

Peace of Mind That You're Always Prepared:
An Educational Series on the Value of Routine PM Service
Part 4: Embedding

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The paraffin embedding of specimens for subsequent microtomy is a critical step in the preparation of optimal microscope slides. If an error is made such that specimen orientation is compromised in the final microscope slide, it is possible that a complete diagnosis cannot be rendered. For example, a skin cancer may be diagnosed – but if oriented incorrectly during embedding, the determination of surgical margins may not be possible. This is not a desirable result for your laboratory.

This is one reason why paraffin embedding equipment should be included in your annual preventative maintenance equipment checklist. Paraffin embedding equipment includes paraffin pots for melting paraffin pellets, the embedding console unit and the cryo console unit.

Firstly, the type of paraffin used in your laboratory should be optimal for your needs. Paraffin comes in many types. These types are differentiated by how much (if any) polymer is added to the paraffin, which determines the final quality of the paraffin block. Histology laboratories that receive mostly soft tissues prefer a “softer” paraffin as opposed to laboratories that receive hard specimens, such as skin, which would require a “harder” paraffin. Each paraffin type comes with a specification sheet which identifies what the “melting point” range is for that particular paraffin. It is important to match this temperature range with the proper temperature settings used in the tissue processor, paraffin pot and embedding center. Your paraffin vendor can provide valuable information to help you make this decision.



laboratories have one or more “paraffin pots” used to melt the hard pellets into liquid form by heating. Regulations require that the temperatures of the paraffin pots be monitored and recorded on a daily basis. This ensures that the paraffin in use is neither under heated, nor over heated, which could result in sub-optimal results.



The melted paraffin in the paraffin pots is used to replace paraffin used in tissue processors, and to replenish paraffin in the embedding console. Some laboratories may use different paraffins for processing and embedding; however, most laboratories use the same paraffin type in both locations. Alternatively, paraffin pellets may be added directly to the paraffin holding tank of the embedding console. In every scenario, temperature ranges must be determined and the temperatures monitored, as stipulated by the federal CLIA regulations and the College of American Pathologists (CAP: COM.30775).

During the annual preventative maintenance program, both paraffin pots and embedding console paraffin holding tanks must be inspected for properly functioning heating elements. These, in turn, provide an accurate temperature range, set specifically for your laboratory's paraffin type. In addition, the on board thermometer measuring device for each of the units must also be calibrated, to ensure the resulting temperature reading is accurate (CAP: COM.30700, 30725). These readings must be recorded daily and is a regulatory requirement (CAP: COM.30750).



In a similar fashion, the cryo console temperature measurement mechanism must be inspected and calibrated to ensure accurate temperature readings. The service technician will also examine the wiring and switches to ensure safe operation by laboratory personnel. Melting ice from the cryo console poses a hazard if allowed to drain into the electrical connections of the equipment.



The service technician will also examine the integrity of the paraffin holding tank, combined with the dispensing switch and related tubing. Sometimes a leak can occur in one of these connections. The result is a paraffin buildup inside the dispensing console, out of view of the operator. If allowed to leak, the paraffin can build up to a point that causes failure of the unit.

Light sources on the dispensing unit will also be examined by the service technician. In the event that there are light bulbs which can easily be replaced, the technician can leave spare bulbs in the event that one is needed. This can be an easy operation carried out by laboratory personnel.

Many times, embedding equipment is overlooked and is left off of the annual preventative maintenance equipment checklist. However, keeping the embedding equipment in top operating condition is imperative for providing optimal patient care quality as well as helping the laboratory remain in regulatory compliance.

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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.

