



Objective Noise Test Information Package

Introduction:

This information sheet is intended to provide guidance to LVV Certifiers conducting an exhaust Objective Noise Test (ONT) using LVV Standard 90-20 (Exhaust Noise Emissions) and collects together material from certifier training presentations and newsletter items to form a summary document. The information covers three areas: legislation, operation and administration.

Legislation:

Third amendment of the Exhaust Noise Emissions standard 90-20(03)

In November 2011 several changes were made to the standard. Summary of the major changes:

- Vehicles with unmodified exhaust
An unmodified production vehicle with standard exhaust may need to be tested in certain circumstances, for instance if issued with a green sticker for noise. The Standard is updated to allow for testing of an unmodified exhaust.
- Motorsport vehicles
The Vehicle Equipment Rule exempts Motorsport vehicles from exhaust noise requirements while competing and being used on a road for the purpose of inspection, certification, servicing or repair of the vehicle. The Standard is updated to exclude these vehicles.
- Shielding
Addition of the option to use a shielding method to show that non-exhaust noise is influencing the exhaust noise measurement over and above that allowed for in the factoring. This has been the case for a Beach Buggy; shielding the engine reduced the measured noise by 7dBA to an acceptable 95dBA, proving that the 4dBA factor was not appropriate in this case.
- Factoring
The decibel factoring for engines in close proximity (4dBA) and additional mechanical noise (2dBA) cannot be used together or at all on motorcycles or when shielding has been implemented. This caps the maximum possible vehicle noise level at 100dBA for motorcycles and 99dBA for all others.

A factor has been added for historic replica or reproduction vehicles instead of a separate figure in the decibel limit table. This does not change any decibel levels; it is just to align with the Rule.

- Revised formset
The corresponding formset, FS037, has been updated to align with the standard and to make the factoring calculations simpler.

Evidence of ONT for WoF inspection

During a Warrant of Fitness inspection, the inspector is entitled to ask to see not only the label affixed to the exhaust, but the test certificate as well. It is recommended that the certificate is kept with the vehicle, or filed away in case it is ever called for. LVVTA can provide a duplicate copy; this will incur an administration fee of \$25.55 inclusive of GST.

Changes to noise legislation - green stickers

Late in 2009 some changes were made to the regulations regarding exhaust noise, as follows:

A vehicle that is green or pink stickered for exhaust noise will still have to go to a TSDA for a new WOF, but as part of the Wof check the TSDA is no longer allowed to make a judgment on the exhaust noise. Instead, the TSDA must require an Objective Noise Test (ONT) pass.

If a vehicle is green-stickered for noise after it has already passed an ONT, it must have a new ONT carried out after the green sticker was issued. This is not an error, it is a requirement. In this case you should still conduct a full ONT, even if you have already carried out an ONT previously. A new exhaust label can be applied on top of the old one, with the same surface preparation as usual.

A green-stickered vehicle may be presented for test with a standard exhaust fitted, most likely fitted after the sticker was issued as a replacement for a loud exhaust. To get the green-sticker removed a new ONT is required, despite there being no exhaust modifications.

Must an engine swap certification include an ONT?

Following discussion at LVV Certifier training sessions, LVVTA has clarified with NZTA the legal requirement for noise testing of engine swap vehicles.

Unlike scratch-built vehicles, an ONT is not mandatory for an engine swap in a modified production vehicle. However, exhaust noise is a Warrant of Fitness check-sheet item and so is covered by Formset F003 - Safety Item Form. This provides two options for an LVV Certifier; either:

- obtain a valid WoF/CoF check-sheet (or WoF/CoF Pass issued less than 14 days before the date of the LVV inspection) as proof of acceptable noise levels, or
- apply the WoF/CoF subjective test for exhaust noise, using a cheap noise meter if appropriate.

The subjective test requires noise to be less than or similar to standard. Note that if a cheap meter is used then the VIRM requires the noise output measured to be lower than the actual noise limits in the LVV standard, to ensure that the exhaust 'would clearly pass'. If one of the above options is not achievable then an ONT will have to be carried out before LVV certification can be completed.

ESMP data

Wherever possible the appropriate percentage of ESMP figures ('Engine Speed Maximum Power' - the engine speed at which the engine makes its maximum power) from the supplied manual should be used. This ensures that the test is as close to the internationally recognised method as possible.

The figures specified in the LVV Standard are a 'fall-back' and should be used when no ESMP data is available or it is not appropriate to use the ESMP figures. The ESMP manual would not apply when the engine has been modified, unless the only modification is the exhaust system itself.

Operational tips:

Overloads caused by noise-spikes and no reading on screen

If the upper limit in the top right corner of the screen flashes 'OVL' instead of showing the upper limit (100, 120 or 130dBA) then a noise spike has occurred during recording and the decibel figure recorded is not valid and must be done again.

If the meter does not register a reading, with "-- --" on the display, then the scale may be set too high (70–140 dBA) – change the measurement range to 50–120 dBA or 30–100 dBA (see appendix 2).

Low battery inaccuracy/back-up battery

LVV Certifiers have found that the rechargeable batteries often run down in the ONT meter. It is possible that when the low-battery symbol is flashing, the meter accuracy may drop, so it is very important to always use charged batteries. The meter also has a back-up battery hidden inside it that stores the yearly calibration settings. This battery recharges from the main batteries.

It isn't likely to happen with us, but if a meter is left more than 3 months without charged batteries in it the calibration will be lost and the meter will need to be returned to the supplier for recalibration, which isn't cheap, at around \$400. It is good practice when not using the meter for extended periods to remove the batteries to prevent leakage, but please bear in mind that they should be charged and put back in every month or so to keep the back-up battery healthy.

Care of equipment

Please take all precautions necessary to avoid damage to the equipment. There has been a rise in damage due to operator carelessness, especially to:

- tachometer inductive cable (burnt on extractors)
- microphone cable (wires pulled from connectors).

Please also regularly check the batteries for signs of leakage – two tachometers have been irreparably damaged and a noise meter had to be replaced due to corrosion from leaking batteries.

Please inform the LVV office immediately of any equipment faults or damage.

Aluminium exhaust label

One aluminium exhaust label is to be attached to the exhaust where it can be read, but not so visible that the owner would object – the underside of the tailpipe is the common position. Twin exhausts only require one label. For permanent adhesion the exhaust must be thoroughly cleaned with the fluid supplied.

We have had several reports of exhaust noise labels falling off the tailpipe. We don't know the reason in each case, but it may be one or more of the following:

- Not using the cleaning fluid supplied - brake cleaner will not work. If you have run out order more from the Wellington LVV office.
- Applying the label to a cold exhaust. The adhesive is cured with heat and so a label on a cold exhaust could fall off before it has had a chance to set. Fit the label when the exhaust is warm.

If a label has to be replaced because the original has disappeared or been damaged, follow this process:

- Clean the surface as usual - the new label can go over an old label, or remnants of one.
- Fill out a new test certificate, identical to the original except write the new label number.
- Take the owner's original white copy and give them the new white copy.
- Send the original white copy with the blue copy to the Wellington LVV office, briefly explaining the situation. A fee is not currently charged for this.

We would like to know if there are more instances of labels coming off. If anyone has easy access to a vehicle that they have noise tested, please have a quick look to see if the label is still in place.

Noise meter operation instructions

Appendix 1 contains the operating instructions for the type 1 noise meter.

Noise meter and calibrator controls layout

Appendix 2 contains the layout of the buttons for the type 1 noise meter and B&K field calibrator.

Tachometer faults

Over time some of the inductive tachometers have developed faults, often due to burnt cables. If for practical reasons the laser tachometer cannot be used instead, then a trusted alternative should be used. As a last resort the vehicle tachometer can be used. Please note this on the form-set and report any fault with the supplied tachometer as soon as possible to the LVV office.

Administration:

Updated versions of the standard and formset

There has been more than one version of the ONT standard and formset, as some requirements have changed over time, so please ensure that the latest version used. The latest version is available from the LVVTA website as well as in the LVV Certifier's manual.

Triplicate certificate – Certifier *MUST* sign it

Each time an LVV Certifier conducts an ONT, he must remember to sign and date it. The copies are distributed as follows:

- white copy to the customer – certifier to ensure customer knows to keep this safe;
- blue copy to LVVTA office, along with the formset and the administration fee;
- yellow copy to be kept by the LVV Certifier.

The Warrant of Fitness inspector is entitled to ask to see the test certificate. It is recommended that the certificate is kept with the vehicle, or filed away in case it is ever called for. LVVTA can provide a duplicate copy; this will incur an administration fee.

Hologram sticker on white copy of certificate only

The mandated hologram sticker is applied to the white copy only; it doesn't need to go on the blue office copy. The hologram sticker is used so that the LVV Certifier and customer don't have to wait for the LVVTA office to return a stamped and laminated copy, as we do with upper seatbelt anchorage declaration forms.

Send in form-set, blue certificate copy, & payment to LVVTA *PROMPTLY*

Each month LVVTA is required to send the details of all ONT results conducted to NZTA so that the Government is aware of what is happening throughout the country. NZTA also need up to date information in order to check that WoF garages are referring green stickered vehicles for an ONT.

Therefore, it is very important that we get the blue copy from the LVV Certifier shortly after each test. Please do not store them up for long periods in order to send in batches. We will periodically ask all LVV Certifiers with LVEX category to bring their ONT test certificate book and remaining exhaust labels to a training session so that we can ensure we are up to date with tests done.

How much to charge

NZTA quote a noise test at 'around \$200' (including GST). The charge should be fair and reasonable, so in some cases may have to be higher. The LVV Certifier pays LVVTA an administration fee for each ONT certificate issued; this fee covers the system set up, administration, documentation and consumable fees.

Certifiers on holiday

If you hold a noise meter ONT kit and are not going to be available for a length of time, you should contact the closest certifier with EX category and pass the kit to that person for the period of time that you are away. This is especially important when Police conduct vehicle compliance operations and may issue many green stickers for noise. The LVVTA office should also be informed of any prolonged absence in order to refer customers elsewhere.

Couriered ONT kit

The case is usually couriered locked – the key is in the handle. When returning the case please ensure to lock it and place the key back in the handle. If possible, charge the batteries so that the next LVV Certifier can use the equipment immediately.

NZTA noise testing pamphlet

NZTA have a pamphlet on exhaust noise. A copy is enclosed in the instruction folder in each ONT kit and is also available on the NZTA website, found by searching 'noisy vehicle' or directly accessed here:

<http://www.nzta.govt.nz/resources/vehicle-failed-noisy-exhaust/docs/noisy-vehicle.pdf>

Finally:

As always, to enable quick identification of the changed or additional areas, all new additions and changes are denoted by a dotted vertical stroke in the left margin and the use of grey highlight over the affected text.

If any assistance in the use of this Information Sheet is required, please contact an LVVTA technical team member at the Wellington LVVTA office.

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Appendix 1 – B&K type noise meter instructions

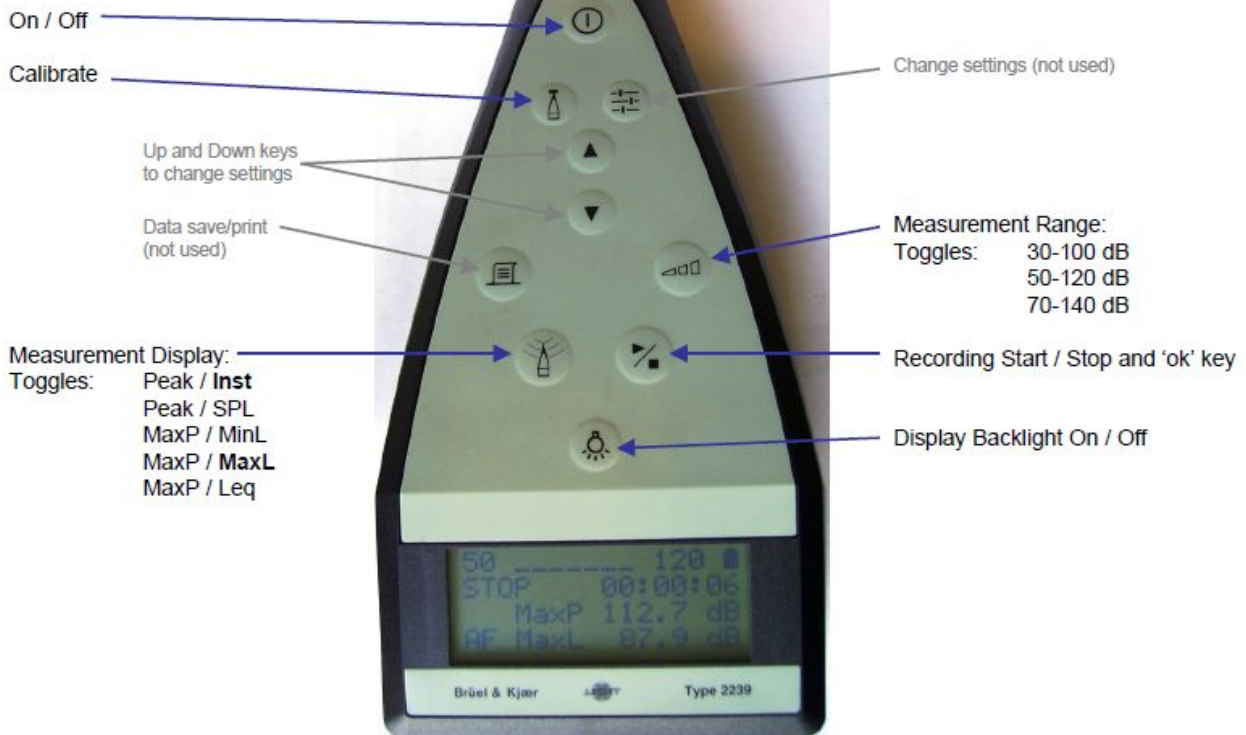
Start-up		
1		Switch on Sound Level Meter (SLM). Wait 15 to 20 seconds for self-test to complete and the measurement screen to appear.
2		The meter automatically starts recording when switched on. Press <i>Recording/Start/Stop</i> button to stop measurement.
Perform SLM calibration		
3		Press <i>Calibrate</i> button.
4		Check calibration level on screen reads <u>94.0 dB</u> . If necessary use arrow buttons to adjust level
5		Place microphone into calibrator.
6		Switch on calibrator and rest on a solid surface.
7		Press <i>Recording/Start/Stop</i> button on noise meter. Wait 10 seconds for calibration to complete. ' Completed Successfully ' will briefly appear on screen before the measurement screen appears.
8		Press the <i>Display/Calibrate Abort</i> button as many times as required to display Peak & Inst levels.
9		Check <i>Inst</i> level is within 0.5 dB of <u>94.0 dB</u> (i.e. between 93.5 dB and 94.5 dB).
10		If not within 0.5 dB of <u>94.0 dB</u> , restart the calibration test (repeat steps 3 to 9) or contact LVV office for advice.
11		Record <i>Inst</i> dB level on formset.
12		Remove the microphone from the calibrator.

Perform background noise test		
13		Press the <i>Display/Calibrate Abort</i> button as many times as required to display <u>MaxP & MaxL</u> levels.
14		Press <i>Recording/Start/Stop</i> button to start measurement.
15		Wait <u>5 to 10 seconds</u> while background noise level records.
16		Press <i>Recording/Start/Stop</i> button to stop measurement.
17		Record <u>MaxL</u> background noise dB level on formset.
Perform Noise measurement		
18		Adjust throttle until required RPM is reached. Press <i>Recording/Start/Stop</i> button to start measurement.
19		Hold RPM for <u>1 to 2 seconds</u> .
20		Release throttle and continue recording for <u>7 seconds</u> or until RPM has dropped back to idle speed.
21		Press <i>Recording/Start/Stop</i> button to stop measurement.
22		Record <u>MaxL</u> dB level on formset.
23		Repeat noise test twice more (<u>#18-#22</u>). Additional sets of tests may be required for multiple exhausts
Perform final checks		
24		Recheck background noise (<u>#13-#16</u>).
25		Record <u>MaxL</u> background noise dB level on formset.
26		Recheck calibration of SLM (<u>#3-#10</u>).
27		Record <u>Inst</u> calibration dB level on formset.
28		Switch off SLM.

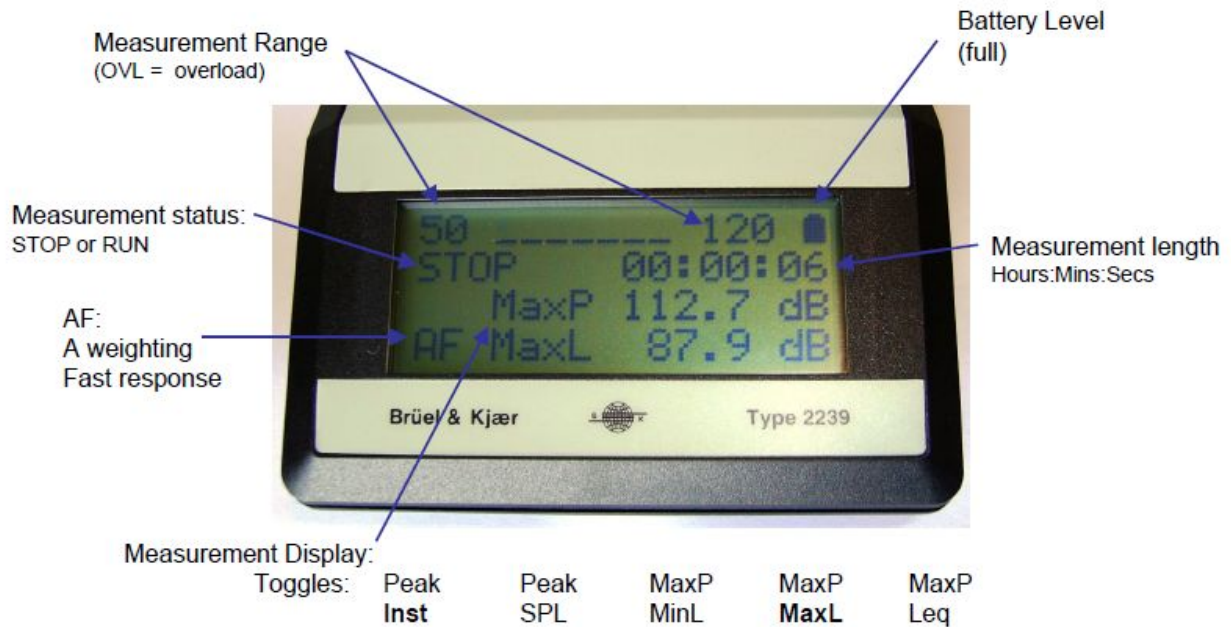
Appendix 2 – B&K Sound level meter and field calibrator controls layout

Sound Level Meter Buttons

(grey text is for buttons that are not used)



Sound Level Meter screen



Use **Inst** to view an instantaneous reading (for example, during calibration)
Read **MaxL** for the maximum level during a test (ignore Peak and MaxP readings)

Field Calibrator

