

TASA  
Tecnológica de Alimentos  
Peru



Fuel: Diesel

Machine/Type: Boat/Engine

Test: Combustion Efficiency

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Xp Lab, Inc.

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# CASE STUDY



April 2, 2012

TASA – 44/IT12-03

## OBJETIVE

Verify the benefits of fuel additive: Xp3.

Using Xp3 fuel additive should: improve combustion efficiency by eliminating the presence of water, stabilize the volatile chains, better the oxygen input during combustion, clean, and reduce deposits.

Those improvements should translate in an increase in the engine power or fuel savings, as well as a reduction in the emissions.

## TESTING

For that purpose we requested the Fishing Division Management to make Tasa 44 ship available for the test, which was conducted in Callao on the December 26 and 27, 2012. The test was performed in two stages:

- 1st day – a base line was established without additive
- 2nd day – with additive

We hired the principal engine manufacturer's representatives, MAN Ferrostal, who sent 2 technicians to be present during the test.

### Principal Motor Details

|                       |                  |
|-----------------------|------------------|
| Make and Mode         | MAN 6L 23/30     |
| Power @ Speed         | 1287 hp @900 rpm |
| Capac. Tk comb PpBr   | 2000 gal         |
| Capac. Tk comb PpEr   | 2000 gal         |
| Capac. Tk comb PpBr   | 1800 gal         |
| Capac. Tk comb PpEr   | 1800 gal         |
| Capac. Tk comb. Daily | 800 gal          |

#### Participants:

- Javier Alvarado TASA, Projects
- Emiliano Almeyda TASA, Projects
- Robert Minaya TASA, Equip. Engineer
- Pedro Portal Ferrostal, Technician

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## DATA WITHOUT ADDITIVE

Test: TASA 44 – Xp3 Additive – 26/12/2011

| HOUR           | LOAD % | RACK | SPEED km     |
|----------------|--------|------|--------------|
| 02:00 p.m.     | 100    | 26   | 12.6         |
| 02:03 p.m.     | 100    | 26   | 12.8         |
| 02:09 p.m.     | 100    | 26   | 12.7         |
| 02:10 p.m.     | 100    | 26   | 12.6         |
| <b>AVERAGE</b> |        |      | <b>12.68</b> |

*All tests were directed at 180°*

We had access to the technical report issued by MAN Ferrostal, from which we summarized the following principal data:

- Engine velocity 900 rpm
- Rack 26 each unit
- Flow Control 16 mm
- Exhaust Temperature 300° C
- Units 1 al 6 Temperature 350, 340, 325, 330, 330, 330, °C
- Units 1 al 6 Pmax 140, 143, 140, 140, 140, 140 , bar
- Vessel Speed 12.6 nuts
- Fuel consumption 60 gl/h
- Turbo Charge Air Pressure 95 bar
- Turbo Air Charge Temp. 38 °C

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## DATA WITH ADDITIVE

Test: TASA 44 – Xp3 Additive – 27/12/2011

| HOUR            | LOAD % | RACK | SPEED km     |
|-----------------|--------|------|--------------|
| 02:16 p.m.      | 100    | 26   | 13           |
| 02:18 p.m.      | 100    | 26   | 13.2         |
| 02:22 p.m.      | 100    | 26   | 13.2         |
| 02:24 p.m.      | 100    | 26   | 13.0         |
| 02:26 p.m.      | 100    | 26   | 13.3         |
| <b>PROMEDIO</b> |        |      | <b>13.14</b> |

*All tests were directed at 180°*

To homogenize the mixture of the additive in the aft and day tanks, the entire contents of the day tank was transfer twice to the aft tank.

We had access to the technical report issued by MAN Ferrostal, from which we summarized the following principal data:

- Engine velocity 900 rpm
- Rack 26 each unit
- Flow Control 16 mm
- Exhaust Temperature 310° C
- Units 1 al 6 Temperature 355, 350, 330, 335, 335, 335, °C
- Units 1 al 6 Pmax 145, 150, 145, 150, 145, 150 , bar
- Vessel Speed 12.6 nuts
- Fuel consumption 60 gl/h
- Turbo Charge Air Pressure 1.95 bar
- Turbo Air Charge Temp. 38 °C

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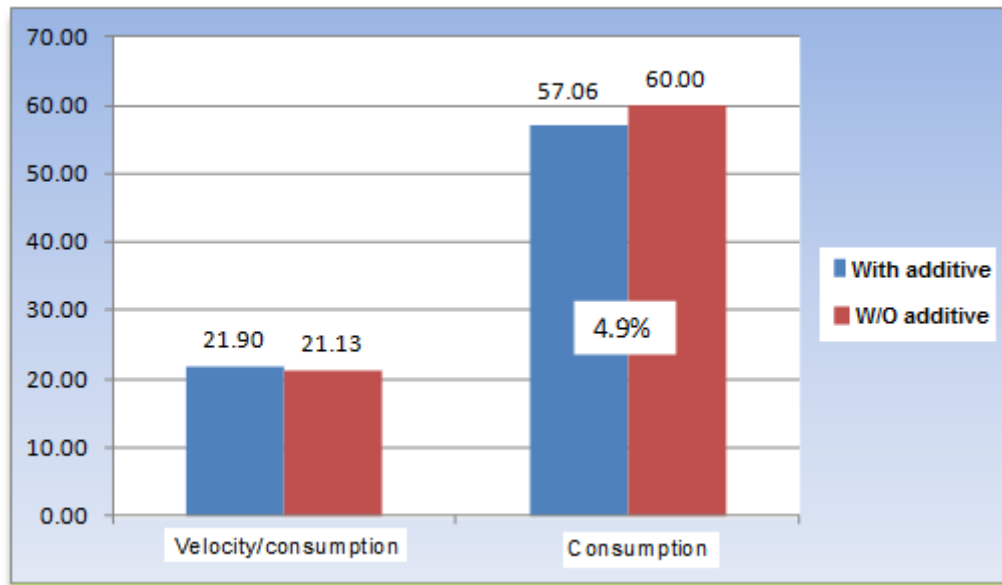
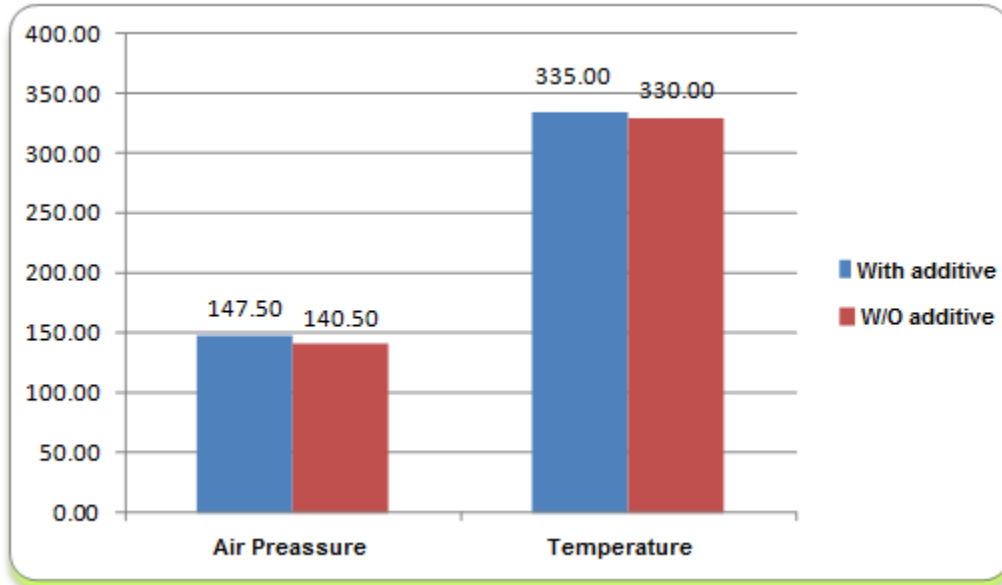
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## COMPARATIVE RESULTS



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## CONCLUSIONS

- The Pmax power pressure increased 5° C, which indicates that power increased approximately 5% in each unit. In order not to affect the life of the engine, we should reduce the fuel injected into the system.
- The increase in the exhaust temperatures of 5°C is the result of the increase in the power.
- The speed of the vessel increased in approximate 0.5 knots.
- If we reduce the increase in power it will translate in a 5% fuel savings keeping the vessel at the same speed.
- It is common to see black smoke emanating from the exhaust pipe, however it decreased considerably after the use of the additive, which is a good sign of a more complete combustion. Consequently there is the added benefits of saving and caring for the environment.