



## Linear Standardization

### Instructions for Plotting Your Linearity Curve

#### Importance of Linear Standardization:

In accordance with the EPA Method 180.1 linear calibration or standardization in the range of interest must be done every six months in addition to the normal instrument calibration (quarterly). By obtaining a multipoint linear curve in the range of interest the operator can correct for 1) any electronic/readout instabilities and 2) for those instruments that don't have a set 0.0(2) NTU calibration point (turbidity free water). This standardization curve can also help to off-set differences in instrument design to provide much better correlation between those instruments' displayed values.

Most instruments on the market today have factory calibration set-points that span a large range with the first (non-zero) point being 1, 10 or even 20 NTU. Also, most drinking water testing is done at the <1.0 NTU level. Of course, diluting formazin down to the lowest range is an exercise in futility due to its lack of stability and the large factor dilution from 4000 NTU. Thus, known standards, including certified turbidity free water, available in the range of interest can provide the user with the confidence that a standard curve can bring. Follow the instructions below to plot your curve with the TRUE VALUE on the y-axis and the INSTRUMENT READING on the x-axis.

#### Procedure:

- 1) Turn on the instrument and allow it to warm up for at least 0.5 hour.
- 2) Calibrate the instrument if necessary per the manufacturer's instructions using AMCO Clear Turbidity Primary Standard or formazin alternative.
- 3) Select a clean, scratch free vial. **NOTE:** The same vial should be used for both the linear standardization and for the ensuing sample readings.
- 4) Index the vial. Determine the orientation point in which the cell has the least effect on the light source (where a low NTU standard displays its lowest turbidity value). Mark the vial so that this orientation is achieved each time it is placed into the meter.
- 5) Rinse the vial twice with the turbidity free\* standard and fill slowly as to eliminate introducing bubbles.
- 6) Wipe the vial with an alcohol wipe or silicone oil to eliminate fingerprints, water and the effects of fine scratches and place the vial into the turbidimeter aligning the index marks.
- 7) Record the instruments displayed value on the paper provided and plot the appropriate point on the graph.
- 8) Repeat steps 5 – 7 with the next highest standard in the series and then for the remaining standards until you have the necessary plot over your range of interest. Those performing drinking water testing, for example, would choose the kit containing 0.0, 0.2, 0.4, 0.6, 0.8, 1.0 NTU (Linear Calibration/Standardization 1 kit) which is important in when employing meters with 10 or 20 NTU as the first calibration point.

#### Sample Analysis:

- 1) Rinse your sample vial (the same one your calibration and linear standardization was completed with) with two 5 ml portions of sample to be tested.
- 2) Fill the vial with sample as to not introduce bubbles, line up the index mark and record the value.
- 3) Find the recorded instrument value on the x-axis, trace up to the curve to determine the true value of the sample on y-axis.