Accuracy: Accuracy may be defined as the ability of instruments to respond to a true value of a measured variable under the reference conditions. It refers to how closely the measured value agrees with the true value.
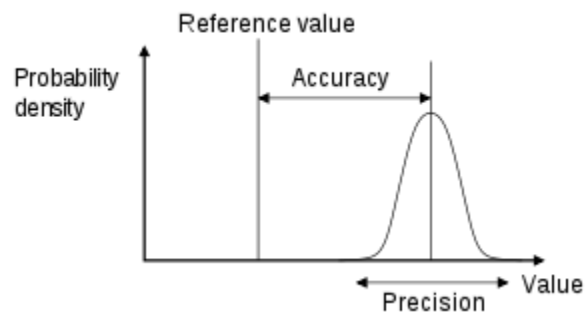

Accuracy has two definitions:

1. More commonly, it is a description of *systematic errors*, a measure of statistical bias; as these cause a difference between a result and a "true" value, ISO calls this *trueness*.
2. Alternatively, ISO defines accuracy as describing a combination of both types of observational error above (random and systematic), so high accuracy requires both high precision and high trueness.

In simplest terms, given a set of data points from repeated measurements of the same quantity, the set can be said to be *precise* if the values are close to each other, while the set can be said to be *accurate* if their average is close to the *true value* of the quantity being measured. The two concepts are independent of each other, so a particular set of data can be said to be either accurate, or precise, or both, or neither.

**Precision** though much different. The distinction between

the precision and accuracy will become clear by the following example. Several measurements are made on a component by different types of instruments (A, B and C respectively) and the results are plotted. In any set of measurements, the individual measurements are scattered about the mean, and the precision signifies how well the various measurements
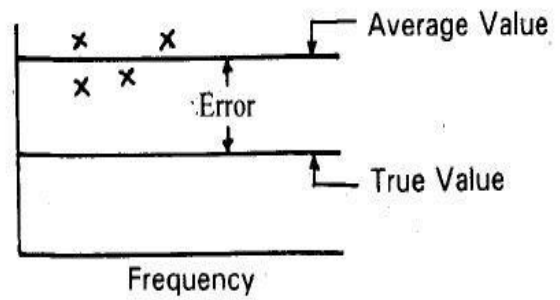
(a) Precise but not accurate
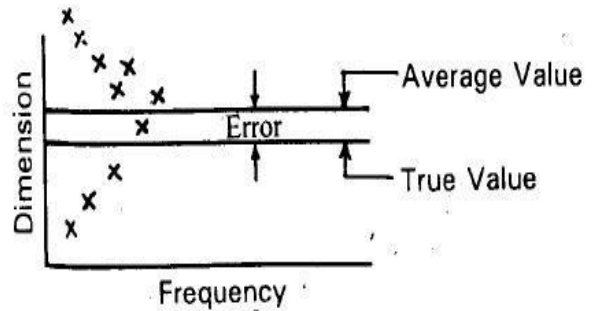
(b) Accurate but not precise
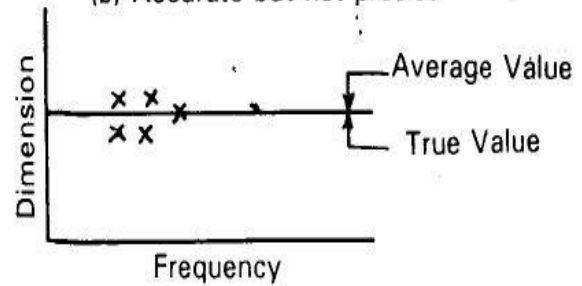
(c) Accurate & precise

Performed by same instrument on the same quality characteristic agree with each other. The difference between the mean of set of readings on the same quality characteristic and the true value is called as error. Less the error more accurate is the instrument. Figure shows that the instrument A is precise since the results of number of measurements are close to the average value. However, there is a large difference (error) between the true value and the average value hence it is not accurate. The readings taken by the instruments are scattered much from the average value and hence it is not precise but accurate as there is a small difference between the average value and true value.

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