

CealDoctor / Nano Doctor Test Result in Tug boat

| | | | | | |
|--------------------------------------|---------------|---------------------------------------|----------------------|---------------|--|
| Vessel information (Daedong No.6) | Engine Type | 니가다6L 22HLX (1800PS x 2 : 3,600PS) | Products Information | Products Name | Nano Doctor / CealDoctor |
| | Engine Oil | SAE#40 (1,600liter) | | Model name | NanoDoctor Turbo |
| | Oil Tank Type | Sump Type | | Ingredient | Cu-Ni Alloy nano powder |
| | Fuel Type | Bunker A | | Test Period | April 15th ~ July 14th 2011 (3months) |

| Test Contents | Test Article | Test Result | | | |
|---------------|---------------------------------|---|---|--|--|
| | | Index | 1st Injection(1.25% Add.) (20liter CD injection) | 2nd Injection(1.88% Add) (10liter CD injection) | 3rd Injection(2.5% Add.) (10liter CD injection) |
| | Fuel Usage | 100 | n/a | n/a | n/a |
| | Exhaust Gas | 100 | 70 | 50 | 30 |
| | Oil Usage | 100 | n/a | n/a | n/a |
| | Oil filter cleaning time | 100 | 135 | 160 | 175 |
| Final Comment | Fuel Efficiency | As the running speed (RPM) in Tug boat is very flexible, It is very difficult to measure Fuel Efficiency. But in consideration of Fuel efficiency in Sampan boat, reduction of exhaust gas & increase of the interval of Oil filter cleaning in Tug boat, It can be assumed to have effect 5 ~ 7% of Fuel efficiency. | | | |
| | Reducing Exhaust Gas | Reduction of Exhaust Gas was around 70% after final 3rd injection. | | | |
| | Reducing Engile Oil consumption | 64 ~ 98liter/month of engine oil reduction due to the increasing of the interval of oil filter cleaning. (Oil filter cleaning : Before - 90 ~ 100times/month VS After - 51 ~ 58times/month) (Oil damage : 2liter engine oil damage in 1time engine oil filter cleaning) | | | |
| | Oil filter cleaning time | Interval of oil filter cleaning time was incresed from 2hours to 3.5hours. | | | |

* Index (100) is an assumed figure for a criterion of the state of ship before injection CealDoctor.

