LOGFILE Feature 36/2020 – Environmental Monitoring for Non-Sterile Manufacturing: Establishing Where to Sample

4-5 Minuten

When selecting the number of sites to be sampled, the author recommends utilizing established guidelines. For example, ISO 14644-1:2015 contains a table used to establish the number of nonviable (total) particulate samples required based on the size of the room to be monitored. As part of the environmental monitoring performance qualification (EMPQ), surface and active viable air samples are typically taken near the same locations as the nonviable particulate samples.

A common approach in establishing the monitoring sites includes obtaining a map of the room, gridding the room into equal sections, and using the risk assessment analysis results to choose the most appropriate locations to sample. The information obtained from the risk assessment is then used to plot out where in the grid the sample(s) should be taken. Samples should be collected at the sites identified to contain the highest risk of contamination.

Equipment surface monitoring sites should also be based on risk assessment and will change from company to company depending on the equipment and the products being manufactured (Sutton, 2009). Note that all risk assessment decisions should be documented.

Samples can be taken randomly within the grid section, at the same place each time within the grid section, evenly distributed within the grid sections, or the sample sites can be determined by risk assessment (Sandle, 2016). A documented risk assessment for the

selection of the sample sites should be performed (PDA TR 13).

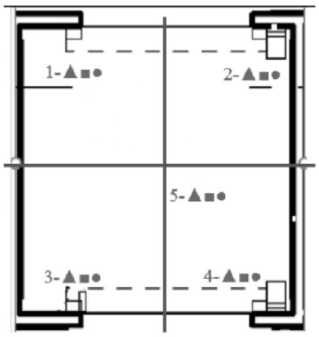
By using the risk assessment approach, one can base the samplesites on the following information:

- Room layout (Sandle, 2016).
- Equipment type (Sandle, 2016).
- Airflow patterns (Sandle, 2016).
- Position of air supply and return vents (Sandle, 2016).
- Air-change rates (Sandle, 2016).
- Room activities (Sandle, 2016).
- The proximity to the exposed product (USP <1116>).
- The proximity to the exposed containers (USP <1116>).
- The proximity to the exposed closures (USP <1116>).
- Sites that demonstrate heaviest microbial proliferation (USP <1116>).
- Sites that are difficult to clean (USP <1116>).
- Sites that are difficult to set up (USP <1116>).
- High traffic areas (USP <1116>).
- Material and waste flow (USP <1116>).
- Impact of interventions (USP <1116>).
- Length of the process (USP <1116>).
- Sites that might contribute to microbe dispersal (USP <1116>).
- Product contact surfaces (USP <1116>).
- Proximity to utilities or drains.
- Storage areas.
- Spatial coverage.
- Construction materials.
- Potable water usage.

Sample sizes should be sufficient to optimize detection of environmental monitoring contaminants (FDA, 2004). Figure 1

demonstrates a room layout grid, which defines the sample locations to bemonitored during an EMPQ.

Figure 1 Sample Site Planning for EMPQ



Description	Air ■	Surface ●	Particulate ▲	Selection criteria
Close to the right-hand corner on the "dirty side" of the room near the corridor	1A	1S	1P	• Areas that may be difficult to clean • Personnel flow • Material flow • Perceived air flow due to positioning of supply HEPA, returns, and pressure differential
Close to the left-hand corner on the "dirty side" of the room near the corridor.	2A	2S	2P	• Areas that may be difficult to clean • Personnel flow • Material flow • Perceived air flow due to positioning of supply HEPA, returns, and pressure differential
Close to the right-hand corner of the room on the "clean side"	3A	3S	3P	• Areas that may be difficult to clean • Personnel flow • Material flow • Perceived air flow due to positioning of supply HEPA, returns, and pressure differential
Close to the left-hand corner of the room on the "clean side"	4A	4S	4P	• Areas that may be difficult to clean • Personnel flow • Material flow • Perceived air flow due to positioning of supply HEPA, returns, and pressure differential
Close to center of the room on the "clean side"	5A	5S	5P	• Material flow • Perceived air flow due to positioning of supply HEPA, returns, and pressure differential • Spatial coverage

References:

International Organization for Standardization (ISO) (2015) ISO 14644-1:2015(E) Cleanrooms and Associated Controlled Environments – Part 1: Classification of Air Cleanliness.

Parental Drug Association (PDA) (2014) PDA Technical Report No.13, Revised 2014: Fundamentals of an Environmental

Monitoring Program. PDA, Bethesda, MD.

Food and Drug Administration (FDA) (2004) Guidance for Industry: Sterile Drug Products Produced by Aseptic Processing – Current Good Manufacturing Practice. Food and Drug Administration, Rockville, MD, USA.

Sandle, T. (2016) “ISO 14644 Parts 1 and 2 – The Revised Cleanroom Standard and Contamination Control.” In Madsen, R. and Moldenhauer, J. (eds.) Contamination Control in Healthcare Product Manufacturing PDA/DHI, pp. 3–32.

Sutton, S. (2009) Qualification of an Environmental Monitoring Program –
1 Selection/Justification of Sample Sites. PMF Newsletter August.

United States Pharmacopeia (USP) <1116> Microbiological Evaluation of Cleanrooms and Other Controlled Environments.