

Pleasure Craft Construction

Noise Emission



Canadian Marine Advisory Council - Fall 2020

Pleasure Craft – Noise Emission

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Introduction

The objectives of this presentation are to:

- review the background behind noise emission Regulations for pleasure craft;
- present current regulatory requirements;
- highlight current issues;
- present current practices in other countries; and
- discuss and receive comments on possible options for the future.

Background

- Noise emissions from pleasure craft have been a growing concern since the 1990s.
- The first attempt to introduce regulatory requirements in 1999 proved to be difficult to enforce. These requirements were modified in 2003 to assist enforcement capabilities.
- Complaints from communities and the public about noise have continued over the years.
- Modifications were introduced in 2010 to address the “silent choice” bypass installation, which was considered to be the major issue.
- This led to an increase in complaints from boat owners who were being fined, but a reduction in the number of complaints from communities and the public.
- Better Regulations or More Enforcement ?
- Are the Regulations too stringent or not stringent enough ?

Current Legislation – *Small Vessel Regulations*

“**muffler**” means an expansion chamber within the exhaust line specifically designed to reduce engine noise, but does not include a muffler cut-out, straight exhaust, gutted muffler, glass pack muffler, by-pass or similar device. (silencieux)

Current Legislation – *Small Vessel Regulations*

Mufflers

1000. (1) No person shall operate or permit another person to operate a power-driven vessel unless it is equipped with a muffler that is in good working order.

(2) No person shall operate or permit another person to operate a vessel equipped with a muffler cut-out or by-pass unless the muffler cut-out or by-pass is visibly disconnected in a manner that ensures it cannot be easily reconnected while the vessel is in operation.

Current Legislation – *Small Vessel Regulations*

(3) Subsections (1) and (2) do not apply in respect of a vessel that

- (a) was constructed or manufactured before January 1, 1960;
- (b) is engaged in formal training, in an official competition or in final preparation for an official competition;
- (c) is propelled by an outboard engine or a stern-drive, if the exhaust gases are directed under water through the propeller hub or below the cavitation plate;
- (d) is operated at five or more nautical miles from shore; or
- (e) is propelled by gas turbines or by an aircraft-type propeller operating in air.

Issues

- Definition of a muffler
 - Not always easy to know if a particular device meets the definition of a muffler
 - No performance standards (e.g. decibel limits)
 - Does not allow for innovative noise reduction mechanism
- Muffler cut-out or bypass
 - What is visually disconnected?
 - What is not easily reconnected?
- Underwater (stern drive) exhaust and bypass
 - Is the presence of a bypass acceptable?

Noise Legislation in Other Countries

- United States
 - No harmonized national law
 - Model Noise Act, developed by NASBLA implemented in more than 30 states, in various forms
 - Compliance to SAE standards in the field
- Europe
 - Mandatory Noise Emission Certification for new boats EU Recreational Craft Directive (RCD) 2013/53/EU
 - Compliance to ISO standards for manufacturers

Technical Standards

- SAE J2005
 - Developed for ease of enforcement in the field.
 - Only measures noise level at idle speed
 - Acceptable Sound Level set by Regulations
- SAE J1970
 - Developed for ease of enforcement in the field.
 - Measure noise level at shoreline. Compliance is responsibility of operator not a design feature of the boat
 - Acceptable Sound Level set by Regulations
- SAE J34
 - Not intended for enforcement in the field
 - Measure by-pass noise at full throttle or max speed of 70 km/h
 - Compatible with ISO 14509-1, although less extensive
 - Acceptable Sound Level set by Regulations

Technical Standards

- ISO 14509-1: Pass-by measurement procedures
 - Not intended for enforcement in the field
 - Measure by-pass noise at full throttle or max speed of 70 km/h
 - Compatible with ISO SAE J34, although more extensive
 - Sound level set by Regulations
- ISO 14509-2: Sound assessment using reference craft
 - Alternative methods to 14509-1, same objective
- ISO 14509-3: Sound assessment using calculations and measurement procedures
 - Alternative methods to 14509-1, same objective

Noise Levels – dB(A)

Noise Source	Decibel Level	Decibel Effect	Existing Regulations / Standards
Chain saw (operator)	120	Painful. 32 times as loud as 70 dB.	
Auto horn at 1 meter; Live rock music (108 - 114 dB).	110	Average human pain threshold. 16 times as loud as 70 dB.	
Jet take-off (at 305 meters); Outboard motor, power lawn mower, motorcycle, farm tractor, jackhammer (operator)	100	8 times as loud as 70 dB. Serious damage possible in 8 hr exposure	
Motorcycle at 25 ft (90 dB).	90	4 times as loud as 70 dB. Likely damage 8 hr exp	NASBLA / SAE 2005 - 90 dB - Some States / Older vessels
Dishwasher; Propeller plane flyover at 1000 ft (88 dB); Diesel truck 40 mph at 50 ft (84 dB);	80	2 times as loud as 70 dB. Possible damage in 8 hr exposure.	NASBLA / SAE 2005 - 88 dB - Some States / Newer vessels
Passenger car at 65 mph at 25 ft (77 dB); Freeway at 50 ft from pavement edge 10 a.m. (76 dB). Vacuum cleaner (70 dB).	70	Arbitrary base of comparison. Upper 70s are annoyingly loud to some people.	NASBLA / SAE J1970 - 75 dB RCD p > 40 kW - 75 dB RCD p > 10 kW < 40 kW - 72 dB
Conversation in restaurant, office, background music; Air conditioning unit at 100 ft	60	Half as loud as 70 dB. Fairly quiet	RCD p < 10 kW - 67 dB
Quiet suburb, conversation at home; Large electrical transformers at 100 ft	50	One-fourth as loud as 70 dB.	
Library, bird calls (44 dB); Lowest limit of urban ambient sound	40	One-eighth as loud as 70 dB.	
Quiet rural area	30	One-sixteenth as loud as 70 dB. Very Quiet	

Options

- Status Quo
- Improve definition of “muffler” and modify/clarify requirements without adding performance standards
 - Limited possibility of improvement
 - Some subjectivity may remain
 - Difficult to consider new technology
- Introduce performance standards for boat manufacturers
 - Objective solution
 - Relatively simple to implement and enforce at fabrication
 - Difficult to enforce in the field
 - Limited cost impact
 - Will have no effect on existing boats
- Introduce performance standards for boats in the field
 - Objective solution
 - Will required equipment and training for enforcement agencies
 - May have cost impact on existing boats
 - Maybe more difficult to enforce than current requirements
- Combination of the above

Comments . . . Questions

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