

7.1.4 CALCULATION AND REPORTING OF FECAL INDICATOR BACTERIA

The range of ideal colony counts differs depending on the fecal indicator group to be enumerated (table 7.1–9). Crowding and insufficient media to support full development of colonies can result if the bacterial concentration on the filter exceeds the upper limit of the ideal range. The lower limit of the ideal range is set as a number below which statistical validity becomes questionable (Britton and Greeson, 1989, p. 14). For potable waters, results are routinely reported from counts of less than 20 colonies per filter. The computation is the sum of the colony counts for each sample volume, multiplied by 100, and divided by the sum of the sample volumes.

- ▶ Enumeration results for the membrane-filter method are expressed as a concentration in units of col/100 mL.
- ▶ Whole numbers are reported for results less than 10, and two significant figures are reported for results greater than or equal to 10.

The examples that follow include most of the colony-count situations commonly experienced:

Case 1: Ideal colony counts**Example 1:** Ideal colony count on one filter

<u>Sample volume</u>	<u>Colony count</u>
6.0	7 (do not use)
25	21
100	101 (do not use)
<u>Sum 25</u>	<u>21</u>

$$\text{col}/100 \text{ mL} = (21 \times 100) / 25 = 84$$

Example 2: Ideal colony counts on two or more filters

<u>Sample volume</u>	<u>Colony count</u>
6.0	7 (do not use)
25	21
100	58
<u>Sum 125</u>	<u>79</u>

$$\text{col}/100 \text{ mL} = (21 + 58) \times 100 / (100 + 25) = 63$$

Example 3: If dilutions of the original sample were made before filtration (sample volumes less than 1 mL), calculate the volume (in mL) of original sample as follows:

(TNTC, "Too numerous to count")

<u>Sample volume</u>	<u>Colony count</u>
0.1 (1:10)	50
0.3 (3:10)	TNTC (do not use)
1.0	TNTC (do not use)
<u>Sum 0.1</u>	<u>50</u>

$$\text{Colony count} = 50$$

$$\text{Volume of original sample} = 0.1 \text{ mL}$$

$$\text{Volume of diluted sample} = 1.0 \text{ mL}$$

$$\text{col}/100 \text{ mL} = 50 \times 100 / 1 \times 0.1 = 50,000$$

Case 2: Colony counts less than or greater than the ideal range but not zero or TNTC (Too Numerous To Count).

Results are reported with the statement,
 "Estimated count based on non-ideal colony count."

Example 1: Less than the ideal range on all filters

<u>Sample volume</u>	<u>Colony count</u>
3.0	2
10	6
30	18
<u>Sum 43</u>	<u>26</u>

$$\text{col}/100 \text{ mL} = (2 + 6 + 18) \times 100 / (3 + 10 + 30) = 60$$

Example 2: Either greater than or less than the ideal range

<u>Sample volume</u>	<u>Colony count</u>
4	18
20	101
100	TNTC (do not use)
<u>Sum 24</u>	<u>119</u>

$$\text{col}/100 \text{ mL} = (18 + 101) \times 100 / (4 + 20) = 500$$

Case 3: No typical colonies on any of the filters. Assume a colony count of one on the filter with the largest sample volume.

Result is reported as less than the calculated number per 100 mL.
 It is a maximum estimated number.

<u>Sample volume</u>	<u>Colony count</u>
3.0	0 (do not use)
10	0 (do not use)
30	assume 1
<u>Sum 30</u>	<u>1</u>

$$\text{col}/100 \text{ mL} = (1 \times 100) / 30 = <3$$

Case 4: Less than the ideal range—including some zero counts—and no filters that are TNTC (Too numerous to count).

The result is reported as "Estimated count based on non-ideal colony count."

<u>Sample volume</u>	<u>Colony count</u>
3.0	0 (do not use)
10	0 (do not use)
30	5
<hr/>	<hr/>
Sum 30	5

$$\text{col}/100 \text{ mL} = 5 \times 100 / 30 = 17$$

Case 5: Colony counts on all filters are TNTC. Assume maximum ideal count on filter with the smallest volume filtered.

(Result is reported as greater than the calculated number per 100 mL. It is a minimum estimated number.)

<u>Sample volume</u>	<u>Colony count</u>
3.0	TNTC assume 60
10	TNTC (do not use)
30	TNTC (do not use)
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Sum 3	60

$$\text{col}/100 \text{ mL} = 60 \times 100 / 3 = >2,000$$