

Calculating 90th Percentiles

- How do you calculate the 90th percentile result?
 - For systems collecting more than 5 samples;
 - Place Lead or Copper results in ascending order.
 - Assign each sample a number, 1 for the lowest value and rank.
 - Multiply the total number of samples collected by 0.9
 - Example: 20 samples X 0.9 = 18
 - Therefore, the 18th highest ranked result is the 90th percentile sample to be compared to the Action Level.



Calculate the Lead 90th Percentile 10 samples collected

Site 1: 0.005 mg/L
Site 2: 0.015 mg/L
Site 3: 0.005 mg/L
Site 4: 0.014 mg/L
Site 5: 0.017 mg/L
Site 6: 0.005 mg/L
Site 7: 0.011 mg/L
Site 8: 0.002 mg/L
Site 9: 0.018 mg/L
Site 10: 0.004 mg/L

What is the 90th percentile value?



Calculate the Lead 90th Percentile 10 samples collected

Order and Rank Lead results from lowest to highest:

- Rank 1 – Site 8 – 0.002 mg/L
- Rank 2 – Site 10 – 0.004 mg/L
- Rank 3 – Site 6 – 0.005 mg/L
- Rank 4 – Site 3 – 0.005 mg/L
- Rank 5 – Site 1 – 0.005 mg/L
- Rank 6 – Site 7 – 0.011 mg/L
- Rank 7 – Site 4 – 0.014 mg/L
- Rank 8 – Site 2 – 0.015 mg/L
- Rank 9 – Site 5 – 0.017 mg/L**
- Rank 10 – Site 9 – 0.018 mg/L

Multiply the number of samples by 0.9:

$0.9 \times 10 \text{ samples} = 9$ Therefore, the 9th highest ranked sample is the 90th percentile result to compare to the Action Level.

Lead 90th Percentile = 0.017 mg/L
(Action Level is 0.015 mg/L)



Calculating 90th Percentiles

- Calculating 90th percentile result for system that collected 5 samples:
 - Rank results in ascending order and assign a number to each with 1 being the lowest rank.
 - Calculate the average of the 4th highest and 5th highest ranked results.
 - The result of which is then compared to the Action Level.



Calculating 90th Percentiles

Calculate the Lead 90th Percentile
5 samples collected

Order and Rank lead results from lowest to highest:

- Rank 1 – 0.001 mg/L
- Rank 2 – 0.003 mg/L
- Rank 3 – 0.005 mg/L
- Rank 4 – 0.012 mg/L
- Rank 5 – 0.026 mg/L

Multiply the number of samples by 0.9 :

0.9 X 5 samples = 4.5. Therefore, calculate the average of the 4th (0.012) and 5th (0.026) highest ranked result to get the 90th percentile result to compare to the Action Level.

$$\frac{0.012 \text{ mg/L} + 0.026 \text{ mg/L}}{2} = 0.019 \text{ mg/L}$$

Lead 90th percentile = 0.019 mg/l (Action Level is 0.015 mg/l)



90th percentile Interpolation Calculation

Calculate the Copper 90th Percentile
7 samples collected

- Calculating 90th percentile result for system that collected 7 samples:
 - Rank results in ascending order and assign a number to each with 1 being the lowest rank.
 - Interpolate to get the 90th percentile level. The result of which is then compared to the Copper Action Level.



90th percentile Interpolation Calculation

Calculate the Copper 90th percentile
7 samples collected

Interpolate: $0.9 \times 7 \text{ samples} = 6.3$.

Therefore, interpolate to get the 90th percentile result to compare to the Action Level.

- Rank 1 – Result = 1.17 mg/l
- Rank 2 – Result = 1.19 mg/l
- Rank 3 – Result = 1.34 mg/l
- Rank 4 – Result = 1.51 mg/l
- Rank 5 – Result = 1.57 mg/l
- Rank 6 – Result = 1.73 mg/l
- Rank 7 – Result = 1.95 mg/l



90th percentile Interpolation Calculation

Calculate the Copper 90th percentile
7 samples (90th %) = 6.3 ranked sample

First, subtract the difference between the 6th (1.73) & 7th (1.95) ranks.

$$1.95 - 1.73 = 0.22$$

Second, multiply the answer by 0.3 since the 90th percentile is 0.3 higher than the 6th ranked result in this case.

$$0.22 \times 0.3 = 0.066$$

Next, add 0.066 to the 6th ranked result (1.73).

$$1.73 + 0.066 = 1.8 \text{ mg/l}$$

Copper 90th percentile = 1.8 mg/l (Action Level is 1.3 mg/l)