

TECH NOTE

Thawing of H²O (demi-water) based samples



THAWING OF H₂O (DEMI-WATER) BASED SAMPLES

With the SPL Guard Florida

This note is about the thawing of frozen samples (-80 °C) to +5°C, using room temperature air (+20°C). SPL Guard has developed a new specialized instrument (Florida), which is better and faster than any other instrument for thawing 10 SBS format racks on a platform. The newly designed instrument now fulfils a major improvement on the two most important aspects of thawing:

- All samples go through the same temperature treatment when thawing (samples in the center of a rack are exposed to the same temperature process as samples on the outer side), resulting in equal quality of all the samples in a rack
- A faster and more efficient thawing process

This newly developed platform indeed is more efficient than any platform in the market which is proven by extensive tests. Below more information about the execution and results of the tests.

Thawing Tests

The equipment used in the tests:

- SPL Guard Florida
- A common available thawing platform instrument on the market

The SPL Guard Florida has a row of ventilators in the back of the platform. The ventilators blow room temperature air into the platform. For complete description of the instrument see the specifications.

The racks used in the tests:

- 96-well format racks equipped with 1.40ml tubes, filled with 1.00ml water

The way the measuring is done:

Thermo couples (suitable for the temperature range we look at) are inserted through the cap of the tube. In every test a corner tube was measured and a center tube. The thermo couples were inserted to the bottom because it is the point where the first melted ice is found.

Location of the racks during the tests:

Three different types of tests were done, see images on the right.

- Only one rack was placed at the middle of the platform - Image 1
- Only one rack was placed in the corner of the platform - Image 2

- The platform was loaded with racks and the rack measured was located - Image 3

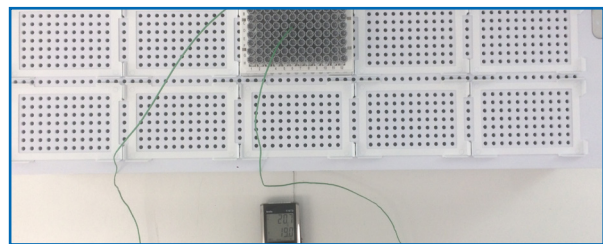


Image 1: SPL Guard Florida with rack in middle

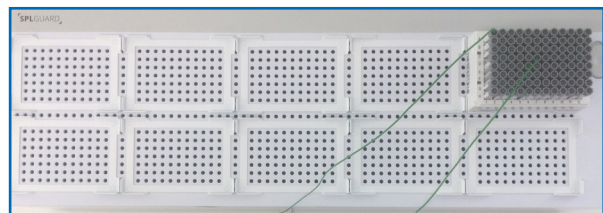


Image 2: SPL Guard Florida with rack in corner

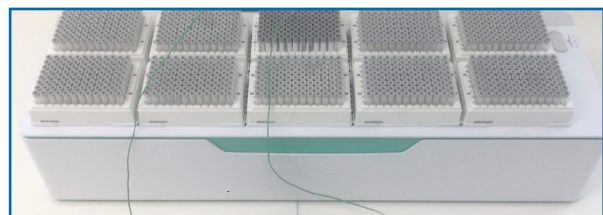


Image 3: SPL Guard Florida with platform full of racks

Measuring time:

The racks used for the tests were conditioned at -80°C. The temperature is continuously measured during the tests. The time is recorded until a temperature of +5°C is achieved.

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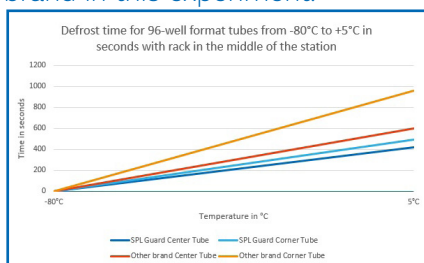
Results:

Below the results of the experiment are shown in the table (Table 1) and in the different graphs (Graph 1-3). In the table you can find the time in seconds it took to defrost the sample from -80°C to +5°C, for a rack that is placed in the middle of the thawing platform, the corner of the thawing platform or when the full platform is used compared to the other brand next to the SPL Guard Florida. In the graphs of the three conditions are depicted when comparing the SPL Guard Florida with the other brand.

		SPL Guard Florida		Other Brand	
Start temp	Location	Corner tube	Center tube	Corner tube	Center tube
-80°C	Middle	490	420	960	600
	Corner	650	480	1320	720
	Full	560	450	1510	810

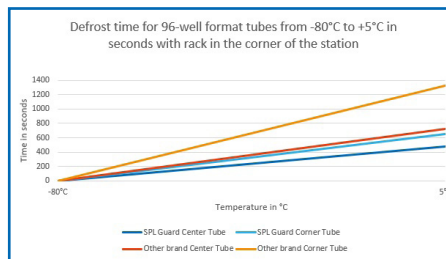
Table 1: Defrost time for 96-well format tubes to +5°C in seconds.

As shown in the table and in the graphs, the SPL Guard is faster in any case compared to the other brand in this experiment.



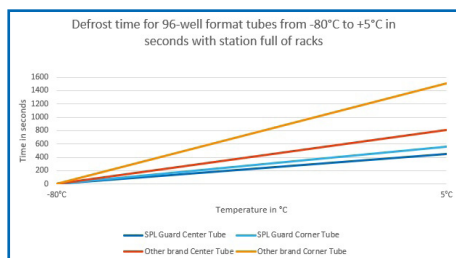
Graph 1: Defrost time for 96-well formatrack tubes in the middle of the station.

For the SPL Guard it takes the center tube only 7 minutes to defrost when the rack is placed in the middle of the platform (graph 1) and the corner tube takes approximately 8 minutes, whereas the other brand it takes the center tube 10 minutes to defrost and the corner tube 16 minutes. So the SPL Guard is significantly faster and there is also a less big of a difference between the center tube and corner tube with defrosting compared to the other brand.



Graph 2: Defrost time for 96-wellrack tubes in the corner of the station.

When the rack is placed in the corner of the platform (graph 2) it takes the SPL Guard Florida 8 minutes to defrost the center tube and approximately 11 minutes to defrost the corner tube. For the other brand this is respectively 12 minutes for the center tube and 22 minutes for the tube in the corner, making the SPL Guard two times as fast as the other brand for the corner tube. Furthermore, there is for the other brand a difference of 10 minutes between the center tube and the corner tube, making it less efficient and significant less faster than the SPL Guard Florida.



Graph 3: Defrost time for 96-well formatrack tubes with station full of racks.

When the complete station is filled with racks (graph 3), it takes the middle tube in the middle rack 7,5 minutes to defrost and the corner tube approximately 9 minutes compared to 13,5 minutes for the center tube and approximately 25 minutes for the corner tube of the other brand.

Conclusion:

It can be concluded that the SPL Guard is significantly faster than the other brand and that the difference between the defrosting of the corner tube and center tube is significantly less compared with the other brand, making it more efficient.