

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-312
Relating to Exemptions Under Section 27156
of the Vehicle Code

IRAAL, INCORPORATED
HYDRO POWER PAK MODEL 1200T

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-5;

IT IS ORDERED AND RESOLVED: That the installation of the Hydro Power Pak Model 1200T manufactured by Iraal, Inc., RR1 Box 111, Keosauqua, Iowa, 52565, has been found not to reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for all 1993 and older model-year heavy-duty diesel fueled engines.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different from those submitted by the vehicle manufacturer.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Marketing of this device using an identification other than that shown in this Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF IRAAL, INC.'S HYDRO POWER PAK MODEL 1200T.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at El Monte, California, this 10th day of August, 1993.


R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF IRAAL, INC.'S HYDRO POWER PAK MODEL 1200T
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF
THE CALIFORNIA CODE OF REGULATIONS

August 1993

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by

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(This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

Iraal, Inc., of RR1 Box 111, Keosauqua, Iowa, 52565, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for their Hydro Power Pak Model 1200T device. The Hydro Power Pak Model 1200T device is designed for installation on all 1993 and older model-year heavy-duty diesel fueled engines.

Iraal, Inc. has submitted a completed application and all the required information. Based on independent laboratory emissions test results, the Hydro Power Pak Model 1200T device was found not to have any adverse effects on emissions.

The staff recommends that Iraal, Inc. be granted exemption as requested and that Executive Order D-312 be issued for the Hydro Power Pak Model 1200T device.

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I. INTRODUCTION

Iraal, Inc., of RR1 Box 111, Keosauqua, Iowa, 52565, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for their Hydro Power Pak Model 1200T device. The Hydro Power Pak Model 1200T device is designed for installation on all 1993 and older model-year heavy-duty diesel fueled engines.

Iraal, Inc. has submitted a completed application and all the required information.

II. CONCLUSION

Based on independent laboratory emissions testing, the staff concludes that the installation of the Iraal, Inc.'s Hydro Power Pak Model 1200T device will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that Iraal, Inc. be granted exemption as requested and that Executive Order D-312 be issued for the Hydro Power Pak Model 1200T device.

IV. DEVICE DESCRIPTION

The Hydro Power Pak Model 1200T device creates and supplies hydrogen and oxygen mixed with air to the engine. The device may be installed on all 1993 and older model-year heavy-duty diesel fueled engines.

The device consists of an 11 inch square by 15.5 inch tall box with a tightly fitted lid. Two electrical connections are provided on opposite

sides of the box. On top of the lid, an air cleaner is attached which acts as the device's air intake. Four holes are drilled through the lid allowing air to enter the main chamber of the device. In the center of the lid extending through and sealed from the air cleaner chamber is the output tube connecting the main device chamber with the supply hose connecting to the engine air intake.

Inside the box and connected to the external electrical connections are vertically oriented anode and cathode plates. During operation, these plates are submerged in an electrolyte solution consisting of Glacial Acetic Acid. According to the manufacturer, an electrolyte solution containing 1% to 1 1/2% acetic acid and distilled water will produce optimum results. With these concentrations, the electrolyte keeps the cathode and anode plates clean, creates its own buffer and removes the gas bubbles that form on the plates. Additionally, the manufacturer claims this concentration of acetic acid will put the proper pressure on the chemical reaction occurring in the electrolysis process and, thus, produces higher amounts of hydrogen gas.

According to the manufacturer, this device when connected to the vehicle's main electrical power supply produces hydrogen and oxygen which reduces emissions, carbon deposits and increases power and fuel mileage.

V. HYDRO POWER PAK MODEL 1200T DEVICE EVALUATION AND DISCUSSION

A 1987 Chevrolet Silverado C20 pick-up truck equipped with an 6.2 liter diesel engine was used for the evaluation of the Iraal, Inc.'s Hydro Power Pak Model 1200T. The dynamometer inertia weight and loading were calculated by procedures as outlined in "Procedures For Exemption of Add-on and Modified Parts", paragraph III.F.. The dynamometer inertia weight and loading used were 6500-lbs and 18.4-hp respectively.

Comparative emissions tests were conducted by Mercedes-Benz Service Corp., Ann Arbor Emission Test Laboratory, Ann Arbor, Michigan. Testing consisted of one Cold-Start CVS-75 emission test in the modified (Hydro Power Pak Model 1200T device installed) configuration, followed by one Cold-Start CVS-75 emission test in the unmodified (baseline) configuration. The Air Resources Board did not perform tests to confirm the test results submitted by the applicant. A summary of the test results are shown below.

Exhaust Emissions Test Results
On A 1987 Chevrolet C20

Test Mode	Exhaust Emissions (gm/mi)			
	<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>
Baseline	0.200	1.35	3.31	0.745
Device	0.221	1.34	3.26	0.735
Difference	+0.021	-.01	-.05	-.010
% Difference	+10.5%	-.1%	-1.5%	-1.3%

The differences between the device emission test results and baseline emission test results submitted by the applicant were within the allowed limits of .1 gm/mile HC, 1.0 gm/mile CO, .1 gm/mile NOx and .03 gm/mile PM as specified in the "Procedures for Exemption of Add-On and Modified Parts." Therefore, the installation of the Iraal, Inc.'s Hydro Power Pak Model 1200T did not have an adverse effect on exhaust emissions on the test vehicle.

Smoke opacity tests were also conducted at the Mercedes-Benz Laboratory using the snap-idle test procedures developed by the Air Resources Board. The snap-idle tests were conducted subsequent to the FTP dynamometer test sequence. A summary of the smoke opacity test results are shown on the following page.

Smoke Opacity Test Results
(Mercedes-Benz Laboratory)

<u>Test Number</u>	<u>Opacity in Percent</u>	
	<u>Baseline</u>	<u>With Device</u>
1	16	11
2	38	14
3	33	15
4	29	13
5	23	21
6	29	17

All smoke opacity levels are below the 40 percent opacity standard required under Title 13, California Code of Regulations, Section 2180 through 2187.

Iraal, Inc. claims that results in the field and laboratory consistently show reductions in fuel consumption, opacity, and emissions of hydrocarbons, carbon monoxide, nitrogen oxides, and particulates. However, with the exception of the reduction of opacity, the test results from the Mercedes-Benz Laboratory did not support these claims.

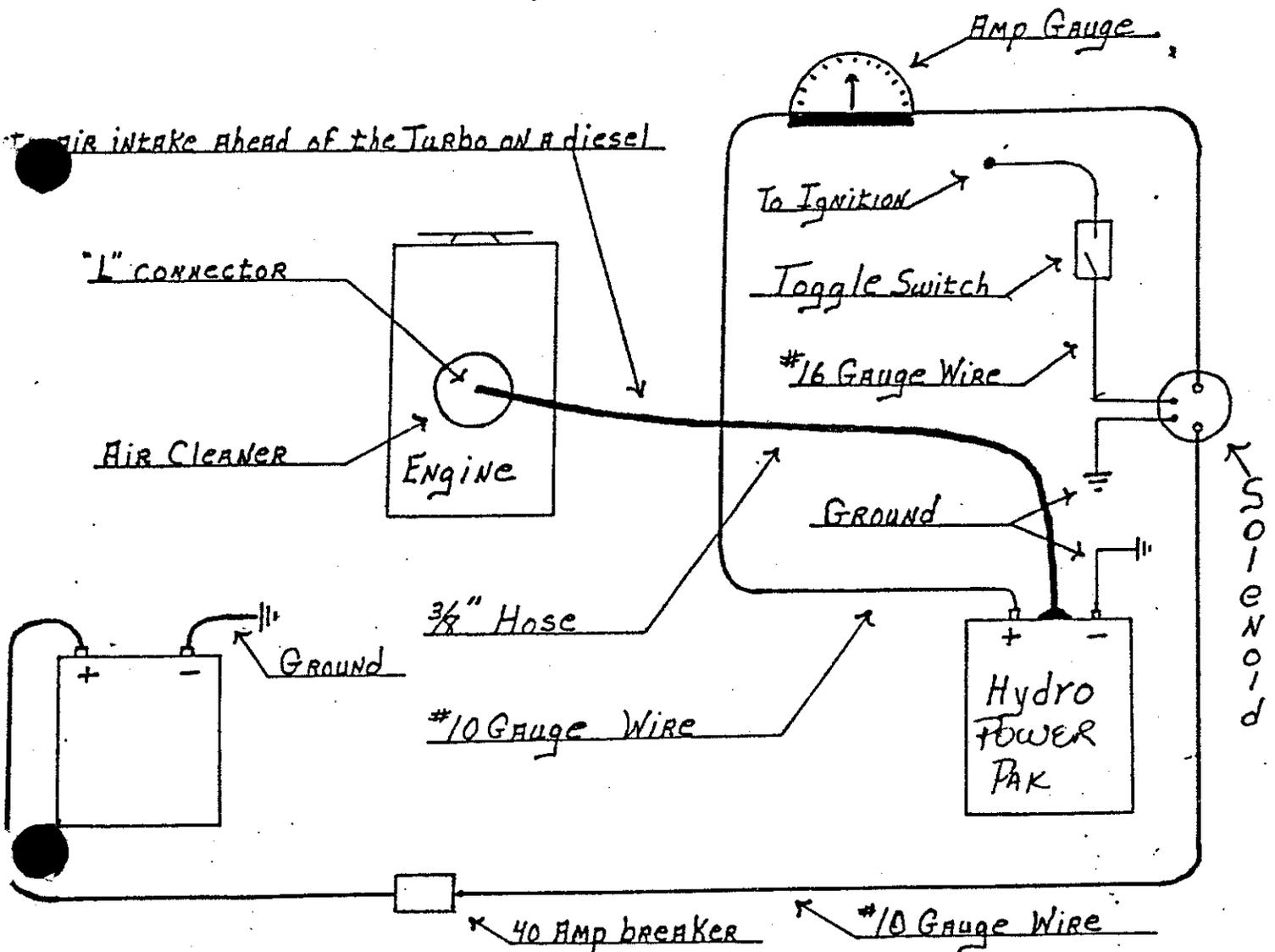
Based on the test results, the staff concludes that the installation of the Iraal, Inc. Hydro Power Pak Model 1200T device will not have an adverse effect of exhaust emissions on the affected vehicles. Iraal, Inc. submitted all the required information and fulfilled the requirements for exemption.

APPENDIX

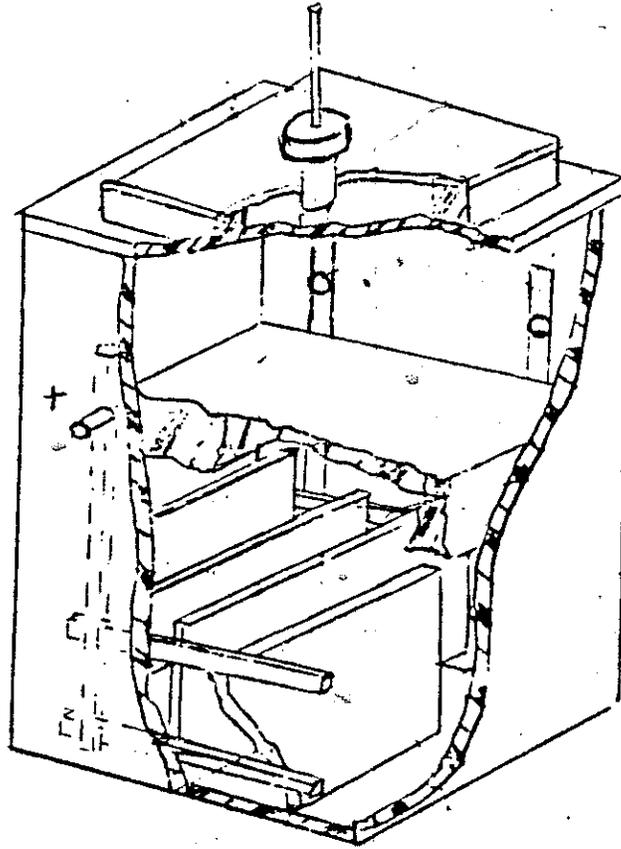
APPENDIX A:

INSTALLATION INSTRUCTIONS
OF HYDRO POWER PAK

1. Determine where the HYDRO POWER PAK is to be mounted. Attach bracket to wall securely. Layout 10 ga. wire with inline breaker from battery to solenoid.
2. Install Amp. Gauge and toggle switch in cab where desired.
3. Run 10 gauge wire from one side of solenoid to the Amp. Gauge.
4. Run 10 gauge wire from the other side of Amp. Gauge to the plus side of the HYDRO POWER PAK
5. Run 10 gauge wire from minus side of HYDRO POWER PAK to grounding point.
6. Run 16 gauge wire from small post to solenoid to grounding point.
7. Run 16 gauge wire from the other small post on solenoid to one side of the toggle switch.
8. Run 16 gauge wire from other side of toggle switch to ignition switch in on position - not accessory position.
9. On a gas or propane engine run the 3/8 inch hose from the "L" outlet on top of the HYDRO POWER PAK to the "L" connection on top of the air cleaner housing. On a diesel connect 1/2 inch hose to air intake just ahead of the turbo.



APPENDIX B:



THE HYDRO POWER PAK MODEL 1200T