

## Confined space weighing solutions from A&D

Solutions for glove box, fume hood, forensic bags and build-in components



Glove box, photo courtesy of Yamato Scientific

### What you will learn

- Challenges of weighing in small spaces
- Unique problems presented by vacuum, pressurized and hazardous environments
- Hints and help for more accurate weighing

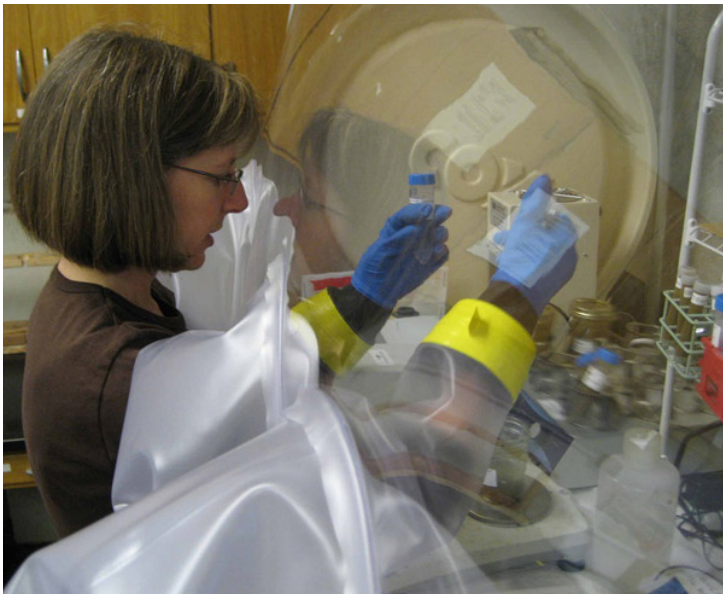


Checking for salad contamination in an FDA facility

### Challenges of confined-space weighing

Confined spaces can be difficult to access, and equipment should be small to fit through the restricted dimensions of the port. Compact overall size, and the ability to detach the breeze break (draft shield) increases your choices in a balance or scale.

System integrators and OEMs who need to design-in the weighing function may have even further size limitations even in equipment which is large overall. To solve this problem, A&D has an array of weigh modules that can be directly built-in and controlled by the system. To learn more about your options, [contact us](#).



Work at a University of California facility in a glove bag crowded with equipment and supplies

## Unique Challenges to Consider

From simulating the emptiness of space to high-pressure locations, the challenges of weighing away from ambient atmosphere multiply. Precise measurements require calculating and compensation for the buoyance of air, and more so for pressurized environments. Air-pillow operated internal calibration features will not function in a vacuum, and certain types of capacitors do not tolerate vacuum well, or at least for extended periods.

Finally, measuring in a confined space with flammable vapors or other flash hazards can present additional risks and potential problems. The limited volume of a chamber may result in increased concentration of flammable gases or liquids, compared to, say, a full-size fume hood. This may call for use of intrinsically safe balances, such as the EK-AEP series.

## Tips, hints and your choices for confined weighing

For tips improving your weighing technique, see [12 Tips for Performing Stable Measurements](#). A selection of relevant A&D solutions available to you, with key dimensions are the in the chart below. Contact A&D for advice on your specific application.

The balances listed below have detachable breeze breaks, reducing their size for easier entry and exit into a chamber. The AD-4212 A/B Series have their electronics outside, in the remote controller, further shrinking the space required in the chamber. As long as a cable can be run outside, via an access port, the balance can be powered and controlled externally.

Series	BA-6	AD-4212D	AD-4212B	HR-A & HR-AZ	AD-4212A	AD-4212C	EK-AEP
Finest readability (mg)	0.001	0.001	0.01	0.1	0.1	0.1	0.01 g
Footprint (width x depth, mm)	173 x 305	168 x 286	98 x 230	198 x 253	98 x 230	80 x 240	190 x 218
Height with draft shield (mm) <sup>3</sup>	204	170	155	315	155	97	54
Detachable draft shield	yes	yes	yes	yes	yes	n/a	n/a
Battery option	no	no	no	yes	no	no	battery only
Notes	internal calibration	internal calibration	remote controller <sup>1</sup>	internal/external calibration	remote controller <sup>1</sup>	direct digital output	intrinsically safe <sup>2</sup>

1. controller contains most of the electronics and is operable outside the glove box
2. See certificate for details of intrinsically safe rating
3. no draft shield available for EK-AEP series, IS rating precludes use of draft shield