

### Does ASTM require the use of PVD?

No. **ASTM C39** requires every concrete test specimen that is tested using unbonded caps (neoprene pads in steel retainers) be checked to verify the specimen does not depart from perpendicular more than 0.5 degrees when the test load is applied. This check can be performed using a variety of modified tools (carpenter's squares, feeler gauges, etc...) purchased from a local hardware store, *or by utilizing a device specifically manufactured for this purpose (the PVD/Perpendicularity Verification Device).*

### Why are there different sizes and styles of PVD's?

Concrete compression tests are often performed utilizing steel spacers to reduce the distance between the upper and lower platens of the compression machine. Because perpendicularity must be checked using the lower platen of the machine, it is often necessary to "reach" around any spacers, and the steel retainers, to contact the test specimen with the vertical edge of the PVD. For special situations PVD's can be custom manufactured to meet this requirement.

### Can I use a 1/8" drill bit or other 1/8" material to check for perpendicularity? ASTM C39 says 0.5 degrees is equivalent to 1/8" in 12".

No. Because of the steel retainers on each end of the concrete specimen, the length being checked on a 6"x12" cylinder is 9" to 10". The length being checked on a 4"x8" cylinder is 5" to 6". In no case would the user be checking a length of 12", so the use of a 1/8" thick tool for this purpose would not be correct. The gap tool would be too large and could result in the testing of specimens that do not meet the required perpendicularity.

### How are the PVD gap tools designed for the various sizes and styles of PVD's?

The gap tool represents the maximum allowable departure from perpendicularity based upon the length of the vertical edge of the verification device. To arrive at the proper tool thickness, the "allowable thickness per inch" is calculated, then multiplied by the length (in inches) of the verification device. For our purposes, this number is 0.0104. For example, if the vertical edge of the PVD (or other device) is 9.5", the maximum allowable gap would be  $0.0104 \times 9.5$  or **0.0988 inches**. We use stock material in the closest thickness possible to our target thickness without going thicker. This slightly undersized gap tool introduces a safety margin when performing the perpendicularity verification.

### What should I do if my test specimen does not pass the go/no go perpendicularity verification?

If the gap tool is able to pass between the PVD vertical edge and the test specimen, the test should not proceed. Release the load on the specimen, recenter and realign the specimen in the steel retainers, apply approximately 10% of the anticipated total load to the specimen, and recheck for perpendicularity. If the specimen still does not pass the perpendicularity verification do not proceed with the compression test. One or both ends of the specimen should be trimmed by sawing or grinding so that a subsequent perpendicularity verification is successful. If acceptable perpendicularity is still not achieved, refer to ASTM C617 Standard Practice for Capping Cylindrical Concrete Specimens.