

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-70  
Relating to Exemptions under Section 27156  
of the Vehicle Code

MALLORY ELECTRIC COMPANY  
"MALLORY UNILITE MODEL 501"  
BREAKERLESS IGNITION CONVERSION UNIT

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 Section 39515 of the Health and Safety Code and Executive Order G-30A;

IT IS ORDERED AND RESOLVED: That the installation of the "Mallory Unilite Model 501" breakerless ignition conversion unit manufactured by Mallory Electric Company, Division of W. R. Grace & Co., 1801 Oregon Street, Carson City, Nevada 89701 has been found to not 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 installation on 1957-1974 model year vehicles equipped with a Delco 8 cylinder distributor except as follows:

- 1) Those vehicles originally equipped with breakerless ignition systems.
- 2) Those 1966 through 1970 vehicles equipped with "NOx retrofit devices" with a 4° retard in basic ignition timing (i.e., Carter, Echlin, STP Air Computer, Pure Power - Electro-NOx).

This device is a miniaturized breakerless conversion unit which is installed inside the distributor. It consists of an opto/electronic module and a shutter wheel. The electronic module consists of a light emitting diode, an infrared detector, and a transistor switching circuit.

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

MALLORY ELECTRIC CO., N.Y.  
"MALLORY UNILITE MODEL 501"  
BREAKERLESS IGNITION CONVERSION UNIT

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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.

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 "MALLORY UNILITE MODEL 501" DEVICE.

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.

Executed at Sacramento, California, this 16 day of September, 1976.

*original signed by*  
Thomas C. Austin  
Deputy Executive Officer-Technical

State of California  
AIR RESOURCES BOARD

September 8, 1976

Staff Report

Evaluation of Mallory Electric Company  
"Mallory Unilite Model 501" Breakerless Conversion Unit  
for Exemption from the Provisions of  
Section 27156 of the Vehicle Code

I. Introduction

Mallory Electric Company, Division of W. R. Grace & Co., 1801 Oregon Street, Carson City, Nevada, 89701, has applied for an exemption for its breakerless ignition conversion device. The applicant had originally applied for an exemption for 1957 through 1974 model year vehicles equipped with a Delco or Ford 8 cylinder distributor (Exhaust A). The application was later revised (Exhibit B) to include only Delco 8 cylinder distributors. This device will be marketed as "Mallory Unilite Model 501."

II. System Description

The device is a unit to replace the contact points within the distributor. It consists primarily of an opto/electronic module and a shutter wheel. The electronic module consists of a light emitting diode, an infrared detector, and a transistor switching circuit. The module has been reduced in size through the use of thick film hybrid solid state circuitry. The module is mounted onto the distributor breaker plate using the screws supplied. The shutter wheel has cut windows to allow light passage to activate the detector at the appropriate intervals. The wheel is mounted onto the distributor rotor drive plate. Exhibit C shows the electrical schematic of the device.

### III. System Evaluation

The applicant did not submit any emission data indicating the device will not have any adverse effect on the emission control system. In lieu of emission tests the applicant submitted an ignition system bench test on a 1968 Delco 8 cylinder distributor by comparing the output characteristics of the ignition system with and without the device. The test was accomplished on an ignition system simulator in accordance with "ARB Guidelines for Testing and Criteria for Emission Compliance of Ignition System Modifications". The ARB performed a confirmatory test on a 1974 Delco 8 cylinder distributor. Table I and II are the summaries of applicant's test data and ARB Laboratory test results.

The applicant's test data showed about a 20% reduction in available secondary voltage with the device installed at the condition simulating fouled spark plug. However the ARB Laboratory confirmatory test on the 1974 Delco distributor did not show any significant degradation of the secondary voltage from OEM.

Both the applicants test data and ARB Laboratory test results indicated no significant degradation of other critical ignition system parameters such as spark advance, spark energy, and spark duration.

### IV. Manufacturer's Claims

The applicant claims the installation of the device on the motor vehicles will reduce tune ups, maintenance and adjustments.

It is the staff's judgement that the installation of the device on a vehicle could result in the following:

1. This breakerless system offers potential for reduced maintenance.
2. The electrical characteristics of this system do not indicate any significant benefits on performance, fuel economy and emissions reduction greater than would be expected from a properly tuned engine.

V. Conclusion and Recommendation

The above evaluation of the "Mallory Unilite Model 501" unit by the ARB staff showed that the installation of the device will not adversely affect the ignition characteristics of the OEM ignition system.

The staff therefore recommends that Mallory Electric Company be granted an exemption from the prohibitions of Section 27156 of the California Vehicle Code for its "Mallory Unilite Model 501" for installation on 1957 through 1974 model year vehicles equipped with a Delco 8 cylinder distributor except as follows:

1. Those vehicles originally equipped with breakerless ignition systems.
2. Those 1966 through 1970 vehicles equipped with "NOx retrofit devices" with a 4° retard in basic ignition timing (i.e., Carter, Echlin, STP Air Computer, Pure Power - Electro-NOx).

Table-I MalloryUnilite Breakerless Ignition System  
 Data Summary for 1968 Delco 8 Cylinder  
 Distributor (Applicants Test Data)

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
800	0.5	0
1400	5.5	5.5
2000	14.0	13.5
2600	18.5	18.0
3000	20.5	20.5

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>
3	0	0
6	1.0	0
9	7.5	7.5
15	20.5	20.5
20	25.0	25.0

C. Spark Duration in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	800	800
3000	700	600

D. Secondary Voltage Rise Time in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	25	20
3000	30	30

E. Spark Energy in Millijoules

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	24	26
3000	14	14

F. Available Secondary Voltage in Killovolts (simulating fouled spark plug)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	15	12
3000	14	11

G. Available Secondary Voltage in Killovolts (with load)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	20	19
3000	20	17

Table II MalloryUniLite Breakerless Ignition System  
Data Summary for 1974 Delco 8 Cylinder  
Distributor (ARB Confirmatory Tests)

A. Centrifugal Spark Advance in Crankshaft Degrees

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
800	0	0
1400	2.5	3.5
2000	7.0	8.0
2600	12.5	13.5
3000	15.0	15.0

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>
3	0	0
6	10.5	10.0
9	14.5	14.5
15	14.5	14.5
20	14.5	14.5

C. Spark Duration in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	2000	1800
3000	1500	1200

D. Secondary Voltage Rise Time in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	100	100
3000	100	100

E. Spark Energy in Millijoules

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	34.2	34.2
3000	22.5	24.0

F. Available Secondary Voltage in Killovolts (simulating fouled spark plug)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	17	16
3000	14	13

G. Available Secondary Voltage in Killovolts (with load)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>
600	26	24
3000	18	19

GRACE

*Kenny  
Action Plan*

Automotive Specialties Division

W. R. Grace & Co.  
7091 Belgrave Ave.  
Garden Grove, Calif. 92641

(714) 893-0595

July 12, 1976

Mr. G. C. Hass, Chief  
Vehicle Emissions Control Program  
Air Resources Board  
9528 Telstar Avenue  
El Monte, California 91731Subject: Application for an ARB Resolution of Compliance with Section  
27156 of the California Vehicle Code.

Dear Mr. Hass:

This letter is an application for an ARB resolution of compliance with Section 27156 of the California Vehicle Code for the Mallory Unilite electronic conversion for the Delco & Ford Distributors.

I am applying for the exemption in behalf of the Mallory Electric Company, a wholly owned subsidiary of the W. R. Grace Company of New York. It is the function of our test center in Garden Grove to offer our test labs & services to the Automotive Specialties Divisions of W. R. Grace as well as represent them with all state & federal agencies.

A copy of a letter authorizing me to act in behalf of Mallory Electric is attached.

Description of Device

The device is a unique breakerless conversion ignition device that incorporates numerous design changes making it totally different than the previous SS-1 conversion unit.



# GRACE

Mr. G. C. Hass

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12 July 1976

The new unit has been reduced in size through the use of thick flim hybrid solid state circuitry allowing the entire package to be mounted inside the distributor offering simplified installation.

## Purpose of the Device

The purpose of the device is to replace the conventional breaker points with a non-contacting infrared triggered unit. The conversion eliminates the effects of point contact wear, timing changes, & reduced energy output of the conventional point contact system. It thereby offers reduced tuneup maintainance & adjustments.

## Installation Instructions

Detailed instruction sheets as well as 2 sample units will be immediately forwarded under separate cover for your evaluation.

## Test Data

Bench test data has been supplied as per The ARB guidelines of 3-1-76 for the Delco & the Ford Distributor. The tests were performed with strict adherence to the ARB guidelines for testing & evaluation of Ignition system modifications. A copy is attached

The Data on the Ford unit was taken using the earlier 1969 eccentric vacuum advance plate.

Data is being compiled for the latter pivotal concentric unit & will be forwarded when completed.

## Application of the Device

The Unilite #501 is manufactured to work with the 8 cylinder delco distributors from 1957 to 1974 with the conventional breaker point ignition.

GRACE

Mr. G. C. Hass

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12 July 1976

The Unilite #502 is manufactured for use with the 8 cylinder Ford distributor from 1956 to 1974 with conventional breaker point ignition.

If you have any questions regarding the enclosed information, Please do not hesitate to call.

Sincerely,

A handwritten signature in cursive script, appearing to read "Andy Krumm", written in dark ink. The signature is fluid and extends across the width of the page.

Andy Krumm  
Director of Research & Development

GRACE

Automotive Specialties Division

W. R. Grace & Co.  
7091 Belgrave Ave.  
Garden Grove, Calif. 92641

(714) 893-0595

July 21, 1976

Mr. G. C. Hass, Chief  
Vehicle Emissions Control Program  
Air Resources Board  
9528 Telstar Ave.  
El Monte, Calif. 91731

Subject: Application for an ARB Resolution of Compliance with  
Section 27156 of the California Vehicle Code.

Dear Mr. Hass:

In my letter of July 12, I applied for an exemption in  
behalf of Mallory Electric Company for both Delco and Ford  
eight cylinder distributors.

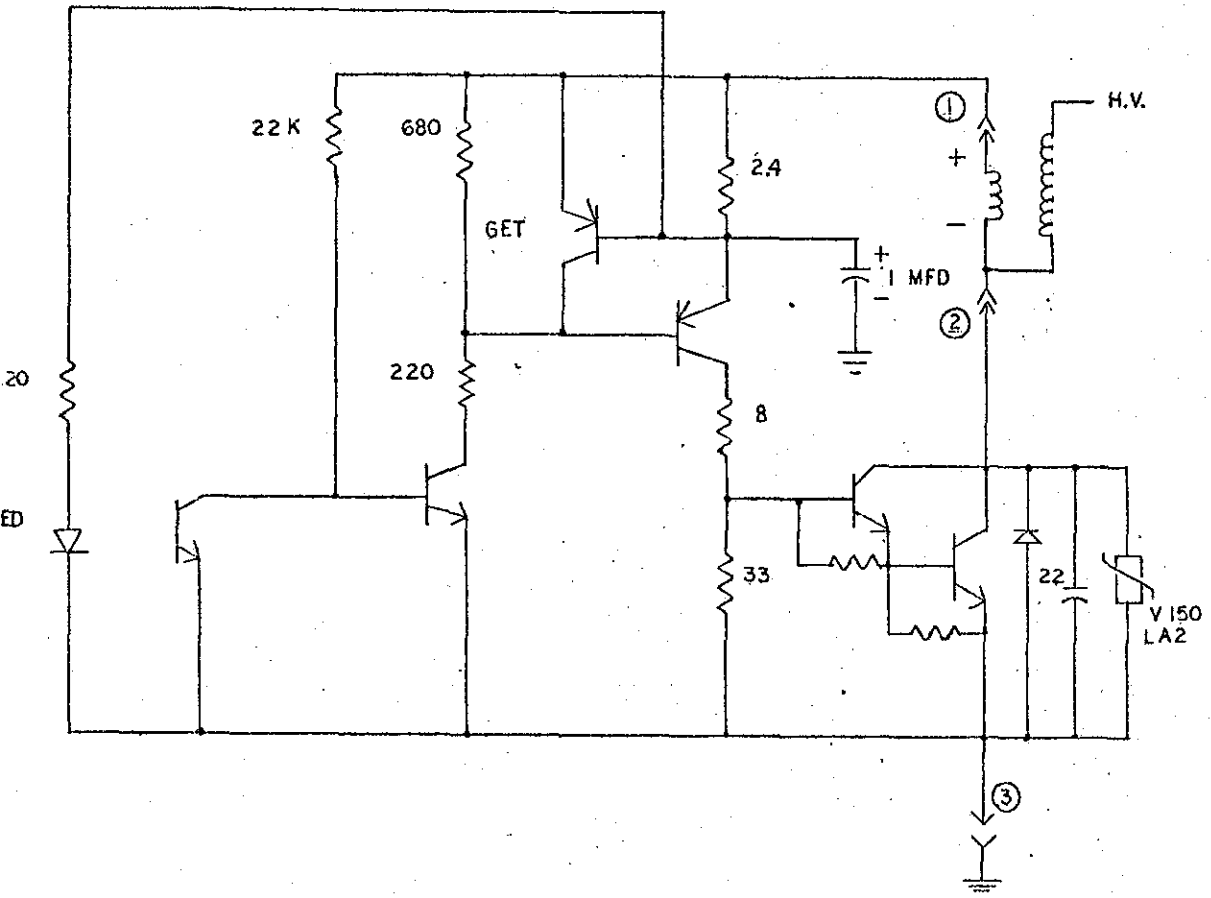
At this time I would like to withdraw the application for  
the Ford unit and apply only for the Delco conversion. It is  
our intention to resubmit the Ford application at a later date.

Please contact me if you have any questions in this matter.

Sincerely,



Andy Krumm  
Director of Research and Development



- ① RED
- ② GREEN
- ③ BROWN

<b>MALLORY ELECTRIC CORP.</b>				UNIL SCHEMA PART NO. ASSEMBLY
1801 OREGON ST., CARSON CITY, NEV. 89701 PH. (702) 882-6600				
SCALE 1:1	REF.	REVISION	DATE	
DATE 9-26-76				
DRN. D. SASS				
CKD. APPVD.				
DASH NO.	MATERIAL DESCRIPTION		SIZE	SPECS.
TITLE:				

DRAWING NO.