

Dear Sir or Madam

To ensure a safe operation on the low-sulphur fuels introduced from 2020, this Service Letter describes the engine programme upgrades for newbuildings and the possible upgrades and retrofit solutions for engines in service. The recommended upgrading of existing engines is made to continue the high reliability and availability of the engines.

As the subject of onboard handling and filtration of 2020 fuels is covered by the documents listed as references, it will not be further described in this Service Letter.

Details of the various upgrade packages are available through our PrimeServ organisation. Please contact your local PrimeServ agent or our PrimeServ department by e-mail at primeserv-hol@man-es.com with reference to this service letter.

Yours faithfully



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Action code: **WHEN CONVENIENT**

Preparation for 2020 fuels

SL2019-676/JNN

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Concerns

Owners and operators of
MAN four-stroke diesel engines.

Type:

Marine: L16/24, L21/31, L27/38,
L23/30H, L28/32H

Stationary: L21/31S, L27/38S, L23/30S,
L28/32S, V28/32S, V28/32H

References:

SL2019-670

PCI 398

SL2018-661

SL2017-640

SL2017-638

SL2014-593

Attachments:

Spare part plates P51756 / P61756



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Upgrade of design for engine newbuilding

As standard, all engine designs for newbuildings are updated with the following parts:

- Coated fuel injection pump plungers
- Hard facing of inlet and exhaust valves and valve seats

By application of coated fuel injection pump plunger, the pump is less disposed to seizure caused by fluctuation in fuel temperature and viscosity. However, it is still important to keep the fuel viscosity within the specified limits.

The applied hard facing on the inlet and exhaust valves and valve seats increases the resistance against mechanical wear and corrosion; targeting to maintain the present time between overhaul.

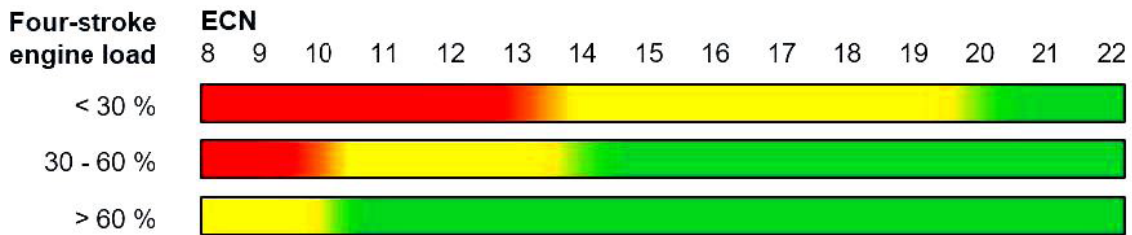
Due to the lead time of the updated parts, we recommend to check with the actual engine builder that the updated parts are applied in case of newbuilding orders.

Charge air preheating

Application of charge air preheating is standard for the L16/24 engines. It is available as an option for new engines and as retrofit for engines in service.

By application of charge air preheating, the engine's capability to operate on fuels with a low estimated cetane number (ECN) is improved.

Figure 2 shows the recommended operational reference ranges for the ECN parameter. It is critical if the fuel has an ECN lower than 20; especially in the low-load range.



Available upgrade / retrofit package for engines in service

The matrix below gives an easy overview of available upgrade packages for our engine types in service.

| | L16/24 | L21/31 | L27/38 | L23/30H | L28/32H |
|----------------------------------|---------|---------|-----------|-------------|-----------|
| HFO (up to 3.5%S) | A+H | A+H | A+H | A+H | A+H |
| Ultra-Low Sulphur Heavy Fuel Oil | A+H | A+H | A+H | A+G+H+I | A+G+H |
| Distillate Fuels | B+C+D+F | B+C+D+F | B+C+D+E+F | B+C+D+F+G+I | B+C+D+F+G |
| Hybrid Fuels | A+H | A+H | A+H | A+H | A+H |
| Bio Fuels | C+J | C+J | C+J | C+J | C+J |
| LNG / Dual Fuel | N/A | N/A | N/A | K | K |

| | |
|---|---|
| A | Fuel filter package |
| B | Improved material for inlet / exhaust valves |
| C | Coated plunger/barrel in fuel HP pump |
| D | Drain split for collection of leak oil |
| E | Sealing oil in fuel pump |
| F | MDO/MGO cooler or chiller |
| G | Increased HT temperature to reduce liner lacquering |
| H | Charge air preheating |
| I | Improved piston ring package (lowered LO consumption) |
| J | Special filter application with heating |
| K | Engine conversion to dual fuel |