**Dear Operator**

In the CIMAC Heavy Fuel Working Group, we are developing recommendations and tools for the industry on how to select the right fuel quality and how to handle the fuel on board or in power stations to give the optimum diesel engine reliability and availability.

As a working group, we are specialists represented from all parts of the marine and fuel industry, and at the moment we are collecting information about situations experienced where the Ignition and Combustion properties of the fuel are suspected of having influenced negatively on the engine performance. Feedback from operators is vital for us to make accurate recommendations according to actual situations on board vessels and in Power Stations.

We therefore ask you kindly to inform us of any such incidents experienced by you and your colleagues. Please fill in the attached questionnaire and return it to the following

e-mail address: [CIMACSURVEY@DNVPS.COM](mailto:CIMACSURVEY@DNVPS.COM)

Furthermore, we ask you to please keep the questionnaire at hand for future fuel performance issues of possible interest to us, as the CIMAC WG Fuels will continue to collect and evaluate reported experience.

Data received will be treated confidentially, however, generated trends and conclusions will be published as knowledge and tools for the industry.

Please see our latest recommendation regarding ignition and combustion of fuel oil, available free of charge from the CIMAC website;

<http://www.cimac.com/cimac_cms/uploads/explorer/Working%20groups/CIMAC_Fuel_Quality_Guide_Ignition_and_Combustion.pdf>

Thanking you in anticipation.

Best regards

Kjeld Aabo

Chairman of the CIMAC Working Group Fuels

# Questionnaire

Survey for development of CIMAC fuel quality recommendations

## Engine Data

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Engine Make: |  | Model: | |  | | | 2-st  4-st | | |
| Bore | | |  | | | | | | mm |
| Stroke | | |  | | | | | | mm |
| Nominal engine speed (100% MCR) | | |  | | | | | | rpm |
| Nominal max firing pressure | | |  | | | | | | bar |
| Effective Compression ratio | | |  | | | | | | - - |
| Operating Load Profile (2) | | |  | | | | | | % MCR |
| Injection system | | | Mechanical | | | Electronic | | | |
| Application | | | Marine | | | Power Plant | | | |
| Operating curve | | | Const RPM | | Vari P | | | Fixed P | |

## Engine Condition

|  |  |  |
| --- | --- | --- |
| Cumulated Running Hours |  | hours |
| Oldness Percentage (3) |  | % |
| Oldness Percentage of injector nozzles (3) |  | % |

## Notes

|  |  |  |  |
| --- | --- | --- | --- |
| ( 1 ) | If a parameter is not known, please indicate NA meaning Not Available | ( 3 ) | Oldness Percentage means (running hours when damage occurred - running hours at last main overhaul) / (normal periodicity between two main overhauls) |
| ( 2 ) | Operating profile to be filled in with :  L : Low meaning most of the time operating at 0 - 60%MCR  M : Medium meaning most of the time operating at 60 - 80%MCR  H : High meaning most of the time operating at 80 - 100%MCR |

## Engine problems

***Symptoms***

|  |  |  |
| --- | --- | --- |
| Starting difficulties / failures | Yes | No |
| Heavy knocking | Yes | No |
| Dark smoke (under normal operating conditions) | Yes | No |
| Increased deposits in combustion chamber | Yes | No |
| Turbocharger surging | Yes | No |
| Sticking exhaust valves | Yes | No |
| Pmax increase | Yes | No |
| Burned piston crowns | Yes | No |
| Other symptoms (please comment) | Yes | No |

***Damages***

|  |  |  |
| --- | --- | --- |
| Increased piston grooves fouling | Yes | No |
| Sticking / broken piston rings | Yes | No |
| Liner lacquering - in combination with sudden increase in lub oil consumption | Yes | No |
| Bore polishing / scuffing / blow-by | Yes | No |
| Increased wear rate of liners or piston rings | Yes | No |
| Exhaust valve burning | Yes | No |
| Turbocharger vibration | Yes | No |
| Thermal cracks / erosion-cavitation on cylinder head deck or liner | Yes | No |

## Fuel Parameters

|  |  |  |  |
| --- | --- | --- | --- |
|  | As bunkered | After on-board treatment |  |
| Density at 15°C |  |  | kg/m3 |
| Viscosity at 50°C |  |  | cSt |
| Sulfur content |  |  | %m/m |
| % MCR (Carbon Residue) |  |  | %m/m |
| % Asphaltenes (when available) |  |  | %m/m |

## Fuel Bias Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Ash content |  |  | %m/m |
| Vanadium (V) content |  |  | mg/kg |
| Sodium (Na) content |  |  | mg/kg |
| Aluminium+Silicon (Al+Si) content |  |  | mg/kg |
| Nitrogen (N) (when available) |  |  | %m/m |

## FIA-100 Test Results

|  |  |  |
| --- | --- | --- |
| ECN (Estimated Cetane Number) |  | - - |
| ID (Ignition Delay) |  | ms |
| MCD (Main Combustion Delay) |  | ms |
| EC (End Combustion) |  | ms |
| CP (Combustion Period = EC-ID) |  | ms |
| ABP (After Burning Period) |  | ms |
| max ROHR level |  | bar/ms |
| PMR (Position of max ROHR) |  | ms |

## Parameters reported according to test method IP541/06 (FIA-100 FCA)

## Additional comments