AHLSTROM MUNKSJÖ

# LONG-TERM PRESERVATION OF DNA

Ahlstrom-Munksjö GenSaver™

Ahlstrom-Munksjö GenSaver™ 2.0

## SPECIMEN COLLECTION CARDS

# Simple collection
# Long-term preservation
# High quality genetic profiles

Ahlstrom-Munksjö GenSaver™ and GenSaver™ 2.0 collection cards are treated with a new-to-market proprietary chemistry intended to prevent environmentally induced degradation. Our cards allow long-term preservation of DNA from biological fluids stored at ambient temperature.

## A few reasons why:

**Long-term preservation of DNA:**

The chemical treatment of our cards allows long-term ambient protection of DNA from dried matrix spots and improved qualitative and quantitative DNA recovery

**ISO 18385 compliance:**

Our cards are manufactured in accordance to the world's first international standard for forensic consumables, minimizing the risk of human DNA contamination

**High quality NGS data:**

DNA preserved on our cards can be used even after 20 years of ambient storage to generate high quality next generation sequencing data

**We meet your needs:**

Our cards are customizable and can be tailored to fully accommodate your biological fluids sampling needs


## Our solutions to your needs:

- HUMAN IDENTIFICATION
- GENOMICS
- ANIMAL IDENTIFICATION
- PLASMID SCREENING
- TRANSGENIC IDENTIFICATION

# Customizable designs for Forensics and Biobanking markets

Ahlstrom-Munksjö **GenSaver™** and **GenSaver™ Color** cards are designed for the collection, transport and storage at ambient temperature of DNA from biological fluids. The fiber-based material of these cards is made of pure absorbent fibers, impregnated with a proprietary chemical formulation intended to prevent environmentally induced degradation for long-term ambient preservation of DNA.

- **GenSaver™** - suitable for collection of blood samples
- **GenSaver™ Color** - suitable for the collection of colorless biosamples, such as saliva, buccal cells and urine.

**GenSaver™ 2.0** and **GenSaver™ Color 2.0** collection cards offer additional features, preventing the growth of microorganisms during the long-term ambient storage of DNA.

## Typical characteristics

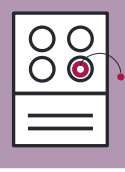
| Product | Cards/ Pack | Sample areas/card | Max. Vol loaded/ sample area (µl) | Ref. Number | Samples type | Max. storage | Applications |
|---|---|---|---|---|---|---|---|
| Ahlstrom-Munksjö GenSaver™ | 25/100 | 4 | 125 | 8.564.0002.B-G/8.564.0002.B-N | Blood | 20 years | Human Identification (direct-multiplex PCR and quantitative PCR, STR & NGS genotyping)<br>Genomics<br>Animal identification<br>Plasmid screening<br>Transgenic identification |
| | 25/100 | 2 | | 8.564.0001.B-G/8.564.0001.B-N | | | |
| | 25/100 | 1 | | 8.564.0000.B-G/8.564.0000.B-N | | | |
| Ahlstrom-Munksjö GenSaver™ Color | 25/100 | 4 | 70 | 8.565.0002.B-G/8.565.0002.B-N | Saliva<br>Buccal cells<br>Urine | 20 years | |
| | 25/100 | 2 | | 8.565.0001.B-G/8.565.0001.B-N | | | |
| | 25/100 | 1 | | 8.565.0000.B-G/8.565.0000.B-N | | | |
| Ahlstrom-Munksjö GenSaver™ 2.0 | 25/50/100 | 96 | 5 | 8.566.0003.B-G/8.566.0003.B-K/ 8.566.0003.B-N | Blood | 20 years | |
| | 25/100 | 4 | 125 | 8.566.0002.B-G/8.566.0002.B-N | | | |
| | 25/100 | 2 | | 8.566.0001.B-G/8.566.0001.B-N | | | |
| | 25/100 | 1 | | 8.566.0000.B-G/8.566.0000.B-N | | | |
| Ahlstrom-Munksjö GenSaver™ Color 2.0 | 25/50/100 | 96 | 5 | 8.567.0003.B-G/8.567.0003.B-K/ 8.567.0003.B-N | Saliva<br>Buccal cells<br>Urine<br>Bacterial suspension<br>Cell lysate | 20 years | |
| | 25/100 | 4 | 70 | 8.567.0002.B-G/8.567.0002.B-N | | | |
| | 25/100 | 2 | | 8.567.0001.B-G/8.567.0001.B-N | | | |
| | 25/100 | 1 | | 8.567.0000.B-G/8.567.0000.B-N | | | |

# Your results are a few steps away

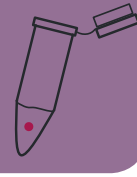
## How to - simplified collection and analysis

**1.** Collect biosample and let it dry

**2.** Punch a 1.2 mm paper disc



**3.** Add the disc to PCR reagents



**4.** Amplify genomic DNA

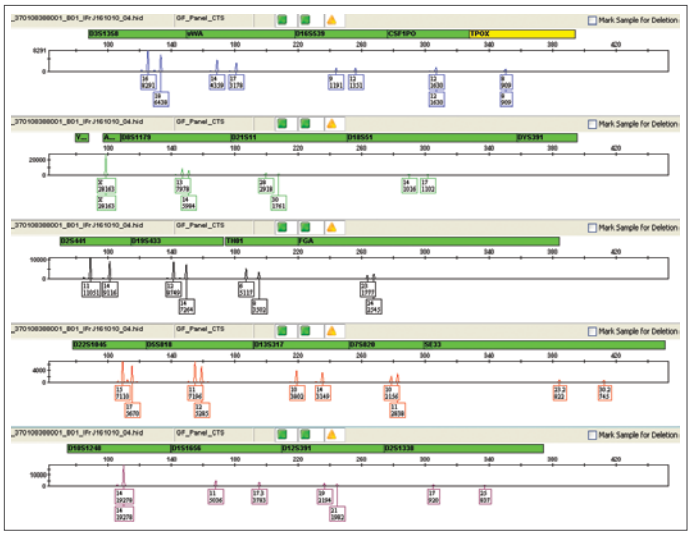
# High-quality STR Profile

These data have been obtained from genomic DNA purified from 7 µl of female human saliva spotted on GenSaver™ Color 2.0 card, air dried, then stored at room temperature for 10 years*.

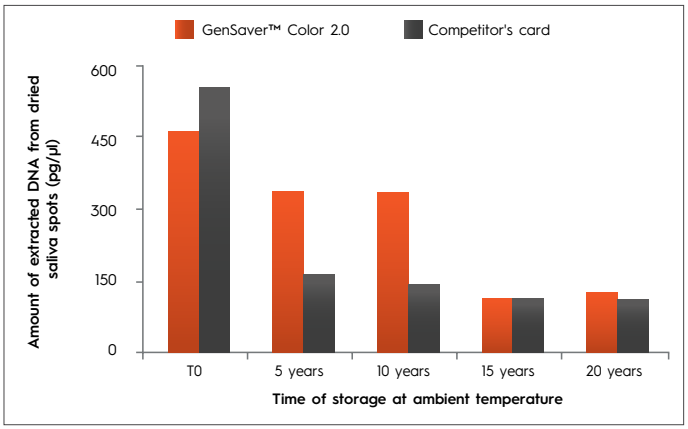
| Locus | Allele 1 | Allele 2 | Summary |
|---|---|---|---|
| DS1358 | 100% | 100% | 4 correct calls out of 4 |
| vWA | 100% | 100% | 4 correct calls out of 4 |
| D16S539 | 100% | 100% | 4 correct calls out of 4 |
| CSF1PO | 100% | N/A | 2 correct calls out of 2 |
| TPOX | 100% | N/A | 2 correct calls out of 2 |
| Yindel | N/A | N/A | 0 correct calls out of 0 |
| AMEL | 100% | N/A | 2 correct calls out of 2 |
| D8S1179 | 100% | 100% | 4 correct calls out of 4 |
| D21S11 | 100% | 100% | 4 correct calls out of 4 |
| D18S51 | 100% | 100% | 4 correct calls out of 4 |
| DYS391 | N/A | N/A | 0 correct calls out of 0 |
| D2S441 | 100% | 100% | 4 correct calls out of 4 |
| D19S433 | 100% | 100% | 4 correct calls out of 4 |
| TH01 | 100% | N/A | 2 correct calls out of 2 |
| FGA | 100% | 100% | 4 correct calls out of 4 |
| D22S1045 | 100% | 100% | 4 correct calls out of 4 |
| D5S818 | 100% | 100% | 4 correct calls out of 4 |
| D13S317 | 100% | N/A | 2 correct calls out of 2 |
| D7S820 | 100% | 100% | 4 correct calls out of 4 |
| SE33 | 100% | 100% | 4 correct calls out of 4 |
| D10S1248 | 100% | N/A | 2 correct calls out of 2 |
| D1S1656 | 100% | 100% | 4 correct calls out of 4 |
| D12S391 | 100% | 100% | 4 correct calls out of 4 |
| D2S1338 | 100% | 100% | 4 correct calls out of 4 |

| | |
|---|---|
| Total numbers of sample | 2 |
| Total of possible allele calls | 76 |
| Total correct allele calls | 76 |
| **Percentage of Accuracy**<br>N/A: Non Applicable | **100%** |

Percentage accuracy of allele calls for 20 loci determined by STR profiling of purified DNA.



Electrophoregram for the STR amplification from purified DNA.

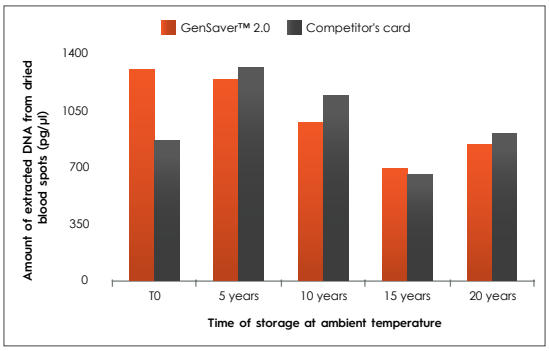



Total yield of genomic DNA quantified by real-time PCR.

# Next Generation Sequencing Data

| Ahlstrom-Munksjö card | Years of storage | Bases | ≥ Q20 | Reads | Mean Read Length |
|---|---|---|---|---|---|
| GenSaver™ 2.0 | 15 | 35 899 842 | 34 420 724 (96%) | 439 855 | 82 bp |
| | 20 | 37 970 318 | 35 669 237 (95%) | 472 610 | 80 bp |
| GenSaver™ Color 2.0 | 15 | 25 613 871 | 24 621 019 (96%) | 325 937 | 79 bp |
| | 20 | 38 027 859 | 35 628 198 (94%) | 490 048 | 78 bp |

NGS data obtained from DNA purified from blood (GenSaver™ 2.0) or saliva (GenSaver™ Color 2.0) stored at ambient temperature for 15 and 20 years. The high quantity and quality of DNA stored and extracted is correlated with high number of Reads and a Quality test (Q20) value at 95%. This high data quality is consistent and demonstrates that NGS is achievable even after long-term storage of DNA at ambient temperature on Ahlstrom-Munksjö cards.



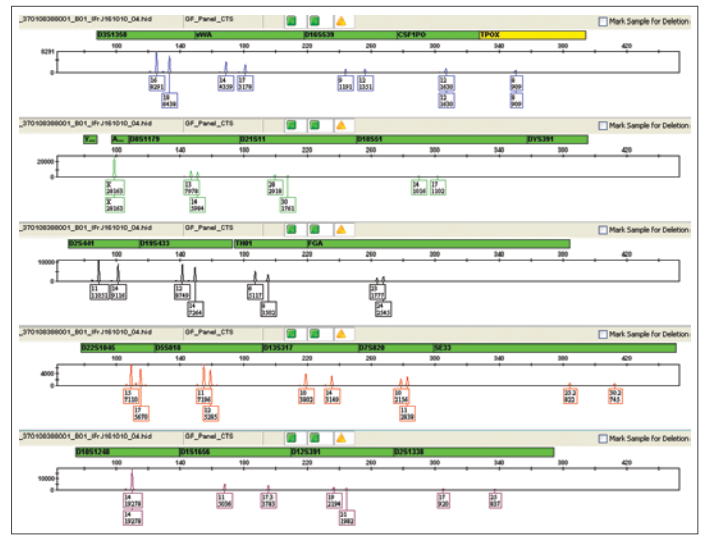

Total yield of genomic DNA purified from paper discs taken from the center of 80 µl human blood spotted on GenSaver™ card, air dried, then stored at ambient temperature for 20 years*. DNA has been quantified by real-time PCR.

* Test performed with accelerated ageing conditions. Real-time stability studies are ongoing to confirm these results.

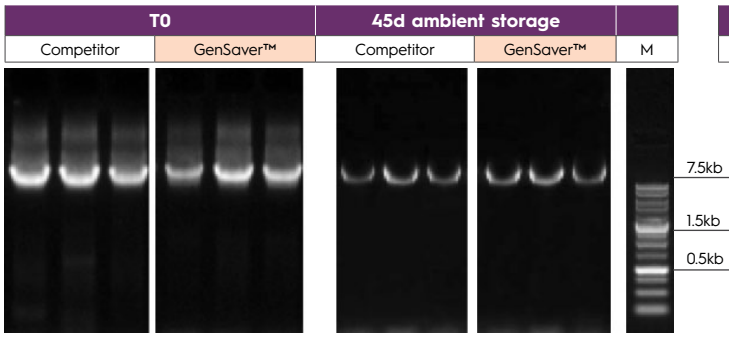
## Stability for direct DNA amplification

| Locus | Allele 1 | Allele 2 | Summary |
|---|---|---|---|
| DS1358 | 100% | 100% | 6 correct calls out of 6 |
| vWA | 100% | 100% | 6 correct calls out of 6 |
| D16S539 | 100% | 100% | 6 correct calls out of 6 |
| CSF1PO | 100% | 100% | 6 correct calls out of 6 |
| TPOX | 100% | 100% | 6 correct calls out of 6 |
| Yindel | 100% | N/A | 3 correct calls out of 3 |
| AMEL | 100% | 100% | 6 correct calls out of 6 |
| D8S1179 | 100% | 100% | 6 correct calls out of 6 |
| D21S11 | 100% | 100% | 6 correct calls out of 6 |
| D18S51 | 100% | 100% | 6 correct calls out of 6 |
| DYS391 | 100% | N/A | 3 correct calls out of 3 |
| D2S441 | 100% | 100% | 6 correct calls out of 6 |
| D19S433 | 100% | 100% | 6 correct calls out of 6 |
| TH01 | 100% | N/A | 3 correct calls out of 3 |
| FGA | 100% | 100% | 6 correct calls out of 6 |
| D22S1045 | 100% | 100% | 6 correct calls out of 6 |
| D5S818 | 100% | 100% | 6 correct calls out of 6 |
| D13S317 | 100% | N/A | 3 correct calls out of 3 |
| D7S820 | 100% | 100% | 6 correct calls out of 6 |
| SE33 | 100% | 100% | 6 correct calls out of 6 |
| D10S1248 | 100% | 100% | 6 correct calls out of 6 |
| D1S1656 | 100% | 100% | 6 correct calls out of 6 |
| D12S391 | 100% | 100% | 6 correct calls out of 6 |
| D2S1338 | 100% | 100% | 6 correct calls out of 6 |

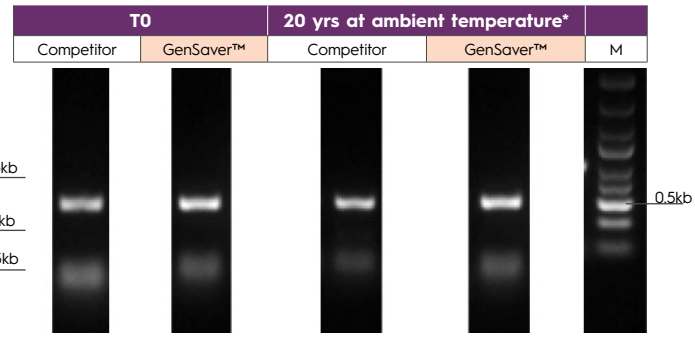
| | |
|---|---|
| Total numbers of sample | 3 |
| Total of possible allele calls | 132 |
| Total correct allele calls | 132 |
| **Percentage of Accuracy**<br>N/A: Non Applicable | **100%** |



STR Electrophoregram from direct DNA amplification from a 1.2 mm paper disc taken from the center of dried blood spots collected on GenSaver™ card.

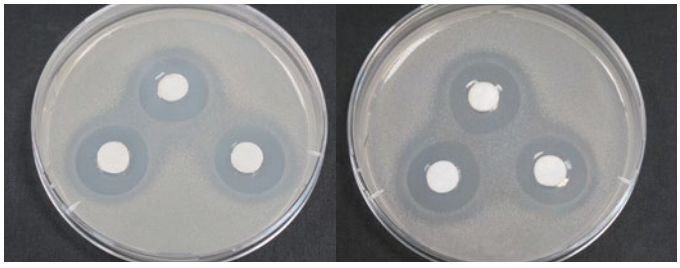



Agarose gel analysis (1XTAE, 0.8% agarose) of a direct amplification of a 7.5 kb PCR product (Beta-globin gene, single copy gene) from 1.2 mm discs taken from the center of 80 µl dried blood spots collected on GenSaver™ card.

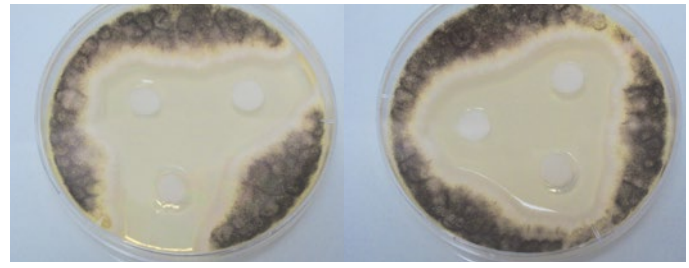



Agarose gel analysis (1XTAE, 1.2% agarose) of a direct amplification of a 500 bp PCR product (Cathepsin K gene, single copy gene) from 1.2 mm discs taken from the center of 80 µl dried blood spots collected on GenSaver™ card.

## Antimicrobial activity of GenSaver™ 2.0 and GenSaver™ Color 2.0



Zones of growth inhibition for *Bacillus subtilis* (seeded on classic nutrient medium $10^5$ CFU/ml) grown in the presence of GenSaver™ 2.0 (left) and GenSaver™ Color 2.0 (right) discs.



Zones of growth inhibition for *Aspergillus niger* (seeded on sabouraud nutrient medium $10^5$ spores/ml) grown in the presence of GenSaver™ 2.0 (left) and GenSaver™ Color 2.0 (right) discs.

Ahlstrom-Munksjö is a global leader in fiber-based materials, supplying innovative and sustainable solutions to customers worldwide. Our offerings include decor paper, filter media, release liners, abrasive backings, nonwovens, electrotechnical paper, glass fiber materials, food packaging and labeling, tape, medical fiber materials and solutions for diagnostics. Combined annual net sales are about EUR 2.15 billion and we employ 6,000 people. The Ahlstrom-Munksjö share is listed on the Nasdaq Helsinki and Stockholm. The company was formed on April 1, 2017 through the merger of Ahlstrom Corporation and Munksjö Oyj.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