



REFERENCE SERIES SUBWOOFERS

RW15

WELCOME

Thank you for buying a DLS REFERENCE subwoofer. The subwoofer must be installed correctly in order to work well. This manual will show you how to install it like a pro. Please read the entire manual before beginning the installation.

Install the subwoofer yourself if you feel confident with our instructions and if you have the proper tools. However if you feel unsure, turn over the installation job to someone better suited to it.

The speakers are designed for enclosure mounting. In "open air" installations the power handling capacity is reduced by 30% from the nominal value.

CONNECTION OF SUBWOOFER

How to connect depends on what type of amplifier you use. The best is to follow the instructions given in the manual for the amplifier. Most amplifiers today have built-in lowpass crossover and possibilities to connect your subwoofer in bridge mode.

Two 4 ohm subwoofers are often connected in stereo mode since most amplifiers can't handle bridge mode loads below 4 ohms. If you have a DLS Ultimate amplifier it's possible to connect two 4 ohm subs in bridge mode, these amplifiers are 1 ohm stable.

RW15 has double four ohm voice coils which makes the subwoofer more flexible. You can connect a single voice coil in 4 ohm. If you want to use both voice coils you can either connect them in series to 8 ohm or in parallel to 2 ohm. If you want to connect more than one subwoofer the dual voice coils system gives you great possibilities to connect in a way that suits your amplifier.

We also recommend the use of a subsonic highpass filter. This gives a better bass reproduction with less "rumble". In most DLS amplifiers this feature is already built-in.

For wiring use high class speaker wires, min AWG13 (2.5 mm²). For example **DLS SC 2x2,5**.

WARRANTY SERVICE

This speaker is covered by warranty, depending on the conditions in the country where it is sold. If the speaker is returned for service, please include the original dated receipt with the product.

SUBWOOFER ENCLOSURES, GENERAL

Build your enclosure in a stable and airtight material. The best is MDF-board, 19 mm, or particle board, 22 mm. Larger enclosures must have bracing inside to avoid vibrations. The enclosure must be completely airtight. Use sealing compound in all joints, also around the cable terminals. The size of the enclosure is decided by the speaker data.

SEALED ENCLOSURES

Sealed enclosures are easy to build. The size is not critical, but it can't be too small. The speaker data such as Fs, Qts, Vas and X-max decides the size of the enclosure.

Large speakers need larger boxes. Two speakers need a box of the double size etc. The enclosure must be completely airtight.

A sealed enclosure should be filled with acoustic wool up to 75 - 100%.

A sealed enclosure has a lower efficiency than vented enclosures but they can handle high power and are easy to build. A subwoofer in a sealed enclosure creates a tight bass suitable for the audiophiles listening to classical music, jazz and soft rock. You can use RW15 in sealed enclosures if you use single voice coil connection.

VENTED ENCLOSURES

A speaker in a vented enclosure has a higher efficiency (3 dB) and higher power handling capacity than in a sealed enclosure. In a vented enclosure the sound from the speaker and the port work together creating a higher sound level. The sound from the port must come out in the same phase as from the speaker otherwise the result is bad.

The size of the vented enclosure is decided by the speaker data just as for the sealed one.

The size of the vehicle often decides the practical size of the enclosure. A smaller enclosure has a higher resonant frequency than the larger one. The size of the enclosure should not be so big that the speaker plays below its own free air resonance (Fs), then it loses in power handling capacity.

The port does not have to be fully inside the enclosure as long as the area and length are correct.

Sometimes you need two or more ports in an enclosure. You can convert from one to two or more ports as long as the total port area is the same.

All DLS subwoofers work well in vented boxes.

BANDPASS ENCLOSURES

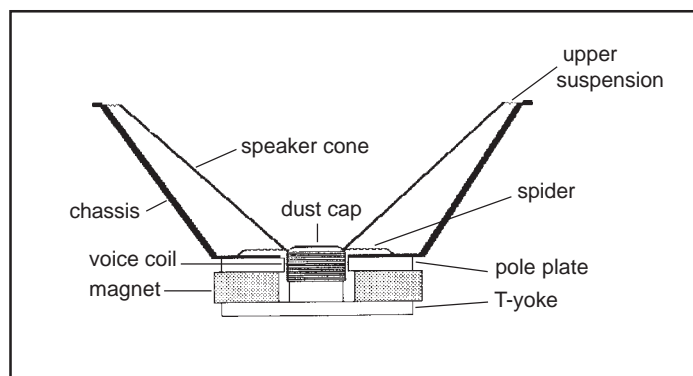
In all bandpass enclosures the speakers are hidden inside the enclosure, all sound is coming out through the ports. There are different types of bandpass enclosures and they have in common that they are a bit more difficult to build. Most DLS subwoofers can be used in bandpass enclosures.



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TECHNICAL SPECIFICATIONS FOR DLS REFERENCE SUBWOOFERS

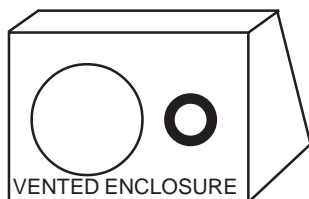
Size	RW15 37,5 cm (15")
Impedance Z	2 x4 ohm
Nom.power (RMS)	400 W (max 600)
Frequency range	15 Hz - 1 kHz
Voice coil diameter	75 mm (3")
Voice coil length	40 mm (1,57")
X-max	+/-14 mm (0,55")
CMES	117,8421
SD	830 cm ²
Cone material	Paper
Magnet, weight	160 oz (4,5 kg)
Magnet, diameter	180mm (7,08")
Installation depth	180 mm (7,08")
Mounting hole	353 mm (13,9")
Outer diameter	385 mm (15,15")
Weight	12,5 kg (27,55 lb)



Data that varies depending on way of connection:

	Single VC, 4 ohm	VC:s in series to 8 ohm	VC:s in parallel to 2 ohm
Re / Z	3,6 ohm / 4 ohm	7,1 ohm / 8 ohm	1,6 ohm / 2 ohm
BL product	13,3	25,6	13,2
Sensitivity	86,7 dB	89,4 dB	90,1 dB
Fs	29,4 Hz	28,7 Hz	28,7 Hz
Vas (liter)	116,3	122,2	122,2
Vas (ft ³)	4,1	4,3	4,3
Qms	3,2	3,2	3,2
Qes	0,75	0,42	0,38
Qts	0,75	0,43	0,30

RECOMMENDED ENCLOSURES FOR RW15

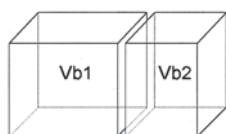


F3 = approximative lower frequency for vented boxes in Hz. Often called F-3 dB point = the point where the power is 50% lower.
Fb = Box resonant frequency

Subwoofer	Volume (liter/ft ³)	Port	Dampning	F3	Fb
RW15*	vol: 46 / 1,62	4" x 27 cm/ 10,6"	Line inside	44,4 Hz	40 Hz
RW15**	vol: 56 / 1,98	4" x 29 cm/ 11,4"	Line inside	38,7 Hz	35 Hz

*=voice coils in parallel to 2 ohms. **=voice coils in series to 8 ohms.

SEALED BANDPASS



Vb1=rear chamber
Vb2=front chamber

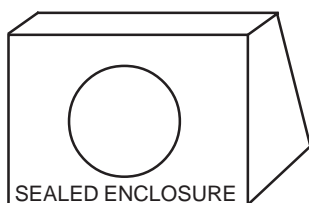
The speaker is installed in Vb1 playing into chamber Vb2 where the port(s) are installed.

RW15

Vb1	Vb2	port Vb2
29,78	26,76	2x10,2x44 cm
1,05 ft ³	0,94 ft ³	2x4"x17" (US)

F3 Vb1: 40 Hz, Vb2: 109 Hz

In this example the voice coils are connecten in parallel to 2 ohms.



Sealed enclosure:

Volume 58 liters

F3= 38,5 Hz

Use single voice coil 4 ohm

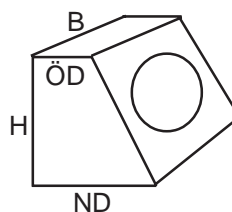
CALCULATE YOUR ENCLOSURE

Box volumes:

When calculatung the volume of an enclosure you simply multiply the width (W) x heigth (H) x depth (D). Use measures in dm and you will get the answer in liters.

A trapezoid box is calculated as below:

$$\text{Vol} = \text{width (W)} \times \text{heigth (H)} \times \frac{\text{upper depth (UD)} + \text{lower depth (LD)}}{2}$$



Be sure to measure the inside dimensions.

RUNNING-IN PERIOD

Allow the speaker to play for at least 15-20 hours. After this time the performance is correct.