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# 2D CODE READING PROCEDURE

For frozen sample tubes



# 2D CODE READING PROCEDURE

WHILE WORKING WITH SAMPLES THAT HAVE BEEN STORED AT ULTRA-LOW TEMPERATURES, IT IS IMPORTANT THAT THE USED EQUIPMENT CAN WITHSTAND THESE CONDITIONS WITHOUT FAILING. THE RACK READER DR710 IS ESPECIALLY DESIGNED TO BE USED IN THESE EXTREME CONDITIONS.

Micronic conducted several tests\* with the Rack Reader DR710 to evaluate the performances of its active anti-frost system and to determine a scanning procedure for reading codes of frozen sample tubes as effective and efficient as possible.

## CODE READING PROCEDURE FOR FROZEN SAMPLE TUBES

During the tests 100 scan cycles are performed with 10 different racks coming straight from a -80°C freezer.

### Protocol

The following protocol was used for the tests:

1. Ten racks with tubes are filled with demineralized water (up to the specified working volume) and closed with screw caps using the Micronic Screw Cap Recapper CS500, 510 or 520.
2. The racks are placed in the -80°C freezer and cooled for a minimum of 24 hours.
3. Boot up PC and the Micronic Code Reading Software.
4. Connect the DR710 to a power supply and the used PC.
5. Initialize the DR710 (activate the anti-frost system by pushing the button on the front right side) and perform a test scan with an unfrozen rack. Write down rack ID.
6. The first rack with 2D Data-Matrix coded tubes is taken out of the freezer.
7. Write down the walking time.
8. The rack is scanned 10 times conform the 'scanning procedure' as described below.
  - a. The bottom of the rack and the tubes is cleaned with alcohol wipes to remove any frost from the 2D Data-Matrix codes. Make sure the wipes contain a sufficient amount of alcohol (the alcohol slowly vaporizes from the wipes making them less effective) and after that it is cleaned with a dry cloth.
  - b. Place the rack on the reader and perform a scan
  - c. Remove the rack immediately after the scanning is completed
  - d. After each scan the number of no read tubes is recorded and the 2D Data-Matrix codes are cleaned with an alcohol wipe to ensure no ice is present on the codes.
  - e. Repeat the steps above 10 times.

9. Take the next rack out of the freezer and start again with the 'scanning procedure'.

### Results

#### Anti-Frost System Performance

Three tests were conducted for all tube formats (24-, 48- and 96-well format). During each test, 10 racks were scanned after each other with approximately 10-20 seconds between the scans. This number should be used as a benchmark. In the table below are the number of erroneous codes compared to the total read codes:

Format	No read tubes	Total read tubes	Failure percentage
24-well	57	2400	2.38%
48-well	49	4800	1.02%
96-well	50	9600	0.52%

Table 1: Summary test results no read tubes compared to read tubes

### Conclusions

The active anti-frost principle of the Rack Reader DR710 shows that it is possible to scan sample storage tubes with minimal reading errors if the following conditions are met:

1. After scanning, the rack is immediately removed from the scanning surface.
  2. The scanner surface is kept clean from dry ice and water drops. Clean scanner surface and code surface before placing rack on scanner.
  3. The code surfaces are cleaned with a dastex cloth with isoproponol and after that cleaned with a dry cloth.
- During the test 10 racks were scanned after each other with approximately 10-20 seconds between the scans. This number should be used as a benchmark.
  - The tests were conducted in an environment of 22°C. The performance of the system in lower or higher temperatures is not tested.

\*Test Report TR024501 can be requested for more information.



## ABOUT MICRONIC

Our goal is to advance research by serving scientists in finding solutions that contribute to a higher quality of life. We develop and manufacture a range of Dutch-designed products to enhance the process of sample preservation and storage.

Micronic is an independent organization with its headquarters located in Lelystad, the Netherlands. Micronic produces and assembles its labware in certified Class 7 clean rooms which are located in the Netherlands and the United States. Its labware equipment is also assembled inhouse.

Micronic is an ISO 9001 and 14001 certified company. The Micronic sales, marketing and product support is organized at two sales offices: Micronic America LLC and Micronic Europe BV. The products are applied worldwide in the (research) laboratories of university hospitals, forensics, agricultural, veterinary and governmental institutes, as well as companies in biotech, food, chemical and pharmaceutical industries.

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