

INTRODUCTION

The AQ 311S Single Pan balance is of unequal arm type with 4 beams. The maximum capacity is 311 grams and the readability is 0.01g. The balance comes with a stainless steel weighing pan and includes a built in platform to aid density determination by weighing samples in air and in water.

SPECIFICATIONS

Capacity	311 g	
Readability	0.01g	
Beam Calibration:	Front Beam	1 x 0.01g
	2 nd Beam	10 x 1g
	3 rd Beam	100 x 10g
	4 th Beam	200 x 100 g
Damping	Magnetic	
Pan Size	100mm (4") diameter Stainless Steel	
Density Platform	75 mm (3") diameter Adjustable height	
Overall Size (w x h x d)	370 x 300 x 137mm (14.5" x 11.8" x 5.4")	
Gross Weight	2 kg. (4.4Lb)	

SETTING UP

Unpack carefully. The balance consist of the main body, the pan support yoke and the stainless steel pan.

Place on a firm, level surface. Away from fans or open windows.

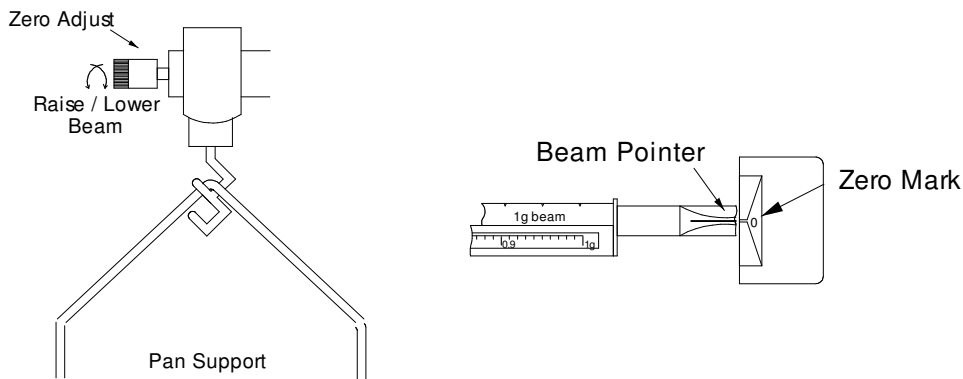
Position the density platform against the table.

Slide all the weights to the left. Make sure the 3 largest weights fit into the notch on their beams. The front weight should point to zero.

Hang the pan support yoke from the top position of the dual hook.

Place the stainless steel pan on the pan support.

Check the zero balance. The pointer on the right end of the beam should align with the zero mark. Adjust the thumb screw on the left end of the beam if necessary.



WEIGHING

To weigh using the AQ 311S simply place the item to be weighed on the stainless steel pan. The beam will move up. Adjust the weights on the 4 beams until the pointer is aligned with the zero mark again. Start with the largest weight and work towards the smallest. Each weight should be moved until the beam falls below zero then moved back one notch, then the next weight moved.

The last weight moved will be the sliding weight on the front beam. Slide this weight until the beam pointer aligns with the zero mark.

Read the weight by adding the values for each weight. For example 100 +20+5+0.27 = 125.27g

USING A CONTAINER FOR THE SAMPLE.

If an empty beaker is placed on the scale you must first determine the weight of the empty beaker. Then add the material to the beaker and weigh again. The weight of the material within the beaker is the total weight minus the weight of the beaker when empty.

FILLING TO A KNOWN WEIGHT

Place the empty beaker on the balance and determine the weight. Add the desired weight to this value to determine the final weight. Set the weights on the beam to represent this final value.

Pour the material into the beaker slowly. As the desired weight is approached the beam will rise. Stop filling when the beam pointer is aligned with the zero mark.

DENSITY MEASUREMENTS

To measure the density of a solid it is necessary to find its mass in air and then in a fluid of known density. The density of the sample is then computed from:

$$\rho_s = \rho_{fl} \times \frac{m_{air}}{m_{air} - m_{fl}} \quad \rho_{fl} = \text{density of fluid}$$

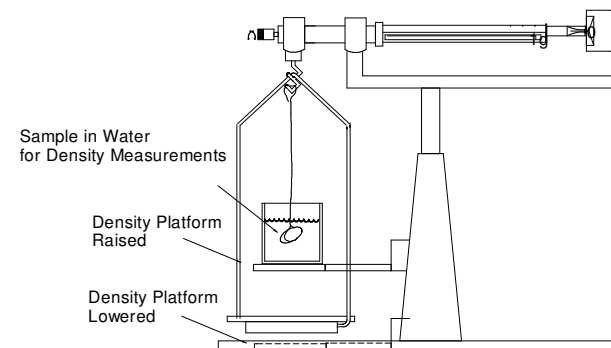
If the liquid is water then ρ_{fl} is approximately 1g/cm³

See reference books to learn more about getting the best accuracy and other methods that can be used.

On the AQ 311S this test is done by removing the pan support, raising the density platform to clear the pan and replacing the pan support. A beaker with water can be placed on the platform.

Fit a piece of thread to the lower hook and adjust the weights to balance the beam. Deduct this weight from any other readings.

Weigh the sample to be tested in air, either by placing it on the pan below the beaker support, or by hanging from the thread on the lower hook, without the beaker in place. Then weigh the sample suspended in water. Determine density from the equation above.



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Solutions in Weighing Technology



AQ 311S Quadruple Beam Balances OPERATOR'S MANUAL

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