

## CAPILLARY SUCTION TIMER, No. 294-00

### Operating Instructions:

1. Clean and dry the test head
2. Plug the test head assembly into the socket on the rear panel of the instrument.
3. Place the special filter paper on top of the test head stand, and place the block having the stainless steel probes in it, with the probe size downwards, on top of the filter paper.
4. Use either the 1 cm diameter funnel opening for “fast” filtering or the 1.8 cm diameter funnel opening for “slow” filtering systems. Insert the appropriate funnel into the test head and rotate the funnel while applying a light downward pressure when in position, to ensure an even contact with the filter paper.
5. Switch the instrument on – A very short “beep” will sound.
6. The counter should indicate zero and the Finish lamp should not flash. If necessary, press the Reset button in order to reset the counter to zero and extinguish the Finish lamp.
7. The instrument is now ready to use. Using a syringe, pour the sample fluid into the funnel. Liquids from the sample are absorbed by the filter paper in a circular pattern of increasing diameter. When the liquid front reaches the first pair of contacts, a short “beep” will sound, the counter starts and timing commences. When the liquid front reaches the third contact, timing ceases, and the counter stops, the Finish lamp flashes and a one second “Beep” is sounded. Make a note of the counter reading which is the C.S.T. (Capillary Suction Time) in seconds and tenths of seconds.
8. Carefully remove the top of the test head and then the funnel opening. Remove the CST paper from the base and discard. Thoroughly wipe clean and dry the test head and funnel opening. Any moisture remaining on the test head or funnel opening may produce inaccurate CST readings.
9. Repeat from step 3 for a minimum of three measurements per sample and take the average CST.
10. Switch the instrument to OFF after usage.

### Notes:

Several factors have a significant affect on the CST including the filter paper, temperature and suspended solids concentration.

1. A double thickness of filter paper may be used to slow down the rate of travel of the liquid front. This is sometimes useful with a very fast aqueous system.
2. A special filter paper (No. 294-05) is available for very slow filtering systems.
3. Whatman 17 chromatography grade filter paper is machine made and as a result has a grain in the paper. This grain produces a slightly elliptical wetted area instead of a circular wetted area. To assure that the

CST is always measured along the major axis of the ellipse it is important to perform every test with the filter grain running parallel to the longer side of the test cell.

4. Temperature has a significant affect of CST results. The CST decreases as the temperature of the fluid being tested increases. To minimize the effect of temperature on the fluid being tested, the samples should attain ambient temperature prior to performing the tests. The temperature of the fluid should also be recorded so corrections can be made if there are temperature variations among the samples.
5. Suspended solids concentration has a significant effect on the test results. When using the CST procedure to evaluate drilling fluid additives, sludge conditioners, or assist in the operation of a dewatering process, this effect can be avoided by adhering to proper sample preparation procedures, particularly in ensuring homogeneity between each of the samples to be tested. Comparison of CST data between different original samples (especially if taken on different days) cannot be made with confidence unless suspended solids concentrations are comparable. A rough correction for different solids contents can be made by dividing the fluids, or sludge's CST value by its corresponding solids concentration.

### **Maintenance:**

Always keep the test head clean and dry. Occasionally clean the probes by drawing the block carefully with a slight downward pressure over 400 grit carborundum paper laid on a flat surface.

### **Battery Replacement:**

This instrument uses a commonly available 9-volt “transistor radio” type battery, which should provide many hours of operation before replacement is necessary. For maximum operational life, an ALKALINE type battery is recommended.

To replace the battery:

1. Turn the instrument OFF.
2. Carefully lift the battery drawer in the holder using the slot in the drawer. Pull the drawer completely out of the holder. Note the orientation of the tabs on the top of the battery. Remove the old battery and replace with a fresh one oriented as noted above. Slide the drawer back into the holder until it snaps into position.
3. Turn the instrument on to verify operation.
4. If the instrument does not operate, it is possible the battery was installed with the polarity reversed. Repeat the replacement steps above, but roll the battery so that the tabs are reversed. Reinstall and check the operation.

### **Filter Paper:**

Further supplies of the special filter paper for use with the CST instrument are available from OFI Testing Equipment, and may be ordered as follows.

- #294-01 Standard CST paper, Chromatography grade, 150 filters per box
- #294-05 Special CST paper, recommended for very viscous or slow filtering systems, 300 per box

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