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| **CBG Formalin Recycler** |
| **Purpose** | To provide working guidelines for the operation of the CBG formalin recycler. |
| **Policy Statements** | This applies to all Histology Technical staff performing formalin recycling |
| **Materials** | **Reagents** | **Supplies** |
|  | * antifoam
* sodium phosphate buffer
* EZ Clean
* Formalin Assay kit
 | * pH test strips
* CBG assay kit
* CBG formalin recycler
* Magnetic stir plate
* Erlenmeyer flask
* Serologic pipettes
 |
| **Sample** | 10% formalin not contaminated with picric acid or nitrocellulose. |
| Records/Forms/Required | CBG Formalin Log |
| **Quality Control** | Each run should have pH verified and adjusted before use. Concentration should be checked monthly by titration. |
| **Special Safety Precautions** | Wear eye protection, gloves and lab coat. If a spill occurs use spill kit and contact Safety at extension 6-6712. |
| **Procedure** |  |
|  | **Step** | **Action** |
| Container Placement |  |  |
|  | 1 | Pour the waste to be recycled into the spigotted container, keep lid loose.  |
|  | 2 | Place recycled formalin container on the bottom shelf of the cart and secure lid. |
|  | 3 | Place the formalin waste container on the bottom shelf with drain tubing inserted through the capped opening. Insert vent line tubing into the small hole on top of the container. |
| Starting a run |  |  |
|  | 1 | Make sure antifoam container has sufficient reagent. |
|  | 2 | Formalin to be recycled -press **enter.** |
|  | 3 | Press **enter** to begin, no for options. |
|  | 4 | Are all containers empty and in position press **enter** |
|  | 5 | Is fill container in place, spigot open and lid loose press **enter** |
|  | 6 | Check antifoam reservoir |
|  | 10 | Press enter when ready to fill. Note “click” when fill valve opens. (If autostart is on, unit will start automatically.) |
|  | 11 | Unit filling press enter when done (If autostart is on, operating will begin automatically in about 20 minutes). |
|  | 12 | Unit operating, elapsed time\_\_\_\_\_\_\_\_\_. (About 5 hours) |
|  |  | When cycle is completed, the LCD display will read end of cycle, total time\_\_\_\_”. Hours and minutes of cycle time will be displayed. Empty recycled product from container to prepare for pH and concentration testing. Replace recovery container and press reset to return to the beginning of the program.Waste is sewered when container becomes full.  |
| **Cleaning the tank** |  | Every 10 runs the recycler will prompt a cleaning cycle. Prepare the EZ Clean Solution according to directions on the container. **Put Finish Filter in Bypass.** Put empty recovery and waste container in place. Follow the prompts on the LCD display. |
|  | 1 | Formalin to be Recycled Press Enter > Press Enter |
|  | 2 | Press Enter to Begin, No for Options > Press Enter |
|  | 3 | The Last Flush was Done # Runs Ago , > Press Enter |
|  | 4 | A Cleaning Cycle is Recommended > Press Enter |
|  | 5 | Enter to Clean Tank, No to Continue > Press Enter |
|  | 6 | Performing Manual Drain > Press Enter |
|  | 7 | Enter when Waste Jug is in Place > Press Enter |
|  | 8 | Opening Waste Drain Please Wait > Allow Drain to Open  |
|  | 9 | Manually Draining, Enter When Done > Press Enter |
|  | 10 | Closing Waste Drain > Allow Drain to Close  |
|  | 11 | Please Empty Waste Container > Empty Container  |
|  | 12 | Place Fill Container with Agent in Place > Press Enter  |
|  | 13 | Press Enter and Fill with Cleaning Agent > Press Enter  |
|  | 14 | Unit Filling, Press Enter when Done > Press Enter |
|  | 15 | Cleaning Unit, Elapsed Time > Unit will heat to temperature, then run for 60 minutes. Waste Drain will open and dispense cleaning agent into waste container. |
|  | 16 | Please Empty Waste Container > Empty waste container of cleaning agent. |
|  | 17 | Place Fill Container with Water in Place (2.5-4 gal.) > Press Enter  |
|  | 18 | Press Enter and Fill with Water > Press Enter |
|  | 19 | Unit Filling, Press Enter when Done > Press Enter |
|  | 20 | Rinsing Unit, Elapsed Time > Unit will drain automatically after 3 minutes. Empty waste container, return Finish Filter to the "On" position and prepare unit for normal operation. |
| **Formalin Assay Procedure** | Assay should be performed monthly and documented on assay clipboard. 9-12% formalin concentration. If assay is out of range discard the batch being tested. Check the next batch being recycled, if out of range again discard and notify Biomed.  |
|  | **Step** | **Action** |
|  | 1 | Add 10mL of distilled water into an Erlenmeyer flask. |
|  | 2 | Place flask on stirrer using a white background and add stir bar. |
|  | 3 | Using a clean 0.5-1.0mL pipette, add 0.4mL of well mixed formalin. (Remember, if calculating the Multiplier Factor, use vendor formalin of known concentration). |
|  | 4 | Add 10 drops of Assay pH Indicator |
|  | 5 | Is the formalin buffered? (Recycling removes buffers).Yes – Add drops of Reagent #1 until solution just starts to change to blue.No – Do not add Reagent #1 to the solution. |
|  | 6 | Using a clean 5-10mL pipette, add 4mL of Reagent #2 to the solution. Wait 1 minute and the solution should turn dark blue. |
|  | 7 | Using a clean 5-10mL pipette, titrate with Reagent #3 until the blue color changes back to clear. Record the volume in milliliters of Reagent #3 used to change the solution to clear. |
|  |  | To calculate the Multiplier Factor:$$Multiplier Factor=\frac{\% of known formalin concentration}{mL of Reagent \#3}$$To calculate recycled formalin concentration:$$Recycled Formalin Concentration=mL of Reagent \#3×Multiplier Factor$$Example: 10% vendor formalin required 5.5mL of Reagent #3.$$\frac{10}{5.5mL}=Multiplier Factor of 1.82$$ The recycled formalin required 5.4mL of Reagent #3.$$1.82×5.4mL=9.8\% formalin concentraion$$ |
| **pH test strips** | pH test strips (6.5-8.5) : immerse indicator pad into formalin for 1 second. Within 10 seconds, compare the color of the indicator pad to the color chart on the label. Formalin should be as close to pH 7 as possible. If pH is 6.5 or lower, add 40 mL of CBG phosphate buffer per gallon of formalin. |
| **Maintenance** | The finish filter should be changed every 3-5 months depending on usage. See CBG formalin recycler manual page. |
| **References** | CBG Biotech formalin recycler manual |

**Historical Record**

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| Version | Revised by | Effective Date | Summary of Revisions |
| 1 |  |  | Initial version. |
| 2 | A. Dubbelde | 6/27/19 | Update format, add version, and add assay procedure to this one. |
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