

Private Label

Mexico City  
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In response to your request of November 8 of this year for the evaluation in laboratory tests of Blue Sky additive D-1280X, we are herein attaching the results of such tests done with commercial Pemex-Diesel. In accordance with recommendations given to us by your company, the dosage of the additive used was at the volume rate of 1 of additive by 1280 of diesel.

The results show a satisfactory performance in the detergency evaluation, since the fume emissions determined in Bosch fume units (UHB) diminished from 3.14 to 1.6. We should point out that the emissions are also lower than the 1.76 UHB reference parameter empirically determined to rate additives with the potential of good performance in cleaning the fuel injection system of diesel engines.

We also have a satisfactory performance with respect to particulate matter emissions, since we registered a reduction from 0.08 to 0.03 g/BHP-Hr with the use of the additive.

On the other hand, in the lubricity test, using the ASTM-D-6079 Standard Method, a slight increase was noticed in the lubricant characteristics of the fuel, although not enough to fulfill the specifications of 0.45 mm maximum evidence of wear. In the rest of the tests, rust prevention, oxidation stability, and low temperature fluidity, no changes were observed in the performance of Pemex-Diesel with the use of this additive.

If you have any questions or doubts we would be happy to be of help.

Yours sincerely,

Olga Pie Contijoch (Chemical expert)  
Fuel Additive Area

Copy to Engineer J. Huascar Angulo García. Chemical Products Manager.

## **Summary of Test Methods.**

### **NACE-TM-01-72. Determining Corrosive Properties of Cargoes in Petroleum Product Pipelines.**

300 ml of fuel are placed in a 400 ml Berzelius beaker in a controlled bath at 38 °C. A cylindrical iron specimen is introduced in the beaker and the fuel is stirred for 30 minutes, 30 ml of distilled water are then added and the test is kept stirring for a further 3.5 hours at a temperature of 38 °C. Once the test is done the iron specimen is cleaned with acetone to determine the area of corrosion.

### **ASTM-D1094- Standard Test Method for Water Reaction of Aviation Fuels.**

Using a standard technique, a sample of fuel is stirred at room temperature and in a perfectly clean test-tube with a regulating solution of phosphate compounds. The cleanliness of the test-tube is evaluated. The change in volume of the water layer and the appearance of the interface are used to evaluate the fuel's reaction to water.

### **Method for Determining Detergency in Monocylindrical Engines.**

The process consists in the measuring of fumes emitted by a diesel engine operating during 15 hours with diesel without the additive. The average of these evaluations is then compared to the average obtained in the same way by using diesel with the additive and the percentage of decrease or increase is determined.

### **Method For Determining Emissions of Particles in Monocylindrical Engines.**

The process consists in the measuring of particles obtained when passing a sample of escape gases from a monocylindrical engine through a membrane of 0.5 microns. The engine is connected to an alternate current generator which gives a sequence of charges of 0, 20, 40, 60, 80 and 100% of the engine's power. The average of particulate matter emissions is determined for the diesel fuel with and without the additive, and the specific percentages of decrease or increase are also determined.

### **ASTM-D-2274-01. Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)**

A 350 ml sample of filtered diesel is heated at 95 °C (203 °F) for 16 hours, bubbling oxygen through the sample at a rate of 3 liters per hour. After the aging process is completed the sample is cooled at room temperature before filtering it to obtain the amount of filterable insolubles. The insolubles that adhere to the walls of the oxidation cell and glass equipment are removed with a trisolvent. The trisolvent is then evaporated to obtain the amount of adherent insolubles. The sum of filtered and adhered insolubles, expressed in milligrams per 100 ml, is given as the total of insolubles.