger	According to manufacturer's recommendations.	According to manufacturer's recommendations.	According to manufacturer's recommendations.
Air cooler(s)	Cleaning: based on engine observations	48,000 or according to manufacturer's recommendations	Clean before differential pressure has increased 50% compared to sea trial value.
Flaps and butterfly valves in scavenge air receiver	Check movement at every scavenge port inspection.	48,000	Periods with slow steaming may reduce lifetime
Various fuel and lubricating oil filters	Cleaning: based on engine observations		
Lubricating oil bottom tank	Cleaning 32,000		Typically done at 5 years docking.
Chains	Retighten chains 3,000-4,000 every six months	96,000	New or overhauled chains to be checked/re-tightened after 500, 1,500 hours.
Gear wheel drive for hydraulic pumps	First inspection 500 Subsequent inspections 6,000	Gear wheel Engine lifetime Gear wheel bearings 96,000	
Accumulators on HPS and HCU	N_2 pressure 2,000 Rubber diaphragms 32,000	Engine lifetime	Replace diaphragms after 5 years.
Hydraulic safety block	Cartridge valves - change O-rings 32,000	Cartridge valves 96,000 Solenoid valve 64,000	Check and adjust safety valve if required after 32,000 hrs.
Hydraulic hoses		32,000	Replace after 5 years.
MPC, MOP A, MOP B	Visual inspection 6,000	64,000	Replace if failing.
Angle encoder	Visual inspection 6,000	64,000	Replace if failing.
Angle encoder amplifiers	Visual inspection 6,000	64,000	Replace if failing.
Fuel booster sensor	Visual inspection 6,000	64,000	Replace if failing.
Exhaust valve sensor	Visual inspection 6,000	64,000	Replace if failing.
Marker sensor	Visual inspection 6,000	64,000	Replace if failing.
Cables	Visual inspection 6,000	96,000	Replace if failing.
Gas injection valve (GIV) Valve nozzle	 4,000	16,000 8,000	Check and replace if required.
Control oil pipe arrangement Non-return valve	32,000 16,000	Engine lifetime Replace or overhaul 32,000	Replace static O-rings at overhaul. Check spring and seat.
Window valve High-pressure gas seal	16,000 8,000	32,000 16,000	Pressure – and function test. Replace if required. Replace seals at overhaul.

ME-GI Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Sealing oil pump N_2 accumulator filter	N_2 pressure 2,000 Rubber diaphragms 32,000	96,000	Replace diaphragms after 5 years.
LPS booster pump seals		32,000	Change seals when required.
Blow-off valve	32,000	64,000	
Purge valve	32,000	64,000	
Resume valve	32,000	64,000	
ELWI	32,000	64,000	
ELGI	32,000	64,000	
Gas channel pressure sensor		64,000	Replace if failing.
Chain pipe	16,000	32,000	Check for oil in outer pipe.
Gas block Non-return valve Accumulator	 8,000 N_2 pressure 2,000	Engine lifetime	Check in situ for gas tightness. Replace diaphragm after 5 years.

ME/ME-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Cylinder liner	Bore sizes 98-80 24,000 70-50 16,000	Bore sizes 98-90 80,000 80-65 70,000 60-50 60,000	Check the overall cylinder condition through the scavenge ports at least once a month.
Piston rings	Bore sizes 98-80 24,000 70-50 16,000	Bore sizes 98-80 24,000 70-50 16,000	
Piston crown	Bore sizes 98-90 24,000 70-50 16,000	Bore sizes 98-90 80,000 80-65 70,000 60-50 60,000	Pressure test at every 2nd piston overhaul, recondition/rechrome when required (typically every 24-32,000 hours). Piston crown can be reconditioned by welding-up twice.
Stuffing box	Bore sizes 98-80 24,000 70-50 16,000 check lamellas	32,000 32,000 renew lamellas	
Exhaust valve spindle and bottom piece	Bore sizes 98-50 First inspection[1] 6,000 Bore sizes 98-60 Subsequent inspections[2] 24,000 Bore size 50 Subsequent inspections[2] 16,000	Bore sizes 98-60 96,000 50-35 64,000 DuraSpindle or Nimonic spindle	[1] First inspection Condition check of air spring according to Instruction manual. Inspection of spindle and seats. Max burn-off rate of spindle disc underside to be estimated and calculated for lifetime of spindle. [2] Subsequent inspections Condition check and complete overhaul of exhaust valve. For Dura-/Nimonic spindles: rewelding is possible up to three times during lifetime. For bottom piece seats: only light grinding is usually required at subsequent inspections.
Exhaust actuator	24,000	64,000	Lifetime can deviate due to cavitation.
Exhaust valve high-pressure pipe	24,000	64,000	Lifetime can deviate due to cavitation.
Main hydraulic pump	32,000	96,000	Check and replace hydrostatic bearings at overhaul. Check and replace cylinder set and piston if required.
Proportional valve for main hydraulic pump		20,000	Replace valve after 20,000 hours.
Pressure relief valve for main hydraulic pumps	40,000	96,000	Replace sealings at overhaul.
FIVA	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
ELVA	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
ELFI valve	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.

ME/ME-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Standard fuel oil valves	8.000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Holder 32,000 Head 32,000	Check components and replace if required. Change O-rings. For fuel oil valves tightened by torque (without spring packs): clean threads on studs and ensure smooth operation of nut – otherwise replace nut and/or fuel oil valve stud.
Fuel oil valves of latest design (engines with updated fuel oil valve design with guide rings)	8,000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Guide rings 16.000 Back-up ring 16,000 Holder 48,000 Head 48,000	Check components and replace if required. Change O-rings, back-up ring and guide rings.
Fuel oil pressure booster	32,000 based on engine observations	64,000 replace or recondition	Change sealing rings on hydraulic piston and suction valve at overhaul.
Suction valve	8,000	16,000	Check for wear at seat and conical ring.
LDCL pump seals		32,000	Change seals if required.
Cylinder cover		96,000	Check for burned grooves at fuel oil valve nozzle holes. Weld-up if required, up to 2-3 times during service life.
Starting valve	12,000	96,000	
Cylinder lubricator	24,000	96,000	Check timing and adjustment.
Crosshead bearings Main bearings Crank bearings Thrust bearings	Check clearances and crankshaft deflection: once a year Check bearing edges by wire gauges: once a year	64,000 96,000 96,000 96,000	Do not open bearings unless bearing material fragments fall out or other bearing inspection measures indicate so.
Stay bolts including bracing screws	Tighten bolts and screws: First inspection 500 Second inspection 1,000 Third inspection 1,500 Subsequent inspections 32,000	Engine lifetime	Typically done at 5-year docking.
Holding down bolts	Tighten: First inspection 500 Second inspection 1,000 Third inspection 2,000 Fourth inspection 4,000 Fifth inspection 8,000 Subsequent inspections 16,000	Engine lifetime	

ME/ME-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Turbocharger	According to manufacturer's recommendations.	According to manufacturer's recommendations.	According to manufacturer's recommendations.
Air cooler(s)	Cleaning: based on engine observations	48,000 or according to manufacturer's recommendations	Clean before differential pressure has increased 50% compared to sea trial value.
Flaps and butterfly valves in scavenge air receiver	Check movement at every scavenge port inspection	48,000	Periods with slow steaming may reduce lifetime
Various fuel and lubricating oil filters	Cleaning: based on engine observations		
Lubricating oil bottom tank	Cleaning 32,000		Typically done at 5-year docking.
Chains	Retighten chains 3,000-4,000 every six months	96,000	New or overhauled chains to be checked/retightened after 500, 1,500 hours.
Gear wheel drive for hydraulic pumps	First inspection 500 Subsequent inspections 6,000	Gear wheel Engine lifetime Gear wheel bearings 96,000	
Accumulators on HPS and HCU	N_2 pressure 2,000 Rubber diaphragms 32,000	Engine lifetime	Replace diaphragms after 5 years.
Hydraulic safety block	Cartridge valves - change O-rings 32,000	Cartridge valves 96,000 Solenoid valve 64,000	Check and adjust safety valve if required after 32,000 hrs.
Hydraulic hoses		32,000	Replace after 5 years.
MPC, MOP A, MOP B	Visual inspection 6,000	64,000	Replace if failing.
CCU and ACU amplifiers	Visual inspection 6,000	64,000	Replace if failing.
LVDT and LDI hydraulic pump amplifiers	Visual inspection 6,000	64,000	Replace if failing.
Fuel booster sensor	Visual inspection 6,000	64,000	Replace if failing.
Exhaust valve sensor	Visual inspection 6,000	64,000	Replace if failing.
Angle encoder	Visual inspection 6,000	64,000	Replace if failing.
Marker sensor	Visual inspection 6,000	64,000	Replace if failing.
Cables	Visual inspection 6,000	96,000	Replace if failing.

ME-B Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Cylinder liner	Bore sizes 60-50 16,000 46-35 12,000	Bore sizes 60-46 60,000 40-35 50,000	Check the overall cylinder condition through the scavenge ports at least once a month.
Piston rings	Bore sizes 60-50 16,000 46-35 12,000	Bore sizes 60-35 16,000	
Piston crown	Bore sizes 60-50 16,000 46-35 12,000	Bore sizes 60-46 60,000 40-35 50,000	Pressure test at every 2nd piston overhaul, recondition/rechrome when required (typically every 24-32,000 hours). Piston crown can be reconditioned by welding-up twice.
Stuffing box	Bore sizes 60-50 16,000 46-35 12,000 check lamellas	Bore sizes 60-50 32,000 46-35 24,000 renew lamellas	
Exhaust valve spindle and bottom piece	Bore sizes 60-35 First inspection[1] 6,000 Bore sizes 50-35 Subsequent inspections[2] 16,000 Bore size 60 Subsequent inspections[2] 24,000	Bore size 60 96,000 50-35 64,000 DuraSpindle or Nimonic spindle	[1] First inspection Condition check of air spring according to Instruction manual. Inspection of spindle and seats. Max burn-off rate of spindle disc underside to be estimated and calculated for lifetime of spindle. [2] Subsequent inspections Condition check and complete overhaul of exhaust valve. For Dura-/Nimonic spindles: rewelding is possible up to three times during lifetime. For bottom piece seats: only light grinding is usually required at subsequent inspections.
Exhaust actuator	32,000	96,000	
ELFI valve	32,000	64,000	Check and replace if required. Replace pilot valve after 32,000 hours.
Exhaust valve high-pressure pipe	32,000	96,000	
Main hydraulic pump	32,000	96,000	Check and replace hydrostatic bearings at overhaul. Check and replace cylinder set and piston if required.
Proportional valve for main hydraulic pump		20,000	Replace valve after 20,000 hours.
Pressure relief valve for main hydraulic pumps	40,000	Engine lifetime	Replace sealings at overhaul.

ME-B Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Standard fuel oil valves	8,000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Holder 32,000 Head 32,000	Check components and replace if required. Change O-rings. For fuel oil valves tightened by torque (without spring packs): clean threads on studs and ensure smooth operation of nut – otherwise replace nut and/or fuel oil valve stud.
Fuel oil valves of latest design (engines with updated fuel oil valve design with guide rings)	8,000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Guide rings 16,000 Back-up ring 16,000 Holder 48,000 Head 48,000	Check components and replace if required. Change O-rings, back-up ring and guide rings.
Fuel oil pressure booster	32,000 based on engine observations	64,000 replace or recondition	Change sealing rings on hydraulic piston and suction valve at overhaul.
Suction valve	8,000	16,000	Check for wear at seat and conical ring.
LDCL pump seals		32,000	Change seals if required.
Cylinder cover		96,000	Check for burned grooves at fuel oil valve nozzle holes. Weld-up if required, up to 2-3 times during service life.
Starting valve	12,000	96,000	
Cylinder lubricator	24,000	96,000	Check timing and adjustment
Crosshead bearings Main bearings Crank bearings Thrust bearings	Check clearances and crankshaft deflection: once a year Check bearing edges by wire gauges: once a year	64,000 96,000 96,000 96,000	Do not open bearings unless bearing material fragments fall out or other bearing inspection measures indicate so.
Stay bolts including bracing screws	Tighten bolts and screws: First inspection 500 Second inspection 1,000 Third inspection 1,500 Subsequent inspections 32,000	Engine lifetime	Typically done at 5-year docking.
Holding down bolts	Tighten: First inspection 500 Second inspection 1,000 Third inspection 2,000 Fourth inspection 4,000 Fifth inspection 8,000 Subsequent inspections 16,000	Engine lifetime	

ME-B Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Turbocharger	According to manufacturer's recommendations.	According to manufacturer's recommendations.	According to manufacturer's recommendations.
Air cooler(s)	Cleaning: based on engine observations	48,000 or according to manufacturer's recommendations	Clean before differential pressure has increased 50% compared to sea trial value.
Flaps and butterfly valves in scavenge air receiver	Check movement at every scavenge port inspection.	48,000	Periods with slow steaming may reduce lifetime
Various fuel and lubricating oil filters	Cleaning: based on engine observations		
Lubricating oil bottom tank	Cleaning: 32,000		Typically done at 5-year docking.
Chains	Retighten chains: 3,000-4,000 every six months	96,000	New or overhauled chains to be checked/retightened after 500, 1,500 hours.
Accumulators on HPS and HCU	N_2 pressure 2,000 Rubber diaphragms 32,000	Engine lifetime	Replace diaphragms after 5 years.
Hydraulic safety block	Cartridge valves - change O-rings 32,000	Cartridge valves 96,000 Solenoid valve 64,000	Check and adjust safety valve if required after 32,000 hrs.
Hydraulic hoses		32,000	Replace after 5 years.
Angle encoder	Visual inspection 6,000	64,000	Replace if failing.
Marker sensor	Visual inspection 6,000	64,000	Replace if failing.
MPC, MOP A, MOP B	Visual inspection 6,000	64,000	Replace if failing.
Cables	Visual inspection 6,000	96,000	Replace if failing.

MC/MC-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Cylinder liner	Bore sizes 98-50 16,000 46-26 12,000	Bore sizes 98-90 80,000 80-70 70,000 60-50 60,000 46-35 50,000 26 40,000	Check the overall cylinder condition through the scavenge ports at least once a month.
Piston rings	Bore sizes 98-50 16,000 46-26 12,000	Bore sizes 98-50 16,000 46-26 12,000	
Piston crown	Bore sizes 98-50 16,000 46-26 12,000	Bore sizes 98-90 80,000 80-70 70,000 60-50 60,000 46-35 50,000 26 40,000	Pressure test at every 2nd piston overhaul, recondition/rechrome when required (typically every 24-32,000 hours). Piston crown can be reconditioned by welding-up twice.
Stuffing box	Bore sizes 98-50 16,000 46-26 12,000 check lamellas	Bore sizes 98-50 32,000 46-26 24,000 renew lamellas	
Exhaust valve spindle and bottom piece	Bore sizes 98-35 First inspection[1] 6,000 Bore sizes 98-60 Subsequent inspections[2] 24,000 Bore sizes 50-35 Subsequent inspections[2] 16,000	Bore sizes 98-60 96,000 50-35 64,000 DuraSpindle or Nimonic spindle	[1] First inspection Condition check of air spring according to Instruction manual. Inspection of spindle and seats. Max. burn-off rate of spindle disc underside to be estimated and calculated for lifetime of spindle. [2] Subsequent inspections Condition check and complete overhaul of exhaust valve. For Dura-/Nimonic spindles: rewelding is possible up to three times during lifetime. For bottom piece seats: only light grinding is usually required at subsequent inspections.
Exhaust actuator	32,000	96,000	
Exhaust valve high-pressure pipe	32,000	96,000	
Standard fuel oil valves	8,000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Holder 32,000 Head 32,000	Check components and replace if required. Change O-rings. For fuel oil valves tightened by torque (without spring packs): clean threads on studs and ensure smooth operation of nut – otherwise replace nut and/or fuel oil valve stud.

MC/MC-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Fuel oil valves of latest design (engines with updated fuel oil valve design with guide rings)	8,000 depending on fuel quality	Valve nozzle 16,000 Spindle guide 16,000 Non-return valve 16,000 Spring 32,000 Thrust spindle 16,000 Foot 32,000 Spring pack 16,000 Guide rings 16,000 Back-up ring 16,000 Holder 48,000 Head 48,000	Check components and replace if required. Change O-rings, back-up ring and guide rings.
Fuel pump plunger and barrel, suction valve, puncture valve and shock absorber	16,000 based on engine observations 8,000 for suction valve and puncture valve	Renew or recondition 40,000	Change sealing rings on barrel, plunger, puncture valve and suction valve.
LDCL pump seals		32,000	Change seals if required.
Cylinder cover		96,000	Check for burned grooves at fuel oil valve nozzle holes. Weld-up if required, up to 2-3 times during service life.
Starting valve, safety valve and indicator cock	12,000	96,000	
Alpha Lubricator	Check/refill accumulators 8,000 Overhaul lubricators 32,000	96,000	
Crosshead bearings Main bearings Crank bearings Thrust bearings	Check clearances and crankshaft deflection: once a year Check bearing edges by wire gauges: once a year	64,000 96,000 96,000 96,000	Do not open bearings unless bearing material fragments fall out or other bearing inspection measures indicate so.
Roller guide for fuel pump and exhaust valve	Check condition in situ 2,000	Engine lifetime	Check running surfaces and free rotation of roller.
Chains	Tighten chains: 3,000-4,000 every six months	96,000	New or overhauled chains to be checked/retightened after 500, 1,500 hours.
Chain wheels and rubber guide bars	Visual inspection 3,000-4,000	Chain wheels 96,000 Guide bars 32,000	First inspections and retightenings after 500, 1,000 and 1,500 hours in total service.
Reversing and regulating gear	Check moving parts 3,000-4,000	Engine lifetime	Pneumatic/hydraulic governor: oil change every 4,000 hours.
Stay bolts including bracing screws	Tighten bolts and screws: First inspection 500 Second inspection 1,000 Third inspection 1,500 Subsequent inspections 32,000	Engine lifetime	Typically done at 5-year docking.

MC/MC-C Engines
Guiding Overhaul Intervals and Expected Service Life

Component	Overhaul interval (hours)	Expected service life (hours)	Remarks
Holding down bolts	Tighten: First inspection 500 Second inspection 1,000 Third inspection 2,000 Fourth inspection 4,000 Fifth inspection 8,000 Subsequent inspections 16,000	Engine lifetime	
Turbocharger	According to manufacturer's recommendations.	According to manufacturer's recommendations.	According to manufacturer's recommendations.
Air cooler(s)	Cleaning: based on engine observations	48,000	Clean before differential pressure has increased 50% compared to sea trial value.
Flaps and butterfly valves in scavenge air receiver	Check movement at every scavenge port inspection.	48,000	Periods with slow steaming may reduce lifetime
Various fuel and lubricating oil filters. Camshaft filters and TCS filters, if any	Cleaning: based on engine observations		
Lubricating oil bottom tank	Cleaning: 32,000		Typically done at 5-year docking.