

SOUNDSTREAM
GRANITE
PRO

***Pro8, Pro10,
Pro12 and Pro15***
SUBWOOFERS

**OWNER'S MANUAL &
INSTALLATION GUIDE**

GRANITE "PRO" SUBWOOFERS

CONGRATULATIONS!

You have chosen a superior product for reproducing true high-fidelity in the car. This precision component, when properly installed, is capable of audiophile-quality performance. The Granite Pro woofers are well-suited for sealed, vented, and **bandpass** enclosures. They also work well in infinite baffle installations at one-half the power rating.

Should your woofer ever require service or replacement, recording the information below for **your own records** will help protect your investment.

Model Number: _____

Serial Number: _____

Dealer's Name: _____

Date of Purchase: _____

Installation Shop: _____

Installation Date: _____

DESIGN FEATURES

- **Installation Flexibility** The Granite Pro woofers perform well in infinite baffle, sealed, vented, and **bandpass** enclosures. Regardless of the application, Granite Pro woofers perform.
- **High-Efficiency Design** The Granite Pro woofers use high efficiency magnet structures and Dual Density Bonded Polyether Foam surrounds to ensure high efficiency, as well as durability.
- **Computer-Optimized Straight-Edge Cone Design** ensures the most efficient energy transfer / transient response.
- Vented **Pole Piece** for greater **voice coil cooling**.
- **Specially Coated Heavy Steel Frame Basket** for extra rigidity and damping.
- **Insulated Input Leads**
- **Designed and Manufactured in the U.S.A.**

THIELE/SMALL PARAMETERS

	Granite Pro 8	Granite Pro 10	Granite Pro 12	Granite Pro 15
Freq. Response	40-500 Hz	37-500 Hz	33-500 Hz	25-500 Hz
Sens. 1 w/1 m	90dB	92 dB	93 dB	92 dB
impedance (nom. z)	4 ohms	4 ohms	4 ohms	4 ohms
Rated Program Power	100 watts	125 watts	150 watts	200 watts
Rated Peak Power	175 watts	200 watts	250 watts	300 watts
Fs	45 Hz	42 Hz	34 Hz	22 Hz
Qts	0.447	0.577	0.530	0.480
Qms	5.305	6.62	7.55	8.41
Qes	0.488	0.632	0.570	0.509
Vas (ft ³)	1.13	1.40	3.46	12.36
Vas (liters)	32	40	98	350
Vas (m ³)	0.032	0.040	0.098	0.350
Cms (um/N)	467.4	226	246	345
DCR (ohms)	3.2	4.2	3.3	3.19
Levc (mH) @ 1 kHz	0.811	0.80	0.70	0.65
BL (Tesla m)	7.05	10.54	10.51	11.60
Sd (in ²)	34.13	54.3	86.7	131.0
Sd (m ²)	0.0220	0.0350	0.0531	0.0845
Sd (cm ²)	220	350	531	845
X max one way (linear mm)	5.00	4.25	5.00	5.00
X max one way (peak mm)	18	21	18	21
Vd (linear cm ³)	110	203	451	507
Vd (peak cm ³)	396	735	956	1775
Vd (linear m ³)	0.00011	0.000203	0.000451	0.000507
Vd (peak m ³)	0.000396	0.000735	0.000956	0.001775
Mms (grams)	62	62	88	145
Magnet Assembly (oz)	72	106	106	179
Magnet Weight (oz)	32	38	38	68
Vf (volume of frame)	45 in ³	120 in ³	135 in ³	275 in ³
Coil (mm)	20	15.2	17.75	22.7
TP (mm)	6	9.4	9.4	10.5
Mounting Dia. (in)	7	9 1/8	11 1/8	14

SELECTING AN ENCLOSURE

There are several different enclosure designs for different applications. The Granite Pro subwoofers work very well in all the following enclosure designs. It is up to you to select the specific enclosure that will work the best for your particular application.

Infinite Baffle

Infinite baffle is the simplest type of subwoofer installation. In this type of installation, the woofer(s) is mounted to a baffle which is then mounted to either the rear deck or back seat of the vehicle. The best results are achieved when the trunk area is virtually airtight and isolated from the passenger compartment.

Pros

- Excellent low frequency extension
- *Excellent transient response
- Uses almost no trunk space

Cons

- Lower power handling
- Low to medium efficiency

Sealed Enclosure

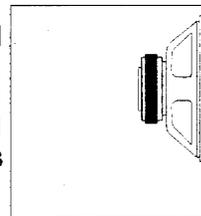
Sealed enclosures are relatively simple to build and install, as all that is required is an airtight box. The larger the sealed enclosure, the more the performance resembles that of an infinite baffle installation. Small sealed enclosures work very well in midbass applications.

Pros

- Very good low frequency extension
- Very good transient response

Cons

- Medium power handling
- Medium efficiency



Sealed(S)

Vented Enclosure

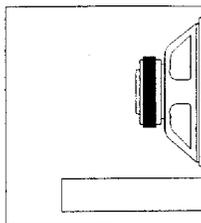
Vented enclosures use a sealed enclosure with a vent or port in the box which is tuned to resonate at a specific frequency.

Pros

- Good low frequency extension down to the tuning frequency
- High power handling down to the tuning frequency
- Higher output than sealed enclosures

Cons

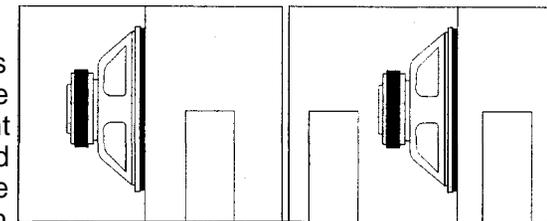
- Low power handling below the tuning frequency
- *Almost no output below the tuning frequency



Vented (V)

Bandpass Enclosure

Bandpass enclosures enclose both sides of the woofer(s). An airtight enclosure is built around the front and back of the woofer and one or both chambers are ported to specific frequencies.



Sealed Bandpass (SW)

Vented Bandpass (VBP)

Pros

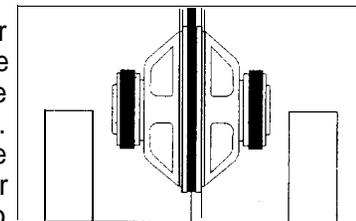
- High power handling within the operating frequencies
- Very high output within the range of the operating frequencies

Cons

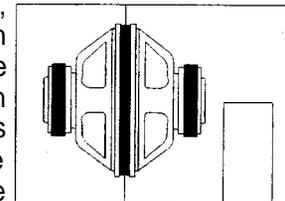
- Low power handling beyond the tuning frequency
- *Poor to moderate transient response
- *Poor low frequency extension

Isobaric Woofer Configuration

There are two basic types of woofer configurations, standard and isobaric. The standard uses a single woofer and is the type used in most subwoofer installations. There are instances, however, when the airspace available for a subwoofer enclosure is not large enough to accommodate a particular design. In these instances, an Isobaric configuration (also known as push-pull, compound, clam-shell, and composite) may work. This configuration involves two woofers operating as one. The most common use of the Isobaric configuration is two woofers bolted together and the polarity is reversed on one of the woofers so that one pushes while the other pulls. The benefit of the Isobaric woofer configuration is that the **Vas** (equivalent airspace) of the woofer is halved. By the same token, the necessary airspace for the woofer to perform in an enclosure is cut in half. The disadvantages to the design, however, the main being that even though you are using two woofers, the output is equal to one woofer in an enclosure twice the size of the enclosure for the Isobarically configured woofer.



Isobaric Vented Bandpass (ISOVBP)

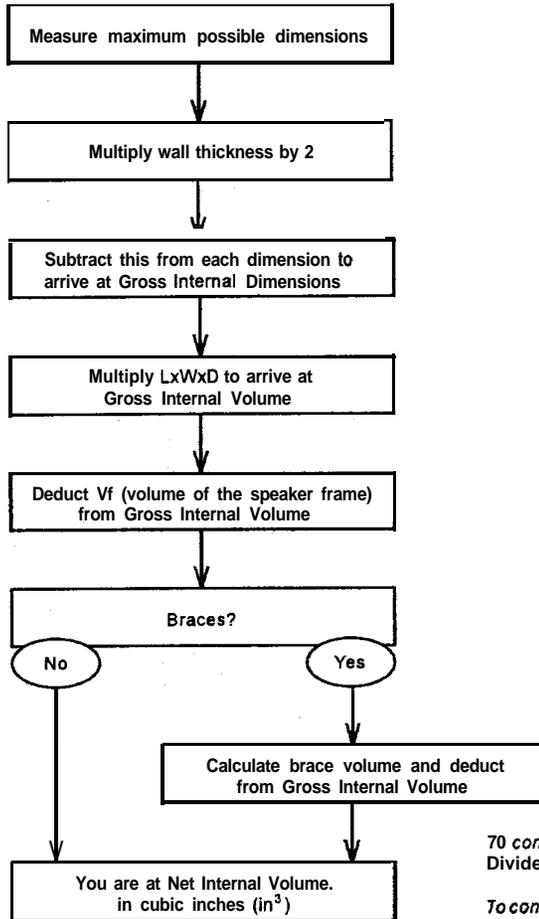


Isobaric Sealed Bandpass (ISOSBP)

■ CALCULATING (NET) INTERNAL ENCLOSURE VOLUMES ■

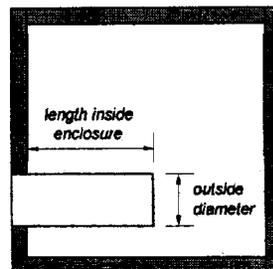
When constructing any type of enclosure, you must be aware that the outside dimensions DO NOT represent the true (Net) volume inside. Such things as woofers, ports, thickness of enclosure material, dividing wall septums, and any internal bracing will reduce the total amount of the

actual air space available. The following worksheet has been designed to provide you with the necessary steps to accurately calculate the absolute (Net) internal volume of any given enclosure.



Calculating Cylindrical Port Volume

1. Measure the outside diameter of the port and divide by 2 for the radius.
2. Square the radius and multiply by 3.14 (π) to arrive at outside port area.
3. Multiply the area by the length of the port *inside* the enclosure for the port volume.



BUILDING THE ENCLOSURE

- Determine the dimensions of your enclosure.
- **Be** certain the box you have designed will fit into the location you have chosen. Sometimes making a cardboard box with the same outside dimensions is helpful.
- Use **3/4** inch thick Medium Density Fiberboard (MDF) or High Density Particleboard. It is preferable to cut the wood with a table saw to ensure straight, even joints. If a table saw is not available, a circular saw is acceptable.
- Use a "T" square to verify precise right angle gluing.
- Use a high quality wood glue and air nails or wood screws to assemble the enclosure. Elmer's® woodworker's glue and **Weldwood®** work well. To guarantee an airtight box, seal each inside joint with RTV silicone glue.
- For Sealed Enclosures, stuff the chamber with **50-75%** filling (approximately 1.5 pounds per cubic foot) of fiberglass insulation or Dacron.
- For Vented Enclosures, staple 1 inch thick fiberglass insulation or Dacron to all walls of the enclosure except the baffle to which the woofer is mounted.
- Use the supplied gasket to seal the woofer in the enclosure and eight(8) wood screws or T-nuts and bolts. Progressively tighten each of the bolts or screws to prevent warping the woofer frame.
- Use slide-on connectors to attach speaker wires. Do not solder wires to the provided terminals as this may cause damage to the factory wire connection. This may also void the speakers warranty.

SUGGESTED ENCLOSURES

- The following designs include a variety of enclosure types. Each design has a frequency response curve that shows predicted output with 2.0 volts input, measured at 1 meter. 2.0 volts across a **4Ω** load corresponds to 1 watt per speaker. Also, each frequency response curve was generated using a **12 dB/octave** low pass filter at 100 Hz. The performance of each of these enclosures will be different once installed in a car. The amount each enclosure will vary depends on the car and installation location. The "standard" curves given correspond to performance outside the car to help you visualize relative performance differences. Read through the descriptions given for each enclosure and select the one that suits your needs.
- Remember: all suggested enclosure volumes are Net, and **DO NOT** include woofer, port, and bracing displacement!

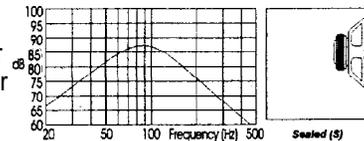
GRANITE PRO 8

Infinite Baffle

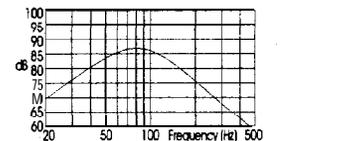
- Excellent performance for all types of music at moderate levels

Sealed

- **0.5 ft³** Net Internal Volume - Excellent for **midbass**, must be stuffed with fiberglass or other acoustic insulation

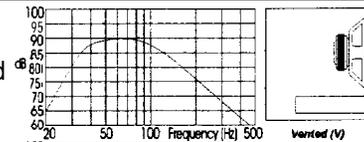


- **1.0 ft³** - Good enclosure for classical & jazz

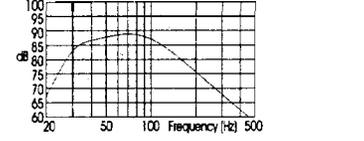


Vented

- **1.0 ft³ @ 40 Hz** (3" x 7.25" port) - Very good for rock and rap

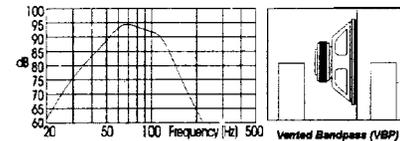


- **1.0 ft³ @ 36 Hz** (3" x 9.5" port) - Very good for jazz and rock, good for classical, good for rap

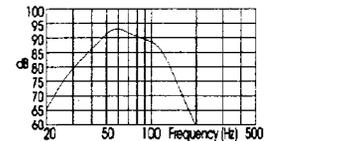


Vented Bandpass

- Enclosure **#28** - Very high output, smooth response, very good for rap & rock
Rear = **0.7 ft³ @ 44 Hz** (3" x 9" port)
Front = **0.5 ft³ @ 90 Hz** (4" x 3.5" port)

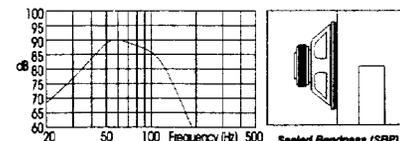


- Enclosure **#29** - High output, wide response, punchy bass, good all around enclosure
Rear = **0.86 ft³ @ 38 Hz** (3" x 10" port)
Front = **0.4 ft³ @ 85 Hz** (4" x 6.25" port)



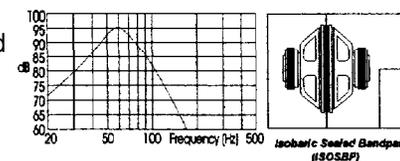
Sealed Bandpass

- Enclosure **#26** - Good output, solid response to 42 Hz, good all around enclosure
Rear = **0.6 ft³ sealed**
Front = **0.4 ft³ @ 75 Hz** (4" x 9" or two 3" x 10.9" ports)



Sealed Bandpass - Isobaric Configuration

- Enclosure **#25** - Very high output, very good for rap or rock
Rear = **0.65 ft³ sealed**
Front = **0.60 ft³ @ 62 Hz** (4" x 9" port)



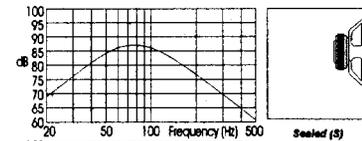
GRANITE PRO 10

Infinite Baffle

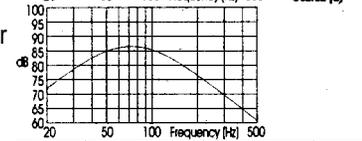
- Excellent performance for all types of music at moderate levels

Sealed

- **1.0 ft³** - Good small enclosure, good for rock, good for rap

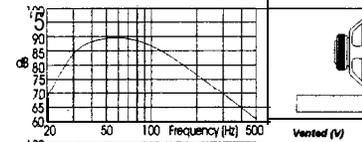


- **2.5 ft³** - Good all around enclosure, good for jazz & classical, very good for rock, good for rap

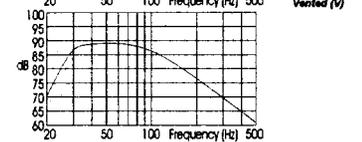


Vented

- **1.5 ft³ @ 35 Hz** (3" x 6" or 4" x 12" port) - Very good all around enclosure

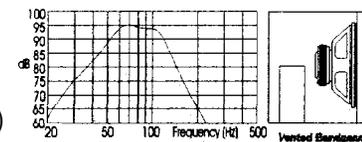


- **2.0 ft³ @ 32 Hz** (3" x 5" or 4" x 10.25" port) - Very good low frequency extension, very good for classical and jazz



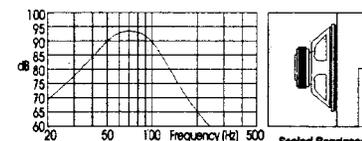
Vented Bandpass

- Enclosure **#4.1** - Very high output, very good for rap and rock
Rear = **0.8 ft³ @ 45 Hz** (4" x 14" port)
Front = **0.7 ft³ @ 92 Hz** (two 4" x 5.5" ports)



Sealed Bandpass

- Enclosure **#1** - Very high output, very good for rap
Rear = **0.6 ft³ sealed**
Front = **0.8 ft³ @ 80 Hz** (two 4" x 6.75" ports)



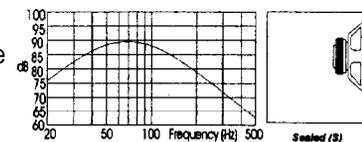
GRANITE PRO 12

Infinite Baffle

- Excellent performance for all types of music at moderate levels

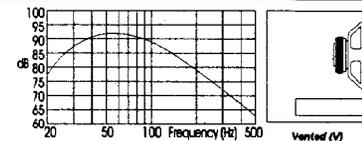
Sealed

- **3.0 ft³** - Good, smooth butterworth response (Q=.7), very good for jazz & classical, good for rock



Vented

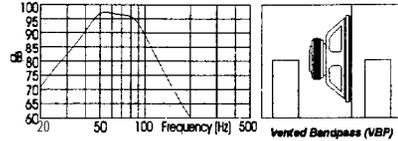
- **2.5 ft³ @ 30 Hz** (4" x 9" port) - Good output, good for jazz & classical, very good for rock, good for rap



GRANITE PRO 12 (continued)-

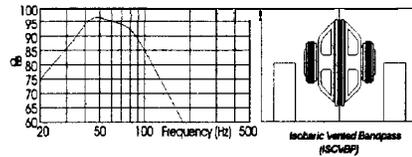
Vented Bandpass

- Enclosure #10 - Very high output, very good for rap
Rear = 1.9 ft³ @ 36 Hz (4" x 8" port)
Front = 1.6 ft³ @ 70 Hz (three 4" x 5.75" ports)



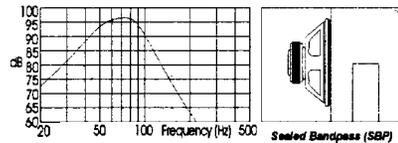
Vented Bandpass - Isobaric Configuration

- Enclosure #11 - Medium high output with good bass extension
Rear = 1.1 ft³ @ 30 Hz (3" x 13.5" port)
Front = 0.75 ft³ @ 63 Hz (two 3" x 7.75" ports)



Sealed Bandpass

- Enclosure #7 - High output, good for rap, hard hitting bass
Rear = 1.2 ft³ sealed
Front = 1.7 ft³ @ 67 Hz (two 4" x 3.5" ports)



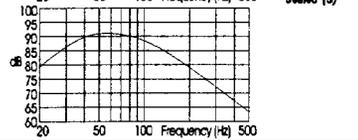
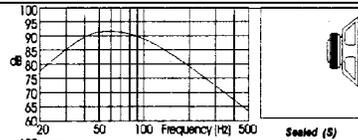
GRANITE PRO 15

Infinite Baffle

- Excellent performance for all types of music at moderate levels

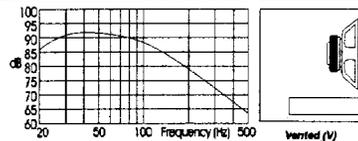
Sealed

- 3.0 ft³ - Good medium power enclosure, good for jazz & rock
- 4.0 ft³ - Very good for classical & jazz, smooth response



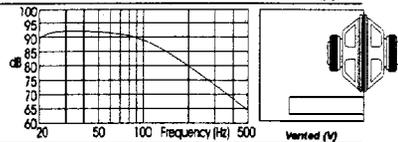
Vented

- 7.0 ft³ @ 20 Hz (two 4" x 16.25" ports) - Very good all around enclosure, flat to 20 Hz in car



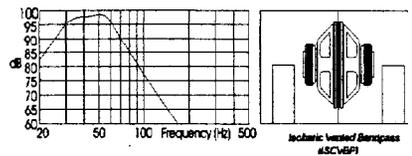
Vented - Isobaric Configuration

- 5.5 ft³ @ 20 Hz (two 4" x 21" ports) - Very good all around enclosure, flat to 20 Hz in car



Vented Bandpass - Isobaric Configuration

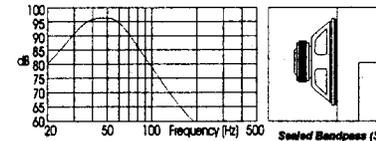
- Enclosure #17 - High output, good for rock & rap
Rear = 3.4 ft³ @ 25 Hz (4" x 10" port)
Front = 2.9 ft³ @ 47 Hz (three 4" x 9.75" ports)



GRANITE PRO 15 (continued)

Sealed Bandpass

- Enclosure #13 - Very high output, good for rap & rock
Rear = 3.0 ft³ sealed
Front = 5.0 ft³ @ 50 Hz (four 4" x 3.75" or three 6" x 8" ports)



Sealed Bandpass - Isobaric Configuration

- Enclosure #14 - Very high output, good for rap & rock
Rear = 1.5 ft³ sealed
Front = 2.5 ft³ @ 48 Hz (two 4" x 5.75" or four 4" x 12.6" ports)

