Timing of Replacement of Tissue Processing Reagents

1. Alcohol solutions

- Alcohol solutions deteriorate by various factors such as decrease in concentrations of alcohol, lipids eluted into the solutions, pigments or debris from tissues, precipitation of phosphate salts from buffered formalin and coloration by inks for preventing loss of specimens.
- There was a medical article that had accepted 1% or less of water content in the last alcohol station.

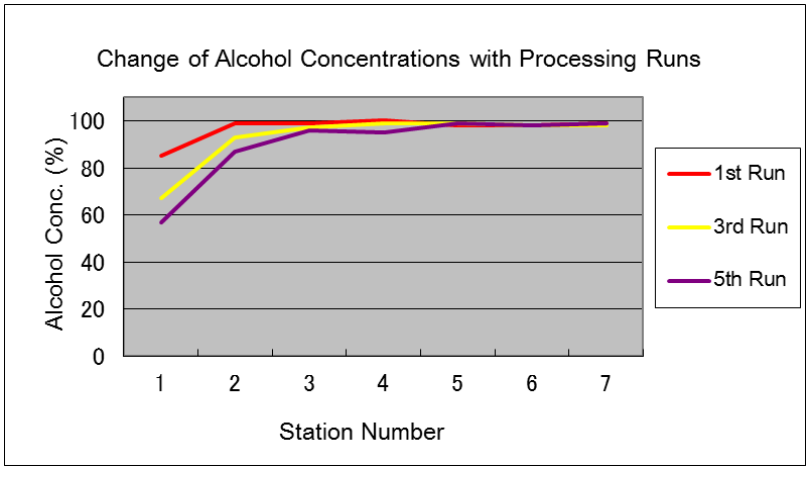
Solution Volume (1,000ml each)		Sta. 1	Sta. 2	Sta. 3	Sta. 4	Sta. 5
Initial concentrations of alcohol		99.7%	99.7%	99.7%	99.7%	100%
After the 1st use	Amount of water carried over	103.00ml	12.36ml	4.12ml	3.37ml	0.31ml
	Water concentration	9.36%	1.12%	0.37%	0.31%	0.03%
After the 2nd use	Amount of water carried over	193.64ml	28.84ml	6.37ml	3.64ml	0.61ml
	Water concentration	17.60%	2.62%	0.58%	0.33%	0.06%
After the 3rd use	Amount of water carried over	276.04ml	51.31ml	10.45ml	4.26ml	0.94ml
	Water concentration	25.09%	4.66%	0.95%	0.39%	0.09%
After the 4th use	Amount of water carried over	350.95ml	78.55ml	16.64ml	5.38ml	1.34ml
	Water concentration	31.90%	7.14%	1.51%	0.49%	0.12%
Concentrations of alcohol after the first rotation of solutions		92.86%	98.49%	99.51%	99.88%	100%

* Conditions: 1,000ml of solution in each station, about 50 biopsy samples, total weight of about 140 grams of samples

Reference: T. Iwadate, Technical Manual for Pathology Samples, Pathology Sample Preparation Techniques, Vol. one, Ishiyaku Shuppan, 1981, P64

The article said that the concentration of water in the first alcohol station increased about 8 ~ 10% after every use with the above conditions. However, it was also described that the change of water contents and concentrations would differ according to the number of runs if processing conditions change.

- The result of experiments done at our laboratory also indicates that, with the 300-cassette retort capacity setting on VIP6, the gradient in concentrations of alcohol changes according to the number of processing runs as follows:



- Compared to the above data, the concentrations of low-concentration alcohol solutions may further decrease because, in actual operation, the solutions are rotated automatically through the Automatic Transfer or manually by moving the bottles from one station to another. We think it very important to manage the last station of the alcohol group for complete dehydration. To keep alcohol concentrations high, we recommend replacing (rotating) the solutions after every five runs as a guide.

2. Xylene (clearing reagent)

- Xylene is diluted or deteriorates by a carry-over of alcohol and elution of lipids.
- It is stated in a medical article that an allowable level of carried-over alcohol is within a few percent (three or four runs done).

3. Paraffin

- Paraffin decreases with repeated use and deteriorates by a carry-over of clearing reagent and elution of lipids.
- A lot of clearing reagent is carried over into the paraffin stations during every processing run. If the last paraffin station is contaminated with a clearing reagent, it may cause paraffin block surfaces to be depressed and/or tissue to deform as the clearing agent evaporates over time.

4. Reference information

- Questionnaire survey about how processing reagents are managed, done at a seminar held by a local association of medical technologists in Japan (June 2013)
  27 out of 31 laboratories provided “by the number of days used” as the answer. Two laboratories stated “by the number of cassettes processed”, one “a specific day of the week” and one “by the number of runs done”. The top of the answers from the laboratories who manage reagents “by days” was 7 days (10 out of 27 laboratories) and the second was 5 days.
- Guidelines of solution exchange at 10 customers

Customer	Alcohol	Clearing Reagent	Paraffin
A	Every 5 runs	Every 5 runs	Every 20 runs
B	Every 3 runs	Every 3 runs	Every 3 runs
C	Every 5 runs	Every 5 runs	Every 5 runs
D	Every 5 runs	Every 5 runs	Every 20 runs
E	Every 2 runs	Every 2 runs	Every 3 runs
F	Every 3 runs at most	Every 4 runs at most	Every 5 runs at most
G	Every 1,200 blocks	Every 1,200 blocks	Every 24,200 blocks
H	Every 7 runs	Every 7 runs	Every 7 runs
I	Every 5 runs	Every 5 runs	Every 5 runs
J	Every 5 runs	Every 5 runs	One month

End