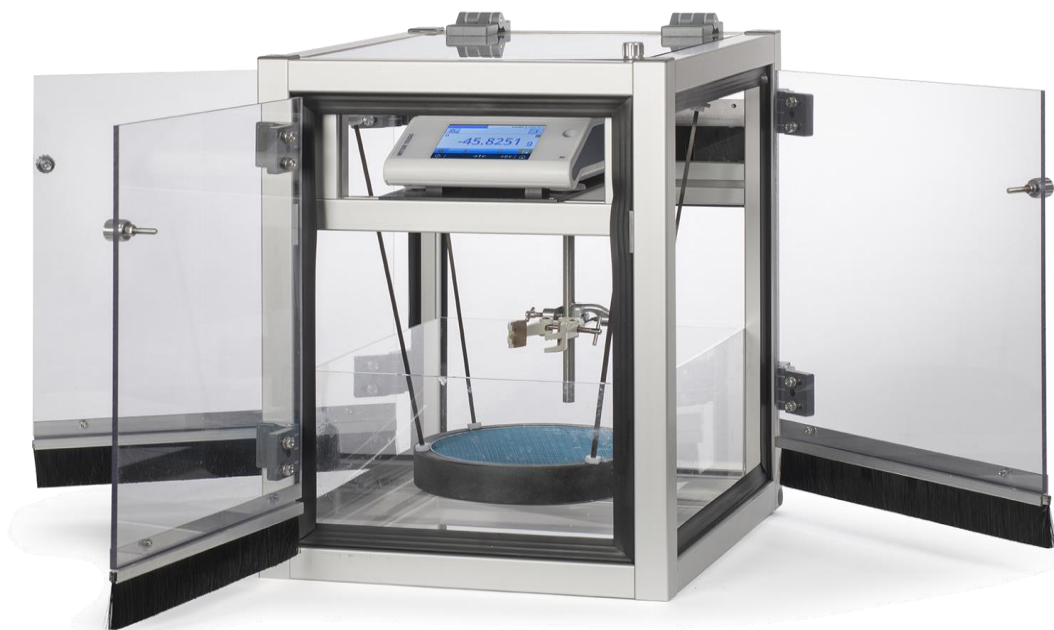
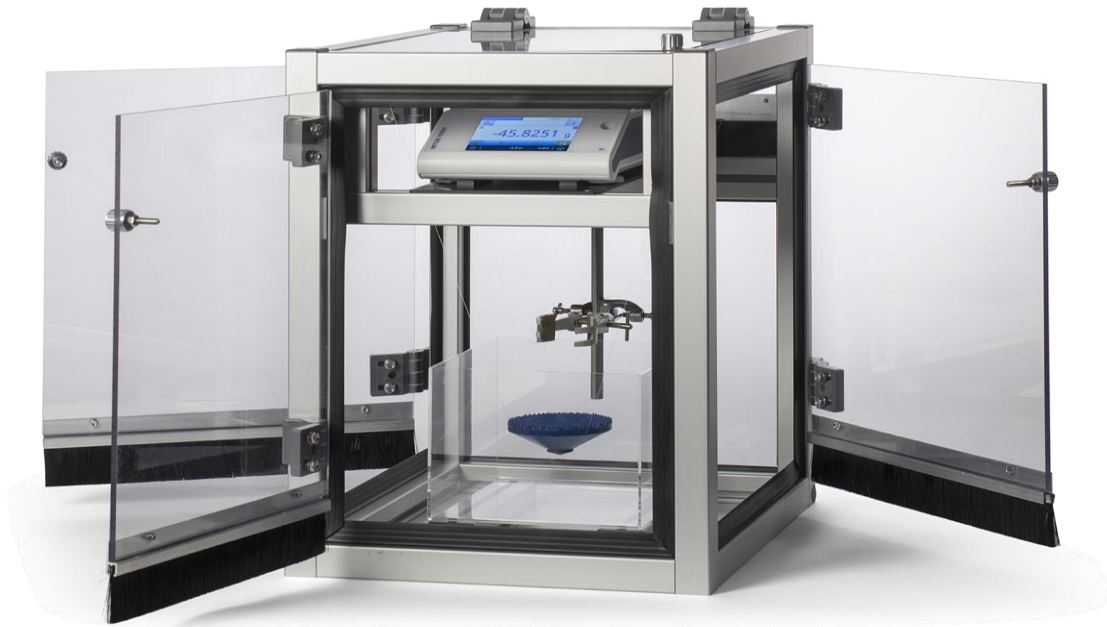


Radiation Force Balance



A Radiation Force Balance (RFB) provides a means to directly measure the power produced by a source of ultrasound. It accomplishes this by means of a highly accurate micro-balance that is used to determine the acoustic radiation force that occurs when ultrasound is incident upon a highly absorbing target. The RFB from Precision Acoustics Ltd can be used to measure ultrasonic power from 10 mW to 100 W over a wide range of frequencies.

INTRODUCTION

Ultrasonic power is a primary acoustic quantity and its measurement is required by international standards for both diagnostic and therapeutic ultrasound systems. The ability to measure ultrasonic power accurately is vital to ensuring the correct operation and safe use of ultrasound in medicine.

FEATURES OF RADIATION FORCE BALANCE FROM PRECISION ACOUSTICS LTD:

- Two suspended target configurations:
 - High frequency target
 - Low frequency target
- Integrated draft enclosure to minimise environmental artefacts
- Customisable configuration (on request) to accommodate unusual transducer geometries.
- Automatic calculation of ultrasonic power and measurement uncertainty via bespoke software
- Automatic calculation of focussing and absorption correction factors as specified in IEC 61161 within software.
- Typical type A (random) measurement uncertainties of 1% at powers >100 mW

TYPICAL PROPERTIES

	High frequency	Low frequency
Target material	F28P	F48P
Max transducer diameter	100mm	150mm
Power range	10 mW – 100 W	10 mW – 50 W
Volume of water required	3.5 litres	17.5 litres
Measurement uncertainty	$\pm 7\%$ at 95% confidence level for powers > 50 mW	
Frequency range	1 MHz – 20 MHz	200 kHz – 1.5 MHz

Degassed water is recommended for all RFB measurements to minimise artefacts arising from bubble formation in the presence of high-power fields. This is particularly important for the measurement of HIFU/HITU fields. RFB tanks can be supplied with in-out hose connections to the suspended target tank on request. Precision Acoustics Ltd can also supply water treatment systems if required.

For traceable measurements, it is essential that the RFB is calibrated over the frequency and power range that you are measuring. Each RFB is supplied with an NPL calibration certificate, traceable directly to the UK Primary Standard for ultrasound power. Various RFB calibration options are available, please contact the team at Precision Acoustics Ltd to discuss the NPL calibration which most suits your requirements.

All information is based on results gained from experience and tests, and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside the control of Precision Acoustics Ltd.