

Bolt's worldwide leadership as a supplier of seismic energy sources has been maintained by an on-going commitment to research and development. Bolt Technology Corporation prides itself in a long tradition of service to our customers.

The company's commitment to service and excellence is demonstrated by extensive quality control procedures and tests. In addition to in-plant inspection, Bolt maintains an extensive test facility where each marine, land and borehole air gun is rigorously tested under conditions which simulate actual applications.



▲ Aerial View of Bolt's Test Facility

Bolt is committed to being the premiere supplier of seismic energy sources for geophysical exploration.



▲ Bubble Venting from a 9000 in³ Air Gun at 10 m. depth

Bolt Technology Corporation

Four Duke Place
Norwalk, CT 06854
Phone: (1) 203 853 0700
Fax: (1) 203 854 9601

Bolt Technology Corporation

3024 Rogerdale Road
Houston, TX 77042
Phone: (1) 713 784 8200
Fax: (1) 713 784 7158

www.bolt-technology.com
sales@bolt-technology.com



Borehole Air Guns

2200LL-BHS

DHS-5500

WELLSEIS[®] Borehole Air Gun Tool



DHS 5500



2200LL-BHS



WELLSEIS[®] Borehole Air Gun Tool



Practical Borehole Sources

The need for a practical borehole source as an alternative to dynamite and surface sources has long been understood. The depths at which a down-hole source must operate range from a few metres to several thousand metres, consequently Bolt Technology Corporation has developed several down-hole Air Guns to meet these varied requirements.

DHS-5500

The DHS-5500 is a small, light-weight Air gun suitable for operation at depths to 100 metres. The DHS-5500 is designed for chamber volumes ranging from 1 in³ to 20 in³, and operates at a pressure of 2,000 psi.



DHS-5500 Downhole Source

The DHS-5500 can be deployed in a shallow borehole, and at 16 lbs. is light enough to be easily managed by hand, without resorting to expensive mechanical winches. The DHS-5500 is also configured with composite air tanks as a portable air gun for remote operations.

2200LL-BHS

The 2200LL-BHS incorporates Bolt's patented *Long Life*TM technology to produce a high energy source suitable for deployment in well bores as deep as 1000 metres. The 2200LL-BHS can be equipped with chamber volumes ranging from 10 in³ to 250 in³.



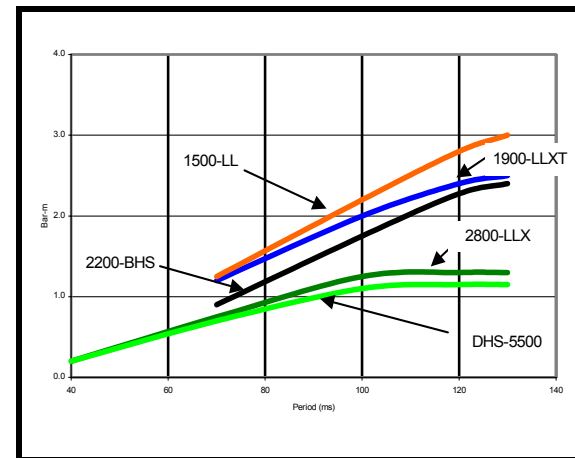
2200LL-BHS

The 2200LL-BHS weighs **129 lbs**, and is **5** inches in diameter and **34 ½** inches in length with a 200 in³ chamber.



Relative Output Comparison

While it is difficult to accurately measure absolute energy levels inside a borehole, it is instructive to measure the output of borehole sources against marine air guns of equivalent volumes and pressure. The following graph illustrates relative peak output levels for all of Bolt's air guns, in the volume range 10 in³ to 500 in³.



Peak Output Levels

WELLSEIS[®]

In order to provide an air gun energy source for borehole depths in excess of 1000 metres, Bolt Technology Corporation developed the WELLSEIS[®] borehole air gun tool.



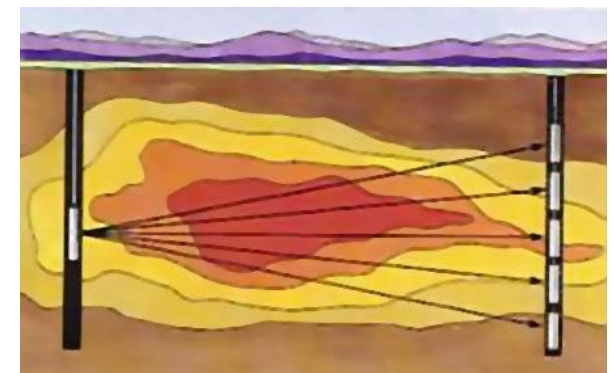
WELLSEIS[®] Borehole Source



WELLSEIS[®] Air Gun Tool

The WELLSEIS[®] borehole air gun tool can be configured as a point source with either one, two or three air guns. The *Long Life*TM Air Gun Model 22500 accepts chamber sizes from 10 in³ to 120 in³, with a maximum differential pressure of 3000 psi relative to the borehole pressure.

Versatile Borehole Air Gun Sources



Crosswell Tomographic Survey

Bolt Technology Corporation offers a range of solutions to the problem of deploying an efficient borehole energy source. From the light-weight **DHS-5500** to the High Energy **2200LL-BHS** or the **WELLSEIS[®]** multi-element Air Gun Tool, Bolt can deliver a borehole source in shallow mud pits or deep cased boreholes. These borehole air guns generate highly repeatable source signatures suitable for VSP surveys, reverse VSP surveys, crosswell tomographic surveys and checkshot surveys. Each borehole air gun is designed to be deployed in a standard 5 ½ in. cased wellbore.

