

ILLINOIS DEPARTMENT OF TRANSPORTATION
BUREAU OF MATERIALS AND PHYSICAL RESEARCH
Procedure for Freeze-Thaw Expansion Measurement

1. Inspect the indicator and make sure the alignment mark on the mounting bolt is aligned. Gently try to move the indicator to make sure the back plate has not loosened. If the alignment bolt mark has moved or the indicator has loosened, corrective action must be taken before any readings are taken. (Once corrective action has been taken, the Concrete Laboratory Supervisor shall send an email to the Aggregate Technology Coordinator detailing any and all corrective actions taken.)
2. Turn on the indicator.
3. Holding the standard bar by the green handle, place a drop of WD-40 on the top of the bar and into the cup at the bottom of the measuring device. (Make sure the WD-40 does not accumulate in the cup reservoir and fill the cup.) Raise the indicator shaft by either lifting the handle or using the button at the end of the flexible cable. Carefully place the standard bar into the cups with the arrow on the standard bar pointing upward. Gently turn the standard bar two turns in a counter clockwise direction while making sure not to apply horizontal pressure in any direction during rotation. The flat surface of the standard bar should be parallel with the front cut face on the metal base of the measuring device.
4. The reading on the indicator display will be referred to as the “offset reading” and represents the current distance between the indicator at its longest extension zeroed, to the reading with the standard bar seated in the measuring device cups and aligned in the reading position. The offset reading should not change more than ± 0.0005 inch between racks. This number may change if a different standard bar is used or if the standard bar has been damaged. If the digital indicator does not display the correct reading, corrective action must be taken before any readings are taken. (Once corrective action has been taken, the Concrete Laboratory Supervisor shall send an email to the Aggregate Technology Coordinator detailing any and all corrective actions taken.)
5. Print this reading. (Next to this reading write the date and your initials.)
6. Press the “SET/ZERO” button on the indicator and ensure the indicator display reads 0.0000 inch. If this reading is not displayed press the “SET/ZERO” button again until the required reading is displayed. Once the 0.0000 inch reading is achieved, print this reading and label it on the printout as the “ZERO” reading. If you cannot acquire the ZERO reading, corrective action must be taken before proceeding. (Once corrective action has been taken, the Concrete Laboratory Supervisor shall send an email to the Aggregate Technology Coordinator detailing any and all corrective actions taken.)

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7. Press the button on the flexible cable or raise the lifting handle to remove the standard bar and wipe the WD-40 from each end of the bar before placing it back into the holder.
8. Press the "FEED" button on the printer four times before measuring the beams. (This will give you space to write the sample ID# on the printout.)
9. Remove the beam to be read from the specimen rack. Wipe both ends of the beam and place it into the device cups making sure the end of the beam marked with an "X" is facing upward. Make sure the cap nuts are seated into the upper and lower measuring device cups by turning the test beam two rotations in a counter clockwise direction. The "finished" face (or labeled face) of the beam shall be facing outward and the specimen sides shall be in alignment with the alignment block located directly below the specimen. Press the "DATA" button on the printer to record the measurement. When returning the beam to the rack, place it upside down relative to the direction it was when you removed it from the rack.
10. Press the "FEED" button twice after each set of three beams is measured. Label the printout at the beginning of each set of three readings with the sample number.
11. Measure each beam in the rack (or group) by following steps 7-9.
12. After measuring the entire rack (or group), press the "FEED" button four times. Verify, as outlined in step 3, that the digital indicator is still zeroed (0.0000 inch) and print the reading. If the reading is not zero, re-zero with the bar to achieve this reading. Take the bar out of the indicator and print the reading of the indicator shaft at its fully extended position (this should read the same as the offset reading except it will be a negative (-) reading). Record the positive of this offset reading along with the initial offset reading in the spreadsheet located at S:\concrete\excel\Freeze-Thaw\Off Set Readings starting in 2012.xlsx.
13. Measure any subsequent racks (or groups) by following steps 7-12.
14. Wipe any WD-40 or residue from the measuring device after all racks are measured for the day.

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