

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-156-1
Relating to Exemptions under Section 27156
of the Vehicle Code

LUMENITION LIMITED
"LUMENITION"

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 Lumenition ignition system manufactured by Lumenition Limited, and distributed by O.G.A. International, of 1100 Owendale, Suite E, Troy, Michigan 48083-1970, 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 1981 and older model-year vehicles with a four-cylinder or six-cylinder engine and originally equipped with a Kettering-type (point-type) or electronic ignition systems.

The device consists of a light emitting diode with a detector block, a chopper, and a power module (PMA50, PMA60, FK109, or FK110).

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 device 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.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board. Exemption of a kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of a kit as an individual device.

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 THE LUMENITION IGNITION SYSTEM.

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.

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.

Executive Order D-156, dated May 6, 1985, is superseded and of no further force and effect.

Executed at El Monte, California, this 26th day of July, 1985.



K. D. Drachand, Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF LUMENITION LIMITED'S "LUMENITION" IGNITION SYSTEM FOR
EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN
ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE
CODE

July 15, 1985

EVALUATION OF LUMENITION LIMITED'S "LUMENITION" IGNITION SYSTEM FOR
EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN
ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE
CODE

by

State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

(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

O.G.A. International, of 1100 Owendale, Suite E, Troy, Michigan 48083-1970, on behalf of Lumenition Limited, has applied for an exemption from the prohibitions in Vehicle Code (V.C.) Section 27156 for the "Lumenition" optronic ignition system. Exemption is requested for 1981 and older model-year vehicles with a four-cylinder or six-cylinder engine and originally equipped with a Kettering-type (point-type) or electronic ignition systems.

O.G.A. International has submitted comparative (without and with the Lumenition system installed on test ignition distributors) ignition system bench test data on five ignition distributors (a Ford Motorcraft, a Toyota Nippondenso, a Volkswagen Bosch, a Datsun Hitachi, and a Saab Delco brand).

Based on the comparative ignition system bench test data submitted by O.G.A. International, the staff concludes that the "Lumenition" ignition system complies with the requirements for the V.C. Section 27156 exemption and that the system will have no adverse effect on exhaust emissions from vehicles for which exemption is requested.

The staff recommends that Lumenition Limited, through O.G.A. International, be granted a V.C. Section 27156 exemption for the "Lumenition" ignition system as requested and that Executive Order D-156-1 be issued.

CONTENTS

	<u>Page Number</u>
<u>SUMMARY</u>	i
<u>CONTENTS</u>	ii
I. <u>INTRODUCTION</u>	1
II. <u>CONCLUSIONS</u>	1
III. <u>RECOMMENDATIONS</u>	1
IV. <u>LUMENITION IGNITION SYSTEM DESCRIPTION</u> <u>AND OPERATION</u>	2
V. <u>EVALUATION</u>	2
VI. <u>RESULTS</u>	3
VII. <u>DISCUSSION</u>	3
<u>APPENDICES</u>	
DIAGRAM	A-1
TEST DATA	B-1

EVALUATION OF LUMENITION LIMITED'S "LUMENITION" IGNITION SYSTEM FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

I. INTRODUCTION

O.G.A. International, of 1100 Owendale, Suite E, Troy, Michigan 48083-1970, on behalf of Lumenition Limited, has applied for an exemption from the prohibitions in Vehicle Code (V.C.) Section 27156 for the "Lumenition" ignition system. Exemption is requested for 1981 and older model-year vehicles with a four-cylinder or six-cylinder engine and originally equipped with a Kettering-type (point-type) or electronic ignition systems.

O.G.A. International has submitted comparative (without and with the Lumenition system installed on test ignition distributors) ignition system bench test data on five ignition distributors (a Ford Motorcraft, a Toyota Nippondenso, a Volkswagen Bosch, a Datsun Hitachi, and a Saab Delco brand).

II. CONCLUSIONS

Based on the comparative ignition system bench test data submitted by O.G.A. International, the staff concludes that the "Lumenition" ignition system complies with the requirements for the V.C. Section 27156 exemption and that the system will have no adverse effect on exhaust emissions from vehicles for which exemption is requested.

III. RECOMMENDATIONS

The staff recommends that Lumenition Limited, through O.G.A. International, be granted an exemption from the prohibitions in V.C. Section 27156 for the "Lumenition" ignition system as requested and that Executive Order D-156-1 be issued.

IV. LUMENITION IGNITION SYSTEM DESCRIPTION AND OPERATION

The major components of the "Lumenition" ignition system are a light emitting diode with a detector block, a chopper, and a power module. The components are packaged with installation hardware and instructions and sold as a unit.

The Lumenition system utilizes the vehicle's original equipment manufacturer (OEM) coil for the primary voltage source of the ignition system.

The chopper is designed to have one blade for each cylinder, as applicable, and is fitted to the distributor cam within the ignition distributor. The detector block sits below the chopper and is mounted on the distributor stator plate. It consists of a light emitting diode and an infra-red ray detector. The detector block, in conjunction with the rotation of the chopper, receives signals that are fed into the power module for the switching of the ignition system primary coil.

The Lumenition system is available and compatible for vehicles both fitted with kettering-type or electronic ignitions originally. Fitting kits containing specific interruptor blades, screws, washers etc. are provided for specific distributors. Both fitting kits are utilizing identical power module and optical switch.

A schematic diagram of the "Lumenition" ignition system is shown in the Appendices.

V. EVALUATION

Evaluation of the Lumenition system consisted of comparing ignition system test data (without and with the Lumenition system installed on test ignition distributors) on five ignition distributors. The five Lumenition kits selected for comparative testing are:

Lumenition kit

OEM

FK3/PMA50/FK109
FK604/PMA50/FK109
LCK216X
FK637/PMA50/FK109
FK309/PMA60/FK110

Ford Motorcraft EDA22
Toyota Nippondenso 26163
Bosch 023/186001
Datsun Hitachi D609
Delco D302

These kits cover the majority of the applicable vehicles in the states as listed in the company's Application Data booklet. The tests were performed by Lumenition Limited, at their test facility, as required per Air Resources Board "Criteria for Aftermarket Ignition System Modifications" procedures.

VI. RESULTS

Lumenition Limited's test data are shown in the Appendices. The submitted test data show that:

- A. The secondary available voltage of the device test is within ten (10) percent of the baseline available secondary voltage;
- B. The rise time with the device is more than ten (10) microseconds;
- C. The spark duration with the device is more than 100 microseconds; and
- D. The spark energy with the device is not degraded by more than 20% from the baseline spark energy.

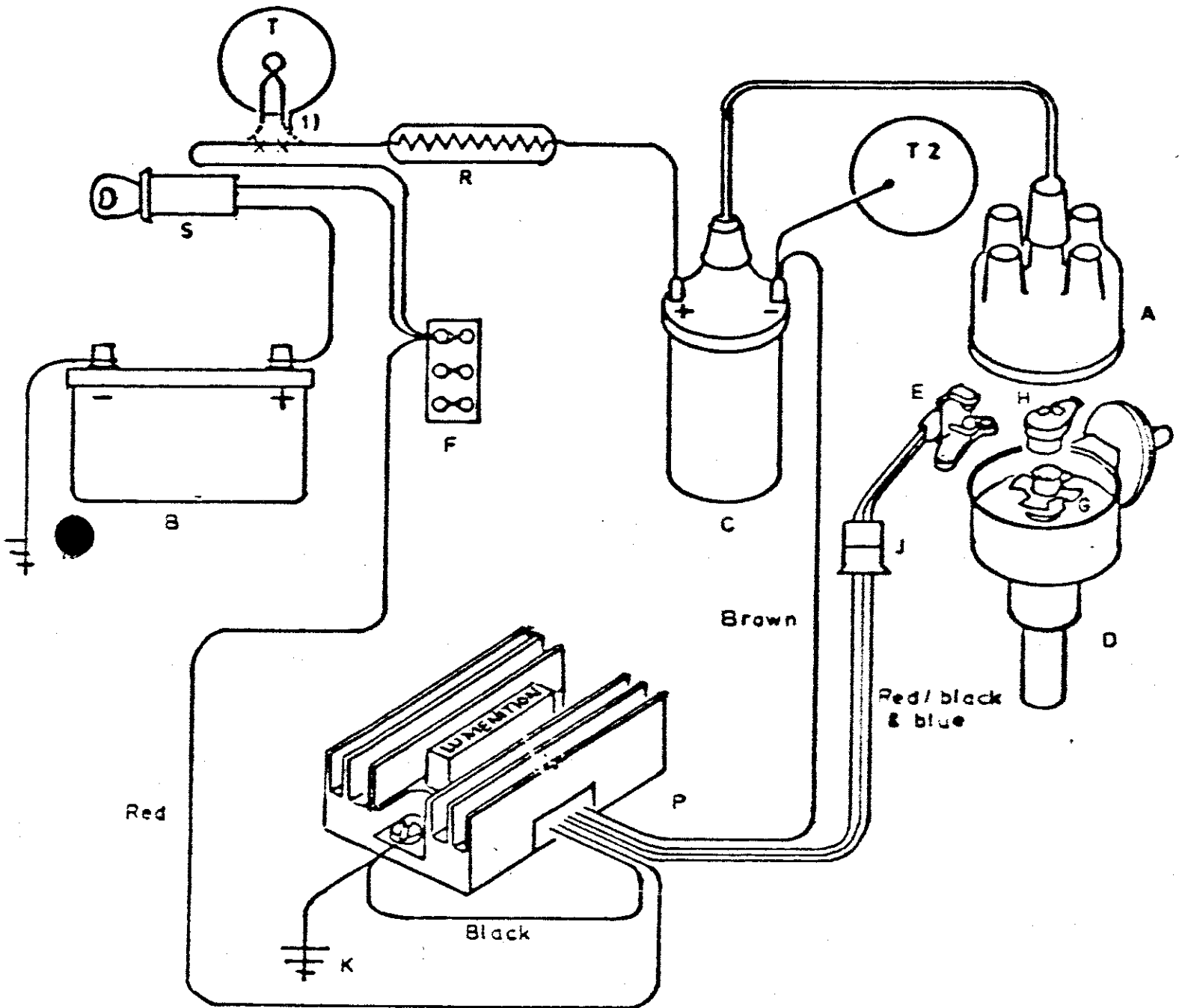
In summary, they meet the Air Resources Board's evaluation criteria for aftermarket ignition systems.

VII. DISCUSSION

Based on the applicant's bench test data, the staff concludes that the "Lumenition" ignition system complies with the requirements for the exemption from the prohibitions in V.C. Section 27156.

APPENDICES

Schematic Diagram
Lumenition Ignition System



- | | | | | | |
|---|-----------------|---|-----------------|-----|--|
| A | Distributor cap | H | Rotor | X-X | Intersect for tach. with current trigger (1) |
| B | Battery | J | Connector | T2 | Tach. with voltage trigger |
| C | Coil | K | Ground | | |
| D | Distributor | P | Power module | | |
| E | Optical Switch | R | Resistor | | |
| F | Fuse box | S | Ignition switch | | |
| G | Chopper | T | Tachometer | | |

TABLE 1

Ignition System Bench Test Data
Evaluation of Lumenition Ignition System

Ford Motorcraft Brand/4-cylinder

	Baseline			Device		
	Start	Idle	2000 RPM	Start	Idle	2000 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	36	23	17	37	24	18
Secondary Available Voltage (simulating fouled plug) (KV)	24	15	14	25	16	13
Spark Energy (mjoules)	52.8	33.8	20.7	52.9	32.6	19.4
Spark Duration (microsec.)	2000	1500	1200	2100	1550	1200
Rise Time (microsec.)	90	80	80	90	75	75

* Not affected by Lumenition ignition system.

TABLE 2

Ignition System Bench Test Data
Evaluation of Lumenition Ignition System

Toyota Nippondenso Brand/4-cylinder

	Baseline			Device		
	Start	Idle	2000 RPM	Start	Idle	2000 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	29	25	20	30	25	21
Secondary Available Voltage (simulating fouled plug) (KV)	19	14	13	20	14	13
Spark Energy (mjoules)	40.5	30	19.4	46.1	36.3	24
Spark Duration (microsec.)	1500	1000	900	1600	1100	1000
Rise Time (microsec.)	85	75	75	90	75	73

* Not affected by Lumenition ignition system.

TABLE 3

Ignition System Bench Test Data
Evaluation of Lumenition Ignition System

Volkswagen Bosch Branch/4-cylinder

	Baseline			Device		
	<u>Start</u>	<u>Idle</u>	<u>2000 RPM</u>	<u>Start</u>	<u>Idle</u>	<u>2000 RPM</u>
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	19	28	23	20	28	24
Secondary Available Voltage (simulating fouled plug) (KV)	13	19	16	14	20	17
Spark Energy (mjoules)	21	47	24	18	47.3	25.5
Spark Duration (microsec.)	1000	1400	1000	1000	1500	1100
Rise Time (microsec.)	85	70	70	85	70	70

* Not affected by Lumenition ignition system.

TABLE 4

Ignition System Bench Test Data
Evaluation of Lumenition Ignition System

Datsun Hitachi Brand/6-cylinder

	Baseline			Device		
	Start	Idle	1750 RPM	Start	Idle	1750 RPM
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	30	25	20	32	26	21
Secondary Available Voltage (simulating fouled plug) (KV)	20	15	13	20	16	14
Spark Energy (mjoules)	37.3	30	23	46.1	36.3	24
Spark Duration (microsec.)	1500	1000	980	1600	1000	1000
Rise Time (microsec.)	90	75	75	90	75	73

* Not affected by Lumenition ignition system.

TABLE 5

Ignition System Bench Test Data
Evaluation of Lumenition Ignition System

Saab Delco Branch/4-cylinder

	Baseline			Device		
	<u>Start</u>	<u>Idle</u>	<u>2000 RPM</u>	<u>Start</u>	<u>Idle</u>	<u>2000 RPM</u>
Total Spark Timing	*	*	*	*	*	*
Secondary Available Voltage (with load) (KV)	20	28	22	21	29	24
Secondary Available Voltage (simulating fouled plug) (KV)	13	19	12	14	20	16
Spark Energy (mjoules)	21	54	29	18	47.3	25.5
Spark Duration (microsec.)	1000	1500	1100	1000	1500	1100
Rise Time (microsec.)	85	70	70	85	70	70

* Not affected by Lumenition ignition system.