Chlorine Demand Determination Method

1. Determine Actual Bleach Concentration
   a. For 8.25% bleach put 1 ml in 100 ml of distilled water (~ 825 ppm of NaOCl or ~786 ppm Chlorine)
   b. Add 1 ml of solution in "a" in 100 ml of distilled water (~7.86 ppm of free Chlorine)
   c. Run Free chlorine residual of solution in "b".   Your actual chlorine level in "a" is 100 X this value.
2. Determine your ammonia concentration of the water you will want to test in ppm Nitrogen, ammonia.
3. Estimate the theoretical demand of the water that you will be testing.   The rule of thumb is 8 ppm of chlorine per ppm of Nitrogen, ammonia.
4. Prepare at least 5 100 ml samples of the water to test.
5. You will want to test below and above the theoretical chlorine demand.   For example if your tested ammonia level is .5 ppm then you would want to have one test of adding 4 ppm of chlorine and perhaps two samples below the theoretical chlorine demand number and two samples above the theoretical chlorine demand number.   In this case you may want samples tested at 1 ppm, 2 ppm, 4 ppm, 6 ppm, 8 ppm.   More samples could be added if you want more resolution to the demand curve.
6. After adding the appropriate amount of chlorine to each test beaker,   allow 30 minutes of reaction time for the chlorine .
7. Use the free chlorine residual test.   Record the free chlorine test in ppm.
8. Plot the free chlorine residual versus the amount of chlorine added and estimate the breakpoint which is the point where the chlorine demand has been satisfied and free chlorine begins to increase proportionally to the amount of chlorine added.
9. Note that the presence of monochloramine interfers with the DPD free chlorine test and free chlorine values below the breakpoint (where monochloramine predominates) can give false free chlorine residuals.

References:

1. UltraPure Water Journal. January 2003, pp36-39. "Breakpoint Chlorination Plays Important Role in RO Pretreatment"- James McDonald
2. Waste Water Engineering – Metcalf and Eddy, third edition, pp 334-336.