

Peace of Mind That You're Always Prepared:
An Educational Series on the Value of Routine PM Service
Part 3: Tissue Processing

Author:
Clifford M. Chapman
BS, MS, HTL (ASCP), QIHC





Peace of Mind That You're Always Prepared:

Part 3: Tissue Processing

Previous articles have shown that one of the benefits of a preventative maintenance program is that it can ensure employee safety in the laboratory. This is especially true of equipment located in the tissue processing area of the histology laboratory. Equipment that is operating in an unsafe manner may have serious deleterious acute and chronic health effects.

Whether using standard routine tissue processing in closed system processors, or microwave assisted tissue processors, reagents are used that can be dangerous to laboratory employees. Formalin fixatives are carcinogenic and OSHA has established exposure limits for employees that handle formaldehyde. Alcohols and xylene are flammable, and their fumes considered hazardous to health.

Histology laboratory personnel come into contact with these reagents during the procedure of changing the reagents in a tissue processor and during loading/unloading cassettes into/out of the tissue processor. Employees are trained in the use of appropriate personal protective equipment (PPE) and are expected to use it accordingly. Additionally, there should be engineering controls present in the form of a chemical fume hood located in the tissue processing area. This hood may be connected to an external exhaust. However, it may also run the air through a filter and then back into the laboratory. As discussed in the previous article on Surgical Grossing, these filters must be (a) appropriate for the reagents being used and (b) changed out on a regular basis.

Additionally, any and all laboratory employees that enter the tissue processing area for any reason are exposed to the air in that space. Current lean operations used in histology laboratories often require tissue processing throughout the day. As these tissue processors run, the air contained within the retorts of the machines is expelled from the tissue processor. Like a chemical fume hood,

the tissue processor may be attached to external exhaust. However, many tissue processors send this air through a combination of water and activated charcoal filters prior to being released into the laboratory space air.

A preventative maintenance plan is necessary for such filters contained within fume hood and tissue processor equipment. Your vendor should be able to recommend the correct filter for each application, and provide it in a timely fashion such that your laboratory is able to remain in compliance with the time frames established for filter change out. Your vendor may also have a filter change out program in which the vendor personnel perform the actual changing of the filters. The personnel will also provide the correct paperwork to document the changes. The time between filter changes will most likely be more frequent than the annual preventative maintenance that is performed on the tissue processors, which is usually in the three to six month range.



The annual preventative maintenance of the tissue processor is of extreme importance. This is not only true for the safety reasons cited above, but for assurance of your laboratory's turnaround time and specimen quality as well. Tissue processors are complicated machines with many moving parts. Vacuum pumps are used to move fluids into and out of the retort chamber, rotary valves direct the flow of reagents, heating units keep paraffin heated and the lines and retort heated when moving paraffin through the machine; not to mention the many feet of tubing required.



Any failure in any of these systems may cause the tissue processor to stop, thereby causing your laboratory turnaround time to be increased. More importantly: any failure in any of the systems may jeopardize the processing quality of the specimens on board the tissue processor at the time. Incomplete fixation, over/under dehydration, sub-optimal clearing and excessive heating are just a few of the issues that can result from a tissue processor failure.



All of these possibilities, along with employee safety, form the basis for having a complete and accurate annual preventative maintenance. Pumps and heating elements are tested and measured, rotary valves are examined, temperature settings are measured and plastic tubing and reagent reservoirs are examined for potential failures – just to name a few of the parameters. Your vendor should be able to provide trained service technicians to perform such a complete preventative maintenance procedure. The procedure should also be completely documented, listing all of the components which were tested, and the result. The service technician should also be proactive. If a component is identified which may fail in the near future, it should be replaced during the time of the preventative maintenance – not in the future, after it fails.

A properly performed annual preventative maintenance on your tissue processors should ensure zero failures during the subsequent year.

This, in turn, will ensure optimal processing of specimens, safety of employees, optimal laboratory turnaround times and peace of mind with regard to the specimen processing procedures that determine the final quality of patient care.

ABOUT THE AUTHOR:

Clifford M. Chapman
BS, MS, HTL (ASCP), QIHC

Clifford Chapman has over 40 years experience managing both private reference and teaching hospital pathology laboratories in the Boston area, including Massachusetts General Hospital, Pathology Services, Children's Hospital Boston, and StrataDx.

He also has over 25 years experience presenting lectures, workshops, teleconferences and webinars at the local, regional and national level for the Massachusetts Society for Histotechnology, Region I Histology and National Society for Histotechnology.

Clifford is a specialist in histological techniques, quality management, laboratory workflow and laboratory safety. He is an author and co-author of over thirty scientific publications, including his most recent book "Dermatopathology Laboratory Techniques". Clifford is currently the Technical Specialist at StrataDx and works as a consultant at Medi-Sci Consultants.

