GMP No. 4

ADJUSTING THE OPTICAL SCALE ON A SINGLE PAN MECHANICAL BALANCE

When a single pan balance is used for comparing unknown weights to reference standards, it is desirable to adjust the optical scale so that all readings obtained in the intercomparison will be above zero. For the double substitution weighing design, the readings should begin in the first quarter of the optical scale. For a modified substitution, it is most useful to set the optical scale at its midpoint. An upscale reading can be obtained by several methods depending upon the features of the balance and the value of the weights being used in the intercomparison.

I. Zero-adjust knob: If the coarse zero adjustment has sufficient range, the optical scale reading can be increased or decreased to obtain the desired reading. The fine zero adjustment is used to obtain the final reading.

II. Tare-adjustment knob: If the balance has a tare adjustment feature, it can be used easily to reduce the optical scale reading. The tare adjustment also can be used effectively for weights that would normally give readings near zero when the optical scale starts at zero. This is accomplished by dialing in built-in weights such that the optical scale reading is at the maximum. The tare adjustments can then be used to reduce the reading on the optical scale.

III. Small weights: If the weights under test would normally give readings near zero, small weights can be placed on the balance pan to increase the reading on the optical scale. These weights must remain on the pan throughout the intercomparison.

Small weights can be used in combination with the zero and tare adjustments to obtain the desired setting.

IV. Internal zero adjustment: In some cases, the balance may be used to test weights that would normally give readings at the maximum range of the optical scale with the maximum setting of the built-in weights. An example of this would be the testing of a 1-kg weight on the Mettler CB 1000 balance. In this case there is no additional range on the optical scale to permit the performance of the sensitivity test portion of the weighing design. Under this condition, a sufficient amount of optical scale range can be obtained by adjusting the zero adjustment balance ball that is inside the balance. This adjustment would then permit the external zero adjust knobs to be used to obtain the final setting.

Once the desired optical scale setting has been obtained and the intercomparison has begun, no further adjustments should be made until the intercomparison has been completed.