Identification of deviation
Deviations may be identified by the tester during execution of the protocol or by a reviewer.

Where a protocol error is identified, it is recommended that the deviation procedure makes a clear distinction between typographical and other minor errors where the intent of the protocol is still clear, and errors that require correction to allow the test to be executed. It is considered acceptable to hand-amend (per applicable site documentation practices) typographical and other minor errors that have no impact on the test method or acceptance criteria. Where correction is required to allow the test to be executed, including determining whether the test passes or fails, then a deviation should be raised.

Document the deviation
The deviation should be documented according to the applicable procedure or protocol. This should include assignment of a reference number to the deviation, the test section (and run number, where applicable), the test step (where applicable), a description of the deviation and the signature and date of the person recording the deviation.

Although errors may be grouped by type, repetitive protocol errors are the most practically grouped in this way. When deviations are grouped, care should be taken to ensure that the link between each individual issue identified, its investigation, and corrective actions is clear. In addition, all issues will need to be resolved (or transferred to a tracking system) to allow closure of the deviation.

Investigation
An investigation should be conducted to determine the root cause of the deviation. In many cases, this will not require any in-depth analysis. However, for system or process failures, a formal investigation including appropriate technical representatives may be required. Such a detailed investigation should be conducted according to applicable procedures.

The investigation may be used to identify the type of deviation; this can be documented descriptively on the form or by using check boxes. Examples of types of deviations could include:

- *System/Process Error* -An actual problem with the functionality of the system or a technical problem with the process, whereby the system or process does not meet the acceptance criteria when the test step is executed.

- *Protocol Error* -The test step instructions require addition, deletion, modification and/or clarification due to missing/incorrect/ambiguous test instructions. Or the acceptance criteria require addition, deletion, modification and/or clarification due to missing/incorrect/ambiguous acceptance criteria.

- *Other* -A deviation occurs that is not related to the test method, acceptance criteria or system, for example, operator error.

Deviation Closure
Once all actions have been completed and confirmed on the deviation form, closure of all deviations should be reviewed and approved by the appropriate QA representative prior to approval of the validation study. This approval may be by signing each deviation form, or through the final approval of the completed validation study. The approach taken should be documented.

When a corrective action is not complete and has no impact on the release of a system or process for the next step in validation or for use, it is acceptable to use a follow-up system (for example, CAPA) to assure that the corrective action is completed and document the appropriate reference on the deviation form and in the Validation Report

Examples of Deviations
An out-of-specification (OOS) result generated by the laboratory is a deviation and should be investigated according to applicable procedure and procedures for laboratory OOS results. Another common deviation is missing or lost data. The impact of the missing or lost data should be evaluated to determine the criticality of the unavailable information and its impact on providing evidence of validation or qualification of the system or process.

Example 1
Deviation - Product temperatures are recorded during the validation run using 10 thermocouples placed in the product, evenly distributed throughout the load and linked to a data logger. At the completion of the cycle, it is discovered that one of the thermocouples has fallen out of the product container it had been placed in.

Investigation & corrective actions - The other 9 thermocouples have provided valid data. The location of the thermocouple that fell out of the product container is assessed to determine if this location is a 'worst-case' location within the load. If it is a worst-case location, then repetition of the study may be warranted. If not, then it may be possible to write a rationale that explains why the missing data point does not negate the validation.

Example 2
Deviation - In the process validation of a solid oral dosage product, 3 samples are to be taken from each shift (beginning, middle and end) during compression. The compression step for the proposed batch size takes on average 8 shifts to complete. During validation batch #2, the samples are forgotten during the night shift.

Investigation & corrective actions - A temporary corrective action is put in place to ensure that all samples from all shifts are collected for the remainder of validation batch #2 and #3. It is determined that a sufficient amount of data has been obtained to allow extrapolation of the data to cover the 3 missing samples from validation batch #2, particularly since samples were neither the start nor the end of the batch. Had the missing samples been from a potentially critical stage in the compression the deviation may have required a 4th batch to replace the missing samples.

Note: -the principles of this example may also be applied to the taking of homogeneity

