

# NHT 1259 Frequently Asked Questions

This is version 0.2 of the PRELIMINARY, unofficial NHT 1259 list of frequently asked questions. The accuracy of data in this FAQ is unconfirmed and this FAQ is not sanctioned by NHT, the bass mailing list, or any other person. Mr. Ken Kantor of NHT has seen this document and corrected one error, but is not vouching for accuracy.

## What is the 1259?

In brief, the 1259 is a cast-frame 12" woofer with a polypropylene cone, large vented voice coil, large magnet structure, rubber surround, and extremely long linear throw. The 1259 is a 6 ohm speaker with a single voice coil.

The 1259 is a custom woofer designed by Bill Bush, NHT Chief Engineer, for use in NHT products and made for them by Tonegen of Japan. NHT has made the driver available to builders through a retailer called A & S Speakers (Also known as Just Speakers).

A & S Speakers  
4075 Sprig Drive  
Concord CA 94520 USA  
Voice 510-685-6400  
FAX 510-603-2724

As of January, 1996, if you mention the internet, you get a special price of \$115 each for this driver from A & S. The regular price is \$149 each. Madisound also sells the 1259 for \$149.

## What are its characteristics?

|                          |       |              |          |
|--------------------------|-------|--------------|----------|
| Effective cone diam.     | D:    | 20.00 cm     | 7.87 in. |
| Maximum linear excursion | Xmax: | 1.50 cm      | 0.59 in. |
| Bl product               | Bl:   | 7.50 N/A     |          |
| Voice coil dc resistance | Re:   | 3.40 Ohms    |          |
| Mechanical mass          | Md:   | 32.00 gm     |          |
| Mechanical compliance    | Cms:  | 1.52 e-3 m/N |          |
| Mechanical losses        | Rms:  | 1.55 kg/s    |          |

Nominal impedance 6 ohms  
Maximum music power 300 watts  
Frequency range 19-1000 Hz  
Sensitivity 90 dB SPL @ 2.83 VRMS @ 1 meter  
Voice coil inductance 1.2 mH  
Voice coil diameter 50 mm  
Voice coil height 34 mm  
Air gap height 8 mm  
Magnet weight 59 oz

### THIELE/SMALL PARAMETERS

|                          |        |              |             |
|--------------------------|--------|--------------|-------------|
| Effective cone diameter  | d:     | 20.00 cm     |             |
| Maximum linear excursion | Xmax:  | 1.30 cm      |             |
| Resonant frequency       | F0:    | 19.00 Hz     |             |
| Equivalent volume        | Vas:   | 190.00 L     | 6.71 cu. ft |
| Mechanical Q             | Qms:   | 2.60         |             |
| Electrical Q             | Qes:   | 0.56         |             |
| Total Q                  | Qts:   | 0.46         |             |
| Reference efficiency     | n0:    | 0.22 %       |             |
| Output level             | < SPL: | 85.52 dB SPL |             |

|                      |      |               |
|----------------------|------|---------------|
| Effective area       | Sd:  | 507.00 sq. cm |
| Maximum displacement | Vd:  | 408.41 cu. cm |
|                      | Krm: | 28.89         |
|                      | Kxm: | 26.67         |
|                      | Erm: | .584          |
|                      | Exm: | .647          |

PERFORMANCE COMPARISONS

|                          |      | CLOSED | REFLEX       |
|--------------------------|------|--------|--------------|
| Enclosure volume         | Vb:  | 88.62  | 299.21 L     |
| -3dB frequency           | F3:  | 32.43  | 15.56 Hz     |
| Peak response ripple     | Rh:  | 0.00   | 0.04 dB      |
| Maximum acoustic output  | Par: | 0.15   | 0.03 W       |
| Maximum SPL              | SPL: | 100.88 | 94.14 dB SPL |
| Maximum electrical input | Per: | 68.57  | 14.52 W      |

FREQUENCY RESPONSE

Intervals per octave 6.0

|                    |      | CLOSED | REFLEX   |
|--------------------|------|--------|----------|
| Starting frequency | 15.9 | -12.66 | -2.21 dB |
|                    | 17.8 | -10.78 | -0.77 dB |
|                    | 20.0 | -8.99  | -0.27 dB |
|                    | 22.4 | -7.29  | -0.13 dB |
|                    | 25.2 | -5.73  | -0.09 dB |
|                    | 28.3 | -4.36  | -0.07 dB |
|                    | 31.7 | -3.20  | -0.05 dB |
|                    | 35.6 | -2.27  | -0.03 dB |
|                    | 40.0 | -1.56  | -0.02 dB |
|                    | 44.9 | -1.05  | -0.01 dB |
|                    | 50.4 | -0.69  | -0.00 dB |
|                    | 56.6 | -0.45  | 0.00 dB  |

CLOSED BOX DESIGN

|                         |      |              |             |
|-------------------------|------|--------------|-------------|
| Desired system Q        | Qtc: | 0.71         |             |
| Recommended box volume  | Vb:  | 88.62 L      | 3.13 cu. ft |
| Enclosure damping       |      | 3.00 (0 - 5) |             |
| Tuning ratio            | a:   | 1.91         |             |
| System resonance        | Fc:  | 32.43 Hz     |             |
| Actual system Q         | Qtc: | 0.71         |             |
| -3dB frequency          | F3:  | 32.43 Hz     |             |
| Peak response ripple    | Rh:  | 0.00 dB      |             |
| Maximum acoustic output | Par: | 0.15 W       |             |
| Maximum SPL             |      | 100.88 dB    |             |
| Maximum input power     | Par: | 68.57 W      |             |

VENTED BOX DESIGN (NOT RECOMMENDED!!!)

|                           |      |              |              |
|---------------------------|------|--------------|--------------|
| Recommended box volume    | Vb:  | 299.21 L     | 10.57 cu. ft |
| Tuning ratio              | a:   | 0.64         |              |
| Enclosure resonance       | Fb:  | 16.50 Hz     |              |
| Recommended vent diameter | Dv:  | 20.05 cm     | 7.89 in.     |
| Desired vent diameter     | Dv:  | 5.08 cm      | 2.00 in.     |
| Vent length               | Lv:  | 3.73 cm      | 1.47 in.     |
| -3dB Frequency            | F3:  | 15.56 Hz     |              |
| Peak response ripple      | Rh:  | 0.04 dB      |              |
| Max. acoustic output      | Par: | 0.03 W       |              |
| Maximum SPL               |      | 94.14 dB SPL |              |
| Maximum input power       | Per: | 14.52 W      |              |

## How can I use it?

The 1259 works best in a sealed enclosure of approximately 3 cubic feet (85 liters), stuffed with approximately

3 pounds of acoustic polyester fiber or fiberglass insulation.

In the NHT 3.3, the first speaker design in which the 1259 was incorporated, the internal volume used is 2.7 cubic feet (76.44 liters). In addition, the NHT 3.3 makes use of a sub-divided enclosure with resistive damping between sections to achieve an even lower 3dB rolloff frequency (called F3).

One of the best material for speaker cabinets is 1" MDF (Medium Density Fibreboard). It is more expensive than particle board, but much better damped. Some have used 3/4" MDF successfully, and have made up for the thinness with extra braces. MDF is hard to find, but many lumber yards can special order it from their normal distributors. Often, the lumber yard doesn't even know that they can get it, because so few people ask for it.

When calculating volume, allow for the space taken up by the speaker itself and all internal braces. Use lots of braces spaced irregularly. They will not hurt and will probably help. Use cleats at the joints, shelf braces, cross braces, and even battens across the larger panels. Box L vs W vs H is not critical at all (nor in any other closed box in which the shortest wavelengths to be reproduced are appreciably longer than the shortest box dimension).

Exact enclosure volume is not critical, and stuffing can be added or subtracted to fine tune the response. Mr. Ken Kantor recommends adjusting the stuffing by monitoring the impedance versus frequency of the sealed box system. Add stuffing to lower the frequency where the impedance is highest. When that impedance peak starts to rise in frequency, you have added too much.

The 1259 is built to be mounted facing outwards. Do not use it facing downward or upward. The suspension is not suitable for this use and distortion and/or damage will result from the sagging cone.

## **Is there a dual voice coil version available?**

No. Some people use two 1259 subwoofers for stereo and claim that the performance is superb. There are many advantages to dual subwoofers, such as better stereo image, fewer problems with room interactions, and of course, more bass. Others only use one 1259. If you use just one, you should get a separate power amplifier just for the 1259 and use that amplifier to mix stereo down to mono.

## **How low will this driver go?**

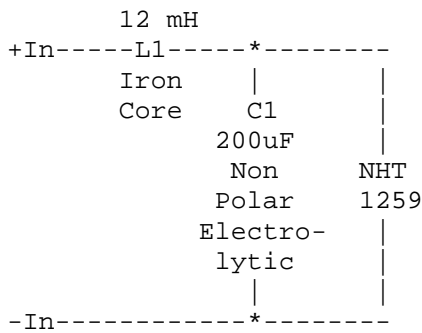
In an optimum cabinet, it will go flat to 30 Hz, and will generate appreciable energy down to 20 Hz, thanks to the more 6 db/octave rolloff of an acoustic suspension cabinet (versus the 12 db/octave rolloff of a tuned port enclosure). Depending on the shape and dimensions of the listening room (i.e., the combination of room gain and room modes), a proper 1259 subwoofer can produce satisfying response well down towards 20 Hz. The 1259 is designed to work well in a near cubical enclosure placed flush against the wall with the driver pointed out into the room.

## **How high will the 1259 go?**

The woofer will operate effectively up to 1 kHz, but the signal applied to the 1259 should be down by at least 12 dB at 1 kHz. Optimum crossover frequencies range from 100 to 250 Hz.

## **What about a crossover for it?**

In the NHT 3.3, the 1259 is driven through the following low-pass filter: This filter has a cutoff frequency of approximately 100 Hz.



## Is this woofer really great?

This is a very good woofer. It is tailored to excellent home audio in a reasonably sized sealed box, and at a fair price. In addition, the NHT Company puts extremely high demands on Tonegen, the speaker manufacturer, for consistency and accuracy in the driver. NHT tests each 1259 to 10% nominal Vas, Mms, and Qts, and +/- 1 dB response, at their factory before shipping to A & S. This is much tighter tolerance than home builders get in other drivers, and has many benefits.

You can spend more money and get a larger woofer, a bigger magnet, etc. Such a driver may be more suitable for specific applications, like theater sound or outdoor sound, but may actually be inferior for home use. Large magnets improve efficiency, but reduce the low-frequency radiation of woofers by acting as a brake on the counter-voltage the voice coil generates as it cuts through the flux of the magnet. Larger woofers suffer from cone breakup and distortion for large excursions. Finally, more expensive woofers may require larger or more complex enclosures.

To our knowledge, the NHT 1259 is one of the most effective deep-bass woofers that have been offered to the DIY constructor. The 1259 has been designed specifically for a small sealed box (acoustic suspension). Used in a vented box, the 1259 might produce more bass, but at the expense of some combination of increased distortion, looser bass, less even frequency response, less maximum output, and at the risk of damage. Vented boxes are not recommended for the NHT 1259. The NHT 1259 is a very high compliance woofer which relies on the air in a sealed enclosure to provide back pressure that linearizes cone motion and protects the driver from damage or destruction by excessive excursion below the frequencies at which a vented box loads the woofer cone.

One additional attribute of the NHT 1259 is that a key developer of the driver, Mr. Ken Kantor, has helped members of the bass list use the driver to its full potentials, offered candid advice, and even revealed some NHT proprietary details for using the driver. This level of support for a DIY driver is unheard of today.

## Are there any other great woofers available for DIY subwoofing?

Several manufacturers offer excellent woofers, including Eton, Peerless, JBL, McCauley, Madisound, and Dynaudio. Members of the bass/DIY loudspeaker list often discuss their experiences with other woofers. More than a hundred members of the list have bought the NHT 1259, some who appreciate its unique balance between reasonable price and superb performance, and others who went by its reputation.

## Where can I learn more?

Buy and read the Loudspeaker Design Cookbook by Vance Dickason. This is the best treatise on DIY speakers that is friendly and readable, yet technical and accurate.

by Vance Dickason (C) 1995 - ISBN 1-882580-10-9

\$34.95 + \$4.45 S&H from:

Old Colony Sound Lab  
PO Box 243  
Peterborough NH 03458-0243 USA  
603-924-9464

\$30.00 + approx. \$3 shipping from:

Madisound  
8608 University Green; Box 4283  
Madison WI 53711 USA  
608-831-3433

Read the rec.audio.\* FAQ, which is available on many usenet sites. It is also available on the world-wide web at:

<http://hydra.unik.no/~robert/hifi/faq/>

It has an entire section on speakers with many tips on speaker construction.

Subscribe to the bass mailing list to learn more about subwoofers and DIY loudspeakers in general.

There are two versions of the bass mailing list:

1. "bass" the real-time list.
2. "bass-digest" the digest version.

To subscribe to bass, send the word "subscribe" in the body of a message to "bass-request@lunch.engr.sgi.com". The message subject is ignored.

To subscribe to bass-digest, send send the word "subscribe" in the body of a message to "bass-digest-request@lunch.engr.sgi.com". The message subject is ignored.

Look at these web sites to see speakers made by others, some of which use the 1259:

- [http://reality.sgi.com/employees/pdc\\_engr/bass/](http://reality.sgi.com/employees/pdc_engr/bass/)
- <http://www.cen.uiuc.edu/~nb10440>
- <http://bundy.hibo.no/~rpd/Speaker/>
- <http://www.qnx.com/~danh/speakers.html>

## Where can I send comments on this FAQ?

Please address all discussion of the NHT 1259 to the bass mailing list. If you have a suggestion or correction for this specific FAQ, please send it to <a href="mailto:neidorff@uicc.com">Bob Neidorff (neidorff@uicc.com). I can't promise that I will read every article in the bass list, so please send specific corrections directly.

## Who wrote this FAQ?

Credit goes to many people, including:

- Paul Close
- Ken Kantor
- Dan Hildebrand
- Doug Purl

and many other members of the bass mailing list, may it live on forever.

|                                    |  |                             |
|------------------------------------|--|-----------------------------|
| Bob Neidorff; Unitrode Corporation |  | Internet: neidorff@uicc.com |
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| Merrimack, NH 03054-0399 USA       |  | FAX : (US) 603-429-8564     |

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