Measuring NO_x Reduction on Heavy Duty and Light Duty Diesel Engines

Using Power Service Diesel Injector & DPF Flush

By Power Service Products, Inc.

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POWER SERVICE PS® Diesel Additives

PROPRIETARY TO POWER SERVICE PRODUCTS, INC.

MEASURING NO_X REDUCTION ON HEAVY DUTY AND LIGHT DUTY DIESEL ENGINES

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Abstract

This study evaluated the effectiveness of Power Service Diesel Injector & DPF Flush in reducing nitrogen oxide (NOx) emissions in both light-duty and heavy-duty diesel vehicles across various engine operating speeds. Three diesel vehicles—a 2024 Peterbilt 579, a 2024 GMC 2500, and a 2023 GMC 1500—were tested using an MRU Ampro Plus Gas Analyzer. NOx emissions were measured at idle, mid-range, and high RPMs before treatment, after treatment, and following extended operation to assess maintenance of emissions improvements. Fuel tanks were dosed with manufacturer-recommended amounts of Diesel Injector & DPF Flush, and treated emissions data were collected after typical driving conditions. Results showed consistent NOx reductions across all vehicles and operating ranges: the Peterbilt exhibited an average 16.2% reduction, the GMC 2500 achieved a 74.7% reduction, and the GMC 1500 showed a 62.7% reduction. Overall, an average NOx emissions reduction of 51.2% was observed and maintained across all testing conditions. These findings suggest that the Diesel Injector & DPF Flush can effectively and sustainably lower NOx emissions in a variety of diesel vehicle applications.

Objective

Determine if the use of Diesel Injector & DPF Flush lowers the NOx emissions on light duty and heavy duty diesel vehicles at different operating RPMs.

Materials

1. Diesel vehicles
    a. 2024 Peterbilt 579

This vehicle hauls the same load the same route each day from Houston, TX to Weatherford, TX. Driver fuels at the same fuel station every fill-up.

b. 2024 GMC 2500
This vehicle is a daily driver. It travels to and from home and the office. It occasionally travels longer distances and pulls bumper pull trailers.

c. 2023 GMC 1500
This vehicle is a company vehicle that travels long distances covering Texas, Oklahoma, Arkansas, Louisiana, New Mexico, and Colorado.

2. Power Service Diesel Injector & DPF Flush 1:500 treatment ratio
3. MRU Ampro Plus Gas Analyzer

Methods

Data was collected on each vehicle using the MRU Ampro Plus Gas Analyzer. Baseline data was collected when the fuel was untreated with any type of diesel additive. Treated data was collected after fuel with Diesel Injector & DPF Flush was ran through. A final test was ran to determine if improvements in emissions could be maintained.

1. Baseline emissions data was captured at idle, normal operating rpm, and max rpm for each vehicle. Specific testing information for each vehicle is listed below.
    a. 2024 Peterbilt 579
        i. Idle, 1200 rpm, 1400 rpm
        ii. Mileage at first measurement 55,028
    b. 2024 GMC 2500
        i. Idle, 1500 rpm, 3000 rpm
        ii. Mileage at first measurement 21,490
    c. 2023 GMC 1500
        i. Idle, 1500 rpm, 3000 rpm
        ii. Mileage at first measurement 72,118
2. Treat fuel with Diesel Injector & DPF Flush. Tank information and additive amounts listed below
    a. 2024 Peterbilt 579
        i. 2-135 gallon fuel tanks.

ii. 70 ounces of Diesel Injector & DPF Flush

b. 2024 GMC 2500

i. 35 gallon fuel tank

ii. 9 ounces of Diesel Injector & DPF Flush

c. 2023 GMC 1500

i. 24 gallon fuel tank

ii. 6 ounces of Diesel Injector & DPF Flush

3. Treated emissions data was collected at the same rpm listed in baseline testing.

a. 2024 Peterbilt 579

i. Idle, 1200 rpm, 1400 rpm

ii. Mileage at second measurement 55,638

iii. Total miles traveled 610

b. 2024 GMC 2500

i. Idle, 1500 rpm, 3000 rpm

ii. Mileage at second measurement 21,650

iii. Total miles traveled 160

c. 2023 GMC 1500

i. Idle, 1500 rpm, 3000 rpm

ii. Mileage at second measurement 72,340

iii. Total miles traveled 222

4. Maintenance emissions data was collected at the same rpm listed in baseline and treated testing.

a. 2024 Peterbilt 579

i. Idle, 1200 rpm, 1400 rpm

ii. Mileage at final measurement 56,260

iii. Total miles traveled 1232

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b. 2024 GMC 2500

   i. Idle, 1500 rpm, 3000 rpm

   ii. Mileage at final measurement 21,734

   iii. Total miles traveled 244

c. 2023 GMC 1500

   i. Idle, 1500 rpm, 3000 rpm

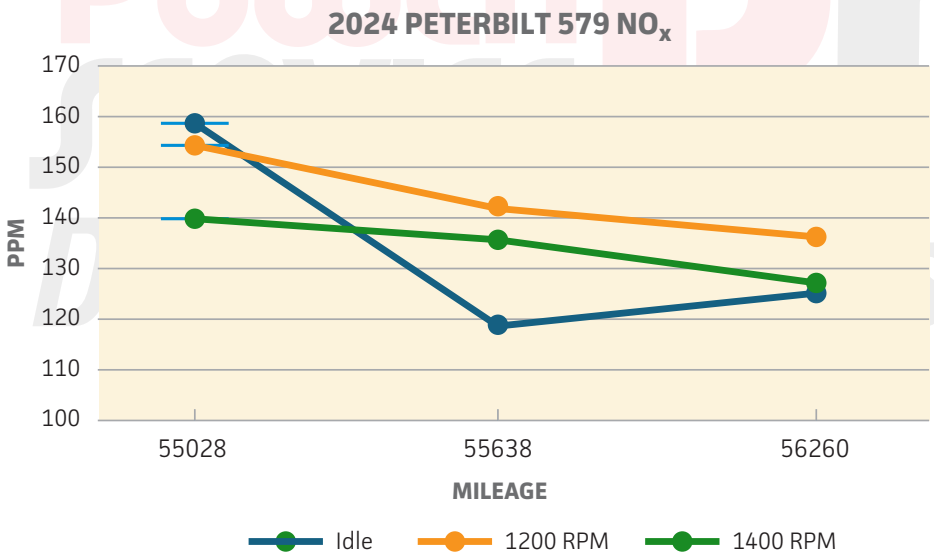
   ii. Mileage at final measurement 73,066

   iii. Total miles traveled 948

Results

Data from each vehicle is listed below:

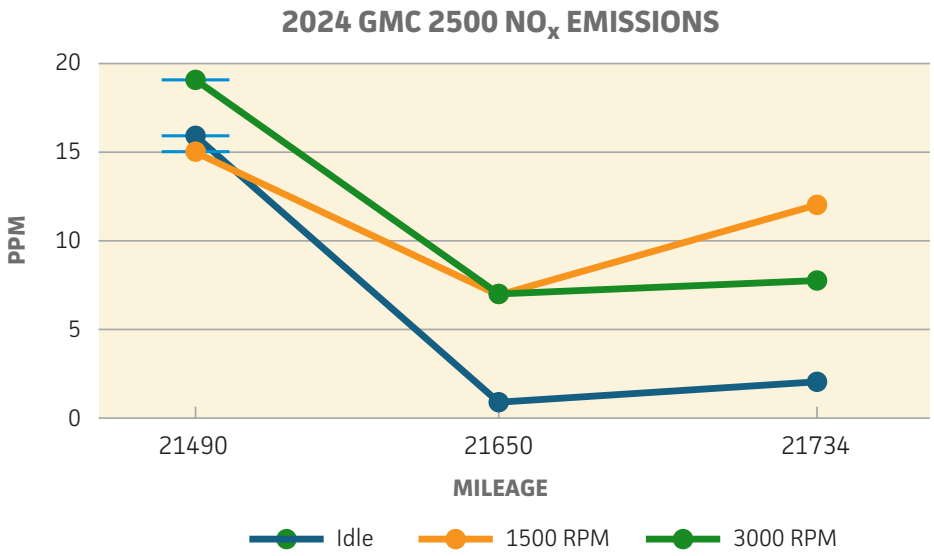
1. 2024 PETERBILT 579



2024 PETERBILT 579 NO_x PPM

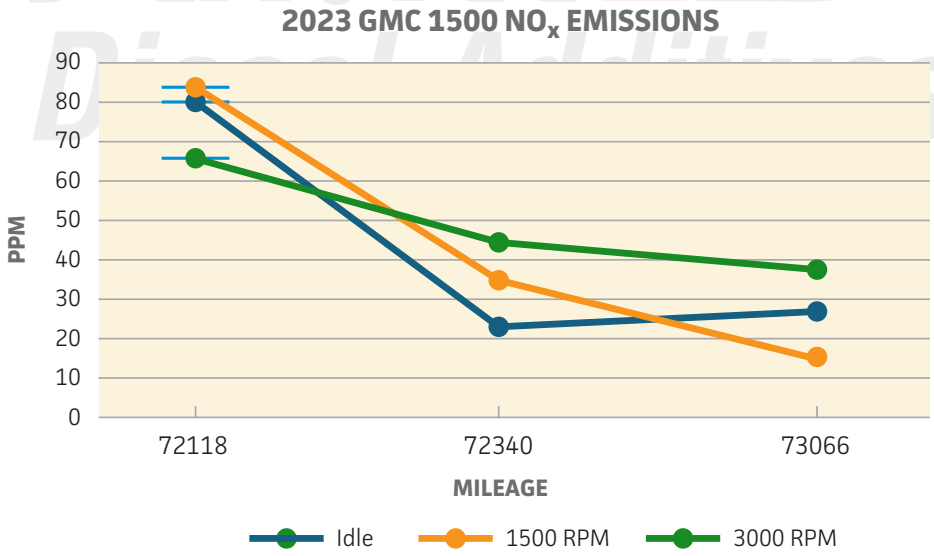
Mileage	55028	55638	56260
Idle	159	119	125
1200 RPM	155	142	137
1400 RPM	140	126	118

2. 2024 GMC 2500



2024 GMC 2500 NO_X EMISSIONS			
Mileage	**21490**	**21650**	**21734**
Idle	16	1	1
1500 RPM	15	7	4
3000 RPM	19	7	7

3. 2023 GMC 1500



2023 GMC 1500 NO_X EMISSIONS			
Mileage	**72118**	**72340**	**73066**
Idle	80	23	27
1500 RPM	84	35	16
3000 RPM	66	44	39

Conclusions

1. 2024 Peterbilt 579
    a. Idle: NOx started at 159 ppm with the untreated fuel, decreased to 119 ppm immediately after treating, and ended with 125 ppm. Overall, a decrease of 21.5%
    b. 1200 rpm: NOx started at 155 ppm, decreased to 142 ppm, and ended with 137 ppm. A total decrease of 11.6%
    c. 1400 rpm: NOx started at 140 ppm, decreased to 126 ppm, and ended at 118 ppm. A total decrease of 15.7%.
    d. Average over all tests was 16.2% reduction on NOx levels.
2. 2024 GMC 2500
    a. Idle: NOx started at 16 ppm with the untreated fuel, decreased to 1 ppm immediately after treating, and ended with 2 ppm. Overall, a decrease of 87.5%
    b. 1500 rpm: NOx started at 15 ppm, decreased to 7 ppm, and ended with 4 ppm. A total decrease of 73.3%
    c. 3000 rpm: NOx started at 19 ppm, decreased to 7 ppm, and ended at 7 ppm. A total decrease of 63.2%.
    d. Average over all tests was 74.7% reduction on NOx levels.
3. 2023 GMC 1500
    a. Idle: NOx started at 80 ppm with the untreated fuel, decreased to 23 ppm immediately after treating, and ended with 27 ppm. Overall, a decrease of 66.3%
    b. 1500 rpm: NOx started at 84 ppm, decreased to 35 ppm, and ended with 16 ppm. A total decrease of 81.0%
    c. 3000 rpm: NOx started at 66 ppm, decreased to 44 ppm, and ended at 39 ppm. A total decrease of 40.9%.
    d. Average over all tests was 62.7% reduction on NOx levels.
4. Overall Conclusions
    a. A 51.2% average reduction in emissions over all testing levels and all vehicles was observed and was maintained.

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