Drill-mud Particle Size Analysis

When developing and maintaining an oil well, knowledge of the particle size distribution (PSD) of the drill mud is essential for controlling the stability of the well, as well as to prevent mud loss and formation damage via mud seepage into the formation. Optimizing the use of drilling fluids can also significantly reduce the cost of drilling. This requires access to facilities that can measure the PSD of mud samples quickly, reliably and efficiently so that the mud engineer quickly can make necessary changes to the mud composition.

By far the quickest method of measuring the PSD is laser diffraction, which has been in use since the 1970's. Today it is used everywhere in industrial and scientific applications where there is a need for rapid, reliable and repeatable PSD measurements. The largest drawback for prolific use of laser diffraction in the drilling industry is that most systems are heavy (~25-50 kgs), require 110/220VAC power and cannot be used outside of a laboratory environment (i.e. they cannot be used on site).

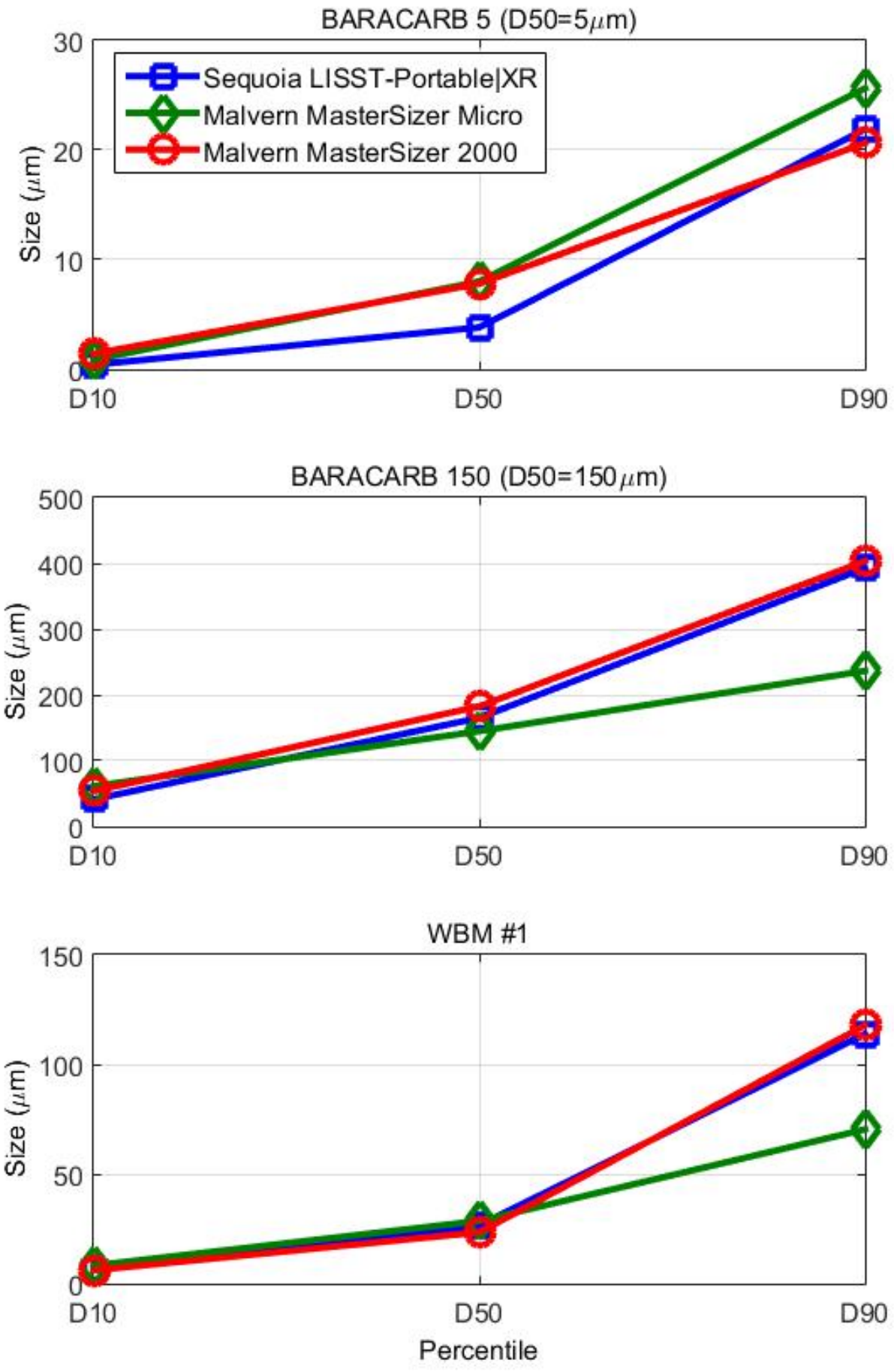
Sequoia Scientific's LISST-Portable|XR changes all this. With a size measurement range from 0.4-500 µm and a footprint the size of a 15" laptop computer, the LISST-Portable|XR is to laser diffraction what the smartphone was to the mobile phone industry. With rechargeable batteries, an ultrasonic probe for complete particle dispersion, a touch panel display for programming and display of data, and weighing in at 9 kg, the LISST-Portable|XR is the worlds' only truly portable laser particle sizer. Programmable SOP's ensures that it can be used by everybody everywhere with a minimum of training.

LISST-Portable|XR particle size analyzer

The sample is poured into the integrated mixing chamber where it is suspended and recirculated using a built-in pump system and sonicated using the optional ultrasonic probe. The PSD is then measured and displayed on the touch panel display in one minute. The data are stored on board and offloaded at a convenient time to a PC for display in reports etc. All samples stored on the instrument can be viewed directly on the touch panel display.

The figures below show a comparison between the LISST-Portable|XR, the Malvern MasterSizer 2000 and the Malvern MasterSizer Micro. The data were obtained in the same laboratory by the same analyst and using the same protocol with respect to instrument settings (e.g. sonication, stirring, optical model) to the extent it was possible between the 3 different instruments. The samples were BARACARB® (a bridging agent), and a water-based drill mud. It is evident that the Sequoia LISST-Portable|XR performs just as well as the Malvern units in measuring these samples.

More information about the LISST-Portable|XR can be found on its website.



Comparison of LISST-Portable|XR vs. Malvern MasterSizer 2000 and MasterSizer Micro