Process 6.11

Changing a Crystal Monitor

1.0 Process Summary

1.1 This process describes the cleaning procedures necessary to change a standard plug-in crystal monitor correctly.

2.0 Material Controls & Compatibility

2.1 Only use a standard 6 MHz crystal monitor (Available for <$10 in nanolab stockroom)

3.0 Applicable Documents

3.1 Manuals for evaporators: cha, ultek2, tescal, nrc

4.0 Definitions & Process Terminology

4.1 Quartz Crystal Monitor: Silicon dioxide crystal with a resonant frequency of 6 MHz.

4.2 Spring Clip: white ceramic plug with gold plated leads on front – used to hold crystal into monitor assembly

4.3 Monitor assembly: Mechanical assembly used to plug crystal monitor into head assembly

4.4 Head assembly: post and port for the Monitor assembly, used to position crystal in chamber and deliver cooling water.

5.0 Safety

5.1 Don't breathe in metal particulate. Always use a vacuum rather than a blow gun to clean up particles.

6.0 Process Data

6.1 N/A

7.0 Process Explanation

7.1 Crystal monitors have a lifetime based on mass and mechanical strain of the layers deposited on them.

7.1.1 When a crystal reads more than 100% life consumed, the crystal must be changed out for a new one. Changes as early as 80% are appropriate if a process is very sensitive.

7.2 When changing a crystal monitor, cleanliness of the assembly holding the monitor into the monitor assembly is critical.

7.2.1 Failure to clean the monitor assembly components when changing a crystal can lead to uncontrollable fluctuations in the readout of the crystal monitor. Typically, this is caused by improper contact with the unclean surfaces, which impedes the resonant frequency noise floor of the crystal.

8.0 Process Procedure

8.1 Obtain a crystal monitor from the stockroom before starting

8.1.1 Crystals often are damaged in this procedure and you should aways have 1-2 spares on hand just in case.

8.2 Remove shields from the head assembly

8.3 Remove the monitor assembly

8.4 Using a ¼" diameter or smaller rod-shaped object (Typically the butt end of a pen), push the crystal monitor out of the monitor assembly from the front of the crystal

8.4.1 This typically shatters the old crystal – this is ok.

8.5 Inspect the pins on the spring clip to ensure they are not bent or broken.

8.6 Clean monitor assembly front and backside until shiny stainless steel – use scotch brite and IPA or a razor blade depending on level of cleanliness.

8.7 Wipe all parts down with IPA

8.8 Insert new crystal monitor into monitor assembly, flat gold side facing away from the pins.

8.9 Insert the spring clip to complete the monitor assembly.

8.9.1 Use only moderate force to insert the spring clip. They are fragile and you may damage the pins.

8.9.2 Never twist the spring clip as it is pressing into the assembly, twisting can damage the pins.

8.10 Insert completed monitor assembly into head assembly.

8.10.1 Never twist the monitor assembly as it is pressing into the head assembly, twisting can damage the pins.

8.11 Reattach shields to head assembly.