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MANUFACTURERS ADVISORY CORRESPONDENCE NO. 94-08

November 4, 1994

TO: ALL MANUFACTURERS OF UTILITY AND LAWN AND GARDEN EQUIPMENT ENGINES
ALL OTHER INTERESTED PARTIES

SUBJECT: Certification of One-Wheeled Lawn Edger Equipment Engines.

Enclosed is an Air Resources Board's (ARB's) Manufacturers Advisory Correspondence (MAC) that describes the classification of particular one-wheeled lawn edger equipment as handheld equipment. Manufacturers of utility and lawn and garden equipment engines (ULGEs) will be permitted to certify engines powering such lawn edger equipment to the applicable handheld exhaust emission standards based on criteria outlined in this MAC.

If you have further questions on this matter, please contact Mr. Duc Nguyen, Manager, or Mr. Ronald Haste, Staff Engineer, Certification Section, at (818) 575-7067.

Sincerely,

K. D. Drachand, Chief
Mobile Source Division

Enclosure

State of California
AIR RESOURCES BOARD

SUBJECT: Certification of One-Wheeled Lawn Edger Equipment Engines.

APPLICABILITY: Utility and Lawn and Garden Equipment Engines (ULGEs) Powering One-Wheeled Lawn Edger Equipment.

REFERENCES: 1. Title 13, California Code of Regulations.

[References to the above document are indicated by brackets]

DISCUSSION: Exhaust emission standards, test procedures, and compliance enforcement provisions for ULGEs were approved by the Air Resources Board (ARB) in December 1990, and became effective in May 1992. These regulations are applicable to ULGEs produced on or after January 1, 1995 [Ref.: 1, Section 2400(a)(1)]. Such ULGEs include two- and four-stroke cycle, gasoline-, diesel- and alternate-fueled engines producing under 25 horsepower (18.6 kW). These engines are used to power a large variety of utility, lawn and garden equipment, and a single engine family may be utilized in multiple equipment applications. Commercial equipment is available mainly with gasoline or diesel-fueled engines because these engines offer greater equipment mobility and power than electric motors; residential equipment is available with either gasoline/diesel-fueled engines or electric motors.

There are two categories of ULGEs, handheld and non-handheld equipment engines. Examples of handheld equipment are leaf blowers, chainsaws, and string (line) trimmers; examples of non-handheld equipment are lawn mowers, generators, and garden tractors. Handheld equipment is typically powered by two-stroke engines because such engines provide higher power-to-weight ratios and engine speeds than four-stroke engines, and can operate in varying equipment positions (e.g., sideways, etc.). Two-stroke engines, however, emit significantly higher levels of emissions than four-stroke engines.

There are five individual sets of exhaust emission standards for ULGEs based on engine displacement (i.e., Engine Classes I through V) and equipment designation (i.e., handheld and non-handheld) [Ref.: 1, Section 2403(b)]. Engine Class I and II standards are for non-handheld equipment engines; the less stringent Engine Class III, IV and V standards are for handheld equipment engines. The combustion cycle of an engine is not a criteria for determining the applicable emission standards with the following two exceptions. First, diesel

ULGEs must also comply with particulate matter standards, and, secondly, two-stroke engines powering only snow throwers are allowed to certify to handheld emission standards.

When the ULGE regulations were approved in 1990, handheld equipment engines were allowed to certify to less stringent standards. This allowance was based on market demand, and was intended to continue to make available this type of equipment that is typically powered by two-stroke engines due to their performance characteristics.

As defined in the regulations [Ref.: 1, Section 2403(b)], an equipment must meet both of the following criteria in order to be designated as handheld:

(1) The equipment must require its full weight to be supported by the operator in the performance of its requisite function.

(2) The engine and equipment must require multi-positional characteristics for use (e.g., it must be capable of operating in any position, upside down, or sideways as required to complete the job).

The ARB staff has interpreted the first requirement to mean that any possible load-bearing components (e.g., wheels, feet, skids, tynes, etc.) assembled on equipment are indicative of equipment that is not intended to be supported entirely by its operator. Consequently, engines that power such equipment are classified as non-handheld and are required to certify to the applicable non-handheld standards.

In typical line trimmer equipment, which is designated as handheld type, the lighter-weight cutting tool assembly is located at one end of the long equipment shaft; the heavier engine assembly is positioned at the other end. This configuration results in a center of gravity that is near the engine assembly; hence, the cutting assembly has a tendency to pivot upward away from the ground. An operator must force the cutter downward in order to maintain the necessary contact with the ground surface.

Existing lawn edger equipment is available in both handheld and non-handheld equipment configurations. Handheld lawn edgers are derived from line trimmer equipment. However, handheld lawn edgers are different from line trimmers because they use a solid cutting blade that is oriented perpendicular to the ground; in addition, a single wheel of small-diameter or a skid is attached at the cutting end of the equipment. An operator must still force the cutter downward in order to maintain the required contact with the surface.

The ARB staff had previously determined that lawn edgers that are derived from handheld line trimmers and equipped with a skid or single small wheel are classified as non-handheld

equipment. The ARB staff believed that the inclusion of a wheel/skid indicates that an operator is not able to support the total weight of the equipment during operation. Accordingly, such equipment was classified as non-handheld and engines used in such equipment were required to certify to the non-handheld standards.

In July 1994, the Board approved amendments that clarified and improved the ULGE regulations. At this hearing, industry also requested that the Board amend the definition of handheld equipment so as to result in reclassification of one-wheeled, two-stroke engine-powered lawn edgers as handheld, and thereby allow engines used in such equipment to certify to handheld standards. Industry argued that since one-wheeled lawn edgers are derived from, and essentially identical to, the handheld-designated line trimmers, one-wheeled lawn edgers should be designated similarly. Industry emphasized that the singular small wheel or skid used on such wheeled edgers is not a load-supporting component; it is included on the equipment only to allow the operator to better gauge the correct working position of the cutting tool. Futhermore, industry indicated that placing a significant load on the wheel/skid is undesirable because the wheel/skid then drags in the sod or soil and thus impedes the equipment from performing efficiently. When this happens, the one-wheeled lawn edger loses its advantage of quick and easy operation over the heavier non-handheld multi-wheeled lawn edger.

Acting on the industry's request and presentation at the July 1994 hearing, the Board decided to maintain the present definition of handheld equipment; however, on the basis of the industry's testimony and presentation, the Board directed its staff to reconsider the previous non-handheld classification of only one-wheeled, two-stroke engine-powered lawn edgers. Upon reviewing the industry's request and information, the staff has now determined that the single, small-diameter wheel or skid that is used on a two-stroke engine-powered lawn edger acts solely as an operator's tactile sensor in order to enhance the equipment's working efficiency. Such a wheel/skid is deemed not to relieve the operator from supporting the entire weight of the equipment during operation.
In conclusion, these one-wheeled lawn edgers are found to be handheld equipment; engines that power such lawn edgers will be allowed to certify to applicable handheld standards.

POLICIES: Engines that power lawn edger equipment that uses a single wheel or skid, are allowed to certify to handheld exhaust emission standards, provided the following criteria are met:

a. The lawn edger is derived from handheld-classified line trimmers, and must retain a similar assembly configuration whereby the center of gravity of the equipment is located closer to the engine assembly than to the cutting tool.

b. The lawn edger is equipped with a single wheel or skid in order to enhance an operator's ability to monitor the position of the cutting tool. The wheel or skid must not be intended for supporting any of the weight of the equipment during operation.