

MAAC recommendation – 90 db at 9 feet

We need to be aware that the acceptable industrial work place noise level in Ontario is decreasing to 85 db this year. This may make it more difficult for us to convince the public that 90 db is acceptable.

Every 3db increase in the noise level represents a doubling of the sound energy.

db isn't everything. A mosquito doesn't make 90 db but it sure is annoying.

High frequencies below 90 db will continue to get complaints.

Most of us will say that a 4-stroke engine turning 10,000 rpm and producing at 93 db @ 9 feet is quieter than a 2-stroke engine turning 10,000 rpm and producing 90 db @ 9 feet even though it is only half as much noise. Why?

Because the 4-stroke's exhaust note is 1/2 the frequency, 5000 Hz, of the 2-strokes 10,000 Hz exhaust note.

Others have reported that when engine rpm is kept below 10,000 rpm the noise complaints are reduced.

A rule to consider:

- 90 db @ 9 feet for less than 10,000 rpm
- 87 db @ 9 feet for 10,000 to 14,999 rpm
- 84 db @ 9 feet for greater than 15,000 rpm

Can we reduce the noise that our planes make and meet this rule?

Larger propellers to reduce the engine's rpm.

This will generally result in a small decrease in an engine's maximum hp. But it may give more torque at lower rpm and result in better overall performance. An example that worked for me to reduce the db:

My electric powered Scooter	7 x 3 prop	89 db @ 9 feet
	8 x 6 prop	86 db @ 9 feet

Some props are quieter than others. Some tell me that APC props are the way to go.

Isolate the engine, the noise generator

Rubber mounts from companies like Octura. Fairly expensive, about \$30.

Rubber mounts made from a hockey puck. Inexpensive, about \$2.

RTV a plywood mount into hardwood rails. Inexpensive, about \$4

Why standard mufflers aren't very good.

Most "mufflers" are just an expansion chamber without any baffles.

Small expansion chambers give little noise reduction.

Making the expansion chamber larger will help

but most of us don't want larger and heavier mufflers. ☹

Effective mufflers will have an expansion chamber and some form of baffling.

Buy a muffler with baffles in the expansion chamber.

Example the Revolution Muffler. Pinnacle Hobbies in Markham still have some @ \$15.

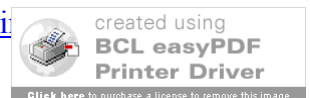
Add a baffle in the middle of an existing muffler.

Add a silencer, second muffler, to the outlet of an existing muffler.

Model boat fellows do this to the tuned pipes on their 25 to 30 cc 2-stroke gas engines.

Muffler source Mel mentioned at the meeting: <http://bissonmufflers.com/en/i>

Check out their Low DB line of mufflers.



Add an additional long tail pipe to an existing muffler.

Fly Quiet's "Quiet" Pipes www.flyquiet.com
Quiet pipes and tail pipe extensions.

From Fly Quiet's Web Site

The Fly Quiet 'quiet' pipe will improve performance, but the primary purpose is to reduce the sound (as a tuned pipe will do very effectively). This is a true tuned pipe in all but the strictest sense, as it is added after the factory muffler instead of attaching directly to the engine's exhaust. The quiet pipe works by reflecting the sound wave back to scavenge the exhaust. To develop very high rpm, measure from the top of the cylinder head to the end of the tuned pipe, then slide the pipe back and forth until reaching the highest rpm. We are not using the high competition double cone pipe, we are instead using the flat plate design that is much less sensitive to tuning. The performance will increase, but we are operating at a much lower rpm to reduce the sound. These quiet pipes are for SPORT ENGINES to bring back park flying without waking up the neighbors.

FLY QUIET 'QUIET' PIPES FOR .30-.35 AND .40-.46 SIZE ENGINES



This picture shows a Cessna 172 with the .40 size engine side mounted and the quiet pipe strapped to the bottom of the plane with two tie wraps. This presents the best appearance when the plane is sitting on the ground. Plus the curved exhaust deflector helps keep the plane clean of exhaust residue. This would be an ideal plane to put the quiet pipe inside to reduce the sound even more and make a very clean appearance. If this is going to be done, the plane needs to be built from scratch with the exhaust system inside and the radio system shielded from the heat like pattern planes. The main question about installing the quiet pipe inside the fuselage is the heat. The heat inside the OS .40 factory muffler is 595 degrees 1/2 inch from the piston. The temperature at the end of the factory exhaust pipe is 389 degrees. At the end of the Fly Quiet pipe it is 194 degrees. With a Fly Quiet tailpipe added, the temperature drops to 136 degrees. Reducing the heat is a major contributing factor to reducing sound.

FLY QUIET TAILPIPES FOR .049-.46 SIZE ENGINES



These tailpipes are made from 1,100 degree fiberglass with high temperature silicon to seal them. The silicon is injected inside and pressed out to completely coat the fiberglass. The silicon is wiped off to reduce weight.

Noise Reduction Chart- Felbridge Flyers RMFC (It Can be Done!)

Model	Engine	Prop	Silencer	RPM	DbA
Aero 10	OS 15 FB	8x5 Graupner	Standard + pipe	9.3k	70
Tiger trainer	Th Tigre GP 40	11x7 Kyosho	Std + Mouse	9k	71
Speedy Bee	OS 26 FS	10x6 Graupner	Standard	9.2k	71
Wot 4	OS 40 FP	11x6 Graupner	Std + mute	9.8k	72
O/D	ASP 12	8 x 4 Graupner	Std	9.1k	72
U-Sky	OS 46 LA	11x7 Graupner	Std + anti vib. Mount	9.3k	72
Own 4	OS46LA	11x7 Graupner	Standard	9.2k	73
Commanche	OS 40 FP	11x7 APC	Standard	6.5k	74
High Boy	OS 40 FP	11x6 Master	Standard	9.8k	74
Own design	OS40 Blue	10.5x6 Graupner	Standard	9.5k	75

Model	Engine	Prop	Silencer	RPM	DbA
U-Sky	OS40 LA	11x6 Graupner	Standard + pipe	9k	75
Magnatilla	OS 52 FS	12x6 APC	Standard	9.5k	75
O/D	OS 40 LA	11x6 Graupner	Standard	9k	75
Hi-Boy	OS 46 LA	11x7 Graupner	Standard	9.5k	75
Super Sport	46 SC	11x9 APC	Std + mouse	8.8k	75
Kamco Cavalier	OS 46 LA	11x6 Graupner	Std + outlet tube	9.8k	75
Moronic	OS 46 SF	12x7 APC	Standard	8.8k	75
WOTS WOT	Saito 65	11x7 3 blade	Std + insert	9.4k	75
Tiger Trainer	OS 46 LA	11x7 Graupner	Standard	9.8k	75
Tiger Trainer	OS 46 LA	11x6 Graupner	Std + rubber pipe	10k	75

Model	Engine	Prop	Silencer	RPM	DbA
Acro Wot	Saito 65	11x7 3 blade cut down	Saito 80 + special tube	9.3k	75
Tiger Trainer	OS40 LA	11x6 Graupner	Standard	9.8k	76
U'Sky	OS46FX	12x7 Graupner	Standard	9.6k	76
Commanche	TT GP 42	11x7 APC	Standard	8.7k	76
Silhouette	ST 45	11x7 Kyosho	Standard	9k	76
Auster	Laser 75	13x7 Master	Quite + tube	7.7k	77
Patriot	Enya 60 FS	12.5x6 Graupner	Irvine mouse	8k	77
Acro Wot	OS 52 FS	11x7 Kyosho	Standard	10.3k	77
Own design	SC 40	11x9 Kyosho	Standard	9.8k	77
WOT4	ST 45	11x9 Kyosho	Std + after silencer	9.3k	77

Model	Engine	Prop	Silencer	RPM	DbA
Hunter	OS46FX	11x7 3 blade cut down to 10.5	Standard	9.4k	77
Super Sport	MDS 58	12x8 APC	Standard	9.3k	77
Vendetta	OS 46 SF	11x8 Kyosho	Std + mute	9.5k	78
Legionaire	MDS 38 Pro	11x8 APC	Flair Std	9.6k	78
Magnatilla	ST 45	12.5x6 Graupner	Standard	9.5k	78
WOT 4	46TS	11x8 APC	Standard + mouse	9.8k	78

Kamco Kadet	OS40MAX	10x7 Graupner	Standard + after	10k	78
Flair SE5A	OS 52 FS	12x7 Graupner	Standard	9.5k	78
Tiger Trainer	OS40 FP	10.5x6 Graupner	standard +OS Quiet	10.0k	78
Tiger Trainer	Th Tig 42	11x7 Graupner	Standard	9.3k	78
Model	Engine	Prop	Silencer	RPM	DbA
Wot 4	Irvine Q40	10x9 APC	Standard	9.9k	78
Limbo Dancer	MDS 38	11x7 APC	Standard	8.8k	78
Wot 4	SC 53 4S	11x7 Kyosho	Standard	9.8k	78
Mustang	Laser 70	12x7 APC	Standard	9.3k	79
Harvard	OS 48 Surpass	12x6 APC	Standard	8.1k	79
WOT4	ST 51	11x9 Graupner	Standard	8.2k	79
Smith Miniplane	Irvine Q40	12x6 Graupner	Flair in cowl	9.4k	79
Aerotec Mustang	OS40LA	10.5x6 Graupner	Standard	9.7k	79
WOT 4	MDS48PRO	11x9 APC	Standard	9k	79
Tiger Trainer	OS52FS	11x8 Kyosho	Standard	8.8k	79
Model	Engine	Prop	Silencer	RPM	DbA
Tiger Trainer	Thun T GP42	11x7 Graupner	Standard	9.6k	79
Hurricane	Laser 150	16x8 3 blade	Standard	6.25k	80
Patriot	SC 91 FS	14x7 Graupner	Standard	9.0k	80
D7	Laser 75	13x6 Master	Standard	9.5k	81
Astro Hog	ST 61	13x8 APC	Standard	9.3k	81
Hurricane	OS 90 FS	12x8 Graupner (3)	Standard + NC Special	9.4k	81
Magnatilla	Th Tig 54	13x6 APC	Standard	9.0k	81
Sport 75	Laser 80	14x7 Graupner	Standard	8.2	81
Mustang	Th Tig 61 pro	13x9 APC	Standard + pipe	8.0k	81
Mustang	Th Tig 61 Pro	13x7 APC	Standard + ali pipe	9.4k	81

Quiet Engine Mount On The Cheap

For a really cheap and effective way to quieten your engine try this:

Get yourself a metre of that brownish flat rubber strapping that is used in upholstery. It is attached and stretched in an interlaced pattern across the seat area of a chair to support the seat cushion. It is about 2 inches wide and one eighth of an inch thick and is sold in D.I.Y. places by the meter.

All you need do is cut 2 strips to fit under the engine lugs. Punch 2 holes for the engine bolts. Use a proper multi sized hole punch. The type used to punch holes in leather belts with the rotary punches that click into position is good.

Cut these strips larger than the engine lugs so that, when tightened down, the engine no longer contacts the engine bearers. Ideally, the rubber rectangles should fold down between the bearers and the bottom curved part of the crankcase. So wooden bearers work best.

If using a specially made aluminium engine mount, use another rectangle between the mount and 'F1' the firewall or bulkhead too.

Tighten everything down and you will be amazed at the difference.

Tim Costello

What are our alternatives?

Get farther away from the public.

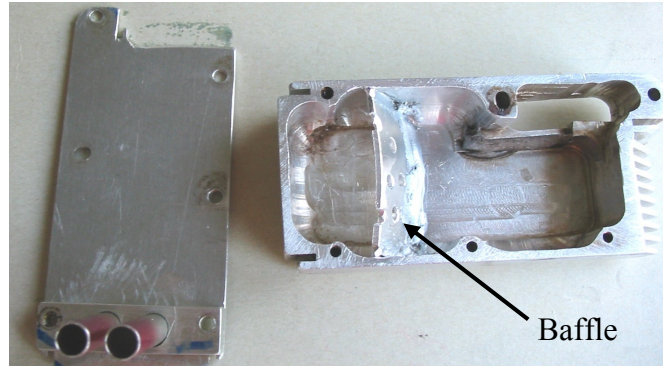
Find a site that is more isolated and make all the noise we like!

Custom Mini Antic Muffler

I built the plane in 1977 I used a simple Du-Bro muffler, an exhaust extension with a series of plates to reduce the noise. It wasn't very effective.

A few years ago I was thinking of flying the plane again and I made a custom muffler primarily to get the exhaust oil down below the plane. I threw out the plates but kept the Du-Bro extension and mounting hardware. When I checked the plane last summer the noise was over 90db.

To meet the MAAC recommendations I installed the baffle shown in the first picture in the muffler. This got the noise down to 88db.



The second picture shows the assembled muffler and the third shows it installed on the Mini Antic.



The fourth shows the plane being tested at our field at our August fun fly.

