State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-182-28
Relating to Exemptions Under Section 27156
of the Vehicle Code

WALKER MANUFACTURING COMPANY
"THREE-WAY PLUS OXIDATION CATALYTIC CONVERTER SERIES 99000"

WHEREAS, Vehicle Code Sections 27156 and 38391, and Title 13, California Code of Regulations (hereafter "CCR") Section 2222(h), authorize the California Air Resources Board (ARB) and its Executive Officer to exempt new aftermarket catalytic converters from the prohibitions of Vehicle Code Section 27156.

WHEREAS, Walker Manufacturing Company (Walker), a division of Tenneco Automotive, of 2701 North Dettman Road, Jackson, Michigan 49201, has applied to the ARB for exemption from the prohibitions in Vehicle Code Sections 27156 and 38391 to market their aftermarket series 99000 three-way plus oxidation catalytic converter (TWC + OC) for the applications shown below. The catalytic converter cannot be installed on vehicles equipped with an On-Board Diagnostic II (OBD-II) system (Title 13, CCR, Section 1968.1):

| Type | Use | Series No. | Max. Eng. Size | Max. Test Veh. Wt. |
|---|---|---|---|---|
| TWC + OC | TWC + OC | 99000 | 5.9L (360 CID) | 6,000 lbs. |
| TWC + OC | TWC | 99000 | 5.9L (360 CID) | 6,000 lbs. |
| TWC | TWC | 99000 | 5.9L (360 CID) | 6,000 lbs. |

WHEREAS, pursuant to the authority vested in the Executive Officer by Health and Safety Code Section 39515 and in the Chief, Mobile Source Operations Division by Health and Safety Code Section 39516 and Executive Order G-45-9, the ARB finds that the above aftermarket catalytic converter complies with the California Vehicle Code Section 27156 and Title 13, California Code of Regulations, Section 2222(h). Emission performance of the catalytic converter was based on bench-aging of the catalyst by AlliedSignal Environmental Catalyst using its ARL-102 rapid aging cycle in lieu of the AMA mileage accumulation (Reference Appendix IV, Title 40, part 86, Code of Federal Regulations (June 28, 1977)).

WHEREAS, emissions tests conducted at Automotive Development and Testing Services, located in Ontario, California, showed the following conversion efficiencies which meet the minimum requirements for new aftermarket catalytic converters:

Catalyst Application Type

| Pollution Component | TWC + OC | TWC |
|---|---|---|
| HC: Min. Requirement | 70 (% Conversion) | 70 |
| Walker's series 99000 | 82.4 | 84.4 |
| CO: Min. Requirement | 70 | 70 |
| Walker's series 99000 | 85.0 | 82.6 |
| NOx: Min. Requirement | 50 | 60 |
| Walker's series 99000 | 69.1 | 84.0 |

IT IS HEREBY RESOLVED that the above catalytic converter is exempt from the prohibitions in Vehicle Code Section 27156 for installation on vehicles subject to the following conditions:

1. No changes are permitted to the catalytic converter as described in the application for exemption. Any changes to the catalytic converter or any of its components, and other factors addressed in this order must be evaluated and approved by the ARB prior to marketing in California.

2. Marketing of the catalytic converter using identifications other than those shown in the exemption application, and in this Executive Order, or marketing of the catalytic converter for an application other than the ones shown in this Executive Order shall be prohibited unless prior approval is obtained from the ARB. Exemption of this product shall not be construed as an exemption to sell, offer for sale, or advertise any components of the catalytic converter as individual devices.

3. Any oral or written references to this Executive Order or its content by Walker, its principals, agents, employees, distributors, dealers, or other representatives must include the disclaimer that the Executive Order or the exemption it provides is not an endorsement or approval of any emission reduction claims for the catalytic converter and is only a finding that the catalytic converter is exempt from the prohibitions of Vehicle Code Section 27156.

4. Walker's installation instructions for the new catalytic converter must conform to requirements in Paragraphs I and IX of California Evaluation Procedures for New Aftermarket Non-Original Equipment Catalytic Converters.

5. Upon installation, the catalytic converter must carry a manufacturer's warranty for 25,000 miles on the substrates and 50,000 miles or five years on the shell and end pipes.

Violation of any of the above conditions shall be grounds for revocation of this order. The order may be revoked only after ten day written notice of intention to revoke it, during which period the holder of the order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request, and the order may not be revoked until a determination is made, after the hearing, that grounds for revocation exist.

Executed at El Monte, California, this 15TH day of November 2000.

FOR
R.B. Summerfield, Chief
Mobile Source Operations Division

State of California
AIR RESOURCES BOARD

# EVALUATION OF WALKER MANUFACTURING COMPANY'S SERIES 99000 NEW AFTERMARKET THREE-WAY PLUS OXIDATION CATALYTIC CONVERTER FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156, AND TITLE 13, CALIFORNIA CODE OF REGULATIONS SECTION 2222(h)

November 2000

by

Mobile Source Division

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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

Walker Manufacturing Company (Walker), a division of Tenneco Automotive, of 2701 North Dettman Road, Jackson, Michigan 49201 has applied for an exemption of its series 99000 new aftermarket three-way plus oxidation catalytic converter (TWC + OC) from the prohibitions in Vehicle Code Section 27156, in accordance with California regulations for new aftermarket catalytic converters. The catalytic converter is manufactured in two different oval configurations and one round configuration. The two converters with oval configuration contain two substrates and are designed for TWC + OC and three-way catalytic converter (TWC) applications. The converter with the round configuration contains a single substrate and is designed for TWC application. Three test catalysts were aged using AlliedSignal Environmental Catalyst's (ASEC's) rapid aging cycle ARL-102 for a duration of 53 hours, based on temperature histogram data collected by ASEC. The substrates are of ceramic monolith type and are coated with platinum and rhodium in a 2:1 ratio. The emission tests were conducted on a 1989 Dodge Ram Van 5.9L, equipped with a TWC + OC, at the equivalent test weight of 7,000 pounds (lbs.), and a 1995 Dodge Ram Truck, equipped with a TWC, at an equivalent test weight of 6,000 lbs. The new catalytic converter is for installation on vehicles equipped with TWC + OC or TWC. The maximum application limits for the new series 99000 catalytic converter are 5.9L and 6,000 lbs., which corresponds to 5.9L engine displacement and gross vehicle weight of 7,500 lbs.

Emissions data submitted by the applicant show that the catalytic converter meets the requirements of Vehicle Code Section 27156 and Title 13, California Code of Regulations, Section 2222(h) for the stated applications. Based on the above, the staff recommends that the exemption be granted as requested and that Executive Order D-182-28 be issued.

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EVALUATION OF WALKER MANUFACTURING COMPANY'S SERIES 99000 NEW AFTERMARKET THREE-WAY PLUS OXIDATIO CATALYTIC CONVERTER FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156, AND TITLE 13, CALIFORNIA CODE OF REGULATIONS SECTION 2222(h)

## I. INTRODUCTION

Walker Manufacturing Company (Walker) of 2701 North Dettman Road, Jackson, Michigan 49201, has applied for an exemption from the prohibitions in Vehicle Code Section 27156 for its series 99000 new aftermarket three-way plus oxidation catalytic converter (TWC + OC) in accordance with California regulations for new aftermarket catalytic converters. The new aftermarket catalytic converter is intended for the following vehicle applications:

| Converter Type | Dimensions | Converter Use | PN/Series | Max. Eng. Size | Max. Veh. Test Wt. |
|---|---|---|---|---|---|
| TWC + OC (oval) | 3.15" x 4.75" | TWC + OC | 99000 | 5.9L | 6,000 lbs. |
| TWC + OC (oval) | 3.20" x 5.70" | TWC + OC | 99000 | 5.9L | 6,000 lbs. |
| TWC + OC (oval) | 3.15" x 4.75" | TWC | 99000 | 5.9L | 6,000 lbs. |
| TWC + OC (oval) | 3.20" x 5.70" | TWC | 99000 | 5.9L | 6,000 lbs. |
| TWC (round) | 3.66" dia | TWC | 99000 | 5.9L | 6,000 lbs. |

The maximum Gross Vehicle Weight (GVW) for the catalytic converter application is 7,500 lbs. Walker intends to market the new converter as a replacement for catalytic converters on in-use vehicles whose manufacturer's warranty has expired and the need for replacement of the original equipment manufacturer (OEM) catalytic converter has been estabiished and documented. The converter cannot be installed on vehicles equipped with an On-Board Diagnostic II (OBD-II) system.

## II. CONCLUSION

The applicant has submitted all the required information, and based on the applicant's submitted exhaust emissions test data, the staff concludes that the new aftermarket catalytic converter meets the criteria set forth in Vehicle Code Section 27156, and Title 13, California Code of Regulations, Section 2222(h) for the stated applications.

III. RECOMMENDATION

Staff recommends that the exemption be granted as requested and that Executive Order No. D-182-28 be issued, permitting the advertisement, sale, and installation of the new aftermarket catalytic converter on applicable vehicles.

IV. DEVICE DESCRIPTION

Walker's series 99000 new aftermarket catalytic converter is designed to use ceramic monolith substrates with three different dimensions and two different shapes. The minor and major axis of the two oval shaped substrates are 3.15 inches and 4.75 inches, and 3.2 inches and 5.7 inches, respectively. The oval substrates are both 1.90 inches in length. The round substrate is 3.66 inches in diameter and 5.00 inches in length. The substrates are coated with platinum and rhodium in a 2:1 ratio. Two substrates are assembled per can for the oval shaped converter with the total volume of 48.8 cubic inches and 58.8 cubic inches, respectively. The round converter contains a single substrate with a volume of 52.6 cubic inches. The substrates are contained in an outer 409 stainless steel shell with compressed intumescent or expanding mat to prevent vibration and exhaust by-pass. The shell halves are sealed by seam weld, and the end pipes are attached to the shell by arc welding. An aluminized heat shield is spot-welded to the upper side of the converter to protect the vehicle from excessive heat. The catalytic converter is sold as a unit with installation instructions or used in customized direct fit exhaust applications. It is sold with a warranty for 25,000 miles on the substrate, and five years or 50,000 miles on the container or shell, and the end pipes.

V. DEVICE EVALUATION

Walker submitted data from testing conducted by Automotive Testing and Development Services (ATDS) laboratory located in Ontario, California. Catalyst bench-aging was conducted by the catalyst supplier, AlliedSignal Environmental Catalyst (ASEC) using its

ARL-102 rapid-aging. The aging duration of 53 hours was calculated from temperature histogram data obtained from vehicles similar to the ones used in emission testing. The 53-hour aging duration was determined to produce aging severity similar to that which the catalyst would experience when aged on the road for 25,000 miles using the AMA driving cycle. Emissions tests were conducted on a 1989 Dodge Ram Van 5.9L equipped with a TWC + OC, and a 1995 Dodge Ram 2500 Truck 5.9L equipped with a TWC.

The evaluation of Walker's new aftermarket catalytic converter is solely based on the bench-aging conducted by ASEC and the emission tests conducted at ATDS. The limits of application of Walker's series 99000 TWC are 5.9L/6,000 lbs. with a corresponding maximum gross vehicle weight of 7,500 lbs. The six test catalysts were labeled W00-181, W00-182, W00-190, W00-191, W00-193, and W00-194 respectively. Testing consisted of two cold-start CVS-75 tests with a simulator ("dummy" catalyst), followed by two cold-start CVS-75 tests for each of the test catalysts. The average of the two test results for each test catalyst was used to calculate the conversion efficiency. The overall conversion efficiency for the catalyst model is the average conversion efficiency of the three test catalysts. The test results for the catalyst are shown below:

Automotive Testing and Development Services, Ontario, California

TWC + OC (3.15" x 4.75")

| | Simulator Average | Catalyst W00-190 Average | Catalyst W00-191 Average | Conv. Eff. Average |
|---|---|---|---|---|
| HC (g/mi) | 3.131 | 0.587 | 0.568 | 81.6% |
| CO (g/mi) | 40.251 | 8.174 | 6.268 | 82.0% |
| NOx (g/mi) | 2.861 | 0.796 | 0.842 | 71.4% |

TWC + OC (3.20" x 5.70")

| | Simulator Average | Catalyst W00-193 Average | Catalyst W00-194 Average | Conv. Eff. Average |
|---|---|---|---|---|
| HC (g/mi) | 3.131 | 0.532 | 0.515 | 83.3% |
| CO (g/mi) | 40.251 | 4.494 | 5.019 | 88.1% |
| NOx (g/mi) | 2.861 | 0.925 | 0.975 | 66.8% |

TWC (3.15" x 4.75")

| | Simulator Average | Catalyst W00-190 Average | Catalyst W00-191 Average | Conv. Eff. Average |
|---|---|---|---|---|
| HC (g/mi) | 1.879 | 0.279 | 0.318 | 84.1% |
| CO (g/mi) | 21.606 | 3.575 | 4.180 | 82.1% |
| NOx (g/mi) | 4.499 | 0.730 | 0.748 | 83.6% |

TWC (3.20" x 5.70")

| | Simulator Average | Catalyst W00-193 Average | Catalyst W00-194 Average | Conv. Eff. Average |
|---|---|---|---|---|
| HC (g/mi) | 1.879 | 0.267 | 0.284 | 85.3% |
| CO (g/mi) | 21.606 | 3.519 | 3.755 | 83.1% |
| NOx (g/mi) | 4.499 | 0.706 | 0.771 | 83.6% |

TWC (3.66" dia x 5.0" long)

| | Simulator Average | Catalyst W00-181 Average | Catalyst W00-182 Average | Conv. Eff. Average |
|---|---|---|---|---|
| HC (g/mi) | 1.879 | 0.316 | 0.294 | 83.8% |
| CO (g/mi) | 21.606 | 3.928 | 3.614 | 82.5% |
| NOx (g/mi) | 4.499 | 0.678 | 0.679 | 84.9% |

The overall conversion efficiencies for the catalytic converter are 83.6 percent, 83.6 percent, and 78.1 percent for HC, CO, and NOx, respectively. The conversion efficiencies of the three different configurations of the catalytic converter each meet the minimum requirements of the California regulations for new aftermarket catalytic converters. The ARB did not conduct confirmatory testing on the catalysts.