

**GENERAL MAINTENANCE INSTRUCTION No 40.**  
**ON**  
**AIR COOLED LISTER DIESEL ENGINES 2 CYL AND 3CYL FITTED**  
**WITH PARKER SPOT-MIX ASPHALT AND BITUMINOUS MIXING PLANT**

1. Aim. To summarize salient aspects of routine maintenance of the Air Cooled LISTER Diesel Engine Types HA & HB 2-3 cylinders fitted with PARKER SPOT-MIX ASPHALT AND BITUMINOUS MIXING PLANT and also correct Engine Starting and stopping procedure for operator's guidance so as to achieve maximum life from the engine.
2. Ventilation for engine. Engine being air –cooled, ensure adequate ventilation for generous air supply wherever machine is installed to ensure its effective cooling. Grills, Wire Mesh or louvers placed in the air stream act as shield and must be used to check dust. However, Keep the exhaust pipe as short and straight as possible. Up to its length of 20 ft, use 2 inch diameter pipe; and for over 20 ft, use 2 1/2 inch diameter pipe.
3. Engine Starting instructions.
  - a) Check the fuel and lubricating oil levels.
  - b) If an oil-bath air cleaner is fitted, fill the oil container with engine to the level marked on the air cleaner.
  - c) Prime fuel and lubricating oil systems
  - d) If engine is fitted with Fuel Lift Pump, prime Fuel Filter by using Priming lever on the lift pump.
  - e) Move decompress or levers away from the flywheel.
  - f) In cold weather only, lift overload stop to allow the pumps to deliver excess fuel.
  - g) Lightly oil the end of the crankshaft extension and fit the starting handle.
  - h) **Important.** Turn the engine slowly from 3 to 10 turns according to the temperature and period of standing unused in order to prime combustion chambers and the lubricating oil systems.
  - i) Turn the handle smartly in a clockwise direction , move the decompression levers towards the flywheel and continue turning fast. Slip off the starting handle when the engine fires.
4. Engine –stopping instruction:-
  - a) Normal method. Move the control lever to the left (towards the flywheel) and hold in this position until the engine stops Do not use the de-compressors for stopping.
  - b) Remote stopping control. For this , a hand lever and Bowden cable have been Provided
5. Speed adjustment. A small adjustment of speed may be made by loosening the lock nuts on the Governor spring adjusting screw and turning the screw in or out. By turning screw in, speed reduced, whereas by turning screw out, speed increases. Tight the locknuts.
6. Changing lubricating oil (Every 250 hours). Warm up engine, drain out sump by opening Drain Plug. Use fuel (and never PARAFFIN). If necessary, rinse out sludge. Use brush ( and not cloth) to wipe out the inside of engine. Every 1500 hours, wash strainer in fuel oil, thoroughly dry and replace it. Replace Drain Plug and refill sump with oil. Use following engine oil:-

Engine HA & HB

	Standard Lub	Equipment lubricant ESSO, Petroleum Co Ltd	Shell Group of companies
a) Upto 40 <sup>0</sup> F (5 <sup>0</sup> C)	SAE 10W	ESSOLUBLE HD 10 ESTOR HD 10	Shell Rotella Oil10 W Shell Talona oil 10 W
b) Upto 40 <sup>0</sup> F to 85 <sup>0</sup> F (5 <sup>0</sup> C to 30 <sup>0</sup> C)	SAE 20/20W	ESSOLUBLE HD 20 ESTOR HD 20	Shell Rotella Oil 20/20W Shell Talona Oil 20
c) Above 85 <sup>0</sup> F(30 <sup>0</sup> C)	SAE 30	ESSOLUBLE HD 30 ESTOR HD 30	Shell Rotella oil 30 Shell Talona oil 30

7. Air Cleaner.

- a) Oil bath type. In very dusty conditions, clean it daily, otherwise at 50 hrs or 100 hrs run. Dismantle and wash in PARAFFIN and shake off surplus before reassembling.
- f) Control cylinder burner in accordance with material flow.
- g) Check pressures of fuel and air to cylinder burner
- h) Check all drives adjust, if necessary.
- j) Maintain a good supply of bitumen
- k) Clean the bitumen circuit or rotary hand pump at all times when the plant is stopped for any appreciable period.

Notes:-

- 1. \*Maintenance Tasks will be carried out by GREF Technical /EME personnel.
- 2. To achieve maximum life from the eqpt and to avoid inopportune breakdowns, SO1/SO2 EME Projects may issue further instructions, to their units and even amend these periodicities and maintenance Tasks depending upon their operating conditions under intimation to this HQ.

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**GENERAL MAINTENANCE INSTRUCTION No 40**  
**ON**

**PARKER-SPOT –MIX ASPHLT AND BITUMINOUS MIXING PLANT FITTED WITH LISTER**  
**19 HP HA-2AIR COOLED DIESEL ENGINE (TYPES HA & HP -2& 3 CYLS ENGINES**

**DAILY-ROUTINE MAINTENANCE**

- a) Check Supply of Fuel Oil.
- b) Check level and condition of lubricating oil. (also in gear box if fitted)
- c) Clean Air cleaner in very dusty condition.
- d) Drain moisture trap in exhaust pipe, if fitted.
- e) Clean Rotary cooling air fan screen, if fitted.

**EVERY 100 HOURS**

- a) Clean Air Cleaner under moderately dusty conditions.
- b) Check for fuel and lubricating oil leaks-tighten nuts and fittings as necessary
- c) Wipe engine and base plate clean.
- \*d) Clean Cylinder, cylinder head and injector fining. Under every dusty conditions.
- e) Check level of electrolyte in battery if electric starting is used.

**EVERY 250 HOURS**

- a) Drain Lubricating oil and refill with correct grade and
- \*b) Check injector sprays and clean if necessary.

**EVERY 500 HOURS**

- \*a) decarbonizes, if engine shows loss of compression, or blow-by past the piston, but do not disturb otherwise.
- \*b) Adjust valve tapped clearances.
- c) Clean cooling fan, if necessary.
- d) Wash engine down with paraffin or fuel oil
- e) Renew lubricating oil filter element
- \*f) Clean cylinder, cylinder head and injector fining under dusty conditions.

**EVERY 1500 HRS**

- \*a) Decarbonizes.
- \*b) Clean inlet manifold and exhaust system.
- \*c) Clean fins on cylinder head, injector and cylinder.
- d) Examine fan blades and clean.
- e) Check free working of Governor linkage and lubricate
- f) Drain and clean Fuel Tank
- \*g) Replace fuel filter element. (Change gasket along)
- \*h) Clean injector nozzles or replace by serviced ones.
- \*j) Adjust injectors pressure setting.
- \*k) Check fuel pump timing and balancing
- \*l) Wash strainer in Fuel oil. Thoroughly dry it up and refit.

## **EVERY 5000 HOURS**

- \*a) Check Big End and Main bearing for tightness.
- \*b) inspect camshaft bearings and tappets.
- \*c) Renew valve springs.

## **PLANT**

### **DAILY FIRST PARADE**

- a) Check oil into pressure blower tank
- b) Fuel in both burner tanks
- c) Lubricate all points
- \*d) Wash burner nozzles in diesel oil.
- e) Always test bitumen pump for free gears before starting up.
- \*f) Clean the bitumen circuit thoroughly.
- g) Clean mixer
- h) Empty fuel filter.

### **WEEKLY**

- a) Lubricate all points,
- b) Check and maintain tyre pressure (100 lbs per sq inch)
- c) Check nuts securing paddle mixer tips (Tighten if necessary)
- d) Check feeder belt for tears.
- \*e) Check mixer tips and linear plates for wear (Adjust if necessary).
- f) Check feed ring liner plates and flame protection plates.
- \*g) Check braking equipment (Shoes and cables etc)

### **MAINTENANCE DURING OPERATION**

- a) Check feeder belt alignment and tension.
- b) Maintain kettle heater fuel pressure at 15-20 lbs per sq. inch for standard heater 25-30 lbs per sq inch for larger heater
- c) Check chimney damper plate for suitable position.
- d) Periodically turn bitumen to bucket valve grease nut
- e) Check blower oil flow regularly
  - b) Paper element type. Inspect daily under dusty conditions, otherwise at maximum interval of 100 hours run. Tap gently to remove the loose accumulation of dust and then blow compressed air at 100 lbs/sq in through the element from inside to out and again inspect element carefully. Even a small hole renders the filter element ineffective and should be replaced. Before re-assembling the inside of the filter casing should be cleaned out with a damp cloth.

8. Fuel filter assy. Always ensure that fuel filter element is clean and unpunctured, which is all the more necessary as engine is diesel run. Never run engine without filter element. Replace element every 1500 hrs. If fuel is dirty, clean filter often to inside the Bowl. Assemble and prime the fuel system by slackening the vent screw until all air is removed and then tightening again. If the engine runs erratically, it should be further primed at the Fuel Pump Vent Screws, which are accessible after remaining the Fuel Pump Housing Door.

9. Pulley Drives. Use pulleys (bolt-on type) with clutch and/or reduction gear as under:-

	Part No	Nos per 2 Cyls	Engine 3 Cyls
8" Diameter x 10" Face (Effective )	291-3165	1	-
10" Diameter x 10 " Face (Effective)	291-3166	1	1
12" Diameter x 10" Fce (Effective)	351-15870	-	1
14" Diameter x 10 " Face (Effective)	351-15860	1	1
Pulley stud 5/8" UNF x 2"	270-143	3	3
Pulley Nut 5/8 " UNF	270-8	3	3
Pulley Spring Washer	27-395	3	3

10. Engine's direction of rotation. It is clockwise, looking on the gear case or starting end of the engine.

11. Secure engine in a level position always.

12. Clutch. This single-plate type is toggle operated and hence self-locking in either engaged or disengaged position. Operator should ensure that clutch is fully engaged or disengaged and that the lever is released on completion of the movement. The sleeve yoke and toggle mechanism should be lubricated through a restriction plug in the end of the crankshaft connected to the engine lubricating oil system. No other lubrication is necessary.

13. Maintenance when engine will not be required for some months.

- a) Replace fuel with a small supply of shell fuses oil or equivalent.
- b) Drain lubricating oil from sump and refill with shell ensis 453 oil or equivalent.
- c) Run the engine for a period to circulate the ensis oil thorough the system and to ensure the fuses oil is passed through the fuel pumps and injectors.
- d) Stop the engine and drain off the Ensis lubricating oil from the sump, after which the crankshaft should not be turned until the engine is again required for service. The fuses oil should be left in the fuel system.
- e) Seal all openings on the engine with tape.
- f) Remove batteries from engines arranged for electric starting and store fully charged with terminals coated with Vaseline (petroleum jelly)
- g) Grease all external bring parts and control linkage etc,
- h) Tie labels on the unit clearly stating its condition.

Note:- Before returning the engine to service, it should be turned by hand to ensure free movement of all working parts.

14. The maintenance Tasks for engine and plant are enclosed at Appendix 'A' for strict compliance.

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